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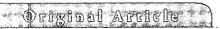
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Comparison of injuries due to lethal weapons during and after civil strife in Sri Lanka: A medico-legal study

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ABSTRACT

Background and Aims: "Injuries due to lethal weapons" has emerged as a subject of public discussion in Sri Lanka. This study was conducted to describe the nature and characteristics of injuries due to lethal weapons during civil strife and to compare those with injuries after civil strife. **Methods:** A cross-sectional study was conducted on patients reported with injuries caused by lethal weapons from 2004 to 2014. Periods before and after May 19, 2009 were considered as during and after civil strife periods, respectively. A total of 21,210 medico-legal examination forms were studied. **Results:** There were 358 (1.7%) injuries caused by lethal weapons. Of them, 41% (n = 148) were during and 59% (n = 210) were after the civil strife. During civil strife, 63% occurred during daytime (P < 0.05). Types of lethal weapons that caused injuries were sharp weapons (n = 282), explosives (n = 49), and firearms (n = 27). Of them, 32% of during and 01% of after civil strife were explosive injuries (P < 0.01). Regarding severity, 73% of during and 57% of after civil strife injuries were severe (P < 0.05). During civil strife, 34% injuries were in lower limbs (P < 0.01) and after civil strife, 37% were in upper limbs (P < 0.05). **Conclusions:** The presence of many similarities indicated that both groups learnt their basis in a society that breeds violence. During civil strife, more injuries occurred during daytime, to lower limbs by explosive weapons and after the civil strife during nighttime, to upper limbs by nonexplosive weapons. Nonexplosive lethal weapon use after civil strife needs further investigation to develop evidence-based interventions.

Key words: During and after the civil strife, injuries, lethal weapons, victims Submission: 19-07-2015 Accepted: 11-02-2016

Introduction

"Injuries caused by lethal weapons" has emerged as a subject of public discussion in the recent past. These injuries are found in community violence, military, and terrorist attacks. The lethal

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weapons causing such injuries are specially designed for offensive or defensive purposes and are capable of producing great bodily harm or death from the manner it is used or intended to be used.^[1] The weapons include knife, sword, gun, pistol, bombs, or the like.^[1] Therefore, lethal weapons causing such injuries are the weapons that are listed under the offensive weapons act of Sri Lanka, from and weapons of Sri Lanka, from and weapons of Sri Lanka, from and we weapons of Sri Lanka.

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Injuries due to explosive lethal weapons are expected in military or terrorist assaults and injuries due to nonexplosive lethal weapons are likely in community violence. Forensic physicians usually come across the injuries that are caused by lethal weapons and based on those injuries, they can ascertain the type of lethal weapons that are used in different circumstances, such as during civil strife and after civil strife.

Illegal explosive weapons and firearms are more available in the community especially during terrorism. Sri Lanka suffered from terrorism for more than three decades until it was defeated on May 19, 2009. After the civil strife, there is huge change in the society including more urbanization, industrialization, and migration and according to Athukorala and Jayasuriya, even the job opportunities have been increased after the war. However, lethal weapons were yet available among the civil community even after the civil strife. Therefore, injuries due to lethal weapons are still reported every now and then.

Further, according to the Handbook of Drug Abuse Information (2011), issued by the National Dangerous Drugs Control Board, there is a remarkable increase in the consumption of alcohol after the cessation of the civil strife in Sri Lanka in 2009, i.e., 67.1 million L of alcohol in 2006 to 75.2 million L in 2010. This may have contributed to bring about a higher number of brawls and more use of lethal weapons and resulted in injuries due to lethal weapons even after the civil strife. Therefore, there was a public discussion in the recent past, especially on the injuries caused by the lethal weapons in Sri Lanka and their control.

Further, there could not only be similarities but also significant differences in the injuries caused by lethal weapons during and after civil strife periods. These relationships could be applied in the evidence-based intervention programs of the lethal weapon injuries. Therefore, this study was conducted to describe the nature and characteristics of injuries caused by lethal weapons during the civil strife and to compare those with the injuries occurred after the civil strife.

METHODS

A descriptive cross-sectional study was conducted on patients reported with injuries caused by lethal weapons from May 19, 2004 to May 19, 2014, at identified tertiary care hospitals in Colombo and Galle, Sri Lanka. All medico-legal examination forms (MLEFs) of four Forensic Medical Officers were perused to identify the victims of lethal weapons.

The study population consisted of two groups: During civil strife and after civil strife. The 5-year period from May 19,

2004 to May 19, 2009 was considered as "during civil strife period" and the 5-year period from May 20, 2009 to May 19. 2014 was considered as "after civil strife period."

The location of the incident was classified as home or outside. Meanwhile, the time of the incident was classified as day (6 am-6 pm) and night (6 pm-6 am).

In this study, the perpetrators were classified as known (including relatives and nonrelatives) and unknown. The lethal weapons were classified as explosives and nonexplosives.

The site of the most severe injury was classified twice. First, it was classified as a lower limb or other sites and then classified as upper limb or other sites. Number of injuries was classified as single and multiple (2, 3, 4, 5, or more than 5 injuries). Type of the most severe injury was classified as cuts and other types of injuries. According to the medico-legal categorization of hurt, the nongrievous injuries were considered as "nonsevere injuries" and the grievous injuries, endangering life injuries and fatal in the ordinary cause of nature injuries were considered as "severe injuries."

Permission of relevant heads of the hospitals was obtained prior to the study. IBM-SPSS statistical package 19.0 was used in the analysis of data. Chi-square tests were performed in bivariate tests, and P < 0.05 were considered statistically significant.

RESULTS

A total of 21,210 MLEFs were perused and there were 358 (1.7%) injuries caused by lethal weapons. Of them, 41% (n = 148) were during civil strife and 59% (n = 210) were after the civil strife.

Age ranged from 1 to 84 years, mean 33.8 with standard deviation (SD) 12.9 years (mean \pm SD). Thirty-eight percent (n = 135) belonged to 20–29 years group; of them, 39% (n = 57) during civil strife and 37% (n = 78) after civil strife.

The demographic features of the victims such as sex and ethnicity during and after civil strife periods are shown in Table 1.

As seen in Table 1, 79% (n = 282) were males; during civil strife 61% (n = 90) and after civil strife 91% (n = 192). When the race of the victims of lethal weapon injuries is concerned, 79% (n = 283) were Sinhalese, 17% (n = 61) were Tamils, and 4% (n = 14) were Moor.

In relation to the race, 60% of during civil strife and 92% of after civil strife victims were Sinhalese.



(3**38**)

Features of the vicinity of occurrence of injuries due to lethal weapons such as place and time during civil strife and after civil strife periods and their associations are shown in Table 2.

As shown in Table 2, 70% (n = 249) of injuries due to lethal weapons occurred outside and rest were at home. Further, of outside incidents 72% (n = 107) during civil strife and 68% (n = 142) after civil strife.

When the time of occurrence is considered, 54% (n=193) of injuries due to lethal weapons occurred in daytime and rest were at night. According to Table 2, 63% of during civil strife and 48% of after civil strife injuries occurred in daytime and the difference was statistically significant ($\chi^2=8.093$, P=0.004<0.01). During civil strife, more victims were injured by lethal weapons in daytime.

The characteristics of the incident of assault causing lethal weapon injuries such as the perpetrator and the type of

Table 1: Features of the victims during and after civil strife periods During After Total (n=358) (n=148) n (%) (n=210) n (%) n (%) Sex Male 90 (61) 192 (91) 282 (79) Female 58 (39) 18 (09) 76 (21) Race 89 (60) 194 (92) 283 (79) Sinhala Non-Sinhala 59 (40) 16 (08) 75 (21)

Table 2: Place and time of occurrence of injuries due to lethal weapons during and after civil strife periods and their associations

	During (n=148) n (%)	After (n=210) n (%)	Total (n=358) n (%)	Р
Place				
At home	41 (28)	68 (32)	109 (30)	0.344>0.05
Outside home	107 (72)	142 (68)	249 (70)	
Time				
Daytime	93 (63)	100 (48)	193 (54)	0.004<0.01
Nighttime	55 (37)	110 (52)	165 (46)	

Table 3: Features of the incident of assaults causing lethal weapons injuries during and after civil strife periods and their associations

	During (n=148) n (%)	After (n=210) n (%)	Total (n=358) n (%)	P
Perpetrator				
Known	123 (83)	197 (94)	320 (89)	10.001<0.01
Unknown	25 (17)	13 (06)	38 (11)	
Weapon				
Explosive	48 (32)	01 (01)	49 (14)	10.000<0.01
Nonexplosive	100 (68)	209 (99)	309 (86)	

weapon used during and after civil strife and their associations are shown in Table 3.

When the type of the perpetrator who caused the lethal weapon injuries was concerned, 89% (n=320) were "known" to the victim; of them, 8% (n=29) were relatives and 80% (n=291) were nonrelatives. The remaining perpetrators (11%, n=38) were unknown to the victim. According to Table 3, 83% of during civil strife and 94% of after civil strife lethal weapon injuries were caused by a known perpetrator and this difference was significant ($\chi^2=10.479$, P=0.001<0.01). After civil strife period, the perpetrator of lethal weapon injuries was more commonly known to the victim.

According to Table 3, the types of lethal weapons used to cause injuries were explosive (14%) and nonexplosive weapons (86%). Explosive weapons were low explosives, grenades and bombs fired via heavy caliber guns, artillery, rocket grenade propeller (RGP), mortar, etc. Nonexplosive weapons were sharp weapons (79%, n = 282) and firearms (7%, n = 27). The sharp weapons used were knives, sword, "manna," and "kattha." Of them, 62% (n = 223) were light sharp weapons such as knives. The types of firearms used were handguns and rifles, during civil strife n = 14 and after civil strife n = 13. According to Table 3, 32% of during civil strife and 1% of after civil strife lethal weapon injuries occurred due to explosive weapons and this difference was significant ($\chi^2 = 75.045$, P = 0.000 < 0.01). During civil strife period, injuries due to explosive weapons were more common. In contrast, only one had got injured by explosive weapons after civil strife and that had also been an accidental blast.

Features of the lethal weapon injuries such as the site of most severe injury, number of injuries, type of most severe injury, and severity of injuries during and after civil strife periods and their associations are shown in Table 4.

When the "site of the most severe injury" was considered, 31% (n=112) were in upper limbs, 27% (n=96) in head, and 16% (n=56) in lower limbs. As shown in Table 4, 30% of during civil strife and 6% of after civil strife injuries were found in lower limbs and this difference was statistically significant ($\chi^2=39.166$, P=0.000<0.01). During civil strife period, lower limbs had a higher chance of getting injured due to lethal weapons.

According to Table 4, upper limbs were involved in 24% (n = 35) of during civil strife and 37% (n = 77) of after civil strife and this difference was statistically significant ($\chi^2 = 6.235$, P = 0.013 < 0.05). After civil strife, upper limbs had a higher chance of getting injured due to lethal weapons.



Table 4: Features of the injuries due to lethal weapons sustained during and after civil strife periods and their associations

	During (n=148)	After (n≈210)	Total (n=358)	Р
	n (%)	n (%)	n (%)	
Site				
Lower limbs	44 (30)	12 (06)	56 (16)	0.000<0.01
Other areas	101 (70)	198 (9 4)	299 (84)	
Site				
Upper limbs	35 (24)	77 (37)	112 (31)	0.013<0.05
Other areas	110 (76)	133 (63)	243 (68)	
Number of injection				
One injury	56 (38)	106 (50)	162 (45)	0.018<0.05
Multiple	92 (62)	104 (50)	196 (55)	
Type of injection				
Cuts	46 (31)	168 (80)	214 (60)	0.000<0.01
Other injection	102 (69)	42 (20)	144 (40)	
Severity				
Nonsevere	40 (27)	90 (43)	130 (36)	0.002<0.01
Severe	108 (73)	120 (57)	228 (64)	

Number of injuries sustained was 1, 2, 3, 4, 5, or more than 5. Multiple injuries (2 or more) were found in 55% (n=196). Of them, 62% of during civil strife and 50% of after civil strife victims had multiple injuries and this difference was statistically significant ($\chi^2=5.597$, P=0.018<0.05). During civil strife period, victims had a higher chance of getting multiple injuries due to lethal weapons.

When the "type of the most severe injury" was considered, 60% (n=214) were cuts, 17% (n=62) were stabs, 11% (n=39) were fractures, 7% (n=27) were firearm injuries, 5% (n=18) were lacerations, and 1% (n=04) were blast injuries such as otic and lung blasts. According to Table 4, 31% of during civil strife and 80% of after civil strife injuries were cuts and this difference was statistically significant ($\chi^2=86.406$, P=0.000<0.01). After civil strife, victims had a higher chance of getting cut injuries due to lethal weapons.

As shown in Table 4, 64% (n=228) were severe injuries (52% grievous, 4% endangering life, and 7% were fatal in the ordinary cause of nature) and rest (36%, n=130) were nongrievous. Severe injuries were found in 73% (n=108) of during civil strife and 57% (n=120) of after civil strife and this difference was statistically significant ($\chi^2=9.407$, P=0.002<0.01). During civil strife, victims had a higher chance of getting severe injuries due to lethal weapons.

Discussion

Injuries by lethal weapons such as explosives and firearms are commonly found in the activities of the underworld and terrorists. In Sri Lanka, such activities were drastically reduced with the cessation of the civil strife on May 19, 2009.

In this study, it was revealed that there were not only similarities but also significant differences in lethal weapon injuries during and after the civil strife periods. During the civil strife, lethal weapon injuries were occurred during daytime with explosive weapons to the lower limbs and after the civil strife, injuries occurred at nighttime with nonexplosive weapons to the upper limbs.

According to the "Grave Crime Abstracts of Sri Lanka Police" for the year 2011, the annual total injuries due to lethal weapons were 3141.^[7] In this study, an average of 36 cases were reported per year, and it was about 1% of the national prevalence.

Among all reported cases (21,210), there were 358 victims injured by lethal weapons and the prevalence of lethal weapon injuries was 1.7%. Of them, the number of injured victims after civil strife (59%) was common than during civil strife (41%). Although the number of injured victims of lethal weapons was more after civil strife, their severity was less and 99% were due to nonexplosive weapons such as knives.

Cases of injuries due to lethal weapons in both during and after civil strife periods were similar in many ways. It was common that the victims were Sinhalese, males of 20–29 years, assaults were carried out outside home, by a known person: the most common lethal weapon was light sharp weapons such as knives and the injuries were severe. The similarities in both groups can be interpreted as an indication that both groups took their basis from a society that breeds violence.

In this study, it was revealed that there were injuries due to three types of lethal weapons: Sharp weapons, firearms, and explosive weapons. The types of sharp weapons used to cause injuries were light sharp weapons such as knives, and heavy sharp weapons such as sword, "manna," and "kattha." Of them, majority (62%, n = 233) were light sharp weapons such as knives. The types of firearms used to cause injuries were handguns and rifles.

The types of explosive weapons used to cause injuries were low explosive bombs (homemade bombs) and high explosive bombs (grenades and bombs fired via heavy caliber guns). Homemade bombs are specially prepared in Sri Lanka to kill or chase away animals and usually cause accidental injuries. Although the heavy caliber guns such as artillery, RGP, and mortar are a kind of firearms, they fire high explosive bombs and results in injuries due to explosive weapons. In this study, there had been 49 injuries due to explosive weapons; of them, only 4 received real blast injuries such as otic and lung blasts. The remaining victims of explosive weapon injuries received abrasions, contusions, lacerations, fractures, etc.



According to the grave crime abstracts of Sri Lankan police for the year 2011, the most common lethal weapon was knives. [7] Similarly, in this study, the most severe type of injury was cuts (P = 0.00 < 0.01) and most common lethal weapon was knives (62%, n = 223).

According to the medico-legal categorization of hurt in Sri Lanka, the grievous, [8] endangering life^[8] and fatal in the ordinary cause of nature injuries were considered as "severe injuries." In this study, majority of the injuries were severe in nature because the weapons that were used were lethal.

Injuries due to lethal weapons were found at different sites of the body. When the site of the most severe injury was considered, the most common site was upper limb, then the head, and then the lower limb.

Terrorist or underworld activities were more during the civil strife period in Sri Lanka, and approximately 30,000 military personnel lost their lives, more than 25,000 became disabled, and many thousands of civilians perished due to the injuries of lethal weapons. [9] Similarly, in this study, during civil strife period, the lethal weapon injuries due to explosive weapons were more common (P = 0.000 < 0.01) and the perpetrators were mostly unknown to the victim (P = 0.001 < 0.01).

During civil strife period, lower limbs had a higher chance of getting injured due to lethal weapons (P = 0.000 < 0.05) and this could have been due to more availability of explosives including antipersonal mines during the period of war.

During civil strife period, victims had a higher chance of getting multiple injuries (P = 0.018 < 0.05) and severe injuries (P = 0.002 < 0.01) due to lethal weapons. This could have been due to more prevalence of injuries due to explosive weapons (32%) and firearms (n = 14) during civil strife period when compared to number of postwar explosive weapon injuries (1%, n = 01).

During civil strife period, there was a higher chance of getting injured during daytime (P = 0.004 < 0.01). During civil strife, people were afraid to move out in the night, and the day-to-day activities were done during daytime and may have engaged in fights and received injuries. The Liberation Tigers of Tamil Elam military defeat in May 2009 was a pivotal event in Sri Lankan history. It lifted the veil of fear that hung over daily life and impacted each and every Sri Lankan over three decades. ^[9] Therefore, after the civil strife period, people have more nightlife engagements and that could have influenced the number of nighttime injuries.

During and immediately after the civil strife, there was a cleansing of the underworld in Sri Lanka^[10] and after the civil

strife, the number of attacks by unknown perpetrators of the underworld or terrorist groups have been reduced to almost zero. Therefore, in contrast, after the civil strife, the perpetrator of the injuries caused by lethal weapons was more commonly known (P = 0.001 < 0.01).

After the civil strife, victims had a higher chance of getting nonexplosive injuries such as cuts than explosive injuries (P = 0.000 < 0.01). This could have been due to the reduction or nonavailability of illegal explosive weapons after the civil strife in Sri Lanka.

Further, after civil strife, victims had faced more multiple assaults with lethal weapons (P = 0.002 < 0.01) and this may have been due to more use of less fatal lethal weapons such as knives. After civil strife, upper limbs had a higher chance of getting injured (P = 0.013 < 0.05) and this could have been due to more defense injuries of frequently used sharp weapons such as knives.

The most striking feature found in this study was the prevalence of injuries caused by nonexplosive lethal weapons such as sharp weapons or firearms in both periods, while the injuries due to explosive weapons were almost confined to the period of civil strife. After the civil strife, there was only one blast injury and it was also an accidental blast injury.

The number of injuries due to firearms during the period of civil strife was n = 14 and after the civil strife was n = 13 and showed that the availability of the firearms was almost similar in both periods. This indicates that the illegal weapon smuggling had been continued even after the cessation of civil strife.

Conclusion

The presence of many similarities indicated that both groups learnt their basis in a society that breeds violence. However, there were several differences in the injuries caused by lethal weapons during and after the civil strife. During the civil strife, unknown perpetrators caused multiple and severe injuries to the lower limbs during daytime with explosive weapons. After the civil strife, known perpetrators caused single and nonsevere injuries to the upper limbs during nighttime with nonexplosive weapons such as knives.

The above findings can be used to formulate better policies to curb the occurrence of deaths and morbidity due to lethal weapons in Sri Lanka in the future. It is better to review the number of existing firearms and explosive weapons and provide the permission only for those who need them in order to control the severe lethal weapon injuries. Prevalence of nonexplosive lethal weapon injuries after the civil strife needs



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to be further investigated in order to develop evidence-based interventions.

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Conflicts of interest

There are no conflicts of interest.

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