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Criminal Violence in Libya: A Descriptive, Autopsy-Based Study of Deaths by Firearms in Tripoli



العنف الجنائي في ليبيا: دراسة وصفية تستند إلى تشريح الجثث للوفيات بالأسلحة النارية في طرابلس.

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Abstract

The uprisings in some Arab states during the past several years developed into armed conflicts. Therefore, the incidence of violent crimes has become more common with no reliable data on their patterns. The present study aimed to estimate the magnitude of that problem by studying the frequency and pattern of firearm deaths in Tripoli, Libya.

A retrospective descriptive study of autopsy cases of firearm deaths was conducted. The data was retrieved from medico-legal reports of cases that were referred to the Forensic Medicine Department of the Judicial Expertise and Research Center, Ministry of justice, Tripoli, Libya during two years from the 1st of January 2014 to the end of December 2015. Structured data sheets were produced.

Out of 4,342 unnatural deaths that were autopsied, 774 cases (17.82 %) were due to firearms. Males were commonly targeted. The mean age of victims was 31.7 ± 11 years with significant predominance in the middle age group. Incidence of firearm deaths in non-Libyans increased in 2015 to 8.5%. Homicidal cases represented 92.12% of cases. There was a significant relationship between manner of firing and sex ($p \leq 0.001$). In 95.9% of cases, the firing was from a far range. Rifled weapons were used in 98.32% of cases. Head and neck were targeted in 30.8% of cases.

There is a high incidence of illegal firearm use and firearm related deaths in Libya. Societal and international efforts are needed to decrease the illicit use and trafficking of such weapons.

المستخلص

تطورت الانتفاضات في بعض الدول العربية إلى اشتباكات مسلحة. وهكذا أصبحت حوادث الجرائم العنيفة أكثر شيوعاً مع عدم وجود بيانات موثوقة عن أنماطها. تهدف هذه الدراسة إلى تقدير حجم هذه المشكلة من خلال دراسة وتيرة ونمط وفيات الأسلحة النارية في طرابلس، ليبيا.

وقد أجريت دراسة وصفية بأثر رجعي من حالات تشريح الجثث الناجمة عن وفيات الأسلحة النارية. وتم استرجاع البيانات من التقارير الطبية والقانونية للحالات التي تم إحالتها إلى قسم الطب الشرعي التابع لمركز البحوث والخبرات القضائية، وزارة العدل، طرابلس، ليبيا خلال فترة عامين اعتباراً من 1 يناير 2014 وحتى نهاية ديسمبر 2015. وذلك من خلال إعداد قواعد بيانات هيكلية. ومن بين 4342 حالة وفاة غير طبيعية تم تشريحها، كانت 774 حالة (17.82%) بسبب الأسلحة النارية. وتم استهداف الذكور على الأغلب. وكان متوسط عمر الضحايا 31.7 ± 11 عاماً مع نسبة كبيرة من الفئة العمرية المتوسطة. وارتفع معدل وفيات الأسلحة النارية من غير الليبيين في عام 2015 إلى 8.5%. وتمثل حالات القتل 92.12% من الحالات. وكانت هناك علاقة ذات دلالة إحصائية بين طريقة إطلاق النار والجنس ($P \geq 0.001$). وفي 95.9% من الحالات، كان إطلاق النار من مسافة بعيدة. واستخدمت الأسلحة البنادق في 98.32% من الحالات. وتم استهداف الرأس والعنق في 30.8% من الحالات. وهناك نسبة عالية من الاستخدام غير المشروع للأسلحة النارية والوفيات المرتبطة بالأسلحة النارية في ليبيا، ما يستلزم بذل جهود مجتمعية ودولية للحد من استخدام الأسلحة والاتجار بها بصورة غير مشروعة.

Keywords: Forensic Science, Violence, Autopsy, Firearm Deaths, Libya.

الكلمات المفتاحية: علوم الأدلة الجنائية، العنف، تشريح الجثة، وفيات الأسلحة النارية، ليبيا.



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1. Introduction

Violence, with its resultant injuries, is a significant cause of death and ill health worldwide. According to the World Health Organization (WHO), injuries are responsible for the deaths of 5.8 million people all over the world each year [1]. Unfortunately, illegal and random use of firearm weapons is continuously increasing [2]. This results in the deaths of hundreds of thousands of people every year [3].

Gun-related violence is known to be more common in urban areas and in concurrence with gang violence, frequently involving juveniles or young adults [4]. Firearm related violence is not evenly distributed around the world; the magnitude of the problem varies considerably by region, political status and income [5].

In the United States, there are higher rates of firearm ownership than in other developed nations, with higher rates of firearm deaths which exceed deaths caused by Road Traffic Accidents (RTA). In contrast, rates of death from firearm injuries are lower in European countries [6]. For example, in Sweden, Finland and Denmark the rate of death from firearm injuries is around 200 per year, mostly due to suicides [7-9].

There is always an immeasurable impact of deaths caused by firearm injuries on the communities and families affected, whose lives are often changed irreversibly by these tragedies [10].

Deaths of young people weaken the work force and leave families with no main earners, which in turn is posing a great economic load on the national economy.

The risk factors associated with firearms are variable, and if promptly documented and addressed, they could decrease the problem of violent deaths [11].

Recently, there have been uprisings in several Arab states, including Tunisia, Egypt, Libya, Syria and Yemen. In Tunisia and Egypt these took the form of civil protests against police forces. However, in Libya, Syria and Yemen they developed into civil wars and armed conflicts. This led to the deterioration of law enforcement and justice. Therefore, the incidence of violent crimes with gunshot injuries has become progressively more common [12].

Libya is the second largest country in Africa. Its population is known to be of diverse composition made up of

many nationalities. Following the Libyan armed uprising in February 2011, foreign intervention, in the form of NATO airpower, supplied fighting groups with weapons and missiles to defeat the Libyan regime [13]. Since that time, there has been an increased incidence of the illegal use of firearms. This has resulted in an incidence in firearm injuries and deaths with no reliable official data on the numbers or patterns of such cases [14].

The present study aimed to estimate the magnitude of the problem of firearm injuries in Tripoli (the capital of Libya) by studying the frequency of firearm related deaths as well as identifying and classifying the pattern of such injuries.

2. Subjects and Methods

2.1 Study Design

A two year retrospective descriptive case series study of autopsy cases of firearm induced deaths was conducted. The data was retrieved (after official approval) from the medico-legal reports of all cases of firearm related deaths that were referred for autopsy to the Forensic Medicine Department of the Judicial Expertise and Research Center, Ministry of justice, Tripoli (Libya) during the two year period from the 1st of January 2014 to the end of December 2015.

For the purpose of data collection, the official records of the autopsied subjects were thoroughly reviewed to fulfill a well-structured data sheet, which was divided into two parts:

1. The first part comprised socio-demographic data of the victims such as age, sex, nationality and residence.
2. The second part of the sheet entailed the manner of death (homicidal, accidental or suicidal), type of weapon used, range of firing, number of wounds, site of entry and exit wound, if not retained.

2.2 Data Processing and Analysis

Data were fed into the computer and analyzed using IBM SPSS software package version 20. Qualitative data were described using number and percent, while quantitative data were described using mean and standard deviation. The level of significance was set at p value <0.05 . Chi-square test was used for categorical variables; Fisher's



Exact or Monte Carlo correction was used for Correction of chi-square when more than 20% of the cells had an expected count less than 5. For normally distributed quantitative variables, student t-test was used to compare between two studied groups. The given graphs were created using Microsoft excel software 2010.

3. Results

During the study period (from January 2014 to the end of December 2015), a total of 4,342 dead bodies were brought to the Forensic Medicine Department of the Judicial Expertise and Research Center, Ministry of justice, Tripoli, for postmortem examination. Out of those 4,342 unnatural deaths, 774 (17.82 %) deaths were due to firearm injuries.

During 2014, out of 2105 autopsies, 21.71% ($n=457$) deaths were identified to be due to firearms while during 2015, this number decreased to 14.17% ($n=317$) out of 2,237 total number of deaths.

Out of 457 victims during 2014, 448 (98%) were male and nine were female (2%), with a male to female ratio of 49.7:1. In 2015, this ratio decreased to be 27.8:1 as males

constituted 96.5% (306 subjects) and 11 females (3.5%).

Among all cases, the minimum and maximum ages of victims were one year and 95 years, respectively. The mean age was found to be 31.7 ± 11 with significant predominance of the middle aged group during both years. (Table-1).

During the study period, there were 414 cases (53.48%) out of 774 cases of firearm injuries that occurred in urban areas, while 360 cases (46.5%) occurred in rural areas with a significant difference between their frequencies. ($p = 0.03$).

The highest number of firearm crimes, 203 (26.22%), occurred in the winter. In summer, 201 cases (25.96%) occurred, while 199 cases (25.71%) occurred in spring. Finally, in autumn, there were 171 cases (22.09%). There was no significant difference between these results.

For the nationality of victims, Table-2 shows that the incidence of firearm deaths in non-Libyans increased in 2015 to be 8.5%.

Regarding the manner of death, out of 774 firearm deaths, 92.12% ($n=713$) were declared to be homicidal, 6.85% ($n=53$) were accidental and 1.03% ($n=8$) were suicidal. There was a significant relationship between manner

Table 1- Distribution of the studied cases according to age groups of the victims over the two years.

Age group (years)	2014		2015	
	No	%	No	%
<19	47	10.3	24	7.6
20-39	329	72	229	72.2
40-59	74	16.2	54	17
>60	7	1.6	10	3.2
Total	457	100	317	100

Table 2- Distribution of the studied cases by nationality over the two years.

Nationality	2014		2015	
	No	%	No	%
Libyan	437	95.6	290	91.5
Chadian	3	0.7	6	1.9
Ghanaian	3	0.7	2	0.6
Egyptian	3	0.7	4	1.3
Algerian	1	0.2	-	-
Moroccan	3	0.7	-	-
Non-Libyan				
Mali	1	0.2	3	0.9
Nigerian	2	0.4	4	1.3
Sudanese	2	0.4	6	1.9
Pakistani	1	0.2	-	-
Bangladeshi	1	0.2	-	-
Syrian	-	-	2	0.6
Total	457	100	317	100



of death and sex where $p \leq 0.001$, and it was noticed that all suicidal cases were among males. On the other hand, females outnumbered males among cases of accidental firing (Table-3).

Generally, the cause of death was determined to be due to shock and hemorrhage in 256 cases (33.07%) and due to injury to vital organs in 518 cases (66.93%).

Entry wounds were identified on the basis of their specific appearance: blackening, smoothening and burning were present in cases of close range of firing. Inverted margins and marginal abrasions were seen in distant range firing, while muzzle impact was present in contact firing.

In the largest number (95.9%) of cases, the firing was from a far range (743 cases out of 774). Contact firing was

seen only in 9 cases (1.16%). Firing was from close range in 22 cases (2.84%) cases. Rifled weapons were used in 761 cases (98.32%), while shotguns were used in 1.68% of cases ($n= 13$). There was a significant relationship between the type of weapon and range of discharge (Table-4).

Among 774 studied cases, it was noticed that the number of entry wounds of firearm missiles was less than 5 in 736 cases (95%), while it exceeded 10 in a small number of cases (8 cases, 1%), (Figure-1).

The head and neck were targeted in one third of cases (30.8%), followed by the chest in 23% ($n=178$) (Figure-2).

Table-5 shows that there was a significant relation between the site of exit and the site of entrance of firearm projectiles.

Table 3- Relation between the manner of death and sex.

Sex	Manner of Death			Total
	Homicidal	Suicidal	Accidental	
Male	709	8	37	754
Female	4	0	16	20
Total	713	8	53	774

$X^2 = 23.8, p \leq 0.001$

Table 4- Relation between the type of weapon used and range of discharge.

Type of weapon	Range of Discharge			Total
	Far	Contact	Close Range	
Rifled	735 (96.6%)	7 (0.9%)	19 (2.5%)	761 (100%)
Shotgun	9 (69.2%)	1 (7.7%)	3 (23.1%)	13
Total	744	8	22	774

$X^2 = 25.7, p \leq 0.001$

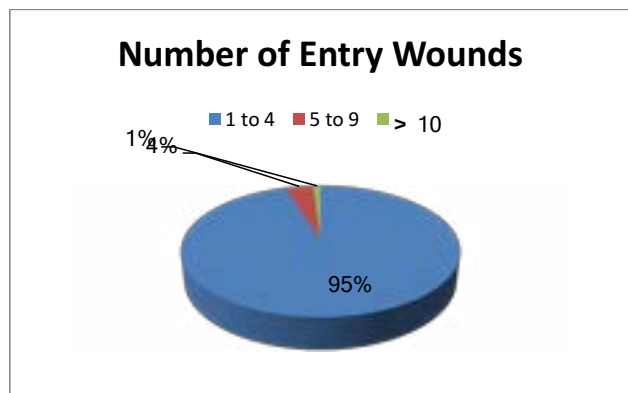


Figure 1- Distribution of the studied cases by the number of inlets of firearm projectile.

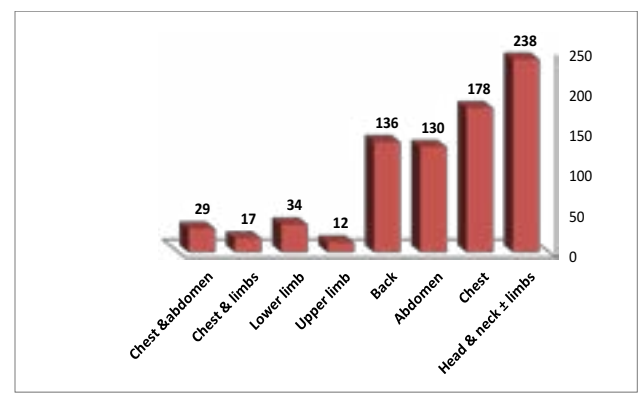


Figure 2- Distribution of the studied cases by the site of entrance of firearm projectile.

Table 5- Relation between the site of entrance and site of exit of firearm projectiles.

Site of Entrance	Site of Exit									Total
	Head and neck ± limbs	Chest	Abdomen	Retained	Back	Upper limb	Lower limb	Chest and Limbs	Chest and abdomen	
Head and neck ± limbs	191	0	0	47	0	0	0	0	0	238
Chest	0	0	0	71	96	11	0	0	0	178
Abdomen	0	0	0	25	105	0	0	0	0	130
Back	0	43	32	34	0	0	0	15	12	136
Upper limb	0	0	0	5	0	7	0	0	0	12
Lower limb	0	0	0	8	0	0	26	0	0	34
Chest and limbs	0	0	0	5	3	4	5	0	0	17
Chest and abdomen	0	0	0	21	8	0	0	0	0	29
Total	191	43	32	216	212	22	31	15	12	774

$$\chi^2 = 26.6, p \leq 0.001$$

4. Discussion

Firearm Injuries are among the major health problems that severely affect health-care systems and criminal justice. Firearms are used in more than 25% of all assaults, over 60% of all homicides and almost half of all suicidal cases, according to studies from the United States and other developed countries [15].

In spite of the magnitude of this problem, little is known about the pattern of firearm injuries in Arab countries. The current study was carried out to investigate the pattern of firearm injuries in Tripoli (Libya) retrospectively by the autopsy reports of the victims who died due to firearm injury.

During the period of the present study (two years), a total of 4,342 dead bodies were brought to the Forensic Medicine Department of the Judicial Expertise and Research Center, Ministry of justice, Tripoli (Libya) for postmortem examination. Out of those, 774 (17.82 %) deaths were due to firearm injuries. That incidence is higher than that was recorded in other developing countries like India, as the National Crime Records Bureau reported a total of 12.2

% of people murdered by firearms in 2008 [16]. The relatively high incidence of firearm induced deaths in Libya may be explained by the sudden flood of small firearms into such a previously peaceful country where gun ownership for civilians was unusual for decades.

On the other hand, studies in the United States and other developed countries reported that firearms are used in more than 25% of all assaults and over 60% of all homicides [15].

In a country like Pakistan, where there is tribal culture and unstable non-secured borders with Afghanistan, almost all types of sophisticated firearm weapons are trafficked. Therefore, up to 47.05% of autopsy cases were identified to be due to firearms, according to a study that was carried out in 2011 and 2012 [17].

In the current study, males were proved to be at higher risk of firearm deaths. This was in agreement with multiple previous studies [17-19]. That high proportion of firearm deaths among males could be explained by their gender role which forces them to be exposed to quarrels and the



outside environment more than females.

A significant predominance of the middle-aged group (20-39 years) among firearm fatalities was noticed in the present study. This finding disagrees with the traditional theory of “adolescent risk taking” [19-20]. However, on the other hand, we cannot ignore the large discrepancies in behaviors between different population groups. Even modern researchers and theorists discard internal biological (i.e., neurological) and developmental (i.e., risk taking) traits in favor of external socioeconomic conditions (unemployment, absence of law, discrimination, etc.) [21].

The current study illustrated that most cases (53.48%) of firearm deaths occurred in urban areas of Libya, which may be due to armed conflicts based on political causes as well as violent street crimes [22]. Multiple previous studies in different countries showed similar results [17, 19, 22].

In the present study, the high rate of homicidal deaths (92.11%) in a civilized city like Tripoli raises a question marks over the police authority and its ability to control such crimes. There was a significant relationship between manner of death and sex, as it was noticed that all suicidal cases were among males while females outnumbered males among cases of accidental firing.

Generally, the cause of death was determined to be an injury to vital organs in 66.93% of cases. The head was the body part most exposed to injury, which denoted the intention of homicide rather than suicide (putting into consideration the far range of firing and/or multiple entry wounds) [22].

5. Conclusion

There is a high incidence of illegal firearm use in Libya, especially among young age groups. Our study suggests that the illegal current trafficking of firearms in Libya resulted in a high rate of deaths by such weapons. There is a need to increase local and international efforts to reduce this.

Proper policies and strategies regarding eradication of social evils by prompt judiciary actions should be made to bring down the rising graph of homicidal firearm deaths. Nevertheless, it should be considered that increasing public awareness, good education and career opportunities are most protective against criminal acts in any community.

6. Limitation of the Study

The study concerned only firearm deaths that were referred to forensic examination in Tripoli, as there were no valid national databases on such deaths in Libya. Similarly, there were no official data on non-forensic firearm deaths that occurred without reporting to the concerned authorities.

Other types of violent deaths like bomb blasts and burns are not included in the present study though they are common in Libya. In spite of these limitations, the study delivers valuable information on the pattern of firearm-related deaths in Libya. In addition, it provides some approaches to reduce these crimes.

Ethical Approval

This study followed the ethical guidelines of the Ethical Committee of Alexandria University and official approval was obtained from the concerned authorities in Libya before the collection of data.

Conflict of Interest

There are no conflicts of interest related to the publication of this paper.

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References

1. Injuries and violence: the facts [database on the Internet]. WHO. 2010 [cited 14/10/2017]. Available from: www.who.int/violence_injury_prevention/en/
2. Rawson B. Aiming for prevention: medical and public health approaches to small arms, gun violence, and injury. *Croat Med J.* 2002;4:379-85.
3. Miller M, Azrae I, Hemen way D. Rates of house hold firearm owner ship and homicide across US regions and states, 1988–1997. *Am J Public Health.* 2002;12:1988-93. <https://doi.org/10.2105/AJPH.92.12.1988>
4. Bridges F, Kunselman J. Gun availability and use of guns for suicide, homicide, and murder in Canada. *Percept Mot Skills.* 2004;2:594-8. <https://doi.org/10.2466/>



- [pms.98.2.594-598](#)
5. Christoffel K. Firearm injuries: epidemic then, endemic now. *Am J Public Health*. 2007;4:626-9. <https://doi.org/10.2105/AJPH.2005.085340>
 6. Miller M, Azrae I, Hemenway D. The epidemiology of case fatality rates for suicide in the North east. *Ann Emerg Med*. 2004;723-30. <https://doi.org/10.1016/j.annemergmed.2004.01.018>
 7. Karlsson T, Isaksson B, Ormstad K. Gunshot fatalities in Stockholm, Sweden with special reference to the use of illegal weapons. *J Forensic Sci*. 1993;6:1409-21. <https://doi.org/10.1520/JFS13545J>
 8. Thomsen J, Albrektsen S. An investigation of the pattern of firearm fatalities before and after the introduction of new legislation in Denmark. *Med Sci Law*. 1991;2:162-6. <https://doi.org/10.1177/002580249103100213>
 9. Mattila V, Makitie I, Pihlajamaki H. Trends of hospitalization in firearm -related injury in Finland from 1990 to 2003. *J Trauma Acute Care Surg*. 2006;5:1222-7. <https://doi.org/10.1097/01.ta.0000197179.50226.1d>
 10. Coyne-Beasley T, Lees AC. Fatal and nonfatal firearm injuries in North Carolina. *N C Med J*. 2010;71(6):565-8.
 11. Kieltyka J, Kucybala K, Crandall M. Ecologic factors relating to firearm injuries and gun violence in Chicago. *J Forensic Leg Med*. 2016 Jan;37:87-90. <https://doi.org/10.1016/j.jflm.2015.11.003>
 12. Lutterbeck D. Arab uprisings, armed forces, and civil-military relations. *Armed Force Soc*. 2013;39:28-52. <https://doi.org/10.1177/0095327X12442768>
 13. Dau A, Tloba S, Daw M. Characterization of wound infections among patients injured during the 2011 Libyan conflict. *East Mediterr Health J*. 2013;19:356-64. <https://doi.org/10.26719/2013.19.4.356>
 14. Levine A, Shetty P. Managing a front-line field hospital in Libya: description of case mix and lessons learned for future humanitarian emergencies. *Afr J Emerg Med* 2012;2:49-52. <https://doi.org/10.1016/j.afjem.2012.01.005>
 15. Humayun M, Khan D, Zaman F, Khan J, Khan O, Z P. Analysis of homicidal deaths in district Di Khan: an autopsy study. *J Ayub Med Coll Abbottabad*. 2009;21(1).
 16. NCRB (National Crime Records Bureau). 2009. Crime in India: 2008. New Delhi: NCRB, Ministry of Home Affairs. <http://ncrb.nic.in/cii2008/home.htm>
 17. Mirza C, Khan A, Malik L, Malik M, Parveen K. An Autopsy Based Study of Pattern of Firearm Injuries in Karachi, Pakistan. *Emergency Med*. 2013;3:165.
 18. Agha S, Khan O, Khan J, Khan D, Raja A. Homicide pattern in District Haripur. *Gomal J Med Sci*. 2012;10:67-70.
 19. Hagraas A, Kharoshah M. Medico-legal evaluation of firearm injuries during the period from 2005 to 2010 in the Suez Canal Area, Egypt: A retrospective study. *Egypt J Forensic Sci*. 2012;2:1-10. <https://doi.org/10.1016/j.ejfs.2012.01.002>
 20. Males M. Does the adolescent brain make risk-taking “inevitable?” A skeptical appraisal. *J Adolescent Res*. 2009;24(1):3-20. <https://doi.org/10.1177/0743558408326913>
 21. Gould S. *The mismeasure of man*. New York NY: Norton; 1981
 22. Daw M, El-Bouzedi A, Dau A. Libyan armed conflict 2011: Mortality, injury and population displacement. *Afr J Emerg Med*. 2015;5:101-7. <https://doi.org/10.1016/j.afjem.2015.02.002>

