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Violent Deaths in Postmortem Cases in the West Bank in the Years 2013-2023: A Retrospective Study

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ABSTRACT: Manner-specific mortality is an important measure for evaluating the health of a population. Violence-related deaths in Palestine is a neglected topic in local studies. We aimed to analyze the epidemiological patterns of violence by examining manner-specific mortality in postmortem cases from the northern region of the West Bank-Palestine. Additionally, we sought to identify the risk factors associated with social violence. We reviewed and analyzed autopsy reports stored in the Forensic Medicine Institute's database at An-Najah National University from 2013 to 2023. The study focused on deaths caused by violence, which were categorized based on the manner of death: intentional (homicide or suicide), unintentional (accidental), and political (incidents related to war). Out of 1101 cases, 316 (28.7% were attributed to political violence, which was primarily linked to the Israeli occupation; 94.9% were males, 69.1% were young adults, and 49.8% originated from urban areas. In the remaining 785 cases, 367 (46.8%) were deaths related to social violence, with 33.4% being homicides and 12% being suicides. The main causes of death related to social violence were gunshot wounds (46.6%), hanging (21.3%), and stab wounds (13.6%). Social violence was more prevalent among males (OR=2.220, p

Keywords: Violence, Youth and Emerging Adults, Homicide, Firearms and Violence.

Introduction

The most fundamental objective of public health is to ascertain facts about mortality rates. The analysis of mortality data is a vital aspect of public health, as it offers valuable insights into the health status of various communities and helps to identify persistent risk patterns in specific regions (1). Manner-specific mortality is, therefore, an essential metric for assessing population health. Additionally, global health concerns remain a significant issue, particularly in terms of violence-related mortality (2).

Violence is a significant challenge for countries around the world, inflicting devastating impacts on individuals, families, and communities. According to the World Health Organization's (WHO) Global Status Report on Violence Prevention 2014 (3), more than 1.3 million people die from violence each year, accounting for nearly 2.5% of all deaths worldwide. The same report highlights that homicide ranks as the third most common cause of violent death in men and the fourth most common cause of death overall (4). Therefore, violence has become a global public health priority (5,6),recognized as a significant and growing health problem that can be prevented and its impact reduced (7). To effectively prevent deaths due to violence, it is important to address the underlying facts. Therefore, the World Health Organization (WHO) called for enhanced capacity to collect data systematically on the magnitude, scope, characteristics, and consequences of violence, at the local, national, and international levels (5). Such data can be collected from death certificates, medical examiner reports, law enforcement reports, and from secondary sources such as homicide and hospital data.

Deaths occurring outside hospitals without medical attention make it challenging to determine the cause of death, limiting usefulness of registration data for research and policy. Autopsies can serve as alternative sources to address this issue effectively. The lack of a unified system and incomplete death registration in Palestine are hindering the monitoring of violent deaths in the region. This makes it difficult to accurately track and report on incidents of violence, which is crucial for understanding the situation and working towards solutions (8,9).

In the Palestinian context, most studies on violence focus on gender-based violence. Palestinian women have been subjected to historical political and gender-based violence (10), leading to high levels of anxiety and a severe experience of neighborhood violence and disorder (11). Approximately one-third of Palestinian women experience various forms of violence (12). Mortality related to violence among Palestinians is a neglected topic in local health. The absence of such data is an important limitation in developing and implementing policies to prevent violence among Palestinians. We aimed to analyze the epidemiological patterns of violence by examining manner-specific mortality in postmortem cases from the northern region of the West Bank-Palestine. Specific objective was to determine the risk factors associated with social violence. The results of this study can serve as a benchmark to measure future progress and raise awareness about violence as a local health problem.

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Methods

Study design, setting, and population

This retrospective study involved a review of medical records of autopsied cases that occurred between January 2013 and December 2023 in the north of the West Bank-Palestine. Cases that were referred to the Forensic Medicine Institute (FMI) at An-Najah National University in Nablus, Palestine from mainly the north of the West Bank between January 2013 and December 2023. FMI is one of two institutes established by the Palestinian Authority to handle cases in the West Bank. It was established in 2006 to cover the northern governorates in the West Bank (6 governorates including the following cities; Nablus, Tulkarm, Qulqilia, Jenin, Salfiet and Tobas) and included postmortem cases from the northern region, serving approximately 50% of Palestinians. Some cases were also referred to institutions from other regions, such as Ramallah, Jericho, Hebron, and Bethlehem. There were a total of 1105 postmortem cases included during the study period. The study excluded cases from the Gaza Strip(n=4 cases). The cases of homicide by political occupation (n=316) underwent only external examination in hospitals, leaving 785 cases unpolitical. Given a total population of 1101, with a margin of error of 5% and a confidence level of 95%, the minimum required sample size was 288 for a proportion of 50%.

Variable definitions

Autopsies were performed by forensic pathologists and involved a review of the person's medical history gathered from family members and medical records (when available). The process included an external examination, an internal examination of all major organ systems through dissection, and additional studies such as histology, microbiology, and toxicology in specific cases determined by the forensic pathologist. The final autopsy reports, which included information on the person's age, gender, place of residence, cause and manner of death, as well as any pre-existing illnesses, symptoms, healthcare-seeking behavior, medications used, and hospital admissions, were stored in the database of the forensic medicine institute. The manner of death was divided into intentional (homicide or suicide), unintentional (accidental), natural, or undetermined. The cause of death refers to the actual mechanism that leads to a person's death (13,14). The study focused on deaths caused by violence, which were categorized based on the manner of death: intentional (homicide or suicide), unintentional (accidental), and incidents related to war (political).Factors studied were gender (male, female), location (divided into city, village, and refugee camps), area in the West Bank (north middle, south), age (≤5 years, 6-17, young adults aged18-40, late adults >40), and seasons (summer, autumn, winter, spring).

Data analysis

Statistical Product and Service Solutions (SPSS), Version 27 (IBM Corp., Armonk, NY: IBM Corp.) was used for data analysis. Categorical data were described using percentages. Binary logistic regression analysis model was used to assess the relative risk of social violence by calculating odds ratios (OR) and 95% confidence intervals (CI) for risk factors. A p-value of less than 0.05 was considered statistically significant. The model aimed to study the association of social violence with gender (male, female) and location (refugee camp, city, village) and was adjusted to the area in the West Bank (north, middle, south), age groups (≤5 years, 6-17, young adults 18-40, late adults > 40), and seasons (summer, autumn, winter, spring).

Results

General characteristics of post-mortem cases

There were a total of 1101 postmortem cases included during the study period. The majority of post-mortem cases were males (82.7%). The highest percentage of cases fell within the age range of 18 to 40 years (57.2%), followed by those over 40 years old (25.2%). Most of the cases were from the northern area of the West Bank (79.7%) and from rural areas (53.3%). For more detailed information, please refer to (Table 1).

Table (1): General characteristics of post-mortem cases between 2013 and 2023 (n=1101)

	Category	n(%)
Gender	Male	911(82.7)
	Female	190(17.3)
Age (years)	0-5	55(5.0)
	6-17	132(12.0)
	18-40	630(57.2)
	>40	277(25.2)
Location	City	389(35.5)
	Village	587(53.3)
	Camp	124(11.2)
Area in the West Bank	South	101(9.2)
	North	877(79.7)
	Middle	121(11)
Season	Winter	239(21.7)
	Spring	241(21.9)
	Summer	254(23.1)
	Autumn	367(33.3)

The epidemiology of manner of death between cases related to social issue

Out of 1101 cases, 316 (28.7%) were related to political conflict, and 785 cases were related to none political (social issues). Natural death was the leading manner of death, accounting for 39.9% of cases, followed by homicide (33.4%), accidents (14.8%), and suicide (12%). The data revealed that males had the highest death rates among all manners of death. The most predominant age group among all manners of death was those aged between 18 and 40. Moreover, 28.7% of suicidal cases were during autumn, while 36.3% of homicidal cases were during summer. Cases from rural areas accounted for more than half of the homicide and suicide cases (59.2% and 61.7% respectively). (Table 2) provides a comprehensive breakdown of the epidemiology of the different manners of death.

Table (2): Epidemiology of manner of death in post-mortem cases between 2013 and 2023

	Category	None political cases				
		Natural n(%)	Suicide n(%)	Homicide n(%)	Accidental n(%)	Total n(%)
All cases		313 (39.9)	94 (12.0)	262 (33.4)	116 (14.8)	785(71.3)
Gender	Male	232 (74.1)	71 (75.5)	227(86.6)	81 (69.8)	611 (77.8)
	Female	81 (25.9)	23 (24.5)	35 (13.4)	35 (30.2)	174 (22.2)
Age (years)	0-5	32 (10.3)	0(0.0)	9 (3.4)	14 (12.1)	55 (7.0)
	6-17	16 (5.1)	18 (19.4)	25 (9.5)	16 (13.8)	75 (9.6)
	18-40	136 (43.6)	61 (65.6)	163 (62.2)	55 (47.4)	415(53.0)
	>40	128 (41.0)	14 (15.1)	65 (24.8)	31 (26.7)	238 (30.4)
Season	Winter	70 (22.4)	26 (27.7)	46 (17.6)	26 (22.4)	71(22.5)
	Spring	75 (24.0)	24 (25.5)	56 (21.4)	35 (30.2)	51(16.1)
	Summer	74 (23.6)	17 (18.1)	95 (36.3)	29 (25.0)	39(12.3)
	Autumn	94 (30.0)	27 (28.7)	65 (24.8)	26 (22.4)	155(49.1)
Location	City	101 (32.3)	29 (30.9)	66 (25.2)	36 (31.0)	232 (29.6)
	Village	189 (60.4)	58 (61.7)	155 (59.2)	70 (60.3)	472 (60.1)
	Camp	23 (7.3)	7 (7.4)	41 (15.6)	10 (8.6)	81 (10.3)

Factors related to violence

There were 316(28.7%) cases related to political violence due to occupation, these cases were not subjected to a complete autopsy, but only external examination. Social violence accounted for 46.8% of post-mortem cases. The data showed that majority of the social and political violence cases were males (84.2% and94.9%, respectively). Moreover, 59.4% of social violence cases were from rural areas, 63.4% were individuals aged between 18 and 40 years, and 31.6% of the cases happened during summer. On the other hand, 49.8% of political violence cases were from cities, 69.1% fell within the age range of 18 to 40 years, and the highest percentage of cases happened during autumn (49.1%). For more detailed information, please refer to (Table 3).

Table (3): Factors related to violence in post-mortem cases between 2013 and 2023

	Category	Violence n(%)	
		Social violence	Political violence
All cases		367 (46.8)	316 (28.7)
Gender	Male	309 (84.2)	300(94.9)
	Female	58 (15.8)	16(5.1)
Age (years)	0-5	10 (2.7)	0(0.0)
	6-17	43 (11.7)	57(18.3)
	18-40	232 (63.4)	215(69.1)
	>40	81 (22.1)	39(12.5)
Season	Winter	75 (20.4)	71(22.5)
	Spring	81 (22.1)	51(16.1)
	Summer	116 (31.6)	39(12.3)
	Autumn	95 (25.9)	155(49.1)
Location	City	98 (26.7)	157(49.8)
	Village	218 (59.4)	115(36.5)
	Camp	51 (13.9)	43(13.7)

Causes of death related to social violence

Specific causes of death related to social violence are displayed in Table 4. Gunshot was the leading cause of death among all causes related to social violence (46.6%) followed by hanging (21.3%), stab wounds (13.6%) and being hit by others (4.4%).The most common cause of death among females was hanging (31.0%) followed by gunshot (27.6%). However, the most common cause of death among males was gunshot (50.2%) followed by hanging and stab wounds (19.4% and 13.9%, respectively). For the location, it was found that gunshot was the most common cause of death in refugee camps, cities and villages (62.7%,48.0% and 42.2% respectively); however, it is important to note that most cases of gunshots occurred in villages (92 cases) (Table 4).

Table (4): Causes of deaths related to social violence.

Cause of death	Total n(%) n=785	Violent cases n (%) n=367	Gender		Location		
			Males n (%)	Females n (%)	Camp n (%)	City n (%)	Village n (%)
Gunshot	171(21.8)	171(46.6)	155(50.2)	16(27.6)	32(62.7)	47(48.0)	92(42.2)
Hanging	78 (9.9)	78(21.3)	60(19.4)	18(31.0)	6(11.8)	21(21.4)	51(23.4)
Stab wound	51 (6.5)	51 (13.9)	43(13.9)	8(13.8)	8 (15.7)	11(11.2)	32(14.7)
Poison	28 (3.6)	10 (2.7)	8(2.6)	2(3.4)	1(2.0)	2(2.0)	7(3.2)
Hit by others	16 (2)	16 (4.4)	13(4.2)	3(5.2)	2(3.9)	3(3.1)	11(5.0)
Falling down	31 (3.9)	8 (2.2)	6(1.9)	2(3.4)	1(2.0)	4(4.1)	3(1.4)
Burning	19 (2.4)	6 (1.6)	4(1.3)	2(3.4)	0(0.0)	2(2.0)	4(1.8)
Drowning	15 (1.9)	2 (0.5)	1(0.3)	1(1.7)	0(0.0)	1(1.0)	1(0.5)
RTA*	10 (1.3)	2 (0.5)	2(0.6)	0(0.0)	0(0.0)	0(0.0)	2(0.9)
Smothering	5 (0.6)	5 (1.4)	2(0.6)	3(5.2)	0(0.0)	5(5.1)	0(0.0)
Throttling	7(0.9)	7 (1.9)	6(1.9)	1(1.7)	0(0.0)	2(2.0)	5(2.3)
Others	354(45.2)	11 (3.0)	9 (2.8)	2 (3.4)	1(2.0)	0(0.0)	10(4.7)
Total	785 (100)	367 (46.8)	309(84.2)	58(15.8)	51(13.9)	98(26.7)	218(59.4)

Note. Abbreviations. RTA: Road traffic accidents.

Adjusted binary logistic regression for the risk factors associated with social violence

A total of 316 incidents of political violence were not included in binary logistic analysis since they could have potentially influenced the final outcome. Social violence is more significantly prevalent among males than females (OR=2.220, p<0.001), and among city dwellers (OR=1.816, p<0.021) and refugees (OR=2.016, p<0.012) than village dwellers. Social violence was less prevalent in the middle (OR=0.318, p<0.038) than the north of the West Bank. On the other hand, violence was less prevalent in children aged <5 years (OR=0.161, p<0.001) and individuals aged >40 years (OR=0.191, p<0.001) than young adults (aged 18 and 40 years). It was more prevalent in summer (OR= 1.646, p<0.020) and spring (OR= 1.594, p<0.024) compared to winter (Table 5).

Table (5): Adjusted binary logistic regression for the risk factors associated with violence among postmortem cases

Social violence Yes, is the reference category	**Category**	**aOR**	**95%CI**	**P-value**
Gender	Male	2.220	1.525-3.231	<0.001*
	Female	1		
Location	Refugee Camp	2.016	1.166-3.484	0.012*
	City	1.816	1.095-3.012	0.021*
	Village	1		
Area (West Bank)	Middle	0.318	0.108-0.939	0.038*
	South	0.745	0.395-1.406	0.364
	North	1		
Season	Summer	1.646	1.080-2.508	0.020*
	Spring	1.594	1.062-2.391	0.024*
	Autumn	1.530	0.990-2.362	0.055
	Winter	1		
Age (years)	0-5	0.161	0.069-0.373	<0.001*
	6-17	0.506	0.239-1.072	0.075
	>40	0.191	0.092-0.394	<0.001*
	18-40	1		

Note. *P-value <0.05. Abbreviations: aOR: Adjusted Odds Ratio, CI: Confidence Interval

Discussion

Violence is a global health concern that affects individuals and communities worldwide. Manner-specific mortality is a vital metric to evaluate population health. Accurate mortality data is crucial for effective planning, prioritization, and monitoring of health policies in any country to improve the health services and systems. Autopsy is a more reliable method for revealing the underlying causes of death that may have gone unwitnessed. Violence-related death by gender and age provides important health information.

Deaths caused by violence are often overlooked in local research. In this study, young Palestinian adult men were the primary victims of social and political violence, with homicide followed by suicide being the most common cause of violent deaths. The lack of local studies on violence in postmortem cases constrains the discussion of the study. However, these results agree with other worldwide and Arab-word results. Approximately 80% of violent crime victims worldwide are males, with those aged 15 to 29 experiencing the highest (3,4). Men, influenced by societal expectations of toughness, often resort to alcohol or substance abuse as coping mechanisms for trauma, as research suggests a connection between stress and both physical violence and substance-related aggression (15,16). Young adults in particular are at heightened risk of both experiencing and perpetrating violent acts, highlighting the urgency of focusing on violence reduction within this age (17,18). They are more likely to engage in violent behavior when there is a lack of parental supervision, substance abuse, access to drugs, poor academic achievement, and witnessing or experiencing violent behavior (19–21). Moreover, the distribution of violent deaths by causes differs significantly between locations. The majority of social gunshot cases occurred in villages, followed by cities. Within refugee camps, the majority of deaths were caused by social gunshots. Palestinian refugee camps suffer from violent conflict and weak law enforcement across the region (22,23). In addition, Palestinians living in refugee camps experience high levels of unemployment, poverty, and population density, along with having overall low income and poor infrastructure (24,25). These factors render them more prone to neglect, exploitation, and an increased risk of violence (26). To address this issue effectively, interventions should focus on enhancing access to economic opportunities, providing decent housing, improving educational opportunities. These measures are crucial for violence reduction and the utilization of social and health services tailored specifically to this subgroup (18). Most Palestinian villages are located in

Area B, where the Palestinian Authority assumes civil responsibilities, and Israel holds security responsibilities. Fewer villages are located in Area C, where Israeli authorities assume full control (27). The lack of full control and sovereignty in these areas has limited the Palestinian authority's ability to manage them, making them more susceptible to different problems (28).

In the Arab world, research has demonstrated that women and younger adults may face a higher risk of suicide (29). Males were more often victims of homicide while females were more often victims of suicide (30). However, further investigation is needed to understand the variations between and within countries. In our study, homicides were identified as the leading cause of violent death among female cases, followed by suicides. A recent Palestinian study revealed that 37% of Palestinian women experiencing violence in general, with a substantial portion subjected to physical violence at least once. These findings underscore the urgent need for efforts to address violence against women and to implement strategies aimed at prevention, intervention, and support for victims (31). Due to its familial and traditional social structure, women in Palestine have limited power to make decisions and are at a higher risk of experiencing physical abuse compared to egalitarian nations (10). According to an analytical study that covered a total of 76 cases of gender-related killings or "femicides", most victims were young women between 18 to 29 years of age, and 18.0% were under 18 years of age (32). Adolescents are at high risk of gender-based violence, with their young age and conflictual relationship increasing their risk for physical and emotional violence (33). Most of the femicide cases in the aforementioned analytical study were family-related, with brothers, fathers, and sons committing the majority of these homicides, whereas husbands committed 23.0% of femicides (32). The Palestinian Authority has previously established a specialized unit within the police to compete this growing problem (34).

Six modes of killing were identified in socially violent deaths, with gunshot followed by hanging as the leading causes of socially violent death among males and hanging followed by gunshot among females. Various studies have shown that gunshot wounds are the leading cause of death among males (35,36), whereas poisoning and hanging are frequently observed among females in different countries (37–39). Our study reveals a quite alarming trend in Palestinian society, where the prevalence of violent deaths is widespread. Specifically, hanging emerged as a significant cause in villages and among females, accounting for 21.3% of all violent deaths. On the other hand, political and social gunshot, followed by hanging, were the predominant causes among males. This could be explained by honor killings and blood vengeance, which are known to be common in Arab societies (40,41), especially in rural areas.

Political violence was mostly prevalent among cities. The data on causalities from the United Nations Office for the Coordination of Humanitarian Affairs indicated that most deaths during the recent years due to political gunshots occurred in the cities of Jenin and Nablus, both located in the north of the West Bank (42). Over the past few years, these cities have seen a surge in political conflict and a sharp increase in casualties due to political violence, which is closely related to the reemergence of different militant groups in the West Bank (43).Providing strong support to women, strengthening security measures, addressing underlying causes, and implementing legal frameworks for accountability and prevention are all critical components that need to be taken into consideration.

A comprehensive understanding of violent deaths is crucial to prevent them. We recommend the establishment of violence prevention council to help minimize the number of deaths related to violence, especially among young adults. This council should focus on reducing both intentional and unintentional violence, considering the different demographic groups affected by these incidents. While investigators collect valuable information, it's not systematically combined. The introduction of a national reporting system could help us develop effective prevention strategies. Therefore, the establishment of a national violent death reporting system (NVDRS) is vital (44). This system should cover all types of violent deaths, including suicides and homicides, across various settings and age groups. Such an approach will help us understand the root causes of violent deaths and develop effective strategies to prevent them, ultimately saving lives. It is important to consider all the factors that contribute to violent deaths, such as relationship issues, mental health conditions and treatment, toxicology results, and life stressors like financial or work-related problems. By compiling this information into a comprehensive database, decision-makers and program planners can use it to derive insights and develop effective violence prevention initiatives. Over all, to address violence in Palestine, interventions should focus on improving economic opportunities, housing, educational prospects, and tailoring social and health services to the needs of vulnerable subgroups. Addressing violence against women and implementing prevention strategies are crucial, along with strengthening specialized police units and addressing societal expectations influencing coping mechanisms. Comprehensive prevention programs are vital to reduce violence and ensure the safety of the population.

Limitations and strengths of the study

This study has several limitations that must be considered before interpreting its findings. First, consistent reporting on violence-related deaths could be more suitable for this study. Furthermore, the absence of data concerning non-fatal injuries related to violence can affect our findings, as only fatalities are accounted for. For a comprehensive understanding of violence, the inclusion of all spectrums of violent incidents is needed, including those that do not result in death. In addition, the absence of essential data regarding the circumstances and the demographics of violent deaths could have impacted the accuracy and depth of our analysis. The absence of previous local research on deaths related to violence was one of the most significant limitations in forecasting changes in the prevalence and characteristics of violence in the West Bank. Moreover, retrospective studies using postmortem cases have limitations due to incomplete data, recall bias, confounding variables, and variations in data quality, hindering the establishment of clear cause-and-effect relationships. Despite these limitations, this study is the first to calculate rates of social and political violence using postmortem cases in the West Bank-Palestine. This research data can serve as an essential reference point for future studies on violence-related mortality and overall mortality in the region. Moreover, analyzing the factors that cause variations in mortality rates across different regions can provide insights for implementing prevention and health promotion measures.

Conclusion

The current study is a new attempt to investigate the epidemiology of violent death within the West Bank's Palestinian community. Young adult men were the main victims of social and political violence. Political violence was mostly prevalent among cities. The high prevalence of social violence in refugee camps and villages in the West Bank underscores the need for interventions in these areas. The research findings highlighted the significant impact of violence on individuals and communities in Palestine. The study highlighted also the disproportionate impact of social and political violence on young Palestinian adult men, as well as the prevalence of violence against women, particularly within familial structures. The data emphasized the urgent need for comprehensive interventions aimed at violence reduction,

addressing root causes. Additionally, the findings underscored the critical importance of implementing strategies to prevent and address violence against women and to provide support for victims. Addressing these complex issues requires a multifaceted approach, including the improvement of social and health services tailored to at-risk subgroups and the establishment of specialized units to combat gender-based violence. Overall, the research findings call for targeted efforts to improve the well-being and safety of individuals and communities affected by violence in the region. We recommend the development of a national violent death reporting system (NVDRS) to aid in future data collection and analysis. The increase in violence rates due to age and geography highlights the importance of national health awareness and preventive programs to reduce injury.

Ethics approval

The study protocol (IRB number: Nsg, August 2022/33) was approved by the Ethics Committee of the Institutional Review Board "IRB" at An-Najah National University (ANNU). All data was collected and treated confidentially using codes instead of names. We ensure utmost respect for the deceased and their families when safeguarding data collected from postmortem cases, ensuring that personal information is not compromised. We strictly adhere to ethical guidelines and legal requirements to protect the identities and sensitive information of the cases involved in the research. This includes securing data storage, using anonymized data for analysis, and obtaining informed consent from the institution regarding using their cases' information. Sensitive information such as the victim's name, date of birth, specific crime location, date of the crime, and case number were not disclosed to maintain the privacy and dignity of the cases involved. Data were available for the researchers only.

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