

CHAPTER 3

Epidemiology of Violence

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In order to appreciate the range of violent events that may be encountered in the practice of forensic nursing, it is important to understand the various forms of violence that result in injury, as well as the proportions of these events in the population in general, and in specific subgroups of the population. An understanding of the basic principles of epidemiology, with specific reference to injury epidemiology, is also essential.



CHAPTER FOCUS

- » Definition of Violence
- » Description of Types of Interpersonal Violence
- » Sources of Data
- » Epidemiology of Violence
- » Risk Factors for Violence

KEY TERMS

- » assault
- » epidemiology
- » firearms
- » homicide
- » intentional injury
- » intimate partner violence
- » National Violent Death Reporting System
- » suicide
- » terrorism
- » violence
- » war

On any given day, it is possible to read multiple news reports that reinforce the fact that violence is a part of our everyday lives. Dramatic events such as suicide bombings and other acts of terrorism have taken over the front pages of our newspapers, and the common acts of violence such as homicides and assaults that occur around the country are relegated to other parts of the paper. Biases in reporting can lead one to either underestimate or overestimate the number of events that take place in any particular city or state or in any given population subgroup. Putting together the data about all of these events is important in understanding the true nature of violence and its impact on our society.

Violence Defined

Violence has many forms. In this chapter, only physical violence will be discussed in detail. In addition, the standard terms to describe intent with respect to injury will be

used. Unintentional injuries are injuries that result from events that have traditionally been thought of as accidents. Some examples of such events are a motor vehicle crash that occurs when a driver fails to stop quickly enough to avoid hitting the car in front of him, an elderly woman tripping and falling over a loose rug in the bathroom, or a toddler who cuts his chin on the sharp edge of an end table. What these events have in common is that they were not intentional—neither the injured person nor another person deliberately caused the event that resulted in an injury.

Intentional injuries or injuries related to violence are the result of a deliberate act that is committed by the person who is injured, or by another person, with intent to cause harm. These events include such things as an overdose of illicit drugs, a fistfight that leads to facial injuries, and a drive-by shooting of two adolescents walking down a street. At times, an intentional act of violence becomes an unintentional act as innocent bystanders, by virtue of being in the wrong place at the wrong time, become the victims.

CASE STUDY 3.1

Innocent Bystanders

In July 2010, a 14-year-old girl was killed by a rain of gunfire as she sat on a safari tourist bus with her relatives in the U.S. Virgin Islands. She was apparently caught in the crossfire between two rival gangs at war. The girl was on an on-shore excursion from a cruise ship that had stopped for the day at Sharma Amalie. Another passenger was injured in the shootout. The girl was found wounded on the bus while the intended victim was found dead in the street near the bus.

Source: CNN. (2010). Teen tourist killed in crossfire in U.S. Virgin Islands. Retrieved from <http://news.blogs.cnn.com/2010/07/13/teen-tourist-killed-in-crossfire-in-u-s-virgin-islands>



The types of violent events that occur and the mechanisms by which they occur can be defined further. **Homicide** is an intentional killing of one person by another. **Suicide** is the deliberate taking of one's own life. **Assault** is the physical attack by one person upon another, which may or may not result in physical injury. **Intimate partner violence (IPV)** is the occurrence of physically violent acts between persons who have an intimate relationship, regardless of their sex. Weapons include any object or body part that is used to inflict physical harm on a person. **Firearms** are handguns, long guns, and any other type of gun that may be used to inflict harm upon oneself or another person. **Terrorism** is the deliberate and planned act of a person or group of people against another person or group of people in order to achieve political or economic gain. **War** is a conflict that results in broad-scale violence against specific groups of people who are sought out because of their religious, political, or social beliefs.

Two particular types of violence that are not discussed in this chapter, as they require more detailed attention, are child abuse and sexual assault. Child abuse includes injuries intentionally inflicted upon a child by a parent, caretaker, or other adult who has responsibility for a child, or who is an intimate partner of the parent or caretaker of a child. Sexual assault is the act of forcing a person, against her or his will, to participate in a sexual act, either actively or passively.

Epidemiology

Epidemiology is the study of the impact of disease and injury on the population. This includes an examination of the distribution of injury and illness, as well as an assessment of the risk factors that contribute to these health problems. The epidemiologic model that takes into account the host, the agent of injury or illness, and the vector by which the injury or illness is transmitted is readily used in the study of injuries and violence. In addition, Haddon (1968) proposed that all injuries, including those resulting from violent acts, could be analyzed using a matrix that includes three phases (preevent, event, and postevent) and three factors (human factors, vehicle/agent factors, and the environment). This matrix can be used to perform an examination of a single event or to evaluate multiple violent events for commonalities and differences. An example of the matrix as applied to a violent event is shown in **Table 3-1**. Applying these types of epidemiologic methods to look at violent events provides information about relationships between various physical and environmental factors and the potential outcomes associated with them.

Sources of Data

Data concerning deaths due to violence as well as nonfatal violence-related injuries may be obtained from a number of sources. However, there is no comprehensive, timely database that provides all of this information in one place. In order to address this problem, at least with respect to violent deaths, the Centers for Disease Control and Prevention has initiated the **National Violent Death Reporting System**. This system is designed to maintain a complete, timely record of violent deaths of residents of 13 states in the United States, as well as any deaths to nonresidents that occur in those states. The cases collected within this system include deaths due to homicide, suicide, undetermined intent, legal intervention, and unintentional firearm injury. Data are obtained from death certificates, medical examiner or coroner records, law enforcement records, and crime laboratories. This system has only recently been initiated, but it shows promise for providing population-based data on deaths due to violence (Paulozzi, Mercy, Frazier, & Annest, 2004). It is expected that all 50 states will be involved in this data collection system in the future.

Various levels of hospital data also are available, but the specific type of data available and degree of complexity vary by state. Hospital discharge data sets are generally based on billing data and can provide information about hospitalizations and sometimes emergency department visits related to violence. National databases that contain information about

TABLE 3-1 Haddon Matrix applied to a violent event

<i>Phases</i>	<i>Factors</i>		
	<i>Human</i>	<i>Vehicle/Agent</i>	<i>Environment</i>
Pre-event	History of abuse as a child	Firearm stored with bullet in chamber	Violence accepted as a means of settling disagreement
Event	Human body's resistance to energy insults	Hollow-point bullet flattens as it passes through body tissue	Presence of other people during the assault
Post-event	Hemorrhage	Location of bullet fragments	Rapid access to emergency care

treatment for injuries, including those related to violent events, are as follows: the Healthcare Cost and Utilization Project data set, which is maintained by the Agency for Healthcare Research and Quality and can be queried for specific information (AHRQ 2010); the Emergency Department Internet Query System of the National Hospital Ambulatory Medical Care Survey can be queried by specific International Classification of Diseases -9 code, as well as population subgroup, in order to examine emergency department visits for violence-related injury (McCaig & Burt, 2003).

The Uniform Crime Reports of the Federal Bureau of Investigation provide information about homicide and other crimes, and the National Incident-Based Reporting System provides more in-depth analysis of crime data, which includes homicide and assault information (Uniform Crime Report, 2008). Data about both the perpetrator and victim, which can be useful in investigations and risk assessments, are available.

The Centers for Disease Control and Prevention does provide data on fatal and non-fatal injuries due to various causes in the Web-based injury statistics query and reporting system (CDC, 2010b). This database can be queried in order to identify specific rates of both fatal and nonfatal injury events due to various causes.

Rates

Rates of injuries or deaths due to violence are often reported. In general, the rate is expressed as the rate per hundred thousand of the population of interest. This provides useful information for comparing rates across age groups, sexes, racial/ethnic groups, and other population groups.

The Epidemiology of Violence

Of the approximately 150,000 injury-related deaths in the United States each year, 31% are due to violence. Suicide accounts for 62% of the **intentional injury** deaths, homicide accounts for approximately 37%, and legal interventions account for fewer than 1% (CDC, 2010b). Intentional injuries are one of the leading causes of death for several age groups, as illustrated in **Table 3-2**. Injuries resulting from violence are responsible for approximately 9% of the years of potential life lost prior to age 75. Table 3-2, **Table 3-3**, and **Table 3-4** illustrate the leading causes of death, injury-related death, and violence-related death across the life span for the year 2007.

Suicide

Each year, suicide accounts for approximately 31,000 deaths in the United States. It is important to keep in mind the appropriate terms to use when discussing suicide. A completed suicide occurs when the victim dies. A suicide attempt is an event in which the victim does not die. Suicide disproportionately affects adolescents, young adults, and the elderly. The methods by which these events occur are also important to understand. The instrument most often used in suicide is a firearm. In 2007, 17,352 firearm-related suicides occurred, with the greatest number of these (3,943) in the 65 and over age group (CDC, 2010b). Other means of committing suicide include drug overdose, hanging, suffocation, and carbon monoxide poisoning. **Table 3-5** compares some of the common mechanisms of homicides and suicides.

TABLE 3-2 10 Leading Causes of Death, U.S. 2007, All Races Both Sexes

	Age Groups						
	1-4	5-9	10-14	15-24	25-34	35-44	45-54
Unintentional Injury 1,588	Unintentional Injury 965	Unintentional Injury 1,229	Unintentional Injury 15,897	Unintentional Injury 14,977	Unintentional Injury 16,931	Malignant Neoplasms 50,167	Malignant Neoplasms 103,171
Congenital Anomalies 546	Malignant Neoplasms 480	Malignant Neoplasms 479	Homicide 5,551	Suicide 5,278	Malignant Neoplasms 13,288	Heart Disease 37,434	Heart Disease 65,527
Homicide 398	Congenital Anomalies 196	Homicide 213	Suicide 4,140	Homicide 4,758	Heart Disease 11,839	Unintentional Injury 20,315	Chronic Low Respiratory Disease 12,777
Malignant Neoplasms 364	Homicide 133	Suicide 180	Malignant Neoplasms 1,653	Malignant Neoplasms 3,463	Suicide 6,722	Liver Disease 8,212	Unintentional Injury 12,193
Heart Disease 173	Heart Disease 110	Congenital Anomalies 178	Heart Disease 1,084	Heart Disease 3,223	HIV 3,572	Suicide 7,778	Diabetes Mellitus 11,304
Influenza & Pneumonia 109	Chronic Low Respiratory Disease 54	Heart Disease 131	Congenital Anomalies 402	HIV 1,091	Homicide 3,052	Cerebrovascular 6,385	Cerebrovascular 10,500
Septicemia 78	Influenza & Pneumonia 48	Chronic Low Respiratory Disease 64	Cerebrovascular 195	Diabetes Mellitus 610	Liver Disease 2,570	Diabetes Mellitus 5,753	Liver Disease 8,004

(continues)

TABLE 3-2 10 Leading Causes of Death, U.S. 2007, All Races Both Sexes (continued)

	Age Groups							
	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64
Perinatal Period	70	Neoplasms 41	Benign Pneumonia 55	Influenza & Mellitus 168	Cerebrovascular 505	Cerebrovascular 2,133	HIV 4,156	Suicide 5,069
Benign Neoplasms	59	Cerebrovascular 38	Cerebrovascular 45	Influenza & Pneumonia 163	Congenital Anomalies 417	Diabetes Mellitus 1,984	Chronic Low Respiratory Disease 4,153	Nephritis 4,440
Chronic Low Respiratory Disease	57	Septicemia 36	Benign Neoplasms 43	Three Tied 160	Liver Disease 384	Septicemia 910	Viral Hepatitis 2,815	Septicemia 4,231

MV = motor vehicle.

Produced by: Office of Statistics and Programming, National Center for Injury Prevention and Control, Centers for Disease Control and Prevention.
Data source: National Center for Health Statistics (NCHS), National Vital Statistics System.

TABLE 3-3 10 Leading Causes of Injury Deaths, United States 2007, All Races, Both Sexes

	<i>Age Groups</i>						
	< 1	1-4	5-9	10-14	15-24	25-34	35-44
Unintentional Suffocation 959	Unintentional Drowning 458	Unintentional MV traffic 456	Unintentional MV traffic 696	Unintentional MV traffic 10,272	Unintentional MV traffic 6,842	Unintentional Poisoning 7,575	Unintentional Poisoning 9,006
Homicide Unspecified 174	Unintentional MV traffic 428	Unintentional Fire/burn 136	Homicide Firearm 154	Homicide Firearm 4,669	Unintentional Poisoning 5,700	Unintentional MV traffic 6,135	Unintentional MV traffic 6,262

MV = motor vehicle.

Produced by: Office of Statistics and Programming, National Center for Injury Prevention and Control, Centers for Disease Control and Prevention.
Data source: National Center for Health Statistics (NCHS), National Vital Statistics System.

TABLE 3-4 10 Leading Causes of Violence-Related Injury Deaths, United States 2007, All Races, Both Sexes

	Age Groups							
	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64
Homicide Unspecified 174		Homicide Firearm 47	Homicide Firearm 154	Homicide Firearm 4,669	Homicide Firearm 3,751	Suicide Firearm 2,879	Suicide Firearm 3,531	Suicide Firearm 2,786
Homicide Other Specified, Classifiable 61		Homicide Suffocation 21	Suicide Suffocation 119	Suicide Firearm 1,900	Suicide Firearm 2,306	Homicide Firearm 2,038	Suicide Poisoning 2,015	Suicide Poisoning 1,147
Homicide Firearm 48		Homicide Cut/pierce 13	Suicide Firearm 53	Suicide Suffocation 1,533	Suicide Suffocation 1,770	Suicide Suffocation 1,839	Suicide Suffocation 1,589	Suicide Suffocation 725

MV = motor vehicle.

Produced by: Office of Statistics and Programming, National Center for Injury Prevention and Control, Centers for Disease Control and Prevention.

Data source: National Center for Health Statistics (NCHS), National Vital Statistics System.

TABLE 3-5 Injury Deaths Classified by Type of Injury

<i>Mechanism</i>	<i>Suicide</i>	<i>Homicide</i>
Firearm	17,352	12,632
Suffocation	8,161	637
Transportation-related	131	30
Poisoning	6,358	85

Source: From WISQARS. WISQARS Leading Causes of Death Reports, 1999–2007. Retrieved from <http://webappa.cdc.gov/sasweb/ncipc/leadcaus10.html>

There are multiple risk factors for suicide that may change across the life span. One of the most important risk factors is depression. Other factors that contribute to the risk of suicide include alcohol problems, chronic illness, mental health problems, and impulsive behavior.

Homicide

Homicide accounts for approximately 37% of intentional injury deaths and was responsible for 18,773 deaths in 2007 (CDC, 2010b). The vast majority of homicides in the United States are committed with a firearm; other mechanisms of homicide include knives or sharp objects, assaults with a blunt instrument, fire, or use of a motor vehicle. Although there are fewer homicides than suicides each year, the primary mechanism for each is a firearm, accounting for approximately 55% of these events. Homicide continues to be the leading cause of death for black males between the ages of 15 and 24, as it has been for the past several years. In addition, black females between 10 and 19 experience homicide at a rate that is three times that of white females in the same age group. The homicide rate among black females aged 15 to 45 years has increased over the past several years so that it is now the leading cause of death in this group. Other groups in which homicide is one of the leading causes of death are children between ages 1 and 4, and youth between ages 15 and 19 of all racial groups. Despite this, there has been a steady decrease in the rate of homicide deaths over the past 10 years. This may be attributable to many interventions, and it is difficult to determine exactly what proportion of the decrease is due to these changes.

Intimate Partner Violence

Intimate partner violence (IPV) includes violence between two people of either sex who are currently, or have been, intimate partners. Women who experience IPV are higher utilizers of healthcare services than other women, making more emergency department visits for injuries and medical complaints, as well as more visits to primary care and mental health services (Centers for Disease Control and Prevention, 2010a). Women are victims of IPV far more often than men, and in the United States, women who are homicide victims are most likely to have been killed by a partner. IPV is responsible for approximately 40% of homicides, but only a small percentage of these deaths occur in men.

Generally, homicide in an intimate relationship is not the first act of violence that occurs. Rather, the violence within the relationship escalates over time, with injuries becoming more severe and/or violent episodes becoming more frequent. Estimates are that approximately 1.5 million women are the victims of IPV each year in the United States (Tjaden & Thoennes, 2000). Multiple risk factors contribute to IPV, as well as IPV resulting in homicide. A recent study by Campbell and associates demonstrated that unemployed abusive men were four times more likely to commit femicide than employed men who abused their partners (Campbell et al., 2003). Prior arrest for IPV decreased the risk of femicide, whereas an abuser's access to a firearm increased the risk. Women who left a highly controlling abusive partner were at greater risk of being killed, whereas women who never lived with the abusive partner had a lower risk of femicide.

Dating Violence

Physical violence in a dating relationship has been reported to occur in as many as 32% of relationships in high school and college women (White & Koss, 2003). Sexual assault occurs with some frequency in this age group, as half of sexual assaults against females occur to those ages 12 to 24 (Bachman & Saltzman, 1995). A recent study found a rate of dating violence against young women of 88% (Smith, White, & Holland, 2003). The greatest risk of victimization was in women who had been victimized in childhood and adolescence.

Terrorism

The Code of Federal Regulations defines terrorism as “. . . the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives” (28 C.F.R., 1998, Vol.1, Parts 0-42). Terrorism has been a problem in the United States for many years, with some of the most dramatic examples including not only the events that took place on September 11, 2001, but also events such as the bombing of the Murrah Federal Building in Oklahoma City on April 19, 1995; the intentional poisoning using contaminated food of the citizens of Dalles, Oregon, by a religious cult that sought to take over the town by winning an election; the distribution of weaponized anthrax through the mail and the bombing of the World Trade Center in 1993.

The epidemiology of terrorist events is evolving, as researchers identify methods of collecting data in multiple victim incidents and providing real-time information on the extent of injuries and illness occurring. Some of the particular challenges related to the study of terrorist events include the need to protect sensitive data that may be used in legal actions, and the sheer volume of data that may be necessary in order to include all of the victims of these acts in any analysis. As opposed to the epidemiology of violence-related injury, where there are identifiable specific causes of the incidents, the mechanism of any particular terrorist event may not be predicted, and the temporal nature of these events will be different than that of other types of violence, which focus more on individuals than large groups of people.

War

During a war or conflict, many types of violence may occur, and various population groups may be affected. Military units or civilian groups fighting against one another might be expected to suffer fatal and nonfatal injuries, but civilians who are not part of the conflict may also be injured or killed, either intentionally or unintentionally. In addition, other risks may exist during a conflict or time of little government control, including sexual assaults of women and young girls. Other consequences of war include those related to land mines that are placed during a conflict but left undetonated, which place the population in the area at risk for injury and long-term disability. Forensic nurses are often in a position to care for victims of war and torture, and indeed there are centers in the United States devoted specifically to this purpose. Displaced victims of war and violence frequently find themselves in need of health care in a culture totally foreign to them. The challenge for forensic nursing is to provide care often within the context of memories of horror of the past and extreme anxiety for the future. An understanding of the sufferings and in many cases possible feelings of humiliation, sorrow, and prolonged grieving of this vulnerable population is a unique challenge for forensic nursing.

Workplace Violence

Although workplace violence, an act of physical, verbal or psychological assault by one worker against another, can occur at any place where there is an employer–employee relationship, employee–employee relationship, or, in the case of health care, a client–caregiver relationship, workplace violence within the healthcare setting can be one of the most unpredictable types and therefore the hardest to control. The healthcare sectors lead all occupational settings in terms of the incidence of nonfatal acts of violence (McPhaul & Lipscomb, 2004). Certain risk factors should alert the caregiver staff. These risk factors include a violent episode that precipitated the current hospitalization, substance abuse or mental health instability evident at the time of treatment, a history of violent behavior either by the client or others with him/her, an accident involving children where blame is being argued, and situations involving law enforcement. At other times the simple stress of the situation can cause a seemingly stable individual to act in an erratic and violent manner. Increasingly, healthcare workers—most particularly nurses—are finding themselves the victims of violence that occurs in the workplace. Within healthcare settings, the emergency department of the hospital is one of the most common venues for individuals prone to violent behavior to act out. Other settings such as extended care facilities and critical care units and mental health facilities are also involved. The stressful and sometimes frustrating nature of crises observed in critical settings may trigger aggressive or violent behavior directed at healthcare personnel attempting to provide treatment to friends or relatives of the aggressor. The forensic nurse in these settings may be able to avert disaster by observing each encounter with stressed individuals through a forensic lens and observing simple safety measures such as avoiding arguing with suspected individuals, allowing an escape route from the treatment area, using calming communication skills, allowing limited numbers of individuals in the direct treatment area and soliciting assistance from security personnel before a dangerous situation escalates.



CASE STUDY 3.2

Workplace Violence: Three Examples

An elderly patient verbally abused a nurse and pulled her hair when she prevented him from leaving the hospital to go home in the middle of the night.

An agitated, psychotic patient attacked a nurse, broke her arm, and scratched and bruised her.

A disturbed family member whose father had died in surgery at the community hospital walked into the emergency department and fired a small-caliber handgun, killing a nurse and an emergency medical technician and wounding the emergency physician (NIOSH, 2002, Case reports section).

Source: National Institute for Occupational Safety and Health. (2002). Violence occupational hazards in hospitals. Retrieved from <http://www.cdc.gov/niosh/docs/2002-101/#12>

Summary

Epidemiology serves as an investigative method that can be used to examine patterns of injury, patterns of circumstances, and patterns of behavior of humans, vehicles, and environments that contribute to violent events. Knowledge of the epidemiology of violence, as well as epidemiologic methods that are used to study injury and violence, can provide a basis for determining the likelihood that specific events are the result of specific causes and circumstances. The consistent use and practice of these methods can enhance the expertise of the forensic investigator and provide excellent tools for practice. Interventions by forensic nurses aimed at changing the behaviors of individuals and families that lead to violence are informed by the nurse's knowledge of where and how violent events are most likely to unfold.



QUESTIONS FOR DISCUSSION

1. How can forensic nursing contribute to the collaborative investigation of violent events?
2. What is the role of forensic nursing in identifying risk factors for violence?
3. What role can forensic nursing play in preventing violence?
4. How can forensic nurses use epidemiology to assist in the investigation of violent events?

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