Trends In Firearm Injuries Related To Accidental Causes: A Study


Abstract
Gunshot wounds are the second leading cause of death after road traffic accidents within young population in many countries which is the most productive section of the society. This study describes demographics, causative factors, intent, incident locations of firearm injuries and gun-related activities in which patients were engaged at the time of injury among patients treated in hospital emergency departments for unintentional firearm-related injuries. It is a prospective study conducted over a period of 1 year i.e. May 1, 2007 to April 31, 2008 and all the cases of Gunshot Injuries (GSI) that presented to the casualty department of Jawaharlal Nehru Medical College & Hospital (JNMCH), Aligarh, INDIA were analysed. The information of the cases was obtained from casualty records, history and examination of patient and photograph of the patient's wounds. Parameters studied are age, sex, site of wounds, weapon used, circumstances leading to injury and shot by whom. A total of 198 cases of firearm related injuries reported and 50 were found to be due to unintentional causes. These injuries are most common in children (28%) and most common cause was ceremonial firing (40%). Head and neck region is most commonly affected (34%) followed by trunk (30%). Most frequently used weapon is shotgun (50%). Firearm injuries are one of the emerging causes of unintentional injuries to children and youth. This study suggests that efforts should be made to limit unsupervised access to firearms, to promote safe storage of firearm and apart from strict licensing law, medical assessment is recommended.

Key Words
Gunshot, Injury, Unintentional

Introduction
The incidence of gunshot wounds in civilian trauma has increased in many parts of the world, sometimes approaching epidemic level e.g. Brazil, Columbia and United States of America (1). These wounds are some time fatal leading to death. In many countries it is the second leading cause of death after road traffic accidents within young population which is the most productive section of the society (2). Gunshot injuries are on the increase because of recent escalation in crime and illicit trading especially in the developing countries and low income countries e.g. South-East Asian countries. In India, there was 1993 reported number of accidental deaths due to firearms in 2003 (3). In U.S. an estimated two nonfatal firearm injuries occur for every firearm death and injury rate of unintentional non fatal gunshot wound is 13 times that of fatal one (2,4,5).

While numerous studies relating pattern of fatal firearm injuries in India have been conducted, none has described the epidemiological patterns in unintentional, firearm-related injuries fatal and nonfatal. This study presents estimates on injury circumstances, site of injuries, and the age/sex of patients coming to hospital emergency
departments for unintentional firearm-related injuries and also gun-related activities in which patients were engaged at the time of injury. The data suggest the need for further development of system to study pattern of injuries and evaluation of injury prevention strategies for gun owners and users.

Materials and Methods

It is a prospective study conducted over a period of 1 year at Jawaharlal Nehru Medical College & Hospital (JNMCH), Aligarh, INDIA. All the cases of Gunshot Injuries (GSI) that presented to the emergency department were analyzed. For this study, only those cases in which patient clearly stated that it was unintentional in nature, were labeled as accidental gunshot injury and included in the study. Cases which were brought dead were not included in the study. Further these Cases were defined as nonfatal if they were discharged from the hospital alive and fatal in case of death while undergoing treatment and also in whom survival is unlikely on the expert opinion of the consultant in-charge. The information of the cases was obtained from casualty and ward records, history and examination of patients, and photograph of the patient's wounds. Parameters studied are age, sex, site and number of wounds, weapon used, circumstances leading to injury and shot by whom. The observed data is entered onto a worksheet and analyzed using Microsoft Excel word 2007 version for analysis.

Results

During the study period a total of 198 cases of firearm related injuries reported to the emergency department of JNMCH. Out of these 198 cases 50 were found to be due to unintentional causes and were included in the study.

Age and sex distribution of these 50 cases is described in Table 1. These injuries are most common in children (28%) and least reported in older age group (8%). Majority of victims were male with male to female ratio of 3:1.

Activities that were primarily responsible for the injuries are categorized in Table 2. 40% of accidental firearm injury was due to ceremonial firing as the commonest cause and malfunctioning and playing with weapons as the least common contributing factors. Victim-shooter relationship defined in Table 3 shows assailant was not known in 50% of cases, as most of the accidents occurred during celebrations and in 32% of cases the injury is self-inflicted. Places where such mishaps occurred have been tabulated in Table 4. 52% of mishaps occurred at places such as marriage halls, processions, work place etc. and these places are grouped under heading others. It is followed by accidents at home (38%). Accidents are rare at outskirts i.e. fields and highways.

Table 5 shows site of injury in accidental gunshot cases. Head and neck region is most commonly affected site (34%) followed by trunk (30%). Injuries to extremity and multiple sites were present in 24% of the total cases. Injury was fatal in 12% of cases, of which, 4 cases were of head injury, 1 of abdomen and 1 of thoracic region. And all cases were of single firing. Table 6 shows type of weapons involved in unintentional firearm injuries. Most frequently used weapon is shotgun (50%).

Discussion

Firearm accident rate in India is 0.26 and bound to increase owing to the rapid proliferation of illegal firearms (6). This study was done to study the demographic pattern of accidental gunshot injuries which come to the emergency department of hospital. Unintentional firearm injury is a public health issue and this study will provide some help in eliminating the problem at root level by recommending preventive strategies for it.

Leading cause of accidental injuries i.e. 40% (Table 2) in our study was ceremonial firing. This is in accordance with our observation that most of the cases of unintentional firearm related injury were reported during months of March, April and July, which are considered as marriage season in India and it is common practice to fire a celebratory shot during the proceedings. An accidental injury can be sustained during such functions in the case of person who is handling firearm and has consumed alcohol or if he is not trained to handle it and he is just doing it for adventure. The victim is either a part of procession or just a bystander. However, Singh BP has reported hunting or mishandling of firearm to be the most common cause of accidental firearm injury in northern India (7). This difference can be attributed to proliferation of illegal firearms and stricter hunting laws now a days. We also agree with Karger B that human themselves are responsible for their actions rather than technical faults (8). Children were the majorly affected group (Table 1) and it can be accounted as they are difficult to control in gathering and get attracted to the sight of firearm or sound of gunshot their chances of getting injury increases.
Also they might get injured while playing with loaded firearm. This is in contrast to Singh BP where youth are major victims. However, leading cause and place of injury are different in both the studies and in accordance with the affected group, the results are justified. Our study is in accordance with other studies of developed countries where the common cause of injury in children is because of playing (4, 5, 9).

In our study, it was observed that in 50% of accidental gunshot injury cases victim did not know the assailant (Table 3). It can be explained on the basis that patient was victim of celebratory gunshot which in turn is the commonest cause of accident. However, it will also include cases where history was masked by the victim to save someone. Another major group which has scope of improvement is accidental self infliction of wound while handling the firearm which accounts for 32% of total cases (Table 3). Since, single shot self inflicted injuries are more likely to be suicidal in nature there is a possibility that a number of suicidal cases are reported under this category, however multiple gunshot wound can also result from suicide attempt (10).

It has been observed in our study that accidental gunshot injuries mostly occurred at places like party place, work place if the victim somehow deals with firearm and friends place and such accidents were rare at outskirts (Table 4). Singh BP has reported that accident locations were most commonly the forest because maximum number of accident cases observed were due to hunting (7) and some have also reported playing as leading cause (11,12). Since the leading cause in our study was celebratory gunshot this contradiction is self explanatory. Since majority of cases were caused during ceremonial
firing or were self-inflicted where the fire is usually made upwards or during loading or malfunctioning of gun upper region of body has greater chances of injury, which in our study has come out to be Head and neck region (34%) followed by trunk (30%) and least commonly affected site was the extremities (table 5). And a major reason for head and neck injury can be processions of marriage usually pass through streets and children watch it from balcony or rooftops. Similar trends of accidental injury are reported in northern India (7, 13). In developed countries many of the researchers have found injury to the extremities as most common site in cases of non fatal accidental injury it can be due to the fact that major cause is playing or mishandling (4,5). Multiple injuries are not so rare in our case because of proliferation of country made weapon (katta), which we observed are responsible for 44% of cases (table 6). Such findings due to crossfire or an automatic weapon have also been mentioned (10, 14). Most common weapon used in our study was shot gun and it can be due to easy issue of license to farmers and for security purpose (table 6).

**Conclusion**

After the research we can conclude that humans are the only ones who should be blamed for accidents and not circumstances. Since celebratory gunshot is the most common cause firings, therefore firing of live cartridges at public gatherings should be banned, be it marriage, during festivals or elections with strict enforcement of the laws. Considering proportion of self inflicted injuries in our study, proper certified training of the individuals acquiring weapon and issuance of guidelines regarding usage of firearms should be done strictly. Many of the single shot gunshot injuries or self inflicted injuries were suspected to be suicidal in nature therefore evaluation of mental status by an expert should be done before issuance of license or selection of candidates in services which involves handling of firearms e.g. police services. This evaluation should be repeated at the time of renewal of license. Thus, above measures will not only control problems of affected population but also the causative factors. Thus with combined effort of government and individuals incidence of unintentional fire arm injuries could be checked at the root level.

**References**


