

Mortality in Land-Mine Accidents in Iran

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Abbreviations:

HCRI = High Center for Research and Informatics

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Abstract

Objective: To study the rate of prehospital mortality before establishment of a rescue system for victims of land-mines in Iran.

Method: Survey at rural clinics in mine-affected areas, and retrospective review of public patient records.

Results: A total of 36.4% of casualties from land-mines in the study area died during the period of 1989–1999. The mortality seems highest in those victims who were torso injured.

Conclusion: The mortality rate from accidents involving land-mines in the study area was high. Most fatalities seemingly occurred in the prehospital setting.

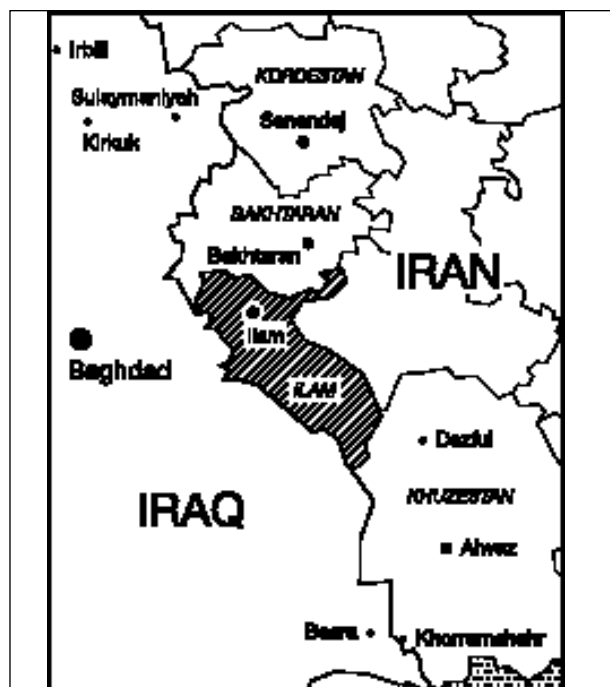
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Introduction

An epidemic of land-mines is occurring. Despite major mine clearing operations and international, political, anti-mine campaigns, more mines are being laid than are being cleared; the numbers are increasing during every war. Since the mine infested areas are vast and the minefields, as a rule, are not mapped, injury prevention programs (mine clearing and mine awareness) have been expensive and ineffective. Therefore, in an attempt to reduce mortality and morbidity, the World Health Organization has called upon the international medical community to set-up trauma systems for victims of land-mine explosions in mine-affected communities.¹ Such programs should be monitored carefully regarding their effectiveness and quality. This requires good estimates of the mortality associated with injuries by land-mines prior to implementing the intervention.

The populations affected by land mines generally live in rural communities where the civilian infrastructure has been damaged by years of war and

conflict. At present, many mine victims who die on the way to hospital are not registered in public files. Therefore, exact figures on the prehospital mortality are difficult to obtain. From a survey conducted in Afghanistan, Bosnia, Cambodia, and Mozambique, Anderson *et al* reported that one-third of mine victims died at the site of the explosion. However, the data for their study were gathered only in areas that were readily accessible.² A household survey in two mine-infested districts in Mozambique reports a case fatality rate of 48%.³ In a study of 3,800 war injured in rural Afghanistan, Husum reported a prehospital mortality rate of 26.1% when prehospital trauma care was not provided. After establishing an in-field rescue system providing early advanced life support, the mortality rate decreased to 13.6%.⁴ The objective of the present study was to estimate the baseline mortality prior to setting up a pilot program in prehospital trauma care for land mine victims in the province of Eylam in Iran.



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Figure 1—Map of the provinces Kordestan, Bakhtaran (Kermanshah), Ilam, and Khuzestan. The Iranian border provinces Kordestan, Bakhtaran (Kermanshah), Ilam, and Khuzestan are heavily mine infested. The actual study was conducted in the province of Ilam.

Materials and Methods

The 1980–1988 war between Iraq and Iran left millions of land mines on Iranian ground. According to the Ministry of Health in Tehran, the provinces Kordestan, Kermanshah, Eylam, and Khouzesstan are the most mine-infested Provinces (Figure 1). Surgeons at Ilam University Hospital, which is one of the provincial trauma centers, expressed concern about land-mine victims regularly being admitted for treatment in poor general condition after protracted evacuations (personal communication). On request from Ilam University Hospital and in agreement with the Ministry of Health, the Ilam province was selected as the target area for the present study. Ilam is a mountainous province with a population of 500,000. The rural population consists of small-community farmers and nomads. There are health centers at village level staffed with non-graduate medical officers. Trauma victims from the village population will be transferred from the health centers through district hospitals staffed with general practitioners, to the surgical center at Ilam University Hospital.

The majority of land-mine victims referred for primary surgery to Elam University Hospital come from the districts Mehran, Dehloran, and Moosian. Therefore, a preliminary survey was conducted at the village health centers in these three districts. The survey indicated that only a few land-mine victims from the village population had been managed by the health centers during the period 1989–1999. However, the health center staff reported numerous cases of mine injured among the tribal nomad population. Those victims had been transferred directly from the site of accident

Year	Total victims		Fatalities	
	n		n	(%)
1989	49		25	(51.0)
1990	101		40	(65.5)
1991	125		57	(45.6)
1992	115		31	(26.9)
1993	78		23	(29.5)
1994	101		32	(31.7)
1995	131		49	(37.4)
1996	135		63	(46.7)
1997	90		28	(31.1)
1998	110		33	(30.0)
1999	47		13	(27.7)
1989–1999	1,082		394	(36.4)

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Table 1—Mortality rate in land-mine victims in Ilam

to the surgical hospital. Therefore, health center and hospital files could not provide complete data on the outcomes for victims of land-mine injuries.

In Iran, all families victimized by war and land mines receive monetary support from the government once the accident is registered and validated. This applies to survivors and non-survivors, for the village population, and for nomads. Therefore, all families are instructed to report the outcome of persons injured by land mines to the Province Governor's Office for Social Welfare. Then, these individual reports are validated immediately by surveys at the site of explosion conducted by the local military authorities. Reports on accidents, injuries, and fatalities that cannot be confirmed by the military survey are regarded as false, and the perpetrators will be strictly punished. Mortality data for the present survey were gathered retrospectively from all consecutive validated cases registered during the period 1989–1999 at Ilam General Governor's office. The files were cross-checked for survivors with the patient files at Ilam University Hospital.

The Janbazan Foundation is a semi-governmental institution responsible for the rehabilitation of war and land-mine accident survivors. These rehabilitation programs are monitored by High Center for Research and Informatics (HCRI) in Tehran. Data on the pattern of injury in Ilam survivors was collected retrospectively from the HCRI database for the period 1989 through 1999.

Results

From 1989 to 1999, a total of 1,082 persons were reported injured by land mines in the Ilam province. The overall rate of fatalities was 36.4% (range of yearly rate 27.0% to 65.5%); (Table 1). The highest mortality rates occurred during 1989 and 1990. Most mine victims were young (mean of ages = 23.5 ±15.7 years ±1 standard deviation) and were male (91.4%).

In a subgroup of 138 survivors managed by HCRI, 78.5% had injuries to the extremities; 24.6% involved the upper extremities, and 54.4% the lower extremities. Only 3.6% of the survivors had torso injuries (Table 2).

Discussion

The current study confirms that the death tolls in land-mine accidents are high. The results correspond with previous

Region injured	n	(%)
Head, face, neck	24	(17.4)
Torso	5	(3.6)
Upper limbs	34	(24.6)
Lower limbs	75	(54.4)

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Table 2—Pattern of injury in land-mine accident survivors (n = 138; n = number)

studies from other mine-infested countries.¹⁻³ Most fatalities occur prehospital in scenarios with protracted evacuation times. Exact mortality data on land-mine casualties from Ilam University Hospital were not available. However, studies on large cohorts of war- and land-mine injured indicate a hospital fatality rate of <5%.⁴⁻⁷ Thus, the current study indicates that the prehospital fatality rate in mine victims in the study area maybe >30%.

There may be some dark numbers in this study: The nomad population accounts for the majority of land-mine casualties in this part of Iran. During their biannual migration, the nomad families may not have time to register their casualties at public offices. Also, the nomad population is less well integrated into “the official society”, making them hesitant to participate in the bureaucratic process of registration. The risk of false positive registrations (over-reporting of casualties) seems to be small due to careful case validation by the military authorities and the strict punishment for false positive reports. Thus, the real number of casualties and the prehospital death rate may be higher than reported.

There were few torso injured in the study population. The Iraqi army used bounding fragmentation mines extensively during the actual war. Different from blast mines

causing traumatic amputations, the bounding fragmentation mines produce multiple penetrating injuries to the torso. Without in-field life support, the fatality rate for wartime penetrating torso injuries is expected to be approximately 50%, and the fatality rate for extremity injuries approximately 15%.^{4,5} According to prevailing religious rules in the study area, the dead should be buried within 24 hours. This makes second-hand validation of injury patterns in fatalities difficult, especially for fatalities among the migrant population. Hence, the number of registered cases with torso injuries in this study may be falsely low, and reflect a high prehospital mortality rate in this group of casualties.

Conclusion

The study confirms that the case fatality rate in land-mine victims in Eylam, Iran is high, 36.4%. Most fatalities probably occur prehospital. Due to military restrictions, injury prevention strategies are difficult to implement in the study area. Also, such programs are expensive and very time-consuming. Therefore, a pilot training program to enhance the prehospital trauma care capacity of the existing health infrastructure in Ilam will be implemented seeking improvement of the outcome from land-mine injuries.

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References

1. Kakar F, Bassani F, Romer CJ, Gunn SWA: The consequence of land mines on public health. *Prehosp Disast Med* 1996;11:2-10.
2. Andersson N, da Sousa CP, Paredes S: Social costs of land mines in four countries: Afghanistan, Bosnia, Cambodia, and Mozambique. *BMJ* 1995;311:718-721.
3. Ascherio A, Biellik R, Epstein A, et al: Deaths and injuries caused by land mines in Mozambique. *Lancet* 1995;346:721-724.
4. Husum H: Effects of early prehospital life support to war injured: The battle of Jalalabad, Afghanistan. *Prehosp Disast Med* 1999;14:75-80.
5. Bellamy RF: The causes of death in conventional land warfare. *Milit Med* 1984;149:55-62.
6. Voivodic V: Management of war casualties in the Military Medical Academy (Belgrade) during combat operations in 1991/1992: An overview. *J Trauma* 1996;40:180-182.
7. Burkle FM, Newland C, Meiser SJ: Emergency medicine in the Persian Gulf war - Part 3: Battlefield casualties. *Ann Emerg Med* 1994;23:755-760.