

## Frostbite among Iraqi soldiers during Iraqi-Iranian war

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### Summary:

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**Background:** Frostbite is a cold weather injury characterized by tissue freezing. It can adversely impact military operations. This study was carried out to demonstrate the frostbite among Iraqi -Iranian war.

**Materials:** The over surveillance period was 1<sup>st</sup> Dec. 1987 to 1<sup>st</sup> March 1988. A form was filled for each affected soldier. All cases were followed till Dec. 1988.

**Results:** The reported frostbite cases were 10 000 cases. The rate was of 100 cases per 100 000 person - year. The foot was the most affected site. High frostbite cases were reported during the active military operations.

**Conclusion:** Education, acclimatization and strict enforcement of cold weather injury preventive measures are necessary in military services.

**Key words:** Frostbite, cold weather injury, army, Iraqi-Iranian war.

### Introduction:

Frostbite is a cold weather related injury (CWI) characterized by freezing of tissue. Frostbite is encountered in soldiers, in those who work outdoor enthusiasts, mountain climbers and others at high altitudes. It has been recognized CWIs can adversely impact military operations, and that CWIs are largely preventable<sup>(1,2)</sup>. In the World War 1 the British developed and implemented a protocol for CWIs prevention<sup>(3)</sup>, after which subsequent declines in CWIs among British soldiers were attributed to strict enforcement of preventive measures<sup>(3)</sup>. In turn, the United States Armed Forces adapted the British system of CWIs operation. During the winter of 1950 - 1951 in Korea, there were 5600 medical evacuation of US troops due to cold injuries<sup>(4)</sup>. Several studies had reported high rates of CWIs due to ignorance and poor monitoring of CWIs preventive measures, particularly related to feet<sup>(5,6)</sup>.

Up to my knowledge no previous report was published on frostbite in Iraq. Therefore, this article was carried out to report on the frostbite among the Iraqi troops at the North of Iraq, during the Iraqi-Iranian war (1980-1988).

### Materials and Method:

The overall surveillance period was 1<sup>st</sup> Dec. 1987 to 1<sup>st</sup> March 1988. All the military medical staff was informed to report every case of frostbite by filling a special form. Data requested were age, anatomical site of the lesion, geographical location.

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Soldier's equipments, duties engaged by the soldiers, educational level of the soldiers and severity of the lesion. The reported cases followed up to the end Dec. 1988.

### Results:

The reported number of frostbite cases was 10 000 case (10% of the total fighters). The rate was 100 cases per 100 000 person - year. The anatomical sites most frequently affected were feet and hands (Table 1).

**Table 1: Anatomical site distribution of frostbite.**

Anatomical site	No.	%
Feet	9450	94.5
Hands	120	1.2
Both (feet and hands)	430	4.3

Table 2 shows the distribution of frostbites according to the activities of the soldiers in North Iraq. The number of the cases reported among soldiers during the attack phase was 4750 (47.5%) and the number of cases among the soldiers in the defense phase was 2010 (20.1 %) while during the regression phase was 1520 (15.2%). Fig. I demonstrated the installation of frostbite cases.

**Table 2: Distribution of frostbite according to activity of the soldiers.**

Activity	No.	%
Attack phase	4750	47.5
Defence phase	2010	20.1
Regression phase	1520	15.2
Guarding 2-3 hours	440	4.4
Guarding 5 hours	580	5.8
Patrol	230	2.3
Unidentified	470	4.7

frostbite may be attributed to the fact that during operations, the Iraqi troops were surprised by a sudden low temperature, high/cool winds, dampness, and snowfall and water immersion in mountain, valleys and more in the high passes (factors that interact to increase CWI risks). The finding may reflect the neglected enforcement of CWI preventive measures which are critical to protect the health and operational effectiveness of soldiers. Prolonged or repeated cold exposure might result in thermoregulatory fatigue<sup>(8,9)</sup> while sleep deprivation, negative energy balance, hypoglycemia and cold habituation play a role in blunting thermoregulatory mechanism<sup>(9)</sup>. However, the most frequently reported cases were frostbite, unsuspected cases and immersion foot, because there was no strict definition of frostbite in Iraqi military medical literature.

Feet, hands and both were the affected anatomical sites with frostbite. It is consistent with that reported by other workers<sup>(1,2)</sup>. A recent review of CWIs among soldiers in Alaska reported that hands, feet and ears were the most common affected site of frostbite<sup>(10)</sup>.

The finding that the highest rate (47.5%) was reported among soldiers in the attack phase, followed by defense phase (20.1%) and the regression phase (15.2%) reflects that CWIs preventive measures were not strictly enforced during military operation in Iraqi-Iranian war. In the attack phase, there were a prolonged repeated cold exposure, sleep deprivation, negative energy balance (risk factors for CWIs which are blunting thermoregulatory mechanism) for the period of the phase. The finding that the rate of frostbite during guarding, patrol, and usual daily activities were much lower than during active military operations (attack, defense and regression phases) indicating the lack of enforcement of CWIs preventive measures during the active phases.

Although declines in CWIs among British soldiers were attributed to strict enforcement of effective preventive measures<sup>(3)</sup> in World War I, it was stressed that the weather may destroy the army through high incidence of trench foot<sup>(11)</sup>. Other workers had reported high rates of CWIs due to ignorance and poor monitoring of CWIs preventive measures, particularly related to feet<sup>(5,6)</sup>. Tetanus, hyperglycemia, acidosis, refractory dysrhythmias tissue loss, gangrene and death as complication of frostbite were not reported among the study cases.

**Conclusion:**

Education, acclimatization and strict enforcement of CWI preventive measures are

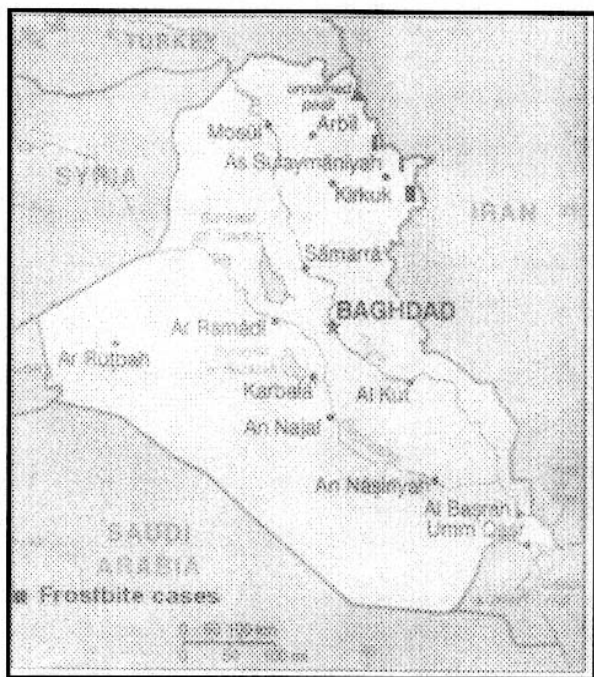


Fig. 1: Geographical distribution of reported cases of frostbite.

**Discussion:**

The finding that 10 000 frostbite cases reported during one winter (1987-1988) is much higher than that reported among Active Duty Soldiers, US Army during five years period 1997-2001 (1714 cases)<sup>(7)</sup>. The reported rate (100 cases per 100 000 person-year) is much higher than rates reported among active duty soldiers, US army (23.7, 28.7 and 20.8 in 1997-1998, 1998-1999 and 2001-2002, respectively)<sup>(7)</sup>. The reported high figure of

necessary measures in military services in cold weathers.

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