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Epidemiology of burns during pregnancy in Tehran, Iran

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ABSTRACT

Objective: The purpose of this study was to determine the epidemiological factors of burns in pregnant women admitted to Motahari hospital in Tehran during a 7-year period.

Study design: This retrospective descriptive study was carried out for a 7-year period. Researchers examined the medical records and documents of all 38 pregnant women admitted to Motahari hospital. The required data including age, days of hospitalization, burn percentage, cause of the burn, extent and severity of the burn, burn involved member, gestational age, and fetal and maternal outcomes were collected using check lists. The collected data were analyzed using statistical package using social sciences (SPSS) software version 20.

Results: During this 7-year period, 38 pregnant women with burns in different parts of their body were admitted to Motahari hospital in Tehran. Regarding burn frequency in the trimesters of pregnancy, the highest frequency was found in the second trimester (73.7%), and the frequency in the first and the third trimesters were 7.9 and 18.4%, respectively. Maternal mortality rate in the third trimester (57.1%) was higher than in the second (46.4%) and the first (33.3%) trimesters; however, fetal mortality rate was the highest in the first trimester (66.7%) followed by the third trimester (57.1%). Overall, fetal death occurred in half of the patients.

Conclusion: The results of this study showed high maternal and fetal mortality rates in pregnant women with burns. This issue indicates that planning and implementing supportive and therapeutic protocols in these patients are of utmost importance and should be carried out by maintaining the health of mother and fetus immediately after patient hospitalization.

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1. Introduction

Every year, more than 11 million people with severe burns require medical interventions. According to the World Health Organization statistics, more than 300,000 people die every

year from fire-related burns worldwide [1]. Injuries related to burns include fractures; dislocations; sprains; strains; intracranial, internal, superficial, and crushing injuries; open wounds; injury to blood vessels, nerve, and spinal cord; and contusions, which are associated with significant maternal and fetal morbidity and mortality with increased rates of

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preterm labor, premature rupture of membrane, and uterine rupture [2]. According to the definition provided by the International Society for Injuries caused by burn, burn is a damage to the skin or other organs which is caused by thermal sources. Burning occurs when a part or all of the cells of the skin or other body tissues are destroyed by hot liquids, hot objects, or flame [3]. Burns are always considered as one of the most devastating injuries that not only lead to death or disability, but also have major economic consequences and severe long-term mental and physical complications. Primary acute care for burns constitutes only a small part of the overall treatment. Patients with burns often require controlled rehabilitation, reconstruction, and psychological support for years [4,5].

Epidemiological studies of burns in different parts of our country show that young people, women, and those with low educational level are more common victims of burns. In addition, the burn frequency of burn, burn level, and mortality rate of women are higher than men in our country as well as many other least developed countries [6–9]. This is while reproductive age is the most important stage of life. The most positive health characteristics are observed in this age group, and the individuals are found to have maximum physical, esthetic, and reproductive capabilities. Mortality in women of reproductive age is generally caused by pregnancy and childbirth. Hence, particular attention has been paid to safe motherhood in order to reduce the mortality rate. Numerous studies have been carried out on mortality caused by pregnancy and childbirth worldwide, particularly in Iran. However, few studies are done on mortality caused by burns in this age group, especially during pregnancy [6].

Physiological changes during pregnancy affect the patient with burns during this period. Thermal burns during pregnancy have many side effects on maternal and fetal outcomes and are associated with a high incidence of complications such as intrauterine fetal death, miscarriage, and preterm birth. Apparently, pregnancy does not change the mother's survival rate [9]. The factors that can play a role in the survival of the mother and fetus are as follows:

1. Body surface burn percentage
2. Gestational age
3. Depth of the wound
4. Burn complications
5. Accompaniment of medical illnesses and other injuries

Generally, prognosis will be better with proper and planned management; however, >40% of the body surface area is affected with burns, and thus the mortality rate of mother and fetus would be approximately 100% [9–11]. Management of burns during pregnancy requires a team approach with close monitoring of the mother and fetus. In most cases, fetal health directly depends on mother's health. Based on this principle and the results of most previous studies, it is deduced that all pregnant patients with burns should receive primary measures; a proper and complete approach to resuscitation must be adopted after burn care for maintaining the health conditions of the mother and fetus. All these measures are found to have significant effects on prognosis and maternal and fetal mortality [12,13].

Information on burns during pregnancy is limited to case reports and case series. Maternal age and trimester of pregnancy of the patients do not appear to affect maternal or fetal outcome, and pregnancy does not appear to independently alter maternal survival after severe burns [14]. This study was conducted for a 7-year period to determine the epidemiological factors and burn outcomes in pregnant women admitted to Motahari hospital in Tehran.

2. Materials and methods

This study is a 7-year retrospective descriptive study; the medical records and documents of all the pregnant women with burns who were admitted to the Motahari hospital were examined. During 2007–2014, this hospital was only the specialized center in Tehran for treating patients with burns. The required data including age, days of hospitalization, burn percentage, cause of burns, extent and severity of burns, burn involved member, gestational age, and fetal and maternal outcomes were collected using check lists.

The extent of burns is estimated on the basis of the burn percentage of total body surface area (TBSA); this burn percentage of skin surface is indicated from moderate to severe intensity using schematic symbols representing the front and back surfaces of the human body. In order to clinically assess the severity of burns, a three-grade classification (2, 3, and 4) is developed. According to this classification, skin irritation, an indicator of mild burns, (grade 1) is not taken into account. The data collected were analyzed using statistical software SPSS version 20. Descriptive statistic methods such as relative and total frequency were used for data analysis.

3. Results

During the study period, 38 pregnant women with burns (average age: $26/5 \pm 6$ years) in different parts of their body were admitted to the Motahari hospital in Tehran. 86% of the patients were <30 years old, the youngest was 17 and the oldest 45 years old (Table 1).

The highest frequency was associated with burns caused by oil and gasoline (53%). Other causes were domestic gas (21.1%), boiling water (7.9%), and flame (5.3%). In addition, 10.5% of the burns were due to other causes (Table 2).

The frequency of total body burn percentage given in Table 3 indicates that the highest frequency was related to burn percentages of 11–20 and 61–70.

The mean burn percentage of body surface area was 45.76 ± 26.19 . In total, 18 out of the 38 admitted patients (47.4%) died. Fetal outcome was not better than maternal outcome as fetal death occurred in 50% of the patients during pregnancy.

The highest frequency of burns was associated with those caused by oil and gasoline (55.3%). The burn frequency with regard to other burn causes is in the following order: domestic gas (21.1%), boiling water (7.9%), and flame (5.3%); other reasons contributed to 10.5% of the cases. The highest burn percentage was 55.33 ± 26.97 , which was related to oil and gas,

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