EVALUATION OF MATERNAL AND FOETAL OUTCOMES IN PREGNANT WOMEN HOSPITALIZED IN KERMANSHAH HOSPITALS, IRAN, OWING TO BURN INJURY, 2003-2008

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SUMMARY. This study addresses maternal and foetal complications in pregnant women hospitalized for burn injuries in 2003-2008. It was a retrospective descriptive cross-sectional study, carried out in pregnant women hospitalized in the burn ward of Imam-Khomeini Hospital, Iran, in 2003-2008 (burn injury rate, 1.88%, 39 cases; mean age, 23.51 ± 4.78 yr). The pregnant woman death rate was 66.7%: 26 patients died because of burn complications and 13 patients (23.3%) survived. The causes and circumstances of the fatalities are reported. There was a statistically significant relationship between burn severity and foetal and maternal mortality rates ($p < 0.02$). Burn severity was not statistically related to premature delivery and mode of delivery. The factors affecting prognosis and the maternal and foetal death rates were the total burn area, continuous clinical surveillance of the mother and foetus, and employment of appropriate treatment protocols.

Keywords: burn, pregnancy, mortality, foetus, lethal area

Introduction

Burn injury is a major cause of disability and mortality and has severe economic and social consequences. It can also lead to somatic and psychological complications.[1]

Burn injuries have several serious harmful effects on the human body, and if the victim is a pregnant woman, the type and severity of the injuries may prove to be more serious owing to the mother's physical condition during pregnancy. Some spontaneously go into labour and give birth to a stillborn baby. The factors contributing to the condition are hypervolaemia, pulmonary injury, septicaemia, and a catabolic state associated with the burn. Some researchers have reported that the maternal and foetal survival rates are related to the percentage of the area burned and that when the burned area exceeds 50%, foetal and maternal morbidity increase significantly.[2]

The management of burns in these patients is not different from that of non-pregnant patients. However, considering the higher intravascular volume and cardiovascular changes in pregnant women, fluid therapy should be performed more cautiously. This is because potential infections, the drugs administered for treatment of the burns, and the stress suffered by the mother and foetus all negatively affect the mother and foetus.[3]

In this respect, few studies have been carried out in Iran, and thus little information is available on pregnant patients with burn injuries. In the study carried out by Maghsoudi et al.,[4] 68.6% of all patients and all the patients with suicidal burning used oil-derived materials as the flammable material. The mean burn area was 7.37% and in 51% of the patients the burn area was more than 40% of the total body area, which resulted in 100% maternal and foetal death.

The health of pregnant women is one of the major health priorities of every community, and burn injury is a harmful factor that directly influences both mother and foetus.

Imam-Khomeini Hospital is one of the largest burn centres in West Iran. This study evaluates maternal and foetal outcomes in pregnant women hospitalized in the burn ward of the hospital. There were several problems in fulfilling the project, including lack of separate coding for files of pregnant women. We used the files available to the best of our ability. Other evidence was also used to obtain data on the cases such as the case history, file summary, police reports, admission letters from other centres, physicians' orders, nursing reports, consultations, and sonography reports.

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Materials and methods

This is a descriptive analytical study. The study population included pregnant women with burn injuries who were referred the burn centre in Imam-Khomeini Hospital, the only burn centre in Kermanshah Province and one of the major burn centres in West Iran. All burn patients in Kermanshah Province and neighbouring provinces are referred to this centre. Valuable information on epidemiology of burn injuries in Kermanshah Province is available in the hospital. Sampling was performed using a simple sampling method. The authors reviewed all files related to the burn ward, and extracted the data regarding pregnant women admitted between 2003-2008. If the demographic data in the files were incomplete, the authors called the patients' families and completed the missing data. We also surveyed cases referred to the Imam-Reza and Motazedi hospitals and included them in the study.

We devised a checklist according to the principles used in international studies, recording data related to the study variables, i.e. mother's age, gestational age, foetal sex, aetiology of the burn, ratio of burn area to the total body area (severity of burn), post-burn maternal and foetal outcomes, and post-burn maternal and foetal mortality rates.

Descriptive statistical methods were used to determine frequency of demographic and clinical characteristics of the study population. The data were analysed using the chi square test and Fisher's exact test.

Results

The total number of patients hospitalized in the burn ward of the hospital during 2003-2008 was 3695, 2067 of whom (55.94 %) were females. Among these, 39 (1.88%) were pregnant and included in the study.

The pregnant women were in the age range of 17-36 yr (mean, 23.5 ± 4.78 yr). The mean gestational age of the women was 23.79 ± 7.61 weeks, the range was 7-38 weeks.

With regard to the participants' occupation, 35 (89.74%) were housewives, three (7.7%) students, and one (2.56%) was a clerk. Considering the jobs of their husbands, 15 (38.46%) were farmers, 11 (28.20%) workers, 2 (5.12%) clerks, and 11 (28.20%) unemployed. Out of all patients, 16 (41%) lived in urban areas and 23 (59%) lived in rural areas. As to the education level, 15 (38.46%) were illiterate, 20 (51.12%) had an education level below high school diploma, three (7.70%) had a high school diploma, and one (2.56%) had an academic qualification.

The seasonal distribution of burns was as follows: 6 (15.38%), spring; 9 (23.07%), summer; 10 (25.64%), fall; and 14 (35.89%), winter.

The causes of burns were hot oil (24 cases, 61.35%), followed by boiling water (6 cases, 15.38%), spilt oil in an oven (4 cases, 10.25%), natural gas leakage from the cylinder (3 cases, 7.70%), and use of gas for baking bread (2 cases, 5.1%).

Burns severity was measured with regard to the total surface of burn area. The severity was less than 25%, 25-50%, 51-75%, and more than 75% of the total body area in 6 (15.4%), 14 (35.9%), 13 (33.3%), and 6 (15.4%) patients, respectively.

With regard to the depth of burn and involvement of superficial layers of the skin and other organs of the body, 9 (23%) and 30 (76.9%) patients respectively had second- and third-degree burns. Totally, among the pregnant women with burn injuries, 26 patients (66.7%) died owing to their injuries and 13 (23.3%) survived. Maternal and foetal outcomes according to the percentage of body surface area burn were determined in each pregnancy trimester (*Tables I, II, III*).

Table I - Relationship between percentage of body surface area burned and maternal and foetal outcomes in the first trimester of pregnancy

Percentage burn outcome	0-25	26-50	51-75	>75	Total
Abortion	0	1	1	1	3
Intrauterine death	0	0	0	0	0
Maternal death	0	0	0	1	1

Table II - Relationship between percentage of body surface area burned and maternal and foetal outcomes in the second trimester of pregnancy

Percentage burn outcome	0-25	26-50	51-75	>75	Total
Abortion	0	2	3	2	7
Intrauterine death	0	1	6	1	8
Normal delivery	2	3	0	0	5
Hysterectomy	0	0	0	0	0
PROM*	0	0	0	0	0
Premature labour	0	1	0	0	1
Maternal death	0	3	7	3	13
* Premature rupture of membranes					

Table III - Relationship between percentage of burned body surface area and maternal and foetal outcomes in the third trimester of pregnancy

Percentage burn outcome	0-25	26-50	51-75	>75	Total
Intrauterine death	o	2	2	3	7
Normal delivery	2	2	0	1	5
Caesarean section	2	3	1	0	6
PROM*	0	3	1	0	4
Premature labour	2	4	1	0	7
Maternal death	1	4	3	3	11
* Premature rupture of membranes					

Considering the type of burn, 17 cases (43.6%) were intentional self-harm burns and 22 cases (56.4%) were accidental.

There was a statistically significant relationship between burn severity and maternal and foetal mortality rates ($p < 0.02$). Out of the women with a percentage of body surface area burn above 60%, more than 50% died (*Table IV*). According to our findings, the severity of burns was not significantly related to abortion ($p = 0.47$), intrauterine death ($p = 0.15$), premature delivery ($p = 0.14$), and the mode of delivery ($p = 0.21$).

As to parity, the pregnancy was the first, second, third, and fourth for respectively 24 patients (61.5%), 10 (25.6%), 4 (10.3%), and 1 (2.6%).

The causes of death in the 26 fatalities were septicaemia (16 cases, 61.5%), acute respiratory failure (6 cases, 23%), and other causes (4 cases, 15.3%).

Table IV - Maternal mortality rate by percentage of burned body surface area (lethal area)

Probability of mortality (%)	Percentage of burn (%)
3.8	14
7.7	40
30.8	49
38.5	54
53.8	60
73.1	70
84.6	82
88.5	90
96.2	98

Discussion

A statistically significant relationship was found between severity of burn and maternal and foetal mortality rates. As observed, more than 50% of the women with a burn percentage above 60% died.

Maghsoudi et al.[4] found that 51% of patients in their study had burns in over 40% of total body area, resulting in 100% maternal and foetal mortality rates.

In a study in India,[5] Mago reported that the frequency of burns increased among pregnant women in rural areas in India. In his study, out of 1200 patients admitted with burns, 384 cases (32%) were pregnant women in the age range of 19-35 and with a mean age of 27 years. In women with burn areas above 50% of total body area, the maternal and foetal mortality rate was 70%.

Rode reported that when over 50% of the total body area was burned, the mother's survival was unlikely.[6] In the study carried out by Gang, two cases of death were observed among women with burns in over 80% of total body area.[7] The difference in the results could be attributed to the difference in the facilities available in centres, the experience of the physicians in charge, and causes of the burns.

The results of this 5-yr study show that, in the time interval concerned, 3695 cases were hospitalized in the burn ward of Imam-Khomeini Hospital, 55.9% of whom were females. Thirty-nine of the patients were pregnant, corresponding to 1.88% of all female cases and 1.05% of all burn cases.

In all previous reports and also according to the results obtained, the percentage of burn area and gestational age were the most important effective factors in the prognosis and outcome of mother and foetus. In other words, the mortality rate of the mother increased with higher burn areas. Thus, foetal survival rate was directly influenced by the percentage of the mother's total burned body area.

Mehdizadeh et al. found that almost 70% of burn cases in pregnancy occurred in the mother's age range of 16-25 yr and that there was a statistically significant relationship between the level of education and the risk of burns in pregnancy: at a lower education level, the risk of burn was higher.[8] In our study, 5.38% of patients were illiterate and 3.51% were scarcely literate, corresponding to 8.89% of all patients studied.

The patients' mean age was 23.51 yr, compared to 24.2 and 27 yr in the studies performed by Maghsoudi and Mago, respectively.[4,5] Our results were not significantly different from the values reported in the two studies mentioned.

In the current study, the highest frequency of burns occurred in winter followed by the autumn. Mehdizade and Rezavand reported the highest frequency in winter.[8,9] This could be attributed to the use of heaters in these seasons.

In this study, 59% of the patients were from rural areas. Mago also reported that most patients were from rural areas.[5] This may be because of the lower awareness of people living in villages and of the use of non-standard heaters.

We observed a statistically significant relationship between severity of burn and foetal and maternal mortality rates. This is consistent with the findings of Mago,[5] Unsur,[10] Rode,[6] Gang,[7] and Chama,[11] who reported that maternal and foetal mortality rates were directly related to the severity of burn. The severity of injuries due to burns and the consequent water and fluid disturbance would appear to directly threaten the life of both mother and foetus.

We did not observe a significant relationship between burn injury in pregnancy and the risks of abortion and premature delivery. In the studies performed by Rode[6] and Agarwal,[12] a direct relationship was reported between the percentage of burn area and the frequency rates of abortion and premature delivery. The differences could result from the difference in sample size of the studies.

Conclusion

The need for potential support to pregnant women with burns in order to minimize the consequences is obvious. Secondary complications that result from organ dysfunction and failure are worrying and directly influence the maternal and foetal mortality rates. Considering the data available, we are far from the ideal treatment and management of burn patients and the current study also confirms this idea.

With regard to the high frequency of mortality in cases of burn injury during pregnancy, and since sepsis is the commonest cause of death in these patients, further studies on infections in burn during pregnancy are recommended.

RÉSUMÉ. Cette étude affronte les complications maternelles et fœtales chez les femmes enceintes hospitalisées pour des brûlures pendant la période 2003-2008. C'est une étude descriptive rétrospective et transversale, menée sur des femmes enceintes hospitalisées dans le service de brûlures de l'hôpital Imam-Khomeini, Iran, entre 2003-2008 (taux de lésions par brûlure, 1,88%, 39 cas; âge moyen, 23,51 ± 4,78 ans). Le taux de décès dans les femmes enceintes était de 66,7%: 26 patientes décédées pour complications de la brûlure et 13 (23,3%) ont survécu. Les causes et les circonstances des décès sont rapportés. Il y avait une relation statistiquement significative entre la sévérité de l'incendie et le taux de mortalité fœtale et maternelle ($p < 0,02$). La sévérité de l'incendie n'était pas statistiquement liée à un accouchement prématuré et le mode d'accouchement. Les facteurs qui influaient sur le pronostic et les taux de mortalité maternelle et foetale étaient l'extension totale de la zone brûlée totale, la surveillance clinique continuelle de la mère et du fœtus, et l'emploi des protocoles de traitement appropriés.

Mots-clés: brûlure, grossesse, mortalité, fœtus, extension léthale

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