

An Insight to Burn Related Maternal Morbidity and Mortality in Pregnancy

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Aims: The aim of this study is to study morbidity and mortality of burn cases during pregnancy and postpartum period.

Methods: This is a retrospective study conducted at Tribhuvan University Teaching Hospital from April 1998 to July 2014. The data were retrieved from the records in burn ward, intensive care unit and emergency unit. Pregnant women with burn were studied for the nature, degree and the percentage of burn in relation to pregnancy outcome and mortality.

Results: There were 32 cases of burn patients with pregnancy. The most common source of burn was kerosene-induced flame (23) followed by domestic firewood (7), boiling water (1) and lightening (1). There were 25 cases of accidental burn and seven were suicidal burn. The age of the patients was ≤ 19 years in 7, 20-24 in 13, 25-29 in 6 and 30-34 in 6 patients. Except for two cases of postpartum burn, all the others occurred during pregnancy between 6-40 gestational week {<12 weeks =5, 13-27 weeks =10, 28-36 weeks =4, 37-42 weeks =6 and unknown =7}. There was only one cesarean and three vaginal births and most resulting in stillbirth owing to higher percentage of burn above second degrees. The percentage of burn was <30% in 13, 30-39% in 3, 40-59% in 6, 60-69% in 5 and 70-90% in 2 patients. There were nine mortality (28.1%) in women above 30% burn.

Conclusions: The most common cause of burn in pregnancy was flame burn. Pregnant women need to be cautioned against flame burn and avoid using kerosene cooking stove to prevent themselves from burn, genuinely necessary steps to be propagated by all healthcare providers and also at the same time counseling against suicide to be done.

Keywords: maternal mortality; suicidal burn; wood fire burn.

INTRODUCTION

Maternal mortality is a priority research subject in Nepal. Upcoming studies have shown suicide as one of the few important contributors to the maternal mortality issues.¹ Burning themselves to death has also been implicated as a suicidal motive.² Significant female population in reproductive age group are being subjected to death due to burn in Nepal.³ While we commonly witness more incidents within households, females are more prone as they are engrossed in domestic cooking using firewood.⁴ Burn acquired at domestic cooking using firewood in squatting position, a normal norm of rural lifestyle that results in extensive scarring in perineum, has been the cause of obstructed labor.⁵

This study values the role of multidisciplinary approach through a specialized team of anesthetist/intensivist, physicians, plastic surgeons and obstetricians for management of these patients. This

study also helps to recognize, understand and educate us regarding current status of burns in pregnancy employing hospital-based data.

METHODS

This was a retrospective study conducted at Tribhuvan University Teaching Hospital between

15th April 1998 – July 2014 from burn ward, intensive care unit and emergency unit. Data source was the record book in burn ward, emergency, intensive care unit, and medical record section. Pregnant women with burn were studied to establish relationships between maternal age, nature of burn (homicidal, suicidal or accidental) including the degree and the percentage of total body surface (TBSA) area burn, source and intentionality of the burn and trimester of pregnancy at the time of the burn. Perinatal and maternal outcome were also studied. A fixed questionnaire was created and filled up. Informed consent was obtained from all the women. Approval from the Institutional Review Committee of the hospital was also taken.

RESULTS

During last 16-years, 32 married women of reproductive age group were admitted with burn

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during pregnancy. Among them, thirty patients were pregnant and two were in puerperium. The intent of burn was accidental in 25 (78.1%) and suicidal in 7 (21.8%) patients (Table 1). Most of the suicidal burns were attempted by using kerosene and three of them succumbed to death. Among the accidental burn, 23 were flame burn, one due to hot water and one due to lightening.

Table 1. Nature of burn, accidental/suicidal (n=32).

Cause of burn	Accidental	Suicidal
kerosene	0	4
Kerosene stove	4	0
Gas stove	2	0
Wood	5	0
Flame	3	0
Makal	3	1
Scald	1	0
lightening	1	0
Unspecified	6	2

Majority were second degree burn (n=28, 87%) and the deeper to dermis or third degree burn were four in number (13%). Among the patients with third degree burn, two survived while two died, all four having had 60% burn. Burned out total body surface area (TBSA) ranged from 1 to 90%. Higher percentage total body surface area affected by burn was noted to produce grave results in terms of maternal and fetal wellbeing. There was no mortality less than 30% burn {(n=10, (31.2%)}, more than 30% (n =22, 68.7%). Nine out of the twenty-two patients (40%) with greater than 30 % burn (Figure 1).

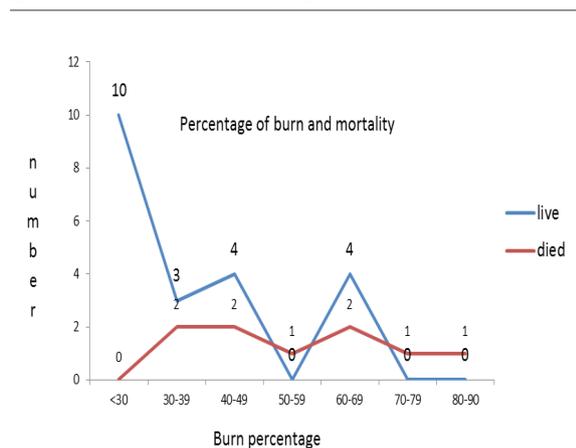


Figure 1. Burn and mortality (n=32).

Among the maternal death that occurred in 9/32 women who sustained burn injury, 3(9.3%) of them were suicidal and 6 (18.7%) were accidental. The

age of the women ranged from 18-34 years and the pregnancy varied from 16-40 weeks. Five of the pregnancy being above 30 weeks period of gestation and two of them being 40 weeks with the record of one fresh stillbirth.

The maternal complications that led to mortality were shock, respiratory distress and sepsis with one sustaining corneal abrasions/perforation. The seriousness of the condition indicated by death within one day in three cases and three days in another, while women were kept alive up to 53 days in one case (Table 2).

Table 2. Summary of maternal mortality due to burn (n=9).

Age (years)	Gestational age (weeks)	Burn %	Type/cause of burn	Burn to mortality interval (days)
18	35	75	Accidental (Kerosene stove)	1
26	16	55	Suicidal (kerosene)	29
18	*	60	Accidental (Kerosene stove)	53
31	40	37	Accidental (woodfire)	31
20	27	30-35	Suicidal (kerosene)	17
19	40	60	Accidental (flame burn)	36
20	*	40	Suicidal	1
18	30	90	Accidental	3
20	36	40	Accidental	1

Note : * Gestational age not known

The pregnancy ranged from G1-G6. Age of the patients ranged from 18-34 years, less than 19 (n=7, 22%); 20-24(n=13, 40.6%); 25-29 (n=6, 18.7%) and 30-34 (n=6,18.7%). with the mean age of the burn affected pregnant women being 23.4 years (Figure 2).

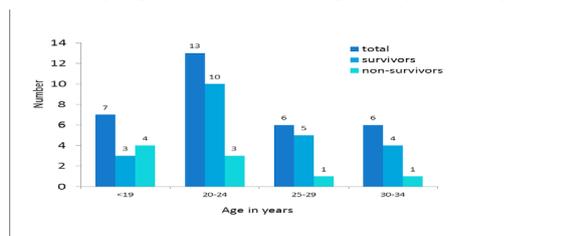


Figure 2. Age in years (n=32).

Two postpartum cases, one who caught fire on saree end while lactating. Period of gestation was less than 12 weeks (n=5, 15.6%); 13-27 weeks (n=10, 31.2%); 28-36 weeks (n=4, 12.5%) and 37-42 weeks (n=6,

18.7%) with dates not verified in five cases (Figure 3).

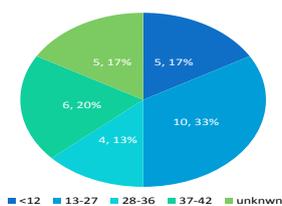


Figure 3. Period of gestation in weeks (n=32).

Labor was induced but failed to progress in one and needed cesarean section. Hospitalization period was 1-66 days (mean =26 days). Hospitalizations in for those who expired were 1- 51days

(mean =19 days) and who survived were 2-66 days (mean= 33 days) (Figure 4).

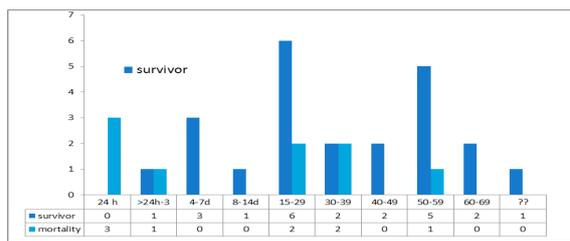


Figure 4. Length of hospitalization (n=32).

DISCUSSION

This retrospective study showed that burn injury during pregnancy is seldom met in our hospital.

Review of hospital records revealed that hardly two cases of burn in pregnancy are admitted per annum with four thousands deliveries and about 250 mixed pregnancies ending uneventfully. And this finding is similar to the other studies reporting incidence of small number of cases of burn in pregnancy.⁶⁻⁹ Burn injuries during pregnancy have adverse effects on maternal and fetal outcome with high incidence of IUD, abortion and premature labor. Pregnancy itself does not alter the maternal survival.¹⁰

The possibility of pregnancy must be considered when any woman of reproductive age sustains a burn injury. Although rare, an extensive burn during pregnancy is a serious complication. In the study done by Agrawal et al¹¹ reported 12.29% of all women of reproductive age admitted with burns were pregnant. Because pregnancy tests were not done routinely the true incidence of pregnancy associated with burn injuries, especially in the first trimester, remains unknown.

Burn can happen accidentally during pregnancy, fetal wellbeing need special attention.

There are specific physiological changes that occur during pregnancy that may have an impact after thermal injury on maternal and fetal well-being. Burns causes many maternal physiological changes and places additional stress on systems that are already highly modified. Pregnancy is associated with hyperdynamic cardiovascular state. After burns there is increased capillary permeability and third space loss leading to hypovolemia, which may in turn lead to hypotension if the patient is inadequately resuscitated leads to placental insufficiency, fetal ischemia, hypoxia and acidosis leading to premature birth. Thus aggressive fluid resuscitation, upright posture and oxygen supplementation should be provided to the mothers even in the absence of smoke inhalation.^{12,13} And fetus in utero calls for extra caution.¹⁴⁻¹⁶

In this study women of reproductive age group have got burn injuries mostly while doing household tasks. Although most of them were accidental, some were intentional and maternal mortality was more in intentional burns. Most of the maternal mortality (40%) had TSAB above 30%. Kamini et al⁹ also showed in their study that the maternal and fetal mortality rates were higher when the burn was suicidal. Higher degree of burn is directly proportionate to severity of outcome. All third degree burn (n=4) resulted in poor outcomes in our study. Prevention of hypovolemic shock by adequate early fluid therapy is required to maintain the uterine blood flow, which in turn maintains fetal tissue pO₂ levels within the normal range. It is recommended to maintain the mother's blood pressure within the normal range and a urine output of 30-60 ml/h. Ventilatory support should be initiated when maternal pO₂ is less than 60 mm Hg as inhaled carbon monoxide can cross the placental barrier to compete for binding sites on fetal hemoglobin, provoking fetal cardiac edema, and affecting cardiac development.¹⁷

There have been concerns of perineal burns posing a difficulty for vaginal birth or cesarean delivery with respect to abdominal burn injuries imparting situational challenges. This runs everywhere even in the best of the hospital, equipped with burn care facilities or having guiding protocol for the management.^{18,19} Women in developing countries typically squat around cooking fires and perineal

burns result in scarring of genitalia leading to obstructed labour and abdominal burn scar may sometimes interfere in abdominal incision while performing cesarean sections. However, in our study spontaneous labor occurred in most cases, while induction was done in one case and resulted in fresh stillbirth.

Our study showed comparable figures of the nature and type of burn, most common being accidental flame burn. This study also showed the maternal mortality comparable to the figures mentioned in most literature as 39% -68.6%.^{7,9,13,20} Despite of sustaining large body surface destruction by burn and long period of hospitalization many patients were successfully sent home after wound management with skin graft.

CONCLUSIONS

Pregnancy does not influence maternal outcome after thermal injury and best chance for fetal survival is to ensure maternal survival. Pregnant women

need to be cautioned against flame burn and avoid using kerosene-cooking stove to prevent them from burn. Maternal survival is less likely if the burn wound exceeds 30% total body surface area. Thermal injury does increase the risk of spontaneous abortion and premature labour and foetal survival depends upon foetal maturity. Urine pregnancy test should be done to all women in reproductive age group admitted in burn ward.

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DISCLOSURE

The authors report no conflicts of interest in this work.

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