Original Research

Burns in pregnancy: Five-year experience in a tertiary hospital in southeastern Nigeria

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Abstract

Background

Burns in pregnancy is often associated with high maternal and fetal morbidity and mortality especially when the total burn surface area (TBSA) involved is high. This study aims to review management outcome of cases of burns in pregnancy at Alex Ekwueme Federal University Teaching Hospital Abakaliki (AE-FUTHA).

Methods

A five year retrospective study of all pregnant women that presented at AE-FUTHA with burn injury between April 2014 and March 2019. Information was collected from the medical records using a proforma and analyzed with IBM SPSS Statistics version 20.0 (IBM Corp., Armonk, NY, USA) using descriptive statistics.

Results

A total of 222 cases of burns were managed but only 8 were pregnant, giving an incidence of 3.6%. The commonest causes were flame (62.5%), scald (25%) and friction (12.5%) occurring mostly during the harmattan season. The median age of participants was 25-34 years. The burns affected 12.5% of the patients in the first trimester and 62.5% and 25% in the 2nd and 3rd trimesters respectively. Most patients (62.5%) had superficial burns while 25% had other associated injuries in addition to burns. About 87.5% had term spontaneous vaginal delivery. There was no maternal death but, there was an early neonatal death.

Conclusion

The good outcome observed in this study with a 100% survival, could be explained by inter-disciplinary management approach given, even as most cases were minor degrees of burns. Early involvement of obstetricians in all burns affecting pregnant women is advised especially in burn centres where obstetricians are hardly in the employ.

Keywords: Burns in pregnancy; maternal outcome; multi-disciplinary management; Nigeria;

Introduction

Burn injuries in pregnancy are often times life threatening to the mother and her unborn child with increased risk of perinatal and maternal mortality and morbidity, especially if not properly managed. These injuries often result from hot liquids (scald), hot solids (contact burns), or flames (flame burns) which may cause superficial or deep skin damages[1]. Burns can also occur from ultraviolet radiations, radioactive agents, electrical, and chemical sources. Smoke inhalation from flames can result in respiratory tract injuries, especially in cases of fire or toxic chemical exposure[1,2]. Apart from the physical injuries, burns cause emotional, psychological and post-traumatic stress disorder to its victims and constitute a source of financial burden to the family, especially in low resource settings like Nigeria, where the health insurance scheme is not fully operational or still at the teething stage, resulting in out of pocket payment for health care services[2,3]. Burns is a rare occurrence during pregnancy but maybe associated with high complication and deaths rates, especially in the low and middle-income countries (LMIC) where more than 4/5th of life threatening burns occur[4,5].

Unfortunately, it is difficult to ascertain the true incidence, morbidity and mortality rates of burns in pregnancy[6,7]. However, Mabogunje in Zaria, Nigeria reported that 86% of the parturient who suffer burn injuries and 71% of their fetuses survived[8]. In order to determine the true incidence of burns in pregnancy, it is thus necessary for all burnt cases of childbearing age women to have a pregnancy test conducted[7-9].

Maternal and perinatal survival correlate significantly with the degree of burn or Total Burn Surface Area (TBBSA) involved. Furthermore, there are reports that adverse prognosis are commoner in parturient with TBSA between 40-60%[4,5].

Burns often result in physiological derangement of the normal body functions and processes, as well as result in additional stress on body systems that are already modified, such as the cardiovascular system which becomes hyper dynamic during pregnancy. Following incidents of burns, there are increased capillary permeability and third space losses leading to hypovolemia and hypotension. These may lead to placental insufficiency with fetal compromise or demise and premature delivery if no appropriate and timely interventions are offered[11,10]. Therefore, adequate resuscitation with intravenous fluids and oxygen supplementation are required as part of supportive management[11].

In early pregnancy, fetal outcome to a large extent depends on gestational age, degree of injury and maternal survival[12].

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However, beyond 32 weeks, neonatal outcome significantly depends on survival of the woman[12]. Fetal survival sometimes depends on the absence of morbidities such as infection, hemodynamic instability like hypotension and hypoxia[7]. Multi-disciplinary approach between the surgical, obstetric and other teams providing supportive care is necessary to achieve optimal outcome. Premature contractions and labor may be aborted by the use of tocolytics, while the patient is being stabilized[9]. The timing and mode of delivery are mainly based on obstetric indications. Nevertheless, vaginal delivery is usually preferred in the absence of contra-indications[6].

Antibiotic that are safe in pregnancy are used. Their use in burn are for prophylaxis, presumptive use and, for treatment of infection[13,14]. Management of wound with tangential excision plus split-thickness skin graft aid wound healing and reduce risk of infection and enhances feto-maternal outcome[9].

There are limited publications and current evidence regarding burns in pregnancy, despite being necessary to formulate guidelines for burn-care providers, counseling patients and their families of potential risk, complications and prognosis. This study attempts to provide an update and recent evidence regarding burns in pregnancy, by determining the clinical presentation, management and treatment outcomes of cases managed at the burns and plastic unit of AE-FUTHA.

Methods

Study design

This is a retrospective study of pregnant women with burns, managed at the Burns and Plastic Surgery unit of AE-FUTHA over 5 years (April, 2014 to March, 2019). Ethical approval was gotten from the Research and Ethics Committee of AE-FUTHA with Approval reference; Ref. no: FETHA/REC/VOL2/2019/261. Routinely our institution being a teaching hospital usually takes consent from patients they manage on using their information for possible teaching, research and educational purposes of public interest.

Data were obtained from the medical records of all patients with burn in AE-FUTHA managed during the study period. Information was collected on socio-demographic characteristics, clinical presentation, and management outcomes. All pregnant women who had burns were included in the study.

Study area

This study was conducted at Burns and Plastic Surgery unit of the Department of Surgery, Alex Ekwueme Federal University Teaching Hospital Abakaliki, Ebonyi State. Ebonyi State is one of the five states in the southeast geopolitical zone of Nigeria. It has a total land mass of 5,533km^2 and a population of about 3,046,28715.

Alex Ekwueme Federal University Teaching Hospital Abakaliki is a 720 bed hospital with 13 clinical departments, of which Department of Surgery is one. The Burns Unit of the Hospital is run by the plastic surgery division of surgery department. There are 8 beds in the acute burns section and 12 beds in the chronic burns and wound section. The plastic surgery division is currently run by 6 consultant plastic surgeons, 6 resident doctors, 14 specialist nurses, and 6 other nurses. Patients are admitted to the acute burns unit through the accident and emergency unit of the hospital. All the patients were co-managed with the Obstetricians and other subspecialists as indicated.

Study population

The study population was pregnant women who suffered burns injuries and were managed at AE-FUTHA during the study period. The diagnosis of pregnancy was from history, examination and confirmed by serum pregnancy test and abdominal ultrasound scan. All women who tested positive for pregnancy and had suffered burns injuries were recruited for the study irrespective of their gestational age and parity.

Data analysis

Data were obtained from the patient's medical case notes using a predesigned proforma. Data were collected on patient's age, gestational age, type, site and extent of burns injury, surgical care, complications, duration of hospital stay, and maternal and fetal outcome. Information on maternal outcome, duration of hospital stay, presence of obstetric morbidity and mortality were collected. Fetal outcome were assessed in relation to the status of the fetus at birth, early neonatal deaths, need for/and indication for newborn intensive care unit admission. Data were analyzed with IBM SPSS Statistics version 20 (IBM Corp., Armonk, NY, USA).

Results

During the study period, a total of 222 cases of burns were managed at AE-FUTHA, seventy-eight were within the reproductive age group (15 to 49 years) but only 8 were pregnant, giving an incidence of 3.6%. The median age of patients was 25-34 years. The majority were government employees (37.5%).

Table 1: Socio-demographic characteristics of patients

Variables	Frequency (%)
Age(years)	
<20	1(12.5)
20-29	3(37.5)
30-39	3(37.5)
>40	1(12.5)
Level of education	
Primary	0(0.0)
Secondary	4(50.0)
Tertiary	4(50.0)
Occupation	
Trading	1(12.5)
Civil servant	3(37.5)
Public servant	2(25.0)
Student	1(12.5)
Farming	1(12.5)
Parity	
1-4	7 (87.5)
≥5	1 (12.5)
Gestational age (weeks)	
1-13	1 (12.5)
14-28	5 (62.5)
>28	2 (25.0)

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Fifty percent of the women had secondary and tertiary levels of education respectively. Similarly, fifty percent of the patients were grand-multiparous (delivered 5 or more times). Almost Two-third; 5 (62.5%) had burn injury during the second trimester, while 25% occurred in the third trimester. (Table1)

Table 2: Surface area burnt, degree of burn, duration of hospital stay and associated injuries

Variables	Frequency	Percentage
TBSA (%)		
≤10	2	25
11 – 20	2	25
21 – 30	3	37.5
31 – 40	1	12.5
Depth of burns		
First degree	1	12.5
Second degree	2	25.0
Mixed thickness	5	62.5
Length of hospital stay (days)		
1-30	4	50.0
31-60	2	25.0
61-90	2	25.0
Associated injuries		
Yes	2	25.0
No	6	75.0%

Table 2 showed that 37.5% of our study population had TBSA ranging between 21-30% while fifty percent of the women had TBSA of burn that was 20% and less. None of the cases under study had more than 40% TBSA. The majority (62.5%) had mostly superficial thickness burn and complications was seen in 25.0% of the cases.

Twenty-five percent of the cases had other associated injuries. The length of hospital stay is shown in Table 2.

Table 3 shows obstetric and fetal outcomes

Figure 1, shows the etiology of burns in pregnancy. Flame injury was the commonest (62.5%) cause of burn followed by scald injury (25.0%) and friction (12.5%) related injury which was seen among the women who had road traffic accident.

Table 3: Clinical findings of the Burns suffered by the study population

TBSA (%)	Frequency	Percentage
≤10	2	25
11 – 20	2	25
21 – 30	3	37.5
31 – 40	1	12.5
Depth of burns		
First degree	1	12.5
Second degree	2	25.0
Mixed thickness	5	62.5
Length of hospital stay (days)		
1-30	4	50.0
31-60	2	25.0
61-90	2	25.0
Associated injuries		
Yes	2	25.0
No	6	75.0

TBSA- total body surface a

Table 4: Obstetric and Fetal outcome

Variable	Frequency	Percentage
Timing of delivery		
Term	7	87.5
Preterm	1	12.5
Mode of delivery		
Spontaneous vaginal delivery	7	87.5
Caesarean section	1	12.5
Maternal mortality		
None	8	100.0
Fetal outcome		
Live birth	8	100
Early neonatal death	1	12.5
Birth weight (kg)		
<2.5	2	25.0
2.5 – 3.5	3	37.5
>3.5	3	37.5

Most (62.5%) of the burn injuries occurred during the dry and Harmattan seasons (between October and March), while 37.5% occurred between April and September- Figure 2. Fifty percent of the burns occur in open kitchen, 12.5% in enclosed kitchen; making a total of 62.5% of accident occurring the kitchen, 25% happened in the living room and 12.5% occurred on the road. Figure 3. All the burn injuries were accidental, no suicidal attempt and no case of assault were recorded.

There were no inhalational injuries and 75% of the patients had no other associated injuries but 25% sustained some other forms of injuries such as pubic symphysis diastasis (12.5%) and avulsion injury of the right heel (12.5%).

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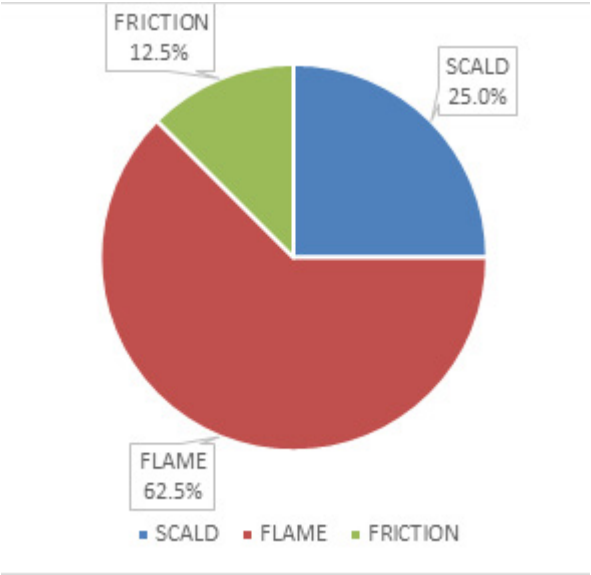
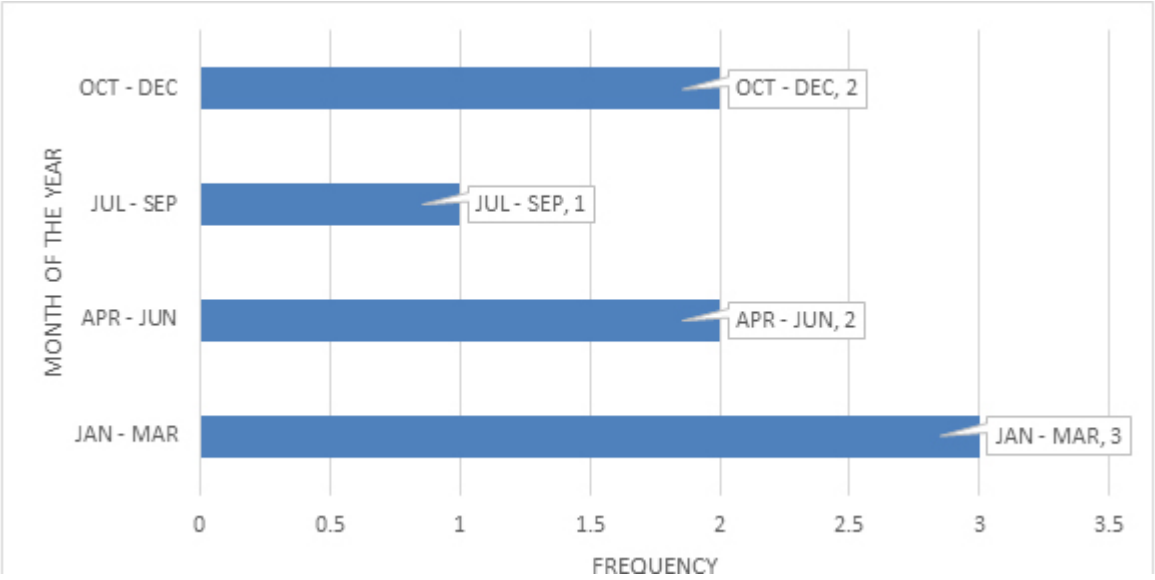


Figure 1: causative agents/source of injury

and burns involving the trunk, while open dressing was used for the facial burns which constituted 37.5% of cases. All the patients were co-managed with Obstetricians, 25% with the Physiotherapist, 12.5% with the orthopedic surgeons and 25% with the Physicians (Cardiologist).

The majority (87.5%) of the women delivered their babies at term, while 12.5% had premature delivery at 28 week. Also, about 87.5% were delivered via spontaneous vaginal delivery, while 12.5% was delivered through pre-burn injury planned elective caesarean section (Table 3). Over a-third (37.5%) had wound infection due to Pseudomonas aeruginosa. There was no maternal death; however the only case delivered prematurely at 28 weeks had early neonatal death in the neonatal intensive care unit (NICU) on the third day of life.

Half (50%) of the patients were discharged within the first month of admission, 25% had hospital stay of 2 months and 3 months respectively.



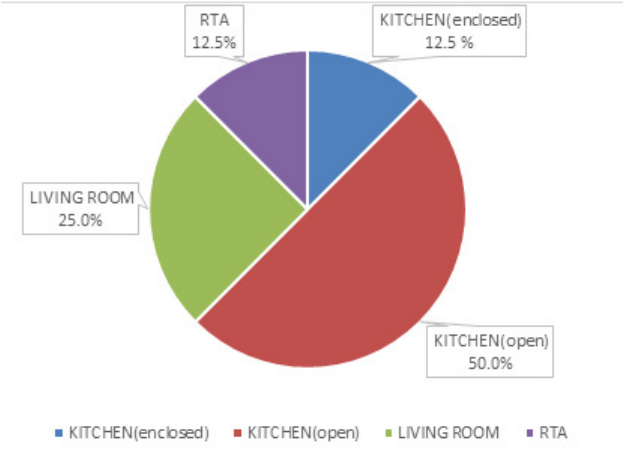


Figure 3: Location of burn occurrence

All the patients had various degrees of both upper and lower extremities burn; 50% had anterior trunk, 37.5% facial and 12.5% breast involvements.

Fifty percent (50%) of the patients had split-thickness skin graft, while the remaining were managed with conventional wound dressings and adjunctive wound therapies. Occlusive dressing were used for all the patients with extremity burns

Discussion

Pregnancy increases the challenges in the management of burns patients because it demands special management and requires early and adequate resuscitation and the use of antimicrobial agents whose use may be influenced by safety concerns. The present study showed that the incidence of burns in pregnancy was 3.6% and that most incidents occurred after the first trimester. Multi-disciplinary approach to management was associated with good surgical and feto-maternal outcomes for those who delivered at term.

The reported incidence of burn in pregnancy varies from region to region. The incidence of 3.6% found in this study is lower than those reported by Ogbogu et al. (9.11%)[5], Zulquarnain et al. (7.2%)[16] and Jain et al. (13.3%)[17]. The true incidence of burns in pregnancy may be underestimated as pregnancy test is not routinely performed on all women of reproductive age group who present with burns.

There are reports indicating that flame burns from gas and kerosene which are commonly used as fuel for cooking and powering machines are the most common causes of burns in most low and middle income countries including Nigeria[4,9,18-20]. This finding is similar to that of the current study where majority of burn in pregnancy were caused by flame and occurred in open kitchens. Adulteration of petroleum product is thought to be responsible for explosion

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and flame burns, especially during seasonal scarcity of petroleum products in Nigeria[21].

This study also showed that burns injury in pregnancy was commoner between October and March (62.5%) of each year, this corresponds to dry season and harmattan period (dry and windy period). This finding is consistent with the report by Isiguzo et al. in Imo state, Nigeria in their two year prospective study on burn injuries[22]. The reason is partly because the dryness and winds of harmattan season aids combustion. Also the cold nights and early morning weather during the harmattan period increases the desire for warmth with lighting of stoves, firewood and boiling of water for bathing. These increase the risk of getting burnt. However, contrary to our finding, Momoh et al reported that more burns injuries occurred during the rainy season[23].

There was no maternal death recorded in the current study; however perinatal mortality was recorded in a patient who was delivered an extreme preterm baby at 28 weeks gestation. Conversely, some studies have reported maternal mortality figures between 28.3% and 63%[4,5,8,19]. Factors that have been associated with poor maternal and perinatal outcomes include TBSA >50%, second and third-degree burns, inhalational injuries, hypovolemia, septicemia, co-morbidities, and suicidal tendencies. None of the patients in this study had more than 40% TBSA. There were also no inhalational injuries. Adequate fluid and antibiotics were also provided to maintain hemodynamic circulation, prevent electrolyte derangement and infection.

The good maternal outcome recorded in the present study may have been due to early presentation, timely and adequate resuscitation and management of patients in high dependency unit (acute burn ward). Multi-disciplinary management with the obstetrician and other specialists was also an important contributor. Some authorities have recommended that viable pregnancies >32 weeks should be delivered early after resuscitation, if the TBSA is above 40%, to enhance fetal survival and that pregnancy should be terminated irrespective of the gestational age, if the TBSA is above 50%[15].

Conclusion

Most burn injuries in pregnancy were seasonal and occurred after the first trimester with majority of pregnancies carried to term. Surgical and obstetric outcomes were favorable with optimal fetal and maternal outcomes and no attendant increase in operative delivery in cases which occurred during the third trimester. Early involvement of obstetricians in all burns affecting pregnant women is advised especially in burn centres where obstetricians are hardly in the employ.

Strength and Limitation

The strength of this study was mainly the availability of complete records. Additionally, the data in the present study were quite recent, reflecting current trends. However, its limitations are related to the small sample size, which may have been affected by missed cases of early pregnancy. There is need to rule out pregnancy in all females burns patients within reproductive age group who are sexually active. There is also need for larger prospective multi-centre studies, meta-analysis or systematic reviews to help provide high level evidence needed to develop and update protocols in management of pregnant burns patients.

Author Contributions

Authors' contributions Nnadozie UU: participated in the conceptualisation, study design, data collection/analysis and interpretation of finding and drafting of the manuscript. Okorie GM and Maduba CC : participated in study design, interpretation of findings and drafting of the manuscript. Anikwe CC and Ugbala A: participated in the data analysis and the interpretation of finding, Lawani OL and Asiegbu OGK: participated in the interpretation of findings and drafting of the manuscript. All participated in the review of the final manuscript. All the authors approved the manuscript

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