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# Blunt Abdominal Trauma during Pregnancy in Nigeria: Causes, Obstetric Complications and Pregnancy Outcome

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## Abstract

**Background:** Trauma is a major cause of morbidity and mortality worldwide. It is among the commonest reason for admission to Accident and Emergency (A&E) Department of the University of Calabar Teaching Hospital (UCTH) Calabar, Nigeria. The pregnant woman is highly vulnerable to trauma with possible injuries to mother and foetus. Such usually evokes great concern. Reports on blunt abdominal trauma during pregnancy in Nigeria are scanty, probably due to the scarcity of trained emergency physicians and trauma surgeons.

**Aim:** This 3 year prospective study aimed at establishing the common causes, obstetric complications and pregnancy outcome in blunt abdominal trauma during pregnancy in the south-south geopolitical zone of Nigeria.

**Methodology:** This was 3 year (March 1 20011 to Feb.28, 2013) the records of all trauma cases admitted into the A and E department of the UCTH, Calabar were prospectively collected. Demographic data, mechanism of trauma, injury severity, management, obstetric complications and pregnancy outcome for pregnant women with blunt abdominal trauma were extracted onto a proforma designed for the study. Pregnancy outcome was regarded as successful if it was carried to term or delivered of live baby with no consequent ill effects traceable to the trauma. The results are presented and discussed.

**Results:** A total of 12488 patients were admitted to the A&E department during the study period. Trauma accounted for 42.0% (5245 patients), of which 0.38% (20) were pregnant women with blunt abdominal trauma. The women were aged 17-40 years. The gestational ages ranged from 8-38 weeks. Thirty-five (65.0%) and 7 (35.0) were booked and un-booked cases respectively. They were 4, 11, and 5 in the 1st, 2nd and 3rd trimester respectively. The mechanism of injury included assaults, road traffic accidents, and falls. Assaults constituted 11 (55.0%), road traffic accidents 7 (35.0%) and domestic falls 2 (10.0%). Fifteen (75.0%) had injury severity score (ISS) <9. The RTA victims had associated injuries, which included bruises, superficial lacerations, one closed left humeral fracture and a red eye. Most patients presented within 6 h and 1>72 hours from time of trauma.

Management approach was multidisciplinary. All patients were monitored for at least 24 h before discharged. The main obstetric complications were premature uterine contractions, vaginal bleeding, foetal distress preterm delivery and 1 intrauterine death (IUD). One patient had emergency Caesarean section due to severe foetal distress. The IUD was recorded in a patient at 34 weeks gestation discharged after 24 hours of monitoring with no discernible risk to mother and foetus. Two patients were lost to follow-up and 17 (85.0%) had successful pregnancy outcome. There was no maternal death.

**Conclusions:** Assault was the most common mechanism of trauma. The excellent outcome notwithstanding our A&E department requires upgrading to possess modern facilities for foeto-maternal monitoring and trained emergency physicians are needed to improve the emergency services especially to the most vulnerable patients like the pregnant women with trauma.

**Keywords:** Blunt trauma; Abdomen; Pregnancy causes; Complication and outcome

## Introduction

Large published reports on trauma during pregnancy are not common. Publications by Curet et al. and Theodorou et al. in 2000 reported on 271 and 80 patients, respectively [1,2]. Trauma in pregnancy constitutes <1% in Australia. However, it evokes lots of concern for the mother and the foetus worldwide. Trauma is one of the leading causes of non-obstetric maternal death. In other developed countries trauma complicates 6-7% of all pregnancies and maternal injury is the leading non-obstetric cause of foetal maternal and death [3,4]. Road traffic accident,

falls, assault, burns and gunshot are common causes of trauma during pregnancy in most published studies. The pregnant woman is more vulnerable to injuries from falls especially during the 3rd semester due gait instability and altered centre of gravity by the enlarged abdomen [5-7]. The uterus with the foetus is virtually a pelvic organ in the 1st trimester and so protected blunt abdominal trauma by the pelvic bones.

Blunt abdominal trauma accounts for nearly all trauma during pregnancy in Australia whereas in the United States of America penetrating injuries constitutes up to 10% [8]. However, any form of trauma during pregnancy can seriously affect the outcome irrespective of abdominal involvement or its severity [3,9].

In Nigeria, studies on blunt abdominal trauma in pregnancy are sporadic, not population-based, scanty and varies in different parts of the country [10-13]. More co-ordinated and population-based researches are needed if we must catch up with the rest of the world.

Emergency physicians in A & E must be trained and equipped to evaluate and treat abdominal trauma during pregnancy. The evaluation and management of even minimal abdominal trauma in pregnancy is often challenging. Ultrasonography is useful for evaluation of foetal age, weight and status of amniotic fluid, but tocodynamometry is more sensitive for diagnosis of placental abruption [14-16]. The need for repeated clinical assessment cannot be over emphasized.

This study from the Niger delta region of Nigeria aims to contribute to the body of knowledge on the problem and make some recommendations for proper care of pregnant women with blunt abdominal trauma in Nigeria.

## Methodology

The proposal for the 3 year prospective study was approved by the UCTH ethical committee to our hospital trauma study group.

The records of all trauma cases admitted into the A&E department of the UCTH, Calabar were prospectively collected for study period from 1st March, 2011 to 28th February, 2013. Volunteer medical officers were educated on data collection and incorporated into the study team as facilitators to ensure uniformity of information. Involved pregnant women with blunt abdominal trauma were selected for the study.

The degree of trauma was described as minor, or severe based on the maternal haemodynamic stability and the injury severity score (ISS). Those with minor injuries like bruises and premature contractions were monitored by repeated detailed clinical examination, manual measurement of vital signs and with pulse oxymetry for 24 h and discharged if, mother and foetus were adjudged not at any risk. They were however advised to return, if there was any complaint like headache, weakness, dizziness, abdominal pains, uterine contraction, abnormal foetal movement or vaginal bleeding etc.

Emergency management based on the Advanced Trauma Life Support (ATLS) protocol was used, aiming to serve the lives of mother and foetus whenever possible. Rapid pregnancy test was done where the last menstrual period (LMP) was unknown or pregnancy suspected. Repeated clinical assessment and ultrasound scanning were done to detect any developing signs that might require urgent surgical intervention.

Pieces of information were continuously obtained from those discharged taking advantage of the global system mobile (GSM) technology boom in Nigeria.

Patients with ISS >9 were regarded as severe requiring active resuscitation, and close foeto-maternal monitoring for further investigations and definitive management.

Repeated regular clinical evaluation and emergency imaging investigations formed the mainstay of immediate care for those admitted beyond 24 h. The wellbeing of the mother was the primary aim of treatment as the life of the foetus depended on the overall clinical state of the mother.

Emergency treatment comprised intravenous fluids administration, pain relief, tocolytics and oxygen where indicated through pulse oxymetry. None of the patient required blood transfusion. Detailed and specific treatment involved emergency physicians, trauma & general surgeons, radiologists, obstetricians, anaesthesiologists, ophthalmologists, and neonatologists. The neurosurgeons were consulted for cases with history of loss of consciousness even if it was transient.

All patients in the study were Rhesus D-positive. There was no need for Anti-D immunoglobulin to any of the patients.

Patients were placed on the left side during monitoring to displace the gravid uterus from pressure on the inferior vena cava.

Joint multidisciplinary approach was adopted for management. The obstetric team performed emergency Caesarean section where foetal distress occurred or abruption placenta was diagnosed by ultrasonography. The neonatology team took over the resuscitation and further care of the baby while the mother was jointly managed by the emergency physician, the obstetrician, the general surgeon and the traumatologist as the case might indicate. There was no facility for cardiotocographic monitoring and Kleihausser-Betke test was not done on any of the patients. Peri-mortem Caesarean section was not done on any of the patients. There was a general deficiency of trained sub-specialty nursing staff. Follow-up period was for 9 months.

Demographic data, mechanism of trauma, injury severity, management, obstetric complications, and outcome were documented.

Specific pieces of information required for the study, collected during admission, treatment and follow up period were extracted onto a proforma prepared for the study.

The results obtained by simple averages and ratios were analysed and discussed against a robost literature review on the subject.

## Results

A total of 12488 patients were seen in the accident and emergency unit of the UCTH, Calabar during the study period (2011-2013). There were 5245 trauma patients. This showed an increase of 303 (6.1%) cases from our previous study of 2008-2010 [17].

Twenty 20 pregnant women had blunt abdominal trauma; 19 of whom knew they were pregnant and 1 was diagnosed using rapid pregnancy test and confirmed cyesis with a live foetus at 8 weeks gestation by ultrasound. They were aged between 17 and 40 years with an average of 26.5 years. The gestational age ranged from 8 to 38 weeks. Thirteen (65.0%) were booked and 7 (35.0%) un-booked cases. The time interval between injury and presentation varied from 6 to >72 h. Most patients presented within 6 h from time of injury. One case at 34 weeks gestation was seen >72 hours after trauma. Fifteen (75.0%) had ISS<9 and 5 (25%) had ISS equals or >9. Higher ISS (>9) and late presentation were associated with obstetric complications.

The mechanism of injury included assaults, road traffic accidents and falls. Assault was the commonest cause of injury involving 10 (50.0%) patients; 7 (35.0%) for RTA and 3 (15.0%) falls respectively (Table 1).

**Table 1:** Causes (Mechanism) of Trauma by Trimester.

| | Mechanism of trauma trimester | | | |
|---|---|---|---|---|
| | 1st | 2nd | 3rd | Total |
| Assault | 2 | 6 | 2 | 10 (50.0%) |
| Traffic | 1 | 4 | 1 | 7 (35.0%) |
| Fall | 0 | 1 | 2 | 3 (15.0%) |
| Total | 4 | 11 | 5 | 20 (100%) |

Those involved in RTA had associated injuries which included bruises, superficial lacerations, one closed left humeral fracture and a red eye. These associated injuries were jointly treated with the appropriate specialists. Majority of the patients were in the second trimester but no trimester was spared (Table 1).

The obstetric complications included premature uterine contractions 15, preterm delivery 1 foetal distress 3, placental abruption 1, and 1 intrauterine death (IUD) (Table 2).

**Table 2:** Obstetric complications.

| Nature of complication | Number of Patients |
|---|---|
| Premature contractions | 15 |
| Foetal distress | 3 |
| Preterm delivery | 1 |
| Abruption placenta | 1 |
| Foetal mortality | 1 |

Three patients had foetal distress. Two were successfully treated by prompt maternal haemodynamic stabilization using appropriate intravenous fluids, pain relief and tocolytics. They were among those with successful pregnancy outcome. One patient had emergency Caesarean section at 32 weeks for severe foetal distress as indicated by foetal heart rate (FHR) of >160 and meconium-stained liquor. The preterm was successfully managed through by the neonatologists.

One patient at 36 weeks gestation discharged earlier with seemingly minor injury returned 3 days later with severe abdominal pains and vaginal bleeding. She had shock and intra-uterine death (IUD) secondary to severe ante-partum haemorrhage, (APH) from placental abruption as diagnosed by ultrasonography and operative findings. This unfortunate situation was indirectly due to patient's non-compliance to instructions due logistics of poor transportation system and economy. This was the only foetal mortality recorded in the study. Mother was however resuscitated, appropriately treated and discharged 9days later. There was no maternal loss.

Two patients were lost to follow up within 6 months. The rest 17, (85.5%) had successful pregnancy outcome (Table 3).

**Table 3:** Pregnancy outcome.

| Outcome | Number of patients | Percentage |
|---|---|---|
| Successful | 17 | 85% |
| Unsuccessful | 1 | 5% |
| Loss to follow-up | 2 | 10% |
| Total | 20 | 100% |

## Discussion

In Nigeria like other developing countries few studies provide data on trauma in pregnancy that can be used to direct management decisions. Inadequate qualified personnel, general infrastructural deficiency and poor or non-availability of foeto-maternal monitoring gadgets are the major reasons [18]. The role of competent trained emergency and sub-specialties nursing staff cannot be ignored without dire consequent resulting maternal and foetal morbidity and mortality.

We believe there may be more pregnant patients with seemingly minor injuries from domestic trauma who end up with the general duty physicians, maternity homes or traditional birth attendants (TBAs). This is the resultant effects of the local socio-culture and beliefs of the people. There are therefore no proper records of blunt abdominal trauma in pregnancy. There is gross under-reporting given that >65% of the population are rural dwellers. There is need for general education of general physicians and the public of the dangers associated with trauma during pregnancy the degree of severity notwithstanding.

This study we hope will provoke more elaborate and prospective population-based researches in this direction.

In this 3 year prospective study at the A&E department of UCTH, Calabar, Nigeria, 20 pregnant trauma patients were seen and managed from March 2011 to February 2013.

Majority 13 (65.0%) of the cases presented within 6 hours after trauma and were mainly from the city and booked patients. This and the committed efforts of the management teams may explain the high successful pregnancy outcome the unavailability of sophisticated monitoring gadgets notwithstanding.

Table 1 shows the mechanism or causes of injuries and the semester distribution. Assaults predominated with 10 cases (50.0%). These were the results of interpersonal or domestic violence. The injuries sustained were multiple punches to the torso, direct kick to the protruding abdomen and push from behind. The anatomic and physiologic changes that occur during pregnancy render the pregnant person vulnerable to any push due to imbalance from altered centre of gravity. Most of the injuries occurred in the 2$^{nd}$ trimester.

Although our report differs slightly from most reports in other parts of Nigeria, it corroborates with similar study by Omoke et al. 2013 where assault rather than RTA was reported as the predominant mechanism of injury. This might be a direct result of the ban on motorcycle transportation within Calabar metropolis [19]. Besides, the current increasing level of violence in the city and general frustrating life situation in the country might have been the result of impatience, intolerance and transferred aggression that currently abound in the country.

Obstetric complications were associated with higher ISS and late (>6 h) presentation. These included premature uterine contractions, premature delivery, foetal distress, placental abruption, and foetal loss; no uterine rupture was recorded (Table 3) [20-22].

Trauma during pregnancy is generally reported one of the commonest causes of maternal mortality [22]. We did not record any maternal mortality. The sociocultural behaviour of the local people is that pregnant women are not involved of stressful activities as long traveling and hard labour. Besides there often warned by their obstetricians about the risks of undue stress on the foetus and every pregnant woman jealously protects her unborn child.

Majority (85%) of the patients had successful pregnancy outcome. This is higher than some reports from the developed countries like the USA where 77% was reported by George et al. 1992 [23]. The high success rate we attribute it to less serious injuries, early presentation and intense clinical management of the cases.

The strength of this study lies in fact that it is prospective work. It has also opened up our eyes to the gross lack of essential modern equipment for monitoring pregnant women involved in trauma. Its limitations are the small number of the sample and being single institutional-based.

## Conclusion

Assault is increasingly common cause of trauma in Nigeria. Women are often the common targets. Seemingly minor trauma can result in very severe obstetric complications.

Repeated clinical evaluation and emergency ultrasonography are the keys to early detection of intra-abdominal injuries in pregnant women with blunt trauma. Monitoring and prompt surgical intervention will help minimize the obstetric complications and improve outcome.

## Recommendations

The pregnant women require protection as they are more vulnerable to trauma especially during the 3rd trimester. There should be stiff penalty for anyone who assaults a pregnant woman.

The A&E Departments of our hospitals should be upgraded to have modern facilities for foeto-maternal monitoring and other gadgets for the managing trauma patients. Trained emergency physicians and other specialists are needed to improve the emergency services in our hospitals.

The emergency physician should request pregnancy test in any woman of childbearing age involved in trauma.

There is dire need for systematic prospective population-based researches to assess the magnitude of this problem to provide appropriate data for planning preventive measures and proper comparison with studies from developed and other developing countries.

## Acknowledgement

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## Conflict of Interest

The authors received no financial assistance from any person(s) or organization.

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