Original Research Article

Uterine rupture: Prevalence and risk factors at a tertiary institution in Nigeria

ABSTRACT

Background: Uterine rupture remains a major life threatening obstetric disaster encountered especially in developing countries and is associated with a high maternal and perinatal morbidity and mortality. The study aimed to determine the trend, prevalence rate, associated risk factors and management options of uterine rupture at Rivers State University Teaching Hospital (RSUTH).

Methods:A retrospective descriptive study of 67 women with uterine rupture managed over a period of 5 years from 1st January, 2016 to 31st December, 2020 at Rivers State University Teaching Hospital, Port Harcourt. A structured proforma was designed and used to extract data from operating theatre registers and the hospital medical records. Data was entered and analyzed using the statistical package for social sciences (SPSS) IBM version 25.0 (Armonk, NY).

Results: During the study period, 7,685 deliveries were conducted in the hospital and 67 were managed for uterine rupture giving a prevalence rate of 0.87% (1 in 115 deliveries).Advancing maternal age, high parity, harmful practices, low socio economic status, unbooked mothers, and previous uterine scars were observed risk factors associated with uterine rupture. Repair only of the uterine rupture was the most common surgical intervention.

Conclusion: The prevalence of uterine rupture was high and most had scarred uterus. There is need for more awareness on the risk factors, signs and symptoms of uterine rupture in order to prevent maternal and fetal morbidity and mortality.

Key words:uterine rupture, prevalence, risk factors, socio-demographics.

1. INTRODUCTION

Uterine rupture remains a major life-threatening obstetric disaster encountered especially in many developing countries and is associated with a high maternal and perinatal mortality [1,2].Uterine rupture is the disruption in the continuity of the uterine layers (endometrium, myometrium, serosa) [2,3]. It can occur during pregnancy, delivery or after delivery [3,4]. Globally, the incidence of uterine rupture is 0.07% which is much lower than what is in Africa-1.3% [5].The incidence of ruptured uterus in most developing countries is 1 in 200 deliveries but in developed countries, the incidence is 1in 4000 deliveries [5].The outcome is worse in sub Saharan Africa because of many delays in treatment [4,6]. Nigeria which makes up about 2 percent of the world population contributes about 10% of the global burden of maternal mortality [4]. Uterine rupture is a known important contributor to maternal mortality in Nigeria [1,6]. Whereas improved obstetric care reduce the rupture from obstructed labour but there has been increased prevalence of scar rupture following increased incidence of caesarean section over the years [6-8].The causes of uterine rupture are broadly classified into 3 categories namely spontaneous, scar rupture and iatrogenic [2,7]. Spontaneous causes implicated in an intact uterus include multiparity, congenital malformation of the uterus, abruptio placentae, perforating mole

[1,6-8]. In a scarred uterus, the causes include; caesarean section scar, hysterotomy scar, previous manual removal of placenta or dilatation and curettage [4,6].Iatrogenic causes of uterine rupture in pregnancy include trauma such as internal version, external cephalic version, a fall, uterine massage and use of oxytocics such as oxytocin and prostaglandins [1,5-9].Risk factors that have been associated with uterine rupture include high parity, induction and augmentation of labour, unbooked cases, deliveries conducted by traditional birth attendants (TBAs) [3,10-11]. Others are previous caesarean section or uterine surgery, macrosomic fetus, placenta percreta, fetal version, breech extraction, vaginal birth after caesarean section (VBAC) [9,12].

The uterine rupture can be of two types – complete rupture and incomplete rupture [1,10]. Complete rupture describes a full–thickness defect of the uterine wall and serosa, resulting in direct communication between the uterus and the peritoneal cavity [2,11-14] Incomplete rupture also called uterine dehiscence describes partial separation of the uterine muscle in association with minimal bleeding, with the peritoneum and fetal membranes remaining intact [6,14-16].

When uterine rupture follows an obstructed labor, the rupture often begins in the lower uterine segment if there was no previous caesarean section scar. But when there is a previous scar, the rupture may be along the previous scar line and the bleeding is much less [4,16].The rupture could either involve the anterior wall, posterior wall, lateral wall of the lower uterine segment or may be multiple affecting all the walls [2,14,16]The bladder could be involved in an anterior wall rupture of the uterus [3,8,15].

Diagnosis is made depending on the period it occurs– pregnancy, labour or post-delivery [1,17].In pregnancy, the feature is sudden severe abdominal pain with tenderness in a parturient with a previous uterine scar. This may be followed by collapse and hematuria [2,18]. These features also apply in spontaneous rupture [2,5,12].The diagnosis of ruptured uterus in labor could be very difficult in certain instances, particularly when the rupture is small and the fetus is not extruded into the abdominal cavity [5,18].The cardinal features of uterine rupture in labour are: continuously instead of the normal intermittent contractions of labour, poor progress in labor, uterine tenderness, altered uterine contour when part of the fetus has already been extruded into the abdominal cavity [18-20].There may be abnormal fetal heart rate pattern e.g. fetal bradycardia, which may be preceded by variable and/or late decelerations [6,19].When the fetus is extruded into the peritoneal cavity after a rupture, the patient will have continuous instead of intermittent labour pains, altered uterine contour because the uterus is felt separate from the fetus whose parts are easily palpable [3,15,19].There may be generalized abdominal tenderness, fluid thrill and shifting dullness when there is massive intra-peritoneal haemorrhage, significant vaginal bleeding, dyspneoa, shoulder tip pain and blood stained urine [15-17].

Management involves resuscitation and laparotomy [6,8,21].Following laparotomy, any of these three procedures may be adopted; hysterectomy, repair alone and repair with bilateral tubal ligation [7,16,22].Hysterectomy is the surgery of choice for uterine rupture unless there is sufficient reason to preserve the uterus. It is specially indicated in spontaneous obstructive rupture following prolonged obstructed labour which is common in the developing countries [19, 21].

Considering the possible anatomical changes that can occur near the cervico-vaginal region, it is preferable to perform a quick sub-total hysterectomy, rather than total hysterectomy. This minimizes the chance of injury to the ureters or bladder [2,20-22].Repair of the ruptured uterus is most applicable to a scar rupture when the margins are clean and it's done by excision of the

fibrous tissue at the margins [1,3,20,23]. One may have to repair a spontaneous obstructive rupture in odd circumstances (desirous of having a child) [24]. In such cases, however there is a chance of peritonitis and septicaemia. Repair and sterilization is mostly done in patients with a clean out scar rupture having desired number of children [20].

Uterine rupture can be prevented through the following measures; performing elective repeat caesarean sections at 38 weeks in selected cases, early diagnosis of malpresentation and malposition which may easily cause cephalo-pelvic disproportion and obstructed labour,meticulous version procedures, extreme care should be exercised with the use of oxytocin in managing labour [4,21,25]. Other public health measures include education of women on the importance of antenatal care and specialized delivery, training of traditional birth attendants, reducing cost of health care, good referral system, improving socio-economic status of women, formal education of girl children, improving qualityand accessibility of health services and training and retraining of health care providers [3,18,23].

Although uterine rupture is rare in the developed world, it remains a public health concern in low income countries like Nigeria due to the substandard obstetric care, poor accessibility and availability of quality emergency obstetric service facilities, poor quality roads, dangerous traditional practices, illiteracy, poverty, unsafe cultural and religious beliefs, unskilled delivery and poor organization of the health sector. These challenges are yet to be reasonably solved, and therefore continue to make uterine rupture a recurring decimal. It therefore became necessary to establish the trend, prevalence and predisposing factorsof uterine rupture commonly encountered in this region, in order to delineate ways to reduce this menace.

2. METHODS

This is a retrospective hospital-based descriptive study of 67 women with uterine rupture managed over a period of 5 years from 1st January, 2016 to 31st December, 2020 at Rivers State University Teaching Hospital, Port Harcourt. The Rivers State University Teaching Hospital (RSUTH) is a 256-bed tertiary health facility with 12 clinical departments, which offers in/out patient and emergency medical services. It is located in Port Harcourt, the capital of Rivers State. It serves as a referral centre covering a large catchment area, including the neighbouring States (Bayelsa, Akwa-Ibom, Abia and Imo States).

A structured proforma was designed and used to extract data from operating theatre and labour ward registers and the hospital medical records. Permission was obtained from the Head of the Department of Records for retrieval of the folders.Information included socio-demographic characteristics, clinical features on admission, booking status, use of oxytocics, previous caesarean sections or other uterine surgeries. Detailed information on operative procedures is further maintained in the operation theatre register. Data was entered and analyzed using the statistical package for social sciences (SPSS) IBM version 25.0 (Armonk, NY). Frequency and percentages were calculated for the categorical variables.The study was approved by the Ethics Review Committee of the hospital.

3. RESULTS

During the study period, 7,685 deliveries were conducted in the hospital and 67 were managed for uterine rupture giving a prevalence rate of 0.87% (1 in 115 deliveries).In 2016 and 2017, there were 20 and 10 cases of uterine rupture managed in the hospital respectively. There were

19, 13 and 5 cases of uterine rupture managed in the hospital in 2018, 2019 and 2020 respectively. This is shown in figure 1. Table 1 shows the socio-demographics of the women managed for uterine rupture during the study period.Mean age of the women ± SD was 32.66 ±3.82 years and majority, 30(44.8%) were in age group 30-34 years. Majority, 28 (41.8%) were Para 3. Sixty women (89.6%) had primary and secondary school education and most of them, 62 (92.5%) were Christians. Twenty seven women (40.3%) were unemployed. Most of the women, 56 (83.6%) were unbooked as shown in figure 2.Of the 67 participants, 50 (74.6%) had history of previous surgery as shown in figure 3. Table 2 shows previous use of oxytocic drugs by the participants and majority of them, 73.1% had previously used oxytocic drugs. Thirty nine (58.2%) women had uterine rupture at first stage of labour while 28 (41.8%) had the rupture in the second stage of labour. All the women received blood transfusion, intravenous fluids, potent broad spectrum antibiotics and analgesics.

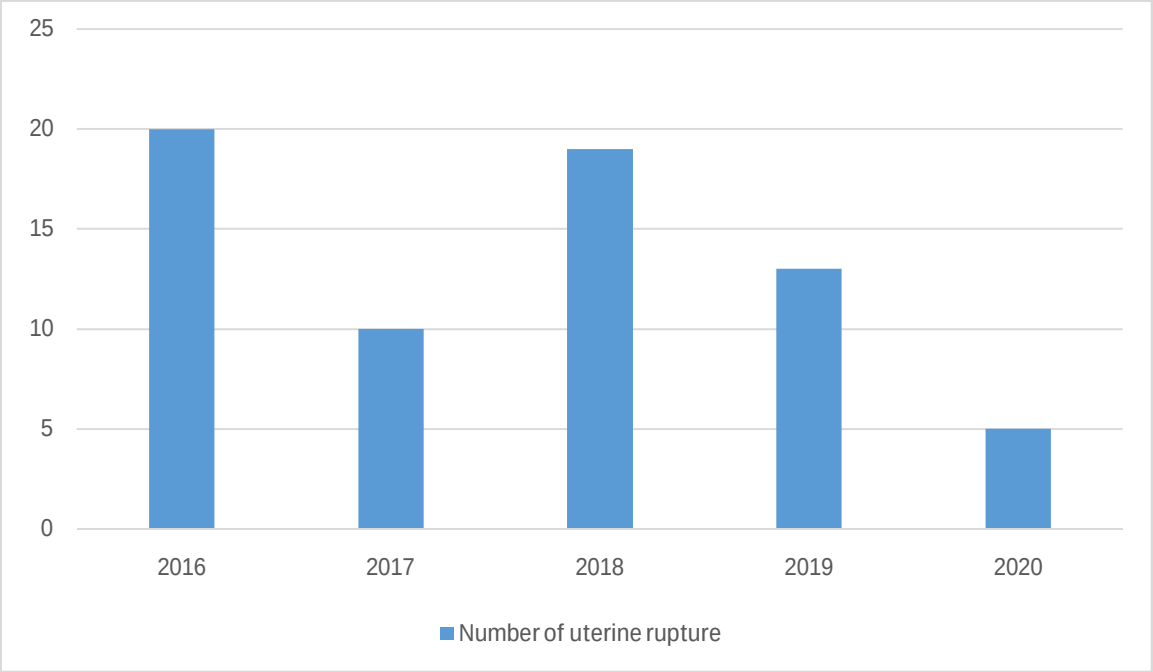

Fig 1: Yearly trend of uterine rupture

Table 1: Socio-demographic characteristics of the participants

Age	Frequency	Percent (%)	Cumulative Percent (%)
25-29	13	19.4	19.4
30-34	30	44.8	64.2
35-39	22	32.8	97.0
≥40	2	3.0	100.0
Total	**67**	**100.0**	
Parity			
P0	7	10.4	10.4
P1	10	14.9	25.3
P2	20	29.9	55.2
P3	28	41.8	97.0
P4	2	3.0	100.0
Total	**67**	**100.0**	
Level of Education			
Primary	34	50.8	50.8
Secondary	26	38.8	89.6
Tertiary	7	10.4	100.0
Total	**67**	**100.0**	
Religion			
Christian	62	92.5	92.5
Islam	2	3.0	95.5
Others	3	4.5	100.0
Total	**67**	**100.0**	
Occupation			
Civil Servant	16	23.9	23.9
Professional	2	3.0	26.9

Self employed	22	32.8	59.7
Unemployed	27	40.3	100.0
Total	**67**	**100.0**	

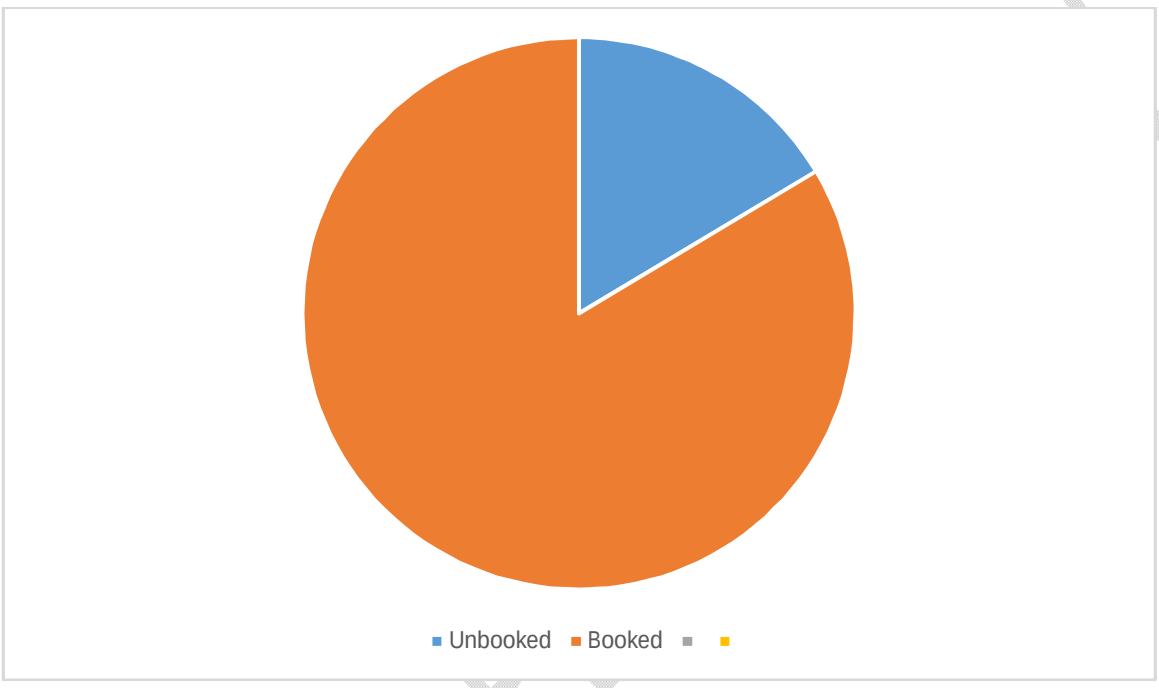

Figure 2: Booking status of the participants

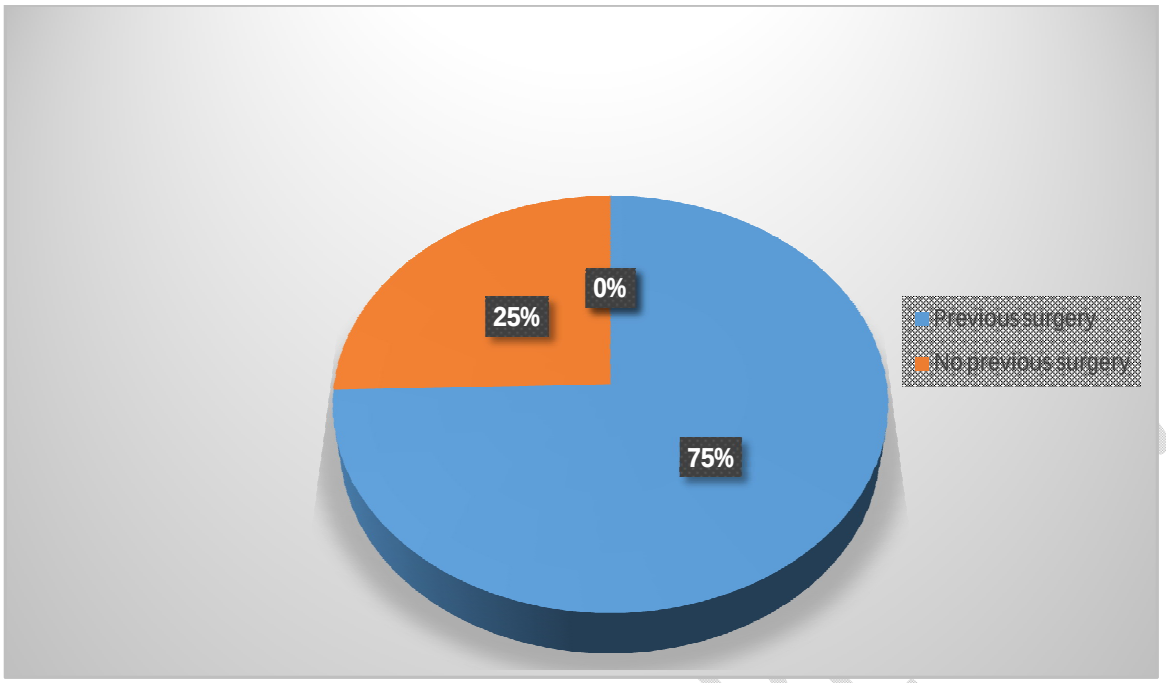

Figure 3: History of previous surgery amongst participants

Table 2: The use of oxytocics amongst participants

Use of Oxytocics	Frequency	Percent (%)	Cumulative Percent (%)
Don't know	4	6.0	6.0
No	14	20.9	26.9
Yes	49	73.1	100.0
Total	67	100.0	

Table 3: Types of surgery

Type of surgery	Frequency	Percent (%)	Cumulative Percent (%)
Repair alone	45	67.2	67.2
Repair + bladder Repair	2	3.0	70.2
Repair +BTL	11	16.4	86.6
SAH	9	13.4	100.0
Total	**67**	**100.0**	

BTL- Bilateral Tubal Ligation SAH- Subtotal abdominal hysterectomy

4. DISCUSSION

The study showed a downward trend in the presentation of uterine rupture at RSUTH probably due to more awareness of this clinical condition and early referral of prolonged obstructed labour cases. The 5 women seen in 2020 could be as a result of COVID-19 pandemic when reduced number of women attended health facilities. Prevalence of uterine rupture differs across geographic regions due to differences in socio-demographic status, the availability and accessibility of routine obstetric care and health system effectiveness [26].The prevalence of uterine rupture in this study is 0.87% (1 in 115 deliveries). This figure is similar to the figures reported in Bauchi (0.8%) and the southern part of Nigeria (0.8%) [4,5].The figure is higher than findings from similar studies in Jos (0.2%), Shanghai (0.0196%), Tanzania (0.22%) and India (0.05%) [4,26,27,28]. but lower than findings in other studies in Ethiopia (2.5%) and Pakistan (1.71%) [6,29]. Globally the incidence of uterine rupture is 0.07% [26]. The incidence in developed countries was 12 in 36,000 births occurring as a result of scarred uterus. This is attributed to improved level of obstetric care [29].The prevalence in our study depicts the figure from a developing country in sub-Sahara Africa where we still have a lot of our women patronizing the traditional birth attendants(TBAs) and havinghome deliveries. The TBAs do all manner of sorts without being supervised and some cases of uterine rupture die in the delivery outlets of traditional birth attendants before presentation to the tertiary institution [29,30].
Advanced maternal age is also associated with an increased rate of uterine rupture [5-7].Mean age of the study is 32 years which is similar to finding from other study [29]. Most of the women who had uterine rupture were aged between 30-34 years. This is similar to studies done in Jos, North Central Nigeria but was higher compared to studies done in the Eastern part of Nigeria and Pakistan, where it was 25-30 years [4,8,10]. It could be explained by the fact that most women in that age group may have had their first or second pregnancies, thereby validating parity as a risk factor for uterine rupture. Women who were para 3 were found to be the most affected. This is very similar to studies done in other parts of the country except for a study done in Benin where patients who were para 1 and 2 had the highest incidence [5,8,9].It is also similar to the findings by Abrar S et al. [29].Multiparity is a well-known risk factor of uterine rupture due to serial stretching of the uterine wall [1,10-13].

Most women in this study were Christians (92.5%) and unemployed (40.3%). This can be explained by the fact that the State where the study was done is predominantly inhabited by Christians and most Christian mothers have the belief that their faith is contradictory to seeking caesarean delivery when there is poor progress in labour or any other obstetric indication, even in the face of dire obstetric complications. Most women, were seen to consult their religious leaders who sometimes opted for "more time" for a miracle to happen. This was seen in some studies [4,14,15].The low socioeconomic status of these patients led to their increased incidence. This is as a result of the fact that they had no means of livelihood to carry out basic needs, talk less of seeking medical attention and paying surgical fees. Some of them are the breadwinners in their homes, and some of their husbands did not make plans for caesarean delivery since it is seen as a "bad omen" societally by most people [6,14,15].Rivers State where these women lived is an oil producing State, where cost of living is expensive and most of these women were affected. This remains a fundamental contributor to the increasing incidence of uterine rupture in developing countries like Nigeria [2,8,16].

It is essential to note that majority of the patients (83.6%) were unbooked. This is similar to findings in other studies in Nigeria [4,5,7]. Studies done in other parts of Africa and Asia also showed the same trend [6,11,12]. Antenatal care remains pivotal in reducing maternal and fetal morbidity and mortality associated with uterine rupture [2,17,18]. Antenatal care provides a platform to identify pregnancies that are at risk of uterine rupture and this encourages taking proactive steps to prevent it [9,19,20]. The observation in this study can be explained by the low socio-economic class that was seen in most of the patients. Most women preferred to register in delivery outlets of traditional birth attendants where registration fees were cheaper. The mothers claim to also have a better sense of mentorship and belonging from the traditional birth attendants and other pregnant women than in hospitals [14,15].

Many risk factors have been linked to uterine rupture. They include high parity, lack of antenatal care, rural residency, malpresentation, previous history of uterine scar, congenital malformations, not using partogram, prolonged obstructed labour, poor socio-economic status, fetal macrosomia, unsupervised labour, poorly developed health system, instrumental vaginal deliveries, injudicious use of oxytocics and lack of facilities for timely referral to hospitals [26-29]High parity weakens the uterus increasing the chance of rupture in subsequent pregnancies. It is therefore essential for health care providers to closely monitor these women during labour for early detection of signs of uterine rupture and prompt interventions [31].

Scarring of the uterus is a known risk factor of uterine rupture [10,20-22].Scarred uterus contributed 66% of case of uterine rupture especially in developed countries. However in developing countries, prolonged obstructed labour and poor access to hospital delivery also contributed significantly to the tune of 25% [31,32].Scarred status may include previous caesarean delivery and previous myomectomy [4,13,23]. Uterine rupture after prior caesarean section is becoming more common as the availability of caesarean section is increasing in developing countries like Nigeria where this study was done [3,7,24]. The risk factors for uterine rupture in women with a history of caesarean section include prior classical incision, labour induction or augmentation, fetal macrosomia, increasing maternal age, post term delivery, short maternal stature and no prior vaginal delivery [1,11,16].Mothers with previous history of CS are more than twice more likely to have uterine rupture than their counterparts [31,33,34].We therefore need to control the indication for the first caesarean section in order to reduce the caesarean section rate and its predisposition to uterine rupture. Apart from previous scar, most of the women who had uterine rupture in this study underwent augmentation with intravenous oxytocin. This was usually carried out in the maternity homes from where they presented, in an attempt by the unskilled birth attendants to ensure vaginal delivery by all means. Other harmful practices carried out by these women include abdominal massage and use of herbal purgatives [5,8,25].

The type of surgery for uterine rupture depends on the type, location, size, residual normal uterus, severity of haemorrhage, parity, desire for future childbearing, condition of patient, associated visceral injuries and expertise of surgeon [26-30].Repair only of the uterine rupture was the most common surgical intervention observed in the study (67.2%), followed by repair with bilateral tubal ligation (16.4%). This was similar to studies done in Jos, North Central Nigeria where over half of the patients had uterine repair and a study in Pakistan where 77% of cases had repair only [10,11].Ruptured uterus has grave social implication in developing countries like Nigeria and Pakistan, where fertility is considered the essence of womanhood and

loss of fertility can lead to divorce [29].In a study done by Abrar S et al, majority of the women had hysterectomy with 45.4% having subtotal hysterectomy attributing this to large number of obstructed labour and unstable haemodynamic conditions. In the same study, 19.2% had uterine repair [29].

5. CONCLUSION AND RECOMMENDATIONS

The prevalence of uterine rupture was high. Most women were unbooked, unemployed, had scarred uterus and had history of use of an oxytocic prior to presentation. To prevent this menace, our women should be educated on the complications associated with unbooked pregnancies, grandmultiparity, unsupervised deliveries, dangers and prevention of uterine rupture. The government should subsidize the antenatal and obstetric care for our women and improve the living standards of the populace. There should be provision of good roads and transport facilities to make referral easy and quick. The government should also make provision to educate the TBAs to know their limit and when to stop management and refer. Their activities should also be routinely supervised. These will go a long way to prevent the morbidity and mortality associated with this obstetric catastrophe.

Ethical approval: The study was approved by the hospital's Ethics Review Committee.

Study limitations: The study is retrospective and sample size is small. It is also a single centre/hospital based study and results cannot be generalized to the whole population.

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