

Risk Factors for Ruptured Uterus in a Developing Country

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Abstract

Objective: This is a comparative prospective study of the risk factors for ruptured uterus in Aminu Kano Teaching Hospital, Kano, Nigeria, between 1st January 2000 and 31st December 2005.

Materials and methods: Forty six women with ruptured uterus (cases) were compared with two hundred and thirty women who delivered without ruptured uterus (control). Chi-square (χ^2) test was used for comparison of the data for statistical significance. The odds ratio (OR) and 95% confidence interval (CI) were determined.

Results: The incidence of ruptured uterus was 1 in 278 deliveries (0.36%). The significant risk factors found were unbooked status (OR = 36.70, CI = 12.85 – 112.94), low socioeconomic status (OR = 11.51, CI = 5.34 – 25.10), 30-39 years of age (OR = 2.23, CI = 1.10 – 4.50), grandmultiparity (OR = 8.25, CI = 3.88 – 17.64), prolonged obstructed labour (OR = 5.92, CI = 2.57 – 13.66). Poor supervision in labor (unbooked status) was found to be the commonest cause of ruptured uterus.

Conclusion: In a predominantly Islamic community like ours where early marriage is common, female western education and employment, as well as education of their husbands, community and religious leaders on the importance of antenatal care and hospital delivery, will go a long way to improve its utilization and reduce the prevalence of ruptured uterus in our community.

Keywords: Ruptured uterus; Incidence; Risk factors; Developing Country

Introduction

Uterine rupture is a potentially catastrophic event during childbirth in which the integrity of the myometrial wall is breached [1-3]. In an incomplete rupture, the peritoneum is still intact, whereas with a complete rupture the contents of the uterus may spill into the peritoneal cavity or broad ligament [1-4]. A uterine rupture is a life threatening event for mother and baby, and still remain a common obstetric problem in developing countries like Nigeria, where it has an incidence which ranges from 1 in 87 to 1 in 273 deliveries [5-9]. In Pakistan an incidence of 1 in 100 deliveries was reported [1] while in Ethiopia it was 1 in 38 deliveries [2]. The reason for the high prevalence of ruptured uterus in developing countries is because more deliveries take place outside the health facilities, and mismanagement by traditional birth attendants is common. The underutilization of the scanty antenatal and family planning facilities, as a result of low literacy level, poverty, socio-cultural barriers, and changing governmental policies [11], making poorly supervised or unsupervised labour be the leading risk factor [3,10,11].

In developed countries, ruptured uterus is very rare, because mismanagement of labor due to delay in getting appropriate management is uncommon [4]. This is because of availability and utilization of the well established antenatal care and family planning services as a result of high literacy level, improved socio-economic status, empowerment of women and desire for small family size [4,12]. Rupture from a previous caesarean section scar, or uterine surgery that resulted in full thickness incisions such as myomectomy, and oxytocin stimulation were found to be the most common risk factors in developed countries [4].

In developing countries, childhood marriages and pregnancies, as well as contracted pelvis from childhood malnutrition which predispose our women to cephalo-pelvic disproportion are common [6,10]. These together with the delay in getting appropriate care in labor, explained why in the majority of the women with unscarred uteri, prolonged obstructed labor from neglect was found to be the leading cause of ruptured uterus in developing countries [1-3]. In Ethiopia

[2] 83.5%, and in Pakistan [1] 85.3% of the cases occurred in women with unscarred uterus. Most of our rural public hospitals and health centers are not functional for 24 hours of the day. And coupled with poor road network and transportation systems to the cities, the result is the delay in getting appropriate care in labor. Consequently, 70% of deliveries in Nigeria are conducted outside the hospitals by unskilled birth attendants or quacks, traditional birth attendants (TBAs), traditional priests, herbalists or prophets [10,15]. In Nigeria 16.9% of women delivered on their own without assistance from anyone [10,15]. In Pakistan 89% of women deliver at home, of these 80% are delivered by TBAs [1].

Society of Gynecology and Obstetrics of Nigeria (SOGON) Needs Assessment Report; showed that delay in getting appropriate care in labour is responsible for the high maternal morbidity and mortality ratio, with a regional variation which showed higher maternal mortality ratio in the North than in the South [5-9]. In Nigeria, current estimates of maternal mortality ratio of 800/100,000 live births showed that it is one of the highest in the world, and is second only to India in the global estimates of maternal deaths [10,11]. In Nigeria the lifetime risk of maternal deaths is 1 in 12, while in Northern Europe it is 1 in 4000 because of absence of delays [1].

The result of the needs assessment by SOGON revealed that phase III delay made significant contribution to maternal morbidity and mortality in all the zones. In Nigeria, only 4.2% of public health facilities met internationally accepted standards for essential obstetric care [11]. Phase I delay was found to be significant in Lagos state in South West

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Zone, and in Kano state in North West Zone, while phase II delay was significant Lagos state. Ruptured uterus was found to be a leading cause of maternal mortality in all the zones [10]. The similarity in the contribution of ruptured uterus to maternal mortality in all the zones in Nigeria, is because the singular most important risk factor which is poor supervision or lack of supervision in labour is still prevalent in all the six zones in the country, where 70% of the women deliver outside a health facility that are poorly or unsupervised [10]. In Zimbabwe [15], Guinea [3] and Ethiopia [2], ruptured uterus was also found to be one of the leading causes of maternal mortality for the same reasons.

Fortunately, ruptured uterus is a preventable condition [1-10]. In order to reduce maternal mortality and morbidity in our community and meet the Millennium Development goals (MDGs) 4 and 5, it is essential to determine the risk factors for ruptured uterus, which is a leading cause of maternal mortality in developing countries like Nigeria, so that recommendation can be made on how to reduce its prevalence and the sequelae.

Patients and Methods

This comparative prospective study was conducted in Aminu Kano Teaching Hospital, Kano, Nigeria, between 1st January 2000 and 31st December 2005, to study the risk factors which predispose our women to ruptured uterus.

Forty-six (46) women with ruptured uterus (cases) were compared with 230 women who delivered without ruptured uterus (controls). The controls were first five women who delivered without ruptured uterus immediately after each one with ruptured uterus. The data were prospectively collected and recorded in a database. Where the patients could not volunteer information, it was obtained from their relatives.

The outcome measures were the socio-demographic characteristics

of the women and their husband's occupation, occurrence of prolonged obstructed labour, previous caesarean sections, and induction or augmentation of labour. The woman's level of education and the husband's occupation were used to determine the social class [4].

The data obtained were collated, and analysis was done using Epi-Info software (6.0 CDC Atlanta Georgia, USA). Chi-square test was used for comparison of the data for statistical significance. A p-value of < 0.05 was taken as significant. The odds ratio (OR) and 95% confidence interval (CI) were also determined where appropriate

Results

There were 12795 deliveries during the period of study, and 46 women had rupture uterus, giving an incidence of 1 in 278 deliveries (0.36%).

Table 1 shows a comparison of the socio-demographic characteristics of the women. Maternal age 30-39 (OR = 2.23, CI = 1.10 – 4.50), unbooked status (OR = 36.70, CI = 12.85 – 112.94) and low socioeconomic class (OR = 11.51, CI = 5.34 – 25.10) were found to be significant risk factors.

Table 2 shows a comparison of the obstetric variables of the women. Grandmultiparity (OR = 8.25, CI = 3.88 – 17.64) and prolonged obstructed labour (OR = 5.92, CI = 2.57 – 13.66) were found to be significant risk factors.

Discussion

The incidence of ruptured uterus in this study was 0.36% (1 in 278 deliveries), which is similar to the values that were reported in other studies from Nigeria [5-10]. It is lower than 0.9% (1 in 110 deliveries) reported from Ethiopia [2] and 1.0% (1 in 100 deliveries) reported from Pakistan [1]. The high incidence of uterine rupture from these

Variable	Number (%)		P-value	OR	CI
	Case n = 46	Control n = 230			
Age in years					
15-20	2 (4.4)	73 (23.0)	<0.05	0.10	0.02-0.43(NS)
20-29	25 (50.0)	86 (37.4)	>0.05	1.67	0.86-3.32(NS)
30-39	20(42.9)	59(34.4)	<0.05	2.23	1.10-4.50(S)
>40	1(3.5)	12 (5.2)	> 0.05	0.40	0.02-3.11(NS)
Social class					
Upper	3(6.5)	131(57.0)	<0.05	0.05	0.01-0.18(NS)
Middle	12(26.1)	64(27.8)	>0.05	0.92	0.42-1.97(NS)
Lower	31(67.4)	35(15.2)	<0.05	11.51	5.34-25.10(S)
Booking status					
Booked	5(10.9)	188(81.7)	<0.05	0.03	0.01-0.08(NS)
Unbooked	41(89.1)	42(18.3)	<0.05	36.70	12.85-112.94 (S)

S= Significant; NS= Not significant

Table 1: Socio-demographic Characteristics of the Women with Ruptured Uterus.

Variable	Number (%)		P-value	OR	CI
	Case n = 46	Control n = 230			
Parity					
Primigravidae (o)	3 (6.5)	79 (34.4)	<0.05	0.13	0.05-0.47 (NS)
Multigravida (1-4)	18 (39.1)	122(53.0)	>0.05	0.57	0.28-1.14 (NS)
Grandmultiparae (≥5)	25(54.4)	29(12.6)	<0.05	8.25	3.88-17.64(S)
Prolonged obstructed labor	16(34.8)	19(8.3)	<0.05	5.92	2.57-13.66(S)
Previous caesarean section	7(15.2)	42(18.3)	>0.05	0.80	0.30-2.04(NS)
Use of oxytocics	3(1.3)	50(21.7)	<0.05	0.25	0.06-0.89(NS)

S= Significant; NS= Not significant

Table 2: Obstetric factors.

developing countries has been attributed to delays (Phase I, II & III) in getting proper treatment in labour [3].

The significant risk factors that were found in this study were maternal age (30 to 39 years), low socio-economic class, unbooked status, prolonged obstructed labour, and grandmultiparity. The most important singular risk factor which is mismanagement of labour by unskilled birth attendants [1-10], can be appreciated in this study, where the risk of ruptured uterus was 36 times higher among unbooked patients.

The highest frequency which occurred among the 30-39 years age group, may be because most of our grandmultiparae were within this age group, which was also the finding from Kaduna, also in North West Nigeria [6], with similar socio-cultural and religious background, probably because early marriage and child bearing are common.

The risk of ruptured uterus which was twice higher among the 30-39 years age group, 8times higher among the grandmultiparae, 12 times higher among the low socioeconomic class, and 6times higher among those with prolonged obstructed labour. This is similar to the findings of other authors [5-8]. It has been shown in other studies from developing countries that, grandmultiparity is common among the low socioeconomic class because of early marriage and poor utilization of family planning services. These groups of women are commonly unbooked, and present late in labour with prolonged obstructed labour from neglect [16-19]. This may explain a relationship between the significant risk factors that were found in this study.

In Nigeria, 70% of the women deliver outside a health facility [10] and this is similar to the finding in Ethiopia [2], Zimbabwe [15] and Pakistan [1]. The reason for the delay in getting proper care in labour, and the high prevalence of poorly supervised labour in the developing countries is because of scanty, poorly equipped and manned health facilities, aversion to Western oriented programmes like antenatal care and hospital delivery, poverty, poor access to the scanty health facilities, as well as poor transfer system [1-10]. Most of the rural public health facilities are not functional for 24 hours in Nigeria [11]. The health facilities are poorly equipped and manned causing delay in diagnosing complications, and when it is done, there may be no facilities to manage them [10]. Most of the health facilities do not meet the Emergency Obstetric Care (EOC) criteria in Nigeria. Only Lagos State met the EOC requirements of 5 midwives per shift in the public health facilities [11]. This together with poor transfer system result in delay in getting to the health facilities in the cities, with resultant complications like ruptured uterus, especially in developing countries where there is high prevalence of cephalopelvic disproportion from contracted pelvis [1-11]. This may explain why higher percentage of patients who were unbooked for antenatal care or who booked elsewhere had ruptured uterus, compared to those who delivered with intact uterus.

In Conakry, Guinea, there was decrease in uterine rupture from 0.20% to 0.12%, and maternal mortality after uterine rupture from 28% to 21% after 6 months of implementation of a program of consultation, feedback and integration (effective transfer system) between peripheral delivery units and two hospitals [3]. Also because of utilization of their effective antenatal care and delivery facilities and effective transfer systems, the incidence of ruptured uterus and its contribution to maternal mortality has been reduced to an insignificant minimum in the developed countries [4]. This shows that effective health care delivery and transfer system, as well as community intervention to encourage the utilization of the antenatal care and delivery services, are essential to reduce the incidence of ruptured uterus and its contribution to maternal mortality.

In a predominantly Islamic society like ours, where women marry early and are not socioeconomically empowered, involvement of the husbands and community is essential, in order to allow the women to avail themselves of antenatal care and delivery facilities. This can be done through education of the husbands, community and religious leaders [16].

Injudicious use of oxytocics was not found to be a significant risk factor as earlier reported in some studies [3,4]. This is in spite the fact that our rate of induction of labour was 3.6% of all deliveries [21], a figure that is similar to the 3.0% from Sokoto [23] also in Nigeria, but it is lower than 9.5 – 33.7% in the United States of America [20,22]. This was probably because of our safe protocol for the use of intravaginal misoprostol and titrated oxytocin infusion for induction or augmentation of labour. In our misoprostol protocol, a 50-micrograms tablet is introduced into the posterior fornix every six hours. It has been found that when patients are properly selected, in dosages of 50 micrograms four hourly or more, misopostol is safe and more effective than conventional methods of cervical ripening and labour induction, and it heralds the return of all the conveniences of daylight obstetrics [20].

Higher doses of misoprostol or shorter dosing intervals are associated with a higher incidence of hyperstimulation and hypersystole as reported in clinical trails by the Cochrane reviewers [20]. Numerous randomized placebo-controlled studies have shown that low-dose oxytocin (physiologic), and high dose (pharmacologic) oxytocin regimens, are usually effective in establishing adequate uterine contractions, and are safe in labour when they are properly titrated against uterine contractions [20]. This can be appreciated in this study, where there was no case of uterine rupture following use of properly titrated oxytocin. Among the referred cases, misuse of oxytocic agents was not a significant factor, probably because of the fear of complications which they may not be able to contain.

Previous cesarean section was not found to be a significant risk factor in this study, which was also the finding in other studies [4]. This could be due to awareness on the part of the women and those who manage them, either in the hospital or elsewhere, of the risk of management of labour in women with previous uterine scar. In developed countries, rupture of a previous uterine scar and the use of oxytocic agents are the common causes of uterine rupture, because of low incidence of cephalopelvic disproportion, small family size, and absence of delay in getting proper management in labour [4].

Conclusion and Recommendations

The significant risk factors that were found in this study were maternal age 30-39 years, low socioeconomic class, unbooked status, prolonged obstructed labour, and grandmultiparity, with the common denominator being delay in getting proper management in labour

Provision of free and accessible antenatal care and delivery facilities, campaign for antenatal care and hospital delivery, female western education and employment opportunities, and acceptance of modern family planning methods to prevent grandmultiparity must be intensified in our community, if the prevalence of ruptured uterus is to be reduced significantly, and MDGs 4 and 5 is to be met.

In a predominantly Islamic society like ours where early marriage is common, involvement of the husbands, community and religious leaders is essential for success of this campaign.

References

1. United Nation Childen Fund (1997) Women's Health in Pakistan.

2. Amanael G, Mengiste MM (2002) Ruptured uterus-eight year retrospective analysis of causes and management outcome in Adigrat Hospital, Tigray Region, Ethiopia. *J Health Dev* 16: 241-245.
3. Balde MD, Bastert G (1990) Decrease in uterine rupture in Conakry, Guinea by improvements in transfer management. *Int J Gynecol Obstet* 31: 21-24.
4. Fedorkow DM, Nimrod CA, Taylor PJ (1987) Ruptured uterus in pregnancy: A Canadian hospital's experience. *Can Med Assoc J* 137: 27-29.
5. Ebeigbe NP, Enabudoso E, Ande AB (2005) Ruptured uterus in a Nigerian Community: a study of socio-demographic and obstetric risk factors. *Acta Obstet Gynecol Scand* 84: 1172-1174.
6. Onwuhafua P, Onwuhafua A, Omekara D, Ibrahim R (1998) Ruptured uterus in Kaduna, Nigeria; a six year review. *J Obstet Gynecol* 18: 419-423.
7. Aboyeji AP, Ijaiya MD, Yahaya UR (2001) Ruptured uterus: a study of 100 consecutive cases in Ilorin, Nigeria. *J Obstet Gynecol Res* 27: 341-348.
8. Ezechi OC, Mabayoje P, Obiesie LO (2004) Ruptured uterus in South Western Nigeria: a reappraisal. *Singapore Med J* 45: 113-116.
9. Olatunji AO, Sule-Odu AO, Adefuye PO (2002) Ruptured uteri at Sagamu, Nigeria. *Niger Postgrad. Med J* 9: 235-239.
10. The SOGON National Partnership Plan for Sustainable Reduction in Maternal and Newborn Deaths. 2008.
11. National Study on Essential Obstetric Care Facilities in Nigeria. Federal Ministry Health, Nigeria. 2003.
12. Olusyanan O, Amiegheme N (1988) Biosocial factors in maternal mortality: a study from a Nigerian Mission Hospital. *Trop J Obstet Gynecol* 1: 88-89.
13. Harrison KA (1988) Maternal mortality - a sharper focus on a major issue of our time. *Trop J Obstet Gynecol* 1: 9-13.
14. Ekwempu CC (1988) The influence of antenatal care on pregnancy outcome. *Trop J Obstet Gynecol* 1: 67-71.
15. Walsh CA, O'Sullivan RJ, Foley ME (2006) Unexplained prelabor uterine rupture in a term primigravida. *Obstet Gynecol* 108: 725-727.
16. Rayamajhi R, Thapa M, Pandes (2006) The challenge of grandmultiparity in obstetric practice. *Kathmadu University Medical Journal* 4: 70-74.
17. Etedafe P, Igbafe AA (2001) Grandmultiparity: Emerging trend in a tropical community. *Trop J Obstet Gynecol* 18: 27-30.
18. Olusanya O, Okpere EE, Ezimokhai M (1985) The importance of social class in voluntary fertility control in a developing country. *West Afr J Med* 4: 4.
19. Briggs ND (1988) Maternal death in booked and unbooked patients: University of Port Harcourt Teaching Hospital experience. *Trop J Obstet Gynecol* 1: 26-29.
20. Wagner M (2003) Misoprostol (cytotec) for labour induction. A cautionary tale. *Midwifery today* 67: 31-33.
21. Omole-Ohonsi A, Mohammed Z (2005) Emergency Obstetric Hysterectomy. *Medicine Review* 12: 4-6.
22. Ozsoy M, Ozsoy D (2004) induction of labor with 50 and 100ug of Misoprostol. Comparison of maternal and fetal outcomes. *Eur J Obstet Gynecol Repro Biol* 113: 41-44.
23. Ekele BA, Oyetunji JA (2002) Induction of labor at Usmanu Danfodio University Teaching Hospital, Sokoto. *Trop J Obstet Gynecol* 19: 74-77.