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Uterine Rupture Factors and Neonatal Outcomes: Sudanese Cases

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Abstract

Background*:** Uterine rupture is linked to high rates of maternal mortality, especially in developing countries. Thus, this study aimed to evaluate the factors contributing to uterine rupture and the resulting neonatal outcomes in Sudan. ***Methodology*:** This study comprised of a series of 26 women presented with uterine rupture to the department of maternity at El-Obeid Teaching Hospital, El-Obeid, North Kordofan state, Sudan. The patients presented within one-year time. ***Results: In this particular group of patients, the neonatal population exhibited the following distribution: 19.2% (5 out of 26) were classified as Alive and well (WA), 23% (6 out of 26) required admission to the neonatal intensive care unit (NICU), 46.2% (12 out of 26) presented with Fresh Still Birth (FSB), and 11.6% (3 out of 26) displayed manifestations of Macerated Still Birth (MSB). ***Conclusion*:** Various factors can impact the outcomes of neonates following uterine rupture, such as the availability of facilities and demographic factors. The majority of newborns delivered showed unfavorable conditions.

Keywords: Uterine rupture, maternity, neonatal outcomes, Sudan.

INTRODUCTION

Uterine rupture is a rare occurrence in obstetrics. This issue remains significant as it is still linked to high rates of maternal mortality, especially in developing nations, as well as severe maternal morbidity, particularly in cases requiring peripartum hysterectomy. It is worth noting that there is a significant global impact in terms of perinatal mortality and morbidity [1, 2]. The rising prevalence of elective and indicated caesarean sections globally has resulted in the emergence of new pathologies and management complexities. There has been a noticeable rise in the number of patients opting for a trial of labor after caesarean section [3].

Uterine rupture has been linked to negative outcomes in more than half of the cases, despite its rarity. Vaginal delivery and unscarred perforation are associated with a greater likelihood of adverse outcomes, underscoring the criticality of early detection and surgical intervention [4]. Several studies have highlighted the considerable maternal morbidity associated with expectant management of cases of CSP with fetal cardiac activity. This primarily includes complications such as hemorrhage and cesarean hysterectomy due to placenta accreta spectrum. Nevertheless, there are also reports of high live birth rates. There is a noticeable absence of literature that addresses the diagnosis and management of CSP in low-resource settings. In certain cases where fetal cardiac activity is not detected, opting for expectant management can be a reasonable choice and has the potential to result in positive outcomes for the mother [5].

Nevertheless, the available data from Sudan on uterine rupture and neonatal outcomes is severely lacking. As a result, this study seeks to evaluate the factors contributing to uterine rupture and the resulting neonatal outcomes in Sudan.

MATERIALS AND METHODS

This study comprised of a series of 26 women presented with uterine rupture to the department of maternity at El-Obeid Teaching Hospital, El-Obeid, North Kordofan state, Sudan. The patients presented within one-year time. Information regarding patients' essential identification data, as well as, the demographical characteristics were obtained from each patient. Each patient was consented for participation in the study. Data were analyzed using SPSS program to get cross-tabulation, frequencies, and percentages.

Ethical Approval: This study's proposal was approved by the Human Research Ethics Committee at MRCC (Approval Number: HREC 0004/MRCC.03/24).

RESULTS

This study investigated 26 women aged 20 to 42 years with a mean age of 30 years.

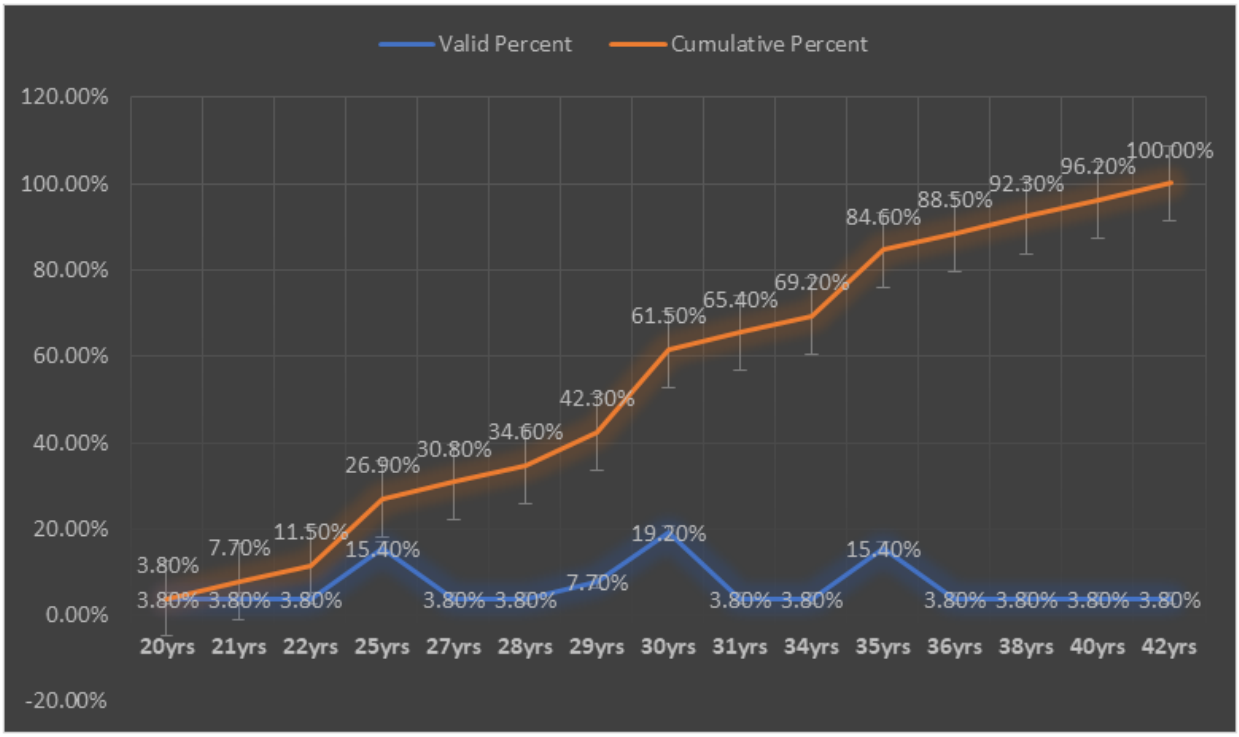

Figure 1: Description of the study cases by age

The distribution of general characteristics related with mother by neonatal outcomes was summarized in Table 1, Figures 2 and 3. In this particular group of patients, the neonatal population exhibited the following distribution: 19.2% (5 out of 26) were classified as Alive and well (WA), 23% (6 out of 26) required admission to the neonatal intensive care unit (NICU), 46.2% (12 out of 26) presented with Fresh Still Birth (FSB), and 11.6% (3 out of 26) displayed manifestations of Macerated Still Birth (MSB).

In terms of parity, the majority of patients (18/26(69%) were Multipara, and the majority of their neonates (7/18(39%)) FSB, followed by (NICU & AW) (5/18(28%). In six Grand-multipara situations 50% of the neonates were FSB and 33% were MSB. The only two Primigravida cases resulted in FSB (100%).

Eleven births, or 42% of the total, occurred at home, while about 15 of the 26 births, or 58%, occurred in hospitals. Of the fifteen hospital births, five (15) (33%) were in the AW or NICU, four (15) (27%) were FSB, and one (1/15 (7%), MSB. Of those delivered at home, 2/11 (18.2%) were MSB and 8/11 (72.7%) were FSB.

Referrals were made available from home to 18/26 (69.2%), including 9/18 (50%) FSB and 3/18 (16.7%) MSB. Two (40%) of the five patients referred from a rural hospital were assigned to the FSB, two (40%) to the NICU, and one (20%) to the AW. The NICU received approximately 67% of inpatient admissions, while the FSB received 33%.

In terms of gestational age, 22/26 (84.6%) were term, 2 (7.7%) were premature, and 2 (7.7%) were past term. Preterm newborns all had FSB, but post-term babies all had NICU.

In terms of time referred to operation, the majority of patients were referred after 4 hours, and it was determined that decreasing referral time enhanced the possibility of better results, as indicated in Table 1, Fig 4.

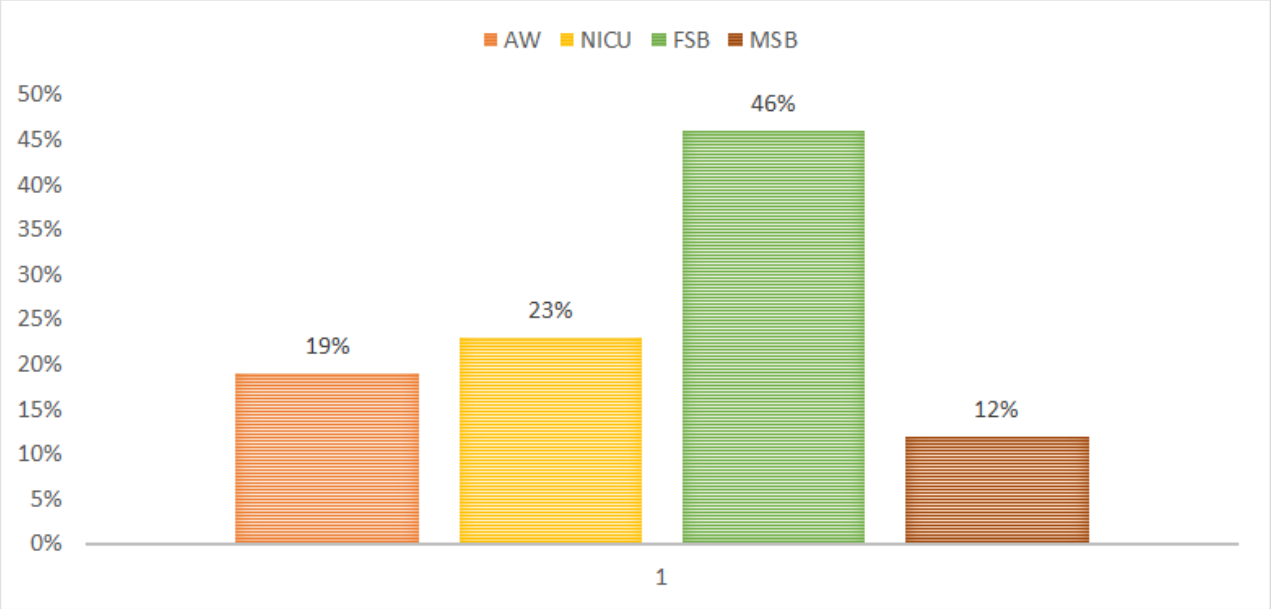

Figure 2: Description of study subjects by neonatal outcomes

Table 1: General factors associated with mother by neonatal outcomes

Variable	AW	NICU	FSB	MSB	Total
Parity					
Primigravida	0	0	2	0	2
Multipara	5	5	7	1	18
Grand-multipara	0	1	3	2	6
Total	5	6	12	3	26
Place of delivery					
Home	0	1	8	2	11
Hospital	5	5	4	1	15
Referral place					
Home	4	2	9	3	18
Rural hospital	1	2	2	0	5
Inpatient	0	2	1	0	3
Gestational age					
Preterm	0	0	2	0	2
Term	5	4	10	3	22
Post term	0	2	0	0	2
Time referred to operation (hour)					
1.00	0	0	2	0	2
2.00	1	3	2	0	6
3.00	1	1	2	0	4
4.00	2	1	4	1	8
5.00	0	1	0	0	1
6.00	0	0	0	1	1
7.00	1	0	0	0	1
10.00	0	0	1	0	1
12.00	0	0	1	0	1
18.00	0	0	0	1	1

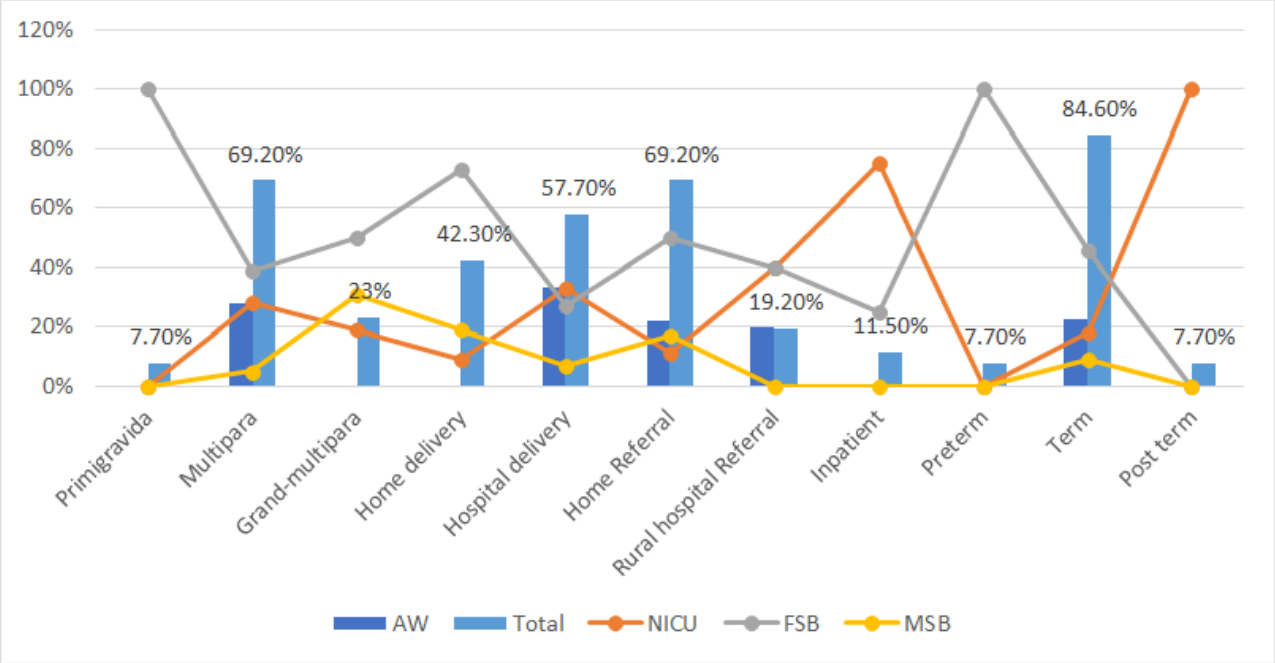

Figure 3: Description of the study subjects by general factors associated with mother by neonatal outcomes

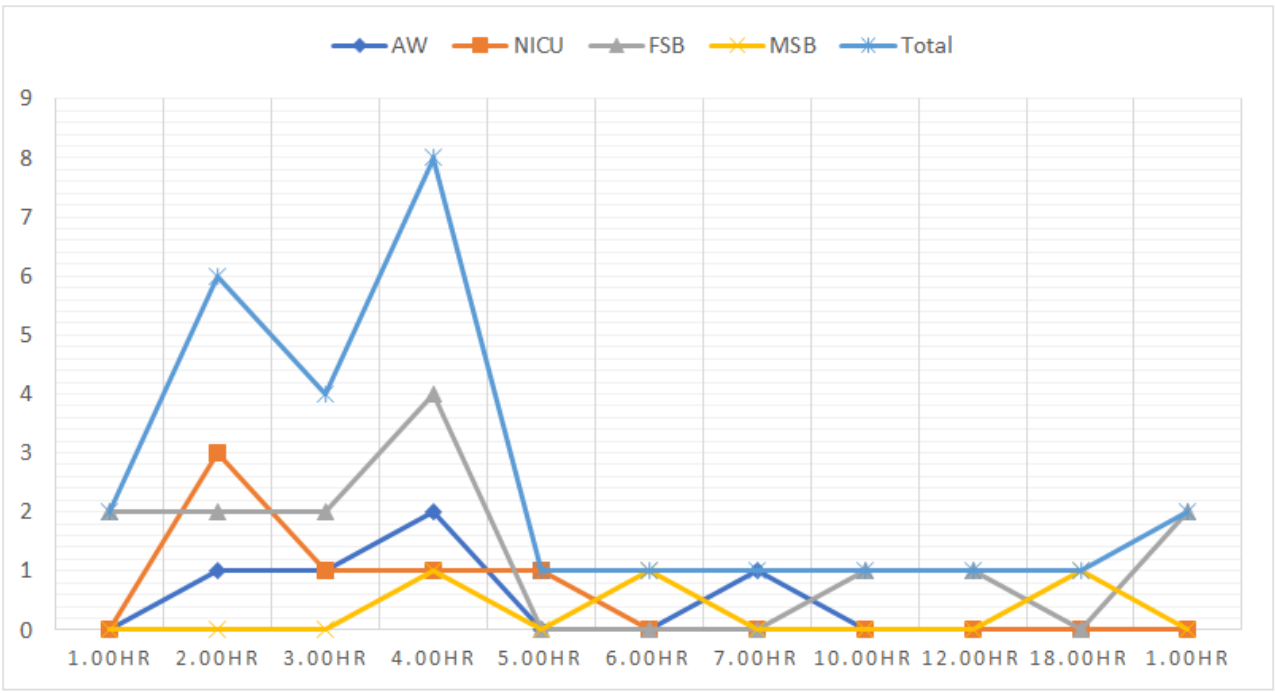

Figure 4: Description of outcomes by the time referred to operation

Table 2 and Figure 2 describe the clinical factors associated with mother by neonatal outcome. The majority of patients (15(57.7%) presented with Laboure pain, followed by vaginal bleeding (7(19.2%). Labore pain was the reason of 9/15 (60%) FSB. In terms of patient condition, the vast majority (77%) seemed to be ill, with only one (3.8%) comatose. FSB was found in 9/20 (45%) of the 20 patients who appeared ill. The mode of birth was CS in 15 cases (57.7%) and vaginal in 11 cases (42.3%). There are no noticeable variations between the two strategies' outcomes. Interrupted ANC was seen in ten (38.5%) participants, Good ANC in eight (30.8%), and No ANC in eight (30.8%). FSB was found in 50% of individuals who had interrupted ANC and 50% of.

Table 2: Clinical factors associated with mother by neonatal outcomes

Variable	AW	NICU	FSB	MSB	Total
Clinical presentation					
Abdominal pain	0	2	1	0	3
Laboure pain	3	2	9	1	15
Vaginal bleeding	2	2	2	1	7
Others	0	0	0	1	1
Total	5	6	12	3	26
Patient's condition					
well	1	1	3	0	5
ill	4	5	9	2	20
comatose	0	0	0	1	1
Mode of delivery					
Vaginal	1	2	6	2	11
CS	4	4	6	1	15
ANC					
Good ANC	1	4	3	0	8
Interrupted ANC	2	2	5	1	10
NO ANC	2	0	4	2	8
ANC with					
Specialist	2	3	2	0	7
Registrar	0	2	2	0	4
Medical officer	1	1	4	0	6
Heath worker	0	0	0	1	1

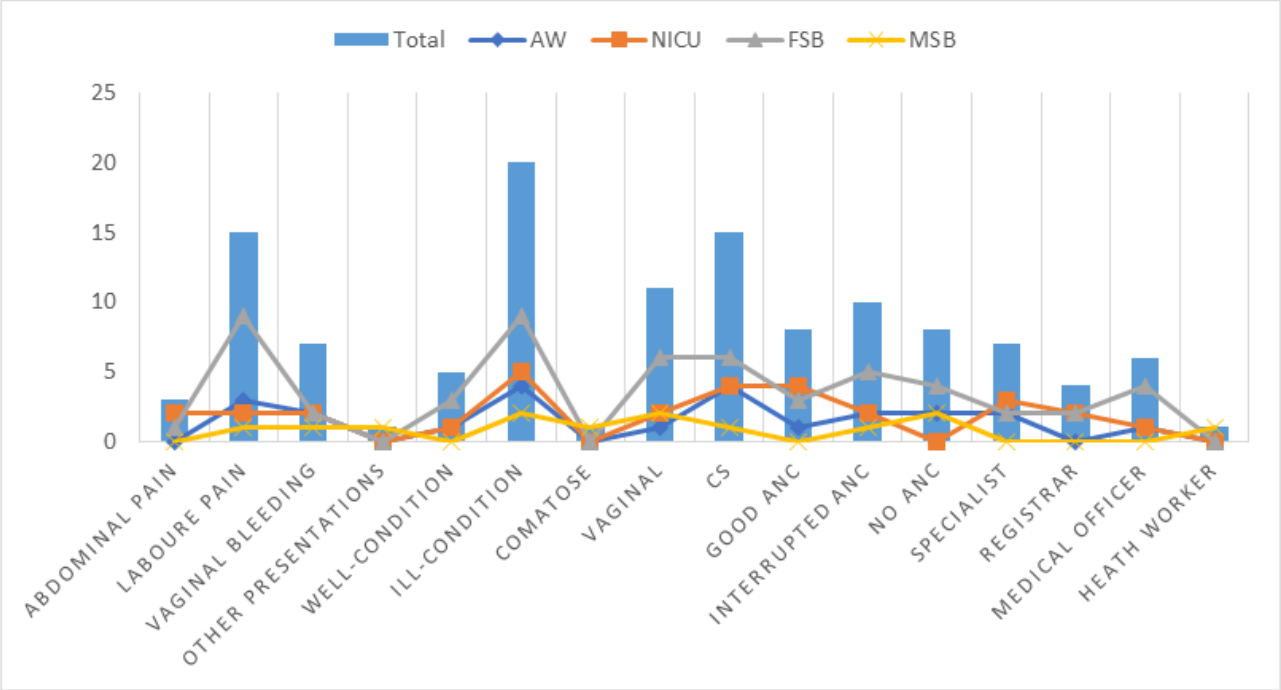

Figure 5: Description of the clinical factors associated with mother by neonatal outcomes

Table 3 and Figure 6 summarize the distribution of study cases by duration of labore and beginning of labore by neonatal outcome. Out of the 10 patients with extended Laboure duration (16 hours), 2/10 (20%) had MSB, 4/10(40%) had FSB, and 2/10(20%) had NICU, whereas 1/7(14.3%) had MSB, 4/7(57%) had FSB, and 2/7(28.6%) had NICU.

Regarding labore beginning, 23 patients had a spontaneous pattern, with 11/23 (47.8%) having FSB, 4/23 (17.4%) having NICU, and 3/23 (13%) having MSB.

Table 3: Distribution of the study cases by duration of Laboure, and onset of Laboure by neonatal outcomes

Variable	AW	NICU	FSB	MSB	Total
Duration of Laboure					
<5hours	0	2	4	1	7
5-10	3	1	3	0	7
11-15	0	1	1	0	2
16+	2	2	4	2	10
Total	5	6	12	3	26
Onset of Laboure					
Spontaneous	5	4	11	3	23
Induced	0	1	2	0	3

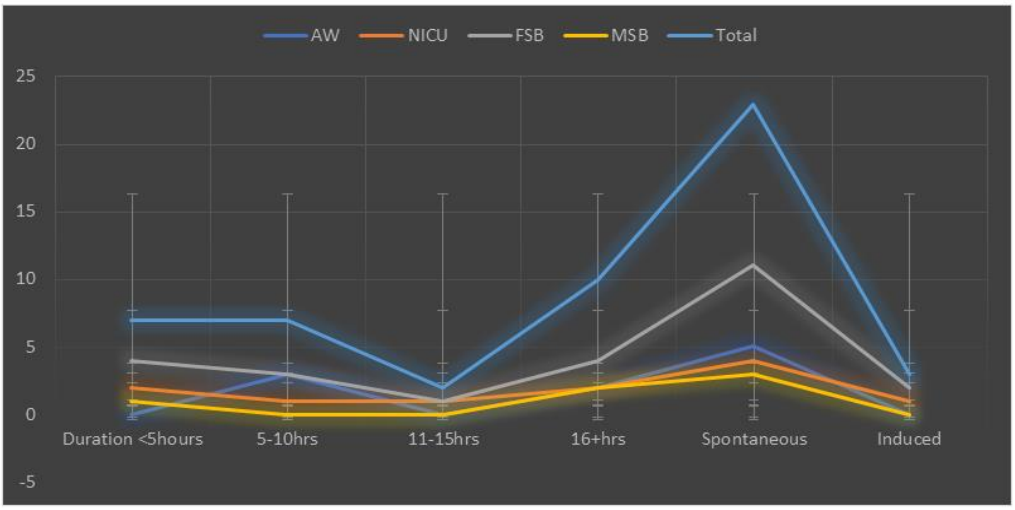

Figure 6: Description of the study cases by duration of Laboure, and onset of Laboure by neonatal outcomes

Table 4 and Figure 7 show the distribution of study cases based on demographic characteristics and neonatal outcomes. The bulk of patients (19/26, or 73%), were from cities, with 3/19 (15.8%) having MSB, 8/19 (42%), and 4/19 (21%), having NICU. 4/7 (57%) of the 7 remote patients had FSB, and 2/7 (28.6%) had NICU outcomes. The age group 26-30 years old was associated with the bulk of FSB cases (5/9(55.6%), followed by the age group 31-35 years old (4/6(66.7%). There are no evident differences in neonatal outcomes based on educational or occupational background.

Table 4: Distribution of the study cases by demographic characteristics and neonatal outcomes

Variable	AW	NICU	FSB	MSB	Total
Residence					
Rural	1	2	4	0	7
Urban	4	4	8	3	19
Total	5	6	12	3	26
Age					
<25 years	3	2	1	1	7
26-30	0	3	5	1	9
31-35	1	1	4	0	6
36+	1	0	2	1	4
Education					
Illiterate	0	2	2	1	5
Primary	3	3	5	2	13
Secondary	2	1	4	0	7
Graduate	0	0	1	0	1
Occupation					
House wife	3	4	7	2	16
Farmer	2	2	4	1	9
Teacher	0	0	1	0	1

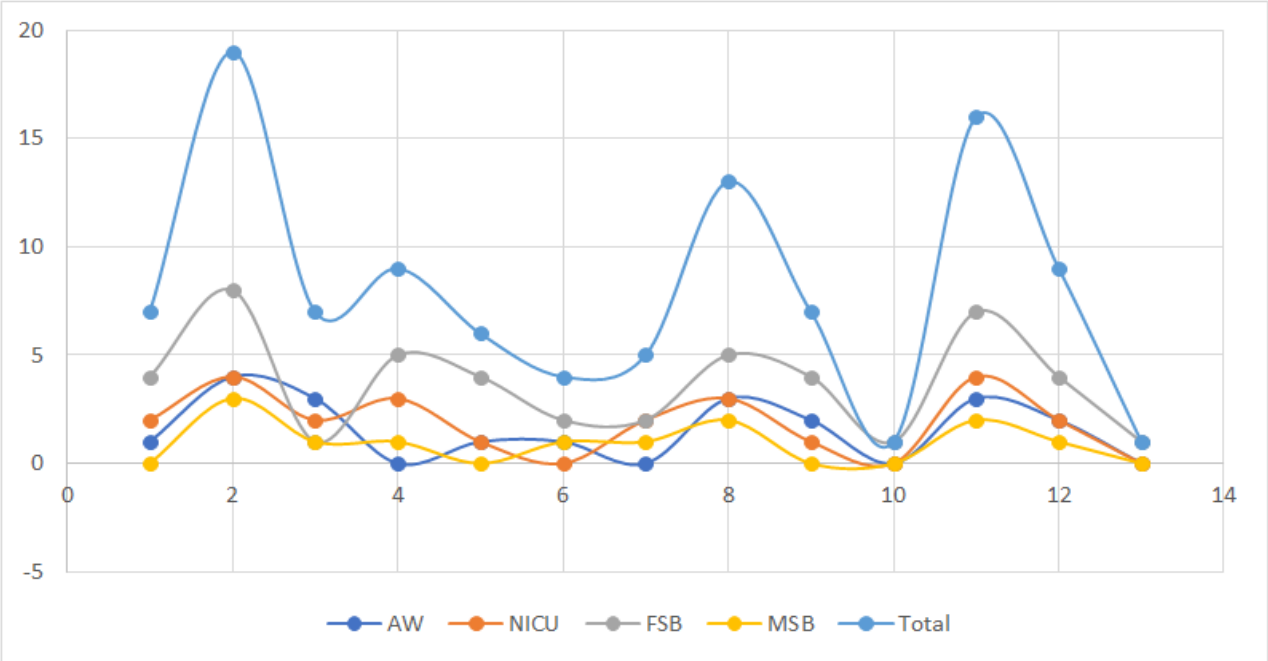

Figure 7: Description of the study cases by demographic characteristics and neonatal outcomes

DISCUSSION

Maternity and neonatal care in the Sudan are currently facing significant challenges due to limited resources and ongoing conflict. It is unfortunate that a significant number of women lose their lives both before and after reaching health facilities, often due to the absence of crucial management tools. Uterine rupture poses a significant threat to maternal health, while the limited availability of facilities contributes to the rising number of neonatal deaths. Consequently, the purpose of this research is to assess the various factors that contribute to uterine rupture in Sudan and the subsequent neonatal outcomes.

The neonatal population in this specific cohort displayed the following distribution: 19.2% were WA, 23% were in the NICU, 46.2% were FSB, and 11.6% were MSB. Based on a recent study, it has been found that approximately 15% to 26% of uterine rupture cases result in infant death, indicating that the survival rate for infants is around 74% to 85%. Nevertheless, a significant number of infants who manage to survive experience lasting brain damage, with nearly a quarter of them needing admission to neonatal intensive care. The survival rate for uterine rupture is greatly affected by the severity of the rupture and the time between the rupture and delivery [6, 7].

This study found that most of the patients (69%) were Multipara, while the majority of their neonates (39%) were FSB. The most critical risk factor for uterine rupture in subsequent pregnancies is a history of previous cesarean delivery. There is conflicting data on the association between having six or more deliveries (grand multiparity) and the risk of uterine rupture. Inducing or augmenting labor during a trial of labor after a cesarean delivery in women who have had multiple pregnancies seems to be a viable choice, with a uterine rupture risk comparable to that of women who have had multiple pregnancies. Opting out of a compulsory cesarean delivery can help lower the chances of having multiple cesarean deliveries in the future [8]. Additionally, there is insufficient evidence to establish a connection between Multipara and adverse neonatal outcomes.

In the current study, regarding the delivery place, those babies born at home had the worst neonatal outcomes. Delivery at a health facility has been shown to significantly decrease the risk of neonatal mortality by 29% in low- and middle-income countries. Based on a meta-analysis, it was found that facility delivery had a significant association with neonatal mortality in 10 out of the 19 studies included in the analysis. However, in the remaining 9 studies, the association was not found to be significant. The random effects model was used to determine the final pooled effect size for health facility delivery compared to home delivery. The relative risk was found to be 0.71 (95% CI: 0.54, 0.87) [9].

The current study's findings indicate that 84.6% of the women were termed. Uterine rupture in a non-laboring woman during the second and early third trimester is an extremely uncommon and highly dangerous situation that poses a significant risk to both the mother and the newborn. Unfortunately, there is a lack of epidemiologic data on this affair [10].

Despite the low percentage of neonates classified as MSB in this study, a significant number of neonates experienced unfavorable conditions. In the largest investigation so far, involving 864 cases of

uterine rupture, the study revealed less favorable perinatal outcomes. The rate of maternal hysterectomy was 10% and the rate of perinatal mortality was 13.3% [6]. In recent decades, intrapartum/infant fatality after total uterine rupture has decreased. Complete uterine rupture was associated with the most intrapartum/infant fatalities if delivery took more than 30 minutes and placental separation/extrusion occurred. Delivery times under 20 minutes greatly reduced intrapartum and baby fatalities [7].

Although this study draws attention to the paucity of literature from Sudan, it is not without its limitations, one of which is its small sample size.

CONCLUSION

Various factors can impact the outcomes of neonates following uterine rupture, such as the availability of facilities and demographic factors. The majority of newborns delivered showed unfavorable conditions. It is crucial to raise awareness and improve healthcare facilities, especially in rural areas. Additional research is needed in this particular context to accurately assess the prevalence of uterine rupture in Sudan.

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