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Maternal and fetal outcomes of home births in Western Sudan

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Abstract

Background: In light of the ongoing Sudanese crisis, many pregnant women are having trouble getting the medical care they seek. Thus, the current study sought to evaluate the effects of home births in Western Sudan on both mothers and their newborns**.** Methodology: From January to December 2023, in the Obstetrics and Gynecology teaching hospital in El-Obeid, North Kordofan State, Sudan, we conducted a descriptive longitudinal investigation for this study**.** This study has recruited approximately 224 participants. **Results**: The most common maternal outcomes observed in this group of patients were postpartum hemorrhage, followed by puerperal sepsis and eclampsia, accounting for 14.3 percent, 13%, and 9 percent of cases, respectively. Fresh stillbirth accounted for the majority of cases, while macerated stillbirth, fetal distress, and birth trauma accounted for 28%, 17%, 15%, and 9% of the cases, respectively. **Conclusion**: Home birth is widespread in Sudan; however, it might harm the mother and baby. Postpartum hemorrhage, puerperal infection, and eclampsia are the main maternal consequences. Fresh stillbirth, macerated stillbirth, fetal distress, and delivery trauma are common fetal outcomes. Prioritize maternity and prenatal care system improvements.

Keywords: maternal, home birth, pregnancy, fetal outcomes, Sudan.

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Introduction

Maternal mortality, stillbirths, and neonatal mortality cause over 5 million deaths each year. These three categories of deaths are often investigated separately, despite the fact that they share common causes and can be handled using similar approaches [1]. Many women in their prime sadly died early as a result of negligence and avoidable situations throughout the critical stages of pregnancy, labor, and the postoperative period. This is a distressing issue in maternal mortality that affects one woman every two minutes, or 800 women each day [2, 3].

Maternal mortality, as defined by the prestigious World Health Organization (WHO), includes the untimely death of a woman at any stage of her pregnancy, regardless of location or duration, or within 42 days after delivering. This tragic outcome is attributed to circumstances that are inextricably linked to or exacerbated by the pregnancy itself, as well as its management, with the exception of serendipitous and unintended causes [4].

Nevertheless, nations impacted by armed conflict perceive a greater incidence of maternal mortality compared to those that are politically stable [5]. Antenatal care significantly impacts crucial health indices, such as maternal and neonatal mortality rates, by promptly diagnosing and managing pregnancy-related problems. The political instability and military violence in Sudan have had a profound impact on the health sector, leading to dire consequences for the health of pregnant women. The majority of women residing in remote villages in Sudan rely on traditional birth attendants to deliver their infants. This can be potentially hazardous or unclean. Hence, the objective of this study was to evaluate the maternal and fetal outcomes of home deliveries in Western Sudan. Nevertheless, nations impacted by armed conflict see elevated rates of maternal mortality compared to those that are politically stable. Hence, the objective of this study was to evaluate the maternal and fetal outcomes of home deliveries in Western Sudan.

Materials and Methods

This study is a descriptive longitudinal inquiry that took place at the Obstetrics and Gynecology hospital in El-Obeid, North Kordofan State, Sudan, from January 2023 to December 2024. The trial involved a total of 224 participants. The trial either transported the patients to their homes or admitted them to the hospital during their labor, where they later gave birth. The sample offered an inclusive

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portrayal of all the participants throughout the specified time period.

Statistician Analysis: We first organized the data into a data sheet and then input it into the Statistical Package for the Social Sciences (SPSS) (Version 24, Chicago, USA) computer software. We performed calculations for frequencies, percentages, cross-tabulation, and the chi square test. We derived the P-value from a 95% confidence interval (CI). Statistically significant results were defined as having p-values less than 0.05.

Informed consent: Before the interview, every participant had to sign a formal ethical consent form.

Ethical Approval: The esteemed Human Research Ethics Committee (HREC) at the Prof. Medical Research Center (MRCC) has duly accepted the protocol for this investigation. I hereby request that an approval number, MRCC 0010, be issued.

Results

This study investigated 224 women aged from 13 to 49 years, with a mean age of 28 years. Out of the 224 women, 68 (30.4%) were multipara, 99 (44.2%) were primigravida, and 57 (25.4%) were grandmultipara, as shown in Fig 1.

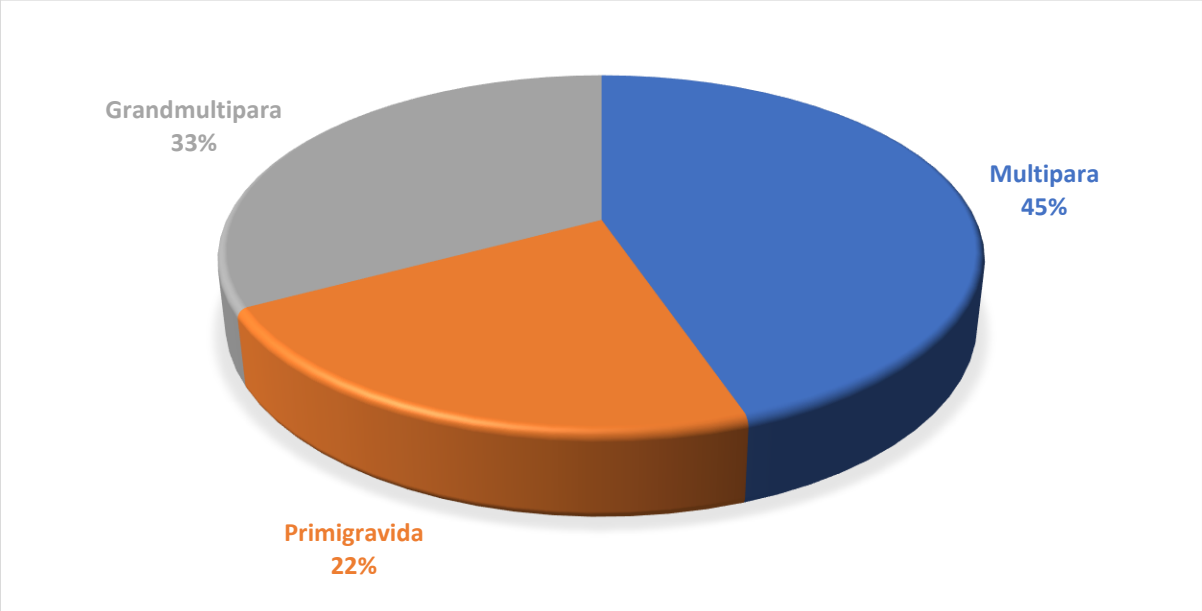

Figure 1 Provides a description of the study subjects by parity.

Most participants were aged ≤20 years, followed by 21–25 and ≥36 years, representing 50 (22.3%), 47 (21%), and 45 (20%), respectively. Out of the 244 women, 139 (62%) were from rural areas, and the remaining 85 (38%) were from urban areas. Fig. 3 shows the description of the study subjects according to their rural or urban localities. The majority of participants were illiterate, followed by those with basic education level and university, constituting 67 (30%), 58 (26%), and 44 (20%), respectively, as indicated in Table 1, Fig 2.

Table 1. Distribution of the study subjects by parity and demographical characteristics

Variable	Multipara	Primigravida	Grandmultipara	Total
Age				
≤20 years	7	42	1	50
21-25	16	23	8	47
26-30	24	8	12	44
31-35	16	12	10	38
≥36	5	14	26	45
Total	68	99	57	224
Residence				
Rural	32	69	38	139
Urban	36	30	19	85
Total	68	99	57	224
Education				
Illiterate	7	41	19	67
Basic	23	20	15	58
Secondary	15	18	9	42
University	18	15	11	44
Postgraduate	5	5	3	13
Total	68	99	57	224

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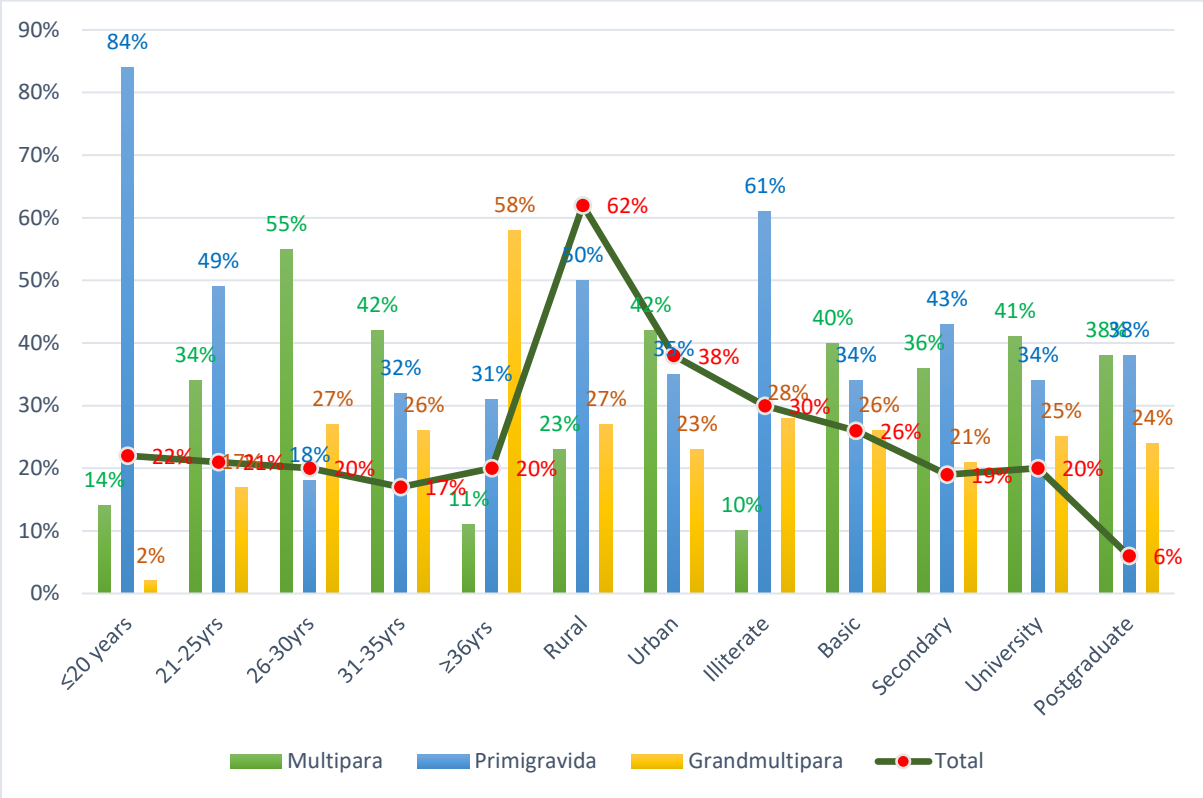

Figure 2. Description of the study subjects by demographic characteristics

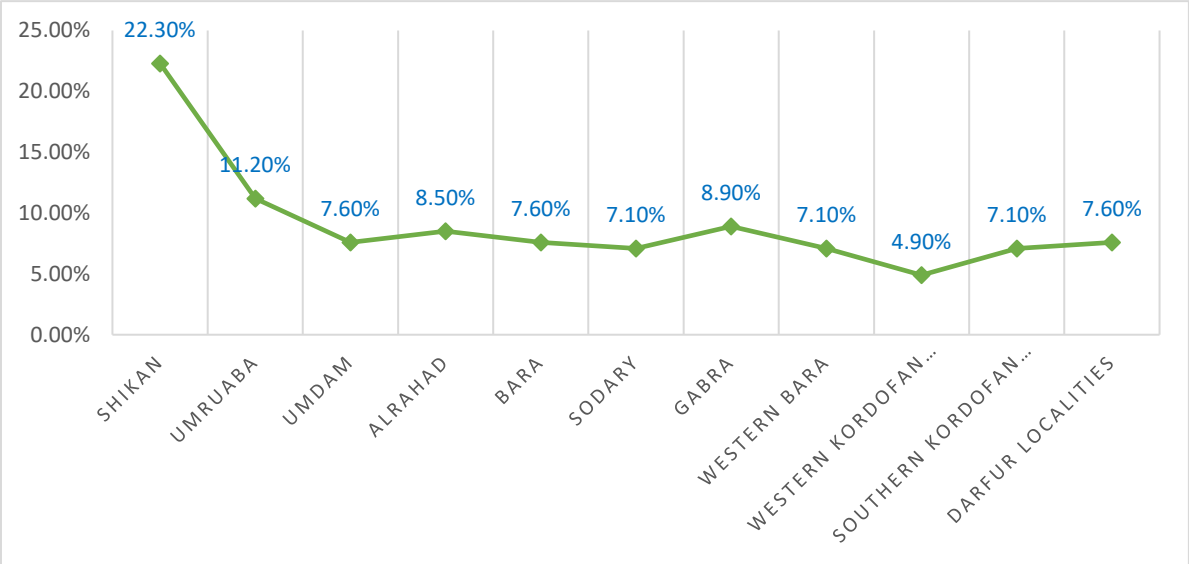

Figure 3 Provides a description of the study population based on their localities.

Table 2, Figs. 4 and 5, summarize the distribution of research subjects based on parity and maternal outcomes. The most common maternal outcomes in this group of patients were postpartum hemorrhage, followed by puerperal sepsis and eclampsia, with 32 cases (14.3%), 29 cases (13%), and 20 cases (9%), respectively. We noticed variations for the different maternal outcomes when we counted the proportions with each parity group, as shown in Fig 5.

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Table 2: Distribution of patients by parity and maternal outcomes.

Variable	Multipara	Primigravida	Grandmultipara	Total
Maternal outcomes				
Puerperal sepsis	7	15	7	29
Postpartum hemorrhage	8	11	13	32
Deep vein thrombosis	5	3	3	11
Eclampsia	3	15	2	20
Puerperal psychosis	4	9	2	15
Obstructed labour	5	4	7	16
Retained placenta	5	7	4	16
Birth canal injuries	4	3	2	9
Antepartum hemorrhage	4	12	4	20
No maternal complications	5	9	3	17
Rupture uterus	3	3	5	11
Vesicovaginal fistula	8	6	1	15
Death	7	2	4	13
Total	68	99	57	224

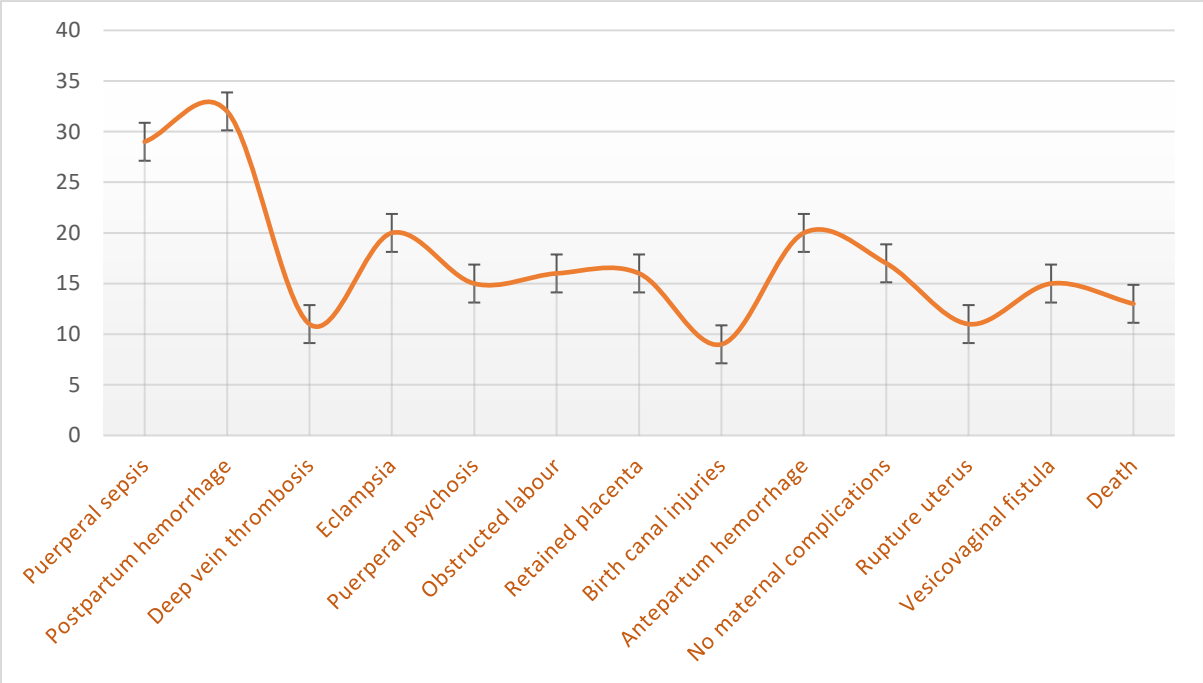

Figure 3. Description of the study subjects by Maternal outcomes

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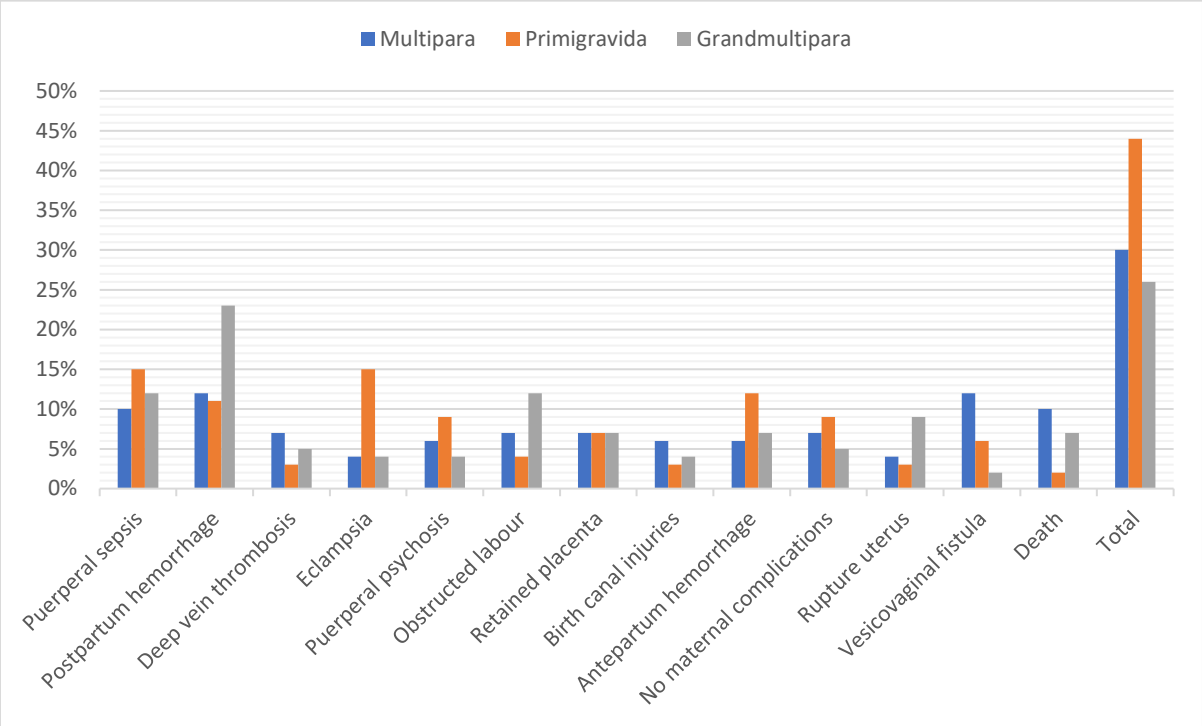

Figure 5. Maternal outcomes within the entire parity group

Table 3 and Fig 6 summarized the distribution of the study subjects by parity and fetal outcomes. Out of the 224 cases, only 69 (31%) were alive and well. Most cases were fresh stillbirth, followed by macerated stillbirth, fetal distress, and birth trauma, which constituted 62 (28%), 38 (17%), 34 (15%), and 21 (9%), respectively.

Table 3: Patients are distributed by parity and fetal outcomes.

Variable	Multipara	Primigravida	Grandmultipara	Total
Fetal Outcomes				
Alive and well	23	30	16	69
Macerated still birth	10	16	12	38
Fresh stillbirth	22	24	16	62
Fetal distress	5	22	7	34
Birth trauma	8	7	6	21
Total	68	99	57	224

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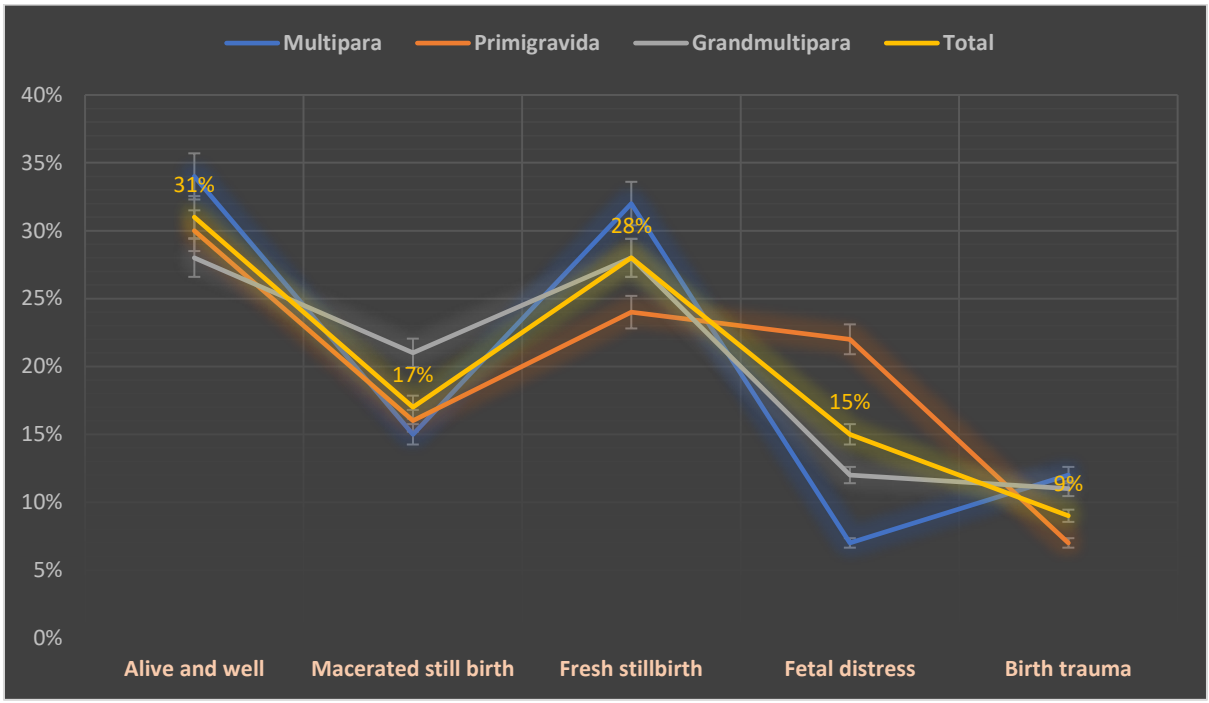

Figure 6. Proportions of fetal outcomes within entire parity groups

Fig. 7 displays the study participants' descriptions according to residence, mode of delivery, and birth attendant caliber. Most cases have spontaneous vaginal delivery followed by Caesarean section and operative vaginal delivery, representing 87 (39%), 83 (37%), and 54 (24%), respectively. Fig. 7 illustrates the quality of birth attendants.

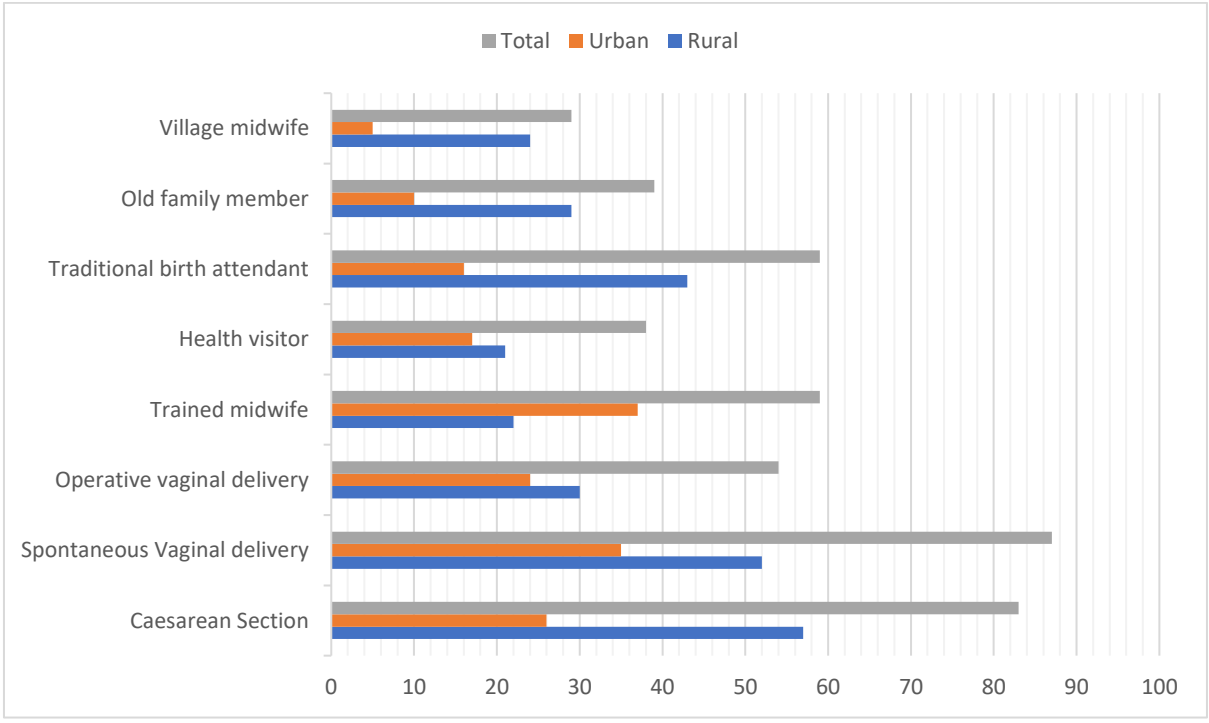

Figure 7 Provides a description of the study participants based on their residence, mode of delivery, and the caliber of their birth attendant.

Discussion

In April 2023, Sudan experienced a substantial conflict that had a profound impact on the healthcare system throughout the entire country. Maternal health and antenatal care are among the most seriously affected. Home birth was prevalent in Sudan, especially in rural regions, prior to the conflict. However, after the war, there was a significant increase in home births, which had negative implications. Therefore, this study aimed to assess the maternal and fetal outcomes of a group of women enrolled during the war.

In this particular group of patients, the predominant maternal outcomes observed were postpartum hemorrhage (14.3%), followed by puerperal sepsis (13%), and eclampsia (9%). Postpartum hemorrhage, a serious obstetric complication, is the leading and most preventable cause of maternal death during childbirth [7]. Globally, the major preventable cause of maternal mortality is postpartum hemorrhage, which is defined as a cumulative blood loss of 1,000 mL or more or blood loss accompanied by signs or symptoms of hypovolemia, regardless of delivery method. Among affluent countries, the United States has one of the highest maternal mortality rates, with postpartum hemorrhage accounting for around 14% of all maternal deaths [8].

Puerperal sepsis constitutes a substantial contributor to avoidable maternal mortality in both economically developed and developing nations. Sometimes, it ranks as the fourth or third most common direct cause of maternal mortality. Although puerperal sepsis is uncommon, it significantly contributes to maternal mortality, morbidity, and chronic complications, including secondary infertility [9]. Traditionally, the postpartum period refers to the six-week period following childbirth, during which infections are common and affect approximately 5 to 7% of women. Puerperal sepsis accounts for 10–15% of postpartum deaths and is one of the top five causes of maternal mortality worldwide. Infections are the primary cause of death following spontaneous or induced abortions. The medical burden resulting from these diseases is worsening due to the increasing bacterial resistance to commonly given antibiotics [9]. Factors such as the mother's level of education, the delivery method, and the presence or absence of pregnancy problems influence the incidence of puerperal sepsis. Ensuring thorough prenatal screenings, providing universal access to healthcare, implementing delivery procedures based on scientific evidence, and promoting education and awareness campaigns focused on the well-being of mothers are extremely important [10].

By expanding access to and promoting the early use of prenatal intervention, we can prevent eclampsia, a precursor to significant maternal morbidity [11].

The occurrence of preeclampsia is increasing worldwide, with emerging countries experiencing a higher rate of instability than developed countries. The World Health Organization (WHO) estimates that preeclampsia affects 2% to 10% of births worldwide [12, 13].

Following ten months of the crisis in Sudan, over 108,000 pregnant women are encountering substantial difficulties in accessing the essential medical aid they require. In conflict-affected regions, an alarming 67% of healthcare facilities are currently inaccessible, with some maternity hospitals being non-functional [14].

The study found that the most common fetal outcomes were fresh stillbirth (28%), followed by macerated stillbirth (17%), fetal distress (15%), and delivery trauma (9%). In spite of worldwide endeavors to diminish maternal and newborn mortality, stillbirths continue to pose a substantial public health obstacle in numerous low- and middle-income nations. District health systems, widely regarded as the foundation of health systems, play a crucial role in addressing the reported lack of data on stillbirths [15]. Labor induction has the potential to avoid stillbirth, and many accepted reasons for inducing labor prioritize this goal. Nevertheless, following childbirth, the child experiences escalating chances of mortality, frequently determined by gestational age. When deciding on the optimal timing for delivery, it is important to take into account the risk of postnatal death in the infant in order to minimize the risk of stillbirth [16].

Fetal intrauterine hypoxia induces fetal distress, posing a significant risk to both the fetus and the pregnant woman. The primary clinical technique for evaluating fetal distress is cardiotocography. Physicians exhibit variable interpretation of CTG data due to subjective variability, physicians interpret CTG data differently. Therefore, an alternate diagnostic technique for identifying fetal distress is necessary. The deep learning-based model for diagnosing fetal distress achieves high classification accuracy but requires a large number of parameters and processing resources, which presents difficulties in its practical application [17].

A targeted clinical evaluation can distinguish between birth traumas and congenital anomalies. Over the past few decades, the incidence of birth trauma has decreased steadily as a result of advancements in obstetrics and the greater utilization of cesarean delivery for cases of dystocia or challenging vaginal deliveries. The incidence of birth trauma decreased from 2.6 per 1,000 live births in 2004 to 1.9 in 2012. The use of forceps and vacuum-assisted deliveries has also declined over the past three decades [18]. According to research, negative interactions with healthcare professionals and maternity care system dysfunction significantly contribute to the occurrence of delivery trauma. Insufficient knowledge and support led women to experience a sense of helplessness and anguish as a result of making poor decisions. Insufficient support exacerbates women's encounters [19].

In conclusion, home birth is common in Sudan, although it is associated with negative consequences for both the mother and the baby. The predominant maternal outcomes are postpartum hemorrhage, followed by puerperal infection and eclampsia. The predominant fetal outcomes

are fresh stillbirth, macerated stillbirth, fetal discomfort, and birth trauma. It is highly advisable to prioritize the improvement of the healthcare system for maternity and antenatal care.

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Authors' contribution

Abdallah AAA: Conception, data collection, analysis, drafting, approval of the final version.

Mohamed NAA: Conception, data collection, approval of the final version.

Mohammed AA: Conception, data collection, approval of the final version.

K Nasralla: Conception, data collection, approval of the final version.

Ahmed HG: Conception, consultation, critical revision, approval of the final version.

Conflict of interest

Authors declare no conflict of interest

Data Availability

Data regarding this research can be requested from the corresponding authors.

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