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Original Research Article

Preterm Birth Outcomes during the War in El-Obeid, Western Sudan

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Abstract

***Background*:** Premature birth is the leading cause of newborn morbidity and mortality. This study sought to evaluate the outcomes of preterm delivery in El-Obeid, Sudan. ***Methodology*:** A prospective descriptive study was conducted in the Obstetrics and Gynecology Hospital in El-Obeid, North Kordofan State, Sudan, from January 2023 to December 2024. The study encompassed approximately 106 hospitalized women with a gestational age below 37 weeks. ***Results*:** The largest G.A. at risk were 34 weeks, followed by 35 weeks, with figures of 26/106 (24.5%) and 20/106 (19%). The majority of deaths occurred at 30 G.A. (27%). The most common risk factor was premature rupture of membranes (PPROM), followed by postpartum hemorrhage (PPH), which accounted for 45% and 39%, respectively. Antepartum hemorrhage caused the majority of deaths (49%) in Sudan. ***Conclusion*:** Preterm birth is widespread in Sudan, with severe consequences, the most common being death. Although postpartum hemorrhage is the most common risk factor, antepartum hemorrhage is becoming more closely associated with death.

Keywords: Preterm Birth, Antepartum Hemorrhage, Postpartum Hemorrhage, Pregnancy, Sudan.

INTRODUCTION

Preterm birth (PTB), defined as delivery before 37 gestational weeks, is a major cause of neonatal and infant morbidity and mortality [1]. PTB affects about 10% of all newborns worldwide and is the leading cause of neonatal death and long-term impairment. PTB continues to be a major source of morbidity and mortality around the world, accounting for around 12–15 million preterm births each year. Although the overall tendency is downward, it is primarily in high-income countries (HIC). The rate remains high in low- and middle-income countries (LMIC), ranging on average between 10 and 12% vs. 9% in high-income countries [2, 3]. Because of the many causes and risk factors of preterm birth (PTB), both naturally and because of medical intervention, it is challenging to come up with reliable ways to predict risk [4]. It is critical to identify women who are at high risk of PPV as soon as possible, especially since there are effective screening methods based on evidence that can help with decision-making about prevention strategies, such as transvaginal sonographic cervical length (CL) measurement. PTB's pathophysiology is complex and multifactorial. Attempts to cut rates by focusing on PTB as a single condition have mostly failed. More recent attempts to phenotype PTB have led to more effective preventative methods. Researchers have found that only primary or secondary prevention can effectively reduce PTB rates. These include recognizing risk factors before and during pregnancy and taking appropriate actions to address them [2, 3]. PTB is more likely to happen if you have been exposed to amphetamines, a single umbilical artery, a personality disorder in the mother, sleep-disordered breathing (SDB), had an induced termination of pregnancy with vacuum aspiration (I-TOP with VA) before, had low gestational weight gain (GWG), or had an interpregnancy interval (IPI) after a miscarriage that was less than six months [1]. A number of medical and scientific groups helped create the clinical practice guideline on giving pregnant women omega-3 docosahexaenoic acid and eicosapentaenoic acid to lower their risk of having a baby before it's due. The guideline is based on strong evidence from randomized clinical trials and a formal consensus process [5]. After the United States Food and Drug Administration removed 17-alpha hydroxyprogesterone caproate from the market in order to prevent recurrent spontaneous

preterm birth, national societies issued conflicting recommendations on how to manage patients with a singleton pregnancy and a history of spontaneous preterm birth [6]. Although the frequency of several diseases increased dramatically during the Sudan war, there is no published data on the epidemiology of PTB in Sudan. The current study is intended to investigate the outcomes of preterm delivery in El Obeid, Sudan.

MATERIALS AND METHODS

This is a prospective descriptive study that will take place in the Obstetrics and Gynecology Hospital in El-Obeid, North Kordofan State, Sudan, between January 2023 and December 2024. The study encompassed approximately 106 hospitalized women with a gestational age of less than 37 weeks.

Statistician Analysis

We first prepared the data in a datasheet and then entered it into a computer statistical tool for social sciences (SPSS) (Version 24, Chicago, USA). We calculated frequencies, percentages, cross-tabulation, and the chi square test. We obtained the P-value using a 95% confidence interval (CI). P values < 0.05 were considered statistically significant.

Informed Consent: Before the interview, we asked each participant to sign a written ethical consent.

Ethical Approval: The Prof. Medical Research Center-MRCC's human research ethics committee (HREC) approved the protocol for this study. The approval number is HREC 0013/PMRCC.9/24.

RESULTS

This study investigated 106 pregnant women aged 15 to 54, with a mean age of 27 years old. The majority of patients in this study were between the ages of 21 and 29, followed by 30-40 and ≤20 years, with 53/106 (50%), 27/106 (25.5%), and 20/106 (19%) correspondingly. Out of the 106 participants, 56 (53%) were rural, and the remaining 50 (48%) were urban. The majority of women were illiterate, followed by those with basic and secondary education, which accounted for 35/106 (33%), 32 (30%), and 29 (27.4%), respectively. The majority of patients were housewives (58/106, 54.7%) and employers (36/106, 33.9%), as shown in Table 1 and Figure 1.

Table 1: Distribution of the study subjects by demographical features

Variable	Rural	Urban	Total
Age			
≤20 Years	8	12	20
21-29	28	25	53
30-40	16	11	27
41-50	3	2	5
≥51	1	0	1
Total	56	50	106
Education			
Illiterate	16	19	35
Basic	17	15	32
Secondary	16	13	29
University	7	2	9
Postgraduate	0	1	1
Total	56	50	106
Occupation			
HW	35	23	58
Employers	15	21	36
Other	6	6	12
Total	56	50	106

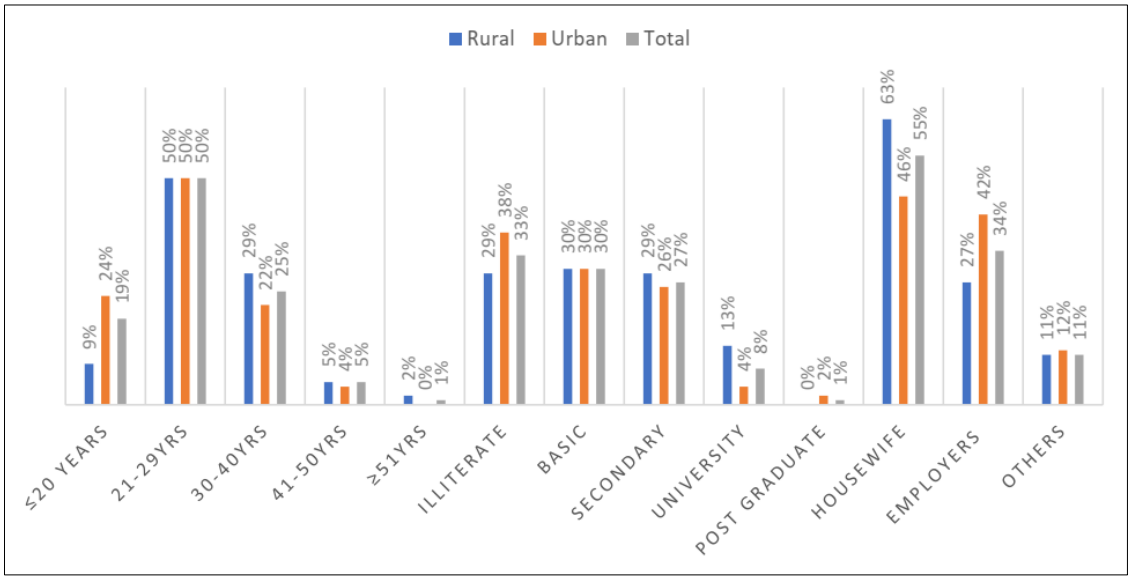

Figure 1: Description of the study subjects by demographical features

Table 2 and Figure 2 describe the patient distribution based on fetal outcomes, ANC, and maternal chronic conditions. Death was the most prevalent outcome in this cohort of patients, followed by cerebral palsy, which accounted for 45/106 (42.4%) and 39/106 (36.7%), respectively. Hypertension and autoimmune disease were the most common maternal chronic diseases, accounting for 32/106 (30%) each, followed by diabetes and infectious disorders, which accounted for 23/106 (22%) and 19/106 (18%), respectively. The majority of deaths were due to autoimmune illness (27/32, 48.3%) and hypertension (13/32, 40.6%). 36 (34%) patients did not receive antenatal care; therefore, 51 (48%) reported irregular antenatal care.

Table 2: Patient distribution by fetal outcomes, ANC, and maternal chronic disease

Variable	Well	Cerebral palsy	Death	Total
Maternal chronic diseases				
Diabetes	4	16	3	23
Hypertension	8	11	13	32
Autoimmune disease	3	2	27	32
Infectors disease	7	10	2	19
Total	22	39	45	106
Antenatal care				
Regular	13	3	3	19
Irregular	6	16	29	51
No	3	20	13	36
Total	22	39	45	106

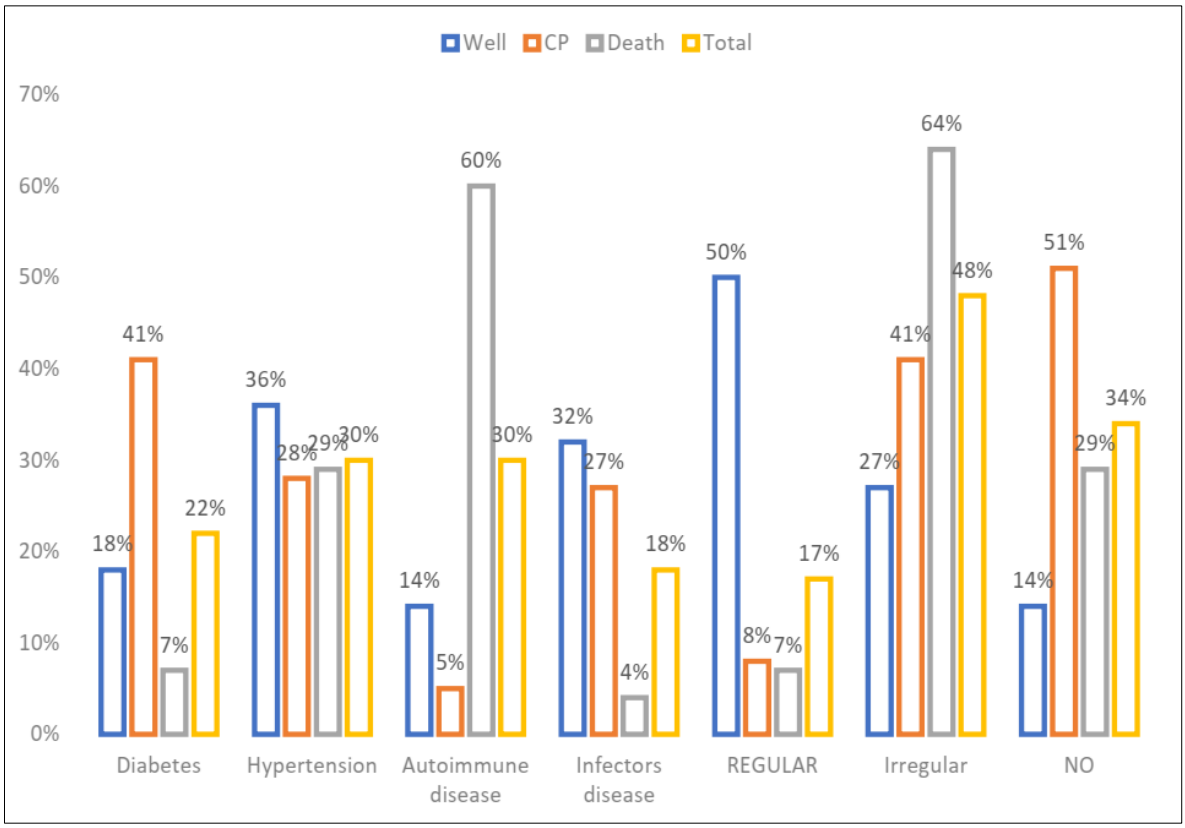

Figure 2: Description of the patients by fetal outcomes, ANC, and maternal chronic disease

Table 3 shows the distribution of patients by results, age, parity, and socioeconomic level. The most common risk age outcomes were 21-30, followed by 31-30, representing 53\106 (50%) and 27\106 (25%), respectively. Grand multipara was the most commonly occurring parity. Major deaths are associated with about 49/106 (46%) cases. Around 21/49(43%), High, moderate, and low socioeconomic status, representing 52/106 (49%) and 51/106 (48%), respectively, were associated with higher death risks. High class was associated with a lower risk of mortality, as evidenced by 25/52 (50%).

Table 3: Distribution of patients based on outcomes, age, parity, and socioeconomic status

Variable	Well	Cerebral palsy	Death	Total
Age group				
<20	1	12	7	20
21-30	11	20	22	53
3-40	7	5	15	27
41-50	3	2	0	5
>51	0	0	1	1
Total	22	39	45	106
parity				
primigravida	2	15	9	26
multipara	8	8	15	31
grand	12	16	21	49
Total	22	39	45	106
Socioeconomic status				
High	0	2	1	3
Moderate	14	12	26	52
low	8	25	18	51
Total	22	39	45	106

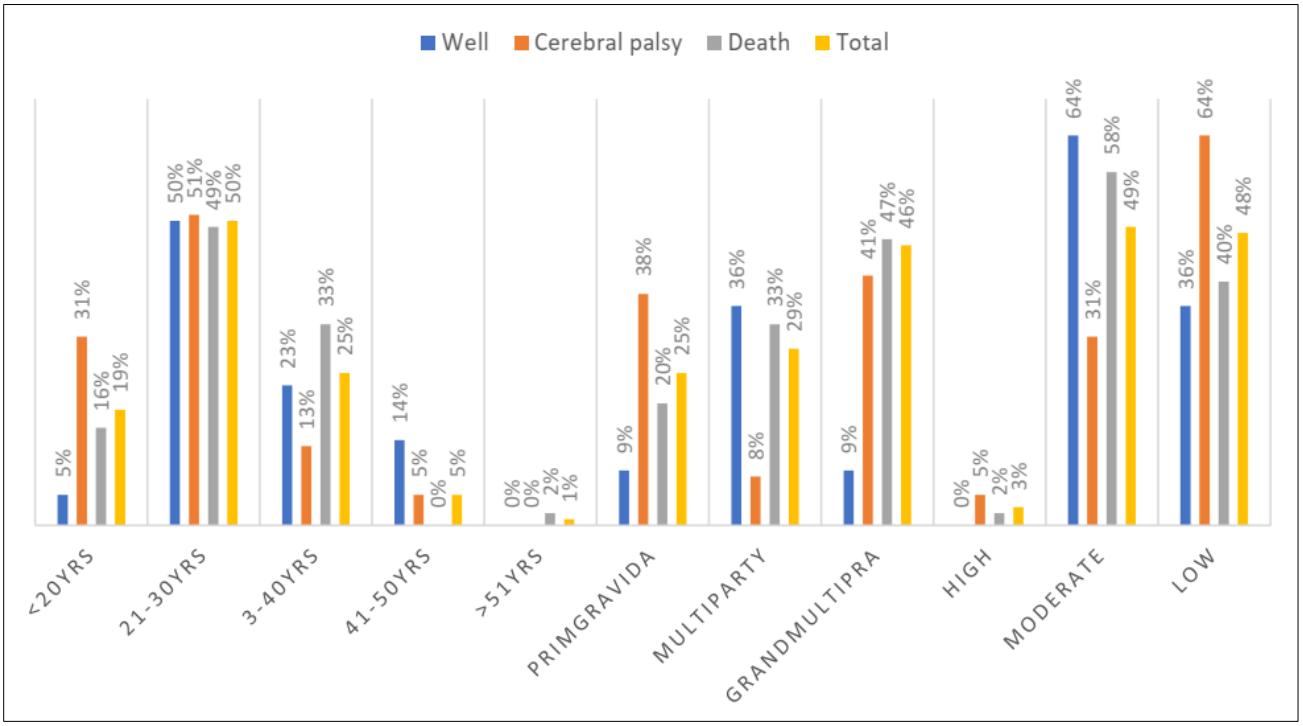

Figure 3: provides a description of the patients based on their outcomes, age, parity, and socioeconomic status

Table 4 and Figure 4 summarize the patient distribution by outcomes, gestational age, and risk variables. 34 weeks were the primary G.A. at risk, followed by 35 weeks, with figures of 26/106 (24.5%) and 20/106 (19%). The majority of deaths occurred at 30 G.A. (27%). The most common risk factor was premature rupture of membranes (PPROM), followed by postpartum hemorrhage (PPH), which accounted for 45% and 39%, respectively. Antepartum hemorrhage caused the majority of deaths (49%) in this case.

Table 4: Distribution of the patients by outcomes, gestation age, and risk factors

variable	well	Cerebral palsy	death	total
Gestation age				
29weeks	0	1	2	3
30weeks	1	1	12	14
31weeks	1	2	0	3
32weeks	5	4	8	17

33weeks	1	2	5	8
34weeks	7	11	8	26
35weeks	5	12	3	20
36weeks	2	6	7	15
Total	22	39	45	106
Risk factor				
Pprom	6	23	19	48
A PH	8	11	22	41
Polyhydrams	8	5	4	17
Total	22	39	45	106

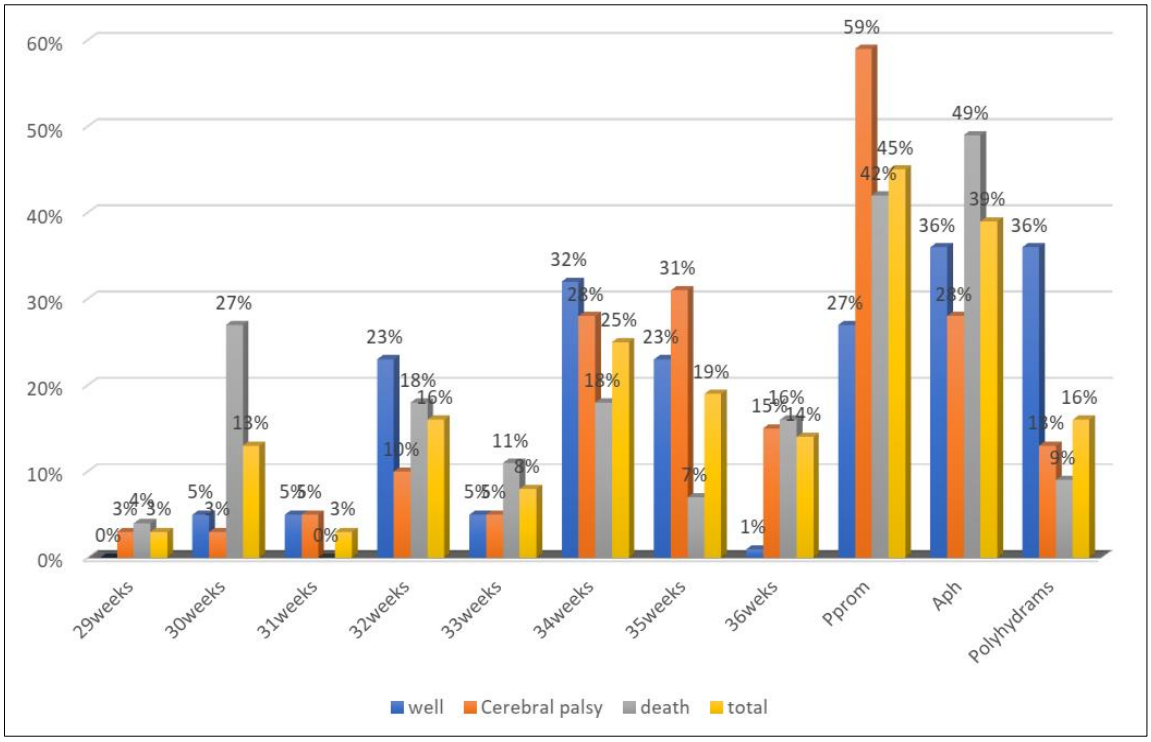

Figure 4: Description of the patients by outcomes, gestation age, and risk factors

DISCUSSION

PTB is a common cause of neonatal death in Sudan, with its causes unknown due to a lack of research in this area and the ongoing war. This has resulted in a complete breakdown of the health system, affecting antenatal care throughout the country. In the current study, the incidence of PTB deaths was 42.5%, which is significantly higher than the global incidence of 10% [2]. Preterm birth is the largest cause of infant death, with long-term physical, neurological, and social consequences. We carefully searched population-based, nationally representative data on preterm birth from January 1, 2010, to December 31, 2020, as well as study data (26 March-14 April 2021) for countries and locations without national-level data. The analysis includes 679 data points (86% nationally representative administrative data [582 of 679 data points]) from 103 nations and territories.

In 2020, an estimated 13·4 million (95% credible interval [CrI] 12·3-15·2 million) newborn babies were born preterm (<37 weeks), compared to 13·8 million (12·7-15·5 million) in 2010 (9·8% of all births [9·0-11·0]) globally. We expected the global yearly decline rate to be -0.14% from 2010 to 2020. In 2020, Southern Asia and Sub-Saharan Africa accounted for roughly 65% of all preterm births, but accounting for only 26% of total livebirths (36,099,000 and 38,819,000, respectively). None of the 33 nations and areas with the greatest data quality were in southern Asia or Sub-Saharan Africa, while 94% (30 of 32 countries) were in high-income countries and areas. From 2010 to 2020, roughly 15% of all preterm deliveries occurred at less than 32 weeks of gestation, necessitating greater neonatal care (<28 weeks: 4·2%, 95% CI 3·1–5·0, 567 800 [410 200-663 200 newborn infants]); 28-32 weeks: 10·4% [9·5-10·6], 1 392 500 [1 274 800-1 422 600 newborn babies]. On a global scale, preterm birth rates have not changed significantly over the last decade. Despite rising facility birth rates and a strong emphasis on routine health data systems, there are still many missed chances to improve preterm birth statistics. Southern Asia and Sub-Saharan Africa, which also have the highest estimated preterm birth burden, exhibit the

most significant gaps in national routine data for preterm births. Countries must focus on programmatic spending to prevent preterm birth and provide evidence-based, quality treatment when it occurs. Investments in data quality are critical to enhancing preterm birth data and using it for action and accountability procedures [7]. Antepartum hemorrhage caused the majority of deaths (49%) in this case. Women with high-risk pregnancies are more likely to experience antepartum hemorrhage, miscarriage, and the need for surgical procedures. Preterm births, low birth weight (LBW), intrauterine deaths, and increased NICU admissions are all examples of neonatal problems. High-risk pregnancy groups had worse maternal and fetal outcomes than low-risk pregnancy groups, including miscarriage (31.6% vs 15.8%) and antepartum hemorrhage (55.6% vs 11.1%). Babies born to high-risk moms were more likely to develop LBW status (52.0%) and respiratory distress (45.5%) than those born to low-risk mothers: 8.0% and 13.6%, respectively [8]. Postpartum hemorrhage was the most common risk factor in the current study, particularly among women who had previously had several pregnancies. Postpartum hemorrhage (PPH), the main cause of maternal death, is defined as blood loss of more than 500 mL within 24 hours of vaginal delivery or more than 1000 mL within 24 hours post-cesarean surgery [9]. Preterm deliveries had a considerably greater incidence of postpartum hemorrhagic composite maternal morbidity than full-term pregnancies. Interventional trials are required to reduce hemorrhagic morbidity from PTB [10]. To summarize, preterm birth is widespread in Sudan, with the most common outcome being death. Although postpartum hemorrhage is the most common risk factor, antepartum hemorrhage is becoming more closely associated with death.

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Authors' Contribution

AA: Conceptual, Data collection, Manuscript Drafting, Analysis, Approval.
HGA: Conceptual, Critical Revision of intellectual contents, Approval.

Conflict of Interest: The authors declare no conflict of interest.

Data Availability: All data related to this work can be obtained from the corresponding author.

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