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Determinants of Maternal Mortality at the Women and Newborn Hospital of the University Teaching Hospitals, Lusaka, Zambia

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Abstract

Introduction: Maternal mortality is a major issue in Zambia and other developing nations, driven by complex sociocultural and logistical factors and poor health services. Despite WHO guidelines, high mortality rates persist, threatening the goal of reducing global maternal deaths to under 70 per 100,000 live births by 2030. This study, therefore, investigated the determinants of maternal mortality at the Women and Newborn Hospital of The University Teaching Hospitals in Lusaka district, Zambia. **Methods:** The study was conducted at the Women and Newborn Hospital of the University Teaching Hospitals in Lusaka, Zambia. The study employed a hospital-based unmatched case-control study of 150 pregnant women who delivered between January 2022 and December 2023. Data were collected from hospital records using a checklist and analysed using STATA version 14.0 at a 5% significance level. **Results:** Study participants had a median age of 28 years; and most of the maternal mortality cases (46.0%, 23) occurred during the postpartum period, followed by 36.0% (18) during antepartum. Delay in reaching the facility (type 2 delay) was the most common delay (54.0%), followed by delay in deciding to seek care (type 1) (46.0%). Results revealed that increased maternal age (aOR = 1.11, 95% CI: 1.02 - 1.20, p = 0.017), low antenatal visits (aOR = 3.82, 95% CI: 1.32 - 11.1, p = 0.014), and delays in reaching the hospital (aOR = 9.11, 95% CI: 2.64 - 31.5, p < 0.001) were associated with increased mortality. **Conclusion:** Most maternal mortality cases occurred during the postpartum period, and type 2 delay was the most common. Determinants of mortality included maternal age, antenatal visits, postpartum hemorrhage, delays in reaching the hospital, and receiving prompt treatment at Women and Newborn Hospital of the University Teaching Hospitals in Lusaka, Zambia. Findings highlight

critical areas requiring intervention to reduce maternal mortality and improve maternal health outcomes.

Keywords

Determinants, Socio-Demographic, Obstetric Factors, Maternal Mortality, Lusaka

1. Introduction

Maternal mortality remains a critical public health concern, particularly in sub-Saharan Africa, where an estimated 200,000 women die annually from pregnancy-related causes. This figure accounts for more than half of all maternal deaths worldwide [1]. The problem is particularly acute in developing nations like Zambia, where maternal deaths continue to pose significant challenges despite various interventions. The high maternal mortality rates are often linked to a complex interplay of socioeconomic, cultural, and healthcare system factors. The current maternal mortality ratio (MMR) in Zambia is 195 deaths per 100,000 live births, which remains well above both national and global targets [2]. This alarming situation jeopardizes Zambia's progress toward achieving Sustainable Development Goal (SDG) 3, which aims to reduce maternal mortality to fewer than 70 per 100,000 live births by 2030 [3]. Primary causes of maternal deaths include obstetric hemorrhage, hypertensive disorders, infections, and non-obstetric complications [4]. Socio-demographic and economic factors like low socio-economic status, young age, high parity, and limited healthcare access increase risks [5]. Lack of skilled providers, emergency services, and family planning further worsen outcomes [6] [7].

Delays in accessing quality care has also been shown to contribute to maternal mortality [8]. Thaddeus and Maine's Three Delays Model, a widely accepted framework, identifies critical barriers to emergency obstetric and newborn care along the continuum from home to hospital [9]. The first delay arises at the household and community level, reflecting delays in deciding to seek care due to factors such as inadequate knowledge of danger signs, low health literacy, social restrictions, and poverty [10]. The second delay refers to challenges in reaching an adequate health facility, exacerbated by geographical remoteness, poor infrastructure, lack of transportation, and associated costs [11]. The third delay occurs at the facility, involving delays in receiving adequate care due to inadequacies in supplies, equipment, trained personnel, or timely referrals for complicated cases [12]. Studies have shown that these delays are significant contributors to maternal mortality, with evidence highlighting their role in the majority of maternal death cases globally [8] [13] [14]. The model not only evaluates why and how maternal deaths occur but also helps identify community and healthcare-level factors, providing a basis for developing strategies to prevent pregnancy and

childbirth-related deaths.

With initiatives like the Reproductive Health Roadmap and family planning programs [4] [15], Zambia has made significant progress in curbing maternal mortality. This, however, is still not close to the achievement of sustainable development goals number three. Addressing maternal mortality in Zambia requires a thorough investigation into its determinants. Although studies have highlighted obstetric hemorrhage, hypertensive disorders, infections, and care delays as leading contributors to maternal mortality in sub-Saharan Africa [16], to our knowledge, no recent study at the Women and Newborn Hospital has specifically reported on the determinants of maternal mortality. This gap is particularly evident at the Women and New-born Hospital of the University Teaching Hospitals in Lusaka. Understanding the determinants of maternal mortality could help in the development of targeted interventions to mitigate maternal deaths. Therefore, the main aim of this study was to determine the determinants of maternal mortality at the Women and Newborn Hospital of the University Teaching Hospitals, Lusaka, Zambia.

2. Materials and Methods

2.1. Study Design and Setting

The study adopted a retrospective unmatched case-control study design. The choice of this design allowed for a comprehensive exploration of factors influencing maternal mortality and the relationship between variables within these groups. The study was conducted at the Women and Newborn Hospital of the University Teaching Hospitals in Lusaka, Zambia. This hospital is a major referral centre and specialist facility, which offered a diverse sample of women who had experienced maternal mortality, providing a holistic representation of cases in the country.

2.2. Study Population, Sampling Technique, and Sample Size

The study population consisted of all pregnant women who died during pregnancy, delivery, and up to 42 days after delivery from 1st January, 2022 to 31st December, 2023 at the Women and Newborn Hospital. The control group was selected from pregnant women who delivered at the same hospital during the same period and survived. A total of 150 participants calculated using EpiIfo™ were sampled, with 50 cases and 100 controls. To enhance the statistical power, a 1:2 ratio of cases to controls was adopted for the study. Cases were identified from the hospital's maternal death registers, while controls were selected from the delivery register.

2.3. Operation Definitions of the Three Delays

Delay 1: Deciding to Seek Care: This is the delay in recognizing a life-threatening complication and making the decision to seek professional medical help. It is primarily caused by a lack of knowledge of danger signs, financial constraints, cultural preferences for home births, and the need for permission from family

elders.

Delay 2: Reaching the Facility: This is the delay in physically transporting the woman from her home to an adequately equipped health facility. Key barriers include long distances, a lack of affordable and available transportation, poor road conditions, and the high cost of travel.

Delay 3: Receiving Adequate Care: This is the delay in receiving appropriate and high-quality care after arriving at the health facility. It is caused by critical shortages of essential supplies (e.g., blood, drugs), insufficient or poorly skilled staff, administrative bottlenecks, and the failure to follow emergency treatment protocols.

2.4. Data Collection Tools and Procedure

Data were collected from the hospital records of the participants. A pre-tested data abstraction tool was used to collect information on socio-demographic characteristics, obstetric history, and factors related to the three delays. The data abstraction form was developed in English and was pre-tested to ensure the validity and reliability of the data collection process.

2.5. Statistical Analysis

The collected data were entered, cleaned, and managed using Microsoft Excel before being imported into STATA version 14.0 for analysis. Descriptive statistics were used to summarize the socio-demographic and clinical characteristics of both cases and controls, with continuous variables presented as means or medians and categorical variables as frequencies and percentages. The association between each independent variable and the outcome (maternal mortality) was first assessed using bivariate analysis. Variables that showed a significant association with the outcome at the bivariate level were then included in a multivariable logistic regression model to determine the independent predictors of maternal mortality. The results of the multivariable analysis are presented as adjusted odds ratios (aOR) with their 95% confidence intervals (CI). A p-value of less than 0.05 was considered statistically significant.

2.6. Ethical Consideration

Ethics clearance was obtained from the University of Zambia Biomedical Research Ethics Committee (UNZABREC-5557-2024) and the National Health Research Authority (NHRA-1544/10/09/2024). A waiver of informed consent was granted for secondary data; identifiers were replaced with study codes.

3. Results

3.1. Socio-Demographic Characteristics

The socio-demographic profile of the 150 study participants is summarized in Table 1, detailing characteristics such as age, marital status, education, and employment.

Table 1. Maternal socio-demographic characteristics (n = 150).

Characteristic	Category	Frequency (n)	Percent (%)
Maternal age	Mean (±SD)	28 (±6.1)	
Marital status	Single	24	16.0
	Married	126	84.0
HIV status	Negative	133	88.7
	Positive	11	7.3
	Unknown	6	4.0
Education level	No formal education	8	5.3
	Primary	64	42.8
	Secondary	61	40.7
	Tertiary	17	11.3
Employment status	Employed	64	42.7
	Unemployed	86	57.3
Spouse education level	No formal education	8	5.3
	Primary	72	48.0
	Secondary	62	41.3
	Tertiary	8	5.3

Table 1 shows that the median age of study participants was 28 years (Interquartile Range, IQR: 23 - 35 years). A majority of the participants were married (84.0%, n = 126). Educationally, the most common level attained was primary education for participants (42.8%) and their spouses (48.0%). Most participants were unemployed (57.3%, n = 86).

3.2. Maternal Obstetric Characteristics

Table 2 presents the obstetric history and clinical characteristics of the participants, including the timing of maternal deaths, antenatal care attendance, parity, and pregnancy-related complications.

Table 2. Maternal obstetric characteristics of participants (n = 150).

Characteristic	Category	Frequency (n)	Percent (%)
Gestational age at delivery (weeks)	Under 14 weeks	25	16.7
	14 - 28 weeks	60	40.0
	Over 28 weeks	65	43.3
Pregnancy interval (months)	Primigravida	20	13.3
	Under 12 months	37	24.7
	12 - 24 months	34	22.7
	Over 24 months	59	39.3
ANC visits during pregnancy	Under 4 visits	93	62.3
	4 or more visits	57	38.8
Parity	Nullipara	32	21.3
	1 - 4 children	76	50.7
	Over 4 children	42	28.0

Continued

History of early pregnancy loss	Yes	64	42.7
	No	86	57.3
Complications in index pregnancy	Yes	91	60.7
	No	59	39.3
Mode of delivery	SVD	92	61.3
	Caesarean section	58	38.7
Chronic illness in pregnancy	Yes	43	28.7
	No	10	71.3
Postpartum hemorrhage (PPH)	Yes	26	17.3
	No	124	82.7
Malaria in pregnancy	Yes	12	8.0
	No	138	92.0
Pre-eclampsia	Yes	23	15.3
	No	127	84.7
Eclampsia	Yes	19	12.7
	No	131	87.3

Table 2 shows that most maternal mortality cases (46.0%, 23) occurred during the postpartum period, followed by the intrapartum period (18.0%, 9) and the antepartum period (36.0%, 18). The majority of women had fewer than four antenatal care (ANC) visits (55.0% of controls and 76.0% of cases). Nulliparous women were more likely to be cases (18.0%) compared to controls (23.0%).

3.3. Delays-Related Characteristics and Period of Occurrence of Maternal Mortality

The distribution of the three delays among maternal mortality cases and the period during which deaths occurred are detailed in Table 3.

Table 3. Distribution of study participants according to the three delays and the Period of maternal mortality (n = 50).

Characteristic	Category	Frequency (n)	Percent (%)
Type of delay			
Delay in deciding to seek care	Yes	23	46.0
	No	27	54.0
Delay in reaching the facility	Yes	27	54.0
	No	23	46.0
Treatment delay at the hospital	Yes	10	20
	No	40	80
Time of Death			
	Post-partum	23	46.0
	Antepartum	18	36.0
	Intrapartum	9	18.0

Table 3 shows that delay in reaching the facility (type 2 delay) was the most common delay (54.0%), followed by delay in deciding to seek care (type 1) (46.0%) and delay in receiving adequate healthcare at the facility (type 3) (20.7%). Of all maternal mortality cases, 46.0% (n = 23) occurred during the postpartum period, 36.0% (n = 18) during the antepartum period, and 18.0% (n = 9) during the intrapartum period.

3.4. Determinants of Maternal Mortality

The results of the bivariate analysis comparing characteristics between cases and controls are presented in Table 4, while the final multivariable logistic regression model identifying the independent determinants of maternal mortality is shown in Table 5.

Table 4. Distribution of maternal factors between cases and controls (n = 150).

Characteristic	Category	Controls n (%)	Cases n (%)	p-value
Maternal age	*Mean* (±*SD*)	26.7 (±6.4)	29.2 (±4.8)	**0.017[T]**
Marital status	*Single*	18 (75.0)	6 (25.0)	0.345[C]
	Married	82 (65.1)	44 (34.9)	
HIV status	*Negative*	88 (66.2)	45 (33.8)	0.917[F]
	Positive	8 (72.7)	3 (27.3)	
	Unknown	4 (66.7)	2 (33.3)	
Education level	*No formal education*	6 (75.0)	2 (25.0)	0.974[F]
	Primary	43 (67.2)	21 (32.8)	
	Secondary	40 (65.6)	21 (34.4)	
	Tertiary	11 (64.7)	6 (35.3)	
Employment status	*Employed*	43 (67.2)	21 (32.8)	0.907[C]
	Unemployed	57 (66.3)	29 (33.7)	
Spouse education level	*No formal education*	6 (75.0)	2 (25.0)	0.911[F]
	Primary	49 (68.1)	23 (31.9)	
	Secondary	40 (64.5)	22 (35.5)	
	Tertiary	5 (62.5)	3 (37.5)	
Gestational age at delivery	*Under* 14 *weeks*	16 (16.0)	9 (18.0)	0.647[C]
	14 - 28 *weeks*	38 (63.3)	22 (44.0)	
	Over 28 *weeks*	46 (38.0)	19 (38.0)	
Pregnancy interval (months)	*Primigravida*	15 (15.0)	5 (10.0)	**<0.001[C]**
	Under 12 *months*	11 (11.1)	26 (52.0)	
	12 - 24 *months*	23 (23.0)	11 (22.0)	
	Over 24 *months*	51 (51.0)	8 (16.0)	
ANC visits during pregnancy	*Under* 4 *visits*	55 (55.0)	38 (76.0)	**0.012[C]**
	4 *or more visits*	45 (45.0)	12 (24.0)	
Parity	*Nullipara*	23 (23.0)	9 (18.0)	**<0.001[C]**
	1 - 4 *children*	66 (66.0)	10 (20.0)	
	Over 4 *children*	11 (11.0)	31 (62.0)	

Continued

History of early pregnancy loss	*Yes*	43 (43.0)	21 (42.0)	0.907[C]
	No	57 (57.0)	29 (58.0)	
Complications in index pregnancy	*Yes*	60 (60.0)	31 (62.0)	0.813[C]
	No	40 (40.0)	19 (38.0)	
Mode of delivery	*SVD*	62 (62.0)	30 (60.0)	0.813[C]
	Caesarean section	38 (38.0)	20 (40.0)	
Chronic illness in pregnancy	*Yes*	25 (25.0)	18 (36.0)	0.160[C]
	No	75 (75.0)	32 (64.0)	
PPH	*Yes*	4 (4.0)	22 (44.0)	**<0.001[C]**
	No	96 (96.0)	28 (56.0)	
Malaria in pregnancy	*Yes*	9 (9.0)	3 (6.0)	0.751[F]
	No	91 (91.0)	47 (94.0)	
Delay in deciding to seek care	*Yes*	43 (43.0)	23 (46.0)	0.727[C]
	No	57 (57.0)	27 (54.0)	
Delay in reaching the facility	*Yes*	31 (31.0)	27 (54.0)	**0.006[C]**
	No	69 (69.0)	23 (46.0)	
Treatment delay at the hospital	*Yes*	21 (21.0)	10 (20.0)	0.887[C]
	No	79 (79.0)	40 (80.0)	
Pre-eclampsia	*Yes*	16 (16.0)	7 (14.0)	0.749[C]
	No	84 (84.0)	43 (86.0)	
Eclampsia	*Yes*	14 (14.0)	5 (10.0)	0.487[C]
	No	86 (86.0)	45 (90.0)	

[F] = Fisher's Exact Test, [T] = T-Test, [C] = Chi-squared Test.

Table 4 shows that bivariate analysis revealed that maternal age was significantly associated with maternal mortality (p = 0.0167), with cases being older (29.2 years) than controls (26.7 years). Also, pregnancy interval (p < 0.001), ANC visits (p = 0.012), parity (p < 0.001), PPH (p < 0.001) and delays in reaching the facility (p = 0.006), were significantly associated with mortality.

Table 5. Regression analysis of determinants of maternal mortality.

Characteristic	Unadjusted estimates			Adjusted estimates		
	cOR	95% CI	p-value	aOR	95% CI	p-value
Maternal age	1.07	1.01, 1.14	**0.018**	**1.11**	1.02, 1.20	**0.017**
ANC visits						
At least 4 visits	Ref			Ref		
Less than 4 visits	2.59	1.21, 5.54	**0.014**	**3.82**	1.32, 11.1	**0.014**
Complications in pregnancy						
No	Ref			Ref		
Yes	1.09	0.54, 2.18	0.813	1.08	0.40, 2.90	0.873

Continued

Chronic illness						
No	Ref			Ref		
Yes	1.69	0.81, 3.51	0.162	0.79	0.27, 2.31	0.665
Mode of delivery						
SVD	Ref			Ref		
Caesarean section	1.09	0.54, 2.18	0.813	0.58	0.21, 1.57	0.283
PPH						
No	0.05	0.02, 0.17	**<0.001**	0.02	0.01, 0.10	**<0.001**
Yes	Ref			Ref		
Delay in deciding to seek care						
No	Ref			Ref		
Yes	1.13	0.57, 2.23	0.727	2.10	0.67, 6.59	0.201
Delay in reaching the hospital						
No	Ref			Ref		
Yes	2.61	1.30, 5.26	**0.007**	9.11	2.64, 31.5	**<0.001**
Delay in receiving treatment						
No	0.94	0.40, 2.19	0.887	0.16	0.03, 0.79	**0.024**
Yes	Ref			Ref		

cOR = Crude Odds Ratio, **aOR** = Adjusted Odds Ratio, **CI** = Confidence Interval.

Table 5 shows that in the multivariable analysis, increased maternal age was significantly associated with higher odds of maternal mortality (aOR = 1.11, 95% CI: 1.02 - 1.20, p = 0.017). Mothers who had fewer than four ANC visits had 3.82 times higher odds of mortality compared to those with four or more visits (aOR = 3.82, 95% CI: 1.32 - 11.1, p = 0.014). Women who did not experience PPH had significantly lower odds of mortality (aOR = 0.02, 95% CI: 0.01 - 0.10, p < 0.001). Delays in reaching the hospital significantly increased the odds of mortality (aOR = 9.11, 95% CI: 2.64 - 31.5, p < 0.001). Promptly receiving treatment at the hospital was significantly associated with lower odds of mortality (aOR = 0.16, 95% CI: 0.03 - 0.79, p = 0.024).

4. Discussion

This study investigated the determinants of maternal mortality at the Women and Newborn Hospital of the University Teaching Hospitals in Lusaka, Zambia, utilizing a hospital-based unmatched case-control design. The analysis revealed that advanced maternal age, inadequate antenatal care (fewer than four visits), and the occurrence of postpartum hemorrhage were significant obstetric and maternal

factors associated with increased odds of mortality. Furthermore, delays in reaching the health facility (Type 2 delay) were the most frequently observed barrier, substantially elevating the risk of adverse outcomes.

The study reveals that the majority of maternal mortality cases occurred during the postpartum period, closely followed by the antepartum period. This observation aligns with findings from Nepal, where it was similarly noted that most cases of maternal death occurred during the postpartum phase, with the antepartum period reflecting the next highest incidence [17]. Additionally, similar trends were documented in the Central African Republic [18]. The consistency of these findings across diverse geographical and socio-economic contexts underscores the heightened vulnerability of women during the postpartum period. This situation also highlights an urgent need for targeted interventions and the strengthening of postpartum care systems, particularly in settings where healthcare resources are limited. The findings suggest that early identification and effective management of postpartum complications could significantly contribute to the reduction of maternal mortality rates, advocating for a comprehensive approach to maternal health that prioritizes the postpartum period as a critical focus for intervention.

The finding that the majority (46%) of maternal mortality cases occurred during the postpartum period is critically explained by the study's key determinants. This high-risk window is directly driven by the emergence of sudden, life-threatening complications, most notably PPH, which was a paramount factor significantly increasing the odds of mortality. The danger of PPH is then catastrophically compounded by systemic delays. A delay in reaching the facility (Type 2 delay)—the most common delay identified—means that women who begin to hemorrhage often cannot access emergency care in the critical golden hour. Furthermore, even upon arrival, a lack of prompt treatment can prevent the effective management of such obstetric emergencies. Therefore, the confluence of a prevalent, lethal complication (PPH) occurring in a time-sensitive period, exacerbated by logistical and clinical delays, creates a perfect storm that defines the elevated mortality risk during the postpartum period.

Increased maternal age is significantly associated with higher maternal mortality odds, increasing by 11% each year. This aligns with studies in Canada, India, Japan, and South Africa, which found higher maternal mortality in older pregnant women [5] [19]-[21]. Rising maternal age is linked to various obstetric complications [22] [23], possibly due to cardiovascular ageing that leads to difficulty adapting to pregnancy changes [24]. Consequently, older women's vascular systems may struggle with pregnancy demands, heightening the risk of complications [25]. Unlike research in India, Nigeria, Cameroon, and a global review [26]-[29], this study found no significant links between marital status, education, or employment and maternal mortality, potentially due to a small sample size, and could also be attributed to the homogeneous nature of the patient population at a national referral hospital.

The study found that fewer than four ANC visits significantly increased mater-

nal mortality risk, with those attending less likely to survive. This aligns with a United Kingdom study findings linking inadequate ANC to higher mortality [30] and Ethiopian results showing a fivefold death risk for non-attendees [31]. Low ANC visits correlate with increased obstetric mortality risk [14] [32], as ANC is crucial for screening complications and monitoring health [33] [34]. Infrequent visits result in missed opportunities for preventive care, such as iron supplementation and tetanus toxoid vaccination.

This study found that PPH significantly correlates with maternal mortality, with women without it having lower mortality odds. These results align with prior research in Iran [35] and Ethiopia [36] linking PPH to maternal death rates [37]. A systematic review in Sub-Saharan Africa identified PPH as the leading cause of maternal mortality [4]. This highlights the need for effective management to improve maternal health, especially in resource-constrained settings like Zambia, where delayed recognition and insufficient skills contribute to the issue. A study in Malawi indicated that maternal deaths from PPH often resulted from the lack of lifesaving skills and monitoring by healthcare workers [38]. Increased awareness among providers is essential to address the serious consequences of PPH on maternal survival.

Research shows that delays in three obstetric types can be life-threatening for women [11]: 1) deciding to seek care, 2) reaching healthcare, and 3) receiving care, with the second delay most common. Similar findings emerged in India [39] and Mozambique [10], with Ethiopia also reporting these trends [31]. Delays in care access relate to referral inefficiencies like fuel shortages in developing countries [39] [40], highlighting the need to improve maternal healthcare by addressing transportation barriers to prevent maternal deaths. Delays in hospital access raise maternal mortality odds, supported by research from Nepal, Malawi, and Zambia [15] [17] [40], arising from referral process issues, including fuel shortages and poor ambulance maintenance, exacerbated by inefficient transfer decision-making in Africa [41]. Improving transportation for obstetric referrals may reduce maternal mortality.

This study found a strong correlation between timely treatment and reduced maternal mortality, consistent with research in Egypt and Malawi [13] [40]. Key factors include early complication detection, effective management of conditions like PPH and preeclampsia, and availability of skilled personnel and resources. The findings underscore the need to improve healthcare systems for swift maternal care access through infrastructure upgrades, staff training, and reduced care delays. Further, in response to the pressing Type 2 delay related to facility access, we recommend the establishment of a Community-Based Emergency Transport System (CETS). This initiative would work by engaging local communities to pre-register drivers and instituting a pre-paid voucher system to eliminate cost barriers, complemented by a dedicated communication network. Through the provision of reliable and prompt transportation, the CETS seeks to greatly decrease the interval between the initiation of care-seeking and arrival at a healthcare facility, consequently reducing a critical contributor to maternal mortality.

The study has several implications for midwifery practice, administration, and education. Nurses and midwives should prioritize ANC, promote community outreach programs, and ensure the availability of life-saving interventions for PPH. Nursing administrators should strengthen emergency referral systems and implement training programs for transport providers. Nursing education should incorporate comprehensive modules on maternal health and encourage critical thinking through case studies and practical simulations.

5. Study Limitations

This study has a few limitations that should be acknowledged. First, it was a retrospective study, which relied on existing hospital records. This can introduce potential issues with data quality, as some records may have been incomplete or missing critical information. Second, the study was conducted at a single urban referral hospital, which may not be representative of maternal mortality determinants in rural or other urban settings in Zambia. Therefore, the findings may have limited generalizability to the wider Zambian population. Lastly, due to the nature of a case-control study, it is challenging to establish a direct causal relationship between the identified factors and maternal mortality.

6. Conclusion

This study investigated the determinants of maternal mortality at Women and Newborn Hospital in Lusaka, Zambia. The study revealed that most maternal mortality cases occurred during the postpartum period and that the second delay was the most common type of delay. Age, ANC visits, PPH, delays in reaching the hospital, and promptly receiving treatment were the key determinants of maternal mortality. These factors suggest the need for comprehensive interventions that address both the quality and accessibility of healthcare in the district. Strategies to reduce maternal mortality should focus on improving ANC, preventing and managing PPH, enhancing emergency transport, and reducing delays at health facilities by implementing effective triage systems and prioritizing emergency cases.

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Conflicts of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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