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Magnitude and Associated Predictors of Blood Loss and Perineal Integrity among Women Giving Birth at Serengeti District Hospital: A Cross-Sectional Documentary Review Study

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ABSTRACT

Background: Obstetric blood loss and impaired perineal integrity are well-known maternal birth outcomes that contribute substantially to maternal morbidity and mortality post-delivery. This study aimed to assess the magnitude and associated predictors of blood loss and perineal integrity among women giving birth at Serengeti district hospital.

Methods: A cross-sectional study design using hospital records of deliveries from Jan –Dec 2021. Systematic sampling was employed for recruitment. A partograph and delivery register were used as tools for obtaining relevant data for this study. SPSS v20 was used for data analysis. A p-value was considered significant at 95% CI and the strength of association was measured using an odds ratio.

Results: Five percent (95% CI: 3.1-7.6%) of participants developed severe obstetric blood loss post-delivery. The overall mean (SD) of blood loss was 234.70±173.901. About 21.0% (95% CI: 17.1–25.3) developed impaired perineal integrity. The multivariate model showed those who had SVD (AOR 0.105, P=0.004) were less associated with severe obstetric blood loss. Moreover, gravida 2 to 4 (AOR 4.134, P=0.050), and abnormal labor (AOR 3.670, P=0.022) were positively associated with impaired perineal integrity compared to their reference category. Urban residency (AOR 0.527, P=0.034) was a protective factor of impaired perineal integrity.

Conclusion: Magnitude and predictors for both obstetric blood loss post-delivery and perineal integrity were identified. Mentoring healthcare providers working in the maternity ward is needed to promote timely identification of risk factors and improve perineal care and maintain good practices during delivery.

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Abbreviations

ANC: Antenatal Care
FHR: Fetal Heart Rate
HIV: Human Immunodeficiency Virus
LOA: Left Occipito-Anterior
MoHCDGEC: Ministry of Health, Community Development, Gender, Elderly and Children
PMTCT: Prevention of Mother-To-Child Transmission
ROA: Right Occipito-Anterior
SVD: Spontaneous Vaginal Delivery
WHO: World Health Organization

Background

Obstetric blood loss post-delivery of or greater than 500mL within 24 hours, for spontaneous vaginal delivery or blood loss exceeding 1000mL post-CS delivery, is considered a massive blood loss which can cause hemodynamic shaking to the patient [1, 2]. Approximately, 11% of maternal deaths in the United States are due to severe obstetric blood loss post-delivery [3]. In low-and middle income countries (LMICs) like Tanzania, it is the main cause of maternal deaths. It is also the primary cause of nearly one quarter of all maternal deaths in the world [4]. According to a study conducted in Dodoma regional referral hospital (DRRH), Tanzania, 38% of maternal deaths was due to severe obstetric blood loss [5]. In 2018, the Ministry of Health, Gender, Development, Elderly and Children (MoHCDGEC), Tanzania reported a similar result [6].

The prevalence of obstetric blood loss varies significantly with the setting of the study; for example, 9.0%, 9.4%, and 16.6% in Uganda, Sidama regional state, and southern Ethiopia, respectively [7-9]. A systematic review study in Africa showed a prevalence rate of 3.51% [10]. Apart from the known causes of obstetric blood loss post-delivery, studies have reported such factors as maternal age, antepartum anemia, abnormal labor, history of obstetric

hemorrhage post-delivery in the previous pregnancies, and instrumental deliveries, multiparity, prolonged labor, CS delivery, multiple pregnancy, and big baby, to contribute significantly to its occurrence [7-11].

Despite the impaired perineal integrity being one of the causes of obstetric blood loss post-delivery, it is also one of the common maternal birth outcomes [2]. It is defined as the loss of integrity of the perineum or genital region of the woman during delivery. It can occur spontaneously, caused by precipitous delivery or due to perineal surgical incisions conducted to widen the perineal outlet [12]. More than three quarter of women giving birth vaginally will develop some degree of impaired perineal integrity, with 0.6–11% of all vaginal deliveries resulting in a third-degree or fourth-degree tear [13]. However, according to literature, impaired perineal integrity decreases with subsequent deliveries, from 90.4% among nulliparas to 68.8% among multiparas undergoing vaginal deliveries [14].

Several factors are documented in the literature concerning the risks of impaired perineal integrity. Fetal head circumference ≥35 cm, and vacuum extraction contribute to it [15]. Others are prolonged duration of second stage of labor, primparity, post-maturity, macrosomia and occipito posterior position. The prevalence of impaired perineal integrity is lower among multipara women as compared to nulliparous women [14]. According to an observational ambispective cohort study conducted elsewhere in Madrid, induction of labor and episiotomy can increase the risk of third and fourth degree impaired perineal integrity [16]. Maternal and gestational age also contribute to the risk increase [17]. Obstetric complications associated with perineal integrity impairment are obvious, and long-term physical, psychological problems 13, and perineal pain, sexual dysfunction [18]. Protective interventions such as antenatal perineal massage, warm compresses, and assuming different maternal birthing positions are believed to reduce the risk of perineal integrity impairment during vaginal delivery [19, 20]. This study aimed to assess the magnitude and associated predictors of blood loss and perineal integrity among women giving birth at Serengeti district hospital.

Methods

Study Setting and Design

A cross-sectional study design was carried out to at Serengeti district hospital, Serengeti DC, Mara Tanzania to analyze secondary data regarding hospital deliveries. All women who received labor and delivery at Serengeti district hospital between January to December 2021. The study included all women who attended at the facility within the respective period of study.

Study Population, Inclusion and Exclusion Criteria

Only women aged 18 years and above, whose partographs were completely filled during labor and delivery were included in the study. However, those women whose records were incomplete were excluded from the study.

Sample Size Determination and Sampling Procedures

The sample size was determined by using the formula acceptable for finite population: $n = N/1+Ne^2$ [21]. According to this formula, *n* is the sample size, N is the size of the population and e is the level of precision whereby N=780, and e=0.05 (5%). The study included 400 participants. Eligible participants (*using completely filled partographs as proxy for target study participants*) were sampled using systematic sampling technique. The delivery register was used to confirm the number of deliveries per month where by average eighty women gave birth at the hospital, giving a total of 960 postpartum women in 2021. After excluding incomplete partographs, 780 were included in the sampling frame. To obtain the participant with eligible criteria, the interval, k, was calculated as follows: N/n, 780/384=2. From the sampling frame, the first partograph was picked randomly, then, subsequently, at every 2nd partographs was picked until the required sample size was reached.

Data Collection Tool and Procedure

This study employed secondary data available at the health facility regarding hospital deliveries. Both partographs and delivery register were used to complement one another for data collection. Once the partograph was picked for extracting the required information, it was then compared in the delivery register to confirm similarity of the information. The following information were obtained: (i) sociodemographic characteristics, (ii) obstetric characteristics, (iii) intrapartum characteristics, and (iv) outcome variables (blood loss and perineal integrity status). The principal researcher and a pre-trained assistant data collector were involved in data collection process.

Variable Definition and Measurement

The partographs which met the required criteria were reviewed one by one to obtain: (i) sociodemographic characteristics, (ii) obstetric characteristics, (iii) peripartum characteristics, and (iv) outcome variables (blood loss and perineal integrity status). The data were entered directly into the SPSS software. Both independent and dependent variables were defined accordingly. Sociodemographic characteristics were defined as maternal age, categorized into three subgroups: <20 years, 20 to 34 years, and 35 and above [22]. Marital status was dichotomized into married, not married. Regarding maternal residence, was measured and categorized as rural and urban. Type of admission was defined as self-referral, or formal referral when the pregnant woman came to labor ward without or with medical directives, respectively.

Obstetric characteristics which included gravidity, parity, ANC visits status, HIV infection status, and hemoglobin checkups during ANC. Gravidity was categorized as primigravida (if it was the first pregnancy), and multigravida (2 to 4), and beyond (if the woman had 5+ pregnancies). Parity was categorized into primpara (for para 1), multipara (for para 2 to 4), and grandpara (for para 5+) [22]. ANC visits were categorized according to FANC model; <4 or ≥4 visits throughout antepartum period. HIV infection serostatus of a pregnant woman, was operationalized as (1) PMTCT1, when the woman was HIV positive, and/or PMTCT2 when she was HIV negative [23]. Regarding hemoglobin (Hgb) checkups, according to this study, it was referred to whether the woman was checked or not during prenatal period.

Peripartum variables included fetal presentation, fetal position, fetal heart rate (FHR), labor status, mode of delivery, and duration of labor. Each variable was defined and measured accordingly. Fetal presentation was categorized into cephalic, and non-cephalic. For fetal position of the presenting part, it was assessed as left occipital anterior (LOA), right occipital anterior (LOA), and non ROA/LOA. Fetal heart rate (FHR) on admission was measured as normal (where FHR was between 120-160bpm or abnormal where FHR was either <120 or >160 bpm. Sex of the baby was dichotomized into male or female, and birth weight of the baby was categorized as ≤2.4,, and ≥2.5 for low birth weight (LBW) and normal birth weight respectively [24]. Moreover, mode of delivery, referred to whether the woman had spontaneous vaginal delivery (SVD) or cesarean delivery. On the other hand, duration of

labor was defined and the cut-off point was set as ≤12 h, and >12 h to indicate normal duration and prolonged duration respectively [25]. The dependent variables for the current study were blood loss post-delivery and perineal integrity. The amount of blood loss was categorized as ≤500 mL or ≥600mL for acceptable blood loss and severe blood loss respectively. Regarding perineal integrity, it was dichotomized into: intact perineum, and impaired perineal integrity. The impaired integrity as per this study meant to comprise episiotomy, perineal lacerations, perineal tears (of any degree), and vaginal tears [26].

Statistical Analysis

Data were analyzed using SPSS version 20. Descriptive statistics were used for categorical data. Chi-square test was primarily performed to isolate variables which fit to be taken to advanced models. Variables with P<0.05 were further taken to bivariate and multivariable logistic regression models to assess for the strength of association. A p-value of <0.05 was considered as significant at 95% CI and the strength of association was measured using odds ratio. Variables that showed significance in the bivariate logistic regression were used for the multivariable logistic regression. Descriptive statistics were presented in text and tables.

Results

Sociodemographic and Obstetric Characteristics of Participants

About 400 participants were included in the study, of which 64.5% were aged between 20 to 34 years. The mean age (SD) of participants was 25.9 ±7.1. Majority (94.5%), were married, resided from rural residents (61.3%), and most of the studied (85%) were self-referrals. Almost two-quarter (49.8%) of participants were gravida 2 to 4, and para 0 to 1 were over one-third (44.8%). Over half (57.5%) had ≥ 4 ANC visits by the time they came to hospital for delivery. Only 2.0% had HIV infection and two-thirds (62.8%) were not checked hemoglobin levels throughout their ANC visits, Table 1.

Table 1: Sociodemographic and Obstetric characteristics of participants (N = 400)

	Characteristics	n	%
Age (yrs.)	≤19	78	19.5
	20 to 34	258	64.5
	≥35	64	16.0
	Mean (SD)	25.9±7.1	
Marital status	Not married	22	5.5
	Married	378	94.5
Residence	Rural	245	61.2
	Urban	155	38.8
Type of admission	Medical referral	60	15.0
	Self-referral	340	85.0
Gravidity	1	83	20.8
	2 to 4	199	49.8
	≥5	118	29.4
	Mean (SD)	3.71±2.654	
Parity	0-1	179	44.8
	2 to 4	131	32.8
	≥5	90	22.5
	Mean (SD)	2.62±2.573	
ANC visits	≤3	170	42.5
	≥4	230	57.5
	Mean (SD)	3..87±1.386	
HIV status	PMTCT2	392	98.0
	PMTCT1	8	2.0
Hemoglobin checkup	Not checked	251	62.8
	Checked	149	37.2

Peripartum Characteristics of the Participants

There was a high proportion (96.5%) of participants with FHR range between 120 to ≤160 bpm on admission, with overall mean (SD) of 132.13±8.421. Regarding fetal presentation and position, cephalic presentation and LOA position had high proportion of 95.0% and 54.5% respectively. Over one-thirds (39.8%) of the participants arrived in labor ward with already ruptured membranes. Almost three-quarter (74.1%) of participants experienced prolonged duration of first stage labor >12 h, while one-third (31.3%) had CS deliveries between Jan to Dec 2021. Majority (54.2%) of newborns were male, and 72.0% had birth weight between 2.5 to 3.5 kg (Table 2).

Table 2: Peripartum characteristics of the participants (N=400)

	Characteristics	n	%
Status of labor	Normal	282	70.5
	Abnormal	118	29.5
Duration of labor	>12 h	101	25.3
	≤ 12 h	299	74.7
	Mean(SD)	11.36±2.125	
Mode of delivery	CS delivery	125	31.3
	SVD	275	68.7
FHR on admission (bpm)	<110>160	14	3.5
	120 to ≤160	386	96.5
	Mean(SD)	132.13±8.421	
Fetal presentation	Non-cephalic	20	5.0
	Cephalic	380	95.0
Fetal position	Non LOA/ROA	16	4.0
	LOA	218	54.5
	ROA	166	41.5
Sex	Female	183	45.8
	Male	217	54.3
Birth weight (kg)	≤2.4	30	7.5
	2.5 to 3.5	288	72.0
	>3.5	82	20.5
	Mean(SD)	3.139±0.483	

Magnitude of Blood Loss and Perineal Integrity Post-Delivery

About 5% (95% CI: 3.1-7.6%) developed severe obstetric blood post-delivery. The overall mean (SD) of blood loss was 234.70±173.901. Less than one-quarter, 84[(21.0%) 95% CI: 17.1 – 25.3] had impaired perineal integrity (Table 3).

Table 3: Magnitude of blood loss and perineal integrity status (N=400)

	Variable	n	%
Blood loss (mL)	>500	23	5.8
	≤500	377	94.2
	Mean (SD)	234.70±173.901	
Perineal integrity	Intact	316	79.0
	Impaired	84	21.0

Sociodemographic, Obstetric and Peripartum Characteristics in Relation to Magnitude of Blood Loss and Perineal Integrity

Chi square test, type of admission ($\chi2$ 6.605, P=0.010), and mode of delivery ($\chi2$ 23.288, P<0.001) were the only factors showed to have significant association with blood loss during delivery. Besides, several factors such as maternal age ($\chi2$ 17.106, P<0.001), residence ($\chi2$ 4.533, P=0.033), type of admission ($\chi2$ 10.892, P<0.001), gravidity ($\chi2$ 13.019, P<0.001), parity ($\chi2$ 14.772, P<0.001), and ANC visits ($\chi2$ 4.248, P=0.039), showed to have significant association with perineal integrity among women who gave birth at Serengeti district hospital (Table 4).

Table 4: Chi square results showing factors associated with blood loss and perineal integrity (N=400)

	Variables	Blood Loss			Perineal Integrity		
		>500mL(n%)	≤500mL(n%)	$\chi2$ (P<0.05)	Intact(n%)	impaired(n%)	$\chi2$ (P<0.05)
Age (yrs.)	≤19	2 (2.6)	76 (97.4)		49 (62.8)	29 (37.2)	
	20 to 34	14 (5.4)	241 (96.4)		210 (81.4)	48 (18.6)	
	≥35	4 (6.2)	60 (93.8)	1.284 (0.526)	57 (89.1)	7 (10.9)	17.106 (<0.001)
Marital status	Not married	15 (4.5)	21 (95.5)		17 (77.3)	5 (22.7)	
	Married	19 (5.0)	359 (95.0)	0.010 (0.920)	299 (79.1)	79 (20.9)	0.042 (0.838)
Residence	Rural	13 (5.3)	232 (94.7)		202 (82.4)	43 (17.6)	
	Urban	7 (4.5)	148 (95.5)	0.125 (0.724)	114 (73.5)	41 (26.5)	4.533 (0.033)
Type of admission	Medical	7 (11.7)	53 (88.3)		57 (95.0)	3 (5.0)	
	Self-referral	13 (3.8)	327 (96.2)	6.605 (0.010)	259 (76.2)	81 (23.8)	10.892 (0.001)
Gravidity	1	3 (3.6)	80 (96.4)		55 (66.3)	28 (33.7)	
	2 to 4	9 (4.5)	190 (95.5)		158 (79.4)	41(20.6)	
	≥5	8 (6.8)	110 (93.2)	1.218 (0.544)	103 (87.3)	15 (12.7)	13.019 (0.001)
Parity	0-1	7 (3.9)	172 (96.1)		126 (70.4)	53 (29.6)	
	2 to 4	6 (4.6)	125 (95.4)		111 (84.7)	20 (15.3)	
	≥5	7 (7.8)	83 (92.2)	1.958 (0.376)	79 (87.8)	11 (12.2)	14.772 (<0.001)
ANC visits	<4	7 (4.1)	163 (95.9)		126 (74.1)	44 (25.9)	
	≥4	13 (5.7)	217 (94.3)	0.485 (0.486)	190 (82.6)	40 (17.4)	4.248 (0.039)
HIV status	PMTCT 2	20 (5.1)	372 (94.9)		310 (79.1)	82 (20.9)	
	PMTCT 1	0 (0.0)	8 (100.0)	0.430 (0.512)	6 (75.0)	2 (25.0)	0.079 (0.779)
Hemoglobin level	Not checked	11 (4.4)	240 (95.6)		193 (76.9)	58 (23.1)	
	Checked	9 (6.0)	140 (94.0)	0.541 (0.462)	123 (82.6)	26 (17.4)	1.804 (0.179)
Status of labor	Normal	6 (2.1)	276 (97.9)		202 (71.6)	80 (28.4)	
	Abnormal	14 (11.9)	104 (88.1)	16.604 (<0.001)	114 (96.6)	4 (.4)	31.288 (<0.001)
Duration of labor	>12 h	8 (7.9)	93 (92.1)		74 (73.3)	27 (26.7)	
	≤ 12 h	412(4.0)	287 (96.0)	2.427 (0.119)	242 (80.9)	57 (19.1)	2.677 (0.102)
Sex	Female	7 (3.8)	176 (96.2)		147 (80.3)	36 (19.9)	
	Male	13 (6.0)	204 (94.0)	0.980 (0.322)	169 (77.9)	48 (22.1)	0.359 (0.549)
Birth Weight (kg)	≤2.4	0 (0.0)	30 (100.0)		23 (76.7)	7 (23.3)	
	2.5 to 3.5	16 (5.6)	272 (94.4)		233 (80.9)	55 (19.1)	
	>3.5	4 (4.9)	78 (95.1)	1.769 (0.413)	60 (73.2)	22 (26.8)	2.407 (0.300)

Predictors of Blood Loss and Impaired Perineal Integrity

Bivariate model showed being self-referred, and SVD decreased the odds of severe blood loss compared to their reference category (COR 0.301, P=0.015), and (COR 0.0101, P<0.001), respectively. Abnormal labor loss (COR 5.444, P<0.001), on the hand, increased the risk of blood. Multivariate model showed those who had SVD (AOR 0.105, P=0.004) was less likely to get severe blood loss. Regarding perineal integrity, bivariate model indicated that being aged between 20 to 34 years (COR 4.819, P<0.001), being gravida 2 to 4 (COR 3.496, P<0.001), para 2 to 4 (COR 3.021, P=0.002), and having ≥4 ANC visits (COR 1.659, P=0.040), and abnormal labor (COR 11.287, P<0.001) were positively associated with impaired perineal integrity compared to their reference category. On the other hand, urban residency (COR 0.592, P=0.034), self-referral (COR 0.168, P=0.003) and SVD (COR 0.081, P<0.001) were negatively associated with impaired perineal integrity compared to their reference category. Multivariate model, showed gravida 2 to 4 (AOR 4.134, P=0.050), and abnormal labor (AOR 3.670, P=0.022) positively associated with impaired perineal integrity compared to their reference category. Additionally, the only factor which was less likely associated with impaired perineal integrity is urban residency (AOR 0.527, P=0.034), Table 5.

Table 5: Predictors of blood loss and perineal integrity among participants (N=400)

		Variables	COR (95% CI)	P≤0.05	AOR (95% CI)	P≤0.05
Blood Loss	Type of admission	Medical (Ref)				
		Self-referral	0.301 (0.115, 0.789)	0.015	0.798 (0.284, 2.243)	0.669
	Mod of delivery	CS delivery				
		SVD	0.101 (0.033,0.308)	<0.001	0.105 (0.022, 0.492)	0.004
	Status of labor	Normal (Ref)				
		Abnormal	5.444 (2.041,14.524)	<0.001	1.049 (0.243, 4.523)	0.949
Perineal Integrity	Age (yrs.)	≤19(Ref)				
		20 to 34	4.819 (1.941, 11.966)	0.001	3.127 (0.823, 11.881)	0.094
		≥35	1.861 (0.799, 4.334)	0.150	1.388 (0.471, 4.094)	0.552
	Residence	Rural (Ref)				
		Urban	0.592 (0.364, 0.962)	0.034	0.527 (0.292, 0.952)	0.034
	Type of admission	Medical (Ref)				
	Gravidity	Self-referral	0.168 (0.051, 0.552)	0.003	0.440 (0.106, 1.827)	0.259
		1 (Ref)				
		2 to 4	3.496 (1.723,7.092)	0.001	4.134 (0.992, 17.232)	0.050
		≥5	1.782 (0.938,3.384)	0.078	1.299 (0.390, 4.327)	0.670
	Parity	0-1 (Ref)		-		
		2 to 4	3.021 (1.489, 6.130)	0.002	1.981 (0.469, 8.372)	0.352
		≥5	1.294 (0.587, 2.852)	0.523	1.036 (0.289, 3.715)	0.957
	ANC visits	<4 (Ref)				
		≥4	1.659 (1.023, 2.691)	0.040	1.616 (0.937, 2.786)	0.084
	Status of labor	Normal (Ref)				
		Abnormal	11.287 (4.029, 31.619)	0.001	3.670 (1.206, 11.165)	0.022

Discussion

The prevalence of women with severe obstetric blood loss post-delivery in the current study was nearly 2 to 3 times to results from the previous studies [7-9]. The observed variations in the current study compared to others, might be due to difference in study design, sociodemographic characteristics difference and maternal health care services accessible. In this study, those women who underwent SVD were less likely to have severe obstetric blood loss post-delivery compared to their reference category. With reference to other studies conducted in Ethiopia and Uganda, severe obstetric blood loss post-delivery was mostly seen among pregnant women who had CS deliveries, compared to those who had SVD, a fact that concur strongly to the results of the current study [8, 9]. A likely explanation for this might be due to that nearly three-quarter of the participants in the current study had SVD which ended without complications such as impaired perineal integrity or prolonged labor.

Regarding perineal integrity, less than one-third, developed impaired perineal integrity (tear) during labor and childbirth. The current result was not comparable to other studies which showed high rate. For example, according to a study conducted in Örebro County, Sweden, found nearly one half developed impaired perineal integrity, while according to a study from one of birth centers in Portugal, nearly three-quarter experienced impaired perineal integrity [12, 15]. Possible explanation for the observed variations can be due to methodological differences to the current study and other studies reviewed.

Surprisingly, this study revealed that being gravida two to four, increased the folds of ending up with impaired perineal integrity during labor and delivery, compared to their reference category, contrary to what is known as per previous studies which indicate the risk to be more likely among primigravidae [12, 16]. Several viewpoints can be raised regarding the observed results in the

current study. First, it can be referred to the characteristics of the previous pregnancy; as having a big baby in the previous pregnancy increases the risk of having a big baby in subsequent pregnancies, which is a risk to perineal trauma during labor and delivery. Secondly, it might be due to the position the mother assumed in the current pregnancy during labor and delivery [12, 27]. It can also be associated with maternal age of the participants, as in the current study, over two-quarter of gravida 2 to 4 were young women who might still have unexplored risk factors.

Furthermore, abnormal labor was revealed to increase the risks of impaired perineal integrity by almost four-folds among women who underwent SVD. Previous studies which noted similar associations concluded that the risk increased among women with abnormal labor associated with prolonged second stage of labor, and shoulder dystocia [28-30]. Possible explanation can be centered to the fact that abnormal labor is usually linked to difficult deliveries which may need additional maneuvers, as for shoulder dystocia or extension of the posterior vagina by surgical incision to enlarge vaginal outlet.

Regarding residence, urban residency, according to the current study, it was found to be a protective factor for developing impaired perineal integrity during labor and delivery. There are limited studies which have investigated similar phenomenon. However, several factors may be attributable to the observed association. Urban residents are more likely to follow obstetric instructions during antepartum and intrapartum; for example, undertaking antenatal perineal massage and assuming different maternal birthing positions during labor and delivery [20, 31, 32]. Additionally, urban women are also considered to be more autonomous, and well-off, and hence, increasing their chance to timely making decisions to visit health facility for labor and delivery before complications arise as cited in the literature [33, 34].

Conclusion

This study noted, though negligible, but significant rate of number of women developed severe obstetric blood loss. The rate of impaired perineal integrity was also significant. Abnormal labor was a main risk factor for both obstetric blood loss and perineal integrity. Gravidity increased the risk of impaired perineal integrity. However, SVD and urban protective factors for obstetric blood loss and perineal integrity respectively. Mentoring healthcare providers working at maternity ward is necessary to promote timely identification of risk factors and improve perineal care and maintain good practices during delivery.

Ethical Considerations: The study was concluded after oral and written permission was sought from the hospital management including the nurse manager for maternity. Since the study employed secondary data, there was neither verbal nor written informed consent from participants whose data was used. Anonymous data entry was done to ensure confidentiality.

Author Contribution: MBT conceptualized and designed the study, obtained datasets, conducted analysis, interpreted the results, drafted and reviewed the manuscript.

Conflicts of Interest: There are no conflicts of interest.

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