

## Obstetric factors associated with the uptake of Postnatal Care among mothers who gave birth in the last six months in Dodoma Region, Tanzania

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### Abstract

**Background:** The World Health Organization defines postnatal care when it is given to the mother and her newborn baby immediately after the birth of the placenta and for the first six weeks of life. The majority of maternal and neonatal deaths occur during childbirth and the postpartum period which can be prevented through adequate utilization of antenatal and postnatal care services.

**Objective:** To assess obstetric factors associated with the uptake of postnatal care services among mothers who gave birth in the last six months in Dodoma region, Tanzania

**Method:** This community-based cross-sectional study was conducted among 420 study participants from January to March 2021. Logistic regression analysis was carried out to measure obstetric factors associated with the uptake of postnatal care. An adjusted odds ratio with a 95% confidence interval and p-value less than 0.05 was applied.

**Results:** The uptake of the recommended four postnatal care visits was 136 (32%). Mothers who received counselling during ANC were almost 4 times more likely to utilize adequate PNC services than their counterparts (AOR=3.737; 95%CI =1.176-31.882; P=0.025). Those who delivered by C/Section were almost 12 times more likely to utilize PNC services adequately (AOR=11.913; 95%CI =3.0901- 45.933; P=0.000). Awareness of the PNC schedule was 18 times more likely to use the PNC services adequately compared with their counterparts (AOR=18.092; 95%CI =8.239- 39.726; P=0.000). Awareness of maternal danger signs was almost 5 times more likely to utilize PNC service adequately than their counterparts (AOR=4.691; 95%CI =2.168- 10.153; P=0.000).

**Conclusion:** The overall uptake of adequate postnatal care in the study area was low. Obstetric factors were found as strong predictors of adequate PNC service uptake among study participants. There is a need to strengthen routine health education during the antenatal and postpartum periods to enhance adequate PNC services uptake among women.

**Keywords:** PNC; Uptake; Obstetric; Factors

### Background

Postnatal care (PNC) is the care provided to a mother and her newborn baby in the first six weeks after birth. The postnatal period (PNP) is the time beginning immediately following the delivery of the placenta and extending through the six weeks (42 days) of birth. This period signifies a critical

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phase in determining the mother's and her newborn's health and survival (WHO, 2015). The goal of care during the early postnatal period is to promote the physical well-being of both mother and baby and support the developing relationship between the baby and his or her parents and family (WHO, 2015). Lack of care in the postnatal period from skilled providers may result in death or disability as well as missed opportunities to promote healthy behaviors affecting women, newborns, and children.

Studies in Africa showed that, every year approximately 125,000 women die in the first-week post-delivery, 50% of these deaths occur in the first week after the delivery while others happen within 24 hours following delivery (Mahmood et al., 2010). In Tanzania, the maternal mortality ratio was 556 per 100,000 live births (MoHSW, MoH, NBS, OCGS, 2016) and the neonatal mortality rate of 24/1000 live births in 2022 (MoHSW, MoH, NBS, OCGS, 2023). This indicates that Tanzania is still far from meeting the Sustainable Development Goal (SDG) targets of reducing the maternal mortality ratio to 70 per 100,000 live births and neonatal mortality to 12/ 1000 births by 2030 (SDG Targets 3.1 and 3.2, respectively (United Nations, 2016). Therefore, postnatal care services target to reduce preventable maternal and neonatal deaths which mostly occur within the first 24 hours and/or 3 days following delivery.

The postnatal care package insists on coverage of four PNC visits, and the first must be within the first 24 hours, at least three additional PNC are recommended for all mothers and newborns, on day 3 (48–72 hours), between days 7–14, and 6 weeks (WHO, 2015). PNC is meant to offer the mothers the opportunity to access check-ups for bleeding and vital signs (Temperature, Pulse, Respiration, and BP), support breastfeeding, check the breasts to prevent mastitis, manage anemia, promote nutrition and insecticide-treated bed nets, receive vitamin A supplementation, and be able to obtain counseling about danger signs and options for contraceptive services (Warren et al., 2010). The care given in the postpartum period helps the healthcare providers detect and manage complications that may occur following delivery (Wudineh et al., 2018). PNC if appropriately done within the recommended time prevents the great majority of maternal deaths (World Health Organization, 2010).

Previous studies have shown that proper management of life-threatening conditions soon after delivery has been shown to prevent maternal and prenatal morbidity and mortality (Bhutta et al., 2014; Singh et al., 2014). Although there is a high rate of death among postnatal mothers and neonates, especially in the first two days post-delivery post-natal services are inadequately utilized. A study done in 2016 that involved six developing countries, reported that only 36% of mothers utilized PNC adequately within 42 days post-delivery (Adhikari & Kumar, 2016). In Tanzania only 50.2% of mothers who had a live birth in the two years before the survey received a postnatal check during the first two days post-delivery. In the Dodoma region, 55.3% of mothers received a postnatal check during the first two days of delivery indicating low utilization of services (MoHSW, MoH, NBS, OCGS, 2023).

Different scholars indicated that PNC services utilization is affected by several factors including maternal age, educational level of a mother, place of delivery, mode of delivery, number of pregnancies, awareness about obstetric-related danger signs, and awareness about PNC services (Berhe et al., 2019; Limenih et al., 2016; Workineh & Hailu, 2014). Other factors found in the literature include the number of antenatal care (ANC) visits, urban residence, and women's autonomy (Berhe et al., 2019; Workineh & Hailu, 2014).

However, the factors of the utilization of PNC services are not the same across different cultures and socioeconomic statuses within a society. For example, Tanzania, is a country, that has an increased health facility network where PNC services are exempted for all postnatal mothers.

Reproductive health services are extensively expanded, including the deployment of skilled healthcare providers and an increase in the budget for health which is meant to ascertain all postnatal mothers and others get quality health services from the public health facilities (MoHCDGEC, 2015). The country has also emphasized private and non-governmental partnerships in the health sector, whereby private health facilities are available for mothers free of choice; yet, the uptake of PNC is still low, especially in Dodoma Region. There was a need to determine the uptake of postnatal care services and the influence of obstetric factors on postnatal care services utilization in the Dodoma region. Therefore, the objective of this study was to assess the obstetric factors associated with postnatal care services utilization among mothers who gave birth in the last six months in Dodoma region, Tanzania.

## Methods

### Study design and setting

The study employed a community-based cross-sectional study design using a quantitative approach conducted from 1<sup>st</sup> January to 28<sup>th</sup> March 2021. The study was conducted in Dodoma region, the capital city of Tanzania. Dodoma region is composed of seven districts: Chamwino, Bahi, Kondoa, Mpwapwa, Kongwa, Chemba, and Dodoma Municipal. Three districts, namely Chamwino, Mpwapwa, and Dodoma municipal were involved in this study. The selected districts have a total of 235 health facilities (11 hospitals, 21 health centers, and 203 dispensaries). Reproductive and child health services including PNC are provided daily in all health facilities except in some remote areas which have no health facilities where the outreach programs are carried out once a month. Data obtained from respective District Reproductive and Child Health Coordinators (DRCHcos) for each selected district shows that there were a total of 97,710 women of childbearing age (WCBA) from Chamwino district, 93,080 from Mpwapwa district, 146, 862 from Dodoma Municipality.

### Study population, inclusion and exclusion criteria

Mothers who were 7<sup>th</sup> to 12 weeks post-delivery who were ready to participate and those with good health conditions were included in the study. However, those mothers who were sick and who lived less than six months in the study area at the time of the interview were excluded from the study.

### Sample size and sampling technique

The required sample size was calculated using the following formula ( $n = z^2 p (1-p)/e^2$ ) whereby;  $n$  = sample size,  $z = 1.96$ ,  $e = 5\%$ , and  $p = 46\%$  (proportion of women using postnatal care services in Dodoma region (National Bureau of Statistics, 2016). An attrition rate of 10% was employed and the required minimum sample size of 420 participants. The sample size was distributed into selected districts by proportional allocation of sample size as shown in *Table 1*.

Table 1: **Sample Size Distribution of Study Population In Selected Districts**

District	Target population	Population proportion	Sample size
Dodoma Municipality	146,862	0.43495	183
Chamwino	97,710	0.28938	121
Mpwapwa	93,080	0.27567	116
Total	337,652	1	420

The current study employed a multistage sampling technique to obtain study representative sample from the region. In the first stage, the list of all districts in the Dodoma Region was obtained and Dodoma Municipality was selected purposively as it is only an urban district with people of different backgrounds. Two other districts (Chamwino, and Mpwapwa) were selected by a simple random method using a lottery method with a replacement approach. In the second stage, simple random sampling was used for two wards from each of the selected districts by using a table of random numbers and obtained six wards. In the third stage, a similar sampling technique was applied to select three villages/streets from each selected ward and obtained a total of 18 villages/streets. From each of the selected villages/streets, all households with mothers who delivered within seven to twelve weeks during the study period were eligible for the study. At the household level, participants were selected randomly and within the households, only one participant was selected.

### **Data Collection Tools and Procedures**

Data was collected through a structured and semi-structured questionnaire using the face-to-face interview method. The data collection tool was prepared in English and translated to Kiswahili. The tools were pre-tested to ensure consistency of the variables included in the study and a village used for pretesting was excluded during actual data collection. Two research assistants (nurses) were used to collect data after training on data collection for one day.

### **Statistical Analysis**

The data were entered, cleaned, and transformed (recoded) using SPSS software version 26. Univariate analysis was computed for each independent variable to assess their proportion. A Chi-square test was done to examine the preliminary relationship between the dependent variable (PNC services utilization) and independent variables (obstetric factor). All variables with  $P < 0.05$  were retained for reduced and full model analysis. Bivariate analysis was done using a logistic regression model to examine the crude association of predictors on PNC service utilization. Adjusted Odds ratio and 95% CI were used to measure the statistical association value 0.05 was used to determine the statistical significance of the tests.

### **Ethical Approval and consent to participate**

Ethical clearance and permission were sought from the University of Dodoma Research and Ethical Conduct Committee with Ref. NO.MA. 84/261/02/214, and permission for research conduct was sought from Regional Administrative Secretary (RAS) for Dodoma region with Re.122/467/01F/175. Verbal consent to participate in the research was obtained from each participant and was assured the right to withdraw from the study at any time of the study. They were also assured of confidentiality and only identification numbers were used to identify participants.

## **Results**

### **Socio-demographic characteristics of study participants**

This study involved 420 participants. The majority of the participants 54.3% were aged between 20 to 29 years, 86.4% were currently married, 68.6% had primary education level, 91.4%, were not employed and 346 incurred no cost to reach a health facility (*Table 2*).

**Table 2: Sociodemographic Characteristics of Participants (N=420)**

<b>Variables</b>	<b>N</b>	<b>%</b>
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Age (years)		
18- 19	23	5.5
20 to 29	228	54.3
≥30	169	40.2
Marital status		
Never married	45	10.7
Married	363	86.4
Separated/Divorced	12	2.9
Place of residence		
Rural	237	56.4
Urban	183	43.6
Education level		
Informal	28	6.7
Primary	288	68.6
Secondary or higher	104	24.7
The employment status of the mother		
Employed	36	8.6
Self-employed	101	24.0
Peasants	283	67.4
Employment status of husband		
Not married/	57	13.6
Separated/Divorced		
Employed	45	10.7
Self-employed	168	40
Peasants	150	35.7
Estimated time to reach a health facility		
>30 min	149	35.5
30 min to 1 hour	241	57.4
≥2 hour	30	7.1
Cost to reach the health facility		
No cost	346	82.4
500 to 2000 TZS	71	16.9
>2000 TZS	3	0.7

### Obstetric Information of the Participants

Of 420 study participants studied, the majority 400 (95.2%) started ANC visits late (≥12 weeks GA) 253 (60.2%) had 4 or more ANC visits, 359 (87.1%) were not counselled about PNC services during ANC, and 386 (91.9%) delivered at the health facility for the current baby. (Table 3).

**Table 3: Distribution Of Obstetric Information Of Participants (N = 420)**

Variables	N	%
<b>ANC visits</b>		
<4	167	39.8
≥4	253	60.2
<b>Gestational age at the first ANC visit (weeks)</b>		
<12	20	4.8
≥12	400	95.2
<b>The health provider attended the mother during the first ANC visit</b>		

Skilled Personnel	247	58.8
Un skilled personnel	173	41.2
<b>Counselled on PNC during ANC</b>		
Yes	49	11.7
No	371	88.3
<b>Parity</b>		
1 to 2	210	50.0
3 to 5	146	34.8
>5	64	15.2
<b>The mother received support from the husband</b>		
Yes	231	55.0
No	189	45.0
<b>Type of support from husband</b>		
Accompaniment	170	40.4
Financial	67	16.0
None	183	43.6
<b>Place of delivery for current baby</b>		
Health facility	386	91.9
Home	34	8.1
<b>Mode of delivery</b>		
SVD	373	88.8
C/Section	47	11.2
<b>Awareness of PNC schedule</b>		
No	273	65.0
Yes	147	35.0
<b>Awareness of maternal danger signs</b>		
No	294	70.0
Yes	126	30.0

### Uptake of Postnatal Care Services Among Study Participants

Results from this study showed that the majority 95.6% of participants attended PNC visits at least once while 4.5% did not attend PNC visits during their postnatal period. Results also showed that only 32.2% of participants completed the recommended four PNC visits (adequate PNC utilization). Regarding the number of PNC attended, the majority (67.8%) of study participants attended PNC less than four visits and 78.6% received PNC services within the first 24 hours as shown in *Table 4*.

**Table 4: Uptake of Postnatal Care Services (N = 420)**

Variables	N	%
<b>Attended PNC at least once</b>		
YES	401	95.6%
NO	19	4.5%
<b>Number of PNC attended</b>		
Four or more visits	136	32.2%
Less than four visits	284	67.8%
<b>Timing of receiving the first PNC visits</b>		
Within the first 24 hours	330	78.6%
Between 48 to 72 hours	64	15.2%
Between 7 - 14 days	7	1.7%

**Types of Postnatal Care Services Received**

Participants were asked about PNC services received during their attendance at the PNC clinic. According to them, within the first 24 hours post-delivery, 124 (29.5%) participants said they were assessed for the color of per vaginal discharge (lochia), 193 (46%) got their newborn babies immunized against polio and Tuberculosis (Polio and BCG), 10 (2.4%) counseled on timely and Exclusive Breastfeeding. About 93 (22.1%) did not attend during these visits. Regarding PNC services provided between 48 to 72 hours, 41 (9.8%) received wound assessment for those who underwent C/S, 40 (9.5%) counseled on EBF, 128 (30.5%) received vaccination services for their newborn babies, while the majority 211 (50.2%) did not attend during this visit. Between 7 to 14 days, 43 (10.2%) got their stitches removed (for those who underwent C/S, 93 (22.1%) were reminded of EBF, and 18 (4.3%) received vaccination services for their babies. However, the majority 267 (63.3%) did not attend the clinic for PNC services. During 6th week post-delivery, 313 (74.5%) reported their babies received pentavalent and Rotarix vaccine, 4 (1%) received health education on EBF, and 103 (24.5%) did not attend during this visit. (Figure 1).

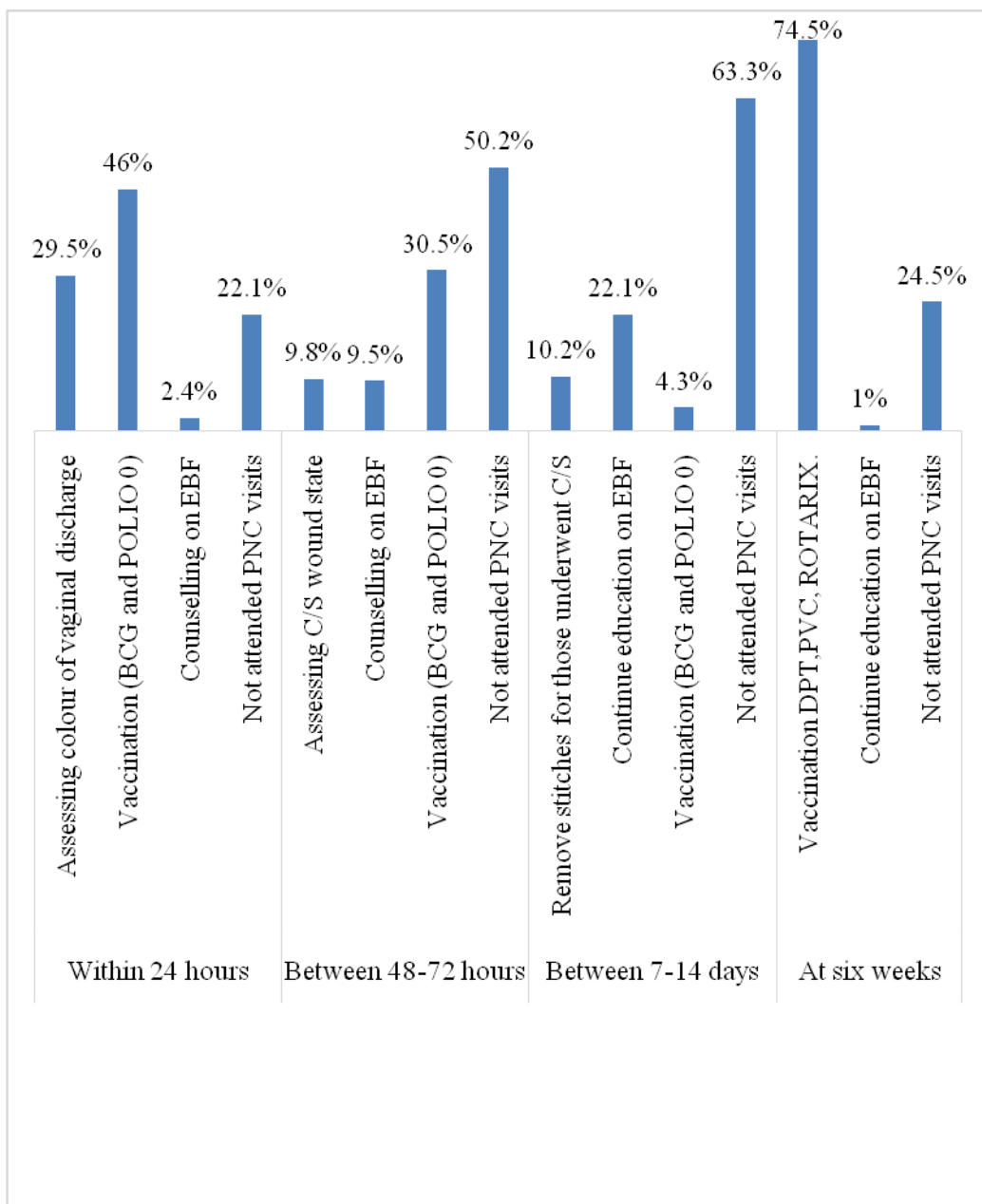


Figure 1: Postnatal care services received at different visits

### Obstetric factors associated with the Postnatal Care services Uptake

Bivariate and multivariate logistic regression analyses were done to determine the association of Obstetric factors on the uptake of postnatal care services. Results from the bivariate logistic regression analysis showed that C/Section delivery, Place of delivery, parity (> 5), counselled on PNC during ANC, and those who were aware of maternal danger signs and PNC schedule were significantly associated with adequate uptake of PNC services during the postnatal period compared with their respective reference category (P < 0.05).

After adjusting for potential confounders in multiple logistic regression model results showed that variables such as counselled on PNC during ANC, Deliver by C/Section, awareness of



PNC schedule, and awareness of maternal danger signs remained the strong predictors of adequate PNC service uptake among study participants. Regarding if mothers received counselling services results showed that, mothers who were counselled on PNC during ANC was almost 4 times more likely to utilize adequate PNC services compared to their counterpart (AOR=3.737; 95%CI =1.176-31.882; P=0.025). Concerning mode of delivery, mothers who delivered by C/Section was almost 12 times more likely to utilize the PNC services adequately compared with those who delivered by normal vaginal delivery (AOR=11.913; 95%CI =3.0901- 45.933; P=0.000). Mothers who were aware of the PNC schedule were 18 times more likely to use the PNC services adequately compared with their counterparts (AOR=18.092; 95%CI =8.239- 39.726; P=0.000). Again those mothers who were aware of maternal danger signs were almost 5 times more likely to utilize PNC service adequately than their counterparts (AOR=4.691; 95%CI =2.168- 10.153; P=0.000) ( Table 5).

**Table 5: Obstetric factors associated with Postnatal Care services Utilization (N = 420)**

Variables	Univariate OR at 95%CI	P-value	Multivariate aOR at 95%CI	P-value
<b>ANC Visits</b>				
< 4 (Ref )				
≥ 4	1.15(0.76, 1.75)	0.512	0.71(0.33, 1.54)	0.391
<b>Gestational Age</b>				
< 12	1.42(0.57, 3.55)	0.458	0.78(0.16, 3.89)	0.762
≥ 12 (Ref)				
<b>Health provider attended the mother during the first ANC visit</b>				
Skilled personnel	1.07(0.70, 1.64)	0.744	1.114(0.53, 2.35)	0.778
Unskilled personnel (Ref )				
<b>Received counselling on PNC during ANC</b>				
Yes	21.42(8.83, 51.95)	<b>0.000</b>	3.73(1.18, 31.88)	<b>0.025</b>
No ( Ref )				
<b>Parity</b>				
1 to 2 (Ref )				
3 to 5	1.06(0.68, 1.65)	0.795	1.37(0.46, 4.08)	0.571
> 5	0.44(0.22, 0.88)	<b>0.020</b>	1.49(0.49, 4.54)	0.479
<b>Support from Husband</b>				
Yes	1.696(1.12, 2.58)	<b>0.013</b>	1.04(0.04, 28.62)	0.980
No ( Ref )				
<b>Type of support</b>				
Accompaniment	1.53(0.97, 2.41)	<b>0.067</b>	1.11(0.04, 32.37)	0.954
Financial	1.92(1.07, 3.46)	<b>0.030</b>	1.11(0.04, 30.16)	0.950
None ( Ref )				
<b>Place of Delivery</b>				
H/Facility	2.98(1.13, 7.89)	<b>0.028</b>	2.26(0.45, 11.6)	0.329
Home ( Ref )				
<b>Mode of delivery</b>				
Normal (Ref)				
C/Section	24.93(9.58, 64.87)	<b>0.000</b>	11.91(3.09, 45.93)	<b>0.000</b>

<b>Awareness on PNC schedule</b>				
Yes	57.64(30.78, 107.94)	<b>0.000</b>	18.09(8.24, 39.73)	<b>0.000</b>
No (Ref )				
<b>Awareness of maternal danger signs</b>				
Yes	21.87(12.82, 37.32)	<b>0.000</b>	4.69(2.17, 10.15)	<b>0.000</b>
No ( Ref )				

## Discussion

This was a community-based study conducted to assess the influence of obstetric factors on the uptake of postnatal care services among study participants. The finding from this study showed that less than half (32.4%) of participants received recommended four PNC services (adequate utilization) during their postnatal period. This finding is almost similar to the finding of a study conducted in Ethiopia with a prevalence of 34.8% and Morocco at 30.1% (Ayana Hordofa, 2015; Elkhoudri et al., 2015). However, the uptake of adequate PNC services in the current study is lower than the results of a study done in Uganda, 50%, and Kenya, 47% (Akunga et al., 2014; Wudineh et al., 2018).

Again, the uptake of postnatal care services in the present study was higher than the finding of studies conducted in Tigray, Northern, Ethiopia, 8% (Workineh & Hailu, 2014), Gambia 22.4% (Barrow & Jobe, 2020), India, 29% (Kaur & Kaur, 2017) and Morogoro, Tanzania 25% (Mohan et al., 2015). The observed discrepancy from these studies could be due to time differences as there was some improvement in the availability and accessibility of maternal health services over time. Another reason could be due to contextual and socio-demographic differences among study participants.

The current study revealed that the uptake of adequate PNC services has been significantly influenced by the mode of delivery, whereby postnatal mothers who gave birth by C/section were more likely to utilize PNC services adequately compared to those who delivered by spontaneous vaginal delivery. A similar finding was observed in previous studies conducted in 33 sub-Saharan African countries, Ethiopia and Tanzania (Benova et al., 2019; Limenih et al., 2016; Mohan et al., 2015). This can be explained that mothers who delivered by caesarean section utilized adequate PNC services as a part of follow-up care for their complications and then had better opportunities to receive health education on postnatal care services. Again, this might be due to fear of complication and therefore utilized PNC services to prevent further complications hence increased healthcare-seeking behaviour.

Concerning the influence of knowledge of postnatal care services, the present study revealed that those women who know about PNC services were more likely to use the service than those who lack knowledge of PNC services. This was similar to the results of a study conducted in northwest Ethiopia and Urban Northern Ethiopia which revealed that postnatal women who were knowledgeable about postnatal care services and maternal complications during the postpartum period were more likely to utilize postnatal care services compared with those who did not know (Gebrehiwot et al., 2018; Limenih et al., 2016).

Mothers who were aware of the PNC schedule were more likely to use adequate PNC services compared with their counterparts. This was similar to the results of a study conducted in Ethiopia which revealed that postnatal women who were aware of the postnatal care service and

maternal complications during the postpartum period were more likely to utilize postnatal care services adequately compared with their counterparts (Beyene et al., 2022; Zeleke et al., 2021). Again, a similar study conducted in northern Ethiopia noted that those women who lacked knowledge of postnatal care services were less likely to utilize the service (Gebrehiwot et al., 2018). Awareness of obstetric danger signs was also found to be a strong predictor of adequate PNC utilization. Mothers who were knowledgeable about obstetric danger signs were more likely to utilize PNC service as compared to those who did not mention any obstetric danger signs.

This result is similar to the study conducted in Kenya (Mayieka, 2019), and Uganda (Sacks et al., 2017). This can be explained by the fact that awareness of obstetric danger signs is an important factor in motivating mothers and their families to utilize health care services adequately with intention of receiving preventive interventions and management of obstetric danger signs. Previous studies have also supported the role of counselling in increasing awareness among postnatal mothers during antenatal and post-delivery and prior discharge home (Berhe et al., 2019; Limenih et al., 2016; Tessema et al., 2020; Wudineh et al., 2018).

### **Strengths and limitations of a study**

The study has presented evidence on obstetric factors associated with adequate uptake of postnatal care services among women in the Dodoma region which could be used as input to strengthen interventions on reproductive health locally and in other similar areas. However, there could be recall bias in the study since the women were asked for retrospective information within the past six weeks after delivery.

### **Conclusion and recommendation**

Although the majority of participants attended PNC services at least once, the overall utilization of adequate postnatal care among women in the study area was low. Obstetric factors associated with adequate PNC service uptake were mothers being counselled during ANC, delivery by cesarean section, awareness of the PNC schedule, and awareness of maternal danger signs. Therefore, to enhance adequate PNC services utilization, healthcare providers and other health stakeholders need to strengthen routine health education during the antenatal and postpartum periods.

### **Abbreviation**

ANC: Antenatal care; TDHS: Tanzania Demographic and Health Survey; TDHS-MIS Tanzania Demographic and Health Survey-Malaria Indicator Survey; PNC; Postnatal Care; RMNCAH: Reproductive, maternal, newborn, child, and adolescent health; SDGs: Sustainable Development Goal; WHO: World Health Organization

### **Competing interests**

No conflict of interest.

### **Authors' contributions**

AFN, NM contributed to the design of the study, data collection, data analysis and drafting of the manuscript. NG and SN contributed to data analysis and critical review of the manuscript. All authors read, commented on, and approved the final draft of the of the manuscript

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