

Factors Associated with Preterm Birth among Mothers who gave Birth in Dodola Town Hospitals, Southeast Ethiopia: Institutional Based Cross Sectional Study

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ABSTRACT

Background: Preterm babies are at high risk of serious illness or death during the neonatal period. Without appropriate management of preterm birth, those who survive are at high risk of lifelong disability and poor quality of life. The magnitude and associated factors of preterm birth were not now well known in the study area. Moreover, the factors associated with preterm birth are believed to differ from one context to another. The objective of this study was to assess the magnitude of preterm birth and associated factors among mothers who gave birth in Dodola town hospitals.

Method: Institutional based cross-sectional study design was conducted in Dodola town hospitals. All mothers who gave birth during study period were included in the study. Data were collected using face-to-face interview from each mother. Bivariate and multivariate logistic regression analysis was used to identify the factors associated with preterm birth. The results of the study are presented with odds ratio and 95% confidence interval.

Result: The magnitude of preterm birth was 13.0%. Monthly income of the mothers [AOR=3.07; 95% CI: 1.12, 8.41], number of ANC visits [AOR=4.07; 95% CI: 1.21, 13.67] and number of household members [AOR=3.23; 95% CI: 1.51, 6.90] were the significant factors associated with preterm birth.

Conclusion: The magnitude of preterm birth in the study area was higher than the report of Federal Ministry of Health. Monthly income of mothers, ANC visits and number of household members were the factors associated with preterm birth. Therefore, still efforts have to be made to decrease the magnitude of preterm birth.

Keywords: Preterm birth, Institution-based cross-sectional study, Dodola town hospitals

ABBREVIATIONS

AOR: Adjusted Odd Ratio; CI: Confidence Interval; FMOH: Federal Ministry of Health; ETB: Ethiopian Birr

INTRODUCTION

Preterm birth is a birth before 37 weeks of gestation; it is the single most vital determinant of adverse infant outcomes, in terms of survival and quality of life in future [1].

In 2015, globally around 6 million children under the age of five have died across, about 2.6 million children died as result of complication because they were born preterm. From those deaths more than three in five were took place in Africa and South Asia [2].

Preterm babies are at high risk to serious illness or death during the neonatal period. Without appropriate measure, those who survive are at risk of lifelong disability and poor quality of life [3].

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At each year, an estimated 15 million babies are born preterm and the number is increasing year to year. Complications from preterm birth are the leading cause of death among children under five years of age, accountable for approximately one million deaths in 2015. The death rate due to preterm birth ranges from 5-18% across 184 countries [4].

Africa and South Asia account more than 60% of preterm births, but born too early is truly a global problem. In the developing country, on average, 12% babies are preterm compared with 9% in higher income country. Within those low-income countries, low-income households are at higher risk of preterm birth. This shows preterm birth is the leading cause of prenatal and neonatal mortality and morbidity in developing country [5,6].

A retrospective cohort study conducted in southern Nigeria showed that Preterm birth admissions constituted one-fourth of the total admissions. Among the risk factors for preterm birth half of them were preterm rupture of foetal membranes and one-third lack of antenatal care visit [7].

According to UN report, Ethiopia is among the five country- Pakistan, Nigeria, Congo, and India- responsible for 50% of all newborn deaths in the World [8].

In Ethiopia, each year 320,000 babies are born and from those babies, 24,400 children under 5 years die due to direct preterm complications [9].

Facility based cross-sectional study conducted in Gondar town showed that 4.4% mothers gave a preterm birth. Mothers who had pregnancy induced hypertension (PIH) had 5 times more likely of having a preterm birth than those mothers without PIH. HIV positive mothers were three times deliver the preterm baby as compared with HIV negative mothers [10].

A cross-sectional study conducted in Debre Markos town showed that 11.6% mothers gave a preterm birth in the town. Mothers with one or more of current pregnancy complication (PIH, APH, multiple pregnancies, polyhydramnios and cervical incompetence) are 2.9 times more likely of developing preterm birth than mothers without any of the mentioned problems. Mothers who developed premature rapture of member and Anemia during pregnancy had about 6.2 times and 7.2 times respectively, increased risk of developing preterm birth than mothers who didn't have the problems [11].

The institution-based cross-sectional study conducted in Jimma showed that women who hadn't substance intake during pregnancy were 47% had less likely preterm birth as compared to mothers who had the history of substance use during pregnancy. Those mothers multi-gravida had pregnancy-induced hypertension, the baby with congenital abnormalities and history of twin pregnancy were another factors associated with preterm birth [12].

Preterm birth is among contributing factors for neonatal deaths to overall child mortality, so it is critical to address the determinants of poor outcomes related to preterm birth to achieve further reductions in child mortality. Ethiopia is among high infant mortality countries in the world, 59/1000 live births [13,14].

Despite the fact that identifying the magnitude and associated factors of preterm birth is essential for further improvement of child mortality reduction interventions but little is known about the preterm birth and associated factors. Moreover, this study is important to provide tangible evidence for possible strategies and interventions to governmental and non-government organizations.

METHODS

Study area

Dodola town is among the towns in west Arsi zone, Southeast Ethiopia which is 318 km far from Addis Ababa and 48 km far from Shashamane town which is capital town of west Aris zone. According to CSA, Dodola town has a total population of 46,489. From the total population of the town half of them were females, 24132 (51.9%). From total females, two fifth of them were in reproductive age group 10, 288 (42.6%). Dodola town has two hospitals (one governmental and one private hospital) and 10 private clinics. Currently, both hospitals (one governmental and one private hospital) are giving delivery service.

Study design

The institutional based cross-sectional study design was conducted from April 1-30, 2017.

Source and study population

All mothers who gave birth in both hospitals were considered as source population whereas the mothers who gave birth in the hospitals and selected for the study was considered as the study population.

Sample size determination and sampling procedure

Sample size was determined by using a single population proportion formula after considering the following assumptions, proportion 25.9% [12], confidence interval of 95%, margin of error 5%. Moreover, the sample sizes were checked for number of factors, to see which factor gives a maximum sample size for the study.

$$n = z_{\alpha/2}^2 * (P(1-P)) / d^2 = (1.96)^2 * 0.259 * (0.741) / 0.0025 = 295$$

Adding 10% non-response rate, the final sample size was 325. Both hospitals in the town (one government and one private hospital) were included in the study. The total number of delivery in 2016 was 3, 210, 2328 deliveries were at government hospital and 882 were at privet hospital [15]. The sample size for each hospital was allocated using probability proportional to the service they render in the year of 2016. Study participants were consecutively interviewed until the required sample size reached for both hospitals.

Data collection tools and data quality control

The interviewer administered questionnaire was adopted after reviewing relevant scientific literatures. The tool were translated into local language Afan Oromo and translated back to English

language to check its consistency. Data were collected by two experienced diploma midwives who were recruited out of the study area to minimize the social desirability bias. Data collection process was supervised by one BSc midwife. Two days training were given for the data collectors and supervisor. Pre-test was done outside the study areas and necessary modification was made. Data collection process was supervised on a daily basis. Every day, the collected questionnaires were cross-checked for their completeness and its consistence.

Inclusion and exclusion criteria

Mothers who had at least one live-birth preceding to this pregnancy with no history of abortion in between this pregnancy was included in the study whereas mothers who were severely ill and cannot answer the questionnaire were excluded from the study.

Study variables

Preterm birth was outcome variable and the socio-demographic data: age, occupation, ethnicity marital status, education, employment and income. The past medical, obstetric and gynecologic history: Last menstrual period, gestational age of the index pregnancy, date of delivery of the preceding birth, parity, gravidity, previous pregnancy complication and outcome, complication of current pregnancy, history of chronic medical illness, contraceptive use, drug use, smoking history, birth weight and Rh factor were the determinant factors.

Data processing and analysis

Data entry was done by using Epi-info and transferred to SPSS version 21 for analysis. Descriptive statistics were used to calculate the frequency distribution and proportions for categorical variables. Multivariate logistic regression analysis was used to identify factors associated with preterm birth. Variables in binary logistic regression analysis with $p \leq 0.2$ were transferred to multivariate logistic regression analysis. In multivariable logistic regression analysis, the variables with P value ≤ 0.05 were considered as significantly associated variable with preterm birth.

Operational definitions

Preterm birth: A new born with a gestational age of 28 weeks to less than 37 weeks.

Low birth weight: Infant weighing less than 2500 g at birth.

Last menstrual period: The date of the starting of last menstruation the women had to the index pregnancy.

Ethical consideration

The ethical clearance was obtained from Madda Walabu University Goba Referral Hospital Ethical Committee. And permission letter was obtained from Aris Zone Health Department, Dodola health office, and respective hospitals. Informed verbal consent was obtained from each mother after explaining the purpose of the study. The study participants' confidentiality was ensured throughout data collection process;

by not writing their personal identification. The interview was held in private to the privacy of study participants. The advice was given for mothers with deliveries of a preterm baby. Counseling was given on vaccination and birth control methods.

RESULTS

A total of 322 mothers who gave birth in both hospitals (government and private hospitals) were included in the study, yielding the response rate of 99.08%. From total study participants, 129 (40.1%) of them in the age group of 18-24 and 268 (83.3%) of them were married.

Table 1: Socio democratic characteristics of the mothers who gave birth in Dodola town hospitals, Southeaster Ethiopia, May 2017.

Variables	Category	Frequency (n=322)	Percentage
Age in year	18-24	129	40.1
	25-31	121	37.6
	32-37	52	16.1
	>37	20	6.2
Marital status	Married	268	83.2
	Divorced	40	12.4
	Widowed	14	4.4
Educational status	Unable to read and write	91	27.3
	Read and write only	97	30.1
	Primary education	52	16.1
	Secondary and above	82	26.4
Ethnic group	Oromo	161	50.0
	Amhara	101	31.4
	Gurage	30	9.3
	Tigre	30	9.3
	Occupational status	House wife	143
Merchant	114	35.4	
Government employed	36	11.2	
Daily labourer	29	9.0	
Religion	Muslim	130	40.4

	Orthodox	109	33.9
	Protestant	58	18.0
	Catholic	25	7.7
Monthly income (USD)	≤ 91.3	289	89.8
	>91.3	33	10.2
Number of family members	≥ 4	247	76.71
	<4	75	23.29

Among the study participants, 97 (30.2%) of them can read and write and half of the study participants was Oromo ethnic group 161 (50.0%). Concerning the occupational status of the study participant, 70 (44%) were housewives and 114 (35.4%) was Merchant. One hundred thirty study participants were Muslim religion followers 130 (40.4%). Regarding monthly income of the study participants, 289 (89.9%) of them earn less than USD 91.3 (Table 1).

Obstetric and maternal conditions

Among the study participants, 42 (13.0%) of mothers gave a preterm birth. From the total mothers who participated in the study, 302 (95%) mothers had less than four focused ANC visits and 264 (82.4%) mothers were Rh factor positive. Out of 322 mothers, 189 (58.7%) mothers had three to four children, 143 (89.9%) mothers had no medical complications, and 246 (76.4%) mothers gave newborn baby with weight of 1500 to 2400 g (Table 2).

Table 2: Obstetric and Medical conditions of mothers who gave birth in Dodola town hospitals, Southeaster Ethiopia, May 2017.

Variable	Category	Frequency (n=322)	Percent
Preterm	Yes (<36 weeks)	42	13.0
	No (≥ 36 weeks)	280	87.0
Number of focused ANC visits	<4	302	95.0
	≥ 4	16	5.0
Rh factor	Positive	264	82.0
	Negative	41	12.7
	Unknown	17	5.3
Number of children have	<3	77	23.9
	3-4	189	58.7
	≥ 4	56	17.4

Complication of current pregnancy	Yes	90	28.0
	No	232	72.0
Birth weight in gram	Below 1500 g	1	0.3
	1500 to 2400 g	75	23.3
	Above 2400 g	246	76.4
Pregnancy induced hypertension	<139/89	295	91.6
	≥ 140/90	27	8.4
Previous medical complications	Yes	32	9.9
	No	290	90.1

Factors associated with preterm birth

The variables included in Bivariate analysis were: Pregnancy induced hypertension, Counseling received, Monthly income, Number of focused ANC visits, Number of family members, Rh factors, Number of children have, Complication of current pregnancy, Birth weight, and Previous Medical complications. In multivariate logistic regression analysis, the following factors were associated with preterm birth: monthly income, number of ANC visits, and number of family members. Those mothers who earn less than 1963 ETB were 3.07 times more likely gave preterm birth than the mothers who earn greater than 1963 ETB [AOR=3.07; 95% CI:1.12, 8.41]. Mothers who attend less than four ANC visits were 4.07 times more likely gave preterm birth than the mothers who had greater than four ANC visits [AOR=4.07; 95% CI:1.21, 13.67]. Moreover, the mother who had more than four family members were 3.23 times more likely had preterm birth than the mother who had less than four family members [AOR=3.23; 95% CI: 1.51, 6.90] (Table 3).

Table 3: Factors associated with preterm birth among mothers who gave birth in Dodola town hospitals, Southeaster Ethiopia, May 2017.

Variable	Preterm birth		COR (95%CI)	AOD (95%CI)
	Yes	No		
Pregnancy induced hypertension				
≥ 140/90	13	14	1	
<139/89	29	266	8.517 (0.65, 19.86)	
Received counseling				
Yes	10	33	1	
No	32	247	2.34 (0.05, 5.19)	
Monthly income				
≥ 1963	12	21	1	1

<1964	30	259	4.93 (2.21, 11.02)	3.07 (1.12, 8.41)**
Number of ANC visits				
≥ 4	6	10	1	1
<4	36	270	4.5 (1.54, 13.12)	4.07 (1.21,13.67)**
Number of family members				
≥ 4	20	227	4.71 (2.398, 9.26)	3.23 (1.51, 6.90)**
<4	22	53	1	1

DISCUSSION

The institution based cross sectional study was conducted to assess the magnitude of preterm birth and associated factors among mothers who gave birth in Dodola town hospitals. The result showed that among 322 mothers who gave birth, 42 (13%) of them gave preterm birth. This finding was consistency with study conducted in French Guiana, which is 13.5% [16]. The prevalence of preterm birth in this study was higher than study conducted in Deber Markos town health institutions, which is 11.6% [11]. This might be due to the difference of study area and the study period. The finding of this study was lower than a retrospective study conducted in Nigeria and institution based cross sectional study conducted in Jimma University specialized hospital, which is 24% and 25.9% respectively [7,12]. This might be due to the difference of study areas and time of the study; currently in the study area there is better health seeking behaviour than previous. Whereas, the finding of this study was higher than study conducted in Gonder, which is 4.4% [10]. The possible reason for this discrepancy could be due to the difference of the study areas.

This study revealed that a significant association was found between monthly income and preterm birth. Those mothers who earn less than USD 91.3 per month was three times more likely gave preterm birth than the mothers who earn greater than USD 91.3 per month. This finding was consistency with study conducted in Deber Markos at 2013 [5,6,11]. This is due to the fact that household’s income is a determinant for a number of health seeking behavior including utilization of maternal and child health services, could be able to prevent preterm birth.

Another factor associated with preterm birth was focused Mothers who attend less than four ANC visits were four times more likely gave preterm birth than the mothers who had greater than four ANC visits. This finding was consistency with study conducted in Deber Markos in 2013 [11]. The possible reason might be at the time of ANC visits, mothers got a lot of information it’s helpful to prevent, diagnose, and treat preterm births in health facilities.

The mothers who had more than four household members were three times more likely had preterm birth than the mothers who had less than four household members. This might be due the fact that pregnant mothers in the large family size not got sufficient care and family size also one means for sharing

monthly income of the household which planned for maternal care and support.

CONCLUSION

The prevalence of preterm birth in this study was higher than the report of Federal ministry of health. Monthly income of mothers, ANC visits and number of household were the factors associated with preterm birth. Therefore, efforts have to be made to decrease the prevalence of preterm birth and to increase mothers’ monthly income, to increase ANC visits, and to have small number of family size.

COMPETING INTERESTS

The authors declare that they have no competing interests.

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LIMITATION OF THE STUDY

Possibility of underestimation of preterm birth magnitude because the study was done in the health institution only and the possible effect of seasonality variability was not excluded.

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