Research Article

Preterm birth and factors: An institution based cross-sectional study in case of southern Ethiopia

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Background: Despite all the effort it has been taken, preterm birth is the most prevailed problem in modern obstetrics, in which it 40% of under-five death is accounted due to prematurity. In Ethiopia, 34% of neonatal deaths prematurity are because of prematurity. The multifactorial nature of factors related to preterm birth makes its etiology of poorly understood. In this regard, the evidence is limited in the study area. Therefore, this study aimed to assess preterm birth and associated factors in Southern Ethiopia.

Methods: A hospital-based cross-sectional study was conducted on 258 samples from February to April 2018 in Jinka General hospital, Southern Ethiopia. By using face-to-face interviews, the data were collected and extracted using a structured extraction sheet from mothers' charts. Gestational age was calculated either by using the last menstrual period or Ballard maturity examination. Binary logistic regression was applied to control confounders.

Results: Among mothers (n=258) enrolled in this study data on preterm birth was revealed 28.4%, in which the average age of subjects were between 18 to 34 years. The probability of developing preterm birth were increased among subjects with gestational diabetes mellitus and no antenatal attendance (AOR=4.65, 95% CI=1.46, 14.80) was found to have a significant statistical association with preterm birth.

Conclusion: The mangnitude of preterm birth in jinka general hospital was 28.4%. Having no antenatal visit and diabetes mellitus during pregnancy were significantly associated with preterm birth. Women should be encouraged to receive antenatal care in order to mitigate preterm birth in the study area. It is essential to give attention to increase the number of pregnant women who are visiting a hospital for perinatal care, yet further investigation is needed.

Keywords: Preterm birth, Southern Ethiopia, Hospital, Antenatal care

Abbreviations:

ANC: Antenatal care, AOR: Adjusted odds ratio, CI: Confidence Interval, PTB: Preterm birth, NLMP (Normal Last Normal Menstrual Period), PROM (Premature Rupture of Membrane), UTI (Urinary Tract Infection)

Background

According to the World Health Organization (WHO), childbirth before 37 completed weeks of gestation accounts for 24% of neonatal death [1,2]. The rate of preterm birth is increasing globally and it ranges from 5% to 7% [3]; yet, variation exists from region to region [4]. For instance, Asian and Sub-Saharan African countries accounted 81.1% of the global live preterm births [5]. A multicenter study showed that the rate of PTB in India, Nigeria, China, Indonesia, and Bangladesh accounted for 6.6 million of the global 14.84 million live preterm births [5].

Based on the WHO report, the rate of preterm birth among newborns delivered in Eastern Africa was 14.3% [2]. A study conducted in Africa showed the top scorers of preterm birth per 1000 live births include Malawi (18.1%), Comoros(16.7%), and Zimbabwe(16.6%) [6]. In Ethiopia, the rate of PTB ranges from 4.4% to 48.6% [7-10]. The magnitude of preterm birth in Mettu hospital was more than 31% [11,12]. In Addis Ababa, spontaneous and induced preterm births were 66.1% and 33.9%, respectively [13].

A high rate of preterm birth variation from place to place may be due to different factors. Different studies identified several

factors associated with preterm birth, such as a history of preterm birth, pregnancy complications, lack of antenatal follow-up, pre-pregnancy weight gain, substance use during pregnancy [10,14,15]. Moreover, many maternal and fetal-related factors increase the risk of preterm birth among women, including maternal age, urinary tract infection, multiple pregnancies, and pre-eclampsia [16,17]. Congenital problems, hydramnios, third trimester bleeding, history of miscarriage[18], absence of antenatal follow up, a hemoglobin level of less than 11gm/ dl, pre-pregnancy maternal disease [12], residence, parity, and marital status were factors associated with preterm birth [19-21].

Compared to term babies, neonates born before 37 completed weeks face a higher risk of several complications due to prematurity [2]. Being born preterm predispose infants to growth impairment, infectious disease, and other chronic illnesses. These are the main reason for neonatal morbidity and mortality [22,23]. In Africa, prematurity alone attributes to 30% of neonatal mortality [6]. An individual-based meta-analysis conducted in east African states revealed that 52% of neonatal death was due to prematurity [24].

In Ethiopia, about 34% of neonatal death and 13.6% of under-five deaths are considered to preterm birth [4,25]. Each year, 24,000 infants die due to complications of prematurity [4]. The limited study conducted in Ethiopia lacks reliability either due to gestational age estimation which relies largely on the last menstrual period or based on delivery records. The limited data in this regard implicates the action to be taken to reduce the rate of prematurity in a low-income country like Ethiopia. Since prematurity is the first cause of neonatal mortality, epidemiological data on the magnitude of preterm birth, and associated factors play a role in maternal and childcare-related planning. Therefore, this study is context-specific and aimed to assess the magnitude and associated factors of preterm birth among women who give birth in Jinka Hospital.

Methods

Study design and population

An institution-based cross-sectional study was conducted among mothers who gave birth in Jinka General Hospital from February 1 to April 30, 2018. Jinka is 750 km away from Addis Ababa, the capital city of Ethiopia. There two health centers and one general hospital in Jinka town and all are public hospitals.

Inclusion and exclusion criteria

Women who gave childbirth and had Ballard maturation assessment or known Last Normal Menstrual Period (LNMP) were included in this study.

sample size and sampling procedure

The minimum required sample size was calculated by using a single population formula considering the following assumptions: 95% confidence interval, marginal error (4%), and 11.6% prevalence of preterm birth [17]. The final sample size after adding a 5% response rate was 258. Lastly, a systematic sampling technique to select mother paired with babies. Newborns delivered at less than 37 completed weeks of gestation, conversely after 28 weeks of gestation were taken

preterm birth. Gestational age was calculated based on LNMP or Ballard score clinical examination. Newborn weight was measured within 60 minutes of childbirth where calibration was considered for each neonate.

Data collection tools and techniques

The data collection were by using face to face interview and parturient profile card was also assessed to collect the necessary data by using a structured data extraction sheet. Primarily, the questionnaire was prepared in English after reviewing relevant works of liter [26-31] and translated into a local language (Amharic) and then back to English by an independent language expert who was native in Amharic. The data collection was carried out between four to six hours (stable vital sign assured) after childbirth but within 24 hours before the parturient being discharged.

Data quality control

The data collection questionnaire was piloted on 10% (26 mothers) of the sample size in Arba Minch General Hospital to verify the appropriateness of the tool and ensure its completeness. Trained six diploma midwives who were fluent in the local language were the data collectors. Data collectors were trained on the purpose of the study, selection of exposed and unexposed, how to keep confidentiality of patient information, the contents of the questionnaire, and data quality management by the principal investigators. The training was based on the guide that was developed for clarifying the interview administered questionnaires. Throughout data collection, the supervisors checked the questionnaire for completeness, clarity, and consistency daily. The data collectors were oriented to correct missing data before the discharge of the patient from the hospital.

Data processing and analysis

The collected data were edited, coded, and entered in Epi-Info version 7.2.0 and were analyzed using SPSS (Statistical Package for Social Sciences) version 20. By using binary logistic regression analysis the factors associated with Preterm birth were identified. In the bivariable analysis, independent variables with a p-value of ≤0.2 remained in the model for potential confounder in the next level analysis. Further, Hosmer-Lemeshow goodness-of-fit was assessed. Independent variables with a p-value of less than 0.05 level of significance were considered significantly significant.

results

socio-Demographic variable

A total of 250 study participants have participated in this study, in which it gives a 96.9 % response rate. The median age of the participants was 25 years old considering an interquartile range of ± 5.12.The majority of the study participants' age was between 18 and 34 years. One hundred fifty-five (62.0%) of the study participant had completed at least primary education. More than fifty percent of the respondents were living in an urban area **(TABLE 1).**

Pregnancy-related factor

One hundred twelve (55.2%) of respondents had a reliable last menstrual period. More than 57% of the study participants had

a successful pregnancy at least twice. Respondents who had no abortion were 83.6%. Among Multigravida mothers, more than 27% were pregnant in less than two years interval. The majority, 224(89.6%) of study subjects had wanted and supported pregnancy. Concerning antenatal care, more than 72% of the study subjects had once in their most recent pregnancy **(TABLE 2).**

Behavioral and Nutritional Factors

From 250 respondents, 247(98.8%) had no habit of smoking during pregnancy. Two-hundred and twenty-two (88.8%) had not drink alcohol during pregnancy. Regarding nutritional status, 206 (82.6%) of the study subjects had eaten three times per day, followed by 28(11.2%) respondents who had meals more than three times during pregnancy. Out of 250 respondents, 174(69.6%), 137(54.8%), and 130(52.0%) included, vegetables, dairy products, and meat in there meal during pregnancy, respectively.

The magnitude of preterm birth

The magnitude of preterm birth among mothers who gave childbirth in Jinka General Hospital was 71 (28.4%).

Factors associated with preterm birth

Multivariable logistic regression showed that women who had at least one perinatal visit were significantly associated with PTB.

The probability of delivering preterm child among mothers who had no antenatal visit (AOR= 3.04, 95%CI= 1.52, 6.08) and gestational diabetes mellitus (AOR= 8.9, 95%CI= 3.3, 23.9) were at increased risk of developing preterm birth **(TABLE 3)**.

Discussion

In this study, the proportion of preterm birth was at 28.4%. This finding is in agreement with studies conducted in India was 25.6% [32] and Jimma University Specialized hospital 25.9% [10]. This variation might be due to the health care system where parturients served almost uniformly throughout the country, especially in a remote setting like Jinka women seem to have no much option because the next level is far-reaching.

On the other hand, the magnitude of preterm birth in the current study is higher than the average rate of preterm birth in Ethiopia 10.1 % [33], Addis Abeba 7.1 % [34], Debre Markos 11.6 % [29], and Gondar 4.4 % [14]. This variation could be due to the difference in a study setting, having this discrepancy in the level of quality service provision, and small participants were involved in the current study. Some of the studies described above had considered multiple institutions. Besides, area-specific health-seeking behavior and living conditions of the people who were targets for the service might have weight to be

Table 1: Socio-Demographic Characteristics of the study participants in Jinka general hospital, Southern Ethiopia 2018 (n=250).

Variables	Frequency(n=250)	Percentage (%)
Age in years		
Less than 18	21	8.4
18 to 34	215	86
Greater than 34	14	5.6
Residence		
Urban	129	51.6
Rural	121	48.4
Ethnicity		
South Ari	74	29.6
Amhara	70	28
Male	26	10.4
Welayita	17	6.8
Mursi	15	6
Hammer	14	5.6
Benema tsemay	11	4.4
Religion		
Protestant	132	52.8
Orthodox	80	32
Muslim	27	10.8
Occupation		
Housewife	145	58
Merchant	32	12.8
Employee	30	12
Student	20	8
Other	23	9.2
Marital status		
Married	239	95.6
Unmarried	11	4.4
Education		
Educated	155	62
No formal education	95	38

Table 2: The pregnancy-related condition of the study participants in Jinka general hospital, southern Ethiopia 2018 (n=250).

Variable	Frequency	Percentage %
Gravidity		
Primigravida	107	42.8
Multigravida	143	57.2
Abortion		
yes	41	16.4
no	209	83.6
Pregnancy Interval		
less than two years	68	27.2
two and above years	63	25.2
ANC visit		
Yes	199	79.6
No	51	20.4
PROM		
Yes	34	13.6
No	224	89.4
Malaria		
yes	25	10
no	225	90
Folic acid supplemented		
yes	108	43.2
no	142	56.8
UTI		
Yes	15	16
No	235	84
Pregnancy Complication		
Yes	32	12.8
No	224	87.2

Table 3: Bivariable and multivariable analysis of the distribution of factors associated with Preterm Birth in Jinka General Hospital, Southern Ethiopia, 2018.

Variables	PTB		COR(95%CI)	AOR(95%CI)
	Yes(n)	**No(n)**		
ANC visit:				
Yes	44	155	**3.96(2.08, 7.51)***	**3.04(1.52, 6.08)***
No ®	27	24	1	1
Diabetes Mellitus:				
Yes	51	173	**11.3(4.31, 29.7)***	**8.9(3.3, 23.9)***
No®	20	6	1.00	1.00
History of Malaria:				
Yes	11	60	0.46(0.20, 1.06)	0.27(0.06, 1.86)
No®	14	165	1.00	1.00
Eating Vegetables during pregnancy:				
Yes				
No®	44	131	1.68(0.94, 2.99)	1.27(0.44, 3.640)
	27	48	1.00	1.00

NB: ****=P<0.001,*=P<0.05, ®=references.*

taken as a reason. Many of the mothers who were visiting Jinka General Hospital were pastoralists in which they may have less awareness to come early to visit a hospital.

The finding on this study was also higher than the studies conducted in a different part of the developing world; in Nigeria 19.9 % [35], Iran 1.52% [36], Brazil 12.5% [16], Kenya 18.3 % [31], and in rural Bangladesh 22.3% [41]. The discrepancy might have resulted from a low rate of ANC follows up in the study area, small sample size, and variation in sampling technique used, and awareness change in time.

In the present study, a woman who had no ANC follow up was more than three times more likely to present with preterm birth than mothers who had ANC follow up. This result is consistent with different studies [35,37]. Antenatal screening is an essential component where a pregnant woman receives timely and accurate information to identify pregnancy complication [38]. In fact, women with antenatal attendance have an opportunity to get information and counseling about important risk factors of preterm birth while a reverse can be happened to those women without antenatal visit. A recent study revealed that women without antenatal care were at increased risk for preterm birth [39]. Further, women with lesser antenatal attendance possess a higher risk of preterm birth [40]. However, it is less clear whether this association is causal or a marker for other factors that contribute to preterm birth because the existence of an unidentified factor might explain precipitating preterm birth in women with no ANC. Moreover, women with low access to maternal services and awareness could be a possible explanation to increase the risk of preterm birth.

Gestational diabetes mellitus was a significant variable associated with preterm birth. Mothers with diabetes mellitus were almost nine times more likely to develop preterm birth than mothers without gestational diabetes mellitus. This finding was in agreement with several studies conducted in Debre Marikos [29], Axum [21], Northern Ethiopia [41], Australia [42], and Qatar [43]. This might be explained by glucose intolerance among subjects, where it affect pregnancy duration and leads to onset of early labor and delivery [44]. Sometimes, healthcare providers might mediate early delivery due to fear of complications due to uncontrolled diabetes mellitus. In addition, health professionals recommend a parturient to undergo cesarean delivery depending on the perinatal fetal weight estimation [45]. Thus, the findings depicts the importance of avoiding untimely delivery to those women with gestational diabetes mellitus.

conclusion

The mangnitude of preterm birth in jinka general hospital was 28.4%. Having no antenatal visit during pregnancy was significantly associated with preterm birth. Women should be encouraged to receive antenatal care in order to mitigate preterm birth in the study area. It is essential to give attention to increase the number of pregnant women who are visiting a hospital for perinatal care, yet this further investigation.

Limitations of the study

Behavioral variables like substance use could be subjected to recall bias and falsified information considering the interview modality. Besides, the sample size was not adequate and due to an inherent limitation of cross-sectional study design; in this work, there is no temporal relationship between the dependent and independent variables. Therefore, future research needs to consider these limitations to conduct further research.

Declaration

Availability of data and materials

The data used in this study are available from the corresponding author on reasonable request.

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