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Prevalence of Low Birth Weight and Its Determinants in Bahir Dar City, Amhara Region, North West Ethiopia: Health Facility Based Cross-Sectional Study

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Abstract: According to EDHS 2016, Low birth weight in Amhara Region was 22.2%. Studies show that low birth weight (LBW) babies are significantly at risk of death, contributing to the high neonatal and infant morbidity and mortality. The poor health outcome of low birth weight can be reduced through quality and comprehensive neonatal care. This study aimed to determine the prevalence and determinants of low birth weight among women who gave birth at health facilities in Bahir Dar city. An institution-based cross-sectional study using an incidence density sampling technique was conducted from February 01/2019 to March 30/2019 in public and private health facilities of the Bahir Dar city. The sample size was calculated using the single population proportion formula. A pre-tested questionnaire was used for data collection and data was entered into the EPI-data and transported to SPSS version 22 for analysis. The totals of 292 respondents were involved in the study. Pregnant women who did not get married [AOR=8.75, 95%CI: 3.00, 25.55], women who had a previous history of LBW [AOR=7. 81, 95%CI: 1.71, 35.69], women with less than four ANC visits [AOR=2.75, 95%: 1.14, 6.63], women whose MUAC were less than 23cm [AOR=12. 12, 95%CI (4.46, 33.02)], anemic women [AOR=9. 15, 95%CI: 2.31, 36.30] and women whose blood hemoglobin level was less than 11gm/dl [AOR=6.10, 95%CI: 2.18, 17.01] were statistically associated with low birth weight. Hence, interventions targeting on marital status, LBW histories, antenatal care visit, and maternal MUAC, anemia and hemoglobin level were recommended to reduce the prevalence of low birth weight.

Keywords: Low Birth Weight, Neonatal Mortality, Neonatal Morbidity

1. Introduction

Low birth weight (LBW) is defined by the World Health Organization (WHO) as weight at birth less than 2500 g (5.5 lb). Overall, it is estimated that 15% to 20% of all births worldwide are LBW, representing more than 20 million births a year [1]. A cross-sectional study at a tertiary care hospital of Kishanganj, Bihar revealed that 34% of newborns were found to be LBW and consumption of Iron/Folic acid tablets and regular antenatal care (ANC) checkup during pregnancy was associated factors for LBW [2].

The weight of an infant at birth is influenced by the health, weight, age and nutritional status of the mother; and the proportions of infants born with LBW closely reflect the health status and the aforementioned factors of the mothers and thereby the communities into which they are born [3]. The public health significance of LBW may be ascribed to its association with an increased risk of prenatal and infant mortality and morbidity. The low birth weight infants are five times more likely to die in the prenatal period and three times more likely to die during infancy [4].

The poor health outcome of LBW, infant morbidity and mortality, can be reduced through different health care

mechanisms. Countries can reduce their neonatal and infant mortality rates by improving the care of LBW infants through improving their feeding, temperature maintenance, hygienic cord and skincare, and early detection and treatment of problems such as infections [5].

According to the UNICEF-WHO level and trend estimate the prevalence of LBW varied widely across regions from 7.2% in More Developed Regions to 17.3% in Asia. There were also variations across sub-regions. In Southern Asia, the prevalence of LBW was 26.4% in 2015 that was more than five times higher than the 5.1% prevalence in Eastern Asia [6].

According to a study conducted at the Kenyatta national hospital-Kenya, the prevalence of preterm birth was found to be 18.3%. Maternal age, parity, previous preterm birth, multiple gestations, pregnancy-induced hypertension, antepartum hemorrhage, prolonged pre-labor rupture of membranes and urinary tract infections were significantly associated with preterm birth [7]. The study on the prevalence of LBW in some selected African countries, namely Burkina Faso, Ghana, Malawi, Senegal, and Uganda documented 13.4%, 10.2%, 12.1%, 15.7% and 10% of respectively [8].

The majority of low birth weight occurs in low income and middle-income countries and especially in the most vulnerable populations such as in sub-Saharan Africa which accounts for 13%. LBW is among the critical issues in Ethiopia that cause many babies short-term and long-term health consequences leading to have higher mortality and morbidity [9].

The prevalence of LBW in Africa was 14.3 percent (14% in sub-Saharan Africa and 13.5% in East Africa) and it was estimated that in Ethiopia the incidence of LBW was 14%. From these data one can conclude that even though there is a decreasing trend of LBW from 1992 to 2000, the rate is decreasing at a decreasing rate; i.e. no significant decreasing rate of low birth weight [1].

A facility-based cross-sectional study in North Wollo Zone of Ethiopia showed common adverse outcomes like intrauterine fetal death, Intra Uterine Fetal Distress, (42.6%), preterm birth (32.4%), and birth defects (4.4%) [10].

In Ethiopia, the prevalence of LBW varies from region to region. According to EDHS 2016, the highest prevalence of LBW was observed in Amhara (22.2%) followed by Afar (26.2%), Oromia (13.1%) and SNNPE (13.1%) while the lowest prevalence was recorded in Harari (4.4%) followed by Dire Dawa (9.2%). Here the trend of LBW in the Amhara region is increasing at a doubling rate from 11.2% in 2011 to 22.2% in 2016 [11]. A study conducted at the Felege Hiwot Referral Hospital in 2015, indicated that low birth weight delivery has occurred in 21.23% among the delivery mothers [12].

Although some studies have documented the prevalence and determinants of LBW, their focus was only in one hospital (Felege Hiwot Referral Hospital) meaning they didn't assess the issue in all health facilities of the Bahir Dar city. Therefore, this study provides valuable information to the health professionals, the health department of the city and other stakeholders to plan their resources for interventions regarding the LBW at the City level.

2. Methods and Materials

2.1. Study Area and Period

The study was conducted from February 01/2019 to March 30/2019 in public and private health institutions of the Bahir Dar city. Bahir Dar is the capital city of Amhara National, Regional State, which is located North West of Ethiopia, and it is 565km away from Addis Ababa. According to the Bahir Dar City communication Affairs report by 2017/18, the total population of the city was 326,163 of these 171,625 (52.6%) were female. Among female populations, 72,831 (46.3%) were at child bearing age (15-49 years). According to an unpublished survey of the city, total live births were 8072; among these 797 (9.87%) of them were LBW [13].

2.2. Study Design

An institution-based cross-sectional study was conducted.

2.3. Sample Size Determination

The sample size was determined using a single population proportion formula, and considering assumptions, such as 95% confidence interval with 5% precision level, 22.2% Prevalence, p, that's taken from EDHS 2016 (from the prevalence of LBW in Amhara region) [11]. And 10% of the non-response rate was added. Based on these assumptions, the sample size was calculated as:

$$n = \frac{Z^2_{\alpha/2}(p)(1-p)}{d^2}$$

n=(1.96)2×0.222 (1-0.222) / $(0.05)^2$ after adding 10% non-response rate

n=265.4 + (265.4x0.1)

n=292

The final sample size was calculated to be 292.

2.4. Sampling Technique

During the study period, there were 7 hospitals (3 public and 4 private), 2 higher maternal clinics (one Family Guidance Association and one Marie stopes international clinic) and 8 public health centers in Bahir Dar city. All the health facilities were considered, and the calculated sample size, 292, was proportionally allocated to each health facility based on their monthly delivery caseload.

2.5. Operational Definition

Normal birth weight: newborns with a birth weight of 2500g and above.

Low birth weight: are those newborn babies weighed less than 2500gm.

Birth weight: the first weight of the newborn measured within one hour after birth.

Wealth index: a composite index composed of key asset ownership variables; it was used as a proxy indicator of household-level wealth after changing into the PCA.

Healthy Bed rest: bed rest taken in light days only without feeling sick and was classified as taking a rest, at least for an hour and never at all every day.

2.6. Data Collection Instruments

An Interview administered questionnaire was developed after a relevant literature review. The questionnaire was first prepared in English then translated into Amharic (local language) for the interview. The questionnaire was pretested on 5% of respondents in one private hospital and relevant amendments were made after the pretest.

Data were collected by trained midwifery nurses by interviewing mothers and observing medical records of mothers and the newborn, and it was supervised by one Bsc Nurse. Eligible newborn babies were approached in the postpartum recovery room and their delivery bed following childbirth. The collected data were checked, reviewed, edited and re-coded on daily basis before analysis.

Follow up on women's chart/card was reviewed to collect medical information of mothers like maternal blood hemoglobin level, weight, and height that could not be obtained from the interview. Maternal anthropometric measurement was also taken after delivery while the mother became stable. The neonate's weight was measured using the standard beam balance in the delivery room within one hour of birth.

2.7. Data Quality Control

The quality of data was ensured before, during and after data collection. Before the actual data collection, the questionnaire was pretested among 5% of the samples to ensure clarity, logical sequence and skip patterns of the questionnaire.

The data collectors and the supervisor were provided one-day training on procedures, techniques, and ways of collecting data, including calculating gestational age, measuring weight, height, MUAC and how to minimize recall bias during the interview. During data collection, continues supervision of data collections has been done. Measuring instruments were checked and adjusted every morning before starting data collection.

2.8. Data Analysis

The data were coded and entered into EPI data version 3.1 and transported into SPSS version 22 for cleaning, re-coding, and analysis. Descriptive statistics were implemented to describe the data in percentages and frequencies. Chi-square test was used to examine the presence of an association between LBW and each independent variable, and it was confirmed that there were no expected frequencies with their cell counts less than five. The goodness of fit of the model was evaluated with the Hosmer and Leme show goodness-of- fit test. Based on this model, independent variables with P-value less than 0.20 in the bivariate regression analysis were considered to be eligible and have passed into a multivariate logistic regression model. Before deciding, multicollinearity among independent variables in the multivariate logistic regression was diagnosed using correlation matrix coefficients; and the result was less than 0.9 for all independent variables. Those independent variables with $p < 0.05$ in the multivariate logistic regression analysis were considered to have a statistically significant association with LBW.

2.9. Ethical Considerations

Ethical approval was obtained from the Institutional Review Board of the College of Medicine and Health Science, Bahir Dar University. Oral permission of the heads of each health facility was also obtained to collect data. Oral consent was also obtained from women and for confidentiality, all records were kept secured and only data collectors, the supervisor, and investigators had access for each client follow up cards.

3. Results

3.1. Socio-demographic Characteristics

Of the total study participates majority of them, 78.8%, were between 20-34 years old. Religiously 74.0% of respondents were Orthodox Christianity followers and 88.7% were married women. Concerning ethnicity, 89.7% of respondents were Amhara. Looking at the occupational status of mothers, 39.0% of them were housewives, 22.3% were merchants, 20.9% were government employees and the rest 17.8% were farmers and engaged in another occupation. Regarding economic status, 26.7% of respondents were poorer and 16.8% were poor (Table 1).

Table 1. *Sociodemographic characteristics of women who gave birth at health facilities of the Bahir Dar city, North West Ethiopia, 2019.*

Variables		Frequency	Percentage
Maternal Age	less than 20 years	29	9.9
	20-34 years	230	78.8
	35 years and more	33	11.3
Residence	Urban	215	73.6
	Rural	77	26.4
Marital status	Single	33	11.3
	Married	259	88.7
Religion of mothers	Orthodox	216	74.0
	Muslim	39	13.4
	Protestant	37	12.6

Variables		Frequency	Percentage
Educational Status of mothers	No formal education	97	33.2
	primary education	72	24.7
	secondary education	51	17.5
	College & above	72	24.7
Ethnicity of mothers	Amhara	262	89.7
	*Others	30	10.3
Occupation of mothers	Merchant	65	22.3
	G/Employee	61	20.9
	Housewife	114	39.0
	Farmer and Others	52	17.8
**Economic Status	Poorer	78	26.7
	Poor	49	16.8
	Medium	61	20.9
	Rich	60	20.5
	Richer	44	15.1

* Others=includes Oromo, Awi, Guragie, and Tigray ethnicity.
**=economic status is calculated and estimated using wealth index.

3.2. Obstetric Factors

More than half of the respondents (65.5%) were multigravida. Among mothers who had more than one previous pregnancy, 52.7% of respondents had 2-4 children. About three-quarters of the respondents, 74.7%, of respondents, reported that they had two and more years of interpregnancy interval in the last pregnancies.

Among respondents, 5.5% had reported that they had a previous history of LBW, while 14.7% had reported a history of abortion. Gestational age of recent pregnancies of respondents showed that 12.0% of them had given birth at less than 37weeks (preterm birth). The majority of respondents, 96.6%, had ANC follow up during their recent pregnancy. Among those who had ANC followed up, 38% of them had less than 4 ANC visits; and 3.4% of them had started their first ANC visit during the 3rd trimester of pregnancy.

Concerning Iron/Folic acid supplement intake, 62.6% of cases and 95.5% of controls reported that they had taken Iron/Folic acid supplement during their ANC follow up. However, 71.3% of cases and 30.7% of controls reported that they took for less than 90 days. About half of the cases, 49.6%, and 3.1% of controls were assessed that they had less than 11gm/dl of hemoglobin level. When we see the sex of the newborn babies who had borne with LBW, 51.8% of the cases and 48.2% of the controls were male (Table 2).

Table 2. *Obstetric factors of women, who gave birth at health facilities in Bahir Dar city, North West Ethiopia, 2019.*

Variables		Frequency (n=292)	percentage
Gravidity	Primigravida	101	34.6
	Multigravida	191	65.4
Parity	One child	101	34.6
	2-4 children	155	53.1
	5 and more	36	12.3
Birth interval	< 2 years	74	25.3
	≥ 2 years	218	74.7
History of Abortion	Yes	43	14.7
	No	249	85.3
History of LBW	Yes	16	5.5
	No	276	94.5
History of Still Birth	Yes	14	4.8
	No	278	95.2
Gestational age at current birth	Less than 37	35	12.0
	37-42 weeks	257	88.0
Number of ANC visit for current birth	< 4 visits	111	38.0
	≥ 4 visits	181	62.0
Trimester during first ANC visit for current birth	1st trimester	151	51.7
	2nd trimester	131	44.9
	3rd trimester	10	3.4
Sex of the newborn baby	Male	148	50.7
	Female	144	49.3
Weight of newborn babies	Normal	238	81.5
	Low	54	18.5

3.3. Maternal Factors

Among the study participants, 12.7% of respondents had < 150cm height and 14.4% of them had less than 23cm MUAC. In terms of gestational weight gain, the majority of the respondents, 79.5%, had gained more than 10kg. About

half of respondents, 49.7%, reported that they drank alcohol during their current pregnancy. Looking at Chat chewing, 3.1% of them had a lifestyle of chewing chat.

Concerning comorbidity during maternal pregnancy, 4.1%, 7.2%, 4.5%, 1.7% and 4.1% of respondents had hypertension, anemia, chronic cough, diabetes mellitus, and chronic diarrhea respectively. Similarly, 9.2%, of respondents had pregnancy-induced hypertension, PIH, during their current pregnancy period. Among respondents, 11.0% of them haven't taken iron/folic acid supplements during their current pregnancy; and 12.3% of respondents had a hemoglobin level < 11gm/dl (Table 3).

Table 3. *Maternal and related factors of women, who gave birth at health facilities in Bahir Dar city, North West Ethiopia, 2019.*

Variables			Frequency (n=292)	Percentage
Mother's height		< 150cm	37	12.7
		≥ 150cm	255	87.3
*MUAC		< 23 cm	42	14.4
		≥ 23 cm	250	85.6
Gestational weight gain		< 10kg	60	20.5
		≥ 10kg	232	79.5
Pregnancy Induced hypertension		Yes	27	9.2
		No	265	90.8
Iron/Folic acid supplementation		Yes	260	89.0
		No	32	11.0
Duration of taking iron tablets (n=260)		< 3 months	93	35.8
		≥ 3months	167	64.2
Hemoglobin level		< 11gm/dl	36	12.3
		≥ 11gm/dl	256	87.7
Life style	Drinking alcohol	Yes	145	49.7
		No	147	50.3
	Chewing Chat	Yes	9	3.1
		No	283	96.9
Co-morbidities	Hypertension	Yes	12	4.1
		No	280	95.6
	Anemia	Yes	21	7.2
		No	271	92.8
	Chronic cough	Yes	13	4.5
		No	279	95.5
	Diabetes mellitus	Yes	5	1.7
		No	287	98.7
	Chronic diarrhea	Yes	12	4.1
		No	280	95.9
Workload during the pregnancy period		Heavy work	185	63.4
		Light work	107	36.6
The practice of taking a healthy bed rest at noon		Yes	166	56.8
		No	126	43.2

*MAUC=mid upper arm circumference.

3.4. Factors Associated with Low Birth Weight

Bivariate logistic regression was conducted to assess the presence of an association between independent variables and the outcome variable (LBW). Independent variables with a p-value of less than 0.20 were considered as significant in bivariate analyses. Thus, marital status, parity, history of LBW, History of stillbirth, and the number of ANC visits, MUAC, anemia during pregnancy, mother's height, and utilization of iron during pregnancy and levels of maternal hemoglobin were statistically associated with LBW at p-value ≤ 0.20.

Independent variables that had a statistically significant association with the outcome variable in the bivariate logistic regression analysis were entered into multivariate logistic regression. Variables like marital status, parity, history of low birth, number of ANC visits, MUAC, anemia during pregnancy and maternal blood hemoglobin level were found out to be associated factors of LBW at p-value ≤ 0.05.

Mothers who had not married were 8.75 times more likely to give LBW babies (AOR=8.75, 95%CI: 3.00, 25.55) compared to married mothers. Mothers who had a previous history of LBW were also 7.81 times more likely (AOR=7.81, 95%CI: 1.71, 35.69) to give LBW baby compared to their counterparts. Mothers who visited less than four times for ANC service during their current pregnancy were 2.75 times more like a risk to have the LBW baby at birth (AOR=2.75, 95%: 1.14, 6.63) than those who had visited four or more times. Similarly, women whose MUAC were less than 23cm were about 12 times more likely to give the LBW baby [AOR=12.12, 95%CI: 4.46, 33.02) compared to those whose MUAC was greater than 23cm. Women who had anemia during pregnancy were about 9 times more likely risky to give the LBW baby (AOR=9.15, 95%CI: 2.31, 36.30) compared to their counterparts. Mothers whose blood hemoglobin level was less than 11gm/dl were about 6 times more likely risky to give the LBW baby (AOR=6.10, 95%CI: 2.18, 17.01) than those whose blood hemoglobin level was 11gm/dl or more (Table 4).

Table 4. *Determinant factors of LBW, for women who gave birth at health facilities in Bahir Dar city, North West Ethiopia, 2019.*

Variables		Birth weight status		COR with 95% Cl	AOR with 95% Cl	p-value
		LBW	NBW			
Marital status	Single	17	16	6.38 (2.96,13.72)*	8.75 (3.00,25.55)**	0.000
	Married	37	222	(1)	(1)	
Parity	Only 0ne	20	81	(1)	(1)	
	2-4 live births	19	136	0.57 (0.29,1.12)	0.66 (0.21,1.49)	
	≥ 5 live births	15	21	2.89 (1.27,6.59)*	3.17 (0.97,10.26)	
History of LBW	Yes	9	7	6.60 (2.34,18.64)*	7.81 (1.71,35.69)**	0.008
	No	45	231	(1)	(1)	
History of stillbirth	Yes	6	8	3.59 (1.19,10.83)*	3.65 (0.74,18.01)	
	No	48	230	(1)	(1)	
ANC visit	< 4 visits	36	75	4.35 (2.32,8.15)*	2.75 (1.14,6.63)**	0.024
	≥ 4 visits	18	163	(1)	(1)	
MUAC	< 23 cm	28	14	17.23 (8.06,36.82)*	12.12 (4.46,33.02)**	0.000
	≥ 23 cm	26	224	(1)	(1)	
Anemia During pregnancy	Yes	12	9	7.27 (2.88,18.33)*	9.15 (2.31,36.30)**	0.002
	No	42	229	(1)	(1)	
Mother's height	<149cm	17	20	5.01 (2.40,10.44)	2.45 (0.78,7.70)	
	≥150cm	37	218	(1)	(1)	
Utilization of Iron	Yes	39	221	(1)	(1)	
	No	15	17	5.00 (2.31,10.83)*	2.12 (0.66,6.75)	
Hemoglobin level	< 11gm/dl	24	12	15.07 (6.83,33.33)*	6.10 (2.18,17.01)**	0.001
	≥11gm/dl	30	226	(1)	(1)	

*Indicates significance at p< 0.05.
AOR=Adjusted Odds Ratio, CI=Confidence Interval and COR=Crude Odds Ratio.

4. Discussion

This study was aimed to assess the prevalence of LBW and its determinants among women who gave birth at public health facilities in Bahir Dar city. Considering p-value < 0.05 marital status, history of LBW, number of ANC visits, maternal MUAC, anemia during pregnancy and maternal blood hemoglobin level were variables that had a statistical association with LBW.

This study revealed that the prevalence of LBW was 18.5%. This was relatively in line with a study in Kenya, 18.3%, [7], some Asian countries, 17.3%, [6]; but it is lower than some studies like in South Asia, 26.4% [6] and North Wollo Zone of Ethiopia, 32.4% [10]. On the other hand, the prevalence of this study was higher than in some other studies, like in Ghana, 10.2%, in Malawi, 12.1%, [8], in Harari, 4.4% and in Dire Dawa, 9.2% of Ethiopia's. The difference in the prevalence of LBW in different countries and within the countries might be because of the difference in the quality of ANC service delivery [14], the body weight of mothers, [8], Socio-Demographic and Obstetric Risk Factors [15].

The present study revealed that maternal age, history of LBW, anemia, and history of stillbirth were significant factors for LBW. The result was supported by other studies in Ethiopia [15, 16].

This study revealed that women whose MUAC was less than 23 cm were more likely riskier to have the LBW baby than their counterparts. The finding from the study conducted in Bahir Dar city supported this finding [17] and investigated in the US [18] was also in line with this finding. Moreover, a 2014 global study conducted in Bangladesh showed that the incidence of LBW was found to be highest when maternal MUAC was less than 23cm [19].

The reason could be the failure of pregnant women to eat a variety of foods, particularly those foods that are important for bodybuilding (protein and fats). There are studies which are inconsistent with this finding, for example, a study investigated in Gamo Gofa of Ethiopia revealed that mothers with MUAC value of less than 23 cm were not likely to risk of low birth weight [20].

Women who visited for less than four ANC visits were more likely to have LBW babies than mothers who had four or more than four ANC visits. Other studies conducted in different parts of Ethiopia (Tigray and Amhara) support this finding [21, 22, 17]. The finding was also consistent with global studies that had been investigated in different countries. A study conducted at Amravati city [23] found out that among the mothers visiting for less than four visits, the odds of delivering LBW babies was 46.7% as compared to those with more than four ANC visits.

Similarly, a study conducted in India [24] also revealed that mothers who had less than four ANC visits were more likely risky for LBW than their counterparts. The statistical association of the number of ANC visits with LBW may be due to an increase in contact time with care providers. As the number of ANC visits (contact time with care provider) increases, women will have an opportunity of obtaining medical, nutritional and educational interventions which could have a potential benefit for the increasing weight of the fetus.

But some findings in Ethiopia such as studies in Debre Birhan [25], Gondar [22] and Arba Minch (20) were inconsistent with the findings of this study. The discrepancy could be due to the difference in study design, sample size and due to time factor.

Pregnant mothers who had blood hemoglobin levels lower

than 11gm/dl were more likely to have the LBW baby than those mothers who had ≥ 11gm/dl hemoglobin levels. This finding is in line with studies conducted in Debre Birhan [25], Adwa general hospital [26] and other studies conducted outside the domestic country [27, 24]. This shows that a decreased level of blood hemoglobin is the risk to have LBW baby increases. The reason for the inverse in the relationship of hemoglobin and LBW may be due to the case that as the level of hemoglobin decreases, the level of oxygen and other important nutrients which are vital for the growth and development of the fetus may be reduced.

Some findings were not in line with the finding of this study, for example, a cross-sectional study conducted in Iran through secondary data did not agree with the present study [28]. The reason might be due to the difference in socioeconomic differences in the two study areas.

5. Conclusion

The findings of this study showed that socio-demographic, obstetric and maternal and related factors were statistically associated with LBW babies who were born in the health facilities in Bahir Dar City. Among socio-demographic variables, the marital status of women was statistically associated with LBW. And among obstetric variables, history of LBW and numbers of ANC visits were statistically associated with LBW. Similarly, maternal MUAC, anemia during pregnancy and maternal blood hemoglobin levels were among maternal and related factors that had a statistical association with LBW.

Therefore, multiple prevention strategies should be designed to tackle these multiple risk factors for LBW in the study area. Any factor that might influence the weight of a fetus of single women should be assessed and these women have to be empowered to enhance the healthy pregnancy. The nutritional contents of the food that pregnant women used to feed themselves and access of women to nutritious foods need to be further evaluated. Furthermore, pregnant women have to be counseled about the nutritional contents of their food to manage maternal MUAC and anemia. Public education and awareness strategies, ANC follow up service deliveries in health facilities and transportation facilities need to be assessed to increase the number of ANC visits. Moreover, pregnant women with a suspected risk of having infants with LBW have to be screened and the ANC follow up service delivery has to be case-specific to address anemic women, women with LBW history and marital status.

Competing Interests

The authors declare that this study has no competing interests.

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