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Research Article

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Maternal Factors Associated with Low Birth Weight among Newborns in Public Hospitals of Burao District, Somaliland, 2025

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Abstract

Introduction: *Low birth weight (LBW), defined by the World Health Organization as a birth weight of less than 2,500 grams, remains a significant public health concern globally and is a leading predictor of neonatal morbidity and mortality (1).*

Method: *An Institutional-based cross-sectional study design was used this study. This design involves collecting data at a single point in time from a specific population. This study was used a consecutive sampling technique to select participants because every eligible mother who met the inclusion criteria during the study period was included until the required sample size was achieved. Data analysis was used in SPSS version 27. This study was used Descriptive statistic to describe frequency distribution and percentage so that Text and tables was used to present data. Also, inferential statistics was used to assess associations between Variables through Bivariate and Multivariate analysis.*

Result: *This study was found the maternal low education level, maternal no intake iron supplementation during pregnancy, and preterm birth are maternal factors associated with low birth weight with P-value less than 0.05.*

Conclusion: *The maternal low education level, no iron supplementation during pregnancy, and preterm birth were significantly associated with low birth weight (LBW).*

Keywords: Maternal, Factors, Associated, Low Birth, newborns, in public hospitals, Burao-District. Somaliland.

Introduction

Low birth weight (LBW), defined by the World Health Organization as a birth weight of less than 2,500 grams, remains a significant public health concern globally and is a leading predictor of neonatal morbidity and mortality [1].

Worldwide More than 20 million infants are born annually out of them 15.5% are born with low birth weight (LBW), 95.6% of them are from developing countries, the level of LBW in developing countries is more than twenty-fold than the level in developed countries [2].

Low birth weight (LBW) is the dominating risk factor for infant morbidity and mortality, (36% of all mortality in children <5 years of age), constituting about 4 million deaths per year. Some term and preterm small babies are healthy, with weight and length according to their genetic potential, while others are smaller due to factors impeding growth during fetal life [3].

Among 384 newborns, 17.9% had LBW (mean birth weight: 2.76±0.69 kg). Significant risk factors included maternal age, education, residence, ANC visits, anemia, inadequate food intake, short birth interval, low maternal BMI, maternal complications, and lack of iron-folic acid supplementation [4].

In Somaliland, limited specific data are available but regional estimates from localized surveys and health facility reports indicate an LBW prevalence ranging from 12% to 14%, similar to other parts of Somalia [5].

A study From Gabiley found that factors like gestational age, first-trimester hemoglobin level, previous history of low birth weight, frequency of meals during pregnancy, and maternal MUAC were associated with low birth weight [6].

A study from Hargeisa Group Hospital concluded that the prevalence of low birth weight was 19.4%, which seemed high according to WHO global estimates of LBW. Factors like gestational age less than 36 weeks, female sex of the neonate, the number of foetuses in the womb, especially multiple foetuses, and the gravidity of the mother, especially primigravida, were all associated with LBW [7].

In Somaliland, there is limited data on the specific maternal factors contributing to LBW, particularly in urban centers such as Burao City. Contributing elements such as maternal age, nutritional status, antenatal care utilization, pregnancy complications. it is essential to identify and analyze maternal factors contributing to LBW in public hospitals of Burao City. This research seeks to fill that gap by exploring the maternal factors associated with low birth weight.

Methods

Study area

This study was conducted in Burao General Hospital and Al-Khalifa Hospital, both located in Burao City, Togdheer Region, Somaliland. These hospitals are the only and largest public Hospitals in Burao City.

Target Population

All mothers with newborns who was delivered at Burao District.

Study Population

All mothers with newborns who was delivered at Burao General Hospital and Al-Khalifa Hospital Burao.

Inclusion Criteria

All mothers who were willing and ready to participate this study.

Exclusion Criteria

All mothers who were refused to participate this study or severely illness during data collection.

Sample Size Determination

Sample size was determined using the single population proportion formula, prevalence 19 % to assess Prevalence of Low Birth Weight in Hargeisa Group Hospital, Somaliland this applying the formula

$$n = \frac{Z\alpha 2 * p(1-p)}{d2}$$

$$n = \frac{3.8416 * 0.19(1-19)}{(0.05)2}$$

$$n = \frac{3.8416 * 0.19 * 0.81}{0.0025}$$

Where:

n= Sample Size

Z= Confidence interval 95%

p= Previous Prevalence 19%

d= Marginal error 5%

After adding 10% of the non-response rate, the final sample size was

n= 260 Subjects

Consecutive Sampling Technique

This study used a consecutive sampling technique to select participants because every eligible mother who met the inclusion criteria during the study period was included until the required sample size was achieved [8].

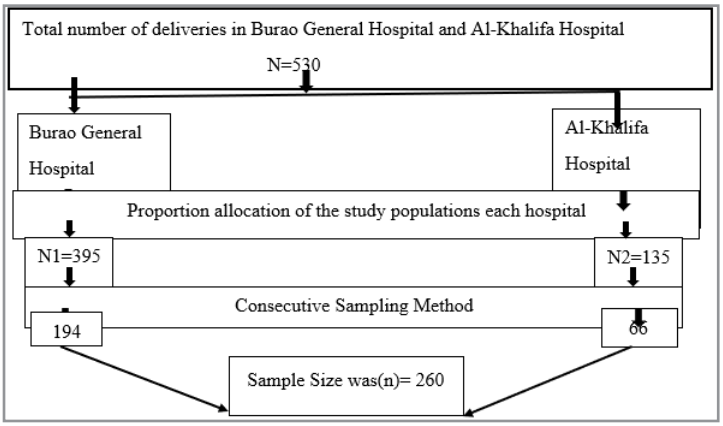

Figure 1: Sampling Technique of the study

Data collection Instrument

A structured questionnaire through kobo toolbox and Hanging scale weight measure were used as the primary data collection instrument, consisting of closed-ended questions designed to capture maternal sociodemographic characteristics, nutritional status and obstetric-related factors.

Data Collection Procedure

Data was collected through face-to-face interview using the structured questionnaire in kobo toolbox administered by trained data collector and weight measurement. Before the data collection, permission was obtained from hospital authorities.

Pretesting

A pretesting study of 5% was conducted Togdheer Private Hospital Burao. The result from the pretesting study was not included in the main data analysis.

Data Management and Quality Control

Data quality was maintained through standardized tools, trained data collector, supervised fieldwork, double data entry, and thorough data cleaning to ensure through Validity and Reliability, and Cronbach's alpha was used to statistically assess the internal consistency and reliability of the scale, with a value of 0.70 or higher was considered. The reliability analysis showed that all sections had acceptable to good internal consistency, with Cronbach's alpha values ranging from 0.76 to 0.84. The overall

reliability of the study was strong (α = 0.85), indicating it was suitable for data collection.

Data Processing and Analysis

Data analysis was used in PSS version 27. This study used Descriptive statistics to describe frequency distribution and percentage so that, text and tables were used to present data. Also, inferential statistics was used to assess associations between Variables through Bivariate and Multivariate Regression Analysis.

Ethical Consideration

Ethical clearance was obtained from Alpha University Burao. All the study participants were informed about the purpose of the study and their consent form before the data collection procedure was done. The information obtained from each respondent to kept confidential.

Result

Socio-Demographic Characteristics

The majority of respondents of 166 (63.8%) were aged between 18–28 years. Most of the respondents, 180 (69.2%), resided in urban areas. A majority of 215 (82.7%) were married and living together. Regarding maternal education, 110 (42.3%) of the respondents had no formal education, while the majority of their husbands, 97 (37.3%), had attained a university-level education. Most of the mothers of 137 (72.7%) were employed, and the majority of husbands of 212 (81.5%) were also employed. Most respondents, 163 (62.7%), had fewer than four family members. A total of 107 (41.2%) of the respondents reported a monthly income level between $100–$200. Additionally, 143 (55%) of the newborns were male, and for 164 (63.1%) of the respondents, the time since delivery was more than one hour ago.

Table 1: Socio-demographic Characteristics (n=260)

Variable	Categories	Frequency	Percentage %
Maternal Age	< 18yrs	36	13.8
	18-28yrs	166	63.8
	29-39yrs	54	20.8
	>40yrs	4	1.6
Residence	Urban	180	69.2
	Rural	80	30.8
Marital status	Married and lived together	215	82.7
	Divorce	45	17.3
	Total	260	100
Maternal education level	No formal education	110	42.3
	Primary level	81	31.2
	Secondary level	53	20.2
	College/University level	16	6.1
	Total	260	100
Husband educational level	No formal education	87	33.5
	Primary level	16	6.1
	Secondary level	60	23.1
	College/University level	97	37.3
Occupational status of mothers	Employed	137	52.7
	Unemployed	123	47.3
Husband Occupational status	Employed	212	81.5
	Unemployed	48	18.5
Family members	<4 members	163	62.7
	>4 members	97	37.4
Family income per month	<$100	44	16.9
	$100-200	107	41.2
	$300-400	92	35.4
	>$500	17	6.5
Sex of newborn	Male	143	55
	Female	117	45
	Total	260	100
When newborn delivered	<1hour ago	96	36.9
	>1hour ago	164	63.1

Nutritional Related Factors of mothers

The majority of respondents of 180(69.2%) reported that they did not take iron and folic acid supplements. Were the respondents, of 155(59.6%) was indicated that they did not experience anemia during pregnancy. A large proportion of respondents of 215(82.7%), reported having a good dietary condition during pregnancy. Regarding regular food intake, most respondents of 110(42.3%) reported that fish was a commonly consumed food. Additionally, most respondents of 155 (59.6%) stated that they received nutritional counseling during pregnancy. Most of the respondents of 167(64.2%) had a maternal body mass index (BMI) between the range of 18 to 25.

Table 2: Nutritional Related Factors (n=260)

Variable	Categories	Frequency	Percentage %
Do you take iron folic acid during pregnancy?	yes	180	69.2
	No	80	30.8
Did you have anemia during pregnancy?	Yes	105	40.4
	No	155	59.6
How is your dietary condition during pregnancy?	Good	215	82.7
	Poor	45	17.3
Which foods did you eat regularly during pregnancy	Fish	110	42.3
	Fruits	36	13.8
	Meat	35	13.5
	Milk	12	4.6
	Other	116	44.6
Did you receive nutritional counselling during pregnancy?	Yes	155	59.6
	No	105	40.4
Maternal Body Mass Index (BMI)	<18.5 (Underweight)	42	16.2
	18-25 (normal weight)	167	64.2
	26-30 (Overweight)	38	14.6
	>30 (Obese)	13	5

Obstetric Related Factors of Mothers

The majority of respondents, 181(69.6%), were multiparous. Most respondents (157, 60.4%) reported a pregnancy interval of 14 months or greater. A total of 183 respondents (70.4%) attended less than four antenatal care visits. Regarding mode of delivery, the majority of 216(83.1%) were delivered with normal delivery. Most respondents, 237(90.2%), reported a single birth type. A large proportion of 224(86.2%) are delivered at a gestational age of 37 weeks or more. Among newborns, 186 (71.5%) had a birth weight of 2.5 kg or more. Additionally, most respondents, 219(84.2%), reported no history of previous low birth weight. The majority of 186(71.5%) did not experience pregnancy complications. Most respondents, 206(79.2%), reported no preeclampsia during pregnancy, while 54(20.8%) reported having preeclampsia. Similarly, most respondents, 240(92.3%), reported no gestational diabetes during pregnancy, whereas 20(7.7%) answered yes.

Table 3: Obstetric Related Factors (n=260)

Variable	Categories	Frequency	Percentage %
Parity	Primigravida	79	30.4
	Multiparity	181	69.6
Pregnancy interval (in months)	<24months	46	17.7
	>24months	157	60.4
	This is my first baby	57	21.9
Number of antenatal care visits of mothers	<4Visits	183	70.4
	>4Visits	77	29.6
Mode of delivery	Normal delivery	216	83.1
	Cesarean section	44	16.9
Type of birth	Single	237	91.2
	Twins	23	8.8
Gestational age of birth (in weeks)	<37weeks	36	13.8
	>37weeks	224	86.2

Weight of newborn at birth	<2.5kg	74	28.5
	>2.5kg	186	71.5
History of low birth weight babies	Yes	41	15.8
	No	219	84.2
Did you have pregnancy complications?	Yes	74	28.5
	No	186	71.5
Did you have preeclampsia during pregnancy?	Yes	54	20.8
	No	206	79.2
Did you have gestational diabetes during pregnancy?	Yes	20	7.7
	No	240	92.3

Multivariate Logistic Regression Analysis

The multivariate logistic regression analysis was performed to identify independent predictors of low birth weight while adjusting for potential confounding variables. Three maternal factors remained statistically significant at the $p < 0.05$,with Maternal low educational level had 2.6 times higher adjusted odds of delivering an LBW infant compared to those with college-level education or above (AOR = 2.6; 95% CI: 1.3–5.1; p = 0.04), Mothers who did not take iron during pregnancy had 2.9 times higher adjust odds of delivering an LBW infant compared to those who received iron supplementation (AOR = 2.9; 95% CI: 1.4–6.2; p = 0.03). Gestational age at delivery remained the most powerful independent predictor. Infants born before 37 completed weeks of gestation or preterm birth had 4.8 times higher adjust odds of being low birth weight compared to term infants (AOR = 4.8; 95% CI: 2.1–10.9; p=0.01).

Table 4: Multivariate Logistic Regression Analysis

		Birth Weight			
Variable	**Categories**	**LBW <2.5kg**	**NBW >2.5kg**	**AOR (95% CI)**	**p-value**
Maternal low educational level	Maternal low educational level	50 (45.5%)	60 (54.5%)	2.6 (1.3–5.1)	0.04*
	Primary level + (Ref)	5 (23.8%)	16 (76.2%)	1	—
Iron Supplementation	No	64 (35.6%)	116 (64.4%)	2.9 (1.4–6.2)	0.03*
	Yes (Ref)	10 (14.3%)	70 (85.7%)	1	—
Gestational Age	<37 weeks/ low gestational age	30 (83.3%)	6 (16.7%)	4.8 (2.1–10.9)	0.01*
	≥37 weeks (Ref)	44 (19.6%)	180 (80.4%)	1	—

*=Statistically significant at $p < 0.05$ AOR = Adjusted Odds Ratio

Discussion

This study was found maternal lack of formal education, no iron supplementation during pregnancy, and preterm birth were significantly associated with low birth weight.

Were a study from the United Kingdom similarly found that low maternal education was associated with low birth weight [9]. Were a study conducted from Tanzania reported that low monthly income was significantly associated with low birth weight [10].

So that this study and other study from United Kingdom similarly was found the maternal low education associated with low birth weight.

While a study from Kenya was found maternal illiteracy or only primary education associated with low birth weight [11]. So that the study from Kenya and this study was found similarly the maternal low education level associated with low birth weight.

Were a study from Ethiopia was found the lack of formal education among mothers was significantly associated with low birth weight [12]. So that this study and other studies from Kenya and Ethiopia similarly was found the maternal lack of formal educational was significantly associated with low birth weight.

A study conducted at Hargeisa Group Hospital, Somaliland, found that maternal anemia was significantly associated with low birth weight ($p < 0.001$), findings from Mogadishu, Somalia, where similar associations were reported among pregnant women attending ANC clinics [13].

While a study conducted in Hargeisa, Somaliland, reported that low maternal education and poor antenatal care utilization were significantly associated with low birth weight [14].

These findings align closely with the present study, which also highlights the role of maternal education in birth outcomes and similarly found the maternal lack of lack of education associated with low birth weight.

Conclusion

This study was found the maternal lack of formal education, no iron supplementation during pregnancy, and preterm birth were significantly associated with low birth weight (LBW).

Recommendations

This study is to recommend the Ministry of Health Development, non-governmental organizations, health care providers, and public health researchers:

- To promote maternal education on pregnancy care, nutrition, and healthcare use.
- To strengthen health systems to improve ANC attendance.
- To provide iron supplementation for all pregnant women.

- To establish programs for early detection and management of preterm labor causes.
- To implement comprehensive maternal nutrition programs.
- To make further researches to explore additional factors associated with low birth weight.

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