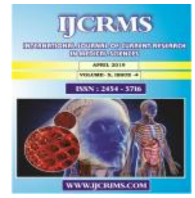
International Journal of Current Research in Medical Sciences
ISSN: 2454-5716
P-ISJN: A4372-3064, E -ISJN: A4372-3061
www.ijcrims.com



Original Research Article
Volume 5, Issue 4 -2019

DOI: http://dx.doi.org/10.22192/ijcrms.2019.05.04.006

Determinant Factor of Low Birth Weight of Infants in Teppi General Hospital in Sheka Zone, South Western Ethiopia

Habitamu Haile (BSc in Statistics),
Assaye Belay (MSc in Biostatistics)
Mizan -Teppi University, college of natural and computational science, department of statistics
E-mail: *abstat23@gmail.com*

Abstract

Back ground: low birth weight is defined as weight at birth less than 2500gm (5.5 pounds). Low birth weight is one of the major predictors of neonatal and prenatal morbidity and mortality both in developed and developing countries. The objective of this study was to assess the prevalence and factor associated to low birth weight among neonatal born infants at Tepi General Hospitals. The purpose of this study was to determine factors associated with low birth weight among infants born at Tepi General Hospital.
Method: Hospital based cross sectional study was employed and cards of 78 mothers who gave birth to low birth weight babies were assessed or selected by randomly or using table method from hospital constituted the study population. Data were collected using pre prepared structured check list by sample technique called simple random sampling and entered into a computer, edited and analyzed using SPSS for windows version 20.0.1.
Results: Prevalence of low birth weight over a period of three weeks preceding the study was about 21.8%. In chi-square analysis age of mothers, mode of delivery type, Apgar scores were appeared to be significantly associated with prevalence of low birth weight among neonatal born five (P<0.05). Out of 78 samples of infants, Majority of infants (47.4%) were born to mothers in the age of below 20 years.
Conclusion: As low birth weight was major problem among neonatal born infants at tepi general hospitals. It is important therefore that the newborn unit is well equipped to provide essential services to newborn at risk, including low birth weight. Thus the issue of low birth weight should not be concern of health sectors only, but should also be concerned of other social sectors.

Keywords: Low birth weight, binary logistic regression, odd ratio.

Introduction

One of the issues of birth outcomes is low birth weight (LBW).This is defined as weight at birth less than 2500g (5.5pounds). Low birth weight (LBW) is one of the major predictors of neonatal and prenatal morbidity and mortality both in developed and developing countries **(WHO, 2011).**

It is believed that the better a population socioeconomic development, the better its health indicators, including LBW. That is LBW is a major factor contributing towards high infant mortality in developing countries. The proportion of infants with low birth weight reflects the socioeconomic development of any region or country **(Murthy, 2002).**

LBW is more common in developing than developed countries; a birth weight below 2,500g contributes to a range of poor health outcomes. However, lower LBW rate of populations with lower socioeconomic levels has been observed compared to populations with better indicators. LBW is mostly common in developing countries, where the burden of malnutrition and infectious diseases is heavy, and the incidence is estimated to be more than twice that of developed countries **(Dreyfuss*et al.*, 2001).**

LBW is mainly as a result preterm birth (before 37 Weeks gestation) or due to restricted intrauterine growth (Kramer, 1987). Preterm babies have a higher risk of death compared to full term babies (Lawn &Kerber, 2006).Preterm birth and Small for Gestational Age (SGA) which is the reasons for low birth weight (LBW) is important Indirect causes of neonatal deaths, contributing 60 to 80 percent of all neonatal deaths globally **(UNICEF&WHO, 2004).**

In Africa infections contributes 39 percent, prematurity 25 percent and asphyxia 24 percent. Low birth weight underlies majority of these deaths and links to maternal health, nutrition and infections such as Malaria and HIV. Low birth weight and preterm birth are major determinants of prenatal survival, infant morbidity and mortality as well as risk of developmental disabilities and illnesses throughout future lives. Birth weight has emerged as the leading indicator of infant health and welfare and the fundamental focus of infant health policy **(Agarwal & Chaudhary, V (2012)**. Babies born with LBW are more likely to have health problems and slower development from immediately after birth to later in life. They suffer from extremely high rates of morbidity and mortality from infectious disease, and underweight, stunting or wasting beginning in the neonatal period through childhood. Low birth weight babies usually need extra hospital care, and there is a constant concern and uncertainty over future health outcomes **(Tegegne BA, 2010).**

Statement of the problem

The high rate of low birth weight (LBW), defined as weight at birth less than 2.5kg is a major problem in developing countries. Cases of low birth weight are more common in the developing countries than in the developed countries.

Babies born low birth weight are 37 percent more likely to die during infancy compared to those of normal weight if other factors are held constant. Therefore low birth weight is strongly negatively associated with infant survival **(Uthman, 2007).**

Low birth weight stems primarily from the mother's poor nutrition and health over a long period of time, teenage pregnancy, high prevalence of infections, and pregnancy Complications. Low birth weight is also associated with many socio-economic factors such as place of residence, education, mothers' age and occupation, birth order, family income and many maternal conditions such as nutritional status, cigarette smoking and health status **(Bodeau-Livinec, (2011).**

These risk factors can be prevented by a lifespan approach (before, during, and after child birth) to the health of women that takes full account of socioeconomic and environmental as well as medical issues and public education campaigns and also by some key preventive interventions like improved food intake of pregnant women, ante natal care (ANC), micronutrient supplementation, prevention and treatment of such infections as malaria, reduction of teenage pregnancy, and maternal education. Ethiopia, having an infant mortality rate of 59/1000 live births has limited data on BW estimates as most deliveries take place at home leading to a highly biased maternal subjective inclusion of a "very mall baby**"(Mitiku, K. (2015).**

Research questions

I. What is the prevalence of low birth weight among neonatal born at TeppiGeneral Hospital?
II. What factors were associated with low birth weight among neonatal born at Tepi general hospital?
III. What model is appropriately fit the data well.

Objectives

General objective.

➢ To determine the prevalence and factor associated was influencing low birth weight among neonatal born infants.

Specific objectives

✓ To assess the prevalence of low birth weight among neonatal born at Teppi General Hospital.
✓ To assess the factors associated with low birth weight among neonatal Born at Teppi General Hospital.

Significance of study

➢ The study will help to determine the prevalence of low birth weight among neonatal born.
➢ It enables us to identify prevalence and factor which cause low birth weight among neonates.
➢ It provides more information to stakeholders about the prevention method of low birth weight among neonates.

Methodology

Description of the study area

This study was conducted at Tepi town; which is found in the western part of the Ethiopia; around 611km far away from the Addis Ababa. This area is particularly found in SNNPR; Sheka zone; Yeki Woreda with average temperature of 26.9 °C and annual rainfall are 1223mm. The town is located between 7212'N-7243'N latitude and 352 3' E _352 7' longitudes with a mean elevation of 1,097 meters above sea level. This study is investigates in Tepi town specifically in population of tepi general hospital infants. Tepi general hospital is a nonprofit health facility which was founded in 2008E.C.

Study Design

Study design would be hospital based cross sectional study and study would be conducted in tepi general hospital from to 1st July 2009 E.C to 1st December 2010 E.C.

Target Population

The number of target population is **291**low birth weight infants in Tepi general hospital from to 1st July 2009 to 1st December 2010 E.C.

Methods of data collection.

The researcher used secondary method of data collection.

Inclusion and exclusion criteria

Inclusion criteria: A mother who had given birth to a singleton live neonate at the hospital was considered for the study.

Exclusion criteria: A mother with multiple birth or still birth, maternal death following delivery excluded from the study.

Sampling technique: The researcher used for this study the sampling technique known as simple random sampling.

Sample size determination: In this study the sample size would determined by using **proportions**, for categorical data. Normally the sample size determination requires three factors, which is*:*

1, level of precision
2, the margin of error (the degree of precision) is 5%
3, level of significance
α = the significance level = 0.05
d =margin of level = 0.07

$Z\alpha/2 = z_{0.025} = 1.96$

P= proportion to
have low birth weight from previous study: p=0.164
(**Tema T., 2006**)

q = proportion doesn't have low birth weight: q=1-p=1-0.164= 0.836
n = sample size
d = margin of error
N = total population size
$Z\alpha_{/2}$ =tabulated normal distribution

The sample size determination formula adopt for this study is,

$$n_o = \left(\frac{Z\alpha/2}{d}\right)^2 * PQ$$ (source sampling theory)

If $\frac{no}{N}$ less than 0.05. Thus, n is equal to n_o.Else**.**n = $\frac{n_o}{1+n_o/N}$(Cochran, (1997): the sample size determination and sampling theory of 3[rd]Edition.)

$$n_o = \frac{(1.96)^2(0.164)(0.836)}{(0.07)^2} = 107 \quad \frac{n_o}{N} = \frac{107}{291} = 0.368 > 0.05.$$

$$n = \frac{n_o}{1+n_o/N} = = \frac{107}{1+107/291} = \mathbf{78}$$

➢ Therefore **78** which would have be sample size for this study

Variable of the Study

Dependent variable*:*

The response variable for this study was Low birth weight categorized as Y as ("normal (≥2500gm)"=0) and ("having low birth weight(< 2500gm)" =1

Independent variables:

Table 1: the independent variables and their category

Independent variables	Categories	code
Age of mothers	continuous	-
Maternal status	Stable	0(ref)
	Unstable	1
Sex of neonates	Male	0
	female	1
Delivery type	Surgery	0(ref)
	Forceps	1
	Other(removal)	2
Apgar score of neonates	<1'/5'(asphyxia)	0(ref)
	≥1'/5'(normal)	1

Statistical model

In this data both descriptive and inferential statistical methods were used to analyze the data.

Descriptive analysis

➢ Descriptive analysis refers to be transformation of raw data into a form that will make them easy to understand and interpret the result.
➢ And it is also type of analyzing the statistical recommended data that contain description like table. Percentage, graph and pie chart
➢ The prevalence of low birth weight was determined using the following formula:-
➢

Low birth weight prevalence

$$= \frac{\text{numberofinfants} < 2500\,grams}{\text{totalbirthweight}} * 100\%$$

Inferential analysis

The inferential statistics used in this study would be chi-square test and binary logistic regression.

Chi-squared distribution

Chi-square test is used to test the homogeneity that exists between the factors and dependent variables. Chi-square can be used to; Test of independence, Goodness of fit.

Assumption of Chi-square test of independence

✓ The observation must be independent of each other.
✓ The sample size is enough large.
✓ The sample must be randomly selected from the population.
✓ The population must be normally distributed for the variable under study.
✓ Expected frequency for each category is at least 5.

Hypothesis Testing

❖ Hypothesis for Chi-square test of independence

Step1: H_0=there is no association between the low birth weight and explanatory variables.
H_1= there is association between the low birth weight and explanatory variables.

Step2: Level of significant =5%

Step3: Test statistic

$$X^2{}_{cal} = \sum\sum\left(\frac{(Oij-Eij)^2}{Eij}\right) = \sim X_\alpha{}^2 \text{ ((r-1)}$$

$$\text{(c-1))} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{ (1)}$$

Where; O_{ij} the observed class frequency and

E_{ij} the corresponding expected class frequencies.

Degree of freedom(c-1) * (r-1) where c and r are the number of columns and rows respectively
Step4: Decision Rule: Reject H0 if X_{cal}> p-value
Or Reject Ho if p-value<X_{cal} level of significance .Here we have to use p value to our decision.

Binary logistic regression

Binary logistic regression is type of regression model which is used when the Response variable is dichotomous and the explanatory variables are of any type.The general model for binary logistic regression is as follows:

$$Logit\,(pi) = log\,(pi/1-pi) = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \beta_3 x_{3i} i + \cdots + \beta_i x_{pi}$$

$$Where, pi = y = 1 = probability\ of\ success$$

$$= \frac{exp(\beta_0+\beta_1 x_{1i}+\beta_2 x_{2i}+\beta_3 x_{3i} i+\cdots+\beta_i x_{pi})}{1+exp(\beta_0+\beta_1 x_{1i}+\beta_2 x_{2i}+\beta_3 x_{3i} i+\cdots+\beta_i x_{pi})} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where: xi is independent variables in the model
Π =the probability of success, i.e.presence of low birth weight.

1-π =the probability of failure, i.e. absence of low birth weight.

Assumption of binary logistic regression

- The response variable is dichotomies.
- The outcomes are independent and mutually exclusive.
- No multi co linearity between independent variable.
- It requires large sample to be accuracies all models.

The general model for binary logistic regression is as follows:

$$Logit\ (pi) = log\ (pi/1-pi) = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \beta_3 x_{3i} i + \ldots + \beta_i x_{pi}$$

Where, pi=y=1 =probability of success

Odds ratio

The odds of some event happening is defined as the ratio of the probability that the event will occur to the probability that the event will not occur. That is, the odd of an event *E* is given by is:

Odds (*E*) = $\frac{P(E)}{1-P(E)}$

The odds ratio, which is Exp (β), is the factor by which odds (event) changes for a 1 unit change in X. The odds ratio is a measure of effect size, describing the strength of association or non-independence between two binary data values..

Model Adequacy Testing

The maximum likelihood and Wald test are the two most parameter estimation methods used in fitting logistic regression model.

The maximum likelihood estimates the parameters β are obtained by maximizing the log-likelihood function which is given by:Log$L(\beta|Y)$ = $\sum y1log\left[\frac{e^{x\beta}}{1+e^{x\beta}}\right] + (1-y1)log\left[\frac{1}{1+e^{x\beta}}\right]$ }………….………. (3)

The maximum likelihood estimates the parameters is found by the derivation of the log likely hood function with respect to each β and given as:-

$$\frac{dlogL(\beta\ |Y)}{d\beta j} = 0,\ j = 1, 2\ldots.k$$

The Wald test statistic

The Wald test is a test the significance of particular independent variables in statistical model.

The Wald test is commonly used to test the significance of individual logistic regression coefficients for each predictor variables.

The Wald test statistic is:$w = \left(\frac{\beta j}{S.E(\beta j)}\right)^2 = X^2$………………………….. (6)

Statistical hypothesis for Wald test

$H_O = \beta_j$ = 0(the coefficient no associated with the predictor) versus $H_1 = \beta_j$ ≠ 0 (the coefficient no associated with the predictor) at α level of significance. **Decision rule**: if w >X^2 we will rejectH_O at a given level of significance and we conclude that the independent Variables Xi has a significant effect on the Probability of success (binary response). The standard error is inflated and lowers the Wald test statistics which lead us a wrongdecision **(Stevenson, 2008).**

Likely hood ratio test

Likely hood ratio test is alternative approach to testing the significance of a number of independent variables. Likely hood ratio test uses the ratio the maximized value of the likely hood functions for the full model ($L1$) over the maximized value of likelihood function for the simple model (Lo). It is compared with aX^2distribution with one degree of freedom.

This log transformation of the likelihood functions yields a chi-squared statistics. The likelihood ratio test (G^2) = -2Ln $\left(\frac{Lo}{L1}\right) = -2Ln(L_O - L1)$ (Chatterjee and Hadi, 2006).

Statistical hypothesis of Likely hood ratio test

$H_0 = \beta_j = \beta_o$ (the coefficient no associated with the predictor).
$H_1 = \beta_j \neq \beta_o$ (the coefficient associated with the predictor)

Goodness of fit of the model: Goodness of Fit measures how well the model describes the response variables. Assessing goodness of fit involves investigating how close values predicted by the model with that of observed values.

Hosmer and Lemeshow test

The Hosmer and Lemeshow are commonly used to test assessing the goodness of fit of model and allow for any number of explanatory variables (Hosmer, *et al, 2000*).The Hosmers and Lemeshow test statistics is defined by:-

$C^2 = \sum\left(\frac{(Oi-Ei)^2}{mipi(1-pi)}\right)$ where Oi, Ei, mi, pi are denotes

the observed events, observations and average predicted risk for the i^{th} risk desire group respectively. The test statistics follows a X^2 distributed with P-2 degree of freedom. The number of risk groups may be adjusted depending on how many fitted risks are determined by the model (Agresti, 2007)

Statistical hypothesis of Hosmers and lemeshow Test

H_0= Model is not good to fit the data versus H_1= model is good to fit the data

Omnibus Test: It is a likelihood ratio test of whether all the independent variables collectively improve the model over the intercept-only model (i.e., with no independent variables added). The *p*-value of 0.00 (i.e., *p* = .00), which is less than 0.05, and then the study have statistically significant overall model.

Statistical hypothesis of Omnibus Test

H_0=there is no difference between the model versus H_1= there is significant difference between the model

Variable selection methods*:* There are different methods for variable selection; in this study I was used forward selection (Wald) which is stepwise selection method with entry testing based on the significance of the score statistic, and removal testing based on the probability of Wald test.

Descriptive Statistics

The purpose of this chapter is to analyze the low birth weight of infants with the objective of assessing the prevalence and factor associated to low birth weight among neonatal born infants and data was gained from the Tepi general hospital in Tepi town. The response variable has two outcomes (0="normal (≥2500gm) and (1="having low birth weight($< 2500gm$)", which are indicators of the low birth weight of infants. Descriptive, chi-square and a binary logistic regression analyses was used to measure the factor the low birth weight of infants. The chi-square analysis is used to see the independence between the outcome variable (the the low birth weight of infants) and other predictor variable.

Table 2: Summaries of Descriptive Statistics

Variables	Category	NBW %(≥2500gm)	LBW%(< 2500gm)	Total in %
Age of mothers	≤20 years	28(35.9%)	9(11.5%)	37(47.4%)
	21-35 years	29(37.2%)	7(9.0%)	36(46.2%)
	≥36years	4(5.1%)	1(1.3%)	5(6.4%)
Maternal status	stable	56(71.8%)	14(17.9%)	70(89.7%)
	unstable	5(6.4%)	3(3.8%)	8(10.3%)
Sex of neonates	female	34(43.6%)	7(9.0%)	41(52.6%)
	male	27(34.6%)	10(12.8%)	37(47.4%)
Mode Delivery type	Surgery	39(50.0%)	15(19.2%)	54(69.2%)
	Forceps	14(17.9%)	1(1.3%)	15(19.2%)
	Other	8(10.3%)	1(1.3%)	9(11.5%)
Apgar score of infant	<1/5(asxia)	50(64.1%)	4(5.1%)	54(69.2%
	≥1/5(norm	11(41.1%)	13(16.7%)	24(30.8%)

From table 2, the three weeks prevalence of low birth weight among neonatal born at Teppi General Hospital was about 21.8**%.**Majority of infants (47.4%) were born to mothers in the age of below 20 years, while 46.2% and 6.2 % of infant were born to mother's age of range between 21-35 and above 36 years, respectively. Three weeks **prevalence** of low birth weight were **11.5%**of infants from mothers in the age below 20 years, while **9.0** % and **1.3**% of infant were born to mother's age of range between 21-35 and above 36 years, respectively, thus infants were born to mother's age below 20 years had more low birth weight as compared to those aged between 21-35 and above 36 years.

Maternal status was 89.7% and 10.3% were **stable** and **unstable** status, respectively. The prevalence of low birth weight among mother who were stable status and unstable were 17.9% and 3.8 %, respectively. The result of table 2 also reveals that 52.6 % and 47.4 % were females and males, respectively. The prevalence of low birth weight among females and males were 9.0% and 12.8 %, respectively. Hence infants who were born a male sex had more low birth weight as compared to those born with female sex.Mode Delivery type was categorized into three: 69.2% of infants were born by surgery method with 19.2 % prevalence of low birth weight; 19.2 % infants were born by forceps method had 1.3% low birth weight cases, and the remaining 11.5% were infants born with other method like removal had 1.3% low birth weight case. Infants who were born by surgery mode of delivery type had more low birth weight as compared to those born with forceps and other mode of delivery type.69.2% of infants whoseApgar score of less than1'/5' prevalence of low birth weight and 30.8 % infants whose Apgar score of greater than1'/5 had 16.7 % low birth weight problem.

Inferential Statistics

In the binary logistic regression model , there were about **5** explanatory variables from which **only 3** variables were selected which have significant effect on the response variable that obtained by using forward variable selection method.

Table 3: Parametric Estimates of Logistic Model by Using Forward Wald

Variables	Category	Est (S.E)	Wald	Sig.	Odd ratio	95%CI	
Age of mother	**≤20(ref)**	**-**	**0.008**	**0.996**	**-**	**-**	**-**
	21-35	0.752(0.642)	1.375	0.041	0.471	0.152	0.642
	≥36	0.103(1.590)	0.004	0.948	1.108	0.049	25.021
Mode of delivery	**Surgery(ref)**	**-**	**4.275**	**0.118**	**-**	**-**	**-**
	forceps	2.496(1.240)	4.054	0.044	12.131	1.068	137.73
	other	0.171(1.575)	0.012	0.914	1.187	0.054	25.972
infant sex	**male(ref)**	**-**	**1.132**	**0.287**	**-**	**-**	**-**
	female	-0.790(0.643)	1.511	0.219	0.454	0.129	1.600
maternal status	**stable(ref)**	**-**	**1.149**	**0.284**	**-**	**-**	**-**
	unstable	-0.731(0.907)	0.649	0.420	0.482	0.081	2.848
apgarscores	**≥1/5(normal)ref**	**-**	**9.004**	**0.103**	**-**	**-**	**-**
	1/5(asphyxia)	-2.693(0.662)	16.561	0.000	0.068	0.019	.248
Constant		0.167(0.410)	0.166	0.683	1.182	-	-

Table 3 showed that The independent variables like Age of mother (1), Mode of delivery (1), Apgar scores (1) have a p-value 0.041, 0.044, 0.000 which is less than 0.05 level of significance. So it is significant to explain infant's low birth weight. But the other remaining variables are insignificant to explain infant's low birth weight.

The model for binary logistic regression for this study was as follows:

Logit (Π(x)) = $\beta_0 + \sum_{i=1}^{3} BiXi$ and Logit (Π(x))=$\beta_0 + B_1 X_1 + B_2 X_2 + B_3 X_3$

Where; Y= rate low birth weight, $\beta_0, \beta_1, \beta_2 \beta_3$ are the parameters, where

X_1=Age of mother between21-35years , X_2 = infants delivered by Forceps type and X_3 = Apgar scores of Infants less 1'/5' and the final model is given by:

Logit (Π(x)) =1.182 +0.752 X_1+2.496 X_2-2.693 X_3

The odd ratio Infants were born to mother's age between 21-35 is 0.471 times less likely tolow birth weight than infants born from mother's age less than 20 holding other variables remain constant. Or infants were born to mother's age between21-35years were **0.471** times with (95%CI: 0.152_0.642, P=0.041) less low birth weight as compared to those aged below 20.

The odd ratio Infants born with forceps mode of delivery were 12.131 times more likely to have low birth weight than infants were born from mothers with surgery mode of delivery holding other variables remain constant. Or Infants born with forceps mode of delivery were **12.131**timeswith (95%CI=1.068, 137.73, P=0.044) more likely than those born with surgery mode of delivery compared to those who were born with other mode of delivery.

The odd ratio of Infants with an Apgar scores of less than 1/5 (asphyxia) (95%CI: 0.019 - 0.248, P-Value=0.000) is 0.068 less likely to have low birth weight than those infants were born have low birth weight when compared to those that were born with a scores of 1/5 or more on Apgar.

Model Adequacy Testing

The Wald Test Statistic: The above table from binary logistic shows that some of the p-value for a particular explanatory variable is less than 0.05.when we compare with the level of significance value (α=0.05), reject the null hypothesis which states that the enter model coefficients are equal to zero: $\beta j=0$, where (j=1, 2 …), which indicates that the overall significance of the model. When we conclude that at least on coefficient is different from zero, the binary logistic model is fitted. If for a particular explanatory variable, or group of explanatory variables, the Wald test is significant, then we would conclude that the parameters associated with these variables are not zero, so that the variables should be included in the model.Therefore from the logistic regression the explanatory variable (Age of mother between 21-35years ,infants delivered by Forceps type and Apgar scores of Infants greaterthan1'/5') have a p-value of (0.041, 0.044, and 0.000) respectively which is less than the significant level (0.05) and those variables should be include in the model.

Table 4: Diagnosis Checking: Results Test of goodness of fit

Omnibus Tests of Model Coefficients				
		Chi-square	df	Sig.
Step 1	Step	16.976	7	.018
	Block	16.976	7	.018
	Model	16.976	7	.018

Omnibus tests of model coefficients give us chi-square of16.976 with p-value = 0.018which is significant at 0.05. This is a test of the null hypothesis that adding the predictors to the model has not significantly increased our ability to predict three week prevalence of low birth weight. Since our omnibus test is significant we can conclude that adding the predictors to the model has significantly increased three week prevalence of low birth weight. So, the models are good fits well.

Table 5: **Hosmer and Lemeshow Test**

Hosmer and Lemeshow Test			
Step	Chi-square	df	Sig.
1	6.507	7	.482

Another method of assessment for overall goodness of fit is by using the Hosmer-Lemeshow test. The Hosmer-Lemeshow test is performed by dividing the predicted probabilities into deciles (10 groups based on percentile ranks) and then computing a Pearson chi-square that compares the predicted to the observed frequencies. A non-significant chi-square indicates a good fit to the data and, therefore, good overall model fit. For this study since the significance of the test p-value was 0.482, which is greater than 0.05.Since the p-value is greater than its significance level (α=0.05) we reject the null hypothesis. Therefore our fitted logistic regression model is good-fit.

Discussion

Prevalence of Low Birth Weight

This study assessed the prevalence and factor associated to low birth weight among neonatal born infants at Tepi general hospital. Accordingly, the study results revealed that the prevalence of low birth weight was 21.8%. This is supported by research done in Jimma with (22.5%) **(Tema T., 2006).**

The present study reveals that majority of the women delivered in at Teppi General Hospital in the study period were aged less than 20 years. This findings was consistent with findings documented elsewhere **(Berihun *et al*, 2012).**The significant effect of age of mothers on low birth weight was found in this study like the studies in Gonder and Jimma (**Tema T. 2006)** In this study a factors were found to be significantly associated with low birth weight on binary logistic regression. They included having delivered al low birth weight baby in the age of mothers between 21-35 years, infants delivered by forceps mode of delivery type and Apgar scores of less than 1'/5' and Apgar scores of infants greater than 1'/5' recorded to have a higher birth weight compared to Apgar scores of less than 1'/5'. This was similar to other studies (**Agarwal *et al*, 2011**).

Conclusion

The prevalence of low birth weight in Teppi General Hospital was 21.8 percents. However, 21.8% prevalence represents a substantial risk to neonatal death among newborn in this hospital. It is important therefore that the newborn unit is well equipped to provide essential services to newborn at risk, including low birth weight.

This finding of this study depicted that Low birth weight is still a public health problem in the study area. It also revealed that Low birth weight is statistically associated with age of mother, mode of delivery and Apgar scores of infants.

The age of mothers, surgery mode of delivery and Apgar scores of infants were the major risk factors for low birth weight. Prevention of preterm birth could reduce low birth weight. Thus the issue of low birth weight should not be concern of health sectors only, but should also be concerned of other social sectors.

Recommendation

With regard to the moderately high low birth weight prevalence, there is need for health care providers in Teppi General Hospital to put more emphasis on focused mode of delivery type ensure risk of low birth weight is detected early and treated appropriately.

Since low birth weight infants are at risk of asphyxia at birth, it is similarly important for the hospital to ensure availability of equipment and skilled staff for infant's resuscitation. We recommended a population based study to ascertain the prevalence of low birth weight and associated risk factors in Tepi town.

References

Agarwal&Chaudhary, V (2012) . Prevalence and determinants of "low birth weight"

Agresti, (2007). An Introduction to categorical Data Analysis and meta-analysis.

Bodeau-Livinec, (2011). Maternal Anemia in Benin: Prevalence, Risk Factors, and Association with Low Birth Weight. American Journal Tropical Medicine and Hygiene.

Chatterley and Hades (1999): ''model adequacy, New York.

Cochran, (1997): the sample size determination and sampling theory of 3rd Edition.

Hosmer, D.W., and Lemeshow, S. (1980). Goodness-of-fit test for the multiple logistic regression models.*Communications in Statistics*, A10, 1043-1069.

Kramer, M.S. (1987). Determinants of Low Birth Weight: Methodological assessment

Lawn, J&Kerber, K. (2006). Opportunities for Africa's newborns: practical data policy

Mitiku, K. (2015). The link between contents and perceived quality of antenatal care.

Murthy H.V.V. (1991). Birth weight and the associated factors-a review.*Indi Jusco 70*Special zone, North West Ethiopia. Retrieved from http://etd.aau.edu.et/handle/123456789/8043

Tegegne BA, FE, LY, 2010: Birth to pregnancy interval and its effect on prenatal outcomes in Addis Ababa, Ethiopia. Ethiopian Journal of Reproductive Health 2010, 4(37-51).

Tema, T. (2006).prevalence and determinants of low birth weight in Jimma zone south westEthiopia.*East African Medical Journal*, 83(7), 366-71.

UNICEF-WHO (2004), United Nations Children's Fund and World Health Organization, (2004) Low Birth Weight; Country and Global Estimates. UNICEF, New York

Uthman O.A. (2007). Effect of low birth weight on infant mortality: Analysis Using Weibull Hazard Model.

WHO, 2011: Guide lines on optimal feeding of low birth weight infants in low and middle income countries. Geneva, Switzerland: World Health Organization 2011.

Work L11, 151-156.

Access this Article in Online	
	Website: www.ijcrims.com
	Subject: Biostatistics
Quick Response Code	

How to cite this article:
Habitamu Haile, Assaye Belay. (2019). Determinant Factor of Low Birth Weight of Infants in Teppi General Hospital in Sheka Zone, South Western Ethiopia. Int. J. Curr. Res. Med. Sci. 5(4): 38-49.
DOI: http://dx.doi.org/10.22192/ijcrms.2019.05.04.006