

ST. PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE
SCHOOL OF NURSING



PREVALANCE OF LOW BIRTH WEIGHT AND ASSOCIATED FACTORS
AMONG NEONATES IN DELIVERY WARD ATTENDING AT ST. PAUL'S
HOSPITAL MILLENNIUM MEDICAL COLLEG ADDIS ABEBA ETHIOPIA
2022

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This research paper to be Submitted to St. Paul Hospital Millennium Medical
College school of nursing for Partial Fulfillment of BSc degree in specialty
Nursing.

Addis Ababa, Ethiopia

Jan
2023

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Acronyms

ANC = Antenatal care

BMI = Body Mass Index

EDHS = Ethiopian Demographic & Health Survey

Gm. = gram

HAART-Highly Active Antiretroviral Treatment

HIV = Human Immunodeficiency Virus

LBW = Low birth weight

MUAC = mid upper arm circumference

PI = principal investigator

PIH = pregnancy induced hypertension

PTB - preterm birth

UNICEF= United Nations international children's emergency fund

WHO = world health organization

DM= Diabetes mellitus

HTN=Hypertension

STI=Sexual transmitted infection

UNDP=United nations development program

SPHMMC=St. Paulo's hospital millennium medical college

Abstract

Background – low birth weight is to describe babies are born weight less than 2.5 kg/2500gr. An average new born usually weights about >2500gr/<4000gr .low birth weight babies may be healthy even though they are small .but a low birth babies can also have many serious health problems. The cause which includes pre-mature that means before 37 weeks of pregnancy a premature babies has less time in the mothers uterus to grow and wt. gain .much of babies wt. is gained during the last weeks of pregnancy, another causes of low birth wt. is condition called birth, IUGR (intrauterine growth restriction) this occurred when babies does not grow well during pregnancy .it may be causes of problems with the placenta, a mother's health, or the babies health

Objective – the objective the study was to assess low birth weight and associated factors among laboring mothers attending St. Paul's hospital millennium medical college delivery ward, Addis Ababa, Ethiopia.

Method - hospital based cross sectional Study design was used. The target population was all delivered mothers and neonates. The data was collected by using structured interview questioner, SPSS version 25 was used for data entry and analysis. Data was cleaned as well as edited before analysis.

Result and discussion The finding of this study shown that the percentage of low birth with weight was 30 (13.6%).The finding of this study was lower than cross sectional study done in India 73 (28.8%),(17) in Uganda 25.5%(16).another, A cross sectional descriptive study was carried out in Bangladesh 25.49% (20). In Ethiopia ,the study done at University of Gondar referral hospital 17.1%(24), in Bahir Dar Felege Hiwote Referral hospital 25.5%(6).

On the other hand the finding of this study was higher than study done in Iran 6.7 %(18). Another facility based cross sectional study conducted on the Prevalence at Maternity Ward at Negest Elene Mohammed Memorial General Hospital in Hosanna Town, SNNPR, Ethiopia showed the prevalence of LBW was (9.8%)(10).

Conclusion and recommendation - Low birth weight is common and accounts for 13.6 % in SPHMMC .Large community-based studies in different geographical, environmental and socio-economic settings should be conducted in Ethiopia to determine the prevalence of low birth weight infants in the general population

Key word-LBW, IUGR, SPHMMC,

1. INTRODUCTION

1.1 Background

The World Health Organization defines Low Birth Weight as a birth weight of less than 2500gram irrespective of the gestational age of the newborn. Low birth weight represents a condition that results in significant impacts in healthcare systems, particularly in developing countries. Even though the efforts made in reducing incidences of LBW worldwide, the problem of LBW remains global health problem, especially in sub-Saharan Africa(1).

Globally, more than 20million infants are born with Low Birth Weight (LBW) and a larger proportion of these concentrating in Asia and Africa (2). Africa has the higher incidence of low birth weight although the report is highest in Asia which is eighteen point three percent. This becomes particularly alarming when an incidence of only 7% is reported for the more developed United Nations Regions (3). Only less than five percent of children in Ethiopia are weighed at birth. This is not surprising because the majority of births do not take place in a health facility, and children are less likely to be weighed at birth in a non-institutional setting. According to the 2016 Ethiopian demography and health survey, 12.3 % of babies in Ethiopia were low birth weight. In Ethiopia different studies have reported the prevalence of LBW in different periods. A hospital based mixed cross sectional study conducted in Tigray in 2015 shows that the prevalence of low birth weight was found to be 14.6 %(4). Another comparative cross sectional study done in Tigray in 2014 shows the prevalence of LBW was 9.9% and 6.3% in Axum and Laelay Maichew districts, respectively(5). According to the in-depth Analyses of the Ethiopian Demographic and Health Survey -2011(2) and a Hospital based cross-sectional study done in Bahir Dar Felege Hiwot hospital (6) shows the prevalence of low birth weight was 30% and 21.23% respectively. So these high prevalence shows that the burden of low birth weight is still under question in Ethiopia.

The prevalence of LBW assumes as a general indicator of morbidity and mortality of both mothers and children, and considers a significant determinant of social circumstances in the future. New born LBW babies face an elevated chance of higher rates of morbidity and mortality caused by infectious diseases in the neonatal, childhood and adulthood. Despite of the efforts made in reducing incidences of LBW worldwide, the issue remains an ongoing policy concern for the global health although World Health Organization (WHO) and United Nation Development Program (UNDP) are continuously addressing this issue through their developmental programs.

In Ethiopia, low birth weight is major public health problems. The achievement of sustainable

Development goals are strongly influenced by progress in reducing neonatal deaths. Since low birth weight is one of the leading cause of neonatal mortality progress of sustainable development goal will be dependent on achieving high coverage of evidence-based interventions that halt Low birth weight and improve survival of these newborns. In general, epidemiological data on the magnitude and risk factors of low birth weight are important for planning maternal and child health care services in developing countries(7).

1.2 Statement of the problem

Child's birth weight is a significant factor which determines vulnerability for risk of childhood illness and childhood survival. The incidence is estimated at more than 20 million births per year. Of these, 95.6% occur in developing countries, where 16.5% of newborn infants are of low birth weight, more than twice the percentage found in developed countries (7%)(6, 8). Some epidemiological observations revealed that infants born under-weight (less than 2500 gram) are approximately 20 times more likely to die than heavier babies(6, 8). In Ethiopia a study done in 2014 shows the prevalence of LBW was 32% which is higher than the studies done previously(9). Major risk factors for low birth weight are Maternal age, Poor maternal nutritional status, pregnant maternal weight, Parity, previous histories of adverse birth outcomes, anemia, Educational status, Lack of Antenatal care and Very low socioeconomic status(7, 8). Children born with low birth weight are more likely to die prematurely compared to infants of normal birth weight. Likewise, these children experience more morbidity, both in the short and long term. Among these, respiratory distress, sleep apnea, heart problems, jaundice, anemia, chronic lung disorders, mental retardation and cerebral palsy are the problems associated with low birth weight babies (10). There is also a greater vulnerability to infectious diseases due to a poorer immune response (11). So, it is clear that low birth weight represents a heavy burden for healthcare services worldwide.

In poorer countries where fewer resources are destined for healthcare, the direct, indirect, immediate and later repercussions of low birth weight constitute a relevant public health issue. However, the great majority of scientific evidence accumulated on this subject is generated in developed countries. Therefore, the purpose of this study is to determine the prevalence and associated factors of low birth weight among newborn babies in SPHMMC delivery ward.

1.3 Significant of the study

- ✓ This study will provide useful information that will inform health facilities to prepare special care for LBW neonates because most dies within 24 hours of delivery due to poor access of intensive care units and trained health care providers.
- ✓ This study provides baseline information about factors for low birth weight in the area that will have greater input to program managers and policy makers for designing, proper implementation and evaluation of programs on reduction of low birth weight and improvement of new born care
- ✓ The study also helps to identify the reasons of low birth weight and it used for to make recommendations based on the study findings for possible solutions.
- ✓ Additionally, this study result help as a source of information to update the knowledge of health care providers regarding the associated factor of low birth weight.

2 REVIEW OF RELATED LITERATURE

There is considerable variation in the prevalence of low birth weight across regions and within countries; however, the great majority of low birth weight births occur in low- and middle income countries and especially in the most vulnerable populations. Regional estimates of LBW include 28% in south Asia, 13% in sub-Saharan Africa and 9% in Latin America. It is worth noting that these rates are high, in spite of the fact that the data on LBW remain limited or unreliable, as many deliveries occur in homes or small health clinics and are not reported in official figures, which may result in an underestimation of the prevalence of LBW (12). Causes of low birth weight are multi-factorial, but are related to either obstetrical factors like preterm birth (Shortened gestation, <37 weeks), which directly contributes to 28% of neonatal death and intrauterine growth restrictions(13). Malnutrition, infection, illiteracy, chat chewing, cigarette smoking, alcohol drinking, malaria, short inter pregnancy intervals, teenage pregnancy have been identified as modifiable risk factors for low birth weight(14, 15). There are also other multiple causes of low birth weight, including early induction of labor or Caesarean birth (for medical or non-medical reasons), multiple pregnancies, and chronic conditions such as diabetes and high blood pressure(16).

2.1 Prevalence of low birth weight

A cross sectional study done in India on determinants of low birth weight from 253 newborns shows that 73 (28.8%) were low birth weight newborns the proportion being significantly more among females than the males (61.6%vs38.4%)(17).

A study conducted on the prevalence and some associated factors in Iran on 461 newborn infants in which 221 boys (47.9%) and 240 girls(52.1%) shows that the prevalence of low birth weight was 6.7%(18). Another case control study done in Iran on the prevalence and associated factors of LBW shows the prevalence was 6.3%(19).

A Cross Sectional Study done on the Prevalence and Factors Associated with Low Birth Weight among Teenage Mothers in New Mulago Hospital in Uganda shows the Prevalence of LBW was 25.5%(16).

Another Multiple Indicators Cluster Survey (MICS) study done in Ghana on the prevalence of Low Birth Weight and Associated Maternal Factors on 10,963 samples shows that the prevalence of LBW was 9.2%(21).

In addition to the Prevalence and determinants of low birth weight done in Nigeria in Benin city was 6.3%(22).

A cross sectional analytic study done on Factors associated with low birth weight among neonates born at Olkalou District Hospital, Central Region, Kenya shows the prevalence of LBW was 12.3%(23).

The study done at University of Gondar referral hospital in Northwest Ethiopia on the Incidence and correlates of low birth weight shows that the incidence of LBW was 17.1%(24).

Maternal associated factors of low birth weight: a hospital based cross-sectional mixed study in Tigray, Northern Ethiopia in 2015 shows the prevalence of LBW was found to be 14.6 % (95 %CI = 12.56-16.61) (4).

Additionally the study conducted in Bahir Dar Felege Hiwote Referral hospital on the prevalence and associated factors shows the prevalence of low birth weight was 25.5 %(6)

A facility based cross sectional study conducted on the Prevalence and associated Factors of Adverse Birth Outcomes among Women Attended Maternity Ward at Negest Elene Mohammed Memorial General Hospital in Hosanna Town, SNNPR, Ethiopia shows the prevalence of LBW was 32 (9.8%)(10).

A comparative cross sectional study on The Prevalence and factors associated with low birth weight in Axum and Laelay Maichew Districts, North Ethiopia shows the prevalence of low birth weight was 9.9% and 6.3% in Axum and Laelay Maichew districts, respectively(5).

Prevalence and Determinants of Small Size Babies in Ethiopia Results from in-depth Analyses of the Ethiopian Demographic and Health Survey -2016.this In-depth analysis of the Survey dataset was conducted using representative data collected from all regions in the country and An average of 12.3% of Ethiopian babies were reported as small at birth by moms and a non-linear but declining trend was observed during the study periods(2).

Institutional based cross sectional study on Adverse birth outcomes among deliveries at Gondar University Hospital, Northwest Ethiopia shows that the prevalence of low birth weight was 11.2%(7). EDHS 2011 data shows that 11 percent babies weighed less than 2.5 kilograms. As noted, a mother's subjective assessment of the size of the baby at birth, in the absence of birth weight, may be useful. Mothers reported 21 percent of all live births in the five years preceding the survey than average. Nearly three children of every ten born to mothers residing in Afar

(30 percent), Amhara (28 percent), Somali (26 percent), and Gambela (27 percent) were reported as very small at birth (5).

2.2 Associated factors of Low birth weight

2.2.1 Demographic and socio-economic factors

According to a cross sectional study conducted on maternal associated factors in Pakistan shows that mothers with low level of education and low weight were at the greater risk of producing low birth weight babies as compared to those who had high level of education. Furthermore, mothers with less than 18 years of age and those aged 35 or more had more risk of low birth weight outcomes. Mothers with low socio-economic status were at higher risk of low birth weight children (25).

According to the study done in India on an epidemiological factors affecting low birth weight, it was observed that the incidence of low birth weight babies was higher in mothers with lower educational and socioeconomic status and there was a statistically significant association between the two. Maternal age was an important factor in low birth weight babies and the incidence of low birth weight decreased with increase in maternal age and the association was statistically significant ($p < 0.01$). However, the low birth weight in relation to occupation was not statistically significant. (13). According to a study done on Risk factors and adverse prenatal outcome associated with low birth weight in Northern Tanzania, Multivariate logistic regression showed female gender of baby was significantly associated with delivery of low birth weight infants (26). Epidemiology of Low Birth Weight in the Town of Sidi Bel Abbes (West of Algeria):

A Case- Control Study confirms there was a close association between low birth weight newborn and primary educated mothers (27). Research done on the incidence of low birth weight babies and associated factors among postpartum mothers who gave birth at Felege Hiwote Referral hospital, Bahirdar Ethiopia Illiterate mothers had higher rate of 28(73.7%) in giving low birth weight deliveries. Mothers who gave birth LBW neonate had significant association with rural residence 25(65.8%) with [AOR=5.09, 95% CI (2.01,12.85)] (6). The study done on the Prevalence and associated Factors of Adverse Birth Outcomes among Women Attended Maternity Ward at Negest Elene Mohammed Memorial General Hospital in Hosanna Town, SNNPR, Ethiopia shows Being government employee [AOR=4.5, 95% CI (1.25,15.9)], rural residence [AOR=3.5, 95% CI (1.57,7.93)] and age <20 years [AOR=4.9, 95% CI (1.29,18.6)] were associated with low birth weight (10). A cross-sectional mixed study design done on maternal associated factors of low birth weight in three zonal hospitals in Tigray, Northern Ethiopia

conducted with 308 sample size, Residence of the mother was strongly associated with low birth weight, mothers residing in rural area were more than 4 times more likely to have LBW babies when compared to those mothers who live in urban (4). Another study done on the prevalence of Low Birth Weight and Associated Maternal Factors in Ghana, The descriptive statistics show that mothers in rural areas tend to give birth to low birth weight children than women who live in urban areas (21).

According to the EDHS 2011 Low birth weight is more common among children of the youngest mothers, age less than 20 (13 percent) and older mothers, age 35-49 (17 percent), The birth weight of a child also varies by place of residence. Seventeen percent of births in rural areas, compared with 9 percent in urban areas, have a reported birth weight less than 2.5 kg. Children of mothers with no education were the most likely to be reported as very small birth weight. LBW has bi variate associations with mother's educational status and No association was found between LBW and mother's occupation (28).

2.2.2 Maternal factors

According to a cross sectional study conducted in Pakistan mothers with last pregnancy interval of less than 12 months were at higher risk of low birth weight children (25).

Another study done in India on an epidemiological factors affecting low birth weight, The inter-pregnancy interval and the number of antenatal visits were having statistically significant association with low birth weight ($p < 0.01$). Overall about 45.6% of the mothers were found anemic and about 48.05% of the anemic mothers delivered low birth weight babies and the association was statistically significant ($p < 0.05$). Iron and folic acid supplementation during pregnancy also had a significant association with low birth weight ($p < 0.05$). This data show significant positive effect of iron & folic acid supplementation during pregnancy (13).

According to the study done in Norway the investigator found no adverse effect of increasing parity on the odds of having a child with low birth weight at normative ranges; such effects only manifest at extremely high parities nine or more children. At moderately high parities, the chance of low birth weight is actually lower than at very low parities (29).

Maternal Risk Factors Determining Birth Weight of Newborns: A Tertiary Care Hospital Based Study in India on 509 deliveries shows gestational age less than 37 weeks had higher risk of delivering low birth weight when compared with gestational age greater than or equal to

37weeks(30). Prevalence and Factors Associated with Low Birth Weight among Teenage Mothers in New Mulago Hospital: A Cross Sectional Study in Uganda shows the gestational age less than 37weeks had higher risk of delivering low birth weight comparing with those who had gestational age of greater than or equal to 37 weeks [AOR 3.302; P = 0.00001](16). A study conducted on Factors associated with low birth weight among neonates born at Olkalou District Hospital, Central Region, Kenya shows premature births (OR=3.65, 95%C.I. =1.31- 10.38) had higher risk of low birth weight than term births(23).

According to a study done on Risk factors and adverse prenatal outcome associated with low birth weight in Northern Tanzania, Multivariate logistic regression showed maternal anemia (RR1.7; 95% CI 1.4–2.2) and being delivered preterm (RR 2.0; 95% CI 1.8–2.3) were significantly associated with delivery of low birth weight infants (26). Epidemiology of Low Birth Weight in the Town of SidiBel Abbes (West of Algeria): A Case- Control Study confirms the close association between low birth weight newborn and prematurity, prim-parity, short inter-pregnancy interval and delayed of first antenatal visit(27).

A Cross Sectional Study conducted on the Prevalence and Factors Associated with Low Birth Weight among Teenage Mothers in New Mulago Hospital shows young maternal age and ANC attendance were not associated with LBW(16).low birth weight has bi-variate with use of antenatal care facilities and gestational age. (28). Research done on the incidence of low birth weight babies and associated factors among postpartum mothers who gave birth at Felege Hiwote Referral hospital ,Bahirdar Ethiopia showed Inter Pregnancy Interval had no significant association on the Low Birth Weight(6).

The study done on the Prevalence and associated Factors of Adverse Birth Outcomes among Women Attended Maternity Ward at Negest Elene Mohammed Memorial General Hospital in Hosanna Town, SNNPR, Ethiopia shows lack of antenatal care [AOR=3.2,95%CI(1.27,8.06)] was associated with low birth weight(10). A cross sectional study design done on the Incidence and correlates of low birth weight at University of Gondar referral hospital in Northwest Ethiopia mothers with lack of ANC follow up during pregnancy had 5.68 times being low birth weight than those mothers who had ANC follow up(24). According to a case–control study conducted in Bale zone hospitals, South-East Ethiopia on Risk factors for low birth weight mothers with absence of antenatal care had 3 times more likely to give low birth weight than those who had antenatal care (AOR = 2.9; 95 % CI = 1.23–6.94)(15).

2.2.3 Nutritional status factors

According to a cross-sectional study done on Risk factors and adverse prenatal outcome associated with low birth weight in Northern Tanzania, Multivariate logistic regression showed mothers who had not counseled during pregnancy (RR 1.3; 95% CI 1.2–1.6) was significantly associated with delivery of low birth weight(26).

A study done in Ethiopia on adverse birth outcomes among deliveries at Gondar university hospital in 2014 shows nutritional counseling and additional diet during the current pregnancy had strong association with low birth weight(7).

Another study conducted on the Incidence and correlates of low birth weight at a referral hospital in Northwest Ethiopia shows nearly half (46.2%) of women said they were given dietary counseling during the current pregnancy and 57.7% were taking additional nutrients during pregnancy(24).

Maternal associated factors of low birth weight: a hospital based cross-sectional mixed study in Tigray, Northern Ethiopia also shows those mother who did not get dietary counseling during pregnancy had 3.5 times higher risk of low birth weight(4).

2.2.4 Maternal behavioral factors: behavioral factor is any factor that can affect pregnant mother as well as pregnancy.

According to a study done on Risk factors and adverse prenatal outcome associated with low birth weight in Northern Tanzania, Multivariate logistic regression showed smoking during pregnancy (RR 1.9; 95% CI 1.0–3.5) was significantly associated with delivery of low birth weight infants (26).another study done in Negest Elene Mohammed memorial general hospital in hosanna town on the prevalence and associated factors of adverse birth outcomes among women attended maternity ward in 2016 shows that tobacco smoking has significant association with low birth weight(10). Risk factors for low birth weight in Bale zone hospitals, South-East Ethiopia: a case–control

Study shows the strong association of chat chewing and low birth weight. Mothers who had history of chat chewing had 6 times higher risk of low birth weight than those had no history of Chat chewing (AOR = 6.4; 95 % CI = 2.42–17.10)(15).

2.2.5 Fetal factors

Determinants of low birth weight in a Block of Hooghly, West Bengal: A multivariate analysis

Study showed that being low birth was significantly more among females than the males (61.6%vs. 38.4%)(17). A cross sectional analytic study conducted on Factors associated with low birth weight among neonates born at Olkalou District Hospital, Central Region, Kenya on 346 mothers with their respective newborn babies shows that female infants (AOR=3.37, 95%C.I.=1.14-10.00)were independently associated with LBW and ten (3.1%) of the newborns were with visible birth defect(23). A study done on the Prevalence and associated Factors of Adverse Birth Outcomes among Women Attended Maternity Ward at Negest Elene Mohammed Memorial General Hospital in Hosanna Town, SNNPR, Ethiopia shows that from 327 pregnant mothers 6 (1.8%) were with visible sever defect(10)..The highest prevalence of LBW (14.3%) in Africa is alarming when an incidence of only 7% Is reported for the more developed United Nations Regions(3).many conducted research reported that prematurity, anemia and inadequate food intake during pregnancy, and lack of antenatal care(ANC) follow up were associated factors of LBW(7).

2.3. Conceptual framework

This conceptual framework was developed after reviewing Ethiopian demographic health survey and different literatures. The diagram shows the relationship between low birth weight with socio– demographic factors, maternal factors, nutritional factors and fetal factors (4, 6, 10, 23, 31).

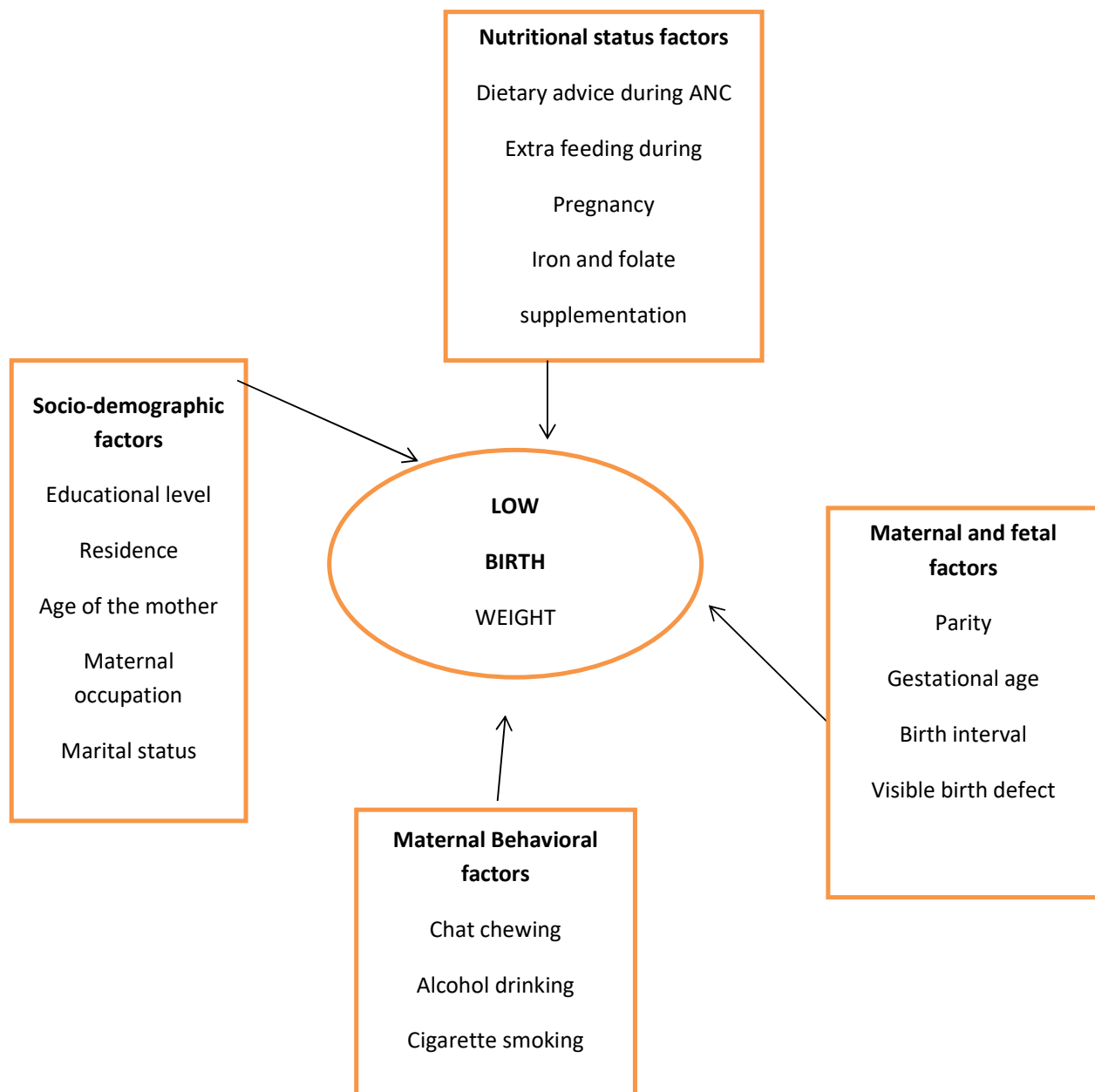


Figure 1:- Conceptual frame work shows the linkage between LBW and associated factors at SPHMMC,2022

3 OBJECTIVES

3.1 General objective

To Assess the prevalence of low birth weight and associated factors among newborn babies at SPHMMC, 2022.

3.2 Specific objectives

- To determine the prevalence of low birth weight among newborn babies at SPHMMC, 2022
- To identify associated factors of low birth weight among newborn babies at SPHMMC, 2022

4. METHODS

4.1 Study area and period

The study was conducted in St. Paul Hospital Millennium Medical College Hospital, Addis Ababa Ethiopia. The hospital is located in Gullele Sub city, Addis Ababa Ethiopia. It was built by Emperor Haile Selassie in 1969 by the help of the Germany Evangelical Church aimed to serve the poor. The hospital has more than 700 beds totally Averages of 568,864 clients are served annually. It has also more than 4,000 clinical and non- clinical staffs out of these clients 9165 all delivered women's include svd, instrumental and c/s. The study was going to be conducted at SPHMMC from September to January/ 2023.

4.2. Study design

An institutional based cross sectional study design and chart review was conducted

4.3. Source population and study population

4.3.1. Source population

The source population was all newborn babies delivered in SPMCH, Addis Ababa, Ethiopia, 2022.

4.3.2. Study population

All randomly selected newborn babies delivered in SPMCH, Addis Ababa, Ethiopia from September to January, 2023.

4.4 Inclusion and Exclusion criteria

4.4.1 Inclusion criteria

All Newborn babies with their mothers who have given live birth in SPMCH are included.

4.4.2 Exclusion criteria

Newborn babies whose Mothers suffering from severe medical or surgical condition, mothers with unknown last menstrual period (LMP) with the absence of ultrasound evidence at the time of study period will be excluded from the study.

4.5. Sample size determination

4.6. Sample size determination

The sample size was determined using a formula for a single population proportion and calculated by Open Epi Info version 3.5.3 statistical software package based on the following assumptions: previous study conducted at facility based indicated the prevalence of low birth weight of 15.6. There for, based on the above assumption, with significant level at 95% confidence interval and margin of tolerable sampling error 5%.

The sample size will be determined by using a single population proportion formula as follow

$$n = \frac{[Z_{\alpha/2}]^2 \times P(1-P)}{d^2}$$

Where

n = sample size

p = prevalence low birth weight (15.6%)

d = maximum allowable error (margin of error) = 0.05

Z = value of standard normal distribution (Z-statistic) at 95% confidence level (z=1.96).

$$\text{➤ } n = \frac{(1.96)^2 (0.16) (0.84)}{(0.05)^2} = 200$$

➤ With 10% non-response rate 20

After calculating the sample size becomes 200 and after adding 10% for non-response the final sample size becomes 220.

Sampling technique (procedure)

The sampled women were selected every K interval from total deliveries using systematic sampling method ($K = 763/220 = 3$) sampling frame from December /2022 to January/ 2022.

4.6.1 Sampling procedure

List of participating mother newborn pairs were obtained from the last one month average number of deliveries in the institution and sampling frame of delivery flow. Then Participants were selected in every 3 newborn babies by using systematic random sampling technique until

the required sample size was obtained and the starting newborn babies was selected by simple random sampling method.

4.7. Variables of the study

4.7.1 Dependent variables

- **Low birth weight**

4.7.2 Independent variables

- **Demographic and Socio-economic factors**
- **Maternal factors of the respondent**
- **Nutritional status and**
- **Maternal behavioral factors**

4.8. Operational definitions/definition of terms

Newborn babies: -The babies age from birth to 24 hour postpartum (35).

Baby birth weight: - Baby birth weight is the first weight of the newborn obtained immediately after birth. It is measured within the first 24 hour of life before significant postnatal weight loss has been occurred by using a calibrated weight scale (35).

Normal birth weight: The newborn infant weight greater than 2500 grams and less than 4000grams.(29)

Low birth weight: -The neonate birth weight less than 2,500 grams (up to and including 2,499grams).(29)

Birth interval: -Birth interval is defined as the length of time between two successive live births. (32)

Prevalence of low birth weight:-the number of low birth weight in percentage from the total live births.(29)

4.9. Data collection tool and procedures

Data was collected using structured pre-tested interviewer guided questionnaire which was prepared by reviewing similar literature and Ethiopian demographic health survey2016

Medical records were cross checked to confirm important variables such as patients' obstetric history and antenatal history.

The data collectors were aware on the objectives of the study, relevance of the study, procedures during interviewing, confidentiality of client information, eligibility criteria, respondents' right, informed consent, ways of approach during interview.

4.10. Data quality assurance

The questionnaire was prepared in English and translated to Amharic, and back translated to English by language experts to check for consistency of the questionnaire. The tool was adopted and modified from a study conducted in Ethiopian demographic health survey, (4). Principal investigators are closely followed for the data collection process. Before the actual data collection pretest was conducted on 5% of the study population at Gandhi memorial Hospital before the actual data collection to evaluate the clarity of questions and validity of the instrument and reaction of respondents to the questions.

Every day all questionnaires were reviewed and checked at the end of data collection period and any errors were corrected accordingly by Principal investigators.

4.11 Data processing and analysis

All filled questionnaires were checked for completeness, consistency, accuracy and entered in to SPSS software version 25 for data analysis. Frequency, proportion, and summery statistics (table and pie chart) were used to describe the study population in relation to the relevant variables.

Bi-variate logistic regression was used to check variables having association with the dependent variables. Then those variables found to have p-value less than 0.2 were fitted to multiple logistic regressions for controlling the effect of con founders. Odds ratio with their 95% of CI were computed and variables having p-value less than 0.05 in the multiple logistic regression models were considered as significantly associated with the dependent variable.

4.12. Ethical consideration

Ethical clearance was obtained from SPMCH and official letters was written to respective department heads. Verbal consent was obtained from each participant's anonymity and confidentiality was kept. Respondents had the right not to participate in or with draw from the study at any stage.

4.13 Dissemination plan

The final result of this paper will be submitted to labor, obs/gyn ward and NICU of SPHMMC, research and publication office.

5. RESULT

5.1 socio demographic characteristics

A total of 220 medical charts were reviewed with 100% response rate. The mean age of the mothers was 29.10 ± 5.5 SD). Regarding educational status more than half 127 (57.7%) attend secondary education and above, concerning their residence more than one third 91 (41.4%) were resided in rural areas. About their marital status, majority of them were in marriage union and few them were in widowed state 4 (1, 8%).regarding their occupation majority of them were house wife followed by government employee and merchants 86 (39.1%),57 (25.9%) and 53 (24.1%) respectively. (Table 1)

Table 1- socio- demographic

table 1- socio- demographic characteristics of mothers in SPHMMC, Addis Ababa, Ethiopia 2022

Variables	Categories	Frequency	Percent
Age	15-19	7	3.2
	20-24	45	20.5
	25-29	70	31.8
	30-34	57	25.9
	35-39	35	15.9
	40-44	6	2.7
Educational status	Unable write& read	32	14.5
	Able to write &read	2	0.9
	Primary education (1-8)	59	26.8
	Secondary &above	127	57.7

Residence	Rural	91	41.4
	Urban	129	58.6
	Single	6	2,7
Marital status	Married	201	91.4
	Divorced	9	4.1
	Widowed	4	1.8
Occupation	Farmer	13	5.9
	Merchant	53	24.1
	Housewife	86	39.1
	Gov. employee	57	25.9
	Other	11	5.0

5.2. Maternal related factors associated with low birth weight

Among the 220, medical charts reviewed more than half of mothers 119(54.1%) had two to three number of previous birth and regarding birth interval more than two third 152(69.%), concerning desirability of pregnancy 187(85%) of the mother had desire to had birth and 36(16.4%) had no history of low birth weight. regarding pregnancy related complication 29(13.2%) found to have complication and the complications include APH 13(5.9%), PROM 14(6.4), and other 2 (0.9%) respectively.

About chronic medical illness 18(8.2%) were found to had it and the illness were TB 3 (1.4%), HIV 7(3.2%), DM 3(1.4%), and HTN 5(2.3%) respectively. 23 (10.5%) and 10 (4.5% mothers found to have past malaria and STI respectively, among the type of STI majority 7 (3.2%) were gonorrhea. Among the chart reviewed anaemia was one of the health problem during the current pregnancy in which it accounts for 41 (18.6%). Concerning gestational age of the mother more than half 117(53.2%) were between 38 to 42 weeks and few of them 34 (15.5%) were 28 to 32 weeks.

Regarding ANC, 209 (95%) mothers were found to attend at least once and 16 (7.3%) start before 16 weeks, 78(35.5%), started between 16-24 weeks and 126 (57.3%) started between 25 to 32 weeks respectively .concerning number of ANC visit half of 111(50.4%) visited 3 to 4 times. finally a bout iron folic acid use 184 (83.6%) of mothers use it and 97 (44.1%) use less than 60 tabs,98(44.5%) 60-90 tabs and 25 (11.4%) use greater than 90 tabs respectively.

Table 2. Maternal related factors associated with low birth weight among infants born at SPHMMC, 2022

Variables	Categories	Frequency	percent
Number of previous births	One	6	2.7
	Two –three	119	54.1
	Four –five	47	21.4
	No previous birth	48	21.8
Pregnancy interval	<12 MONTH	26	11.8
	12-24	152	69.1
	>24	42	19.1
Desirability of pregnancy	YES	187	85.0

	NO	33	15.0
Previous history of low birth weight	YES	36	16.4
	NO	183	83.2
Pregnancy complication	YES	29	13.2
	NO	191	86.8
Type of complication (n=29)	APH	13	5.9
	PROM	14	6.4
	OTHER	2	0.9
Chronic medical illness	YES	18	8.2
	NO	202	91.8
Type of illness(n=18)	TB	3	1.4
	HIV	7	3.2
	DM	3	1.4
	HTN	5	2.3
Malaria infection	YES	23	10.5
	NO	197	89.5
STI	YES	10	4.1
	NO	210	95.9
Type of STI(N=10)	SYPHILS	3	1.4
	GONORRHA	7	3.2
anemia for current pregnancy	YES	41	18.6
	NO	179	81.4
Gestational age of current pregnancy	28-32	34	15.5
	33-37	65	29.5
	38-42	117	53.2
	>42	4	1.8
ANC visit	YES	209	95.0

	NO	11	5.0
Started ANC	<16 week	16	7.3
	16-24 week	78	35,5
	25-32	126	57,3
Number of ANC visit	One	12	5.5
	Two	23	10,5
	Three	46	20,9
	Four	65	29,5
	Five and above	74	33,6
Iron intake	YES	184	83,6
	NO	36	16.4
How many tabs used(184)	<60 tab	97	52.7
	60-90 tab	87	47.3

5.3. Maternal Behavior Nutritional factors and

Among 220 revised medical charts, 188 (85.5%) mothers get dietary advice during ANC visit, among which 160(72.7%) get advice on extra feeding during pregnancy. Regarding cigarette smoking, alcohol intake and chat chewing 4(1.8%) 35(15.9%) and 7(3.2%) mothers were engaged in it during current pregnancy respectively.

Table 3. . Maternal Behavior and Nutritional factors among mothers attending birth at SPHMMC,2022

Variables	Categories	Frequency	Percent
Get nutrition advice during ANC visit	Yes	188	85.5
	NO	32	14.5
Get advice on extra feeding during pregnancy	YES	160	72.7
	NO	60	27.3
smoking during current pregnancy	YES	4	1.8
	NO	216	98.2
alcohol intake during current pregnancy	YES	35	15,9
	NO	185	84,1
chewing Chat during current pregnancy	YES	7	3.2
	NO	213	96.8

5.4 new born factors of infants born at SPHMMC 2022

From a total of 220 medical charts reviewed females were accounts for more than fifty percent , 117(53.2%). Regarding birth with weight 30 (13.6%) have low birth weights

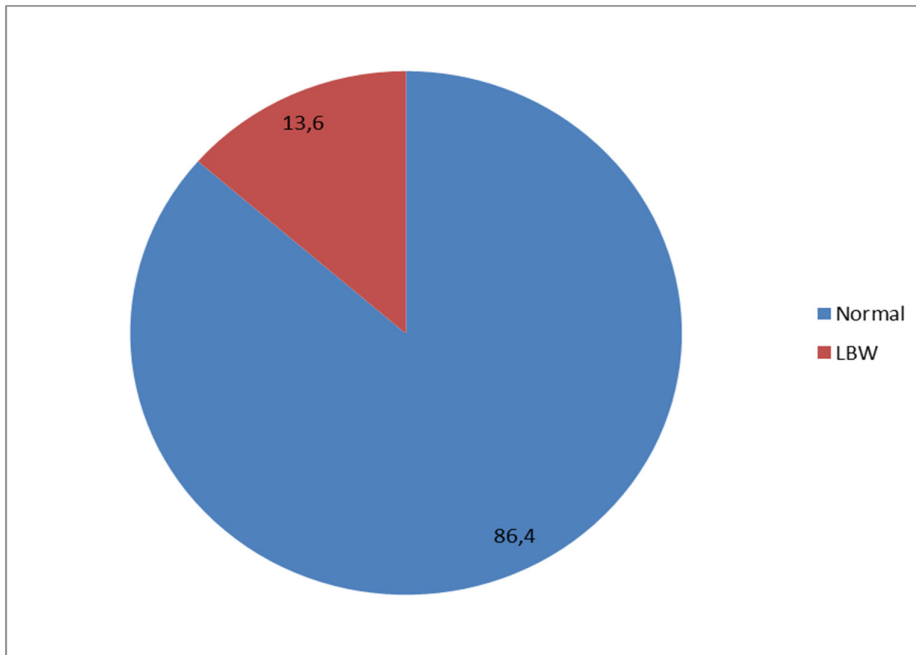


Fig 2. Birth weight status of infants born in SPHMMC, 2022

5.5. Factors affecting low birth weight of neonates on Bivariable logistic regression

On bivariate analysis marital status, pregnancy interval ,desirability of pregnancy ,previous history of low birth weight ,having previous history of malaria and STIs, gestational age of current pregnancy, iron intake during current pregnancy , dietary intake advise, advise on extra feeding during pregnancy and cigarate smoking during pregnancy were significantly associated with P-value less than 0.20 (Table 4).

Table 4. Factors affecting low birth weight of neonates on Bivariable logistic regression

Variables	Category	Neonatal Birth wt.		OR,95%(CI)	P-Value(<0.20)
		Normal	Low birth wt.		
Marital status	Single	3	3	1	
	married	25	176	0.14(0.02-0.7)	0.02
	divorced	1	8	0.12(0.009-1.72)	0.12
	widowed	1	3	0.3(0.02-5.3)	0.4
Desirabilityof pregnancy	Yes	164	23	1	
	No	26	7	1.9(0.75-4.92)	0.17
Previous history of low birth wt.	YES	27	9	0.38(0.16-0.9)	0.03
	NO	162	21	1	
Malaria infection during pregnancy	YES	16	7	3.3(1.2-8.8)	0.01
	NO	174	23	1	
STIs during pregnancy	YES	6	3	1	
	NO	184	27	3.4(0.8-14.4)	0.09
Gestation of current pregnancy	28-32	20	14	1	
	33-37	57	11	0.27(0.108-0.70)	0.007
	38-42	113	5	0.02(-0.19)	0.001
IRON intake	YES	165	22	1	
	NO	25	8	2.4(0.6-1.03)	0.06
dietary intake advised during ANC visit,	Yes	166	22	1	
	NO	24		2.5(1.07-6.2)	0.04

extra feeding advise during pregnancy	Yes	146	14	1	
	No	44	16	3.7(1.7-8.3)	0.001
Cigarate smoking during current pregnancy	Yes	2	2	1	
	No	188	28	0.14(0.02-1.1)	0.06

5.6. Factors affecting low birth weight of neonates on multi variable logistic regression

On multivariable logistic regression analysis marital status, pregnancy interval ,desirability of pregnancy , and STIs, , iron intake during current pregnancy , dietary intake advise, advise on extra feeding during pregnancy and cigarate smoking during pregnancy were not significantly associated significantly associated with low birth weight of neonates,P-value less than 0.05 , but previous history of low birth weight p=0.036, AOR0.28,CI(0.08-0.92) ,having previous history of malaria=002,AOR 0.097 [95%CI 0.022- 0.4270] and gestational age of current pregnancy P=,000, AOR 0.021 [95% (0.004- 0.01)] were significantly associated with low birth weight of neonates with p-value less than 0.05 ,Table 6).

Table 5. Factors affecting low birth weight of neonates on multi variable logistic regression

Variables	Categ ory	Neonatal Birth wt.		OR,95%(CI)	AOR95%(CI)	P-Value(<0.05)
		Normal	Low			
Previous history of low birth wt.	YES	27	9	0.38(0.16-0.9)	0.28(0.08-0.92)	0.03
	NO	162	21	1	1	
Malaria infection during pregnancy	YES	16	7	3.3(1.2-8.8)	0.097(0.2-0.4)	0.002
	NO	174	23	1	1	
Gestation of current pregnancy	28-32	20	14	0.27(0.108-0.70)	0.24(0.08-0.7)	0.01
	33-37	57	11	1	0.24(0.08-0.7)	

6. Discussion

At a world population level, the prevalence of infants with a low birth weight is an indicator of a multifaceted public health problem that includes long-term maternal malnutrition, ill-health and poor health care in pregnancy.

Low birth weight is included as a primary outcome indicator in the core set of indicators for the Global Nutrition Monitoring Framework. It is also included in the WHO Global reference list of 100 core health indicators.

Low birth weight is caused by intrauterine growth restriction, prematurity or both. It contributes to a range of poor health outcomes; for example, it is closely associated with fetal and neonatal mortality and morbidity, inhibited growth and cognitive development, and NCDs later in life. Low birth weight infants are about 20 times more likely to die than heavier infants.

Low birth weight is more common in developing than developed countries. However, data on low birth weight in developing countries is often limited because a significant portion of deliveries occur in homes or small health facilities, where cases of infants with low birth weight often go unreported.

According to this study the prevalence of low birth with weight was 30 (13.6%). The finding of this study was lower than study done in India on determinants of low birth weight from 253 newborns shows that 73 (28.8%) were low birth weight(6). And another Cross Sectional Study done on the Prevalence and Factors Associated with Low Birth Weight among Teenage Mothers in New Mulago Hospital in Uganda shows the Prevalence of LBW to be 25.5%(4). another, A cross sectional descriptive study was carried out in Bangladesh on 102 newborns to assess the proportion of LBW babies revealed that the proportion of LBW babies was 25.49% (n=26)(20).) the reason behind this was most of sample had better dietary intake, pregnancy follow up in health services compared with above mentioned.

In Ethiopia ,the study done at University of Gondar referral hospital in Northwest Ethiopia on the Incidence and correlates of low birth weight shows that the prevalencer of LBW to be 17.1%(14). Additionally the study conducted in Bahir Dar Felege Hiwote Referral hospital on the prevalence and associated factors shows the prevalence of low birth weight was 25.5 %(9). The reason behind this was in our study most of sample came from cold and urban area that means most of our sample were awared about vaccine during pregnancy and diet effect besides that malaria is more prevalence in low land like Bahirdar and Gonder.

EDHS 2016 data shows that 13 percent babies weighed less than 2.5 kilograms. As noted, a mother's subjective assessment of the size of the baby at birth, in the absence of birth weight, may be useful. Mothers reported 21 percent of all live births in the five years preceding the survey than average. Nearly three children of every ten born to mothers residing in Afar

(30 percent), Amhara (28 percent), Somali (26 percent), and Gambela (27 percent) were reported as very small at birth (16).

Prevalence and Determinants of Small Size Babies in Ethiopia Results from in-depth Analyses of the Ethiopian Demographic and Health Survey -2016. This In-depth analysis of the Survey dataset was conducted using representative data collected from all regions in the country and An average of 30.3% of Ethiopian babies were reported as small at birth by moms and a non-linear but declining trend was observed during the study periods (29).

On the other hand the finding of this study was higher than study done in Iran on the prevalence and some associated factors in Iran on 461 newborn infants in which 221 boys (47.9%) and 240 girls (52.1%) shows that the prevalence of low birth weight was 6.7 % (18) respectively.

Another study done in similar area in Iran on the prevalence and associated factors of LBW shows the prevalence was 6.3 % (19).

A facility based cross sectional study conducted on the Prevalence and associated Factors of Adverse Birth Outcomes among Women Attended Maternity Ward at Negest Elene Mohammed Memorial General Hospital in Hosanna Town, SNNPR, Ethiopia showed the prevalence of LBW was (9.8%)(1).

A comparative cross sectional study on The Prevalence and factors associated with low birth weight in Axum and Laelay Maichew Districts, North Ethiopia shows the prevalence of low birth weight was 9.9% and 6.3% in Axum and Laelay Maichew districts, respectively (16).

Another Multiple Indicators Cluster Survey (MICS) study done in Ghana on the prevalence of Low Birth Weight showed that the prevalence of LBW was 9.2% (21). In addition to the Prevalence and determinants of low birth weight done in Nigeria in Benin city was 6.3% (13).

Institutional based cross sectional study on Adverse birth outcomes among deliveries at Gondar University Hospital, Northwest Ethiopia shows that the prevalence of low birth weight was 11.2%(2).

The finding of this study was nearly consistent with , cross sectional study done on low birth weight among neonates born at Olkalou District Hospital, Central Region, Kenya shows the prevalence of LBW was 12.3%(23).

It is also consistent with maternal associated factors of low birth weight: a hospital based cross-sectional mixed study in Tigray, Northern Ethiopia in 2015 shows the prevalence of LBW was

found to be 14.6 % (95 %CI = 12.56-16.61)(4).the difference in the finding of the results could be due to study setting and the different sample size used in the different studies.

6.1. Factors associated with neonatal birth weight, at SPHMMC Addis Ababa, Ethiopia

The finding of this study shown that, history of low birth weight $p=0.036$, AOR 0.28, CI (0.08- 0.92), having previous history of malaria [$p=0.002$, (AOR 0.097 95%CI 0.022- 0.4270)] and gestational age of current pregnancy [$P=0.000$, (AOR 0.021 95% (0.004- 0.01)] were significantly associated with low birth weight of neonates with p-value less than 0.05, this can be interpreted as, those mothers who have no history of low birth weight were 72% less likely to had low birth weight babies, in addition those mothers who had no history malaria infections were about 90% less likely to have low birth weight infant and finally those mothers beyond 32 weeks gestational age were about 98% less likely to had low birth weight babies. The finding of this study is consistent with, a Cross Sectional Study conducted on the Prevalence and Factors Associated with Low Birth Weight among Teenage Mothers in New Mulago Hospital were young maternal age and ANC attendance were not associated with LBW(16).low birth weight has bi-variate with use of antenatal care facilities and gestational age. (28). This study also consistent with a Cross Sectional Study in Uganda which shown the gestational age less than 37 weeks had higher risk of delivering low birth weight comparing with those who had gestational age of greater than or equal to 37 weeks [AOR 3.302; $P = 0.00001$](4).

6.2. Limitation and strength of the study

6.2.1. Limitation of the study

- Shortage of time and budget
- Some of the folders retrieved contained inadequate information and this affected the may affect the quality of the study.
- In addition, the study was conducted in one Hospital and the finding, could not represent the general population.

6.2.2. Strength of the study

- The major strengths of this study was it focus on the sensitive issue which leads to chronic problem.

7. Conclusion

Low birth weight is common and accounts for 13.6 % in SPMMC .Maternal use of diversified food during and before pregnancy had a protective effect against low birth weight.

8. Recommendation

- Large community-based studies in different geographical, environmental and socio-economic settings should be conducted in Ethiopia to determine the prevalence of low birth weight infants in the general population
- Every health service provider should give attention to aware women minimum dietary diversity
- Information on dietary diversity could be disseminated through health institutions, mass media and at community level through Kebele.
- NGOs like UNICEF should be integrated to solve the associated factors of low birth weight

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Acknowledgment

We would like to acknowledge our GOD, St. Paul's hospital millennium medical college for facilitating this opportunity for us to perform research project by preparing this research paper. Our heartfelt thanks goes to our advisor Michael Tamene (BSC, Msc/MRH Assistant professor) for his continuous help equipping us with the necessary knowledge, information and confidence to prepare this research paper.

10 ANNEX

Annex I Informed Consent form

Hello,

My name is _____. I am a student at SPMMC; I am carrying out a study to assess low birth weight and its associated factors at this institution

You will be required to answer questions during an interview that will last approximately 15 minutes, and then your child measurements of weight will be taken. There are no direct benefits during this study. However, it is hoped that the information obtained will be used to advise on improvement of low birth weight in the country. All information provided will remain confidential and will only be reported as group data with no identifying information. All data, including questionnaires will be kept in a secure location and only those directly involved with the research will have access to them. After the research is completed, the questionnaires will be destroyed. Participation in this research study is voluntary. You have the right to withdraw at any time or refuse to participate entirely. Your co-operation will be highly appreciated.

Interviewer's signature: _____

Date: ____/____/2022

Do you agree to proceed with the interview?

Yes, I agree /__/

No, I don't agree /__

Annex II .Questionnaires

English version questioner

Name of Data collectors: ----- Date: -----Qualification: ----- Data

Collector agreement

“I certify that I have filled the questionnaire in accordance with the training that is given to me and instructions stated in it. I have confirmed that the information in it is correct.”

Signature----- Date----- Name of the health facility: -----Record number (code):-----

Checked by supervisor for completeness; Supervisors Name: -----Signature-----

Part 1: Demographic and socio-economic characteristics of the mother

101 Age of the mother at delivery	
102 Religions	1. Muslim 2. Orthodox 3. Protestant 4. Others
103 Maternal Educational status	1. Not read and write 2. Read and write 3. Primary education 4. Secondary education and above
104 Where are you living?	1. Rural 2. Urban
105 Marital status	1. Single 2. Married 3. Divorced 4. Widowed
106 What is your occupation?	1. Farmer 2. Merchant 3. Housewife 4. Government employed 5. If Other specify

Part 2. Maternal factor.

201 Number of previous births (include term and premature deliveries)	1. 1 2. 2-3 3. 4-5 4. ≥ 6 5. no
202 What is the pregnancy interval of the Previous birth? (months)	1. <12 2. 12-24 3. >24 4. no
203 Desirability of pregnancy	1. 1. Yes 2. 2. No
204 Previous history of low birth weight	1. Yes 2. No

205 Did you have pregnancy complication during the current pregnancy?	1. Yes 2. No
206 If yes for question no.20, what type of pregnancy complication?	1. APH 2. PROM 3. PIH 4. Mention if any-----
207 Did you have chronic medical illness during pregnancy? -----	1. Yes 2. No
208 If yes for question number 207, what type Of illness? (TB, HIV, DM, PIH)-----	1.TB 2.HIV 3.DM 4.PIH
209 Did you have malaria infection during the current pregnancy?	1. Yes 2. No
210 Did you have STI during the current pregnancy which is confirmed?	1. Yes 2. No
211 If yes for question no.209, what type of infection?	1. Syphilis 2. Gonorrhea 3. Chancroid
212 Did you have anemia for the current pregnancy that is confirmed with healthcare personnel?	1. Yes 2. No
213 Gestational age of current pregnancy at delivery (in weeks)-----	1.28-32 2. 33-37 3.38-42 4. >42
214 did you have ANC visits for the current pregnancy?	1. Yes 2. No
215 Which month of pregnancy did you start antenatal visits? (record in weeks) -----	1. <16 2. 16-24 3. 25-32 4. other
216 Number of ANC visits attended -----	1. 1 2. 2 3. 3 4.4 5.Above
217 Iron/folate intake during pregnancy?	1. Yes 2. No
218 If yes for question no. 217how many tablet have you ever taken?	1. <60 tablets 2. 60-90 tablets 3. >90 tablets

Part 3: Maternal Behavior and Nutritional factors

301 Have you ever advised about dietary intake during ANC follow up?	1. Yes 2. No
302 Did you take extra feeding during pregnancy?	1. Yes 2. No
303 Were you smoking cigarettes during the	1. Yes 2. No

current pregnancy?	
304 Were you taking alcohol during the current pregnancy?	1. Yes 2. No
305 Were you chewing chat during the current pregnancy?	1. Yes 2. No

Part 4: Newborn Factors

401 Birth weight of live birth baby (kg.) -----	
402 Sex of the newborn	1. Female 2. Male
403 sible congenital defect	1. Yes 2. No

Annex III ASSURANCE OF INVESTIGATOR

The undersigned agrees to accept responsibility for the scientific, ethical and technical conduct of the research project and for provision of required progress reports as per terms and conditions of the Research or /and Department of neonatal nurses of St Paul's Hospital Millennium Medical College.

Name of Student_____ Date_____ Signature_____

Name of Student_____ Date_____ Signature_____

Name of student_____ Date_____ Signature_____

APPROVAL OF ADVISOR

Name of the adviser : **Michael Tamene (BSC, Msc/MRH Ass,t professor).....**