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Review Article

Low Birth Weight and Its Associated Factors among Neonates Born in the Public Health Institutions of Nekemte Town, East Wallaga Zone, West Oromia, Ethiopia

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ABSTRACT

Background: Birth weight is an important indicator to judge the survival chances of the new-born. Many of the new-born die during their first year of life because of low birth weight as they become the victims of protein energy malnutrition and infection. Low birth weight has intergeneration effect in Ethiopia. However, no other study has been conducted on status of birth weight in the study area. Hence, the need to conduct this study was to provide current information about the birth weight and associated factors among neonates born in public health institutions in Nekemte town, East Wollega zone, Oromia, west Ethiopia.

Objective: To assess neonatal birth weight and its associated factors among births at public health institutions providing delivery service in Nekemte town.

Method: A community based cross-sectional study was conducted among 340 mothers who gave birth in Nekemte town in the public health institutions from September 10/2014 to December 10/2014. Simple random sampling was used to identify study unit. Data were collected using a pretested and structured questionnaire by a face-to-face interview technique and the neonate was weighted recorded. Logistic regression analyses method was used to check associations and control confounding.

Result: 62(18.2%) neonates born with low birth weight. Hypertension [AOR =1.64;95% ,CI=(1.543, 2.39)], gestational age less than 37 weeks[AOR =12.08, 95% CI=(1.020 , 2.354)], family size [AOR= 5.719, 95%,CI= (1.660,3.703)], birth spacing duration [AOR=4.1828,95% CI=(1.086, 3.389)], HIV/AIDS [(AOR= 4.072,95%CI=1.842, 2.005], source of drinking water[AOR 2.485;95%, CI=1.053, 5.865)], were some of the major risk factors revealed to affect birth weight.

Conclusion: The prevalence of low birth weight was high in the study area. The finding of this study revealed that: birth spacing, HIV/AIDS, source of drinking water, family size, and hypertension during pregnancy were significantly associated with birth weight. Thus, since the low birth weight has intergenerational effect, an organized effort should be made at all levels to improve the birth weight of neonates.Keywords: Pingchan granule; Motor function; Non-motor function; Sleep; Autonomic function; Psychological disorders; Quality of life.

Keywords: Birth weight; Neonates; Maternal factors; Cross sectional study

INTRODUCTION

Birth weight (BW) is an alarming indicator to judge the survival chances , even in the future adult life of the new-born. Many of the newborn die during their first year of life because of low birth weight (LBW).As they become the victims of protein energy malnutrition and infection, and LBW is defined by WHO, as a BW less than 2.5 kg. Out of estimated 25 million LBW babies born each year, nearly 95% are in developing countries. LBW perpetuates the intergenerational cycle of poverty, under nutrition and disease. The prevalence of LBW is 15%, 12%, and 11% globally, in Africa and Ethiopia respectively, while only 5% neonate's birth weight is measured in Ethiopia [1-4].

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MATERIALS AND METHODS

Study design and period

An institution based cross-sectional descriptive study to determine the prevalence and associated factors of Birth Weight was undertaken in Nekemte town (in two health centers and one referral hospital) from September 10/2014 to November 10/ 2014. The samples were selected consecutively until the required sample size (n=340) reached.

Source population and study population

All laboring mothers and their neonates at the governmental health institutions providing delivery service during the study period were the source population. All sampled laboring mothers who gave live births with their respective neonates at governmental health institutions providing delivery service in Nekemte town during the study period.

Inclusion criteria and exclusion criteria

All mothers who were able to give necessary information and their neonates in governmental health institutions of Nekemte town during the study period were included, while still births, critically ill mothers, who don't respond to the questions, critically ill neonates whose weight couldn't be measured were excluded in this study.

Sample size determination

Sample size calculation was done by single population formula, based on, the prevalence of low birth weight found at kersa that was 28.3, 5% confidence limit, and 95% confidence level.

Sampling technique and procedure

According to the 2006 EC report, among all deliveries conducted in public health institutions of Nekemte town, 85% is at Nekemte hospital, while 10% and 5% is at Nekemte and Cheleleki health centers respectively. After obtaining consent from the selected laboring mothers, face to face interview was carried out, then blood sample was taken by the data collectors and tested by lab technologist for Hgb level, their new born baby's birth weight was measured in kilo grams by digital scale until the expected sample size becomes field. Then their Hgb level on previous ANC visits was traced back from their ANC attendance record(if they have) to see either the Hgb level was increasing, decreasing or same throughout the pregnancy, or not having the visit, and associate with neonatal birth weight [5].

Data collectors

Data were collected by 3 midwives who were well experienced in delivery care and measuring accurate weight of newborns were recruited and training including role play was given on techniques of data collection. The investigator supervised the data collectors randomly while the data collector conduct interviewing of the mothers and taking weight of the newborn babies, and verified 10% of the completed questionnaire to check consistency between interviewers, and then was taking corrective actions. The questionnaire is prepared in such a way that each signed by interviewers and their whole name will be written and this make an interviewer responsible for proper administration of the material.

Operational definition

Birth weight of neonates: The first weight of the fetus or newborn obtained after birth. For live births, birth weight should preferably be measured within the first hour of life, before significant postnatal weight loss has occurred. using a digital scale adjusted on zero, and without wearing any clothes on body of the baby and defined as following: Normal birth weight : Birth weight is 2.5 kg -4.0 kg; Low birth weight :Birth weight Less than 2.5kg; Very low birth weight: Birth weight less than 1.5 kg at birth.

Pretesting the questionnaire

Before data collection, the instrument was pre-tested 17 mothers with neonates. The necessary modifications and corrections were made on the questionnaire before it is used for the actual study.

Study variables

Birth weight of the neonates' was Dependent variable, while Socio-demographic factors, maternal health status, maternal nutrition, maternal health services utilization, Mother environmental factors, Neonatal factors

Data processing and analysis

The coded quantitative data were checked for completeness, double entered in to a computer, cleaned, and processed and analyzed using SPSS windows version 20.0. Descriptive statistics and binary logistic regression analysis methods were used. A binary logistic regression analysis was performed to determine the association. Statistical association was checked by 95% confidence interval and crude odds ratio. The significant variables (p-value <0.5) observed in bivariate analysis were subsequently included in multivariate analysis to control confounding factors. Finally, 95% confidence interval and adjusted odds ratio were reported. P value less than 0.05 were considered as statistically significant.

Data quality control

Quality control measures were employed during data collection and analysis. Before data collection data collectors and supervisors were trained on procedures. The data were verified by the investigator and were cleared and edited daily. Data collection instrument was translated to local language (Afan Oromo) and pretest of the study tools was done before data collection and accordingly necessary corrections were undertaken.

Ethical consideration

Ethical approval was obtained from Wollega University ethical approval committee. A formal letter of cooperation was written to each health facilities from Wollega University. After the purpose of the study is explained, written consent was obtained from each study participant. Participants were informed that participation is on voluntary basis and that they can withdraw at any time if they are not comfortable about the question. Participants were assured that their names or personal identifiers are not included in the written questionnaire to ensure confidentiality [6].

RESULTS

Socio-demographic factors

In this study, a total of 340 deliveries , from which only 4 were twins from the two health centers(Nekemte health center and cheleki health center) and one referral hospital(Nekemte referral hospital) included with the response rate of 100%. The socio demographic study identified that the mean (+ SD) age of the mothers were 25.5(+ 4.7) years and majority, 145(42.6%) of the mothers were in age of 20-24 years followed by those of 25-29, 98(28.8%), while 21(6.2%) were under nineteen years. The pre dominant religion among the mothers was protestant, 272(80%), followed by Orthodox, 43(12.6%).Most, 302 (88.8%) of the mothers were Oromo from the nations and nationality groups. Analysis of the educational status showed that 110 (32.4%) have education level of one to eight grades, followed by those with no education, 92(27%). Family income was determined based on the response of mothers to the question of what is source of income for the house hold in cash or physical. The average birr they can get monthly was registered as house hold monthly income, then categorized based on East African Medical Journal July 2006. 142(41.8%) of the mothers have monthly income of 251-750ETB, followed by those with monthly income of less than 250 ETB (40.9%).

The mothers' response to their occupational status pointed out that the majority 193 (56.8%) of the mothers who gave birth in the health institutions were housewives, while 54 (15.9%) were daily laborers, 36 (10.6%) were government employees, 30 (8.8%) were traders and the rest 27(7.9%) were students. Among the mothers included in this study, majority 320 (94.1%) of them were married, while 10 (2.9%) were single, and the rest 8 (2.4%) and 2(0.6%) were divorced and widowed respectively.

Socio demographic factors on birth weight

Among the total births studied (n=340) in the three health institutions in Nekemte town during the study period 62(18.2%) were under weight (<2.5kg). From the socio-demographic factors ethnicity and family size of the mother were having statistically significant association (PV<0.05), while the mothers' education, age, monthly income, religion and marital status didn't show significant association with birth weight of the neonates.

Maternity and maternal health related factors

The result of the current study showed that majority 139 (40.9%), 182(53.5%),151(44.4%), 286 (84%),280 (82.4%) have gravid one, para one, pregnancy spacing of great or equal to twenty four months, intended pregnancy, and negative HIV test results respectively. Ninety one (26.8%), sixty 0 (17.6%), and sixty four (18.8%) have health problems, hypertension and history of abortion respectively.

Maternal service utilization behaviors

This study identified that, from the maternal service utilization behaviors included, the frequency of ANC service utilization by the pregnant mothers (PV=.007), use of de worming drugs during the pregnancy time (PV=.01), were having statistically significant association with the birth weight of their neonate, while the attendance and the gestational age at which the mothers start the ANC service utilization, rest per day, and others did not have significant association (P-value>=0.05).

Mothers nutritional factors

From the indicators of maternal nutrition factors studied here in this study, the factor revealed to be statistically significant with the neonatal birth weight were weight of the mother, mother's (PV.021 hemoglobin at labor (PV=.01), violence from others (PV.01) The others like maternal height, MUAC, hemoglobin at first trimester were didn't show statistically significant association.

Environmental factors

From the environmental factors studied as the factors affecting birth weight of neonates born at public health institutions found in Nekemte town, the area where the mothers were live during the pregnancy (PV=.01), source of water mothers use for drinking (PV=.038) and infection with malaria (PV=.01) have statistically significant associations with birth weight, but fuel for cooking foods does not have association [8]. More mothers who live in urban use tap water and no history of malaria infection during the pregnancy gave babies with normal birth weight.

Factors related to the neonate

According to this study, the neonatal factors such as gestational age (PV=.001), birth order of the infant (PV=.023), Apgar score (PV=.01) and number of fetus (PV=.000) have statistically significant association with birth weight. gestational age of less than 37 weeks, fourth and above rank of birth order, and those with APGAR score less than seven neonates, and twin neonates have high rate of low birth weight. Though the twins were only four in number and it is difficult to compare it showed statistically significant association.

DISCUSSION

As to this study result, among the total (340) neonates whose birth weight was measured, 278(81.8) were with normal birth weight, while the rest 62(18.2%) weighed low birth weight (<2.5kg).This finding is less than the study finding at Jimma (Kersa) which was 28.3 % and Ghana which was 21.1%, but higher than the study result at Gondar town (17.4%), Gondar university hospital(17.1%), Sudan (12.6%), Tehran Iran (8.7%), EDHS 2011(11%) and almost equal to the findings at India which was 18.1%.Generally higher than the prevalence of LBW at global, Africa and Ethiopia.

Residence of the mother was statistically significant to the birth weight of the neonate; the mothers who live in rural area gave more low birth weight neonates than those living in urban area. This agrees with the findings of studies conducted at Ghana& Sudan. Parity was also significantly associated to birth weight in this study, similar to that of the study result in Sudan.

The finding of this study agrees to the study done in India that gestational age at delivery, frequency of antenatal visits, Hgb at third trimester were significantly associated to birth weight, but gestational age at 1st ANC visit, mothers' height, occupation and religion were not associated in contrast with the study in India. In contrast with the study done in Tehran, Iran and Jimma zone, Anthropometric measurements like, height MUAC of mother and ANC attendance were not associated with birth weight.

Family size, hypertension, HIV/AIDS, use of de worming drugs, violence on mother, source of drinking water, malaria infection were also the factors identified by this study become statistically significant to affect birth weight.

CONCLUSION

The prevalence of low birth weight in the current study area was high. The pregnancy induced hypertension, malaria infection during pregnancy, gestational age less than 37 weeks, family size, time between consecutive pregnancies, HIV/AIDS, frequency of utilization of ANC, Weight of mother, Hgb level at labor, violence, source of drinking water, birth order, APGAR score were the major risk factors for low birth weight.

Hence effective treatment and prevention of malaria and pregnancy induced hypertension; prevention of preterm birth, birth spacing by use of family planning, increasing maternal weight and Hgb by advising mothers on nutrition, promotion of use of clean and safe water and increasing frequency of ANC use could reduce low birth weight.

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COMPETING INTERESTS

The authors declare that they have no competing interests.

Authors' Contribution the authors' responsibilities were as follows:

TG participated in the design of the study, performed the data collection and the statistical analysis and served as the lead author of the manuscript.

DW (PHD) & BM designed and supervised the study, and ensured quality of the data and made a substantial contribution to the local implementation of the study assisted in the analysis and interpretation of the data. All authors read and approved the manuscript. Authors' Information

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