

# Risk Factors for Low Birth Weight in Sidama Zone Government Hospitals, Southern Ethiopia, A Case-control Study

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## Research Article

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# Abstract

**Background:** Many studies had been conducted on the epidemiology of low birth weight (LBW) in high-income countries, however in countries like Ethiopia such evidence is scarce. The objective of this study was to assess the risk factors for LBW in Sidama zone.

**Method:** Hospital-based case-control study design with a total sample size of 480, 96 cases, and 384 controls from March to June 2018. Newborns were selected from three hospitals in the zone using simple random sampling techniques. Data were collected using a pretested questionnaire. Anthropometric measurements were made by following standard procedure. Risk factors for LBW were identified using multivariable logistic regression analysis. The output is presented using an adjusted odds ratio (AOR) with a 95% confidence interval (CI).

**Result:** Multivariable logistic regression analysis shows that urban place of residence [AOR=2.55(95% CI=1.15-5.82)], mothers who did not have iron supplement during pregnancy [AOR=12.5(95 CI=5.06-31.0)], premature birth [AOR=2.78 (95% CI= (1.27-6.06))] and history of pregnancy complication[AOR=7.60(2.03-28.45)] were found to be significant determinants of LBW.

**Conclusion:** Since the prevalence of LBW was more prominent in rural areas than their urban counterparts, socio-economic empowerment of rural women and community-based nutrition promotions programs should be given special emphasis. Strengthening efforts on availing basic health services and promoting education on nutrition during pregnancy also have positive inputs. Iron supplementation and nutritional assessment of women during ANC follow-up and providing interventions accordingly should be strengthening in all health facilities.

## Introduction

World Health Organization (WHO) defines Low birth weight (LBW) as weight at birth of less than 2500g. LBW is a significant public health problem worldwide and associated with a range of both short- and long-term consequences. This cut-off bases epidemiological observations in which infants weighing less than 2,500 g are approximately 20 times have higher risk to die than heavier babies (1-3). The immediate cause of LBW is being prematurity or intrauterine growth retardation(3).

Level of LBW is categorized in to three ordinal categories. Low birth weight is defined as less than 2500 grams, very low birth weight is less than 1500 g and extremely low birth weight is less than 1000 g. LBW infants are at risk of 50 percent greater chance of serious development problems and 5-10 points decrease in IQ point. It is also associated with long-term disabilities, including visual and hearing impairments, cardiovascular disease and diabetes in later life (2).

There is also significant inter-country variation in the prevalence of LBW across regions and within countries; however, the great majority of low-birth-weight births occur in low- and middle-income countries

especially those in South East Asia and Sub-Saharan Africa. People living in the highest socioeconomic status are more likely to receive adequate health care with care standards similar to those in high-income countries. Therefore, prioritizing populations group at greatest risk of LBW as well as those that are most likely to face obstacles in access to health and nutrition interventions is a global concern and fundamental for the success of large scale programs(4).

LBW globally estimated that about 15% to 20% of all births, which represents more than 20 million births a year. The level of low birth weight in developing countries (16.5 %) is more than double the level in developed regions (7 %)(4, 5).The prevalence has been indicating significant variations across regions and countries, in which high burden remains in low and middle-income countries with an estimated figure of 28%, 13% and 9% in South Asia, Sub-Saharan Africa and Latin America respectively. About 95.6 % of worldwide LBW is contributed from low income and middle-income countries. However LBW is a global concern, as some high-income countries are also faced high rates for their context with the prevalence of 7% (5, 6).

According to UNICEF and EDHS 2016 reports LBW prevalence in Ethiopia are 15% and 13% respectively(7, 8).The prevalence of LBW in Sidama zone were 16.5% whereas in Kersa and Dire Dawa town were 28.3% and 13.2% respectively(9, 10). According to EDHS 2016, averages of 10 % and 16% of Ethiopian babies were reported “small “and “very small” at birth in 2016 (8).

LBW has global public health significance, but there is a huge regional variation, which is burdened in the third world countries. LBW remains prodigious major burden for developing countries like Ethiopia. The colossal nature of LBW in Ethiopia a large number of infants had been passed away due to the severity nature of the problem. LBW is a good summary measure of multifaceted public health problems that include long-term maternal malnutrition in Ethiopia. However, information on birth weight was rarely available.

Greater knowledge about the socioeconomic risk factors of LBW could lead to a better evidence based interventions in Ethiopia aimed at reducing neonatal mortality. This study provides valuable information to the health professionals, researchers, regional health bureau and other stakeholders. By using this study, the above professional plan their resource for interventions and for researchers used this research result as a baseline for future studies. The result of this study also serves for Sidama as a baseline for other wide studies as well as for planning health intervention to improve the well being of children and women.

## **Methods**

### **Study design, Study population and sampling**

Hospital based case-control study was conducted in Sidama Zone, Southern Ethiopia. Sidama Zone is one of among fourteen zones of SNNP regional state. Hawassa, which is the legislative seat of the regional government, also serving as the capital city of Sidama zone. It is located 275 km away from the

Addis Ababa, the capital city of Ethiopia. All mother-child pairs who gave birth in the Sidama zone governmental hospitals during the study period were taken as source population whereas mother-child pairs who gave birth at three randomly selected hospitals were considered as study population. Using simple random sampling technique, three study hospitals were included into the study namely Yirgalem general hospital, Bona primary hospital and Leku primary hospital. Subsequently, sample size for each study hospitals was allocated proportionally by taking into consideration of their previous year three months' delivery performance. We randomly selected one case then for every single case, we took four controls until the required sample size fulfilled. Ultimately, 384 normal birth weight neonates (controls) and 96 LBW (cases) were enrolled.

## Data management and analysis

Data were checked for the completeness and consistencies. After that the data was coded and entered in to Epi data and then exported to the Statistical Package for Social Science (SPSS) IBM version 20. Frequency, proportion and measure of central tendency and dispersion were used to summarize information about dependent and independent variables. Table was used to present the data. Chi-square tests were used to compare case and control based on socio-demographic and other pertinent variables. Bivariable and multivariable logistic regressions were used to identify the independent factors related with LBW. Variables that have p value less than 0.25 in bivariable logistic regression analysis were taken to the multivariable model. To check model fitness, we used Hosmer and Lemeshow statistic. Adjusted Odds ratio (AOR) with 95% confidence interval (CI) and p-value was calculated to declare the significance.

## Results

### Socio-demographic and economic characteristics

The study included 384 controls and 96 cases. Table-2 summarizes and compares the socio-demographic characteristics of cases and controls. It is observed that the two groups were significantly different in many socio-demographic variables and socio-economic status. The mean ( $\pm$  SD) age of the mothers of controls and cases were 24.7 ( $\pm$  4.9) and 25.1 ( $\pm$  6.1) respectively but the difference was not significant ( $p=0.369$ ). About 65.0% of mothers who have NBW babies and 35.0 % of mothers with LBW baby live in the urban area ( $P=0.001$ ). More than half of mothers of respondent for controls and cases were Sidama in ethnicity 73.1% and 66.7% respectively ( $p=0.041$ ). More than two-third of mother of cases 71.9% and more than three-fourth of mothers of controls 94.5% were married ( $p=0.001$ ). About 22% of mothers in the control group and 38.5% of mothers from the case group did not have formal education ( $P=0.006$ ). The majority of the mothers of the control group 70.0% and mothers of case group 63.5% were protestant in religion ( $p=0.032$ ). Concerning monthly income more than one fourth of mothers of NBW babies (28.9%) and one fourth of mothers of LBW (25.0%) earning between 1501-2500 Ethiopian Birr ( $P=0.012$ ) (Table 1)

## Table 1

Distribution of mothers by socio demographic characteristics in Sidama Zone selected government hospital, Ethiopia, June 2018.

| Variables      | LBW       |      | NBW       |      | x <sup>2</sup> P-Value |
|----------------|-----------|------|-----------|------|------------------------|
|                | Frequency | %    | Frequency | %    |                        |
| Age (Years)    |           |      |           |      |                        |
| <20            | 15        | 15.6 | 36        | 9.4  | 0.369                  |
| 20-35          | 71        | 74.0 | 326       | 84.9 |                        |
| >35            | 10        | 10.4 | 22        | 5.7  |                        |
| Residence      |           |      |           |      |                        |
| Urban          | 34        | 35.4 | 252       | 65.6 | 0.001*                 |
| Rural          | 62        | 64.6 | 132       | 34.4 |                        |
| Ethnicity      |           |      |           |      |                        |
| Sidama         | 64        | 66.7 | 281       | 73.2 | 0.041*                 |
| Gurage         | 12        | 12.5 | 39        | 10.2 |                        |
| Amhara         | 10        | 10.4 | 35        | 9.1  |                        |
| Wollayta       | 10        | 10.4 | 28        | 7.5  |                        |
|                |           |      |           |      |                        |
| Marital status |           |      |           |      |                        |
| Married        | 69        | 71.9 | 363       | 94.5 | 0.001*                 |
| Divorced       | 27        | 28.1 | 21        | 5.5  |                        |
| Occupations    |           |      |           |      |                        |
| Housewife      | 46        | 47.9 | 198       | 51.6 | 0.004*                 |
| Merchant       | 15        | 15.6 | 60        | 15.6 |                        |
| NGO            | 12        | 12.5 | 12        | 3.1  |                        |
| Student        | 12        | 12.5 | 49        | 12.8 |                        |
| Gov't employee | 11        | 11.5 | 65        | 16.9 |                        |
|                |           |      |           |      |                        |
| Income         |           |      |           |      |                        |
| ≤1500          | 43        | 44.8 | 101       | 26.3 | 0.012*                 |
| 1501-2500      | 24        | 25.0 | 111       | 28.9 |                        |
| 2501-3500      | 16        | 16.7 | 88        | 22.9 |                        |
| >3501          | 13        | 13.3 | 84        | 21.9 |                        |

# Maternal obstetric and health care seeking characteristics

About 43.5% of mothers who have NBW babies and 27.1% of mothers who have LBW offspring had the recommended four and more ANC follow-ups during the index pregnancy (P=0.001). Almost 46.9 % of mothers with LBW and 17.0% mothers with NBW babies have gestational age of less than 37 weeks (P=0.001). Nearly half of mothers who given LBW (53.1%) and NBW infants (48.7%) were multiparous (p=.0.003) (Table 2).

Table 2

Distribution of mothers by obstetric and health care seeking characteristics in Sidama Zone selected government hospital, Ethiopia

| Variables                                     | LBW       |      | NBW       |      | x <sup>2</sup> P Value |
|---|-----------|------|-----------|------|------------------------|
|   | Frequency | %    | Frequency | %    |                        |
| ANC visit                                     |           |      |           |      |                        |
| One Visits                                    | 23        | 24.0 | 13        | 3.4  | 0.001*                 |
| Two visits                                    | 19        | 19.8 | 62        | 16.1 |                        |
| Three Visits                                  | 28        | 29.2 | 142       | 37.0 |                        |
| >=4 visits                                    | 26        | 27.1 | 167       | 43.5 |                        |
| Gestational week at delivery                  |           |      |           |      |                        |
| ≥37   | 51        | 53.1 | 319       | 83.0 | 0.001*                 |
| <37   | 45        | 46.9 | 65        | 17.0 |                        |
| History of pregnancy complication             |           |      |           |      |                        |
| No  | 18        | 18.8 | 64        | 16.7 | 0.002*                 |
| Yes   | 78        | 81.2 | 30        | 83.3 |                        |
| Parity  |           |      |           |      |                        |
| Primi-Para                                    | 35        | 34.5 | 166       | 43.3 | 0.003*                 |
| Multi-Para                                    | 51        | 53.1 | 187       | 48.7 |                        |
| Grand multi-Para                              | 10        | 10.4 | 31        | 8.0  |                        |
| *significant association at P- value of 0.05. |           |      |           |      |                        |

## Maternal nutritional factors

Height and MUAC of the mothers were measured. Additionally, during pregnancy nutritional advice, iron intake level and hemoglobin level were assessed. Around 95.3% of mothers who have NBW infant and 84.5% of mothers who have LBW infants have maternal height of greater than or equal to 145cm (P=0.002). Almost 67.7% of mothers who have LBW babies and 61.5% of mothers who have NBW babies have MUAC of less than 23cm which is indicative of wasting (P=0.213). More than three-fourth (84.9%) of women who have NBW infants and more than half of mothers of LBW infants (62.5%) received nutritional advice during pregnancy (p=0.01). Almost 67.7% of mothers of LBW infants did not take iron during pregnancy whereas 69.5% of mothers of NBW infants took iron supplement during pregnancy (P=0.002). The mean ( $\pm$  SD) hemoglobin level of mothers who have LBW babies were 15g/dl ( $\pm$ 1.24 g/dl) whereas for mothers who have NBW babies were 14mg/dl ( $\pm$ 1.81g/dl) (p=0.250). Almost 14.1% of mothers with NBW babies and 18% of mothers with LBW babies have hemoglobin level of less than 11 mg/dl which is indicative of anemia (p=0.131) (Table 3)

Table 3

Distribution of mothers by nutritional and dietary factors in Sidama Zone selected government hospital, Ethiopia, June 2018.

| Variables                                     | LBW       |      | NBW       |      | x <sup>2</sup> P –Value |
|---|-----------|------|-----------|------|-------------------------|
|   | Frequency | %    | Frequency | %    |                         |
| Maternal Height                               |           |      |           |      |                         |
| ≥1.45cm                                       | 83        | 84.5 | 366       | 95.3 | 0.002*                  |
| <1.45cm                                       | 13        | 13.5 | 18        | 4.7  |                         |
| Maternal MUAC                                 |           |      |           |      |                         |
| <23cm   | 65        | 67.7 | 236       | 61.5 | 0.213                   |
| ≥23cm   | 31        | 32.3 | 148       | 38.5 |                         |
| Nutritional advice during pregnancy           |           |      |           |      |                         |
| Yes   | 60        | 62.5 | 326       | 84.9 | 0.001*                  |
| No  | 36        | 37.5 | 58        | 15.1 |                         |
| Number of meal per day                        |           |      |           |      |                         |
| ≥3  | 72        | 75.0 | 370       | 96.4 | 0.004*                  |
| <3  | 24        | 25.0 | 14        | 3.6  |                         |
| Iron supplement during pregnancy              |           |      |           |      |                         |
| Yes   | 31        | 32.3 | 267       | 69.5 | 0.002*                  |
| No  | 65        | 67.7 | 117       | 30.5 |                         |
| Maternal hemoglobin level                     |           |      |           |      |                         |
| ≥ 11 g/dl                                     | 78        | 81.2 | 330       | 85.9 | 0.131                   |
| < 11 g/dl                                     | 18        | 18.8 | 54        | 14.1 |                         |
| *significant association at P- value of 0.05. |           |      |           |      |                         |

## Risk factors for low birth weight

Bivariable logistic regression analyses for risk factors for LBW were performed. Maternal age, place of residence, marital status, maternal occupation, family monthly income, maternal height, maternal MUAC, number of children, number of ANC visit, gestational weeks at delivery, history of pregnancy

complications, parity, sex of the new born, nutritional advice during pregnancy, number of meal per day, iron supplement during pregnancy, hemoglobin level were analyzed. The analyses revealed that religion, ethnicity, place of residence, marital status, maternal educational status, maternal occupation, family monthly income, maternal height, maternal MUAC, number of ANC visit, gestational age at delivery, history of pregnancy complications, parity, sex of the new born, nutritional advice during pregnancy, number of meal per day, iron supplement during pregnancy, hemoglobin level have p-value of less than 0.25 in bivariable model. Multivariable logistic regression was carried out for risk factors, which have p-value less than 0.25 in bivariable logistic regression models. From this maternal residence, marital status, gestational age at delivery, history of pregnancy complications and iron supplement during pregnancy shows association with LBW.

Maternal residence has influence on birth weight. Compared to maternal residents, the odds of delivering LBW babies were 2.5 times more in rural than urban residents (AOR=2.52(95% CI=1.15-5.82). The odd of LBW in mothers whose marital status is divorced or widowed were nearly six times more as compared to those mothers who were married (AOR=5.97 (95% CI =2.19-16.28)).

The odds of LBW for gestational age less than 37 weeks were 2.78 times more as compared to the those whose gestational age greater than 37 weeks (AOR=2.78(95% CI=1.27-6.06)). Compared to mothers who have not history of pregnancy complication, the odd of delivering LBW were 2.67 times more in mothers who have history of pregnancy complication [AOR=7.60 (95% CI= (2.03-28.45)]. The odds of LBW for mothers who were not took iron during pregnancy is 12.5 times more LBW than those who took iron during pregnancy (AOR=12.5(95 CI=5.06-31.0) (Table 4).

Table 4

Output of bivariable and multivariable logistic regression analysis for risk factors for low birth weight in Sidama zone selected Hospital, June 2010

| Variable         | Frequency (%) |              | COR (95%CI)      | AOR (95%CI)       |
|------------------|---------------|--------------|------------------|-------------------|
|                  | LBW           | NBW          |                  |                   |
| Age (Years)      |               |              |                  |                   |
| <20              | 15 (15.6)     | 36 (9.4)     | 0.91(0.35-2.31)  |                   |
| 20-35            | 71 (74.0)     | 326 (84.9)   | 0.48(0.22-1.05)  |                   |
| >35              | 10 (10.4)     | 22 (5.7)     | 1                |                   |
| Residence        |               |              |                  |                   |
| Urban            | 34 (35.4)     | 252 (65.6)   | 1                | 1                 |
| Rural            | 62 (64.6)     | 132(34.4)    | 3.51(2.19-5.65)  | 2.55(1.15-5.82)*  |
| Marital Status   |               |              |                  |                   |
| Married          | 69 (71.9)     | 363 (94.5)   | 1                | 1                 |
| Divorced/Widowed | 27 (28.1)     | 21 (5.5)     | 6.76(3.61-12.64) | 5.97(2.19-16.28)* |
| ANC visits       |               |              |                  |                   |
| One visit        | 23 (24.0)     | 13 (3.4)     | 5.90(2.38-14.8)  | 3.82(0.94-15.41)  |
| Two visit        | 19 (19.8)     | 62 (16.1)    | 1.80(0.90-3.62)  | 0.87(0.29-2.59)   |
| Three visit      | 28 (29.2)     | 142 (37.0.2) | 1.28(0.71-2.32)  | 0.74(0.30-1.79)   |
| Four visit       | 26 (27.1)     | 167 (43.5)   | 1                | 1                 |
| Height           |               |              |                  |                   |
| ≥1.45m           | 83(84.5)      | 366(95.3)    | 1                | 1                 |
| <1.45m           | 13(13.5)      | 18(4.7)      | 3.18(1.50-6.76)  | 2.24(0.36-14.69)  |
| MUAC             |               |              |                  |                   |
| ≥23 cm           | 65<br>(67.7%) | 236 (61.5)   | 1                | 1                 |
| <23 cm           | 31 (32.3)     | 148 (38.5)   | 1.31(0.81-2.11)  | 0.91(0.45-1.84)   |
| Gestational week |               |              |                  |                   |

|  |            |            |                   |                   |
|--|------------|------------|-------------------|-------------------|
| ≥37  | 51 (53.1)  | 319 (83.0) | 1                 | 1                 |
| <37  | 45 (46.9)  | 65 (17.0)  | 2.82(1.72-4.61)   | 2.78(1.27-6.06)*  |
| History of pregnancy complication                                      |            |            |                   |                   |
| No   | 18 (18.8)  | 64(16.7)   | 1                 | 1                 |
| Yes  | 78 (81.3)  | 30 (83.3)  | 2.15(1.49-4.55)   | 7.60(2.03-28.45)* |
| Nutritional advice during pregnancy                                    |            |            |                   |                   |
| Yes  | 60(62.5)   | 326(84.9)  | 1                 | 1                 |
| No   | 36(37.5)   | 58(15.1)   | 3.37(2.04-5.55)   | 076(0.30-1.91)    |
| Iron supplement during pregnancy                                       |            |            |                   |                   |
| Yes  | 31 (32.3)  | 267 (69.5) |                   | 1                 |
| No   | 65 (67.7)  | 117 (30.5) | 12.32(6.81-22.28) | 12.5(5.06-31.0)*  |
| Maternal Hemoglobin level  |            |            |                   |                   |
| ≥ 11 mg/dl   | 78 (81.2)  | 330 (85.9) | 1                 | 1                 |
| < 11mg/dl  | 18 (18.8)  | 54 (14.1)  | 1.41(0.78-2.53)   | 1.63(0.38-6.90)   |
| Sex of newborn   |            |            |                   |                   |
| Male   | 45 (46.80) | 221 (57.5) | 1                 | 1                 |
| Female   | 51 (53.1)  | 163 (42.4) | 1.54(0.98-2.41)   | 1.29(0.62-2.47)   |
| * show statistically significant association for risk factors for LBW. |            |            |                   |                   |

## Discussion

The study assessed risk factors for LBW among mothers who gave birth at Sidama Zone government hospitals from March 21 to June 21, 2010 G.C. The results of this study revealed that maternal residence,

marital status, gestational week at delivery, history of pregnancy complications, iron supplement during pregnancy were independently associated with LBW. This study showed that some of the socioeconomic factors affect the weight of the newborn negatively. In this regard, mothers who resided in rural area were more likely to deliver LBW babies. This finding in agreement with studies conducted in Bale zone and Tigray region, Ethiopia (11, 12). The reason why rural mothers are at increased risk of delivering LBW might be due to low awareness and poor utilization of health services. These gaps may expose these mothers to low quality of antenatal follow-up and related services. Further, these women may lack adequate nutrition due to their rural residence. In this study, mothers who are divorced or widowed had increased chance of delivering LBW babies. The research conducted in Kenya shows that divorced or widowed mothers have higher odds of LBW(13). Divorced or widowed mothers may exposes more LBW due to financial, emotional and logistic (not having some who to help with errands and care of the home) problems (14). Unmarried status, especially being divorced, has been associated with stress and depression, which have been linked to increased risk of LBW Infants. There is possible explanation for the association between LBW, stress or depression and being widowed /divorced. Stress leads to increased maternal catecholamine release, which causes consequent adverse effects of placental hypo perfusion. Placental hypo perfusion causes growth impairment or uterine irritability and later LBW infants (15). Mothers who deliver less than 37 weeks of gestation are at higher risk for LBW. This finding in concurrent with study done in Tigray and Jimma (12, 16).When gestational age of the fetus falls below, the term level body weight of the fetus falls dramatically due to prematurity and will cause LBW infants (17). This finding also supported by research done in Southwest Ethiopia which concludes mothers who delivered before 37 weeks of gestation have physiological immature infants and causes LBW (18). Research done in Mulago hospital, Uganda reveals gestational weeks affect birth weight negatively. The reason for this is well recognized that as the gestational age of the fetus falls below the acceptable range of time, the body weight of the fetus falls dramatically due to prematurity (19). Mothers who did not supplemented iron during pregnancy had much higher odds of giving LBW babies as compared to those who had iron supplement. Iron and folic acid supplementation for pregnant mothers has a great importance to prevent anemia during pregnancy and has a positive effect on the supplementation of oxygen and nutrient to the fetus thereby enhance better health outcome for both the mother and the fetus (17, 18).Women who supplemented with iron were less probable to deliver LBW baby. It is due to the fact that, the growing fetus shares not only iron but also other nutrient from mother for its intrauterine development (20).This finding also agreed with study done in Wollayta Sodo town and Michew district, Ethiopia (21).

## Conclusion

Low birth weight is problem in Sidama zone public hospitals. This study revealed different risk factors associated with low birth weight. From socio-demographic factors, maternal rural resident and divorced or widowed marital status where identified as risk factors for low birth weight. History of pregnancy complication, prematurity and mothers who did not take iron supplement during pregnancy where among maternal factors identified as positively associated with low birth weight.

## **Abbreviations**

AOR: Adjusted odds ratio

ANC: Antenatal care

BW: Birth weight

BMI : Body Mass Index

CEO: Chief executive officer

CI: Confidence interval

COR: Crude odds ratio

DM: Diabetes mellitus

EDHS: Ethiopia demographic and health survey

HIV: Human immunodeficiency virus

IUGR: Intrauterine growth retardation

IRB: Institutional review Board

LBW: Low birth weight

MUAC: Mid upper arm circumference

NBW: Normal birth weight

## **Declarations**

### **Authors Contributions:**

TT designed the study, conducted data management and analysis, drafted and revised the manuscript. HH participated in the design of the study and revised the manuscript.

### **Acknowledgment:**

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officer (CEO) of Leku hospital, Mr. Guduna Eyamo, chief executive officer of Yirgalem hospital and Mr. Muluken Muntasha, chief executive officer of Bona hospitals for supporting me through any of my needs.

## **Competing interests:**

The authors declared no competing interests.

## **Funding:**

Not applicable

## **Ethical approval and consent to participate**

Approval of the research was given by Hawassa University Institutional Review Board (IRB). Prior to data collection the district administrators were contacted with a description of the study and purposes and consent was taken. Besides, verbal informed consent was obtained from participants (Mothers provided informed consent for themselves as well as children's participation) after a detailed explanation on the purpose and benefit of the study right before data collection. The authors also confirm that, all methods were performed in accordance with the relevant guidelines and regulations.

## **Consent for publications**

Not applicable for this section

## **Availability of Data and Materials**

The datasets used and/or analyzed during the current study are available from the corresponding Author on reasonable request.

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