

Infant Mortality and Its Predictors in Benshangul-Gumuz Region, Ethiopia: Further Analysis of 2019 Ethiopian Mini Demographic and Health Survey

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Abstract: Background: Infant mortality rate has dramatically been fallen in the last two decades globally. Ethiopia, with infant mortality rate of 34 deaths per 1000 live births, is among the countries with high infant mortality in Africa. The main purpose of this study was to investigate predictors of infant mortality in Benshangul-Gumuz region, Ethiopia. Methods: The source of data for this study was 2019 Ethiopian Mini Demographic and Health Survey (EMDHS). Multivariable logistic regression model was used to identify the predictors of infant mortality. Results: Multiple births and infants born from mothers aged 34 years and older were at higher risk of dying before celebrating their first birthdays. whereas females, infants born from mothers with secondary and higher education, infants born from mothers who had ANC visits of at least one time, and infants born at health institution were at lower risk of dying before celebrating their first birthdays. Conclusions: Infant mortality rate in region was high. Birth type, sex of child, maternal age, maternal educational level, place of delivery, and antenatal care visits were predictors of infant mortality in Benshangul-Gumuz region, Ethiopia. Hence, health institutional delivery is recommended in the region to minimize the infant mortality rate in the region.

Keywords: Predictors, Infant Mortality, Benshangul-Gumuz Region, Ethiopia

1. Introduction

Infant mortality rate has dramatically been fallen in the last two decades globally [1, 2]. Despite the dramatic decline in the infant mortality rate globally, low-and middle-income countries still share the largest burden of infant mortality [3-5]. Ethiopia, with infant mortality rate of 34 deaths per 1000 live births in 2021 [6], is among the countries with high infant mortality in Africa.

In spite of the reduction in infant mortality rate in Ethiopia over the past 14 years from 74 in 2005 to 47 in 2019 [7], it increased from 62 in 2016 [8] to 74 in 2019 [7] in Benshangul-Gumuz region in Ethiopia.

Region, residence, religion, employment status of mother, economic status, father's educational level, educational level, maternal age, mother's age at first birth, mother's marital

status, maternal anaemia, HIV status of mother, pregnancy type, diarrhoea, source of drinking water, birth type, parity, sex of child, birth order, place of delivery, body mass index, ANC visit and preceding birth interval were factors associated with infant mortality [9-36].

Benshangul-Gumuz region of Ethiopia with the infant mortality rate of 74, which is very high figure, is the region with the highest infant mortality in the country in 2019 [7]. Thus, the main objective of this study was to investigate predictors of infant mortality in Benshangul-Gumuz region, Ethiopia.

2. Methods

2.1. Data

The source of data for this study was 2019 EMDHS data.

A total of 530 live births were included in the study.

2.2. Variables of the Study

2.2.1. Response Variable

Response variable is the death of child before celebrating first birthday.

2.2.2. Explanatory Variables

The Explanatory variables were place of residence, sex of child, birth order, type of birth, parity, maternal educational level, maternal age, marital status of mother, household wealth index, ANC visits, maternal age at first birth, place of delivery, mode of delivery and source of drinking water.

2.3. Data Analysis

Multivariable logistic regression analysis was done to investigate the risk factors of infant mortality. The data were analyzed by SPSS version 26.

3. Results

3.1. Socioeconomic Characteristics and Results of Bivariate Analysis

Among the total live-born children included, majority of the infants 461 (87.0%) were born in rural areas. About 52.1 % were males and 47.9% were females. About half

(49.4%) had birth order of 4th and above. With regard to type of birth, majority (94.3%) had birth type of single and only 5.7% had multiple birth type. About 41.7%, 30.6% and 27.7% were born from families with total children ever born of 5 and more, 1 to 2, and 3 to 4 respectively. More than half (52.1%) were born from uneducated mothers. Majority (72.5%) were born from mothers aged less than 25 years. More than two-fifth (47.5%) were born from mothers whose age at first birth was less than 20 years. About 61% of the children were born from mothers from poor families. More than three- fourth (86.6%) of mothers attended the ANC follow-up during their pregnancies at least one time. About two-third (66.0%) of the children were born at health institutions. Majority (95.8%) of the children were born vaginally. About four-fifth (79.4%) were born from families who use protected source of drinking water (Table 1).

Of the total children, 43 (8.1%) died before their first birth day. The percentage of infant mortality was higher (8.7%) among rural children than urban ones (4.3%). The highest percentage of infant mortality (10.6%) was among children whose mothers had primary education. The higher percentage (10.6%) of the infant mortality was also observed among children born at home than children born at health institutions (6.9%). The higher percentage (8.5%) of the infant mortality was observed among children whose mothers did not attend the ANC visit (Table 1).

Table 1. Socioeconomic characteristics of the participants and bivariate analysis result of infant mortality in Benshangul-Gumuz region.

Variables	Count	Percent	Child died before celebrating first birthday		P-value
			Yes (%)	No (%)	
Residence					
Urban	69	13.0	3 (4.3)	66 (95.7)	0.044*
Rural	461	87.0	40 (8.7)	421 (91.3)	
Sex of child					
Male	276	52.1	24 (8.7)	252 (91.3)	0.002*
Female	254	47.9	19 (7.5)	235 (92.5)	
Birth order					
First	103	19.4	12 (11.7)	91 (88.3)	0.190
Second -Third	165	31.1	9 (5.5)	156 (94.5)	
Fourth and above	262	49.4	22 (8.4)	240 (91.6)	
Birth type					
Single	500	94.3	30 (6.0)	470 (94.0)	0.000*
Multiple	30	5.7	13 (43.3)	17 (56.7)	
Parity					
1-2	162	30.6	14 (8.6)	148 (91.4)	0.049*
3-4	147	27.7	7 (4.8)	140 (95.2)	
5 and more	221	41.7	22 (10.0)	199 (90.0)	
Maternal education					
No education	276	52.1	19 (6.9)	257 (93.1)	0.032*
Primary	208	39.2	22 (10.6)	186 (89.4)	
Secondary and higher	46	8.7	2 (4.3)	44 (95.7)	
Maternal age					
Less than 25	384	72.5	28 (7.3)	356 (92.3)	0.029*
25-34	35	6.6	7 (20.0)	28 (80.0)	
34 and above	111	20.9	8 (7.2)	103 (92.8)	
Mother's age at first birth					
Less than 20	252	47.5	14 (5.6)	238 (94.4)	0.041*
20-24	132	24.9	14 (10.6)	118 (89.4)	
25 and above	146	27.5	15 (10.3)	131 (89.7)	
Marital status of mother					
Never in union	2	0.4	0 (0.0)	2 (100.0)	0.555

Variables	Count	Percent	Child died before celebrating first birthday		P-value
			Yes (%)	No (%)	
Currently in union	497	93.8	39 (7.8)	458 (92.2)	0.998
Widowed/divorced/separated	31	5.8	4 (12.9)	27 (87.1)	
Household wealth index					
Poor	321	60.6	26 (8.1)	295 (91.9)	0.998
Medium	109	20.6	9 (8.3)	100 (91.7)	
Rich	100	18.9	8 (8.0)	92 (92.0)	
Source of drinking water					0.130
Protected	421	79.4	38 (9.0)	383 (91.0)	
Unprotected	109	20.6	5 (4.6)	104 (95.4)	
ANC					0.012*
No	71	13.4	6 (8.5)	65 (91.5)	
Yes	459	86.6	37 (8.1)	422 (91.9)	
Mode of delivery					0.531
Vaginal	508	95.8	42 (8.3)	466 (91.7)	
Caesarean	22	4.2	1 (4.5)	21 (95.5)	
Place of delivery					0.040*
Home	180	34.0	19 (10.6)	161 (89.4)	
Health institution	350	66.0	24 (6.9)	326 (93.1)	

*: statistically significant

3.2. Predictors of Infant Mortality in Benshangul-Gumuz Region of Ethiopia

This study revealed that sex of child, type of birth, education status of mother, age of mother, ANC visits and place of delivery were risk factors associated with infant mortality in Benshangul-Gumuz region of Ethiopia. The odds of infant mortality among females was 0.690 (AOR: 0.690, 95% CI: 0.342, 0.899) times lower than males. The odds of infant mortality among multiple births was 3.067 (AOR: 3.067, 95% CI: 2.313, 10.139) times higher than among singletons. The odds of infant mortality for those born from mothers with secondary and higher education was 0.460 (AOR: 0.460, 95% CI: 0.287, 0.885) times lower than among infants born from mother with no education. The odds of infant mortality for those born from mothers who had ANC visits was 0.597 (AOR: 0.597, 95% CI: 0.326, 0.709) times lower than among infants born from mothers who had not ANC visits. Similarly, the odds of infant mortality for those born in health institution was 0.611 (AOR: 0.611, 95% CI: 0.0294, 0.0899) times lower than among infants born from mothers who had not ANC visits. The odds of infant mortality for those born from mothers were older than 34 years was 1.539 (AOR: 1.539, 95% CI: 1.183, 9.802) times higher than among infants born from mother were younger than 25 years (Table 2).

Table 2. Predictors of infant mortality in Benshangul-Gumuz region, Ethiopia.

Variables	AOR	95% CI of AOR	P-value
Residence			
Urban	Ref		
Rural	2.208	0.580, 8.339	0.245
Sex of child			
Male	Ref		
Female	0.690	0.342, 0.899	0.038*
Birth type			
Single	Ref		
Multiple	3.067	2.313, 10.139	0.000*

Variables	AOR	95% CI of AOR	P-value
Parity			
1-2	Ref		
3-4	1.588	1.204, 1.799	0.327
5 and more	1.380	0.244, 5.502	0.221
Maternal age			
Less than 25	Ref		
25-34	1.009	0.837, 3.526	0.921
34+	1.539	1.183, 9.802	0.040*
Maternal education			
No education	Ref		
Primary	0.292	0.017, 0.619	0.482
Secondary and higher	0.460	0.287, 0.885	0.007*
Mother's age at first birth			
Less than 20	Ref		
20-24	1.813	0.748, 4.391	0.188
25+	1.354	0.503, 3.648	0.549
Place of delivery			
Home	Ref		
Health institution	0.611	0.294, 0.899	0.024*
ANC			
No	Ref		
Yes	0.597	0.326, 0.709	0.033*

AOR: Adjusted odds ratio, Ref: Reference group, *: statistically significant

4. Discussion

Among the total children include in the study, 43 (8.1%) died before the first birth day. The study revealed that females were less likely to die before celebrating their first birthdays than males. This result agrees with the result of the studies [37, 38]. Multiple births were at higher risk of dying before first birthday than singletons. This result agrees with the studies [29, 39, 40]. Children born from mothers who were 34 years and older were more likely to die before first birthday compared to those born from mothers who were younger than 25 years. Children born from mothers with secondary and higher education were less likely to die before first birthday than those born from mothers with no education. This result agrees with the studies [40-43]. Children born at health institution were less likely to die before celebrating their first

birthdays than infants born at home. This result agrees with the studies [10, 42]. Children born from mothers with ANC visits were less likely to die than those born from mothers with no ANC visits. This result agrees with the studies [40, 44, 45].

5. Conclusions

In this study, birth type, sex of child, maternal age, maternal educational level, place of delivery, and antenatal care visits were predictors of infant mortality in Benshangul-Gumuz region of Ethiopia. Hence, health institutional delivery is recommended in the region to minimize the infant mortality rate in the region.

Competing Interests

Authors declare that they have no competing interests.

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