

Prevalence and Predictors of Adverse Birth Outcome among Deliveries at Butajira General Hospital, Gurage Zone, Southern Nations, Nationalities, and People's Region, Ethiopia

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ABSTRACT

Background: Adverse birth outcomes are the most common public health problem in both developed and developing countries, including Ethiopia. This study aimed to assess the prevalence and predictors of adverse birth outcome among women who delivered at the Butajira General Hospital, Southern Nations, Nationalities, and People's Region, Ethiopia.

Methods: A Hospital-based cross-sectional study was conducted from March 06–27, 2019. Three hundred thirteen mothers' card was obtained using the systematic sampling method. A pretested checklist was used to collect data. Data were entered into Epi-data version 3.1 and analysed using SPSS version 24. Multiple logistic regressions were used to identify associated predictors of adverse birth outcome with 95% confidence interval. p value of <0.05 was considered significant.

Result: The overall prevalence of adverse birth outcome was 18.2%. The predictors of the adverse birth outcome were as follows: being rural residence [AOR=3.2; 95% CI (1.5, 7.7)], mothers aged 35 and above [AOR=8.7; 95% CI (3.1, 24.5)], history of abortion [AOR=2.4; 95% CI (1.1, 5.4)], and pregnancy complication [AOR=12.9; 95% CI (4.8, 35.2)].

Conclusion: Most factors associated with adverse birth outcome are manageable by means of appropriate pre-natal care and improving antenatal, intrapartum, neonatal care services and incorporating community-based health education within our limited resources.

Keywords: Adverse birth outcome; Predictors; Prevalence; Ethiopia

INTRODUCTION

Over the last two decades, the world made substantial progress in reducing mortality among children. Despite of these in 2017 alone, an estimated 5.4 million under age 5 died, mostly from preventable causes. Neonatal deaths account for a greater, and growing, share of all deaths among children younger than 5 [1]. An estimated 2.5 million new-borns died in the first month of life-approximately 7,000 every day most of whom died in the first week after birth. About 36% died the same day they were born, and close to three-quarters of all new-born deaths in 2017 occurred in the first week of life [2]. It accounts for about half (47%) of under-five child deaths [1-3]. The major causes of neonatal deaths are complications

of prematurity, intrapartum-related deaths, and severe neonatal infections [4,5].

Adverse birth outcome is a common and serious health problem globally. The rate of adverse birth outcomes has been increasing worldwide, including developed countries [3]. Preterm birth and low birth weight infants are at greater risk for mortality and a variety of health and developmental problems [6].

Preterm birth is defined as a live birth before 37 completed weeks of gestation [7]. Globally, 15 (9.5%) million babies are born too soon every year and more than ¾ occur in Africa and South Asia and this number is increasing. Over 1 million (35%) children die each year due to complication of preterm birth. It is leading

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cause of new-born deaths and now the second leading cause of death after pneumonia in children under the age of 5 [3,8]. Many survivors face a short term complications such as acute respiratory, gastrointestinal, immunologic, and central nervous system problems and long-term effects of preterm birth, including motor, cognitive, visual, hearing, behavioural, social-emotional, health, and growth problems, may not become apparent for years and may persist throughout a child's life into adulthood [9].

Low birth weight is defined as weight at birth less than 2500 gm [7]. Low birth weight continues to be a significant public health problem globally and is associated with a range of both short-and long-term consequences. Overall, it is estimated that 15% to 20% of all births worldwide are low birth weight babies, representing more than 20 million births a year. The great majority of low birth weight births occur in low and middle-income countries [10,11]. Low birth weight increases the risk for non-communicable diseases such as diabetes and cardiovascular disease later in life [12,13]. The consequences of low birth weight also include fetal, neonatal mortality and morbidity, poor cognitive development [14-16] and an increased risk of chronic diseases later in life [17].

A stillbirth is the birth of a new-born after 28th completed week (weighing 1000 gm or more) when the baby does not breathe or show any sign of life after delivery. Such deaths include antepartum deaths (macrated) and intrapartum deaths [7]. It is a shocking event that has considerable impacts on those affected [18-20]. In every year, 2.6 million stillbirths occur worldwide and 1.2 million occur after the onset of labour and congenital anomalies accounts for 9% neonatal death [21]. Furthermore, the adverse birth outcomes can have significant emotional and economic effects on the infant's family [19,22,23].

There have been a number of previous studies trying to identify associated factors of adverse birth outcome in several countries. However, the factors associated with adverse birth outcome are not the same across different cultures and socioeconomic statuses within a society. Recognized socio-demographic factors for adverse birth outcome rural resident [24,25], low level of maternal education [7,26-28], age of the mother less than 20 [24,28] and age of the mother (≥ 35) years [29]. Obstetric factors include primipara, unwanted pregnancy, previous history of adverse birth outcome [30], pregnancy complication [25,28,31-33,], premature rupture of membrane [28], induced onset of labor [9,30], no-antenatal care visit [33] and incomplete antenatal visit [37]. In addition, studies revealed that, the presence of chronic diseases [27,30], inadequate maternal age gain during pregnancy [7,26,27] and maternal anaemia [32] were factors of adverse birth outcome. As studies indicated, the prevalence of adverse birth outcome varies from place to place in Ethiopia. Prevalence of adverse birth outcome in different towns of Ethiopia is in a range of 18.3%-32.5% [29,31-34].

In Ethiopia, national reproductive health strategy 2014-2018 are developed in 2014 and have implemented a number of activities to improve birth outcomes are increased midwives and emergency surgeons, equip health center with basic obstetrics and new-born care equipment's, equip all hospitals to provide comprehensive obstetrics and new-born care, improving antenatal care and promoting institutional delivery, ensure availability of medicines, supplies and equipment's for antenatal care follow up, childbirth, postpartum and new-born care, improving referral system and health care financing [35].

However, adverse birth outcome seems to be a common cause of neonatal morbidity and mortality in Ethiopia. About 258 stillbirths (30 per 1,000 total births) occur every day [36] and 320,000 babies are born too soon each year and 23,100 children under five die due to direct preterm birth complications [37]. Hospital based studies conducted in Ethiopia show a high neonatal death due to preterm birth [38,39]. Furthermore, congenital anomalies are also another major contributor of neonatal death in Ethiopia (11.7%) [38]. Therefore, the need for further study is absolute to recognize the prevalence and predictors of adverse birth outcome.

METHODS

It was a hospital-based retrospective cross-sectional employed in Butajira Hospital from March 6-27, 2019. The source populations for the study were all cards for mothers who gave birth at Butajira hospital from February 1, 2018 to February 1, 2019. Study populations were randomly selected cards for mothers who gave birth at Butajira hospital from February 1, 2018 to February 1, 2019.

The sample size was determined by using the single population proportion formula. The following assumptions were used to estimate the sample size; the proportion of adverse birth outcome was taken from the study conducted at Negest Elene Mohammed Memorial General Hospital in Hossana Town (24.5%) [32], with 95% confidence interval and desired precision 5% and 10% missed item rate, the final sample size was 313 mothers' cards. Three hundred thirteen mother's cards were obtained using the systematic sampling technique. First, the sample frame was developed using maternity registration numbers from February 1, 2018 to February 1, 2019. Then interval was calculated by dividing total deliveries from February 1, 2018 to February 1, 2019. The first number was selected by using a lottery method from the first 10 maternal registration numbers. Finally, subjects (cards) were selected at every 10 interval and using selected card numbers of the mothers, the card was retrieved from the card room.

Data were collected by using a pre-tested checklist from maternal cards. The checklist was developed based on instruments that were applied in other related studies [32-35]. The checklist was designed to collect data on socio-demographic variables, obstetric related characteristics and medical illness. Data were collected by four clinical nurses. To ensure the quality of data collected from the mothers' card, first, a data collection instrument was pretested on 16 maternity records for the year 2017 and was modified to correct observed inconsistencies. Also, data collectors discussed on procedures of data collection techniques before data collection begun. Additionally, at the end of each day, the questionnaires were reviewed by the investigators, and corrective measures were undertaken. Adverse birth outcome: a mother who gave as low birth weight, preterm, congenital malformation or/and stillbirth, and was classified as: "Present" or "Absent".

Data were entered using Epi-data version 3.1 and exported to Statistical Package social science (SPSS), version 24 software for analyses. Descriptive statistics such as number, percent, mean and standard deviation were used to summarize and present major findings. Binary logistic regression analysis was used to identify factors associated with adverse birth outcome. First a bivariate logistic regression was carried out to select candidate for multiple logistic regression analysis. Multiple logistic regression was done

for variables that has p-value <0.25 during the bivariate logistic regression analyses to identify factors associated with adverse birth outcome. The degree of association between independent and dependent variables were assessed using odds ratio with 95% confidence interval. The p-value <0.05 was considered as statistically significant. The Hosmer-Lemeshow statistic had significant value of 0.84 which shows that it is not statistically significant so that the model was a good fit. Formal letter of permission was obtained from the Wachemo University College of medicine and Health sciences. Additionally, a letter of permission was secured from Butajira town health office and hospital authority.

RESULTS

Regarding to the socio-demographic characteristics of the mothers, 249 (79.6%) were in the age group of 20-34. The majority of them were married 309 (98.7%) and urban 214 (68.4%) by marital status and residence respectively (Table 1).

Concerning gravidity, 223 (71.2%) mothers were multigravida. Sixty-nine (22%) mothers had ever experienced abortion. Most of mothers 294 (93.9%) gave birth within 18 hours while 19 (6.1%) mothers stayed more than 18 hours on labor. Majority of mothers had antenatal care follow-up while 56.4% had four or above visits. Thirty five (11.2%) mothers faced the complication during the pregnancy among which the leading cause was pregnancy induced hypertension 17 (48.6%) followed by premature rupture of fetal membranes 12 (34.3%).

Among all deliveries, 36 (11.5%) had experienced complications, of which prolonged labor accounting 13 (36.2%), followed by malpresentation 12 (33.3%) and thirty-one (9%) women had ever experienced abortion. About onset of labour, 305 (97.2%) were spontaneous and thirty five (11.2%) mothers gave birth *via* caesarean section (Table 2).

Regarding medical illness, 26 (8.3%) mothers have a chronic medical problem. According to reports in the mothers' card, 7 (2.2%) mothers were HIV positive, 18 (5.8%) diagnosed urinary tract infection during the pregnancy and, in 27 (8.6%) of mothers, the haemoglobin level was less than 11 gm/dl (Table 3).

Prevalence of adverse birth outcomes

The overall prevalence rate of adverse birth outcome was 57 (18.2%). Out of these, 27 (8.9%) live birth were low birth weight, 20 (6.4%) preterm birth, 11 (3.5%) stillbirth, and 18 (5.8%) babies were with visible congenital malformation, respectively (Table 4).

Table 1: Socio-demographic characteristics of mothers who were gave birth at Butajira General Hospital from February 1, 2018 to February 1, 2019.

Variable	Frequency(N=313)	Percent
Age group		
<20	33	10.5
20-34	249	79.6
35 & above	31	9.9
Residency		
Urban	214	68.4
Rural	99	31.6
Marital status		
Married	309	98.7
Others	4	1.3

Table 2: Obstetric related characteristics of mothers who were gave birth at Butajira General Hospital from February 1, 2018 to February 1, 2019.

Variables	Frequency	Percent
Gravidity (N=313)		
Primigravida	90	28.8
Multigravida	223	71.2
Ever had abortion(N=313)		
No	244	78
Yes	69	22
Duration of labor(N=313)		
≤ 18 hours	294	93.9
>8 hours	19	6.1
ANC follow up(N=313)		
No	26	8.3
Yes	287	91.7
Pregnancy complication(N=313)		
No	278	88.8
Yes	35	11.2
Types of complication(N=35)		
Pregnancy induced hypertension	17	48.6
Antepartum hemorrhage	6	17.1
Premature rupture of fetal membranes	12	34.3
Onset of labor (N=313)		
Spontaneous	305	97.4
Induction	8	2.6
Mode of delivery(N=313)		
Normal vaginal delivery	248	79.2
Operative vaginal	30	9.6
Caesarean delivery	35	11.2
Complication during labour (N=313)		
No	277	88.5
Yes	36	11.5
Type of labor complication (N=36)		
Prolonged labour	13	36.2
Malpresentation	12	33.3
Obstructed labour	4	11.1
Others	7	19.4

Table 3: Medical factors among women who gave birth at Butajira General Hospital from Feb 1-2018 to Feb 1-2019.

Variables	Frequency	Percent
Chronic illness		
Yes	26	8.3
No	287	91.7
HIV status		
Negative	306	97.8
Positive	7	2.2
UTIs during pregnancy		
Negative	295	94.2
Positive	18	5.8
Hemoglobin level		
≥ 11g/dl	286	91.4
<11g/dl	27	8.6

Table 4: Prevalence of adverse birth outcome among mothers who gave birth at Butajira General Hospitals from Feb 1-2018 to Feb 1-2019.

Variables	Frequency	Percent
Sex of Fetus		
Female	142	45.4
Male	171	54.6
Fetal status		
Alive	302	96.5
Still birth	11	3.5
Birth weight of live birth baby (N=302)		
Normal birth weight (2500-4000 gm)	275	91.1
Low birth weight (<2500 gm)	27	8.9
Gestational age (N=313)		
Term (37-42weeks)	293	93.6
Preterm (<37weeks)	20	6.4
Congenital		
No	295	94.2
Yes	18	5.8
Adverse birth outcome		
No	256	81.8
Yes	57	18.2

Predictors of adverse birth outcomes

In multiple logistic regression analysis, mothers aged 35 and above, being rural residence, complications during the pregnancy and history of abortion were found to be predictors of adverse birth outcome. Mothers aged 35 and above were nearly nine times more likely experienced adverse birth outcome as opposed to women in the 20-34 age group [AOR=8.7, 95% CI (3.1, 24.0)]. Similarly, the presence of a pregnancy complication was nearly thirteen times more likely to have an adverse birth outcome than their counterparts [AOR=12.9, 95% CI (4.8, 35.2)]. Additionally, mothers who have been living in rural residence were more or three times more likely to encounter adverse birth outcomes compared to women who have been living in urban residence [AOR=3.2, 95% CI (1.5, 7.7)]. Moreover, those mothers who had a history of abortion were 2.4 times more likely to experienced adverse birth outcomes respect to their counterparts [AOR=2.4, 95% CI (1.1, 5.4)] (Table 5).

DISCUSSION

The overall prevalence rate of adverse birth outcome was 18.2% and is relatively similar to that reported in the Hospital based studies conducted in Hawassa and Nigeria were 18.3% and 19% respectively [29,40]. However, this study found out a lower prevalence compared to other studies conducted in Gondor [31], Hossana [32], Tigray [33], and Dessie [34], which were 23%, 24.5%, 22.6% and 32.5%. This variation may be due to difference in study design, study setting, sociocultural status, maternal and new-born health care services and various interventions undertaken between these study times. But also, this difference could be an indicator of effectiveness of the national strategies for new-born care services.

History of abortion was found to be predictors of adverse birth outcome and this was similar to a previous study done in Brazil [24]. Reason for such similarity cannot be clarified. Also, the mothers aged ≥ 35 was one of the predictor of birth adverse birth

Table 5: Predictors of Adverse birth outcome among mothers who gave birth at Butajira General Hospital from Feb 1-2018 to Feb 1-2019.

Variables	Adverse birth outcome		COR (95% CI)	AOR (95% CI)
	No	Yes		
Age group				
<20	32	1	0.2 (.02, 1.5).	1 (.09, 10.9)
20-34	215	34	1	1
35 and above (ref.)	9	22	15.5 (6.6, 36.5)*	8.7 (3.1, 24.5)**
Residence				
Urban (ref.)	197	17	1	1
Rural	59	40	7.9 (4.2,15.0)*	3.2 (1.5, 7.7)**
Gravidity				
Primi (ref.)	86	4	1	1
Multi	170	53	6.7 (2.35, 19.1)*	3.0 (0.8,11.4)
History of abortion				
No (ref.)	213	31	1	1
Yes	43	26	4.2 (2.245, 7.7)*	2.4 (1.1, 5.4)*
Mode of delivery				
Normal vaginal delivery (ref.)	212	36	1	1
Instrumental delivery	25	5	1.2 (0.4, 3.3)	1.1 (0.3, 4.2)
Caesarean section (C/S)	19	16	5 (2.3, 10.5)*	2.3 (.8,6.9)
Complications during pregnancy				
No (ref.)	243	35	1	1
Yes	13	22	11.7 (5.4, 15.4)*	12.9 (4.8, 35.2)**

Note: ** Significant at $p < 0.05$

outcome. This finding was almost found to be a universal fact, the mother's age increases the risk of obstetric complications also increases. Similar finding was also reported from the study done in Hawassa [29] which revealed that mothers aged 35 or above was more likely to experience adverse birth outcome.

Adverse birth outcome was also found to be associated with pregnancy complications in this study. Pregnancy complications that contributed to adverse birth outcome in this study may have resulted from insufficient antenatal care follow-up, and pregnancy related complications decreased blood perfusion to uterus, which lead to low birth weight, preterm delivery, and even fetal death. This finding is well known in literature [25,28,31-33]. Rural residence was predictors of adverse birth outcome, similar to what was reported in in Brazil [24], and Gambian [25]. It would have been more ideal, in developing country like Ethiopia maternal health care service distribution were not equal in the urban and rural residence. Also, the awareness of the rural mothers about maternal care services is low respect to the urban mothers.

The limitation of the study includes; data were collected from mothers card, in which some important variables were missing these highlighted as predictors of adverse birth outcome in different studies. Regarding dependent variable, different authors were defined in different way probable to scientifically under or over classifying adverse birth outcome is highly questionable.

CONCLUSION

Most factors associated with adverse birth outcome are manageable

by means of appropriate pre-natal care and improving antenatal, intrapartum, neonatal care services and incorporating community-based health education within our limited resources. Also, further study was recommended in the study area to include some vital variables and to develop an intervention plan.

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AUTHORS' CONTRIBUTIONS

Abdo RA, Halil HM and Kebede BA participated, in the conceptualization of the study design, data collection, and interpretation. Abdo RA analysed data and wrote the manuscript.

COMPETING INTEREST

We declare that we have no competing interests.

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