STILLBIRTH AND ASSOCIATED FACTORS AMONG WOMEN DELIVERED IN PUBLIC HOSPITALS, SOUTHWEST ETHIOPIA

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ABSTRACT

BACKGROUND: Stillbirth has decreased substantially worldwide in the past 40 years. Yet there is still a large gap in the incidence of stillbirth between developing and developed countries. Data on prevalence and main risk factors for stillbirth are limited in developing countries, including Ethiopia. Identifying the prevalence and risk factors of stillbirth is important for planning maternal and child health care services.

OBJECTIVE: To assess the magnitude and associated factors of stillbirth among women delivered at public hospitals in Southwest Ethiopia from February 01 to March 30, 2018.

METHODS: A cross-sectional study was conducted on 1,980 delivering women from randomly selected hospitals from February 01 to March 30, 2018. All women who gave birth at public hospitals of Bench-Maji, Kaffa and Sheka Zones during the study period were included. Data was collected by pretested questionnaire in a face to face interview and then entered to Epidata version 3.0 and exported to SPSS version 21 for analysis. Logistic regression analysis was carried out to identify independently associated factors at CI of 95% and significance level of P-value<0.05.

RESULTS: The magnitude stillbirth in this study was 99 per 1000 livebirths, 95% CI: 85 to114 per 1000 livebirths. Rural residence [AOR = 2.76 (CI 1.57-4.85)], maternal undernutrition [AOR = 2.99 (CI 1.90-4.72)], had no iron/folate intake during pregnancy [AOR = 8.26 (CI 4.82-14.16)], having delivery complication [AOR = 3.77 (CI 2.31-6.16)], induced labor [AOR = 2.25 (CI 1.26-4.00)] and underweight [AOR = 7.60 (CI 3.73-15.48)] were factors significantly associated with stillbirth.

CONCLUSION: In the study area magnitude of stillbirth was found as a public health concern. Residence, nutritional status, iron folate intake during pregnancy, delivery complication, induced labor, and low birth weight were factors significantly associated with stillbirth. This could call for improvement of nutritional status of the mothers; supplementation of iron folate during pregnancy; as well as prevention, early diagnosis and management of obstetric complications.

KEY WORDS: Stillbirth, factors, southwest Ethiopia.

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INTRODUCTION

The World Health oOrganization (WHO) defines stillbirth as a baby born dead at 28 weeks of gestation or more, with a birth weight of ≥1000g, or a baby length of ≥ 35cm [1]. An estimated 2.62 million stillbirths occurred in the world in?? the year 2015 [2]. In sub-Saharan Africa, an estimated 1,060,000 babies die as stillbirths [2]. Ethiopia is fifth of the top ten courtries in the world with the highest stillbirth numbers with stillbirth of 97,000 in 2015 [2].

The worldwide stillbirth rate has declined by 6.3%, from 24.7 stillbirths per 1000 births in 2000 to 18.4 stillbirths per 1000 births in 2015. But in the African region, there was only an annual decline of less than 1.4%. The stillbirth rate for developed countries is estimated between 3.4 and 3.5 per 1000 births, whereas for the developing world, the estimate ranges from 20 to 32 per 1000 births. Two thirds of all stillbirths occur in just two regions; South-East Asia and Africa [2-3]. It is estimated that babies who die before the onset of labor, or ante partum stillbirths, account for two-thirds of all stillbirths in countries where the mortality rate is greater than 22 per 1,000 births [4].

Stillbirth can trigger anxiety as parents attempt to cope with the crisis [5]. Grief can be devastating to the parents; the stillborn infant represents the loss of their future, "the world that should be." Although individual reactions are determined by cultural and religious beliefs, the birth crisis typically causes fear and worry as the family adapts. Sociocultural expectations of grief for varying gestational ages may not be congruent with the parents' experience. Some women have unexpected and profound grief after a first stillbirth [6]. The effects of stillbirth have a burden of funeral cost, loss of work, and resultingunemployment for parents [5].

From previous studies, preterm birth, increasing maternal age, history of stillbirth, reported hypertension, extremes of neonatal birth weight, cesarean delivery, operative vaginal delivery, and assisted breech delivery were all significantly associated with stillbirth [7-9]. Stillbirth is still major public health problem in Ethiopia. In general, epidemiological data on the magnitude and risk factors of stillbirth are important for planning maternal and child health care services in developing countries.

Though there are various studies conducted in low-income countries including Ethiopia [7, 10-12], there is no report about stillbirth and associated factors in the study area. Hence, this study assessed magnitude and associated factors of stillbirth among women delivered at public hospitals in Southwest Ethiopia.

METHODS AND MATERIALS

Study design and setting

An institutional based cross-sectional study was conducted in public hospitals found in Bench Maji, Sheka and Bonga zones namely, Mizan Tepi University Teaching Hospital, Tepi General Hospital, Chena Primary Hospital and Gebretsadik Shawo General Hospital from February 01- March 30/2018. The three zones Keffa, Benchi-Maji and Sheka are located 460km, 583km, and 633km far from Addis Ababa respectively [13]. The zones have one referral hospital, two general hospitals, three primary hospitals and 93 health centres. All of these facilities were providing delivery services. The zones has 1853 obstetric care providers

Sample size and sampling procedure

The sample size was calculated by using a single population proportion sample size calculation formula considering the following parameters. d = margin of error of 2% with 95% significance level, p=proportion expected prevalence of adverse birth outcome are 25% [11] and considering none response rate of 10% it gives as 1980. For the second objective we use different factors to calculate sample size; having low birth weight gives sample size of 855. We took the maximum and the final sample size was 1,980.

Simple random sampling was used to select public hospitals. The total sample size was allocated proportionally to the four selected public hospitals namely, Mizan Tepi University Teaching Hospital, Tepi General Hospital, Chena Primary Hospital and Gebretsadik Shawo General Hospital. Since

the study was based on delivery case flow, the source of population of each hospital was estimated from the past six months (July 2017 to December 2017) delivery report. The sample size allocation for each hospital was based on the total number of deliveries in the past six months prior to the study period. All women who gave birth in the selected hospitals during data collection period were interviewed.

Inclusion and Exclusion criteria

All laboring mothers who gave birth in the selected public hospitals were included and those mothers with multiple or twin pregnancy were excluded.

Data collection method

Both primary data collection and record review were implemented. The data was collected using pre-tested structured questionnaires in face to face interviews, follow-up from admission to discharge, MUAC(Mid Upper Arm Circumference) measurement using Shakir strip tape, and record review for hemoglobin test result. The questionnaire was developed based on instruments that were applied in different related studies[3, 11-12, 14-15]. Questionnaires were developed in English and translated to Amharic by expert, and translated back to English to see consistency of the question. The questions were grouped and arranged according to the particular objectives that they could address. The data was collected by trained first degree midwives.

Data quality control

The instruments were pretested by trained data collectors in Mizan and Sheko health centers among 99 delivering mothers before actual data collection and few modifications were made.

Operational Definition

Stillbirth: the birth of an infant that has died in the womb or during intra partum after 28 weeks of gestation.

Anemia: The hemoglobin level of a pregnant woman less than 11gm/dl irrespective of her trimester of pregnancy

Mid Upper Arm Circumference (MUAC): Measurement taken from the mothers' left extended & relaxed arm just at the mid-point of the tip of shoulder girdle and elbow using Shakir strip tape; MUAC <21cm(undernourished) and MUAC ≥21cm(normally nourished).

Baby weight: The weight of a naked neonate taken right after birth and/or within first hour after home delivery using ordinary baby weight scale; <2500gm (underweight) and ≥2500gm (normal weight).

Data management and analysis

Epidata software version 3.1 and Statistical Package for Social Sciences (SPSS) software version 21.0 was used for data entry and analysis. After organizing and cleaning the data, frequencies & percentages were calculated to all variables that were related to the objectives of the study. Variables with P- value of less than 0.25 in bivariate analysis were entered into the multivariable logistic regression analysis to control confounds so that the separate effects of the various factors associated with stillbirth could be assessed. Finally, variables with p-value less than 0.05 in multivariable logistic regression analysis were considered as independently significant association with stillbirth. Odds ratio was used to determine the strength of association with stillbirth.

Ethical Considerations

The letter of ethical clearance was obtained from Mizan-Tepi University, College of Health Science, Institutional Health Research Ethics Review Committee (IHRERC). Further permission was obtained from the Medical Directors of the selected health facilities. Confidentiality was maintained by making the data collectors aware not to record any identification information. After explaining the objectives of the study in detail, informed verbal consent was taken from all study participants. Privacy was maintained by using private room and examination screening during interview and follow-up.

RESULT

Socio-demographic characteristics of the participants

A total of 1,980 women participated in the study, with a response rate of 100%. Mean and standard deviation of the participants was 24.73(±4.82) years. Slightly less than half 905(45.7%) were rural residents/dwellers, and one fourth 505(25.5%) of

the study participants were unable to read and write. Almost all, 1,911,(96.5%) were married and more than three fourths 1,562(78.9%) were housewives in occupation (Table 1).

Obstetric characteristics of the participants

Regarding the intention of the pregnancies, almost all (1,888 or95.4%) of the pregnancies were intended. The majority (1826 or 92.2%) of

Table. 1. Socio-demographic characteristics of respondents in public hospitals of Benchi-Maji, Kaffa and Sheka zones, 2018.

Variables	Category	Frequency	Percent (%)
Age	15-19	178	9
	20-24	854	43.1
	25-29	585	29.5
	30-34	230	11.6
	35+	133	6.7
Residence	Rural	905	45.7
	Urban	1075	54.3
Educational status	Unable to read and write	505	25.5
	Able to read write(without formal education)	413	20.9
	Primary education	643	32.5
	Secondary education	263	13.3
	College and above	156	7.9
Marital status	Married	1911	96.5
	Single	40	2
	Divorced	7	0.4
	Widowed	10	0.5
	Separate	12	0.6
Religion	Orthodox	897	45.3
	Muslim	404	20.4
	Protestant	679	34.3
Occupation	Housewife	1562	78.9
	Merchant	177	8.9
	Gov't employee	126	6.4
	Non-gov't employee	22	1.1
	Daily labor	93	4.7

the participants had ANC follow-up and also the majority 1664(84%) took iron folate during the pregnancy. Regarding complications, 266 (13.4%) and 385 (19.4%) developed complication during pregnancy and delivery respectively. About one fifth 378 (19.1%) of the participants were anemic. 546 (27.6%) of the participants were undernourished and 148 (7.5%) of the newborns has low birth weight (Table 2).

Magnitude of stillbirth

The magnitude of stillbirth in this study was 99 per 1000 livebirths, (95% CI 85-114 per 1000 livebirths).

Factors associated with stillbirth

Twenty four variables were included in bivariate analysis and thirteen of them were included in the final model. Rural residence, undernutrition, no iron/folate intake during pregnancy, having delivery complication, induced labor, and being underweight were factors significantly associated with stillbirth.

Table. 2 Obstetric and nutritional characteristics of respondents in public hospitals of Benchi-Maji, Kaffa and Sheka zones, 2018.

Variables	Category	Frequency	Percent (%)
Pregnancy status	Intended	1888	95.4
	Unintended	92	4.6
ANC follow-up	Yes	1826	92.2
	No	154	7.8
Iron folate intake	Yes	1664	84
	No	316	16
Complication during current pregnancy	Yes	266	13.4
	No	1714	86.6
Hypertensive disorders of pregnancy	Yes	90	33.8
	No	176	66.2
APH	Yes	54	20.3
	No	212	79.7
Gestational age	<37weeks	182	9.2
	≥37	1798	90.8
Complication during current labor	Yes	385	19.4
	No	1595	80.6
Status of current labor	Spontaneous	1737	87.7
	Induced	243	12.3
Alive birth	Yes	1801	91
	No	179	9
Birth weight	<2500gm	148	7.5
	≥2500gm	1832	92.5
Anemia(using Hgb)	Yes	378	19.1
	No	1602	80.9
Nutritional status(using MUAC)	Under nutrition	546	27.6
	Normal	1434	72.4

Mothers from rural residence were three times more likely to face stillbirth as compared to their counterpart in urban areas [AOR 2.76, 95% CI (1.57-4.85)]. Mothers who did not take iron folate during pregnancy were eight times more likely to have stillbirth as compared to their counterpart [AOR 8.26, 95% CI (4.82-14.16)]. Mothers those whose MUAC was <21cm (undernourished) were three times more likely to have stillbirth as compared to those whose MUAC ≥21cm (normally nourished) [AOR 2.99, 95% CI (1.9-4.72)]. Mothers who developed complication during delivery were four times more likely to have stillbirth as compared to their counterpart [AOR 3.77, 95% CI (2.31-6.16)]. Mothers whose labor was induced were two times more likely to have stillbirth compared to spontaneous labor [AOR 2.25, 95% CI (1.26-4.)]. Mothers who had an underweight neonate were seven times more likely to have stillbirth as compared to mothers who had neonates of normal weight [AOR 7.60, 95% CI (3.73-15.48)] (Table 3).

Table. 3 Factors associated with stillbirth among deliveries in public hospitals of Benchi-Maji, Kaffa and Sheka zones, 2018.

Variable	Category	Stillbirth		COR (95% CI)	AOR (95% CI)
		Yes	No		
Residence	Rural	138	767	4.54(3.16-6.51)	2.76(1.57-4.85)*
	Urban	41	1034	1	
Educational status	Cannot write and read	77	428	4.25(2.47-7.32)	0.48(0.22-1.06)
	Read and write(without formal education)	37	376	2.33(1.29-4.20)	0.73(0.34-1.55)
	Primary education	48	595	1.91(1.08-3.37)	0.56(0.27-1.15)
	Secondary school and above	17	402	1	
Pregnancy status	Intended	160	1728	1	
	Unintended	19	73	2.81(1.65-4.78)	1.58(0.72-3.46)
ANC follow up	Yes	115	1711	1	1
	No	64	90	10.58(7.29-15.35)	1.61(0.84-3.07)
In take Iron folate	Yes	59	1605	1	
	No	120	196	16.66(11.79-23.52)	8.26(4.82-14.16)*
Current pregnancy complications	Yes	61	205	1	1
	No	118	1596	4.03(2.86-5.66)	1.76(0.96-3.22)
Current delivery complication	Yes	113	1482	2.71(1.96-3.76)	3.77(2.31-6.16)*
	No	66	319	1	1
Status of current labour	Spontaneous	135	1602	1	1
	Induced	45	198	2.64(1.82-3.82)	2.25(1.26-4.00)*
Nutritional status (using MUAC)	Normal (MUAC <21cm)	69	1365	1	1
	Under nutrition (MUAC ≥21cm)	110	436	4.99(3.63-6.87)	2.99 (1.90-4.72)*
Anemia (using HGB)	Yes	76	302	1	1
	No	103	1499	3.66(2.66-505)	1.08(0.645-1.83)
Status of birth weight	Normal	92	1740	1	1
	Under weight	87	61	26.97-18.29-39-79)	7.60 (3.73-15.48)*
Gestational age	37 and above weeks	94	1704	1	
	Less than 37 weeks	85	97	15.89(11.11-22.72)	1.69(0.85-3.36)

AOR= Adjusted Odd Ratio; CI= Confidence Interval, COR= Crude Odd Ratio; *=p-value <0.05

DISCUSSION

The magnitude of stillbirth was found to be 99 per 1000 livebirths (95% CI: 85-114 per 1000 livebirths). Moreover; rural residence, undernutrition, no iron/folate intake during pregnancy, having delivery complication, induced labor, and being underweight were factors significantly associated with stillbirth.

The findings of this study are consistent with the study done in Hosana which found 8.6 % of births per 1000 were stillbirths. [11]. In this study the magnitude of still birth is higher than the study done in Tanzania (2.7%) [14], Gondar University Hospital in Ethiopia (7.1%) [12], and Ghana (2.22) [10]. The discrepancy might be due study area difference, care provider competency, or the technology available in health facilities, and topography and infrastructure of the study. And also Additionally, health seeking behavior of pregnant mother in the study area might be not similar with mothers in Tanzania and Gondar. Additional studies are required to analyze the reasons for the differeing results.

In this study residence is significantly associated with stillbirth. Mothers whose who are rural residents were more likely to have stillbirth. This finding is congruent with study from Ethiopia [16]. Similarly, mothers who did not take iron folate during pregnancy were more likely to have stillbirth. This could be due to the fact that iron folate improves the level of anemia and anemia is one of the causes of stillbirth [16].

This study revealed that complication during delivery was significantly associated with stillbirth. Mothers who developed delivery complication were more likely to have a stillbirth. This finding is consistent with studies conducted in Zambia, Southern Ethiopia, and Gondar Ethiopia [7, 12, 17]. Maternal undernutrition is significantly associated with stillbirth. Undernourished mothers were more likely to have stillbirth. This may be due to the fact that maternal undernutrition can cause intrauterine growth retardation and result in low birth weight, and finally can result in stillbirth. This finding is in agreement with studies from Tanzania, Hosanna and Kembata Tembaro zone Ethiopia [11, 14, 17].

This study also revealed that induced labor was a risk factor for stillbirth. Mothers whose labor was induced were two times more likely to develop stillbirth as compared to their counterparts. This may be due to the fact that induction can result in tetanic contraction and finally result in fetal distress. Similarly, low birth weight is significantly associated with stillbirth. Neonates with low birth weight were more likely to be stillborn. This findings also consistent with studies conducted in Ghana, Zambia, Tanzania, Gondar, and Hossaina [7, 10-12, 14].

CONCLUSION

The magnitude of stillbirth in the study area was found to be higher than comparable regions. Residence, nutritional status, iron folate intake during pregnancy, delivery complication, induced labor and low birth weight were factors significantly associated with stillbirth. This could call for improvement of nutritional status of the mothers; supplementation of iron folate during pregnancy; in addition to prevention, early diagnosis, and management of obstetric complications.

DATA AVILABILITY

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

CONFLICT OF INTEREST

The authors declare that they do not have any conflict of interest in any aspect of the article.

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AUTHOR'S CONTRIBUTION

TL- The principal investigator designed the study, collected, analyzed and interpreted the data, and also drafted the manuscript. FW, TA, TM and LC - Participated in conceptualization of the study, design, analyses and interpretation of results as well as drafting and review of the manuscript. All authors read and approved the final manuscript.

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