

Magnitude and Obstetric Complications of Twin Deliveries at Nekemte Referral Hospital, Western Ethiopia: Facility-Based Case Control Study

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ABSTRACT

Background: Twin pregnancy is a high-risk pregnancy with increased risk of obstetric complications.

Objective: This study is to identify magnitude and obstetric complications of twin deliveries at Nekemte Referral Hospital.

Method: Hospital-based unmatched case-control study design was carried-out on 104 sets of twin deliveries as cases and 208 singleton deliveries as controls conducted in obstetrics ward of Nekemte Referral Hospital from March 1, 2016 to February 29, 2017. The data were collected through pretested structured questionnaires and analyzed using SPSS version 20.0. The association between twin delivery and different variables were assessed by using Odds Ratio (OR) along with 95%CI.

Results: The magnitude of twin deliveries was 28.6 in 1000 deliveries. The odds ratio of twin deliveries were significantly higher for the occurrence of hypertensive disorders of pregnancy, gestational diabetes mellitus, preterm delivery, pre-mature rupture of membrane, antepartum hemorrhage, cesarean delivery, anemia, postpartum hemorrhage, sepsis, and cord prolapse when compared to singleton deliveries.

Conclusion: The magnitude of twin delivery in this study was high and numerous maternal complications were identified when compared to singleton deliveries. Thus, twin deliveries need greater attention during pregnancy, delivery and after delivery.

Keywords: Obstetric complications; Twin delivery; Singleton delivery

INTRODUCTION

Twin pregnancy is a type of multiple birth in which the mother gives birth to two babies from the same pregnancy. It usually resulted from fertilization of two separate egg cells and rarely from single fertilized ovum. Its magnitude is generally increasing and varies across human populations [1-3].

Both the anatomic and physiologic changes of twin pregnancy vary from that of singleton pregnancy. Because of this fact, it is associated with increased risk of maternal and fetal complications both in the developed and developing countries. This is probably worse in sub-Saharan Africa, where quality and access to health facility is questionable and poverty is deep rooted [2-8].

In addition to high maternal, fetal and newborn morbidities, twin pregnancy causes more deaths to mother, developing fetus and babies when compared to singleton delivery [4]. Despite its

clinical and public importance, studies on the outcomes of twin deliveries and associated maternal complications are confined to few teaching hospitals in Ethiopia. Thus, it is very important to have baseline study on this issue in western Ethiopia.

MATERIALS AND METHODS

Study area, period and setting

The study was conducted in Nekemte Referral Hospital from March 1, 2016 to February 29, 2017 which is found in Nekemte town 331 km west of Addis Ababa. The hospital was established in 1923 and is giving services for more than 2 million people. It is also serving as a clinical post graduate attachment site for medical students, other health science and postgraduate students in Integrated Emergency Obstetrics, Gynecology and General Surgery (IEOS).

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Currently, the hospital has 178 beds and providing medical, surgical, gynecology, obstetrics, pediatrics, radiology, laboratory, pharmacy, psychiatry, and physiotherapy services for patients. Gynecology and obstetrics department is led by team of health professionals (2 Gynecologist, 2 IEOS, and 20 midwives).

Study design

Hospital based retrospective case control study design was conducted.

Study population

All women registered in log books and have cads, who gave birth in Nekemte Referral Hospital from March 1, 2016 to February 29, 2017. Cases were all twin deliveries whereas Controls were mothers who gave birth to singleton babies after 28 weeks of gestational age.

Sample size and sampling techniques

Sample size was calculated by using Epi info version 7.2.0.1 by considering two-population comparisons of proportions based on the following assumptions. Premature Rupture of Membrane (PROM) was taken as one of outcome variables (maternal complications). The proportion of mothers developing PROM among twin deliveries is assumed to be 15.3% ($p_1=0.153$) and singleton deliveries is assumed to be 3.1% ($p_2=0.03$) [5]. A level of confidence of 95%, power of 90%, ratio of cases to controls of 1:2 and 10% non-responses are considered. This gives sample size, 104 cases (twin deliveries) and 208 controls (singleton deliveries), a total of 312 deliveries. For each twin delivery, two singleton deliveries were clerked by using simple random sampling technique.

Data collection procedures

A pre-tested structured questionnaire was developed after reviewing similar literatures for the data collection. Two midwives and three nurses were recruited and trained on how to collect and fill maternal data obtained from delivery log books and mothers. All completed questionnaires were checked for completeness by the principal investigator.

Ethical consideration

The ethical clearance was obtained from the Ethics Review Committee of the College of Public Health and Medical Sciences of Jimma University. After explaining the procedure and purposes of the study to the hospital manager and medical director, permission to clerk the study participants and access to obstetric records and logbooks was obtained from Nekemte Referral Hospital. All the information collected from the registry was handled confidentially through omitting their personal identification and the data were used only for the research purpose.

RESULTS

Socio-demographic and obstetric characteristics at Nekemte Referral Hospital

A total of 4328 deliveries were conducted at Nekemte Referral Hospital from March 1, 2016- February 29, 2017, out of which 124 were twin deliveries, making 28.6 twin deliveries in 1000 deliveries. Majority of the deliveries (both twin and singleton) were from rural areas, age category of 25 to 29 years and Para II-IV (Table 1).

Maternal complications of twin deliveries at Nekemte Referral Hospital

The major antepartum complications in twin deliveries when compared to singleton deliveries were hypertensive disorder of pregnancy (OR=2.1; 95% CI: 1.54,2.86), gestational diabetes mellitus (OR=3.03; 95% CI: 2.59,3.56), premature rupture of membrane (OR=1.87; 95% CI: 1.28,2.73), preterm delivery (OR=2.76; 95% CI: 2.12,3.40), and ante partum hemorrhage (OR=1.80; 95% CI: 1.09,2.99) respectively.

The likelihood of developing intrapartum and postpartum complications like Cesarean delivery (OR=2.50; 95% CI: 1.88, 3.34), anemia (OR=1.77; 95% CI: 1.24, 2.52), post-partum hemorrhage (OR=1.27; 95% CI: 0.77, 2.11), puerperal sepsis (OR=2.18 95% CI: 1.46, 3.25) and cord prolapse (OR=2.33; 95% CI: 1.51, 3.84) were significantly higher among twin deliveries as compared to singleton deliveries. On the other hand, the risk of developing obstructed labor is lower in twin deliveries (Table 2).

Table 1: The socio-demographic and obstetric characteristics of mothers who delivered at Nekemte Referral Hospital from March 1, 2016 to February 29, 2017.

Socio-demographic and obstetric factors		Cases (Twin) N (%)	Controls (Singleton) N (%)	Total (n=312) N (%)
Residence area	Urban	37 (35.6)	101 (48.6)	138 (44.2)
	Rural	67 (64.4)	107 (51.4)	174 (55.8)
Age in years	15-19	3 (2.9)	14 (6.7)	17 (5.4)
	20-24	30 (28.8)	73 (35.1)	103 (33)
	25-29	42 (40.4)	88 (42.3)	130 (41.7)
	30-34	18 (17.3)	24 (11.5)	42 (13.5)
	35-39	10 (9.6)	9 (4.3)	19 (6.1)
	40-44	1 (0.9)	0 (0)	1 (0.3)
	≥45	0 (0)	0 (0)	0 (0)
Parity	I	10 (9.6)	50 (24)	60 (19.2)
	II-IV	62 (59.6)	129 (62)	191 (61.2)
	≥V	32 (30.8)	29 (13.9)	61 (19.6)
ANC follow up	Yes	92 (88.5)	185 (88.9)	277 (88.8)
	No	12 (11.5)	23 (11.1)	35 (11.2)

LNMP	Known	24 (23.1)	48 (23.1)	72 (23.1)
	Unknown	80 (76.9)	160 (76.9)	240 (76.9)
Self-history of twin pregnancy	Yes	3 (2.9)	4 (1.9)	7 (2.2)
	No	47 (45.2)	95 (45.7)	142 (45.5)
	Unknown	54 (51.9)	109 (52.4)	163 (52.3)
Family history of twin pregnancy	Yes	9 (8.6)	4 (1.9)	13 (4.2)
	No	69 (66.3)	139 (66.8)	208 (66.7)
	Unknown	26 (25)	65 (31.3)	91 (29.1)

ANC: Antenatal Care; LNMP: Last Normal Menstrual Period

Table 2: Maternal complications of twin deliveries at Nekemte Referral Hospital from March 1, 2016 to February 29, 2017

Maternal complications		Cases (Twin) (N=104) N (%)	Controls (singleton) (N=208)	Total (N=312) N (%)	OR* (95% CI)	p-value
HDP	Yes	24 (23.1)	15 (7.2)	39 (12.5)	2.1 (1.54,2.86)	0.001
	No	80 (76.9)	193 (92.8)	273 (87.5)		
GDM	Yes	2 (1.9)	0 (0)	2 (0.6)	3.03 (2.59,3.56)	0.045
	No	102 (98.1)	208 (100)	310 (99.4)		
APH	Yes	7 (6.7)	5 (2.4)	12 (3.8)	1.80 (1.09,2.99)	0.061
	No	97 (93.3)	203 (97.6)	300 (96.2)		
PROM	Yes	14 (13.5)	10 (4.8)	24 (7.7)	1.87 (1.28,2.73)	0.007
	No	89 (85.5)	198 (95.2)	288 (92.3)		
Preterm delivery	Yes	18 (17.3)	4 (1.9)	22 (7.1)	2.76 (2.12,3.40)	0.001
	No	86 (82.7)	204 (98.1)	290 (92.9)		
Cord prolapse	Yes	6 (5.8)	2 (1)	8 (2.5)	2.33 (1.51,3.84)	0.011
	No	98 (94.2)	206 (99)	304 (97.5)		
OL	Yes	1 (1)	8 (3.8)	9 (2.9)	0.327 (0.05,2.09)	0.152
	No	103 (99)	200 (96.2)	303 (97.1)		
Cesarean delivery	Yes	46 (44.2)	29 (13.9)	75 (24)	2.50 (1.88,3.34)	0.001
	No	58 (55.8)	179 (86.1)	237 (76)		
PPH	Yes	10 (9.6)	14 (6.7)	24 (7.7)	1.27 (0.77,2.11)	0.369
	No	94 (90.4)	194 (93.3)	288 (92.3)		
Anemia	Yes	19 (18.3)	16 (7.7)	35 (11.2)	1.77 (1.24,2.52)	0.005
	No	85 (81.7)	192 (92.3)	277 (88.8)		
Hysterectomy	Yes	1 (0.9)	2 (1)	3(0.9)	1.00 (0.20,4.99)	1
	No	103 (99.1)	206 (99)	309 (99)		
Need for blood	Yes	4 (3.8)	3 (1.5)	7 (2.2)	1.74 (0.90,3.38)	0.178
	No	100 (96.2)	205 (98.5)	305 (97.8)		

HDP: Hypertensive Disorders of Pregnancy; GDM: Gestational Diabetes Mellitus; APH: Antepartum Hemorrhage; PROM: Premature Rupture of Membranes; OL: Obstructed Labor; PPH: Postpartum Hemorrhage; SSI: Surgical Site Infection

DISCUSSION

The magnitude of twin delivery in this study was 28.6 per 1000 deliveries. This is higher than other previous studies in Ethiopia such as study in Addis Ababa (24.0 per 1000 deliveries), Mekele (13.7 per 1000 deliveries) and Gondar (14.4 per 1000 deliveries) [9,10]. This finding is also higher than studies in other African countries like Egypt (17.7 per 1000 deliveries) and Sudan (20.8 per 1000 deliveries) [11-13]. The relatively higher magnitude of twin delivery may be explained by the fact that the hospital was the only referral hospital in western Ethiopia, at the time of study, which was receiving cases of twin pregnancy from the surrounding health facilities. On the other hand, similar studies in other African countries like Nigeria, Democratic Republic Congo and Niger showed higher prevalence of twin delivery when compared to the current study [14]. The variation could be due to the ethnic differences in Africa.

Twin deliveries, in comparison with singletons, are associated with increased incidence of maternal complications [5,12]. The likelihood of developing hypertensive disorder of pregnancy and antepartum hemorrhage increased by about two and three folds in twin deliveries as compared to singleton deliveries. These findings are consistent with similar study conducted at Jimma university specialized hospital and Nigeria tertiary hospital. The risk of having gestation diabetes mellitus in twin delivery was increased by about three folds. This is somewhat higher than the previous studies on twin pregnancy and thus we recommend other researchers to give special attention to the association between twinning and gestation diabetes mellitus [5,15].

The risks of developing premature rupture of membranes, cord prolapse and preterm delivery in twin delivery was higher when compared to singleton delivery. This could be explained by the increased intrauterine pressure in twin pregnancy. The current

finding is consistent with similar studies in Ethiopia and other Africa countries [5,6,15].

Like other studies [6,15], anemia was more common in twin deliveries. It is probably explained by the physiologic increased iron demand during pregnancy, and the greater risk of bleeding during and after delivery in twin deliveries. The other important complication after twin delivery was puerperal sepsis. Mothers with twin deliveries were twice at increased risk of having this condition which is among the leading causes of maternal deaths. It might result from different factors like premature rupture of membrane, anemia, preterm delivery, cesarean delivery and uterine manipulations for the other complications.

In this study, 44.2% of twin deliveries and 13.9% of singleton deliveries were Cesarean deliveries. This finding is higher than study done at Azare, Nigeria i.e. 18.5% in twins [16] and Global Network for women's and children's health research in 6 different low and mid income countries (18.1% in twin pregnancies and 9.5% in singleton pregnancies) [17]. This increased cesarean delivery rate in twin pregnancies in this study may be due to increased occurrence of obstetric complications like hypertensive disorders, antepartum hemorrhage, premature rupture of membranes and cord prolapse.

Interestingly, in this particular study, twin pregnancies were at lower risk of developing obstructed labor. It could be due to the presence of other obstetrics complications that make these patients visit health facility before they develop obstructed labor.

This study may have its own limitation in that all the estimates of odds ratio were based on crude estimate and other possible confounding factors were not controlled. This was because of the large number of multiple complications considered for intervention purposes. Future studies may address this by doing multivariate analysis by focusing on some specific maternal complications.

CONCLUSION

In conclusion, despite the above limitations, the magnitude of twin delivery in this study was high and many maternal complications were identified when compared to singleton deliveries. Thus, twin deliveries need greater attention during pregnancy, delivery and after delivery.

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AUTHORS' CONTRIBUTION

AA, TT and DB were involved in all processes of this research work, including conception, design, and supervision of data collection, data analysis and write up of the manuscript. All authors read and approved the final manuscript.

COMPETING INTEREST

The authors declare that they have no any competing interests.

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