Original Article

Twin pregnancies at federal medical centre Katsina: A 5 year review

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ABSTRACT

Background: Multiple gestation is associated with higher risk of maternal complications in the antenatal, intrapartum, and postpartum periods compared with singleton pregnancies, as well as higher risk for perinatal morbidity and mortality.

Objective: The objective of this study was to determine the incidence and obstetric outcomes of twin deliveries in Federal Medical Centre Katsina.

Methods: It is a retrospective study of twin deliveries over a 5-year period from January 1st 2010 to December 31st 2014 conducted at the Federal Medical Centre Katsina (FMCK), Katsina state.

Results: There were 172 cases of twin deliveries out of 9,947 deliveries giving an overall twinning rate of 17.3 per 1,000 deliveries. There were three cases of triplet delivery during this period. The most common complication was preterm delivery which occurred in 40.1% of cases. The mode of delivery was vaginal in 64.5% while 35.5% had caesarean section. Emergency caesarean section for delivery of both babies was carried out in 24.42% while elective caesarean section for both babies accounted for 8.72%. Combined vaginal and abdominal delivery occurred in 2.33% of deliveries. The stillbirth rate was 81.4 per 1,000 births. There were 11 (6.4%) and 17 (9.9%) stillbirths among the first and the second babies respectively. Babies that had normal birth weight constituted 42.2%. The male to female ratio was 1:1.15.

Conclusion: The rate of twin deliveries in our centre is high. There is also associated high rate of maternal complications and adverse perinatal outcomes.

Key words: Obstetric outcome; perinatal outcome; twin pregnancy.

Introduction

Twin pregnancy is associated with increased maternal and perinatal morbidity and mortality, as well as healthcare costs.[1-3] Studies on twin pregnancy are uniquely important to Africa and particularly Nigeria where the highest incidence in the world exists.

This study determined the incidence and obstetric outcomes of twin deliveries at the Federal Medical Centre Katsina. This is with a view to determining the outcome of management of twin gestations in our centre and identifying common complications encountered during their management with the aim of improving care of twin pregnancies in the future.

Methods and Material

All cases of twin gestation at the Federal Medical Centre Katsina, Katsina state over a 5-year period from January 1, 2010 and December 31, 2014 were reviewed, retrospectively.

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Details of the patients who had twin deliveries during the study period were obtained from the labor and delivery register, sand their case files retrieved from the medical records. Data related to the booking status, age, parity, gestational age at delivery, complications, fetal presentation, type of delivery, blood loss, sex, birth weight and stillbirths were extracted, collated and analyzed. The data were analyzed using SPSS 20.0.

Results

During the period under review there were a total of 9,947 deliveries of which 172 were twin deliveries and 3 were triplet deliveries. The incidence of twin delivery in our centre during the study period was 17.3 per 1,000 deliveries. The yearly frequency of twin deliveries during the 5-year period is shown in Figure 1. Most of the patients were in the 26–35 years age group (61%), while the peak occurrence was at 30 years (14.5%). Of the 172 cases of twin deliveries, 84 (49%) were booked cases while 88 (51%) were unbooked. Most of the patients were multiparous (52.9%) [Table 1]. Delivery occurred mostly between 36 and 40 weeks (59%) with the mean gestational age at delivery being 37.2 weeks.

Eighty-one patients (47.1%) had both fetuses in cephalic presentation, 35 (20.3%) had the leading twin in cephalic presentation with the second twin breech, while 32 (18.6%) presented with the leading twin breech and the second twin cephalic. Nineteen patients (11.1%) had both fetuses in breech presentation while 5 patients had other forms of presentation (cephalic-transverse, breech-transverse, transverse-breech, transverse-cephalic).

Preterm delivery was the commonest complication occurring in 40.2% of cases. There was malpresentation of the leading twin in 22.7% of cases, and hypertensive disorders of pregnancy complicated 5.8%. Antepartum haemorrhage, cord prolapse and retained second twin each complicated 2.3% of the cases. There were no complications in 34 (19.8%) of the cases [Table 2]. Overall, spontaneous vaginal delivery was the mode of delivery in 94 (54.7%) and 90 (52.3%) for the first and second babies respectively, while assisted breech delivery was conducted for 21 (12.2%) of the first, and also of the second baby. Instrumental vaginal delivery was not performed for any of the patients. Overall, 111 (64.5%) of twins were both delivered vaginally. A total of 61 cases had caesarean section giving a caesarean section rate for twin delivery of 35.5%. Emergency caesarean section for delivery of both babies was carried out in 42 (24.42%) of the cases while elective caesarean section for both babies accounted for 15 (8.72%). Combined vaginal and abdominal delivery occurred in 4 (2.33%) cases. Of the 61 cases who had caesarean section, 40 (65.6%) were unbooked while the remaining 21 (34.4%) were booked. The main indication for caesarean section was malpresentation of the leading twin (57.38%). There was one maternal mortality among mothers with twin gestation during the 5-year period of review. The death occurred in a patient who had eclampsia.

There were 11 (6.4%) and 17 (9.9%) stillbirths among the first and second babies, respectively. Overall, 28 (8.14%) of the deliveries resulted in stillbirths, giving a stillbirth rate of 81.4 per 1,000 deliveries. The male to female ratio was 160:184.

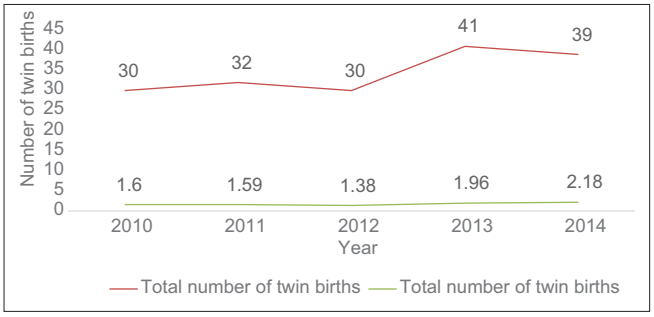

Figure 1: Yearly frequency of twin deliveries

Table 1: Socio-demographic and obstetric characteristics of the patients

Variable	Frequency	Percentage
Age group		
16-20	21	12.2%
21-25	34	19.8%
26-30	59	34.3%
31-35	46	27.6%
36-40	12	7.0%
Total	172	100.0%
Booking Status		
Booked	84	49.0%
Unbooked	88	51.0%
Total	172	100.0%
Parity		
0	21	12.2%
1-4	91	52.9%
≥5	60	34.9%
Total	172	100.0%

Table 2: Maternal outcomes

Complication	Frequency	Percentage
Preterm delivery	69	40.2%
Malpresentation	39	22.7%
No complication	34	19.8%
Hypertensive disorders	10	5.8%
Primary PPH	5	2.9%
Antepartum haemorrhage	4	2.3%
Cord prolapse	4	2.3%
Retained second twin	4	2.3%
Others	2	1.2%
Retained placenta	1	0.6%
Total	172	100

The mean birth weight of twin 1 was 2.4 kg while that of the second twin was 2.2 kg.

Of the 344 babies delivered, 145 (42.2%) had normal birth weights, 144 (41.9%) were of low birth weight while 26 (7.6%) and 28 (8.1%) were of very low birth weight and extremely low birth weight, respectively. Only 1 (0.3%) was macrosomic. There was significant weight discordance of 25% or more between leading twin and the second twin in 17 (9.9%) of the patients.

Discussion

Twins have been an object of great interest and fascination as well as intense enquiry since ancient times.[1] They may less often be monozygotic twins arising from a single fertilized ovum that subsequently divides or dizygotic (twin fetuses resulting from fertilization of two separate ova).[4] Twin pregnancy is associated with increased maternal and perinatal morbidity and mortality, as well as health care costs.[1-3] Women with multiple gestation are nearly six times more likely to be hospitalized due to complications during pregnancy.[2] Perinatal mortality rates are three to four times higher in twin babies than in singletons[5] which could be due to chromosomal abnormalities, prematurity, hypoxia, and trauma. This however is more common in monozygotic twins.[5]

While the incidence of monozygotic twins is relatively stable worldwide at 3.9 per 1,000 births,[6] that of Dizygotic twins varies from 4 per 1,000 births in Japan; to 12 in 1,000 births in the United States; and to 49-54 per 1,000 deliveries among the Yorubas in South-West Nigeria. Although it is very difficult to assess the incidence of twin pregnancy in our environment due to a number of reasons which includes the fact that not all deliveries take place in the hospitals and in some cases proper records are not taken, the incidence of 17.3 per 1,000 deliveries obtained in this study still makes it a major obstetric issue considering the increased risk of obstetric complications as well as the increased perinatal morbidity and mortality rates. The incidence of 17.3 per 1,000 deliveries obtained in this study is lower than those reported from centers in the South-Western (46.5/1000 at Ilesha and 46.2/1000 at Ile-Ife),[7-10] South-Eastern (41.7/1000 at Afikpo),[11,12] South-South (25.6/1000 at Uyo)[13] and North-Central (23.3/1000 at Jos)[3,14] regions of Nigeria. An incidence of 30.6 per 1,000 and 32.5 per 1,000 has been reported in the Niger-Delta and in Abuja Nigeria, respectively.[15,16]

This is however higher than those reported from centers in the North-Eastern part of the country (14.4/1000 at Maiduguri)[17] suggesting that the incidence of twinning is higher in the Southern part of the country than in the North. The incidence of twin delivery in our center is also higher than those from countries in the United Kingdom (14.7/1000)[6,18] despite the reported rise in twinning in these countries due to older maternal age at child birth, ovulation induction and assisted reproductive technology.[5,15,19] The twinning rate in Nigeria appears to be influenced by ethnicity; the Yorubas of South-West Nigeria having the highest twinning rate (54/1000) in the world.[20]

Twin pregnancies are documented to occur more commonly among older women due to increasing follicle stimulating hormone levels and also grand multiparity.[18] In our center however even though most of the patients were between 26 and 35 years, they were mostly multiparous. This may be because this study is a preliminary review which was hospital based and thus may not entirely reflect what may obtain in the community in general.

Other predisposing factors to twin pregnancy include parity, previous history of twin pregnancy, maternal weight and height, positive family history of twin gestation particularly on the maternal side, and assisted reproductive techniques.[21-23] Pregnancies that occur soon after cessation of long-term oral contraceptive use has also been implicated.[24] These factors remarkably influence the incidence of dizygotic twinning.[4]

Maternal complications of twin gestation include hyperemesis gravidarum, anemia, pregnancy-induced hypertension, preeclampsia and eclampsia, polyhydramnios, preterm delivery, and placenta praevia. Other complications include antepartum hemorrhage, post-partum hemorrhage, increased prenatal admission and operative deliveries. The fetal complications include an increased risk of miscarriage, vanishing twin syndrome, congenital anomalies, intrauterine growth restriction, malpresentation, locked twins, retained second twin, low birth weight, and cord prolapse. Others include twin twin transfusion syndrome and twin reversed arterial perfusion sequence seen in monochorionic placentation, and intrauterine fetal death.[25,26]

Women with twin pregnancies are at increased risk of preterm delivery. This is generally attributable to uterine over distension as there is a belief that uterine contractions commence at a critical degree of myometrial stretch and then increase in frequency and strength to ultimately bring about progressive cervical dilatation and preterm labor.[27] Sometimes the preterm delivery may be iatrogenic where indicated. An example is seen in monochorionic

monoamniotic twins which are best delivered at 32 weeks, by caesarean section, after administration of corticosteroids. Termination of pregnancy before term may also be indicated where there are such maternal complications like hypertensive disorders. Preterm delivery was the commonest obstetric complication observed in this study as was the case in other studies carried out in Jos, Abuja, and Uyo.[3,13,16] It is reportedly the most important complication of multiple pregnancies and the single greatest contributor to the high perinatal morbidity and mortality associated with multiple pregnancy.[2,18] The average gestational age at delivery for twins is 37 weeks and about half of twins deliver preterm. The duration of pregnancy in this study was between 36 and 40 weeks, with a mean gestational age at delivery of 37.2 weeks, which is comparable to about 37 to 37.4 weeks found in previous studies.[28,29]

Prematurity poses the greatest threat to twins with an associated Perinatal mortality rate of 3 to 8 times that of a singleton pregnancy.[30] Prematurity is associated with an increased incidence of respiratory distress syndrome, intracranial haemorrhage, cerebral palsy, blindness, low birth weight, and neonatal mortality.[31] RDS accounts for 50% of all neonatal deaths associated with premature birth.[31] Hence various measures have been used in an attempt to reduce the incidence of preterm delivery and prematurity, including hospitalization for bedrest, prophylactic use of tocolytics, and cervical cerclage all of which unfortunately have failed to significantly improve gestational age at delivery.[6,24,32] The use of antenatal corticosteroids when the patients present with preterm labor helps to hasten lung maturity as well as reduce the risk for intracranial haemorrhage, necrotizing enterocolitis, and respiratory distress syndrome. Using magnesium sulphate as tocolytic in the management of those who present with preterm contractions with or without cervical changes at less than 30–32 weeks of gestation, has an added advantage as it has been found to also have neuroprotective effects and thus reduce the risk of cerebral palsy in infants born preterm.[33]

Most clinicians would consider non-vertex first twin as an indication for caesarean section[34] and vertex first twin favorable for vaginal delivery.[11] Most West African countries have caesarean section rate of about 15-21%.[35] The overall caesarean section rate in this study is less than the findings of 38.9% by Persad *et al*. at a tertiary care centre in Canada, 43.1% by Mutihir *et al*. in Jos Nigeria, 45% by Kontopoulous *et al*. in a population based study in the United States and 51.9% reported by Abasiattai *et al.* in Uyo Nigeria.[3,13,36,37] This was possible because of the high rate of vaginal delivery achieved in our cases due to well-planned delivery for the booked mothers as they were educated on birth preparedness and complication readiness. These were to help them present early in labor with the benefit of adequate intrapartum care and supervised delivery. Generally, caesarean section rate for twin pregnancy is usually 2–3 times higher than that for singletons.[18,38] The common indications for caesarean section were mal-presentation of the first twin and hypertensive disorders of pregnancy. In order to prevent fetal interlocking and its very high attendant fetal mortality, most obstetricians advocate delivery by caesarean section when the leading twin is breech and the second cephalic.[39,40] Where the leading twin is noncephalic, there is also increased risk of entrapment of after coming head, and cord prolapse with rupture of membranes. Preeclampsia occurs 3–5 times more commonly in multiple than singleton pregnancies with no influence by zygosity.[6] There is also a tendency for the condition to occur earlier in pregnancy and take a more fulminating course that is likely to lead to Eclampsia.[6] Other indications for caesarean section in twin pregnancy include congenital malformations such as co-joined twins, where there is growth discordance with second twin being larger than the first, and monochorionic monoamniotic twins.

This study revealed that 51% of the mothers did not receive antenatal care. This was not the case at the Lagos University Teaching Hospital where 64.5% of the cases were booked.[27] Lack of utilization of antenatal care has been associated with poor fetal outcome in twin gestation.[41] Antenatal care affords opportunity for assessment of risks as well as planning for the delivery. It is associated with improved outcomes and reduction in perinatal morbidity and mortality.[42] All the patients who achieved vaginal delivery had a twin twin delivery interval less than 30 minutes. The optimal time interval between births of the first and second twin is 10–30 minutes, but with satisfactory fetal heart rate monitoring, greater delay may be quite safe.[5,27] Four of the patients (2.33%) had combined vaginal-abdominal delivery. This has been found to be associated with increased neonatal mortality.[36,37] In this study predisposing factor for combined vaginal-abdominal delivery was mainly unbooked status. Most of those who had caesarean section were unbooked (65.6%).

The incidence of obstetric haemorrhage is higher in twin pregnancies compared to singleton pregnancies. In this study, 2.3% of the patients had antepartum haemorrhage while 2.9% had primary post-partum haemorrhage. Antepartum haemorrhage may be from placenta praevia, abruptio placenta, marginal sinus, or vasa praevia (as there is a higher frequency of velamentous cord insertion in twin pregnancy).[26] Because of the increased placental size, there may be encroachment into the lower uterine segment. Abruptio placenta may occur

from uterine over-distension or from sudden decompression of the uterus following rupture of membranes or delivery of the first twin. Post-partum haemorrhage may occur due to uterine atony from the over-distended uterus. The use of active management of third stage of labor with the oxytocin bolus given only after delivery of the second twin and ruling out higher order multiples, as well as other prophylactic measures such as the administration of misoprostol, helps to prevent primary post-partum haemorrhage which is the leading cause of maternal mortality in our environment.

The mean birth weight for the first and second twins were 2.4 kg and 2.0 kg, respectively, and these corresponded with previous studies where the mean birth weight of a twin had been found to be less than 2.5 kg.[28,43] The incidence of babies weighing less than 2.5 kg found in this study is 57.56%. This might be due to increased preterm labor and delivery as well as a higher incidence of fetal growth restriction found in twins. 17 cases (9.9%) had a weight discordance of 25% or more and this might be due to the unequal sharing of available maternally derived nutrients, reduced placental surface area for each of the two infants, twin twin transfusion syndrome or genetics.

Despite the improvement in maternal and neonatal services the high risk of perinatal morbidity and mortality associated, makes it imperative for efforts to be intensified to ensure optimal care.[27] The stillbirth rate of 81.4 per 1,000 deliveries in this study is high; even though lower than 102 per 1,000 births, 201 per 1,000 births reported among twin deliveries at Abuja and Uyo, Nigeria respectively.[13,16] It is much higher than the stillbirth rates found in developed countries like the United Kingdom and United States and also about two times higher than the National stillbirth rate of 42 per 1,000 births in Nigeria.[44] The number of stillbirths was higher in the second baby compared to the first baby. The increased morbidity and mortality associated with the second baby are well documented.[24,43] The findings in this study confirm twin births as a major contributor to perinatal mortality in Nigeria. Mono-chorionic twins generally have a much higher rate of perinatal mortality than di-chorionic twins, and so the use of obstetric ultrasound scan for early diagnosis of twins and their chorionicity, as well as close foetal surveillance particularly of mono-chorionic twins, and prompt therapeutic intervention where required, are important to reduce perinatal mortality. Most of the women in this study were unbooked (51%) and did not have the opportunity of an early obstetric ultrasound scan to among other things, diagnose the chorionicity. Thus the study could not tell how much of the reported high perinatal mortality was associated with mono-chorionic twins.

Another limitation of the study is that being retrospective, with data collected from files obtained from the medical records department, there were no documentation of minor complications which tend to be exaggerated in twin pregnancy, or occurrence of psychological effects. Because of the enlarged uterus and increased hormone production there are more minor complications in the second half of pregnancy, such as increased frequency of micturition, constipation, varicose veins, dependent oedema, lower abdominal pain, malaise, fatigue, heartburn and lack of sleep. It may be difficult to be comfortable in a position of rest in late pregnancy as the diaphragm is pushed upwards and splinted by the over-distended uterus. Though considered minor complications, these may not be well tolerated by some patients and may be disturbing enough to warrant more frequent hospital presentation despite reassurance from the obstetrician. These symptoms typically resolve after delivery.[26] The psychological effects of twin pregnancy and delivery can be significant and include feelings of isolation, depression and frustration even when caring for healthy full-term babies. These feelings are worsened when the babies are born preterm with handicaps and special needs or admitted into the special care baby unit. There were no documentations of such enquiries in the records obtained.

In conclusion, this study has shown that there is still a high incidence of twin pregnancies in our environment and it is associated with an increased occurrence of maternal complications and a high still birth rate. It therefore highlights the fact that multiple gestation still remains a serious obstetric problem. However early diagnosis, appropriate antenatal, intrapartum and postpartum care as well as adequate neonatal care by skilled attendants may assist in reducing this increased incidence of morbidity and mortality. More efforts should be put in place to encourage early booking and use of antenatal services in order to reduce the complications associated with twin gestation. Improving on the resources dedicated to special care baby units in our facilities would mean better perinatal outcome for most of the babies delivered preterm. Lastly, future researchers can consider doing a multicentre and prospective trial on twin gestation. This will reduce bias as a larger sample size will be recruited and allow for assessment of other possible concerns among women with twin gestation, such as minor complaints and psychological effects of twin gestation.

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Conflicts of interest

There are no conflicts of interest.

References

1. Omu AE. Multifetal pregnancy. In: Okpere EE, editor. Clinical Obstetrics. 2nd ed. Benin: Uniben Press; 2003. p. 180-8.
2. American College of Obstetricians and Gynecologists Committee on Practice Bulletins-Obstetrics, Society for Maternal-Fetal Medicine, ACOG Joint Editorial Committee. ACOG practice bulletin #56: Multiple gestation: Complicated twin, triplet, and high-order multifetal pregnancy. Obstet Gynecol 2004;104:869-83.
3. Mutihir JT, Pam VC. Obstetric outcome of twin pregnancies in Jos, Nigeria. Niger J Clin Pract 2007;10:15-8.
4. Cunninghan FG, Leveno KJ, Bloom SL, Hauth JC, Rouse DJ, etal. Multifetal gestation. In: Cunninghan FG, Leveno KJ, Bloom SL, Hauth JC, Rouse DJ, Spong CY. Editors. Williams Obstetrics. 23rd ed. USA: McGraw Hill Companies Inc; 2010.
5. Bush MC, Pernoll ML. Multiple pregnanacy. In: DeCherny AH, Nathan L, Goodwin TM, Laufer N, editors. Currrent Diagnosis and Treatment, Obstetrics and Gynecology. 10th ed. New York, NY: McGraw Hill; 2007. p. 301-10.
6. Fisk NM. Multiple pregnancy. In: Edmonds DK. editor. Dewhurst's Textbook of Obstetrics and Gynaecology. 7th edition. Oxford; Cambridge, Mass., USA: Blackwell Publishers. 2007. p. 166-76.
7. Ilesanmi AO, Obisesan KA, Arowojolu AD, Fawole O, Roberts AO. Relative birth weight in twins. Nig Med J 2000;38:14-5.
8. Kuti O, Owolabi AT, Fasubaa OB. Outcome of twin pregnancies in a Nigerian Teaching Hospital. Trop J Obstet Gynaecol 2006;23:132-5.
9. Abudu O, Agarin N. Twin pregnancy and perinatal mortality in Lagos. J Obst East Cent 1984;3:7.
10. Akinboro A, Azeez MA, Bakare AA. Frequency of twinning in southwest Nigeria. Indian J Hum Genet 2008;14:41-7.
11. Sunday-Adeoye I, Twomey ED, Egwuatu VE. Births at Mater Misericordiae Hospital, Afikpo, South Eastern Nigeria. Niger J Clin Pract 2008;11:231-4.
12. Brian D, Adinma JI, Agbai AO. Pattern of twin births in Nigerian igbo women. West Afr J Med 1994;13:234-6.
13. Abasiattai AM, Umoiyoho AJ, Utuk NM, Shittu DG. Incidence and mode of delivery of twin pregnancies in Uyo, Nigeria. Niger Med J 2010;51:270-2.
14. Aisien AO, Olarewaju RS, Imade GE. Twins in Jos Nigeria: A seven-year retrospective study. Med Sci Monit 2000;6:945-50.
15. Ibrahim I, Oyeyemi A, Obilahi A. Twin pregnancies in the Niger Delta of Nigeria: A four-year review. Int J Womens Health 2012;4:245-9.
16. Akaba GO, Agida TE, Onafowokan O, Offiong RA, Adewole ND. Review of twin pregnancies in a Tertiary Hospital in Abuja, Nigeria. J Health Popul Nutr 2013;31:272-7.
17. Nwobodo EI, Bobzom DN, Obed J. Twin births at University of Maiduguri teaching hospital: Incidence, pregnancy complications and outcome. Niger J Med 2002;11:67-9.
18. Owen P. Twin pregnancy. Brit J Hosp Med 1997;58:437-9.
19. Russell RB, Petrini JR, Damus K, Mattison DR, Schwarz RH. The changing epidemiology of multiple births in the United States. Obstet Gynecol 2003;101:129-35.
20. Etuk SJ. Twinning in the West African sub-region: Historical and current perspectives. Mary Slessor J Med 1998;1:1-5.
21. Hoekstra C, Zhao ZZ, Lambalk CB. Dizygotic twinning. Hum Reprod Update 2008;14:37-47.
22. Nylander PP. The factors that influence twinning rates. Acta Genet Med Gemellol (Roma) 1981;30:189-202.
23. Reddy UM, Branum AM, Klebanoff MA. Relationship of maternal body mass index and height to twinning. Obstet Gynecol 2005;105:593-7.
24. Fakeye O. Perinatal factors in twin mortality in Nigeria. Int J Gynaecol Obstet 1986;24:309-14.
25. James PN. Multiple pregnancy. In: Whitfield CR. editor. Dewhurst's Textbook of Obstetrics and Gynaecology for Postgraduates. 5th edition. Oxford; Cambridge, Mass.,USA: Blackwell Science Ltd; 1995. p. 439 - 54.
26. Rao A, Sairam S, Shehata H. Obstetric complications of twin pregnancies. Best Pract Res Clin Obstet Gynaecol 2004;18:557-76.
27. Akinlaja O, Anorlu R. Outcome of labor in twin gestation at a tertiary institution in a developing nation: A 15-year review. Obstet Gynecol Cases Rev 2014;1:001. doi: 10.23937/2377-9004/1410001.
28. Abudu O. Multiple pregnancies. In: Agboola A, editor. Textbook of Obstetrics and Gynaecology for Medical Students. University Services Educational Publishers; 1988. p. 131-40.
29. Tuppin P, Blondel B, Kaminski M. Trends in multiple deliveries and infertility treatment in France. Br J Obstet Gynaecol 1993;100:383-5.
30. Nkyekyer K. Multiple pregnancy. In: Kwawukwume EY, Emuveyan EE, Editors. Comprehensive Obstetrics in the Tropics,. Accra, Ghana: Asante and Hittscher Printing Press Ltd; 2002. p. 162-72.
31. Patients' fact sheet. Complications of multiple gestation. American society for reproductive medicine. August 2001. www.asrm.org.
32. Martin JA, Hamilton BE, Sutton PD, Ventura SJ, Menacker F, Munson ML. Births: Final data for 2002. Natl Vital Stat Report 2003;52:1-113.
33. Usman S, Foo L, Tay J, Bennet PR, Lees C. Use of magnesium sulphate in preterm deliveries for neuroprotection of the neonate. Obstet Gynecol 2017;19:21-8.
34. Hogle KI, Hutton EK, Mcbrien KA, Barret JF, Hannah ME. Cesarean delivery for twins: A systematic review and meta-analysis. Am J Obstet Gynecol 2003;88:220-7.
35. Kwakwume E. Cesarean section. In: Kwawukwume EY, Emuveyan EE, editors. Comprehensive Obstetrics in the Tropics. Accra, Ghana: Asante and Hittscher Printing Press Ltd; 2002. p. 321-9.
36. Persad VL, Baskett TF, O'Connell CM, Scott HM. Combined vaginal-caesarean delivery of twin pregnancies. Obstet Gynecol 2001;98:1032-7.
37. Kontopoulos EV, Ananth CV, Smulian JC, Vintzileos AM. The impact of route of delivery and presentation on twin neonatal and infant mortality: A population based study in the USA, 1995-97. J Matern Fetal Neonatal Med 2004;15:219-24.
38. Obiechina NJ, Okolie VE, Eleje GU, Okechukwu ZC, Anemeje OA. Twin versus singleton pregnancies: The incidence, pregnancy complications, and obstetric outcomes in a Nigerian tertiary hospital. Int J Womens Health 2011;3:227-30.
39. O'Connor RA, Hiadzi E. The intrapartum management of twin pregnancy. Progress in Obstetrics/Gynaecology 1999;12:121-33.
40. Abasiattai AM, Bassey EA, Umoiyoho AJ. Foetal interlocking complicating twin pregnancy: A case report. Trop J Obstet Gynaecol 2006;23:183-4.
41. Naqvi MM. Outcome of twin pregnancy in booked versus unbooked cases. J Coll Physicians Surg Pak 2003;13:498-500.
42. Luke B, Brown MB, Misiunas R, Anderson E, Nugent C, van de Ven C, *et al*. Specialized prenatal care and maternal and infant outcomes in twin pregnancy. Am J Obstet Gynecol 2003;189:934-8.
43. Olayemi OO, Adeniji AR, Aimakhu CO. Determinants of perinatal mortality in twins at Ibadan. Trop J Obstet Gynaecol 2002;19:36-8.
44. World Health Organization. World Health Statistics 2011. Geneva: World Health Organization; 2011. p. 44-54.