

(RESEARCH ARTICLE)



## Multiple gestation and perinatal outcome in the Federal Medical Centre, Yenagoa, South-South, Nigeria: A 5-year review

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### Abstract

**Background:** Multiple gestation occurs when the gravid uterus harbours more than one foetus. It is a high-risk pregnancy, because of the associated adverse pregnancy outcomes culminating in some cases, in a high rate of maternal and perinatal morbidity and mortality.

**Objective:** To determine the incidence of multiple gestation, and maternal and perinatal outcomes associated with it at the Federal Medical Centre, Yenagoa, South-South, Nigeria, over a five-year period.

**Materials and Methods:** This retrospective study was carried out between 1st January, 2016 and 31st December, 2020. Data were retrieved and entered into a pre-designed proforma, and analysed using IBM SPSS version 25.0. Results were presented in frequencies and percentages for categorical variables, and mean and standard deviation for continuous variables.

**Results:** One hundred and sixty-three women had multiple gestation in the period under review, out of a total of 4,571 pregnancies, which represented a case incidence rate of 35.6 multiple gestations per 1,000 deliveries in the Centre. Incidence rates for twins and triplets were 32.5 and 3.5 per 1,000 deliveries, respectively. About 51.5% were unbooked for antenatal care in the index pregnancy. The most common (47.2%) complication was preterm delivery. There were 342 neonates from 163 multiple gestations. There was death of 20 (5.8%) babies.

**Conclusion:** The significant maternal and perinatal morbidity and mortality associated with multiple gestation can be reduced by early diagnosis, specialized antenatal care, skilled intrapartum, postpartum and neonatal care in centres with a full complement of skilled obstetricians, anaesthetists and neonatologists.

**Keywords:** Multiple gestation; Twins; Triplets; Preterm delivery

### 1. Introduction

Multiple gestation occurs when the gravid uterus harbours more than one foetus. Twin gestation is the commonest form of multiple gestation, followed by triplet gestation. Higher order multiple gestations have been reported in many parts of the world. Multiple gestation is a high-risk pregnancy, because it is associated with adverse pregnancy outcomes

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culminating in some cases, in a high rate of maternal and perinatal morbidity and mortality [1]. The perinatal mortality rate of twins and triplets is 5 – 10 times that of singleton pregnancy [2].

For the purpose of this discussion, twin gestation will be mainly discussed since it is the commonest form of multiple gestation. Twinning can be dizygotic or monozygotic depending respectively on whether two separate ova are fertilized by two separate spermatozoa or one ovum is fertilized by one spermatozoon, which then splits into two embryos [2]. While dizygotic twinning, which constitutes about 70% of twinning usually results in dichorionic diamniotic twins, monozygotic twins, which constitutes about 30% of twinning could be dichorionic diamniotic, monochorionic diamniotic or monochorionic monoamniotic depending on the time of cleavage, which occur within the first 3 days; within the 3rd and 8th day; and within the 8th and 13th day respectively [2]. Conjoint twins are monozygotic twins whose cleavage occurs later than the 13th day when the embryonic disc would have formed [2].

The incidence of twinning and other higher order multiple gestations has increased significantly over the past decades, primarily because of the availability and increased use of ovulation induction drugs, assisted reproductive technology and increasing maternal age at conception [1,3]. The rate of occurrence of monozygotic twins is the same all over the world (3 – 5 per 1,000 deliveries), while that of dizygotic twins vary from location to location worldwide [2].

The reported spontaneous twinning rate in the Yoruba-speaking south western part of Nigeria is the highest in the world, with values as high as 45 per 1,000 deliveries (1 in 22 deliveries) [4]. Igbo-Ora, a town in Ibarapa Central in Oyo State, South-West Nigeria has been described as the twin capital of the world where the incidence of twin gestation is 158 per 1,000 deliveries [5]. A rate of 27.6 per 1,000 (1 in 36.2) has been reported among the Igbos in Nigeria [6]. The lowest incidence is noted among the Japanese at about 4 in 1,000 deliveries [3].

The risk factors for multiple gestation are advanced maternal age, multiparity, race, family history of multiple gestation, use of ovulation induction agents, tall women (165 cm and above) and obesity (body mass index of 30 kg/m<sup>2</sup> and above) [2,7]. The rate of multiple gestation is increasing with assisted reproductive technologies (ARTs).

Multiple gestation is associated with increased incidence of certain maternal and foetal complications. The maternal complications include exaggerated early pregnancy symptoms, miscarriages, hypertensive disorders in pregnancy, anaemia, antepartum haemorrhage from placenta previa and abruptio placentae, preterm labour and delivery, increased incidence of operative deliveries (mainly due to abnormal foetal lie and presentation), and postpartum haemorrhage (mainly due to uterine over distension, large placental site with possible encroachment to the lower uterine segment) [2,4]. It is a common third stage complication in twin delivery.

The foetal complications include congenital abnormalities, foetal growth restriction, prematurity (from preterm delivery), abnormal lies and presentations, twin–twin transfusion syndrome, twin–anaemia–polycythaemia sequence, twin reversed arterial perfusion sequence, cord entanglement, conjoined twins, as well as death of one or both twins [2,4,7]. The second twin is at a greater risk of intrapartum complications arising from delayed delivery, hypoxia from cord prolapse and placental separation before delivery, manipulations and operative deliveries for malpresentation.

Physical examination findings that may serve as pointers to twin gestation include a uterine size that is larger than expected for the gestational age, palpation of multiple foetal poles and the detection of two audible heart sounds at two separate points by two observers. In modern obstetric practice, confirmation of the diagnosis is usually by ultrasound scan as was used in this case. Early ultrasound scan is important because it enables accurate pregnancy dating, determination of number of foetuses, chorionicity as well as detection of foetal congenital abnormalities/complications. Differential diagnosis of multiple gestation includes those conditions that are associated with large for gestational age, and these include wrong dates, polyhydramnios, hydatidiform mole, uterine leiomyoma and foetal macrosomia.

The mode of delivery is determined by the presentation of the leading twin or leading triplet. Vaginal delivery is usually anticipated when the leading twin is in cephalic presentation. Abnormal presentations of the leading twin like transverse lie and breech presentation are associated with poor foetal outcome, and are delivered by Caesarean section. Active management of the third stage of labour is key in the prevention of primary postpartum haemorrhage. The objective of this study is to determine the incidence of multiple gestation and its maternal and perinatal outcomes at the Federal Medical Centre, Yenagoa, South-South, Nigeria, over a five-year period.

## 2. Material and methods

This study was carried out in the Department of Obstetrics and Gynaecology, Federal Medical Centre, Yenagoa, Bayelsa State, South-South, Nigeria between 1st January, 2016 and 31st December, 2020. It was a retrospective study.

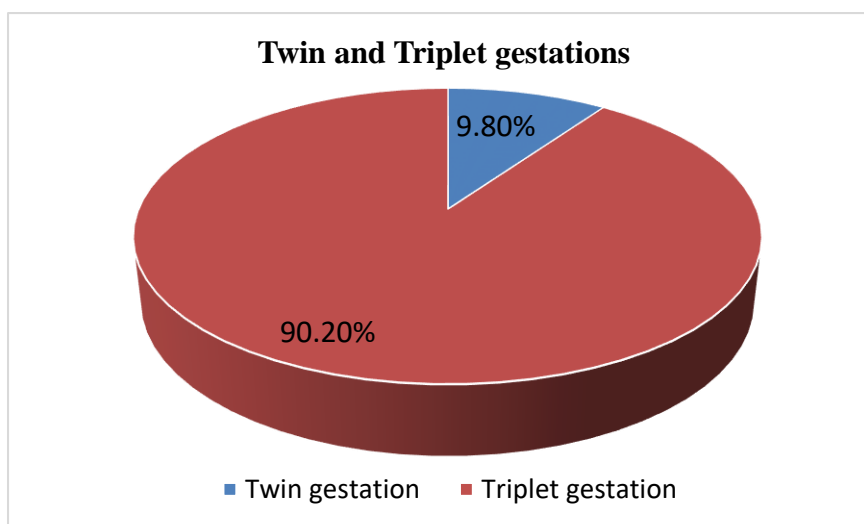
All the patients that had multiple gestation in the period under review at the Federal Medical Centre, Yenagoa were included in this study. All the patients who did not have multiple gestation in this facility were excluded from the study.

Data were retrieved from the labour ward, delivery, theatre and patients' records. These records were entered into a pre-designed proforma. The records included age, marital status, level of education, state of residence, occupation, parity, booking status, gestational age at delivery, type of multiple gestation, mode of delivery, maternal outcome, foetal outcome and total number of deliveries during the period under review. Data were analysed using IBM SPSS version 25.0. Results were presented in frequencies and percentages for categorical variables, and mean and standard deviation for continuous variables.

## 3. Results

### 3.1. Sociodemographic profile of parturient with multiple gestation

One hundred and sixty-three women had multiple gestation in the period under review, out of a total of 4,571 pregnancies, which represent a case incidence rate of 35.6 multiple gestations per 1,000 deliveries in the Centre. Incidence rates for twins and triplets were 32.5 and 3.5 per 1,000 deliveries, respectively. Figure 1 revealed that 147 (90.2%) of the multiple gestations were twin deliveries and 16 (9.8%) were triplet deliveries. The average age of the women is 30.2 years with a standard deviation of 5.5 years. About two-fifth (39.3%) were aged 26 – 30 years, while about a quarter (23.3%) were 31 – 35 years (Table 1). Most (92.6%) of the women were married, Christians (98.2%), and with secondary level of education (47.9%). By occupation, the women were traders (30.7%), civil servants (25.8%) and farmers (12.3%). However, 21.5% were unemployed (Table 1).



**Figure 1** Twin and Triplet gestations in the period under review. N = 163

### 3.2. Obstetric features among parturient with multiple gestation

Majority (42.3%) of women with multiple gestation were multiparous, and the median parity of the women was 2 with range between 0 and 7. About 51.5% were unbooked for antenatal care in the index pregnancy. Three in every five (60.1%) of the women were delivered by emergency Caesarean section (Table 2).

### 3.3. Complications associated with deliveries of multiple gestation

Figure 2 revealed the complications associated with deliveries of the women with multiple gestation in the period under review. The most common (47.2%) complication was preterm delivery. Others include preterm premature rupture of membranes (36.2%), malpresentation (30.1%), anaemia (20.2%) and hypertensive disorders in pregnancy (19.6%). Only 12.3% of these women had no complications (Figure 2).

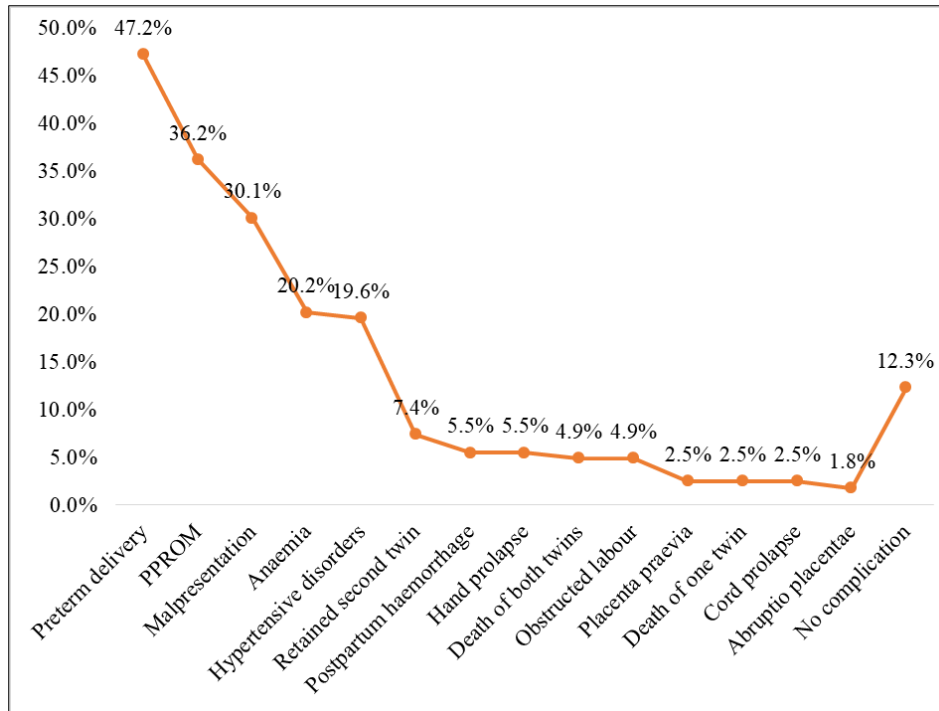
**Table 1** Sociodemographic profile of parturient with multiple gestation

| <b>Characteristics</b>                       | <b>Frequency N = 163</b>         | <b>Percentage (%)</b> |
|--|----------------------------------|-----------------------|
| <b>Age group</b>                             |                                  |                       |
| < 20 years                                   | 8                                | 4.9                   |
| 21 - 25 years                                | 21                               | 12.9                  |
| 26 - 30 years                                | 64                               | 39.3                  |
| 31 - 35 years                                | 38                               | 23.3                  |
| > 35 years                                   | 32                               | 19.6                  |
| <b>Mean age <math>\pm</math> SD in years</b> | <b>30.2 <math>\pm</math> 5.5</b> |                       |
| <b>Marital status</b>                        |                                  |                       |
| Single                                       | 12                               | 7.4                   |
| Married                                      | 151                              | 92.6                  |
| <b>Religion</b>                              |                                  |                       |
| Christianity                                 | 160                              | 98.2                  |
| Islam  | 3                                | 1.8                   |
| <b>Level of education</b>                    |                                  |                       |
| Primary                                      | 27                               | 16.6                  |
| Secondary                                    | 78                               | 47.9                  |
| Tertiary                                     | 58                               | 35.6                  |
| <b>Occupation</b>                            |                                  |                       |
| Professional                                 | 16                               | 9.8                   |
| Civil Servant                                | 42                               | 25.8                  |
| Trader                                       | 50                               | 30.7                  |
| Farmer                                       | 20                               | 12.3                  |
| Unemployed                                   | 35                               | 21.5                  |
| <b>Family history of multiple gestation</b>  |                                  |                       |
| Yes  | 99                               | 60.7                  |
| No   | 64                               | 39.3                  |
| <b>Previous multiple gestation</b>           |                                  |                       |
| Yes  | 34                               | 20.9                  |
| No   | 129                              | 79.1                  |

**Table 2** Obstetric features among parturients with multiple gestation

| <b>Characteristics</b>   | <b>Frequency N = 163</b> | <b>Percentage (%)</b> |
|--|--------------------------|-----------------------|
| <b>Parity</b>  |                          |                       |
| Nulliparity  | 20                       | 12.3                  |
| Primiparity  | 58                       | 35.6                  |
| Multiparity  | 69                       | 42.3                  |
| Grand-multiparity  | 16                       | 9.8                   |
| <b>Median parity</b>   | 2 (0 - 7)                |                       |
| <b>Booking status</b>  |                          |                       |
| Booked   | 79                       | 48.5                  |
| Unbooked   | 84                       | 51.5                  |
| <b>Gestational age at delivery in weeks (irrespective of mode of delivery)</b> |                          |                       |
| 28   | 3                        | 1.8                   |
| 29   | 3                        | 1.8                   |
| 30   | 4                        | 2.5                   |
| 31   | 7                        | 4.3                   |
| 32   | 6                        | 3.7                   |
| 33   | 7                        | 4.3                   |
| 34   | 8                        | 4.9                   |
| 35   | 24                       | 14.8                  |
| <b>36</b>  | <b>69</b>                | <b>42.4</b>           |
| 37   | 15                       | 9.2                   |
| 38   | 10                       | 6.1                   |
| 39   | 3                        | 1.8                   |
| 40   | 3                        | 1.8                   |
| 41   | 1                        | 0.6                   |
| <b>Mode of delivery</b>  |                          |                       |
| Vaginal delivery   | 47                       | 28.8                  |
| Elective Caesarean section   | 18                       | 11.0                  |
| Emergency Caesarean section  | 98                       | 60.1                  |
| <b>*Indications for Caesarean section</b>                                      | <b>N = 116</b>           |                       |
| Previous Caesarean section   | 29                       | 25.0                  |
| Short interpregnancy interval  | 4                        | 3.4                   |
| Malpresentation of leading twin  | 52                       | 44.8                  |
| Malpresentation of leading triplet   | 5                        | 4.3                   |
| Hypertensive disorder  | 32                       | 27.6                  |
| Cord prolapse  | 4                        | 3.4                   |
| Retained second twin   | 16                       | 13.8                  |
| Obstructed labour  | 8                        | 6.9                   |

\*More than one indication applies



**Figure 2** Delivery complications seen with multiple gestation

### 3.4. Delivery outcomes of multiple gestation

There was no case of maternal mortality associated with multiple gestation in the period under review. However, 14.1% of the women had anaemia, fever (1.8%) and wound infection (3.7%).

There were 342 neonates from the 163 multiple gestations. Twenty (5.8%) of the babies died – death of both babies in 8 twin gestations and death of one baby in 4 twin gestations. No death occurred in the 16 triplet gestations in the period under review. Majority of the babies were admitted into the special care baby unit (SCBU) (55.0%) for varying morbidity which include prematurity (49.7%), asphyxia (14.1%), and neonatal sepsis (2.9%).

**Table 3** Delivery outcomes of multiple gestation

| Characteristics  | Frequency N = 163 | Percentage (%) |
|--|-------------------|----------------|
| <b>Maternal Outcome</b>  |                   |                |
| Anaemia  | 23                | 14.1           |
| Fever  | 3                 | 1.8            |
| Wound infection  | 6                 | 3.7            |
| <b>Foetal Outcome</b>  |                   |                |
|  | <b>N = 342</b>    |                |
| Well and alive   | 134               | 39.2           |
| Babies admitted into SCBU  | 188               | 55.0           |
| Perinatal death  | 20                | 5.8            |
| <b>Foetal Morbidity (more than one foetal morbidity applies)</b> |                   |                |
| Mild asphyxia  | 34                | 9.9            |
| Moderate asphyxia  | 8                 | 2.3            |
| Severe asphyxia  | 10                | 2.9            |
| Prematurity  | 170               | 49.7           |
| Neonatal sepsis  | 10                | 2.9            |

#### 4. Discussion

Our main findings were that, over 90% of multiple gestations in this study were twin gestations and is consistent with reports the world over. We recorded an overall incidence rate of 36/1000 (1 in 27.8) deliveries for multiple births over the 5-year period of this review. Our findings were higher than reported values of 27/1000[8]. or (1 in 37) deliveries in a study in ABUTH Kaduna, North-West Nigeria and 28.4/1000[9]. deliveries reported in a study by Adewale et al. in, Bida, Niger State, North-Central Nigeria.

Concerning twin pregnancies, we had an incidence rate of 32.5/1000 or (1 in 30.8) deliveries. This finding was similar to reported values of 30.6/ 1000[10]. in an earlier study done in Bayelsa, South-South Nigeria, 32.5/1000[11]. in Abuja, North-Central Nigeria and 35.7/1000[12]. deliveries in Ile-Ife, Osun, South-West Nigeria. However, our finding was higher than values of 14.4/1000[13]. in Maiduguri, North-East Nigeria and 17.3/1000[14]. in Katsina in North-West Nigeria, 26.3/1000[9]. in Bida, North-Central Nigeria and 19.5/ 1000[15]. in Port Harcourt, 24/1000[16]. in Edo, 25.9/1000[17]. in Uyo, 26.5/ 1000[18]. in Calabar reported from other studies conducted in other southern parts of Nigeria. Furthermore, the incidence of twin delivery in this study, was lower than the reported values in the South western parts of Nigeria which ranged from 35.1/1000 to 46.5/1000 deliveries [19–22]. This finding suggests that the incidence of twinning is generally higher in the southern parts of the country than in the North. However, higher rates of multiple pregnancies are commoner among the south western parts most likely due to differences in ethnicity and diet as suggested by earlier studies.

With regards to triplet pregnancies in this study, we had a prevalence of 0.35%, and was higher than the prevalence values of 0.23% reported by Fajolu et al [23]. at a tertiary hospital in South-West Nigeria, 0.13% reported by Umeora et al [24]. in South-East Nigeria and 0.03% reported by Lawal et al [14]. in North-West Nigeria and 0.1% (1.0/1000) reported by Adewale et al. in a tertiary facility in North-Central Nigeria. The reason for the present finding and relative variability in values reported by other studies is not readily explainable.

Multiple pregnancies have been reported in literature to occur more among women above the age of 35 years and is attributed to grand-multiparity and rising levels of follicle stimulating hormones. Our study however, demonstrated that the converse was the case as about two-fifths of the patients were between 26 and 30 years, and were mostly multiparous. Our observations have been similarly reported in other Nigerian studies. [8,9,14,18]. Furthermore, among parturients in this study, two-thirds had a positive maternal family history of multiple gestation and about one-fifth had a previous multiple gestation. Almost all women in this study had multiple gestations spontaneously conceived, except for two. It is therefore highly likely that an interplay between increasing maternal age, genetic factors and parity partly explains the findings in this study. This supports the postulates by Bulmer,[25]. which highlighted that especially for dizygotic twins, the factor for familial determination of twinning is domicile in the female gene; and Hoekstra[26]. who proposed that family history, gravidity and parity, all increase the risk of spontaneous dizygotic twinning. Other plausible predisposing factors such as ethnicity/race, seasonality and geographical location have been reported in other studies to affect the frequency of multiple gestations [27].

There is still no global agreement on the most appropriate timing of delivery of women with multiple gestations. Nevertheless, it is comprehensible that both maternal and foetal complications are likely to be greater among women with multiple gestations with resultant higher incidence of preterm deliveries that may be spontaneous vaginal or induced. Irrespective of the mode of delivery in this study, the mean gestational age at delivery was 36 weeks. This finding is higher than the 33.3 weeks[10]. that was previously reported in an earlier study in Bayelsa State. However, it is similar to those of previous studies where the mean gestational age were 35.5 weeks[16]. in Benin city, 35.7 weeks[15]. in Port Harcourt and 36 weeks[12]. in Ilesa, though lower than 36.6 weeks[19]. and 36.9 weeks[28]. reported in Ekiti and Kano States of Nigeria respectively. Overall, this finding is in consonance with reports of an association between multiple pregnancy and preterm delivery.

Contrary to what is reported in other studies in Nigeria,[8,15,16,29]. this study noted that more than half of the women who had multiple pregnancies were unbooked. Unbooked status is closely associated with poor perinatal and maternal outcome as noticed in previous studies in this facility [30,31]. Poor utilisation of antenatal care services has also been associated with both poor maternal and foetal outcome in multiple gestation. Multiple gestation is considered 'high risk' pregnancy, and routine antenatal care provides the opportunity for assessing potential risks and planning for delivery, in order to improve foeto-maternal outcomes. Although most of the women in this study had at least secondary level of education, most were Christians and either agrarian, traders or unemployed. Hence, religious or sociocultural factors like 'dread of Caesarean section', preferences for delivery at faith-based organisations, traditional birth attendant's homes or financial constraints may be possible reasons for the high proportion of unbooked patients in this study. Our finding albeit, was somewhat comparable to the study by Lawal et al[14]. in North-West Nigeria where 51% of mothers

with multiple pregnancies were unbooked and were mostly delivered through Caesarean section due to obstetric complications.

During the period of the study, emergency Caesarean section was responsible for more than two-thirds of deliveries among women with multiple pregnancies in this Centre. This is similar to findings of previous studies in the Niger Delta region, Southern Nigeria where up to 60% to 67% of patients had Caesarean section; [15,32]. but contrary to the findings in studies done in Northern Nigeria where deliveries were predominantly vaginal, and Caesarean section rates were considerably lower, ranging between 27.3% to 41.6% [8,11,14,28,33]. The overall Caesarean section rate in this Centre is 42.4%, which is mainly due to unbooked patients referred from traditional birth attendants and private clinics [34]. The high rate of Caesarean section noted among women with multiple gestation in this review may be attributed to the high proportion of unbooked women referred to our Centre with already co-existing poor obstetric outcomes such as malpresentation, premature rupture of membranes and hypertensive disorders, which necessitated emergency Caesarean section to improve foetal and maternal outcome. This was aptly observed also in a study in North-West Nigeria, where, even though majority of mothers delivered vaginally, as high as 65.6% of those who were unbooked, had emergency Caesarean section. On the contrary, Caesarean section rates higher than that reported in this study was noted in another study by Okunade et al [35]. in a tertiary facility in Lagos State, South-West Nigeria, with predominantly booked patients. The Authors attributed their findings to possibly lower thresholds for Caesarean deliveries among women with multiple gestations.

Our study also revealed that the commonest maternal complications from multiple gestations observed in this study was preterm delivery and is consistent with what is documented in existing literature. Uterine over distension has been suggested to be the stimulus to initiate uterine contractions after a 'critical degree' of myometrial stretching with resultant increase in both frequency and strength to eventually bring about progressive cervical dilatation and onset of preterm labour [30,36]. The rate of preterm delivery in this study was considerably lower than the 53.5% and 62.4% rates reported in studies done in Lagos and Port Harcourt respectively. The proportion of women reported in our review to have had preterm deliveries was nonetheless, higher than the 25.7%, 35.4%, 39.7% and 40.2% rates reported in Ekiti,[19]. Uyo,[17]. Abuja,[11]. and Katsina[14]. respectively. Our finding, however, contrasted reports of hypertensive disorders by Adewale et al [9]. in Niger State and prelabour rupture of membranes by Kuti et al [12]. in Ile-Ife, Osun State as being the most common maternal complications.

The perinatal mortality rate (PMR) in this study was 58.5/1000 live births and was higher than the national PMR of 40.9/1000[37]. (95% CI: 38.3, 43.2) live births. About two-thirds of neonates were admitted in neonatal intensive care unit for predominantly prematurity and perinatal asphyxia, and has been similarly reported in other studies [10,20,22,24]. Interesting, was the finding that none of the 16 triplet neonates died in this study. A plausible explanation for this is the possibility that managing obstetricians would generally prefer to perform Caesarean section for triplets or higher order pregnancies than twins unless there were other indications for emergency Caesarean sections in the latter. It is known that triplets delivered through Caesarean section have a lower risk of morbidity and mortality when compared to vaginally delivered triplets [38]. Our finding was better than earlier studies done in a tertiary facility in Bayelsa State where PMR was 158.5/1000 births,[10]. 276/1000 births in a study done in Ebonyi, South-East Nigeria[24]. and 85.4/1000 births in another study done in Maiduguri, North-East Nigeria[13]. and 91/1000 births in Jos North-Central Nigeria [33]. However, the PMR in this study, was higher than the 7.8/1000 births reported in Port Harcourt [15]. The relatively high PMR observed in this study could be a reflection of the considerably higher proportion of unbooked cases in this study and the fact that being a referral Centre, have an increased burden of unsupervised referrals that present when obstetric complications have arisen from preterm labour, malpresentation or premature rupture of membranes or may even arise from delayed presentation from a weak referral system due to remotely sited primary health centres with poor access to the facility. Unbooked status is consistently associated with poor perinatal and maternal outcome in our Centre [30,31,34,39,40]. There laudably, was no maternal mortality recorded in this 5-year review among women that had multiple gestation. However, anaemia was the commonest morbidity observed in mothers post-delivery and has been previously documented in other Nigerian studies.

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## 5. Conclusion

The significant maternal and perinatal morbidity and mortality associated with multiple gestation can be reduced by early diagnosis, booking with specialised antenatal care, skilled intrapartum, postpartum and neonatal care in Centres with a full complement of skilled obstetricians, anaesthetists and neonatologists.



### *Limitation*

This study is limited by the fact that it is a single Centre hospital-based study and retrospective in nature. Thus, limiting the generalisability of the reported findings to the entire population.

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### **Compliance with ethical standards**

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#### *Disclosure of conflict of interest*

The authors declare that there are no conflicts of interest. The research was funded by the authors. PCO conceptualised and designed the study, collated data, wrote the introduction, results and the first draft of the manuscript. DOA wrote the protocol of the study and supervised the entire research. DCB managed literature searches, and wrote the discussion. JIA contributed to literature searches. MTR and AG collected data. All authors read and approved the final manuscript.

#### *Statement of ethical approval*

The research work was examined and approved by the hospital research and ethics committee.

#### *Statement of informed consent*

Not applicable. This study is a retrospective study.

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