AUSTRALIAN JOURNAL OF BIOMEDICAL RESEARCH

Australian Journal of Biomedical Research
(eISSN 3083-4708)

Australasia Publishing Group

Original Article

Pregnancy Outcomes Following Early Ultrasound-Guided Multifetal Pregnancy Reduction After Assisted Conception at a Nigerian Fertility Centre: A Retrospective Cohort Study

Chidinma Magnus Nwogu[1], Aloy Okechukwu Ugwu[2], Damilola O. Akinlawon[3]

[1]*Assisted Conception Unit, Kingswill Specialist Hospital, Lagos, Nigeria*
[2]*Department of Obstetrics and Gynaecology, 68 Nigerian Army Reference Hospital, Yaba, Lagos, Nigeria*
[3]*Department of Obstetrics and Gynaecology, University of Lagos Medical Centre, Lagos, Nigeria*

Received: Jun 21, 2026
Accepted: Aug 23, 2026

Corresponding author's email:
alokechugwu@gmail.com

Citation: Nwogu CM, Ugwu AO, Akinlawon DO. Pregnancy Outcomes Following Early Ultrasound-Guided Multifetal Pregnancy Reduction After Assisted Conception at a Nigerian Fertility Centre: A Retrospective Cohort Study. Australian Journal of Biomedical Research. 2026;2(3):aubm026. https://doi.org/10.63946/aubiomed/19196

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ABSTRACT

Background: Higher-order multifetal pregnancies following assisted conception are associated with increased risks of miscarriage, preterm birth, fetal growth restriction and neonatal morbidity. Multifetal pregnancy reduction may improve outcomes, but evidence from sub-Saharan Africa remains limited.

Methods: This retrospective cohort study included women who underwent ultrasound-guided multifetal pregnancy reduction at Kingswill Specialist Hospital, Lagos, Nigeria, between January 2014 and December 2024. All pregnancies followed assisted reproductive treatment. Reduction was performed between 6 and 12 weeks using ultrasound-guided cardiac puncture followed by aspiration of the selected gestational sac, without potassium chloride injection. Maternal characteristics, procedural details, pregnancy and perinatal outcomes were extracted from clinical records and compared according to reduction before or at/after 8 weeks.

Results: Twenty-three women underwent multifetal pregnancy reduction. Mean maternal age was 32.8 ± 2.3 years, and median parity was 1 (interquartile range 0–2). Seventeen pregnancies (73.9%) were triplets and six (26.1%) were quadruplets. Reduction was performed before 8 weeks in 19 women (82.6%) and at/after 8 weeks in four (17.4%). Immediate post-procedure vaginal bleeding occurred in two women (8.7%), and no immediate post-procedure miscarriage was recorded. The take-home-baby rate was 100.0% before 8 weeks and 75.0% at/after 8 weeks. Earlier reduction was associated with higher mean birth weight, lower preterm prelabour rupture of membranes, lower preterm labour and fewer small-for-gestational-age births. No neonatal deaths or congenital malformations were recorded.

Conclusion: Ultrasound-guided multifetal pregnancy reduction was feasible and associated with favourable outcomes in this Nigerian fertility centre.

Keywords: Assisted Reproduction; Multifetal Pregnancy Reduction; Fetal Reduction; Pregnancy Outcome; IVF; Nigeria

Introduction

The use of ovarian stimulation and assisted reproductive technology has increased the occurrence of multifetal pregnancies. [1, 2] The risk is particularly relevant following the transfer of multiple embryos during in vitro fertilization or the development of several dominant follicles during ovulation induction and intrauterine insemination. [3, ,4, 5]

Higher-order multifetal pregnancy, generally defined as a pregnancy involving three or more fetuses, is associated with substantially greater maternal and perinatal risks than singleton or twin pregnancy. [1, 6, 7, 8]

These include miscarriage, hypertensive disorders of pregnancy, gestational diabetes, antepartum and postpartum haemorrhage, fetal growth restriction, preterm prelabour rupture of membranes, preterm delivery, low birth weight, neonatal intensive care admission and perinatal mortality. [1–3, 9] Multifetal pregnancy reduction is undertaken to reduce the number of viable fetuses and thereby improve the probability of a favourable outcome for the remaining pregnancy. [8, 9, 10]

Different techniques have been described according to the gestational age at intervention, route of access and use or avoidance of cardiotoxic substances. [3, 4] Early transvaginal reduction without potassium chloride has been reported to produce favourable outcomes, although pregnancy loss, infection, bleeding and preterm birth remain recognized complications. [1,2]

Published evidence on multifetal pregnancy reduction originates predominantly from centers outside sub-Saharan Africa. [8, 10-13] Differences in embryo-transfer practice, patient characteristics, access to fetal medicine services, procedural techniques and antenatal follow-up may limit the direct application of those findings to Nigerian fertility practice. Local evidence regarding the procedure and subsequent pregnancy outcomes remains scarce.

Multifetal pregnancy reduction is an important procedural skill within fertility practice in Nigeria, where the risk of higher-order multiple pregnancy remains clinically relevant. Professional ART guidance developed by the Association for Fertility and Reproductive Health recommends that no more than three embryos be transferred during a treatment cycle, while encouraging the transfer of no more than two where clinically appropriate. However, Nigeria currently lacks a comprehensive national statute establishing a legally enforceable limit on the number of embryos transferred. [14-20] Consequently, Nigerian fertility specialists may encounter a greater proportion of triplet and higher-order pregnancies following assisted reproduction. [15] Although prevention through careful ovarian stimulation, appropriate patient selection and limitation of embryo number remains the preferred strategy, clinicians providing assisted reproductive services should also be competent in counselling, patient selection and the safe performance of ultrasound-guided multifetal pregnancy reduction. This is particularly important because higher-order multiple pregnancies are associated with substantially increased risks of miscarriage, preterm birth, fetal growth restriction, neonatal morbidity and perinatal mortality. [14-20]

This study therefore assessed the clinical characteristics, procedural details, complications and pregnancy outcomes of women who underwent early ultrasound-guided multifetal pregnancy reduction following assisted conception at a Nigerian fertility centre.

Study objective

The primary objective was to determine the live-birth rate following early ultrasound-guided multifetal pregnancy reduction. The secondary objectives were to describe pregnancy loss, preterm birth, gestational age at delivery, mode of delivery, procedural complications and neonatal outcomes, and to explore whether these outcomes differed according to gestational age at reduction, initial fetal number, final fetal number, conception method and procedural route.

The secondary objectives were to determine: the rates of pregnancy loss and preterm birth; the gestational age and mode of delivery; maternal and procedural complications; neonatal outcomes; and whether outcomes differed according to the initial fetal number, final fetal number, conception method or procedural route.

Methods

Study design

This was a retrospective cohort study of women who underwent multifetal pregnancy reduction following assisted conception.

Study setting

The study was conducted at Kingswill Specialist Hospital, a regional specialist fertility facility located in FESTAC town Lagos, Nigeria. The centre provides infertility evaluation, ovulation induction, intrauterine insemination, in vitro fertilization, preimplantation genetic testing, intracytoplasmic sperm injection, embryo transfer, early-pregnancy ultrasound and related reproductive-health services. It also has a unit dedicated to training and Research in Reproductive health.

Study period

The study included procedures performed between January 1, 2014, to December 31, 2024, Pregnancy outcomes were followed until delivery.

Participants

The source population comprised women who conceived following assisted reproductive treatment at the centre and subsequently developed a viable higher-order multifetal pregnancy. Women were eligible if they: had at least three viable gestational sacs or embryos confirmed by ultrasound; conceived following IVF-ICSI, embryo transfer or IUI; underwent multifetal pregnancy reduction at the study centre; had the procedure performed during the study period; and had sufficient follow-up information to establish the pregnancy outcome.

Women were excluded if they: experienced spontaneous reduction before the planned procedure; had no demonstrable fetal cardiac activity before intervention; underwent reduction at another institution; had selective termination primarily for a diagnosed fetal abnormality rather than fetal-number reduction; or had records that did not permit confirmation of the procedural or pregnancy outcome. All eligible women treated during the study period were included. Women were also excluded if they had a severe uncontrolled medical disorder likely to independently affect pregnancy outcome, including uncontrolled chronic hypertension, pregestational diabetes with vascular complications, severe cardiac disease, chronic renal disease or active systemic infection.

Counselling and consent

Women and, where appropriate, their partners received counselling regarding the risks associated with continuation of a higher-order multifetal pregnancy. The potential benefits, limitations and alternatives to reduction were discussed. The procedural risks explained included: complete pregnancy loss; loss of a remaining fetus; vaginal bleeding; infection; rupture of membranes; inadvertent injury to another gestational sac; incomplete reduction or need for repeat intervention; preterm delivery; and psychological distress. The final decision to proceed was made voluntarily by the woman. Written informed consent was obtained before the procedure, with verbal confirmation again obtained on the day of intervention.

Pre-procedure assessment

Before intervention, a clinical assessment and ultrasound examination were undertaken. Ultrasound was used to document: the number and location of gestational sacs; fetal viability and cardiac activity; gestational age; crown–rump length; chorionicity and amnionicity, where ascertainable; accessibility of each gestational sac; and any associated uterine, adnexal or pelvic abnormality. Gestational age was calculated from the date of embryo transfer and corroborated by first-trimester ultrasonography. Chorionicity and amnionicity were assessed from the number of gestational sacs, yolk sacs and visible inter-gestational membranes where these could be reliably demonstrated. Where the ultrasound appearances were inconclusive, chorionicity was recorded as indeterminate.

Pre-procedure investigations included full blood count, blood group and Rhesus status, infection screening and coagulation profile.

Selection of the gestational sac

The gestational sac selected for reduction was chosen according to accessibility, location and the anticipated safety of the needle path. Where clinically appropriate, preference was given to the sac that could be accessed with the least manipulation and lowest likelihood of traversing or injuring another gestational sac.

Any additional criteria used, including smaller crown–rump length, abnormal morphology or location, were documented where available.

Timing and route of intervention

Reduction was generally performed between 6 and 12 completed weeks of gestation.

The route was selected according to the location of the gestational sac, uterine position, operator assessment and ease of safe access: women undergoing a transvaginal procedure were placed in the lithotomy position; and women undergoing a transabdominal procedure were placed in the supine position.

Anaesthesia, monitoring and infection prevention

The procedure was undertaken with general anaesthesia. Maternal blood pressure, pulse, respiratory rate, oxygen saturation was monitored during the procedure and recovery.

A stat dose of intravenous ceftriaxone was administered as prophylactic antibiotic therapy according to the center's protocol. The skin and vagina were prepared using 5% povidone iodine, and sterile ultrasound-probe covers, needle guides and procedural equipment were used.

Multifetal pregnancy-reduction procedure

All procedures were performed by two gynaecologists and a senior medical officer under continuous ultrasound guidance. A 17-gauge Kitazato or B. Braun oocyte-retrieval needle was connected to an oocyte pick-up suction pump. The suction pressure was set at approximately 125–150 mmHg. For the transvaginal approach, a sterile needle guide was mounted on the covered transvaginal ultrasound probe. The needle was advanced through a single vaginal puncture and through the uterine wall into the selected gestational sac under continuous ultrasound visualization.

For the transabdominal approach, the needle was introduced through a single abdominal puncture and advanced under ultrasound guidance into the selected gestational sac.

The needle tip was positioned in the fetal cardiac region, and cardiac puncture was performed until cessation of cardiac activity was demonstrated. The contents of the selected gestational sac were then aspirated under ultrasound guidance.

Cardiac puncture preceded aspiration to reduce the risk of sudden needle displacement or inadvertent advancement into an adjacent viable gestational sac. Continuous ultrasonographic visualization was maintained throughout the intervention. At completion, the remaining gestational sacs were examined to confirm persistent fetal cardiac activity. The pelvis was assessed for significant bleeding or other immediate complications. No potassium chloride or other cardiotoxic substance was injected.

Post-procedure care

Women remained under observation in the supine position until they had recovered fully from sedation. Maternal observations, pain, vaginal bleeding and general condition were monitored.

According to the center's protocol, post-procedure medication included: oral metronidazole 400 mg three times daily for 7 days; oral cefuroxime 500 mg twice daily for 7 days; intramuscular progesterone 100 mg as a single dose; vaginal micronized progesterone 400 mg twice daily; and oral folic acid 5 mg daily.

These medications are reported as the protocol used during the study period and should not be interpreted as recommendations for routine practice.

Women were discharged after satisfactory recovery. They were advised to return urgently if they developed heavy vaginal bleeding, increasing abdominal pain, fever, offensive vaginal discharge, fluid leakage, dizziness, syncope or other concerning symptoms.

Follow-up

A repeat ultrasound examination was performed 7 days after the procedure to confirm: continuing cardiac activity in the remaining fetus or fetuses; absence of cardiac activity in the reduced gestational sac; absence of a significant pelvic collection; and absence of other early complications.

Subsequent antenatal care took place at Kingswill Specialist Hospital. Pregnancy outcomes were established from maternity records, delivery records, neonatal records and, where necessary, structured telephone follow-up.

Data collection

Data was extracted from paper and electronic clinical records using a standardized proforma.

Outcomes Measures

The following outcomes were collected: miscarriage, gestational age at delivery, ongoing pregnancy beyond 28 weeks; preterm birth before 37 weeks; preterm prelabour rupture of membranes; number of liveborn infants; birth weight; stillbirth; and neonatal death before 28 days.

Outcome definitions

The primary outcome was live birth, defined as the birth of at least one infant showing evidence of life, at or after 28 weeks.

Secondary outcomes were defined as follows: Immediate procedure-related pregnancy loss: complete loss of the pregnancy within 4 weeks of the procedure.21 Pregnancy loss: complete fetal loss before 28 completed weeks of gestation.21 Ongoing pregnancy: a viable pregnancy continuing beyond 28 complete weeks.21 Preterm birth: delivery before 37 completed weeks.21 Very preterm birth: delivery before 32 completed weeks.21 PPROM: rupture of the membranes before 37 weeks and before the onset of labour.21 Take-home-baby rate: the proportion of treated women who had at least one liveborn infant discharged alive from hospital.

Potential sources of bias

All eligible procedures performed during the study period were included to reduce selection bias. A standardized data-extraction form was used to reduce inconsistent abstraction.

Outcomes were verified from clinical and delivery records wherever possible.

Because the study did not include an untreated control group, it was designed to describe outcomes following reduction rather than establish the causal effectiveness of the procedure.

Study size

All eligible women who underwent multifetal pregnancy reduction during the predefined study period were included. No formal sample-size calculation was performed because the study used an audit of all available eligible cases.

Statistical analysis

Data was entered, cleaned and analyzed using Statistical package for the social sciences -**SPSS Statistics version 32.0 (IBM Corp., Armonk, NY, USA)**. Continuous variables were assessed for distribution and summarized as mean with standard deviation when approximately normally distributed. Parity, which was treated as a discrete variable, was summarized using the median and interquartile range. Categorical variables were presented as frequencies and percentages.

Pregnancy outcomes were compared between women who underwent multifetal pregnancy reduction before 8 completed weeks of gestation and those who underwent the procedure at or after 8 weeks. The Fiser test was used to compare normally distributed continuous variables, including gestational age at delivery and neonatal birth weight.

Ethical considerations

Ethical approval was obtained from the **Research and Ethics committee of 68 Nigerian Army Reference Hospital Yaba. ADM/NARHY/ObGyn7862**.

Results

Baseline maternal and pregnancy characteristics

A total of 23 women underwent multifetal pregnancy reduction during the study period. The mean maternal age was 32.8 ± 2.3 years. Seventeen women (73.9%) were nulliparous, five (21.7%) had parity of 1–4, and one (4.3%) had parity of at least four. The median parity was 1, with an interquartile range of 0–2.

Multifetal pregnancy reduction was performed before 8 completed weeks of gestation in 19 women (82.6%), while 4 women (17.4%) underwent the procedure at or after 8 weeks. Most pregnancies followed fresh embryo transfer [19/23; 82.6%], while four (17.4%) followed cryopreserved-thawed embryo transfer. Seventeen women (73.9%) delivered by caesarean section, while six (26.1%) had vaginal delivery. The baseline maternal and pregnancy characteristics are presented in Table 1.

Table 1. Baseline Maternal and Pregnancy Characteristics Prior to Multifetal Pregnancy Reduction

Variables	Values
Mean Maternal age (years)	32.8±2.3
Parity	
Nulliparous	17 (73.91)
1-4	5 (21.74)
≥4	1 (4.35)
Median parity	1 (interquartile range 0-2)
< 8 weeks	19 (82.61%)
≥ 8 weeks	4 (17.39%)
Fresh IVF Embryo	19 (82.61%)
Cryopreserved-Thawed embryo	4 (17.39%)
Vaginal Delivery	6 (26.09)
Caesarean Section	17 (73.91)

Procedural characteristics and immediate post-procedure complications

All 23 pregnancies were higher-order multifetal pregnancies following assisted reproductive treatment. Seventeen pregnancies (73.9%) were triplet pregnancies, while six (26.1%) were quadruplet pregnancies.

Among the triplet pregnancies, six (26.1% of the total cohort) were reduced from triplets to twins, while 11 (47.8%) were reduced from triplets to singleton pregnancies. Among the quadruplet pregnancies, two (8.7%) were reduced from quadruplets to twins, while four (17.4%) were reduced from quadruplets to singleton pregnancies.

Immediate post-procedure vaginal bleeding occurred in two women (8.7%). One episode followed reduction from triplets to twins, and the other followed reduction from quadruplets to twins. No immediate post-procedure miscarriage occurred.

The procedural characteristics and immediate complications are summarized in Table 2.

Table 2. Procedural Characteristics of Multifetal Pregnancy Reduction and Immediate Post-procedure Complications

Embryo Reduction	N (%)	PV Bleeding post procedure	Miscarriage post procedure
3 to 2	6 (26.09)	1	0
3 to 1	11 (47.83)	0	0
4 to 2	2 (8.69)	1	0
4 to 1	4 (17.39)	0	0

Pregnancy and perinatal outcomes

Pregnancy and perinatal outcomes were compared according to the timing of multifetal pregnancy reduction. Among the 19 women who underwent reduction before 8 weeks, no miscarriage was recorded. Among the four women who underwent reduction at or after 8 weeks, one miscarriage was recorded. This difference was not statistically significant (p = 0.17).

The mean gestational age at delivery was 37.3 ± 1.7 weeks in the group reduced before 8 weeks and 36.8 ± 2.9 weeks in those reduced at or after 8 weeks. The difference was not statistically significant (p = 0.27).

Mean birth weight was higher among women who underwent reduction before 8 weeks compared with those reduced at or after 8 weeks: 3.05 ± 0.21 kg versus 2.92 ± 0.14 kg, respectively (**p = 0.04**).

The take-home-baby rate was 100.0% (19/19) among women who underwent reduction before 8 weeks, compared with 75.0% (3/4) among those who underwent reduction at or after 8 weeks (p = 0.01). No neonatal deaths, single fetal demise, vanishing twin syndrome or congenital malformations were recorded in either group.

Preterm prelabour rupture of membranes occurred in one woman (5.3%) in the earlier-reduction group and in two women (50.0%) in the later-reduction group (p = 0.02). Preterm labour occurred in one woman (5.3%) following reduction before 8 weeks and in one woman (25.0%) following reduction at or after 8 weeks (p = 0.61).

Small-for-gestational-age birth occurred in two pregnancies (10.5%) in the earlier-reduction group and in one pregnancy (25.0%) in the later-reduction group (p = 0.81). Pregnancy and perinatal outcomes are presented in Table 3.

Table 3. Pregnancy and Perinatal Outcomes among our cohort

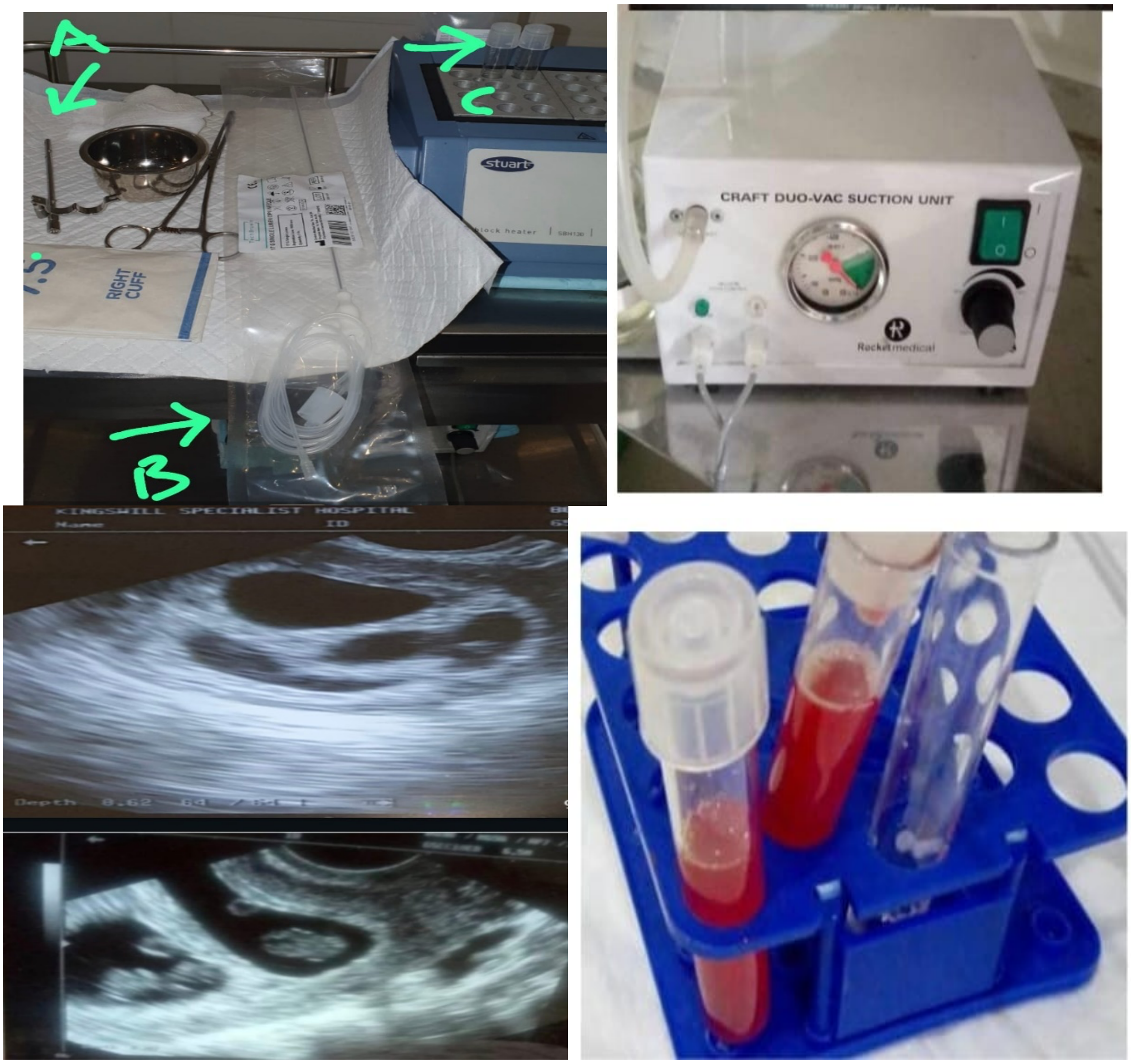
Pregnancy outcome	< 8 weeks	≥ 8 weeks	Statistics
Miscarriage	0	1	0.17^
Gestational age at delivery	37.3 ± 1.7	36.8 ± 2.9	0.27[a]
Birthweight	3.05 ± 0.21	2.92 ± 0.14	**0.04**[a]
Take Home baby	100% (19/19)	75% (3/4)	0.01*
Neonatal death	0 (0.00)	0 (0.00)	0.29*
Single fetal demise	0 (0.00)	0 (0.00)	0.00
Vanishing twin	0 (0.00)	0 (0.00)	0.00
PPROM	1 (5.26%)	2 (50.00%)	**0.02***
Preterm labour	1 (5.26%)	1 (25.00%)	0.61*
Congenital Malformation	0 (0)	0 (0)	
Small for gestational age	2 (10.53%)	1 (25.00%)	0.81*

**- Fisher's exact.*

Overall, singleton gestation was the most common final fetal number after reduction, representing 68.19% of cases, compared with 31.81% that were reduced to twin gestations- Table 4

Table 4- Final Fetal Number After Multifetal Pregnancy Reduction

Variable	Percentage
Singleton	68.19
Twins	**31.81**



Figures 1-4: Showing; (1) needle guard-A, 17 G oocyte retrieval needle for MFPR-B, collection tubes-C , (2) suction pump, (3) transvaginal scan of 4 gestational sacs-upper and 2 gestational sacs -lower after MFPR (4) collection tube with products of conception

Discussion

Evidence regarding the optimal timing of multifetal pregnancy reduction remains inconsistent. Some studies have reported lower pregnancy-loss, membrane-rupture or prematurity rates following earlier reduction, whereas others have found broadly comparable outcomes between early and later procedures. These differences may reflect variation in initial fetal number, chorionicity, gestational-age thresholds, transvaginal versus transabdominal access, use of potassium chloride, aspiration of gestational contents and definitions of pregnancy loss or live birth. Later reduction may also permit spontaneous reduction, more reliable anatomical assessment and screening for aneuploidy. Consequently, the apparent advantage of reduction before 8 weeks in the present cohort should be regarded as hypothesis-generating rather than evidence of an optimal timing strategy. The principal finding was that reduction before 8 weeks was associated with more favourable pregnancy and perinatal outcomes than reduction at or after 8 weeks. Women treated before 8 weeks had higher take-home-baby rates and lower frequencies of preterm labour, preterm Prelabour rupture of membranes and small-for-gestational-age infants. Mean birth weight was also higher in the earlier-reduction group. However, gestational age at delivery did not differ significantly between the two groups.

The association between reduction before 8 weeks and improved outcomes is broadly consistent with the findings of ***Lee et al***., who compared different methods and timings of multifetal pregnancy reduction in 148 pregnancies resulting from assisted reproduction.[1] In that study, procedures performed before 8 weeks were associated with fewer immediate pregnancy losses than later procedures. The authors also reported more favourable outcomes particularly with respect to take-home-baby rate, and preterm Prelabour rupture of membranes.

Our findings similarly showed a higher take-home-baby rate among women treated before 8 weeks than among those treated at or after 8 weeks. Preterm labour and preterm Prelabour rupture of membranes were also less frequent following earlier reduction. These findings suggest that completing the procedure during early gestation may limit uterine disturbance, reduce the quantity of residual gestational tissue and allow more time for resorption of the reduced gestational sac before the period of rapid uterine enlargement.

Nevertheless, the optimal timing of multifetal pregnancy reduction remains uncertain. ***Haas*** and colleagues found that overall perinatal outcomes after early and later reduction were broadly similar, although the effect of timing varied according to the initial fetal number and the specific outcome examined.[2] Early reduction may avoid prolonged exposure to the physiological burden of a higher-order pregnancy, whereas later reduction allows spontaneous reduction to occur and provides an opportunity for first-trimester anatomical and aneuploidy assessment. The apparent benefit of reduction before 8 weeks in the present study should therefore be interpreted as an association rather than proof that early reduction is intrinsically superior.

The small series reported by ***Palshetkar et al.*** also found generally favourable outcomes following ultrasound-guided reduction of higher-order pregnancies to twins or singletons, although the sample comprised only 12 women.[5] Taken together, these studies indicate that multifetal pregnancy reduction can be followed by a high likelihood of pregnancy continuation, but complete pregnancy loss remains an important risk that should be clearly discussed during counselling. This is comparable to our study that had no pregnancy loss post procedure.

Preterm labour was substantially less frequent among women who underwent reduction before 8 weeks than among those treated at or after 8 weeks. Preterm prelabour rupture of membranes showed a similar pattern. These findings are clinically important because prematurity remains the principal contributor to adverse perinatal outcomes in higher-order pregnancies.

Multifetal pregnancy reduction is intended primarily to decrease the risk of severe prematurity by reducing fetal number. Reviews of the procedure suggest that reducing higher-order pregnancies to twins may prolong pregnancy by approximately 4 weeks and improve maternal and perinatal outcomes.[6] ***Macones et al,*** reported a mean gestational age at delivery of 35.6 weeks among triplet pregnancies reduced to twins, compared with 31.2 weeks among unreduced triplets.[7]

Lee et al found lower rates of extreme prematurity and preterm prelabour rupture of membranes with earlier, non-potassium-chloride techniques.[1] The lower frequencies of preterm labour and membrane rupture observed in our earlier-reduction group are therefore biologically plausible. Earlier intervention may reduce the duration of uterine overdistension, and placental burden associated with continuation of the original fetal number. However, factors such as the initial number of fetuses, number remaining after reduction, chorionicity and maternal characteristics may also influence prematurity and should be considered as potential confounders.

Despite the difference in pre-term labour, mean gestational age at delivery did not differ significantly between the two groups. This may reflect the relatively small number of adverse events, variation in the severity or management of pre-term labour, or the influence of the final fetal number. It is also possible that some women diagnosed with preterm labour subsequently continued their pregnancies following treatment.

Mean birth weight was significantly higher among infants whose mothers underwent reduction 8 weeks before. Small-for-gestational-age infants were also less frequent in this group. These findings may reflect a lower frequency of prematurity, a shorter duration of competition among multiple gestational sacs, or differences in placental function between the groups.

Previous studies have shown that higher-order multifetal pregnancies are associated with reduced birth weight and fetal growth restriction. Multifetal pregnancy reduction may improve birth weight by decreasing fetal and placental competition, although reduced twin pregnancies may still have poorer growth outcomes than naturally conceived or unreduced twin pregnancies in some studies. [6,8]

The rate of minor post-procedure bleeding event was reported. This compares favourably with the transient spotting rate of 11.4% reported by ***Ibérico et al.*** [3] the difference may reflect variations in the definition and recording of bleeding, route of access, operator technique and gestational age at intervention.

The present technique involved ultrasound-guided cardiac puncture followed by aspiration of the selected gestational sac without injection of potassium chloride. ***Ibérico et al.*** used cardiac puncture until asystole but deliberately avoided aspiration of embryonic tissue or amniotic fluid.[3] ***Lee et al.*** evaluated several techniques and found that avoidance of potassium chloride was associated with more favourable outcomes in some comparisons.[1]

Aspiration after cardiac puncture may reduce the volume of retained gestational tissue but may also theoretically increase mechanical disturbance, bleeding or the risk of inadvertent injury to an adjacent sac. The low immediate complication rate in this series suggests that the technique was feasible in experienced hands. However, the study was not designed to compare aspiration with non-aspiration techniques, and no conclusion can be made regarding their relative safety. Additionally, multifetal pregnancy reduction should be regarded as a rescue intervention rather than a substitute for preventing higher-order pregnancies. Fertility centers should minimize the risk of high-order multiple gestation through careful ovarian-stimulation monitoring, appropriate cancellation policies and limitation of the number of embryos transferred.

Women considering the procedure require comprehensive and non-directive counselling. Counselling should address the risks of continuing a higher-order pregnancy, the possibility of spontaneous reduction, the risk of complete pregnancy loss after intervention, the potential for prematurity despite reduction and the ethical and psychological implications of the procedure.

Moreover, several hypotheses have been proposed regarding the potential influence of assisted reproductive procedures on the sex ratio at birth. Performing multifetal pregnancy reduction at an earlier gestational age, before fetal sex can be reliably determined, may help minimise the possibility or perception that a particular fetus is selected for reduction based on gender. [10, 11]

Strengths and limitations

It provides clinically relevant data from Nigeria, where published evidence on multifetal pregnancy reduction remains limited. The study also documented the initial fetal number, extent of reduction, immediate complications and a range of pregnancy and neonatal outcomes.

This Study nevertheless has important limitations. Its retrospective design depended on the completeness and accuracy of existing records. It was conducted at a single fertility centre, which may limit generalizability. There was no unreduced comparison group, and the women were not randomly assigned to reduction before or after 8 weeks. The timing of the procedure may have been influenced by clinical or logistical factors that were also associated with pregnancy outcome. Chorionicity could not be reliably established in every pregnancy because some procedures occurred at very early gestations, and misclassification cannot be excluded.

Conclusion

Multifetal pregnancy reduction at this Nigerian fertility centre was followed by a high take-home-baby rate and a low frequency of immediate complete pregnancy loss. Reduction before 8 weeks was associated with a higher take-home-baby rate, higher mean birth weight and lower frequencies of preterm labour, preterm prelabour rupture of membranes and small-for-gestational-age infants than reduction at or after 8 weeks. These findings support the feasibility of early ultrasound-guided multifetal pregnancy reduction in experienced hands but should be interpreted cautiously because of the retrospective study design and potential confounding.

Recommendation

Prospective multicenter studies with standardized outcome definitions and adjustment for initial fetal number, final fetal number, chorionicity and other relevant variables are needed to clarify the optimal timing and technique for multifetal pregnancy reduction in African fertility settings. Notwithstanding, as fertility treatment advances, stakeholders in African setting should start advocating for single embryo transfer.

Acknowledgements

Ethics approval: Ethical approval was obtained from the Research and Ethics **committee of 68 Nigerian Army Reference Hospital Yaba. ADM/NARHY/ObGyn7862**.

Availability of data: An anonymized dataset may be made available by the corresponding author on reasonable request and subject to institutional and ethical approval.

Competing interests: The authors declare that they have no competing interests.

Funding: The study received no external funding.

Authors' contributions: Conceptualization- **CMN, AOU,** Methodology- **CMN, AOU, DOA,** validation- **CMN, AOU, DOA,** formal analysis- **CMN, AOU,** writing – **CMN, AOU, DOA,** original draft preparation- **CMN, AOU, DOA,** writing – review and editing- **CMN, AOU, DOA,** visualization- **CMN, AOU, DOA,** supervision- **CMN, AOU, DOA,**

All authors have read and agreed to the published version of the manuscript.

Acknowledgements: The authors acknowledge the clinical, embryology, nursing and administrative staff of Kingswill specialist hospital and Research and Ethics committee of 68 NARHY for their roles in patient care, record management and ethics approval.

Disclosure of AI Use: No AI was was used at any stage in the preparation of this manuscript.

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