INDUCTION OF LABOUR FOR POST-TERM PREGNANCIES AT CHARLOTTE MAXEKE JOHANNESBURG ACADEMIC HOSPITAL: A ONE YEAR REVIEW

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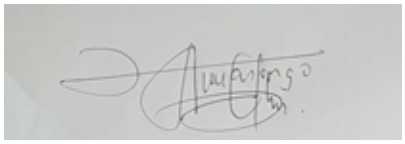
Declaration

I, Dr K Kazadi, declare that this research report is my own work. It is being submitted for the degree of Master of Medicine in Obstetrics and Gynaecology at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any other degree or examination at this or any other University.

Signed: 

Date: 29 November 2021

Dedication

To God, for enabling and empowering me in this achievement.

To my family, for their support and sacrifices along the way.

Abstract

Background: Post-term pregnancy has been associated with adverse maternal and neonatal outcomes. There is controversy regarding optimal management and timing of induction.

Objective: To determine maternal and neonatal outcomes of induction of labour (IOL) for post-term pregnancies in a tertiary hospital over one year.

Methods: A retrospective review of clinical records of all patients induced for post-term pregnancies in 2018. A total of 137 patients were induced; only 105 files contained the required information.

Results: Oral misoprostol was used as the induction agent. Of 105 patients, 61 (58.09%) achieved successful normal vaginal delivery (NVD) and 44 (41.90%) delivered by caesarean section (CS). Eight-four patients (80%) had one cycle of misoprostol and 21 (20%) had two cycles. The greatest number of doses was 24 in 11 patients (10.38%) and the lowest was 2 in six (5.66%). The highest Bishop score (BS) was 5 in 35 patients (33.02%) and the lowest 2 in three (2.83%). The mean time of delivery was 22 hours standard deviation (SD) (16.6) for mothers who had one cycle, and 83.5 (SD 36.6) for those with two cycles. There was no major maternal or neonatal adverse event.

Conclusion: IOL with misoprostol is associated with successful NVDs with no major maternal or neonatal adverse events. A high BS, artificial rupture of membranes (AROM) and using syntocinon (synto) were associated with high likelihood of successful delivery. A second cycle of induction resulted in a diminished chance of successful NVD.

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Table of contents

Declaration ii
Dedication iii
Abstract iv
Acknowledgements v
Abbreviations viii
Authors' credentials 1
1. Introduction 2
2. Methods 3
3. Results 4
4. Discussion 9
5. Conclusion 11
6. Limitations 11
7. Recommendations 11
8. References 13
9. Appendices 15
Appendix A: Protocol 155
Appendix B: Ethical clearance 35
Appendix C: Journal guidelines 37
Appendix D: Certificate of attendance 45
Appendix E: Turnitin receipt and report 46

List of Tables

Table 1: Socio-demographic characteristics of participants 4

Table 2: Time to induction of labour 5

Table 3: Adjuvant methods used and mode of delivery 5

Table 4: Logistic univariate and multivariate regression analyses 8

Table 5: Neonatal complications 8

Table 6: Maternal complications 6

Abbreviations

AFI	Amniotic fluid index
AROM	Artificial rupture of membranes
BS	Bishop score
CMJAH	Charlotte Maxeke Johannesburg Academic Hospital
CS	Caesarean section
ICU	Intensive care unit
IOL	Induction of labour
NNHC	Neonatal high care
NNICU	Neonatal intensive care unit
NVD	Normal vaginal delivery
OR	Odds ratio
PPH	Post-partum haemorrhage
SD	Standard deviation
Synto	Syntocinon

Induction of labour for post-term pregnancies at Charlotte Maxeke Johannesburg Academic Hospital: A one year review

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1. Introduction

Post-term pregnancy, also known as prolonged pregnancy, is one that exceeds 42+0 completed weeks of gestation. The condition has been associated with adverse maternal and neonatal outcomes. Furthermore, there remains a difference of opinion regarding optimal management and timing of delivery.

Several studies [1-5] reported the incidence of post-term pregnancies to be between 4% and 19% and recommended IOL between 41+0 - 42+0 to obviate the risk of adverse perinatal outcomes associated with prolonged pregnancy. The aetiology of post-term pregnancy is not well elucidated but risk factors such as obesity, null parity and maternal age above 30 have been associated with post-term pregnancy. [3] IOL is an intervention designed to artificially initiate uterine contractions leading to progressive dilatation of the cervix and delivery of the fetus from 28 weeks of gestation onwards. Different agents may be used to induce labour but in our study only misoprostol (Cytotec), a synthetic prostaglandin E1 analogue, was used. It shows different dynamics according to the route of administration, which influences the frequency of the dosage. Both the mother and fetus are at increased risk of adverse events when pregnancy continues beyond term, increasing morbidity and mortality.

Another induction agent of labour, dinoprostone, which is a synthetic prostaglandin E2, available in vaginal tablet form and gel, has been used in other studies. It is a very effective method for achieving delivery within 24 hours. However, it has the highest rate of uterine hyper-stimulation with adverse foetal rate changes and is not cost effective. [6,7]

Balloon catheters have been used to mechanically ripen the cervix by applying direct pressure on the internal os of the cervix, stretching the lower uterine segment and indirectly increasing the release of endogenous prostanglandins. However, other studies showed that low dose misoprostol used vaginally was more effective than the balloon catheter in inducing labour and achieving vaginal delivery but balloon catheter has low incidence of uterine stimulation. [8,9]

IOL can result in adverse events, therefore proper counselling of the mother in terms of the benefits and risks of IOL is very important. These adverse events range from an increased possibility of CS, postpartum haemorrhage and uterine rupture, all due to overstimulation of the uterus; prolonged labour; perineal tears on the mother; foetal distress; meconium

aspiration syndrome with all its complications; and hypoxic ischemic encephalopathy and all its complications.

A correct dating of pregnancy is mandatory to the diagnosis of post-term, and early diagnosis of pregnancy is associated with a reduction in the incidence of post-term pregnancy. Different methods are used to assess the gestation of a pregnancy, namely, sure dates, first symphisis to fundal height measurement, measurement of amniotic fluid index (AFI), and early ultrasound. The most accurate ultrasound for dating of pregnancy should be performed between eight weeks and 13 weeks and six days.

2. Methods

This is a retrospective study conducted at Charlotte Maxeke Johannesburg Academic Hospital (CMJAH), which is a tertiary hospital situated in Johannesburg offering multidisciplinary care to the Southern Gauteng region. This is a referral hospital for four district hospitals, six regional hospitals and multiple small midwife obstetric units.

The study included all patients induced for post-term pregnancy from January 2018 to December 2018. The inclusion criteria were all singleton pregnancies at 41 weeks+1 day and an amniotic fluid index (AFI) of <5 if unsure of dates. The exclusion criteria were all pregnancies <41 weeks+1 day, all inductions where indications was not for post term, and grand multiparous with parity >5. Data were collected using ward records in the obstetric admission unit (162), labour ward (166), and antenatal ward (194). The data collected included the socio-demographic characteristics of participants (Table 1), the duration to induction (Table 2) and the adjuvant methods used at mode of delivery (Table 3).

The methods of establishing the gestational age were by: SFH, date and ultrasound.

Failed induction of labour was defined in this research study as a patient who did not achieved normal vaginal delivery after 2 cycles of oral misoprostol.

Data were collected using an Excel spreadsheet and were thereafter exported into a Stata statistical package for analysis. Descriptive statistics were used to analyse the data, and the results are presented in tables.

Permission to access patients' clinical records was granted by the chief executive officer of CMJAH, and ethics clearance was obtained from the Human Research Ethics Committee of the University of the Witwatersand (Ref. No. M190511, Appendix B).

3. Results

In 2018, there was a total of 8 501 deliveries among whom 137 were IOLs (1,61%); however, only 105 (76.64%) patients' records were analysed. Of those, 32 (23.35%) were excluded because of incomplete data.

The socio-demographic characteristics of the study population are summarised in Table 1.

Table 1: Socio-demographic characteristics of participants

	Frequency
	n (%)
Socio-demographics characteristics	
Age (mean=27.8 years, SD= 5i.95)	
Less than 20 years	9 (8.57)
20 - 30 years	68 (64.76)
31 - 40 years	26 (24.76)
Older than 40 years	2 (1.9)
Marital status	
Single	96 (91.42)
Married	9 (8.49)
Parity	
Nulliparous	44 (41.90)
Primiparous	30 (28.30)
Multiparous	31 (29.25)
BMI (mean = 31.1, SD = 5.67) kg/m2	
Normal	14 (13.53)
Overweight	32 (30.19)
Obesity (Class 1)	34 (32.08)
Obesity (Class 2)	16 (15.09)
Extreme obesity (Class 3)	9 (8.49)
Booking status	
Booked	103 (98.09)
Unbooked	2 (1.89)
Gestational age at booking	
First trimester	4 (3.77)
Second trimester	79 (75.23)
Third trimester	22 (20.75)
Method of establishing gestational age	
Dates	7 (6.60)
SFH	82 (78.09)
Ultrasound	16 (15.09)
Induction of labour	
Bishop score at induction	
2	3 (2.83)

3	21 (19.81)
4	46 (43.34)
5	35 (33.02)
HIV status	
Negative	81 (77.14)
Positive	24 (22.64)
CD4 count	
100 - 349	8 (33.33)
350 and greater	16 (66.67)
Viral load	
LTDL	7 (29.17)
Less than 50	5 (20.83)
50 - 999	11 (45.83)
1000 or greater	1 (4.17)

Most of the patients were between the ages of 20 and 30 (64.76%) and single (91.42%). They were Nulliparous (41.90), obese (Class 1) (32.08%) and booked (98.09%). The majority of patients were HIV-negative (77.14%). Most patients had a BS of 4 (43.34%) and 5 (33.02%). A high percentage of patients (75.23%) who booked did so in the second trimester and the method of establishing gestational age was by symphysis fundal height (78.09%).

Time to IOL is summarised in Table 2.

Table 2: Time to induction of labour

	Frequency
	n (%)
Duration to IOL	
24 hrs or less	57 (53.7)
>24 - 48 hrs	24 (22.85)
>48 - 72 hrs	11 (10.4)
>72 hrs	13 (12.3)

Slightly more than half of the patients (53%) delivered within 24 hours or less of commencing with IOL, with 22.85% delivering within 24-48 hours, 10.4% within 48-72 hours and 12.3% more than 72 hours.

Table 3 depicts the different adjuvant methods used as well as the mode of delivery.

Table 3: Adjuvant methods used and mode of delivery

Adjuvant method(s) used	**n (%)**
None	42 (40.00)
Artificial rupture of membranes	24 (22.86)

Artificial rupture of membranes + assisted delivery	1 (0.95)
Artificial rupture of membranes + syntocinon	37 (35.24)
Syntocinon	1 (0.95)
Mode of delivery	
Caesarean section	44 (41.90)
Normal vaginal delivery	61 (58.10)

Of the 24 patients who benefited from AROM, 21 (87.5%) were in the NVD group with three (12.4%) delivered by CS. Of the 37 patients who benefited from AROM plus synto, 34 (91.89%) were in the NVD group with three (8.10%) delivered by CS.

One patient benefited from AROM plus assisted delivery and one benefited from synto, and both delivered vaginally. Of the 42 patients who did not benefit from any adjuvant methods, only four (9.52%) delivered vaginally with 38 (90.47%) delivered by CS.

Out of 105 patients, 61 (58.10%) delivered vaginally and 44 (41.90%) delivered by CS.

Table 4 illustrates the test of association between mode of delivery and maternal factors.

Table 4: Logistic univariate and multivariate regression analyses

Factor	**Categories**	**Univariate odds ratio (OR)**	**Multi-variate odds ratio (OR)**	**Univariate p-value**	**Multi-variate p-value**
Adjuvant method					
	None	1	1	-	<0.001
	Artificial rupture of membranes	11.9	14.0	<0.001	0.339
	Artificial rupture of membranes + assisted delivery	12.5	5.2	0.132	<0.001
	Artificial rupture of membranes + syntocinon	31.1	100.3	<0.001	0.339
	Syntocinon	12.5	5.2	0.132	-
Bishop score					
	2	1	1	-	0.247
	3	1.3	9.1	0.862	0.013
	4	13.4	115.8	0.093	0.008

	5	22.6	172.5	0.046	-
Number of cycles					
	One cycle	1	1	-	0.025
	Two cycles	0.37	0.13	0.049	-

As shown in Table 4, mothers who had AROM only were 12 times more likely to have NVD compared to mothers who had no form of adjuvant method (OR: 11.9; 95% confidence interval (CI): 3.71 – 38; p <0.001). Also, mothers who had AROM and synto were 31 times more likely to have NVD compared to mothers who had no form of adjuvant method (OR: 31.1; 95% CI: 9.03 – 107.05; p<0.001). Syntocinon alone was only given to one patient which prevents analysis.

Mothers with a BS of 5 were about 23 times more likely to have NVD compared to mothers with a BS of 2 (OR: 22.6; 95% CI: 1.06 – 483.67; p = 0.046).

Mothers who had two cycles of induction were 63% less likely to have NVD compared to mothers who had one cycle of induction (OR: 0.37; 95% CI: 0.14 – 0.99; p = 0.049).

Table 4 also presents the adjusted predicting factors associated with delivery, indicating that the likelihood of having an NVD was statistically higher for mothers who had AROM only compared to mothers who did not have any adjuvant method (OR: 14.0; 95% CI: 3.46 – 56.83; p<0.001). Similarly, mothers who had AROM and synto were about 100 times more likely to have a NVD compared to mothers who did not have any adjuvant method (OR: 100.3; 95% CI: 13.1 – 766.1; p<0.001).

Furthermore, in multivariate logistic regression analysis, mothers with a BS of 4 and 5 were more likely to have an NVD with an OR of 116 (95% CI: 2.69 – 4995.01) and 173 (95% CI: 3.78 – 7871.96, respectively. However, the likelihood of having an NVD was statistically significantly lower for mothers who had two cycles of induction compared to mothers who had one cycle of induction (OR: 0.13; 95% CI: 0.02 – 0.77; p=0.02).

Table 5 depicts the neonatal complications found in this study.

Table 4: Neonatal complications

	Frequency
	n (%)
Neonatal outcome	
Neonatal birth weight (Mean = 3349 g, SD = 428 g)	
2500 – 3500 g	67, CS, 2,660 g (63.8)
>3500 g	38, NVD,4370g (35.85)
APGAR at 1st minute	
5	1 (CS (0.94)
6	1 (0.94)
7	2 (1.89)
8	15 (14.15)
9	86 (81.90)
APGAR at 5th minute	
3	3 CS (2.83)
9	47 (44.34)
10	55 (52.38)
APGAR at 10th minute	
9	14 (13.21)
10	91 (86.66)
Admission to NNHC	
No	105 (100.0)
Yes	0 (0.0)
Admission to NNICU	
No	105 (100.0)
Yes	0 (0.0)

Neither the CS nor the NVD group recorded major adverse events, with no admission to neonatal high care (NNHC) or neonatal intensive care unit (NNICU). For neonatal outcomes, the APGAR score was similar in both groups with the lowest being in the CS group with five at the 1st minute. The highest birth weight was in the NVD group at 4370 g and the lowest in the CS group at 2660 g.

Maternal complications are summarised in Table 6.

Table 6: Maternal complications

	Frequency
	n (%)
Maternal outcomes	
Post-partum haemorrhage	
No	104 (99.04)
Yes	1 CS (0.94)
Uterine rupture	
No	105 (100)
Perineal tear	
No	103 (98.9)
Yes	2 NVD (1.89)
Classification of perineal tear	
First degree	1 (50)
Second degree	1 (50)
Intensive care unit	
No	105 (100.0)
Yes	0 (0.0)
High care admission	
No	104 (99.04)
Yes	1 CS (0.94)

Most patients did not experience major adverse events: post-partum haemorrhage (PPH) (0.94%), perineal tear (1.89%), high care admission (0.94) and no uterine rupture or ICU admission. Two patients in the NDV group sustained 1st and 2nd degree perineal tear, with none in the CS group. One patient in the CS group was admitted to high care for two days for blood transfusion secondary to PPH, with none in the NVD group.

4. Discussion

Our main findings which are the likelihood of having NVD is statistically higher for mothers who benefitted from AROM and syntocinon and those findings are consistent with other studies conducted on IOL for post-term patients using oral misoprostol, such as Alfirevic et al. [3] and Hannah et al. [10]

Post-term pregnancies have been associated with adverse maternal and neonatal outcomes. In this study, 105 patients were induced with oral solution misoprostol, resulting in a CS rate of 41.90% and NVD rate of 58.10%.

This is in contrast to a study conducted by Pavicic et al. which found that the rate of CS was higher in the group where IOL was carried out compared to the group where expectant management was carried out. However, the study did not compare the outcomes in terms of perinatal and neonatal morbidity between the two groups. [11]

In their study, Wallstrom et al.'s findings were mostly similar to ours. They noted that the proportion of CS decreased from 26% to 17% when orally given solution of misoprostrol was introduced at the clinic. No maternal or fetal affectations were noted. [7] The inclusion criteria of their study were singleton pregnancy at 41+1 or AFI<5 if unsure of date, cephalic presentation. The induction agent used was misoprostol administered as an oral solution of 200 mcg of misoprostol in 200 ml of water given at 20 ml per 2 hours.

In another study, conducted by Syed et al., [12] most of the women benefited from one cycle of misoprostol (86.81.9%) and most of them achieved NVD (53.62.3%). Similarly to Syed study, in our study most patients achieved vaginal delivery 61(58.09%). Among this majority were nulliparous (20) and primiparous (20), and the time interval to delivery was 24 hours or less in the majority of the patients (57). Twenty-five achieved delivery between 24 and 48 hours, with only a few patients achieving delivery after 72 hours. The mean time for mothers who had one cycle of induction was 22.0 hours with SD = 16.0; and 83.5 hours with SD = 36.6 for mothers who had two cycles of induction. No significant difference was observed in the neonatal and maternal outcome.

In their study, Haq et al. found that the mean length of gestation age was the most important factor to predict a successful vaginal birth. [13] Our study focused on patients at 41 weeks and above.

In our study, as in some others, [7,14] the likelihood of having NVD was statistically higher for mothers who benefited from AROM and synto. [15]

In the systematic review and meta-analysis by Teixeira et al. it was noted that a high BS was predictive of a successful IOL. [16] These findings are consistent with the findings in our study.

In our study, no significant maternal and neonatal complications were observed in either the NVD or the CS group, which is consistent with the findings of other studies. [7,13-14,17]

5. Conclusion

IOL with misoprostol is associated with successful NVDs with no major adverse event for mothers and newborns. A high BS, AROM and the use of oxytocin were associated with high likelihood of successful delivery. Women undergoing a second cycle of induction had a diminished chance of successful NVD, suggesting the need for counselling and the option of offering CS to this group of women after failure of their first cycle.

6. Limitations

The small numbers in this study and the breaking down into even smaller numbers in sub-groups and the detection of complications was difficult due to a small sample size.

7. Recommendations

1. We encourage the hospital to reinforce the IOL in post-term pregnancy and to ensure that all data are correctly recorded.

2. We suggest further studies at CMJAH where different agents for IOL could be used for post-term pregnancy to possibly establish the best induction agent with better results for CMJAH.

3. In view of a small sample size of the study, we suggest a further study with a larger sample size.

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Authors contributions: All authors participated in the elaboration of the study.

Conflict of interest: None

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9. Appendices

Appendix A: Protocol

MMed PROTOCOL

Inductions for post-dates at Charlotte Maxeke Johannesburg Academic Hospital: A one year review

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CONTENTS

Table of contents ii-iii

Abbreviations iv-v

A. BACKGROUND 1-10

A.1 SIGNIFICANCE OF THE STUDY 1

A.2 LITERATURE REVIEW 2-10

1. Introduction 2
2. Diagnostic 3-4
3. Complications 4
   3.1 Maternal 4
   3.2 Foetal 5
4. INDUCTION OF LABOUR 5-10
   4.1. Induction of labour Agents 6-7
      4.1.1. Misoprostol (Cytotec R) 7
      4.1.2. Dinoprostol 7
      4.1.3. Balloon Cather 7
   4.2. Maternal And Foetal Effects Of Induction 8-10

B. AIM 10

C. MATERIALS AND METHODS 11-13

1. Setting 11
2. Study Population 11

Inclusion Criteria 11

Exclusion Criteria 11

3. Study Design 11

4. Sample Size 12

5. Data Collection 12

6. Data Analysis 13

D. PERMISSION AND ETHICAL CONSIDERATIONS

E. BUDGET 1

F. SCHEDULE 14

G. LIMITATION 15

H. REFERENCES 16-18

I. Appendices 19-21

Appendix A 19

Appendix B 20-24

ABBREVIATIONS

ACOG: American Congress of Obstetricians and Gynaecologists

AFI: Amniotic fluid index

AROM: Artificial Rupture of Membranes

ART: Antiretroviral Treatment

BMI: Body Mass Index

CEO: Chief Executive Officer

C/S: Caesarean Section

EMCS: Emergency caesarean section

HB: Haemoglobin

HIE: Hypoxic Ischaemic Encephalopathy

HIV: Human Immunodeficiency Virus

IOL: Induction of Labour

LMP: Last Menstrual Period

MSL: Meconium Stained Liquor

MUAC: Middle Upper Arm Circumference

NICE: The National Institute for Health and Care Excellence

NICU: Neonatal Intensive Care Unit

NSAID: Nonsteroidal anti-inflammatory Drugs

NST: Non-Stress Test

NVD: Normal Vaginal Delivery

RPR: Rapid Plasma Reagin Test

SFH: Symphysis Fundal Height

U/S: Ultrasound

A. BACKGROUND

Post term pregnancy has been associated with adverse maternal and neonatal outcomes. There is, however; controversy regarding the optimal management and timing of induction of labour for these pregnancies. The ACOG recommends either expectant management or induction of labour after 41 completed weeks, whilst the NICE guideline recommends induction between 41 and 42 weeks. The benefits of induction must weigh against increased caesarean section rate which has both, short term and long term morbidity.

A.1 SIGNIFICANCE OF THE STUDY

1. We hope that the study will shed some light regarding the outcomes and complications of induction labour for post term pregnancies.
2. The findings from the study might assist the department in reviewing the induction of labour protocols.

A.2 LITERATURE REVIEW

1. Introduction

Post term pregnancy also known as prolonged pregnancy, is defined as a pregnancy that has exceeded 42+0 completed weeks of gestation whereas a late term pregnancy refers to a pregnancy that is between 41+0 and 41+6 weeks

of gestation [1, 2]. The aetiology of post term birth is not well elucidated. Risk factors such obesity, null parity and maternal age greater than 30 years have been associated with post term birth [3].

The incidence of post term pregnancy is 4% to 19% [4]. According to the Cochrane systematic review, women should be offered induction of labour between 41+0 –

42+0 weeks mainly to obviate the risk of perinatal death. Many current international guidelines also recommend IOL between 41+0 – 42+0 weeks of gestation in order to reduce these adverse perinatal outcomes associated with prolonged pregnancy [1, 2, 5].

2. Diagnosis

The diagnosis of post term pregnancies is based on:

- Sure dates of LMP by the mother: the patient must be certain of her LMP, the Naegle's rule is used.

  Example: LMP 22 0ctober 20018, the expected date of delivery is: 22+7 = 29, October - 3 = July 2018+1=2019; only if LMP occurred after March. If LMP before March example 22 April 2018, the expected date of delivery is 22+7= 29, March + 9 = December 2018 [6].

- Measurement of AFI: In normal pregnancy, amniotic fluid volume increases gradually till 36 weeks and then starts to reduce as pregnancy progresses. At 42 weeks the range of amniotic fluid volume between the 3rd and 97th centile is wide and cannot be used to predict post term pregnancy [7].

- First symphysis – to fundal height measurement. This parameter suffers from poor reproducibility and high variability due to maternal and foetal factors such as obesity, twin's pregnancy, intra uterine foetal growth restriction [8].

- Early ultrasonography in the 1st and early 2nd trimester. It is highly reproducible and accurate for the dating of pregnancy, since early biological variability of foetal biometry is minimal [8].

  The most accurate ultrasound for dating should be performed between 8 weeks and 13 weeks 6 days.

- Early diagnosis of pregnancy is associated with a reduced incidence of post term pregnancy and possibly avoids miscalculation of the gestational age.

3. Complications of Induction of Labour

Both mother and the fetus are at increased risk of adverse events when the pregnancy continues beyond term [2].

There is a significant increase in both maternal and perinatal morbidity and mortality [2].

3.1 Maternal

- Increase rate of caesarean section mainly as a result of overstimulation of the uterus with risk of foetal distress.
- Prolong labour as a result of failed induction.
- Postpartum haemorrhage as result of prolong labour and over distention of the uterus.
- Uterine rupture secondary to uterine overstimulation.
- Perineal tear 3rd or 4th degree tears.

3.2 Foetal

- Meconium aspiration syndrome: Respiratory distress in the first four hours after birth with the presence of meconium stained amniotic fluid. It may be severe (requiring assisted mechanical ventilation), or moderate (requiring oxygen for at least 48 hours or at a concentration of 40% or greater but without mechanical ventilation) [2].
- Hypoxic ischemic encephalopathy due to lack of oxygenated blood flow to the brain secondary to overstimulation and contracture of the uterus.
- NICU admission.
- Perinatal death

4. Induction of Labour

IOL is defined as an intervention designed to artificially initiate uterine contractions leading to progressive dilatation of the cervix and delivery of the fetus from 28 weeks of gestation onwards [2].

IOL is only indicated when it agrees that the mother and/or the fetus will benefit from a higher probability of a healthy outcome than if the birth is delayed. The most common indications for IOL include among others, post

term pregnancy, prolonged pre-labour rupture of membranes, maternal medical conditions such as diabetes mellitus and hypertension. On the contrary, induction of labour is contraindicated in the presence of fetal distress, placenta praevia, previous uterine surgery, malposition, active genital herpes, cord presentation, etc. Such conditions require delivery via caesarean section.

4.1 Induction of Labour Agents

Commonly three induction agents are used for post term pregnancies

4.1.1 Misoprostol (Cytotec [R])

It is synthetic prostaglandin E1 analogue, developed as a treatment for NSAID induced ulcers but has been widely used in obstetrics and gynaecology.

It shows different dynamics according to the route of administration, and this will definitely influence the frequency of dosage.

- Oral misoprostol is rapidly absorbed (peak concentration at 12 minute) and has a half time of 30 to 40 minutes.
- Rectal or Vaginal misoprostol has much slower absorption, with a bioavailability of 4to 6 hours.

- Sublingual route has rapid onset, prolong action and a total bioavailability many times greater than oral route. Misoprostol deteriorates in solution, and solution should be discarded after 24 hours. It is stable in room temperature and therefore does not need to be refrigerated.
- It is highly effective in stimulating uterine contractions and makes its use potentially dangerous with risk of uterine hyper stimulation and uterine rupture.
- It is very cost effective [9].
- Close monitoring is needed for side effects such as diarrhoea, nausea, pyrexia, etc., arising from IOL with prostaglandins and their derivative.

4.1.2 Dinoprostone

- It is a synthetic prostaglandin E2 analogue, available in vaginal tablet form and in gel.
- It is a very effective method for achieving delivery within 24 hours. It has a highest rate of uterine hyper -stimulation with adverse foetal heart rate changes. It is not cost effective [9].

4.1.3 Balloon catheter

It is used to mechanically ripen the cervix. The balloon catheter, Foley catheter as well as the double balloon catheter work by applying direct pressure on the internal os of the cervix, stretching the lower uterine segment and indirectly increasing release of endogenous prostaglandins.

4.2 Maternal and Foetal Effects of Induction

When counselling a pregnant woman, considering induction of labour, the benefits and risks of induction as well as induction agents must be addressed. A Cochrane database systematic review, Gulmezoglu et al., found that the benefits of induction

outweigh the risks. In this review, the author concluded that IOL for post term pregnancy is associated with less perinatal mortality, less caesarean section rate, less perinatal morbidity such as: meconium aspiration syndrome; pneumonia and HIE when compared to expectant management[3].

In terms of the choice of induction agents, a large randomized clinical trial which included 695 women conducted at Rahima Moosa Mother and Child Academic Hospital (RMMCAH) in South Africa and Liverpool Women's hospital in the United Kingdom in 2001, did not show any difference in terms of the mode of delivery (C/S or NVD) between the misoprostol and dinoprostone groups. Maternal and foetal outcomes were the same in both groups [10].

In a similar study conducted in an academic hospital in Johannesburg in 2003, which included 171 women, comparing dinoprostone and misoprostol for IOL for post-dates did not show any difference in terms of delivery rate within 24 hours. However, the rate of caesarean section was higher in the dinoprostone group (24%) when compared to the misoprostol group (14% RR 0.85). There was no difference in terms of foetal and maternal outcome [11].

In A Cochrane database of systematic review, June 2014, Gulmezoglu et al. came to the conclusion that IOL is associated with less perinatal mortality, less caesarean section rate, less perinatal morbidity such as MSL aspiration; Pneumonia and HIE compared to expectant management of post term which show an increase in perinatal adverse events [3]. In contrast, a study conducted by Elaine YuzhenTeo and Sailesh Kumar demonstrated an increased overall risk of emergency caesarean section (EMCS), and more particularly a higher rate of EMCS for no-

reassuring foetal status in the IOL cohort. There were no differences in overall neonatal outcomes between the two groups[1].

A study conducted by Hannah et al. demonstrated that the IOL in post term is associated with lower rates of caesarean section than serial antenatal monitoring. However, the rates of perinatal mortality and neonatal morbidity were similar in both groups and approach management[12]. This is in contrast to a study conducted by Pavicic et al., who demonstrated that the rate of caesarean section was higher in the group where IOL was carried out compared to the where expectant management was carried out. However, this study did not compare the outcomes in terms of perinatal mortality and neonatal morbidity between the two groups[13.]

In view of the different findings above, regarding the outcomes of IOL in post term pregnancies, this study would like to report on the outcomes of IOL for post term pregnancies at Charlotte Maxeke Johannesburg Academic Hospital over a period of one year.

In view of the different findings above regarding the outcomes of IOL in post term pregnancies, this study would like to report on the outcomes of IOL for post term pregnancies at Charlotte Maxeke Johannesburg Academic Hospital over a period of one year.

B. AIM

The aim of the study is to determine maternal and neonatal outcomes of induction of labour for post term pregnancies in a busy tertiary hospital over a one year period.

1. Primary Objectives

- To determine the maternal complications associated with IOL.
- To determine neonatal complications associated with the induction of

labour for post term pregnancies.

2. Secondary Objectives

- To determine the proportion of pregnant women induced for post term pregnancies during the study period.
- To determine the percentage of women who achieve successful normal vaginal delivery after induction of labour for post term pregnancies and the time interval to achieve normal vaginal delivery.

C. METHODS

1.Study Population

This study will include all women who underwent IOL for post term (41+1) during the study period.

Inclusion criteria

- Singleton pregnancy 41+1
- AFI < 5 if unsure of date

Exclusion Criteria

- All pregnancies <41+1
- All induction not for post date
- Grand multiparous with parity >5

2. Setting

CMJAH is a tertiary hospital situated in Johannesburg offering multidisciplinary care to the Southern Gauteng region. It is a referral hospital for 4 district hospitals and 6 regional hospitals

3. Study Design

Retrospective review of patient clinical records

4. Sample Size

This study will include all patients induced for post term pregnancies during a one year study period who fulfil the study criteria.

5. Data Collection

The records of patients who underwent induction of labour will be identified using ward records in the obstetric admission unit (162), Labour Ward (166) and antenatal ward (194). Using a customized data capturing sheet, the following information will be retrieved and recorded:

- Demographic information
- Medical History
- Obstetric History
- Surgical History
- Time taken from induction to delivery
- Total dose of misoprostol taken
- Maternal outcomes:
    - Maternal Fever (Temp > 37.2)
    - Overstimulation of the uterus (5 or more contractions in 10 minutes)
    - Need for caesarean section and indications
    - Uterine Rupture
    - Traumatic Delivery
- Neonatal Outcomes:
    - Birth weight
    - Apgar scare (1, 5, 10 min)

- Foetal Distress
- Meconium Aspiration
- NICU admission
- Perinatal Death

6. Data Analysis

The study data will be captured using excel spread sheet and thereafter exported into Stata statistical package for analysis. For continuous variables, descriptive statistics (frequency, median, mean) will be used. In terms of categorical variables, proportions and percentages will be utilised. The results will be presented in tables and graphs.

D. PERMISSION AND ETHICAL CONSIDERATIONS

Permission to access patient's clinical records will be sought from the CEO of Charlotte Maxeke Johannesburg Academic Hospital. For academic and ethical clearance, the protocol will be submitted to the Department of Obstetrics and Gynaecology's Graduate Protocol Committee (HREC) respectively. All patient records will be identified by the study's unique number.

E. BUDGET

ITEM	COST
Printing	**R 1000**
Data analysis by Statistician	**R 3000**
TOTAL	**R 4 000**

F. SCHEDULE

Task	Jan 2019	March-April	May-June 2019	July-Aug 2019	September 2019	Oct-Nov 2019
Protocol Review Committee	**x**					
Ethics application		**x**				
Institutional permission		**x**				
Data Collection			**x**			
Data analysis and article write-up				**x**		
Submission for examination					**x**	
Submission for publication						**x**

G. LIMITATION

The limitation of the study is due to the fact that it is a retrospective review of patient's records.

The following would therefore need to be considered:

- Some files might be lost or not contain all the information required
- Incorrect dating of pregnancy

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14.

I. APPENDIX A: Bishop's Score

	0		1		2		3	
Dilatation	<1cm		1-2cm		2-4cm		>4cm	
Length	>4cm		2-4cm		1-2cm		<1cm	
Station	-3		-2		-1/0		Engaged	
Consistency	Firm		Average		Soft			
Position	Posterior		Mid- Anterior					

Bishop's Score is a pre-labour scoring system used to assist in predicting whether IOL will be required. If Bishop's score is eight or above, chances of having a vaginal delivery are high and the cervix is said to be favourable for induction. If Bishop's score is 6 or less, the chances of having a vaginal delivery are low and the cervix is said to be unfavourable for induction.

APPENDIX B: Data Sheet

Participant Number:

File Number:

Age:

Parity:_____

Gravidity:

_____

BMI:

Marital Status

(please cross 'X' the applicable box)

Single	Stable Relationship	Married	Divorced	Widowed	Unknown

Past medical history
1.
2.
3.
4.
Past surgical history
1.
2.
3.
4.

Antenatal Record

Booking status *(please cross 'X' the applicable box)*	**Booked**		**Unbooked**	
Gestational age @ booking				
Method of establishing gestational age	**A. Dates**			
	B. Ultrasound			
	C. SFH			
	D. Unknown			

Past Obstetric history

Year	Gestational age at delivery	Mode of delivery	Complications

Booking bloods

Hb				
Rh				
RPR				
HIV				
CD4 count				
Viral Load				
Antiretroviral Therapy	YES		NO	

Induction of Labour

Bishop Score at start of induction		
Induction agent		
Number of cycles ***(Mark with and 'X')***	**A. One**	
	B. Two	
Total dose of induction agent		
NST before induction ***(Mark with an 'X')***	**A. Reassuring** **B. Suspicious**	
	C. Pathological	
Adjuvant method used	**A. AROM**	
	B. Oxytocin	
Time from induction to delivery		
Mode of delivery	**A. NVD**	
	B. Assisted NVD	
	C. Caesarean section	
If CS indication?		

Maternal outcomes

(Please cross 'X' the applicable box)

Pph	YES		NO	
Uterine Rupture				
Perineal Tear	YES		NO	
If Yes Degree				
Icu Admission	YES		NO	
Length Of Stay				
High Care Admission	YES		NO	
Length Of Stay				

Reason for high care or ICU admission :
Maternal outcome:

Neonatal Outcome)

(Please cross 'X' the applicable box)

Neonatal weight at birth						
APGAR Score (/10)	1st min		5th min		10th min	
Admission to neonatal high care	YES		NO			
Admission to NICU	YES		NO			

Reason for NICU admission:

Appendix B: Ethical clearance

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG	HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

Office of the Deputy Vice-Chancellor (Research & Post Graduate Affairs)

TO: Dr K Kazadi
School of Clinical Medicine
Department of Obstetrics and Gynaecology
Charlotte Maxeke Johannesburg Academic Hospital

E-mail: papykasongo@yahoo.fr

CC: Supervisor: Drs HL Chauke and L Shimange-Matsose
<lusandolwethu.shimange@wits.ac.za >
and <HREC-Medical.ResearchOffice@wits.ac.za>

FROM: Iain Burns
Human Research Ethics Committee (Medical)
Tel: 011 717 1252

E-mail: Iain.Burns@wits.ac.za

DATE: 2019/08/08

REF: *R14/49*

PROTOCOL NO: **M190511** *(This is your ethics application study reference number. Please quote this reference number in all correspondence relating to this study)*

PROJECT TITLE: *Inductions for post-dates at Charlotte Maxeke Johannesburg Academic Hospital: a one year review*

Please find attached the Clearance Certificate for the above project. I hope it goes well and that an article in a recognized publication comes out of it. This will reflect well on your professional standing and contribute to the Government funding of the University.

MSWorks2000/Iain0007/Clearscan.wps

UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG

R14/49 Dr K Kazadi

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
CLEARANCE CERTIFICATE NO. M190511

NAME: (Principal Investigator)	Dr K Kazadi
DEPARTMENT:	School of Clinical Medicine Department of Obstetrics and Gynaecology Charlotte Maxeke Johannesburg Academic Hospital
PROJECT TITLE:	Inductions for post-dates at Charlotte Maxeke Johannesburg Academic Hospital: a one year review
DATE CONSIDERED:	2019/05/31
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Drs HL Chauke and L Shimange-Matsose
APPROVED BY:	Dr N Naran, Deputy Chairperson, HREC (Medical)
DATE OF APPROVAL:	2019/08/08

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary on the 3rd Floor, Phillip Tobias Building, Parktown, University of the Witwatersrand, Johannesburg.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to submit details to the Committee. **I agree to submit a yearly progress report**. When a funder requires annual re-certification, the application date will be one year after the date when the study was initially reviewed. In this case, the study was initially reviewed in **May** and will therefore reports and re-certification will be due early in the month of **May** each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature _____ Date _____

PLEASE QUOTE THE CLEARANCE CERTIFICATE NUMBER IN ALL ENQUIRIES

Appendix C: Journal guidelines

SAJOG – South African Journal of Obstetrics and Gynaecology

Submissions

- » Online Submissions
- » Author Guidelines
- » Copyright Notice
- » Privacy Statement

Online Submissions

Already have a Username/Password for South African Journal of Obstetrics and Gynaecology?
GO TO LOGIN

Need a Username/Password?
GO TO REGISTRATION

Registration and login are required to submit items online and to check the status of current submissions.

Author Guidelines

Author Guidelines

Please view the Author Tutorial for guidance on how to submit on Editorial Manager.

To submit a manuscript, please proceed to the SAJOG Editorial Manager website:
http://www.editorialmanager.com/sajog

To access and submit an article already in production, please see the guidelines here.

Author Guidelines
Please take the time to familiarise yourself with the policies and processes below. If you still have any questions, please do not hesitate to ask our editorial staff (tel.: +27 (0)21 532 1281, email: submissions@samedical.org).

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Queries can be directed to claudian@samedical.org

Authorship
Named authors must consent to publication. Authorship should be based on: (i) substantial contribution to conceptualisation, design, analysis and interpretation of data; (ii) drafting or critical revision of important scientific content; or (iii) approval of the version to be published. These conditions must all be met for an individual to be included as an author (uniform requirements for manuscripts submitted to biomedical journals; refer to www.icmje.org)

If authors' names are added or deleted after submission of an article, or the order of the names is changed, all authors must agree to this in writing.

Please note that co-authors will be requested to verify their contribution upon submission. Non-verification may lead to delays in the processing of submissions.

Conflicts of interest
Conflicts of interest can derive from any kind of relationship or association that may influence authors' or reviewers' opinions about the subject matter of a paper. The existence of a conflict – whether actual, perceived or potential – does not preclude publication of an article. However, we aim to ensure that, in

such cases, readers have all the information they need to enable them to make an informed assessment about a publication's message and conclusions. We require that both authors and reviewers declare all sources of support for their research, any personal or financial relationships (including honoraria, speaking fees, gifts received, etc) with relevant individuals or organisations connected to the topic of the paper, and any association with a product or subject that may constitute a real, perceived or potential conflict of interest. If you are unsure whether a specific relationship constitutes a conflict, please contact the editorial team for advice. If a conflict remains undisclosed and is later brought to the attention of the editorial team, it will be considered a serious issue prompting an investigation with the possibility of retraction.

Research ethics committee approval

Authors must provide evidence of Research Ethics Committee approval of the research where relevant. Ensure the correct, full ethics committee name and reference number is included in the manuscript.
If the study was carried out using data from provincial healthcare facilities, or required active data collection through facility visits or staff interviews, approval should be sought from the relevant provincial authorities. For South African authors, please refer to the guidelines for submission to the National Health Research Database. Research involving human subjects must be conducted according to the principles outlined in the Declaration of Helsinki. Please refer to the National Department of Health's guideline on Ethics in Health research: principles, processes and structures to ensure that the appropriate requirements for conducting research have been met, and that the HPCSA's General Ethical Guidelines for Health Researchers have been adhered to.

Protection of rights to privacy

Research Participants

Information that would enable identification of individual research participants should not be published in written descriptions, photographs, radiographs and pedigrees unless the information is essential for scientific purposes and the patient (or parent or guardian) has given informed written consent for publication and distribution. We further recommend that the published article is disseminated not only to the involved researchers but also to the patients/participants from whom the data was drawn. Refer to Protection of Research Participants. The signed consent form should be submitted with the manuscript to enable verification by the editorial team.

Other individuals

Any individual who is identifiable in an image must provide written agreement that the image may be used in that context in the SAJOG.

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Use of racial or ethnicity classifications in research is fraught with problems. If you choose to use a research design that involves classification of participants based on race or ethnicity, or discuss issues with reference to such classifications, please ensure that you include a detailed rationale for doing so, ensure that the categories you describe are carefully defined, and that socioeconomic, cultural and lifestyle variables that may underlie perceived racial disparities are appropriately controlled for. Please also clearly specify whether race or ethnicity is classified as reported by the patient (self-identifying) or as perceived by the investigators. Please note thatit is not appropriate to use self-reported or investigator-assigned racial or ethnic categories for genetic studies.

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SAJOG is an HPCSA-accredited service provider of CPD materials. Principal authors can earn up to 15 CPD continuing education units (CEUs) for publishing an article; co-authors are eligible to earn up to 5 CEUs; and reviewers of articles can earn 3 CEUs. Each month, SAJOG also publishes a CPD-accredited questionnaire relating to the academic content of the journal. Successful completion of the questionnaire with a pass rate of 70% will earn the reader 3 CEUs. Administration of our CPD programme is managed by Medical Practice Consulting. To complete questionnaires and obtain certificates, please visit MRP Consulting

Manuscript preparation

Preparing an article for anonymous review

To ensure a fair and unbiased review process, all submissions are to include an anonymised version of the manuscript. The exceptions to this requirement are Correspondence, Book reviews and Obituary submissions.

Submitting a manuscript that needs additional blinding can slow down your review process, so please be sure to follow these simple guidelines as much as possible:

• An anonymous version should not contain any author, affiliation or particular institutional details that will enable identification.
• Please remove title page, acknowledgements, contact details, funding grants to a named person, and any running headers of author names.
• Mask self-citations by referring to your own work in third person.

General article format/layout

Submitted manuscripts that are not in the correct format specified in these guidelines will be returned to the author(s) for correction prior to being sent for review, which will delay publication.

General:

• Manuscripts must be written in UK English (this includes spelling).
• The manuscript must be in Microsoft Word or RTF document format. Text must be 1.5 line spaced, in 12-point Times New Roman font, and contain no unnecessary formatting (such as text in boxes). Pages and lines should be numbered consecutively.
• Please make your article concise, even if it is below the word limit.
• Qualifications, full affiliation (department, school/faculty, institution, city, country) and contact details of ALL authors must be provided in the manuscript and in the online submission process.
• Abbreviations should be spelt out when first used and thereafter used consistently, e.g. 'intravenous (IV)' or 'Department of Health (DoH)'.
• Numbers should be written as grouped per thousand-units, i.e. 4 000, 22 160.
• Quotes should be placed in single quotation marks: i.e. The respondent stated: '...'
• Round brackets (parentheses) should be used, as opposed to square brackets, which are reserved for denoting concentrations or insertions in direct quotes.

If you wish material to be in a box, simply indicate this in the text. You may use the table format –this is the only exception. Please DO NOT use fill, format lines and so on.

SAJOG is a general specialist obstetrics and gynaecology journal, therefore for articles involving genetics, it is the responsibility of authors to apply the following:

- Please ensure that all genes are in italics, and proteins/enzymes/hormones are not.
- Ensure that all genes are presented in the correct case e.g. TP53 not Tp53.

** NB: Copyeditors cannot be expected to pick up and correct errors wrt the above, although they will raise queries where concerned.

- Define all genes, proteins and related shorthand terms at first mention, e.g. '188del11' can be glossed as 'an 11 bp deletion at nucleotide 188.'
- Use the latest approved gene or protein symbol as appropriate:

o Human Gene Mapping Workshop (HGMW): genetic notations and symbols
o HUGO Gene Nomenclature Committee: approved gene symbols and nomenclature
o OMIM: Online Mendelian Inheritance in Man (MIM) nomenclature and instructions
o Bennet et al. Standardized human pedigree nomenclature: Update and assessment of the recommendations of the National Society of Genetic Counselors. J Genet Counsel 2008;17:424-433: standard human pedigree nomenclature.

Preparation notes by article type

Research

Guideline word limit: 3 000 words (excluding abstract and bibliography)

Research articles describe the background, methods, results and conclusions of an original research study. The article should contain the following sections: introduction, methods, results, discussion and conclusion, and should include a structured abstract (see below). The introduction should be concise – no more than three paragraphs – on the background to the research question, and must include references to other relevant published studies that clearly lay out the rationale for conducting the study. Some common reasons for conducting a study are: to fill a gap in the literature, a logical extension of previous work, or to answer an important question. If other papers related to the same study have been published previously, please make sure to refer to them specifically. Describe the study methods in as much detail as possible so that others would be able to replicate the study should they need to. Where appropriate, sample size calculations should be included to demonstrate that the study is not underpowered. Results should describe the study sample as well as the findings from the study itself, but all interpretation of findings must be kept in the discussion section. The conclusion should briefly summarise the main message of the paper and provide recommendations for further study.

• May include up to 3 illustrations or tables.
• A max of 20 - 25references

Structured abstract

• This should be no more than 250words, with the following recommended headings:

o Background: why the study is being done and how it relates to other published work.
o Objectives: what the study intends to find out
o Methods: must include study design, number of participants, description of the research tools/instruments, any specific analyses that were done on the data.
o Results: first sentence must be brief population and sample description; outline the results according to the methods described. Primary outcomes must be described first, even if they are not the most significant findings of the study.
o Conclusion: must be supported by the data, include recommendations for further study/actions.
• Please ensure that the structured abstract is complete, accurate and clear and has been approved by all authors. It should be able to be intelligible to the reader without referral to the main body of the article.
• Do not include any references in the abstracts.

Here is an example of a good abstract.

Scientific letters/short reports

These are shorter length, scholarly research articles of no more than 1500 words, and include case reports.
Guideline word limit: 1 500 words
• Abstract: Structured, of about 150 words, with the following recommended headings: Background, Objectives, Methods, Results, and Conclusion.
• May include only one illustration or table
• A maximum of 8 references

Editorials
Guideline word limit: 1 000 words
These opinion or comment articles are usually commissioned but we are happy to consider and peer review unsolicited editorials. Editorials should be accessible and interesting to readers without specialist knowledge of the subject under discussion and should have an element of topicality (why is a comment on this issue relevant now?) There should be a clear message to the piece, supported by evidence.
Please make clear the type of evidence that supports each key statement, e.g.:
• expert opinion
• personal clinical experience
• observational studies
• trials
• systematic reviews.

Review articles
Review articles should always be discussed with the Editor prior to submission.

Guideline word limit: 4 000 words
These are welcome, but should be either commissioned or discussed with the Editor before submission. A review article should provide a clear, up-to-date account of the topic and be aimed at non-specialist hospital doctors and general practitioners. They should be aligned to practice in South and/or sub-Saharan Africa and not a précis of reviews published in the international literature
Please ensure that your article includes:
• Abstract: unstructured, of about 100-150 words, explaining the review and why it is important
• Methods: Outline the sources and selection methods, including search strategy and keywords used for identifying references from online bibliographic databases. Discuss the quality of evidence.
• When writing: clarify the evidence you used for key statements and the strength of the evidence. Do not present statements or opinions without such evidence, or if you have to, say that there is little or no evidence and that this is opinion. Avoid specialist jargon and abbreviations, and provide advice specific to southern Africa.
• Personal details: Please supply your qualifications, position and affiliations and MP number (used for CPD points); address, telephone number and fax number, and your e-mail address; and a short personal profile (50 words) and a few words about your current fields of interest.

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• May include only one illustration or table
• Must include a correspondence address.

Obituaries
Guideline word limit: 400 words
Should be offered within the first year of the practitioner's death, and may be accompanied by a photograph.

Illustrations/photos/scans
• If illustrations submitted have been published elsewhere, the author(s) should provide evidence of consent to republication obtained from the copyright holder.
• Figures must be numbered in Arabic numerals and referred to in the text e.g. '(Fig. 1)'.
• Each figure must have a caption/legend: Fig. 1. Description (any abbreviations in full).
• All images must be of high enough resolution/quality for print.
• All illustrations (graphs, diagrams, charts, etc.) must be in PDF form.
• Ensure all graph axes are labelled appropriately, with a heading/description and units (as necessary)

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• Each image must be attached individually as a 'supplementary file' upon submission (not solely embedded in the accompanying manuscript) and named Fig. 1, Fig. 2, etc.

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• Tables should be constructed carefully and simply for intelligible data representation. Unnecessarily complicated tables are strongly discouraged.
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• Journal references: Price NC, Jacobs NN, Roberts DA, et al. Importance of asking about glaucoma. Stat Med 1998;289(1):350-355. http://dx.doi.org/10.1000/hgjr.182
• Book references: Jeffcoate N. Principles of Gynaecology. 4th ed. London: Butterworth, 1975:96-101.
• Chapter/section in a book: Weinstein L, Swartz MN. Pathogenic Properties of Invading Microorganisms. In: Sodeman WA, Sodeman WA, eds. Pathologic Physiology: Mechanisms of Disease. Philadelphia: WB Saunders, 1974:457-472.
• Internet references: World Health Organization. The World Health Report 2002 - Reducing Risks, Promoting Healthy Life. Geneva: WHO, 2002. http://www.who.int/whr/2002 (accessed 16 January 2010).
• Legal references
• Government Gazettes:
National Department of Health, South Africa. National Policy for Health Act, 1990 (Act No. 116 of 1990). Free primary health care services. Government Gazette No. 17507:1514. 1996.
In this example, 17507 is the Gazette Number. This is followed by :1514 - this is the notice number in this Gazette.
• Provincial Gazettes:
Gauteng Province, South Africa; Department of Agriculture, Conservation, Environment and Land Affairs. Publication of the Gauteng health care waste management draft regulations. Gauteng Provincial Gazette No. 373:3003, 2003.
• Acts:

South Africa. National Health Act No. 61 of 2003.
• Regulations to an Act:
South Africa. National Health Act of 2003. Regulations: Rendering of clinical forensic medicine services. Government Gazette No. 35099, 2012. (Published under Government Notice R176).
• Bills:
South Africa. Traditional Health Practitioners Bill, No. B66B-2003, 2006.
• Green/white papers:
South Africa. Department of Health Green Paper: National Health Insurance in South Africa. 2011.
• Case law:
Rex v Jopp and Another 1949 (4) SA 11 (N)
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From submission to acceptance

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DEPARTMENT OF SURGERY

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Dr Kasongo Kazadi

2nd August 2018
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turnitin

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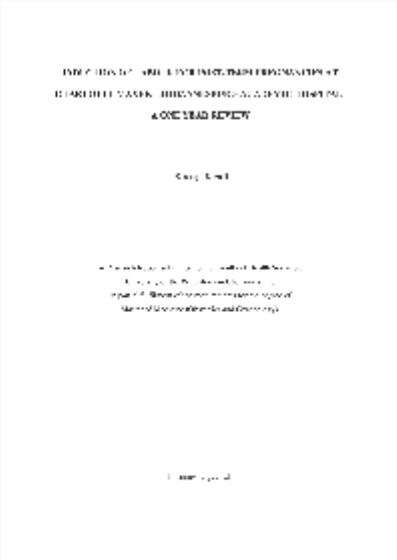

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