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Full Length Research Article

TRANSVAGINAL SCAN CERVICAL LENGTH MEASUREMENT VERSUS BISHOP SCORE PRIOR TO INDUCTION OF LABOUR: A RANDOMISED CONTROLLED STUDY IN OSOGBO METROPOLIS, OSUN STATE, NIGERIA

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ABSTRACT:
Induction of labour (IOL) is a common procedure, occurring in 20-25% of pregnancies, yet around 20% of women undergoing IOL require caesarean section. The traditional Bishop Score (BS) for assessing cervical readiness is subjective and has limited predictive value. This study evaluated the effectiveness of transvaginal ultrasound (TVS) measurement of cervical length as an alternative to BS in predicting IOL outcomes. A randomized controlled trial was conducted among 76 pregnant women with indications for IOL at Osun State University Teaching Hospital, Osogbo, Nigeria, with participants assigned to either the TVS group (n=38) or the BS group (n=38). Primary outcomes included mode of delivery, delivery interval, analgesia, oxytocin use and Apgar scores. Data were analysed using IBM SPSS Statistics V20, with statistical significance set at $p<0.05$. Results showed that the TVS group had a higher rate of spontaneous vaginal delivery (84.2% vs. 73.2%), shorter induction-to-delivery intervals (5.71±2.32 hours vs. 7.26±2.34 hours), less postpartum blood loss (396.05±17.12 mL vs. 485.53±17.98 mL), and better neonatal Apgar scores at one and five minutes (7.21±1.54 vs. 5.09±1.62 and 9.16±0.72 vs. 6.18±1.77, respectively). In conclusion, TVS measurement of cervical length prior to IOL was associated with shorter delivery times, reduced blood loss, and improved neonatal outcomes.

Keywords: Bishop Score, Cervical Length, Delivery outcomes, Induction of labour, Neonatal Apgar score

INTRODUCTION

The ultimate expectation of a family for a pregnant woman is the delivery of healthy baby to satisfied mother (Lawani *et al.*, 2014). Achieving this goal sometimes may require the delivery of the fetus before spontaneous onset of labour to prevent undesired outcome to the mother and or the baby. Intervention may be needed when critical assessment of the obstetric balance indicates the benefit of terminating the pregnancy outweighs the benefit of continuing it. (Lawani *et al.*, 2014). This termination is either by induction of labour or caesarean section, a decision which is largely dependent on the risk assessment of the pregnant woman and fetus. There has been various recommendation from different professional bodies to use induction of labour in this situation when it is certain than waiting for spontaneous labour is risky (NICE, 2021).

Induction is the artificial stimulation of the uterus to start contractions after the age of viability and before the spontaneous onset of labour for the purpose of achieving vaginal delivery (NICE, 2021). The rate of labour induction varies, it may up to 25% at term in developed countries but generally low in low resource settings (WHO, 2022). Indications for induction of labour can be maternal, foetal or fetomaternal and can be carried out at or before term (Ade-Ojo and Akintayo, 2013). For a successful induction of labour, it is crucial that the cervix be favourable. This favourability is assessed using the Bishop score (Abisowo *et al.*, 2017). Induction of labour is performed in about 20-25% of all pregnancies and successful induction is reported to be related to cervical characteristics. Bishop score which has been adopted frequently by obstetricians has a high inter and intra-observer variability (Ade-Ojo and Akintayo, 2013; Abisowo *et al.*, 2017).

Research has demonstrated that the histological features of a naturally ripening cervix are similar to those induced by exogenous prostaglandins (Bedi *et al.*, 2022). However, induction of labour is an artificial treatment that attempts to replicate the physiological process as much as possible (Bedi *et al.*, 2022). The rising rate of caesarean sections and their associated risks in future pregnancies have created a need to find ways to promote vaginal births. Accurately forecasting the likelihood of successful labour induction could potentially lower caesarean delivery rates and their related complications. Traditionally, doctors have used the Bishop score to evaluate the cervix's readiness for labour before induction, as a way to estimate the chances of achieving a vaginal delivery through induced labour (Harnish *et al.*, 2016). The bishop score evaluation method, however, relies on subjective judgment. Research studies have demonstrated that it's not very reliable in predicting how successful an induction will be (Harnish *et al.*, 2016; Abdullah *et al.*, 2022). Studies have shown that using transvaginal ultrasound to examine the cervix can offer a more accurate prediction of induction success than the Bishop Score (Harnish *et al.*, 2016). The Bishop Score evaluates five different factors, but the results of

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these assessments can vary depending on who is performing them. This study is investigating an alternative method that uses just one measurement. This new approach is designed to be more consistent, less prone to differences between observers, and more objective compared to the Bishop Score (Harnish *et al.*, 2016). Hence, this study is focused on the relationship between preinduction sonograhically measured cervical length (CL) and the Bishop score, and to compare the two assessments in the prediction of successful vaginal delivery within 24 hours of induction.

Few studies have been conducted on similar comparison: Research conducted by Aggarwal and colleagues found that cervical length measurements were more effective than the Bishop Score in predicting successful vaginal deliveries within 24 hours of induction (Abdullah *et al.*, 2022). In a separate study, it investigated how pre-induction cervical length (measured via ultrasound) and Bishop Score related to each other (Srivastava and Coumary, 2024). Given the absence of local data on this topic in our area, it is crucial to conduct a comparable study. This research would serve multiple purposes. It would allow us to determine whether the results observed elsewhere can be replicated in our specific environment and population. The study would enable us to compare the induction-delivery interval between two groups: one assessed using transvaginal sonography (TVS) for cervical length measurement, and another evaluated with the bishop score prior to labour induction. Additionally, this research would help us ascertain the proportion of successful vaginal deliveries in both groups, providing valuable insights into the effectiveness of these assessment methods in our local context.

MATERIALS AND METHODS

This study was carried out in Osun State University Teaching Hospital Osogbo (UNIOSUNTH), formerly known as Ladoke Akintola University of Technology Teaching Hospital Osogbo. Osogbo is the state capital of Osun State, it has two local governments areas (Osogbo and Olorunda Local Government Areas) and cover the land area of 47kms^2. According to the National Bureau of Statistics (NBS) and National Population Commission (NPC), Osun State was projected to be 4,435,800 in 2022 and is estimated to reach approximately 4,652,156 by 2025 (NPC and NBS, 2015). . UNIOSUNTH is a tertiary health facility and it offers specialized and general healthcare to the people of Osogbo and its environs. It is a referral centre for other hospitals in the state and neighbouring states in south-west Nigeria. This study employed a randomised controlled study carried out in the labour wards of the Hospital between August 2018 and May 2019. The participants were divided into two groups using block randomization, a method that ensures balance between groups throughout the allocation process. We used blocks of size four, with each block containing two allocations to the study group and two to the control group, in random order. A computer-generated randomization sequence determined the order of these blocks. This process continued until we reached our required sample size, resulting in a total of six blocks. This method guaranteed an equal number of participants in each group at the completion of each block, maintaining balance throughout the study and minimizing potential bias (Figure 1).

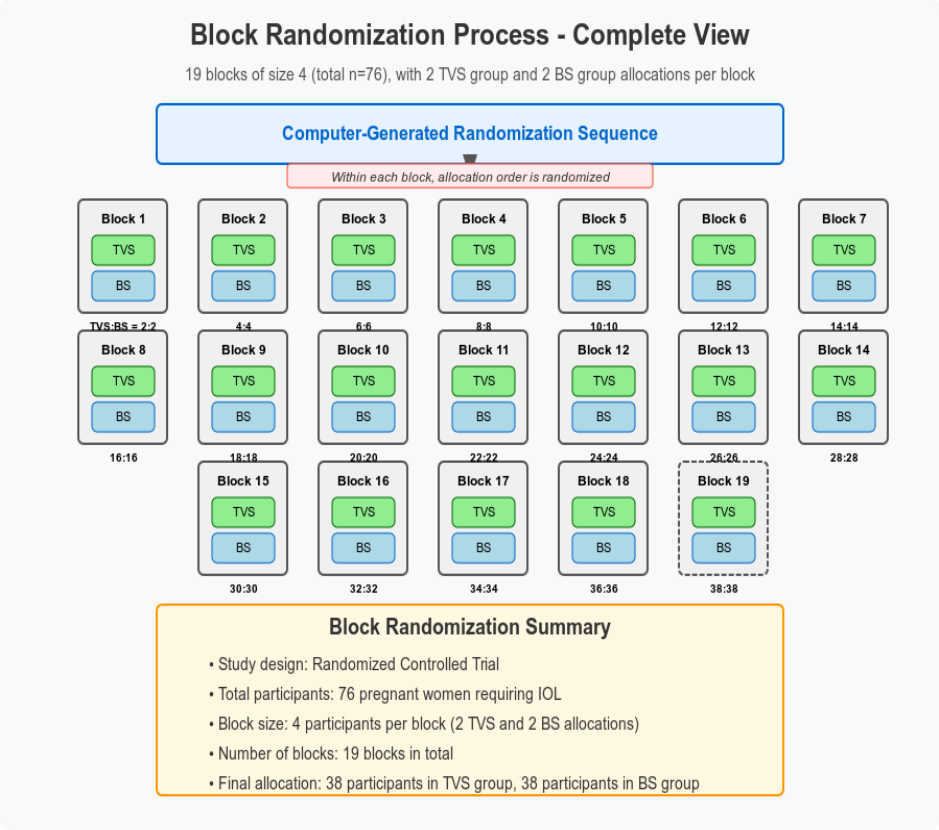

Figure 1: Blood Randomization Process

The study group underwent transvaginal sonographic (TVS) cervical length measurement before labour induction, while the control group was assessed using the Bishop Score. When selected patients arrived for labour induction, they were fully informed about the research and their consents were obtained. For those in the test group, we measured cervical length using TVS at the time of recruitment. We used a DP-6610 digital ultrasonic diagnostic imaging system (mindray), manufactured in China in 2012, equipped with a transvaginal probe with a centre frequency of 6.5 MHz. Patients in the control group underwent a vaginal examination to determine their Bishop Score. In the test group, a cervical length of 2.5 cm or less, as measured by TVS, was considered favourable for induction of labour (IOL). For the control group, a Bishop Score of 6 or higher was deemed favourable for labour induction. According to the American College of Obstetricians and Gynaecologists (ACOG), a cervical length of 2.5 cm or less as measured by transvaginal ultrasound (TVS) is considered a favourable cervical characteristic for induction of labour (IOL) (ACOG, 2019). The rationale for this length threshold is that a shorter cervical length is typically associated with an increased likelihood of successful labour induction and vaginal delivery, compared to a longer cervical length (ACOG, 2019). The rationale for using a Bishop score of 6 as the threshold is that this level typically indicates a cervix that is more "ripe" or ready for successful induction, compared to a lower Bishop score. Some studies have suggested that a Bishop score of 7 or 8 may further improve the likelihood of successful induction, but a score of 6 or higher is a commonly used benchmark (ACOG, 2019).

Study Population and Sample Size

The study populations were pregnant women with term pregnancies admitted for cervical assessment with a valid indication into the UNIOSUNTH, Osogbo. The inclusion criteria include: pregnant women with singleton fetus and intact membrane, with a live fetus in cephalic presentation, bishop score ≥6 and Transvaginal cervical length ≤2.5cm. those with features of foetal distress on admission, previous history of uterine surgery, contraindication of vaginal delivery, estimated foetal weight > 4kg, cervical incompetence and premature rupture of membrane were excluded. The sample size was estimated with the formula for comparing proportion in two independent variables (binary data) the required sample size (Zhang *et al.*, 2017):

$$N = \frac{P1(1-P1) + P2(1-P2)}{(P1-P2)^2} \times K$$

Using the prevalence from previous literature on sonographic assessment cervical length before induction of labour (Abedelazim and Mohammad, 2012). i.e. P1 = 0.783 P2 = 0.837 (Abedelazim and Mohammad, 2012). A minimum sample size of 68 was obtained and considering 10% attrition rate, the sample size was estimated to be a total of 76 patients with 38 patients for each arm.

Method and Procedure of Data Collection:

The research team included three research assistants: Two senior registrars from the obstetrics and gynaecology department. Their role was to perform vaginal examinations to assess the Bishop Score and patient can be assessed by one of the senior registrars. For the TVS, the initial measurement was performed by the researcher while one senior registrar from the radiology department was to verify the accuracy of the transvaginal sonography (TVS) measurements used to determine cervical length. This setup ensured that both the Bishop Score assessments and the TVS measurements were conducted or validated by experienced medical professionals in their respective fields. Patients were provided with comprehensive information regarding the procedure, and the purpose of the study was explained to each participant. Every patient who gave consent was admitted to the labour ward of UNIOSUNTH, where a Transvaginal scan for Cervical Length measurement was performed on each patient before IOL and, a vaginal examination was conducted for the Bishop score group before the induction of labour.

Procedure of Transvaginal Scan to Measure Cervical Length

The procedure began with patients positioned on their backs, knees bent and legs spread, after confirming their bladders were empty. A transvaginal ultrasound probe was prepared by applying gel inside and outside a protective condom cover. This was then carefully inserted into the vagina until the cervical canal was visible. Care was taken to avoid applying pressure that could artificially elongate the cervix. The probe was adjusted to obtain a clear side view of the entire cervix, including the internal os, endocervical mucosa, and external os. The cervical length was measured in a straight line from the external os to the internal cervical os, including the portion of the cervical canal lined with endocervical mucosa. Once the correct view was achieved, the image was frozen. The probe was then gently withdrawn, the patient was cleaned, and assisted to rise from the examination table.

Procedure of Bishop Score

The patient was placed on her back, and the doctor, wearing sterile gloves, cleaned the vulva with chlorhexidine. A vaginal examination was performed to assess various parameters for each patient undergoing induction of labour (IOL). A Bishop Score (BS) of 6 or higher was considered favourable for induction. Patients with an unfavourable cervix were not included in the study. Participants with a favourable cervix by either BS or TVS criteria proceeded to labour induction after randomization. The induction process involved breaking the amniotic sac and administering oxytocin. For the oxytocin infusion, 5 IU of oxytocin was added to 500ml of 0.9% normal saline. The infusion began at 15 drops per minute and increased progressively until adequate uterine contractions were achieved (3-4 contractions in 10 minutes, each lasting 40-60 seconds) or until the maximum rate of 60 drops per minute was reached.

Dose of Oxytocin In 500mls of N/S	1ml/min 15drops	2ml/min 30drops	3ml/min 45drops	4ml/min 60drops
5 IU	7.5 mill unit	15mill unit	22.5 mill unit	30mill unit

Vaginal examinations were conducted every 4 hours, and labour progress was tracked using a partograph. This study defined successful vaginal delivery as one occurring within 12 hours of induction. Caesarean sections were performed if labour failed to progress after 12 hours of induction, or if there were signs of cephalopelvic disproportion or foetal distress. The primary outcome measures include: Time from induction to delivery, method of delivery and newborn Apgar scores at one and five minutes while Secondary outcome measures included blood loss during delivery, admissions to the Special Care Baby Unit (SCBU) and pain relief provided. Patients' information was gathered from antenatal

records, including age, ethnicity, number of previous births, gestational age, and reasons for induction. This data was collected using a proforma. The APGAR score, a standardized assessment of a newborn's physical condition immediately after birth, was evaluated at 1 and 5 minutes. APGAR scores range from 0 to 10, with higher scores indicating better condition. APGAR scores were categorized as normal (7-10), moderate (4-6), or severe (0-3) based on established clinical guidelines (Cunningham *et al.*, 2018).

Data Analysis

The data was cleaned and analysed using IBM SPSS Statistics software version 20, and results were presented as tables and charts. Descriptive statistics such as mean and standard deviation were reported for continuous variables like age, parity, gestational age, induction-delivery interval, and blood loss. To determine the relationship between cervical length (CL) and Bishop score (BS) in predicting successful outcomes, bivariate analyses including t-tests and chi-square tests were used for categorical variables. The p-value of < 0.05 was taken as statistically significant.

Ethical considerations

The study sought and received ethical clearance from UNIOSUN Teaching Hospital Research Ethics Committee in Osogbo, Osun state (LTH/REC/2018/03/27/362). Before participating, subjects provided verbal informed consent. Data collected was anonymized for analysis and storage. Participants were assured their information would remain confidential, in line with bioethical principles. They were also informed that the research findings might be published in medical literature without disclosing individual identities.

Funding

This research study was funded and no external funding or grant was received.

RESULTS

The total number of patients randomised for this study was76 with 38 in each arm of control Bishop score (BS) and the cervical length (CL) measurement group before induction of labour. There was no patient drop out from the study.

Table 1: Comparison of Sociodemographic Characteristics and Obstetrics Data Between Study Groups

Variable	Bishop Score n (%)	TVS (CL) n (%)	χ^2 value	df	p-value
Age Group (in years)					
18-27~~yrs~~	15(39.5)	12(13.6)	0.844	2	0.656
28-37~~yrs~~	18(47.4)	22(57.9)			
38-47~~yrs~~	5(13.2)	4(10.5)			
Tribe					
Hausa	2(5.3)	3(7.9)	0.343	2	0.842
Igbo	4(10.5)	3(7.9)			
Yoruba	32(84.2)	32(84.2)			
Education Status					
None	1(2.6)	2(5.3)	1.030	3	0.794
Primary	4(10.5)	3(7.9)			
Secondary	16(42.1)	13(34.2)			
Tertiary	17(44.7)	20(52.6)			
Occupation					
Business	18(47.4)	19(50.0)	0.261	2	0.878
Civil servant	15(39.5)	13(34.2)			
House wife	5(13.2)	6(15.8)			
Marital status					
Divorced	2(5.3)	0 (0.0)	2.078	3	0.556
Married	26(68.4)	27(71.1)			
Separated	2(5.3)	2(5.3)			
Single	8(21.1)	9(23.7)			
Major indication					
Postdate Pregnancy	28(73.7)	22(57.9)			
Pregnancy Induced Hypertension	2(5.3)	6(15.8)			
Preeclampsia	4(10.5)	4(10.5)	3.387	5	0.641
Diabetes Mellitus	2(5.3)	2(5.3)			
Prolonged pregnancy	1(2.6)	2(5.3)			
Maternal request	1(2.6)	1(2.6)			

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Analgesic					
PCM	16(42.1)	19(50.0)			
PENTA	21(55.3)	18(47.4)	0.486	2	0.784
None	1(2.6)	1(2.6)			
	Mean ± SD	**Mean ± SD**	**t value**	**p value**	
Age	30.66±7.06	30.32±5.49	0.236	0.814	
Gestational Age on induction	285.66±9.21	283.05±11.30	1.101	0.274	

Table 1 shows the comparison of sociodemographic characteristics and obstetrics data between study groups, although no statistically significant association was found, the majority of the participants in both groups had formal education, were multiparous and Yoruba by tribe. The Mean value of maternal age (BS vs TVS (CL) was 30.06 ±7.06 vs 30.32±5.49, t= 0.236, p=0.84. Gestational age (BS vs TVSCL) was 285.66±9.21 and 283.05±11.30 for BS and TVS (CL) respectively, t =1.101 and = 0.274

Table 2: Comparative Variables of Induction of Labour Outcomes Between Study Groups

	Bishop score	**TVS(CL)**	**t-value**	**p-value**
	Mean±SD	Mean± SD		
Interval time	7.26±2.34	5.71±2.32	2.892	0.005*
Birth Weight	3.27±0.53	3.23±0.49	0.348	0.729
APGAR Score at 1min	5.09±1.62	7.21±1.54	5.821	<0.001*
APGAR Score at 5 mins	6.18±1.77	9.16±0.72	9.605	<0.001*
MAXI. dose of oxytocin	6.58±2.36	6.05±2.07	1.035	0.304
Blood loss	485.53±17.98	396.05±17.12	3.604	0.001*

* Statistically significant at p<0.05

Table 2 shows a comparison of labour induction outcomes between the study groups, there was a statistically significant difference between the interval time of bishop score and TVS with mean 7.26±2.34 and 5.71±2.32 mins respectively (p=0.005). In terms of birth weight, the mean score (3.27±0.53) was slightly higher than that of the TVS (3.23±0.49) although not statistically significant. The APGAR score of TVS was found to be higher than Bishop score when measure at both 1 min and 5 mins and this was statistically significant (p<0.001) with the mean score 7.21±1.54 and 5.09±1.62 for TVS and BS respectively at 1 min and mean 9.16±0.72 and 6.18±1.77 at 5 mins. The mean blood loss was higher in BS (485.53±17.98) compared to TVS (396.05±17.12) and this was statistically significant (p<0.001).

Table 3: Mode of Delivery between Bishop Score and Transvaginal Scan

Method of Delivery	**Bishop Score n (%)**	**TVS (CL) n (%)**	**df**	χ^2 **value**	**p-value**
Caesarean Section	10 (26.3)	6 (15.8)	1	1.267	0.260
Spontaneous Vaginal Delivery	28 (73.7)	32 (84.2)			

Table 3 shows the mode of delivery between two groups, although not statistically significant, the majority (84.2%) of the participants in the TVS (CL) group had spontaneous vaginal delivery (SVD) while 15.8% had Caesarean section (CS) compared to the BS group where 73.7% had SVD and 26.3% delivered using CS.

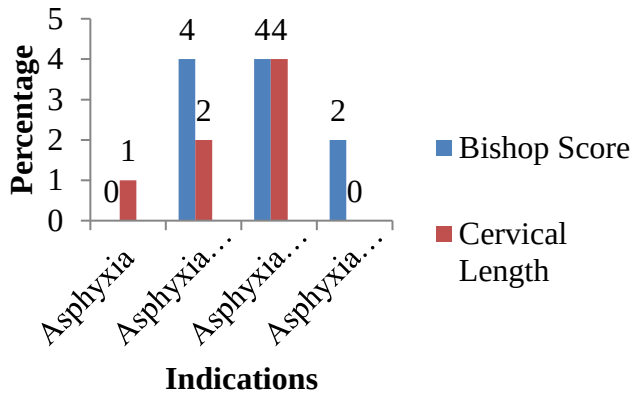

Figure 2. Comparison of the Indication for Admission into Special Care Baby Unit (SCBU)

Figure 2 shows the indication for admission into SCBU for the babies of mothers who had BS and TVS (CL) before labour induction. Neonatal complications were observed in both groups. Four babies in each group experienced asphyxia and neonatal jaundice (NNJ), which were the most common complications. For the indication of asphyxia and sepsis, four babies from the Bishop Score (BS) group required admission, compared to two babies from the Transvaginal Sonography Cervical Length (TVS CL) group. In the BS group, one baby was admitted for asphyxia alone, while two babies were admitted for asphyxia with respiratory distress syndrome (RDS). Notably, in the TVS CL group, no babies required admission for asphyxia alone or for asphyxia with RDS

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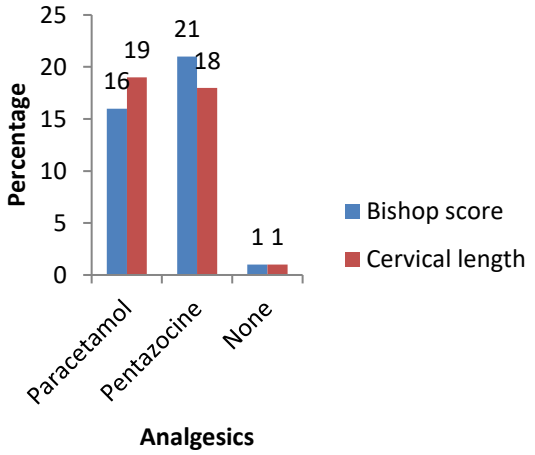

Figure 3. Comparison of Analgesia Usage During Labour Between Two Groups**.**

Figure 3 shows the comparison of analgesia usage during labour between two groups. Only one patient received no analgesics in either group. However, sixteen (16) patients had paracetamol in BS group compared to 19 in the CVS(CL) group. Regarding, pentazocine, eighteen (18) patients utilized it in CVS (CL) group compared to 21 who had it in BS group.

Table 4: Comparative Variables of Apgar Score of The Two Groups

Variable	Bishop Score n (%)	TVS(CL) n (%)	df	χ^2 value	P value
1 minute APGAR Scores	8 (21.1)	27 (71.1)			
Normal (7-10)					
Mild (6)	5 (13.2)	5 (13.2)	3	21.981	<0.001*
Moderate (4-5)	20 (52.6)	5 (13.2)			
Severe (≤3)	5 (13.2)	1 (2.6)			
5 minutes APGAR Scores					
Normal (7-10)	11 (28.9)	38(100.0)			
Mild (6)	4 (10.5)	0 (0.0)	3	41.828	<0.001*
Moderate (4-5)	23(60.5)	0 (0.0)			

* Statistically significant at p<0.05

Table 4 shows the comparative variables of APGAR score of the two groups. At one minute, more than half (52.6%) of the patients in BS group had moderate APGAR score compared to the TVS group where the majority (71.1%) were found to have normal APGAR score and this was statistically significant (p<0.001). At five minutes, all the patients in TVS (CL) group (100.0%) had normal APGAR score compared to the BS group where 60.5% were found to have moderate APGAR score.

DISCUSSION

The usefulness of TVs can cervical measurement in the prediction of successful induction of labour had been evaluated by various studies. However, it remains unknown whether it is clinically useful, or it could replace the Bishop score (Abedelazim and Mohammad, 2012). This study was conducted to compare the cervical length measured by TV scan with BS cervical assessment before induction of labour.

There was no significant difference in socio-demographic and obstetrics data of both groups. Postdate pregnancy (63.2%) was leading indication for labour induction followed by pregnancy induced hypertension (10.5%) and preeclampsia (10.5%) and prolonged pregnancy (5.3%). This is similar to what ~~Sree~~ Gouri *et al.,* found in their study that showed that postdate pregnancy accounted for 70%, whereas pregnancy induced hypertension was (22%) and post term pregnancy accounted for 8% as indication for induction of labour (Gouri *et al.*, 2015). Another study by Lawani et al found 45.8% accounted for postdate pregnancy. Induction for this reason is to reduce the risk to the baby if pregnancy is continued (Lawani *et al.*, 2014). These similarities could be due to physiological constants as the natural progression of pregnancy and its complications follow similar patterns across populations, with postdate pregnancy being inherently more common than other indications due to the natural variation in gestational length (Jukic *et al.*, 2013). Artificial rupture of membranes (amniotomy) was used as the primary method of labour induction for all participants, with this procedure being consistently applied across both the Bishop Score (BS) and Transvaginal Ultrasound Cervical Length (TVS CL) assessment groups.

The socio-demographic and obstetric characteristics were similar between the two groups. The primary reason for inducing labour was postdate pregnancy (63.2%), followed by pregnancy-induced hypertension and preeclampsia (both at 10.5%), and prolonged pregnancy (5.3%). These findings align with ~~Sree~~ Gouri *et al*'s study, which reported postdate pregnancy as the main indication (70%), followed by pregnancy-induced hypertension (22%) and post-term pregnancy (8%) (Gouri *et al.*, 2015). Similarly, Lawani et al. found postdate pregnancy accounting for 45.8% of inductions. Labor is often induced in these cases to mitigate risks to the fetus associated with prolonged gestation (Lawani *et al.*, 2014).

The induction-to-delivery interval was analysed for groups who underwent transvaginal ultrasound cervical length (TVs CL) measurement and Bishop Score (BS) assessment prior to induction. Those who had TVs CL measurements experienced shorter induction-to-delivery intervals compared to those assessed with BS. The difference between the groups was statistically significant (p=0.005). This aligns with ~~Sree~~ Gouri et al's findings, where combining BS and CL showed a significant correlation (p=0.001) with successful induction (Gouri *et al*, 2015). Similarly, Srivastava and Coumar's study demonstrated that both pre-induction Bishop Score and TVs CL measurements were significantly associated with the induction-to-delivery interval (Srivastava and Coumary, 2024). However, their research indicated that the Bishop Score was more effective than TVs CL in predicting the likelihood of vaginal delivery within 24 hours (Srivastava and Coumary, 2024). This suggests that TVs CL may be a more effective tool for optimizing labour induction processes.

This could be due to its ability to provide more precise information about cervical readiness, thereby enabling better clinical decision-making. The implications of these findings are multifaceted:

APGAR scores were significantly higher in the transvaginal ultrasound (TVS) group compared to the Bishop Score (BS) group at both 1 and 5 minutes after birth ($p<0.001$). At 1 minute, the mean scores were 7.21±1.54 for TVS and 5.09±1.62 for BS. At 5 minutes, the mean scores were 9.16±0.72 for TVS and 6.18±1.77 for BS. This difference in APGAR scores between the two methods was not reported in similar studies, suggesting a need for further research to confirm and validate these findings.

There was no statistically significant difference in the maximum oxytocin dose used between the two groups. This result contrasts with Ibrahim et al's study, which found that oxytocin usage was lower in the Bishop Score (BS) group compared to the transvaginal ultrasound cervical length (TV scan CL) group prior to labour induction (Abedelazim and Mohammad, 2012). The discrepancy between this study's findings and those of Ibrahim *et al.* (2012) regarding oxytocin usage could be attributed to differences in study populations, such as variations in baseline cervical characteristics, parity, or gestational age which may influence oxytocin requirements. However, our findings align with those reported by Meijer-Hoogeveen *et al*., who also found no significant difference in oxytocin usage between the two methods (Meijer-Hoogeveen *et al.*, 2009).

Conclusion

This study demonstrates that transvaginal ultrasound (TVS) measurement of cervical length prior to induction of labour (IOL) is a more effective predictor of successful vaginal delivery compared to the traditional Bishop Score (BS). The TVS group exhibited significantly shorter induction-to-delivery intervals, reduced postpartum blood loss, and improved neonatal Apgar scores at both one and five minutes. These findings suggest that TVS provides a more objective and reliable assessment of cervical readiness for labour induction, leading to better maternal and neonatal outcomes. While both methods showed no significant difference in the mode of delivery, the higher rate of spontaneous vaginal deliveries in the TVS group further supports its clinical utility. The study highlights the potential of TVS to reduce the need for caesarean sections and improve overall labour induction success, particularly in resource-limited settings

Limitation of the study

This study could be limited by the fact that not all the participants were not exposed to the same type of analgesia. likewise, analgesic use was not quantified using a formal pain assessment tool like the Visual Analog Scale (VAS).

REFERENCES

Abdullah, Z.H.A., Chew, K.T., Velayudham, V.R. V., Yahaya, Z., Jamil, A.A.M., Abu, M.A., Ghani, N.A.A. and Ismail, N.A.M. (2022) 'Pre-induction cervical assessment using transvaginal ultrasound versus Bishops cervical scoring as predictors of successful induction of labour in term pregnancies: A hospital-based comparative clinical trial', PLOS ONE. Edited by B.A. Wilson, 17(1), p. e0262387. Available at: https://doi.org/10.1371/journal.pone.0262387.

Abedelazim, A. and Mohammad, L. (2012) 'Sonographic assessment of cervical length before induction of labour', Asian Pacific Journal of Reproduction, 1(4), pp. 253–257.

Abisowo, O., Oyinyechi, A.. A., Olusegun, F.F.., Oyedokun, O., Motunrayo, A. and Abimbola, O. (2017) 'Feto-maternal outcome of induced versus spontaneous labour in a Nigerian Tertiary Maternity Unit', Tropical Journal of Obstetrics and Gynaecology, 34(1), pp. 21–27. Available at: https://doi.org/10.4103/TJOG.TJOG_59_16.

American Collge of Obstetricians and Gynecologists (2019) 'Induction of Labor. ACOG Practice Bulletin No. 107.', Obstetrics & Gynecology, 114(2), pp. 386–397.

Ade-Ojo, I. and Akintayo, A. (2013) 'Induction of labour in the developing countries – an overview', Journal of Medicine and Medical Sciences, 4(7), pp. 258–262. Available at: http://www.interesjournals.org/JMMS.

Bedi, P., Ziegler, K., Whitfield, P.D., Davidson, D., Rossi, A.G. and Hill, A.T. (2022) 'Dysregulation of prostaglandins, leukotrienes and lipoxin A 4 in bronchiectasis', Thorax, 77(10), pp. 960–967. Available at: https://doi.org/10.1136/thoraxjnl-2020-216475.

Cunningham, F.G., Leveno, K.J., Bloom, S.L., Dashe, J.S., Hoffman, B.L., Casey, B.M. and Spong, C.Y. (2018) 'Williams Obstetrics', McGraw-Hill Education., p. 25e.

Gouri, S., Jyothirmayi, R. and Varalakshmi, B. (2015) 'Role of Bishop Score and cervical length by transvaginal scan in induction in primigravida', Journal of dental and medical science (IOSR-JDMS), 14(8), pp. 81–85.

Harnish, Y., Kessons, R., Weintraus, Y., Arichia-Tamir, B., Steinar, N., Spiegel, E. and Herskovits, R. (2016) 'The use of sonographic cervical length assessment for the prediction of time from induction to delivery', Journal of maternal fetal and neonatal medicine, 29(14), pp. 2332–2336.

Jukic, A.M., Baird, D.D., Weinberg, C.R., McConnaughey, D.R. and Wilcox, A.J. (2013) 'Length of human pregnancy and contributors to its natural variation', Human Reproduction, 28(10), pp. 2848–2855. Available at: https://doi.org/10.1093/humrep/det297.

Lawani, O., Onyebucji, A., Iyoke, C., Okafo, C. and Ajah, L. (2014) 'Obstetrics outcome and significance of labour Induction in a Health resource poor setting', Obstetrics and Gynaecology International, 4, pp. 19–21.

Meijer-Hoogeveen, M., Roos, C., Arabin, B., Stoutenbeek, P. and Visser, G.H.A. (2009) 'Transvaginal ultrasound measurement of cervical length in the supine and upright positions versus Bishop score in predicting successful induction of labor at term', Ultrasound in Obstetrics & Gynecology, 33(2), pp. 213–220. Available at: https://doi.org/10.1002/uog.6219.

National Institute for Health and Care Excellence (2021) NHS guide line for induction of labour, The NHS's NICE guideline on inducing labor. Available at: https://www.nice.org.uk/guidance/ng207 (Accessed: 2 August 2024).

NPC and NBS (2015) National Population Estimates, National Bureau of Statistics (NBS) and National Population Commisison (NPC). Available at: https://doi.org/10.25336/p6rs3w.

Srivastava, S. and Coumary, S.A. (2024) 'Comparison of Bishop's score with transvaginal sonographic cervical assessment to predict success of induction of labor', Indian Journal of Obstetrics and Gynecology Research, 11(2), pp. 276–280. Available at: https://doi.org/10.18231/j.ijogr.2024.053.

WHO (2022) WHO recommendations on induction of labour, at or beyond term, WHO Publciations. Available at: https://www.who.int/publications/i/item/9789240052796 (Accessed: 3 August 2024).

Zhang, X., Lyu, J., Tu, J., Liu, J. and Lu, X. (2017) 'Sample Size Calculations for Comparing Groups with Binary Outcomes', Shanghai Archives of Psychiatry, 29(5), pp. 316–324. Available at: https://doi.org/10.11919/j.issn.1002-0829.217132.