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Original Research Article

Assessment of Uterocervical Angle by Transvaginal Ultrasound in 2nd Trimester As A Predictor of Spontaneous Preterm Birth

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Abstract

Background: Spontaneous preterm birth (sPTB), defined as delivery before 37 completed weeks of gestation, remains a major cause of neonatal morbidity and mortality. Cervical length assessment by transvaginal ultrasonography is routinely used for risk evaluation; however, its predictive performance may be limited in some pregnancies. The uterocervical angle (UCA) has emerged as a potential complementary sonographic marker for predicting sPTB.

Materials and Methods: This prospective observational study included 97 pregnant women with singleton pregnancies who underwent transvaginal ultrasonography during the second trimester. UCA and cervical length were measured using a standardized sonographic technique. Participants were classified according to pregnancy outcome into spontaneous preterm birth and term birth groups. The association of UCA with pregnancy outcome and gestational age at delivery was assessed. Diagnostic performance was evaluated using sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and the area under the receiver operating characteristic (ROC) curve.

Results: Of the 97 participants, 20 (20.6%) experienced sPTB and 77 (79.4%) delivered at term. The mean UCA was significantly higher in the sPTB group than in the term group (109.66 ± 11.22° vs. 101.09 ± 9.39°, $p < 0.001$). A UCA >105° was significantly associated with sPTB ($\chi^2 = 12.69$, $p < 0.001$), with preterm birth occurring in 38.5% of women with UCA >105°, compared with 8.6% of those with UCA ≤105°. UCA showed a significant negative correlation with gestational age at delivery ($r = -0.661$, $p < 0.001$). At the >105° threshold, sensitivity was 75.0%, specificity 68.8%, PPV 38.5%, NPV 91.4%, and AUC 0.713. Cervical length did not differ significantly between the groups ($p = 0.883$).

Conclusion: Second-trimester UCA measurement by transvaginal ultrasonography was significantly associated with sPTB and earlier delivery. It may serve as a useful adjunctive marker for antenatal risk stratification, although further studies are required to validate its diagnostic performance and clinical utility.

Keywords: Uterocervical angle; spontaneous preterm birth; transvaginal ultrasonography; cervical length; second trimester; pregnancy outcome.

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Introduction

Preterm birth, clearly indicated as childbirth happening before 37 finished weeks of gestation, leftovers an important sponsor to newborn morbidity as well as mortality across the globe. Despite substantial progress in obstetric care and neonatal management, sPTB continues to pose a major clinical challenge. It is accompanying with a extensive variety of adverse outcomes, comprising respiratory distress syndrome, intraventricular hemorrhage, necrotizing enterocolitis, as well as longstanding neurodevelopmental disabilities. These difficulties highpoint the position of initial documentation of at-risk pregnancies to enable timely intervention and advance perinatal results. [1,2]

The fundamental reasons of preterm birth are composite and involve the interaction of multiple factors. These include genetic susceptibility, intrauterine infections, inflammatory processes, cervical structural weakness, uteroplacental insufficiency, and mechanical influences within the uterine environment. Given this multifaceted origin, no single parameter can reliably predict the occurrence of sPTB. Therefore, there has been growing emphasis on identifying reliable, non-invasive markers that can improve early risk detection. [2,3]

Cervical insufficiency is one of the key contributors to sPTB and is considered by effortless cervical dilatation and shortening in the nonappearance of uterine reductions. Assessment of cervical length using transvaginal ultrasonography has traditionally been the primary method for evaluating cervical competence. A shortened cervix is well established as a risk aspect for preterm delivery. However, a considerable percentage of female who deliver preterm may still have a cervical length within normal limits, indicating that cervical length alone does not fully reflect the mechanical and anatomical factors involved in cervical failure. [2,3]

In recent years, consideration has transformed toward additional sonographic parameters that might complement cervical length assessment. One such parameter is the uterocervical angle (UCA), which represents the angle formed between the endocervical canal and the anterior uterine wall. From a biomechanical perspective, this angle influences the direction and magnitude of intrauterine forces acting on the cervix. When the angle is wider, these forces are more directly transmitted toward the internal os, potentially increasing the likelihood of cervical opening. In contrast, a narrower angle may help distribute forces away from the cervical canal, thereby supporting the maintenance of pregnancy. [3,4]

Transvaginal ultrasonography provides an effective and reliable means of evaluating cervical morphology, including both cervical length as well as uterocervical angle. The technique involves obtaining a sagittal sight of the cervix with clear visualization of the interior os, exterior os, and cervical canal. Measurement of the uterocervical angle is performed by illustration one line along the cervical canal as well as another along the anterior uterine wall, with the angle formed at the level of the interior os. Proper technique as well as standardization are essential to ensure consistency and reproducibility of measurements. [4]

Recent studies have suggested that valuation of the uterocervical angle during the 2nd trimester offers valuable predictive information. A wider angle has been accompanying by an augmented likelihood of sPTB, independent of cervical length. Incorporating this parameter alongside cervical length measurement may enhance the accuracy of risk assessment and allow better identification of women who could advantage from defensive strategies such as progesterone therapy or cervical cerclage. [5]

The biological basis for using the uterocervical angle as a predictive marker lies in the mechanical forces acting on the cervix throughout pregnancy. As gestation progresses, the cervix must withstand increasing intrauterine pressure while maintaining structural integrity. An unfavorable uterocervical configuration may increase stress on the internal os, contributing to early cervical remodeling and shortening. These changes are closely linked to modifications in collagen structure as well as tissue elasticity, which are central to the process of cervical ripening. [6]

From a practical standpoint, measurement of the uterocervical angle is feasible in routine clinical practice. Transvaginal ultrasound is widely available, safe, and well tolerated by patients. The addition of UCA measurement does not require specialized equipment and can be performed during standard second-trimester scans. This makes it a convenient tool for incorporation into routine antenatal evaluation, potentially improving early detection of high-risk pregnancies. [6,7]

However, certain factors can influence the accuracy of UCA measurement, including patient positioning, bladder status, and operator technique. Standardized protocols and adequate training are therefore necessary to ensure reliable assessment. Furthermore, although current evidence supports the potential utility of UCA, larger studies are required to establish uniform cutoff values and to determine its role in combination with other clinical and biochemical markers. [7,8]

In summary, the assessment of uterocervical angle represents an evolving approach in the prediction of impulsive preterm birth. By providing additional insight into the anatomical and mechanical factors influencing cervical competence, it may enhance current screening strategies. Improved risk stratification through such methods has the potential to guide targeted interventions and ultimately reduce the burden of preterm birth. [8,9]

The present study aims to evaluate the uterocervical angle measured by transvaginal ultrasound in the second trimester as a predictor of spontaneous preterm birth.

Methodology

A prospective, longitudinal, experimental research was conducted in the Department of Radiodiagnosis at Dr. D. Y. Patil Medical College, Hospital and Research Institute, Kolhapur, Maharashtra, India. The total duration of the study was two years. A rigorous screening process was implemented to

select a homogenous cohort of pregnant female who were at ostensibly low risk for (sPTB), thereby consenting for a clearer assessment of the prognostic value of the uterocervical angle (UCA) independent of other known strong risk factors. The study was conceived and executed in strict adherence to the moral values delineated in the Declaration of Helsinki. Formal approval was attained from the Institutional Ethics Committee (IEC). Al l the participants were selected according to the exclusion and inclusion criteria. A consecutive, non-probability sampling technique was utilized to select the participants. The minimum sample size was 97 participants.

AS this was an observational study.

Group 1 (sPTB Group): Participants who experienced a sPTB (delivery before 37 accomplished weeks of gestation).

Group 2 (Term Birth Group): Participants who distributed at term (at or else else after 37 weeks of gestation).

Inclusion Criteria: Singleton antenatal patients confirmed to be in their 2nd trimester of gestation, specifically between 16 as well as 24 weeks, at the time of enrollment, patients falling within the age group of 18 to 40 years, primigravida women with no identifiable high-risk factors that would necessitate a medically designated preterm delivery, multigravida female through no previous past of spontaneous preterm birth.

Exclusion Criteria: Any patient who declined to provide valid, written informed consent, the presence of any congenital malformation of the uterus or the fetus identified on ultrasound, any diagnosed placental abnormality, such as placenta previa or abruption. women found to have a retroflexed uterus on sonography, as the measurement of the UCA is standardized for an anteflexed uterus, participants with a sonographically restrained cervical length of < 2.5 cm at the time of scanning, as a short cervix is itself a influential independent forecaster of early delivery, pregnancies considered through in vitro fertilization (IVF) or intrauterine insemination (IUI), an earlier antiquity of preterm labour, cervical cerclage, or mysterious intrauterine death (IUD), the presence of any significant psychiatric or medical illness (e.g., uncontrolled hypertension, diabetes, thyroid disorders) that could complicate the pregnancy.

Study Procedure: The procedure for transvaginal ultrasonography was standardized to ensure consistency and accuracy in measurements. A GE Logiq F8 and F8 Expert Ultrasound machine equipped through a transvaginal probe (frequency 4.0-9.0 MHz) was utilized for all scans. An experienced professor of radiodiagnosis oversaw the execution of the scanning process.

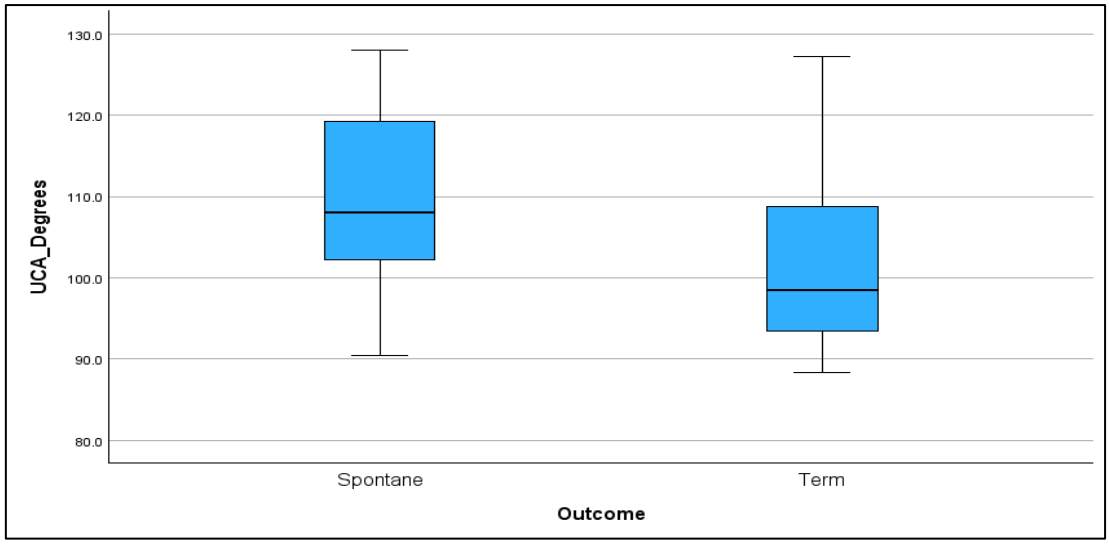
To eliminate the possibility of artifactual cervix elongation, the individual was first instructed to empty her bladder fully. After that, the dorsal lithotomy posture was applied to her. Minimal pressure was used to insert the transvaginal probe into the vagina's anterior fornix so as not to alter the cervical architecture. With the probe set up correctly, we were able to see the whole cervix in mid-sagittal plane, including the echogenic endocervical mucosa all the way down the canal. The cervix took up at least 75% of the screen due to the image's magnification. A typical calliper placement technique was utilized to measure the cervical length, starting at the internal os and moving outwards. Using the frozen sagittal picture, a two-line approach was used to measure the UCA. Starting at the interior os and moving outward along the cervical canal, the first line was created. The location at the tip of the endocervical mucosa was designated as the internal os, whereas the place where both sides lips of the cervix met was known as the external os. For an anteflexed uterus, a 2nd line was drawn along the lower feature of the anterior uterine wall, extending 3 cm upwards from the internal os. The angle subtended between these two lines remained defined as the anterior uterocervical angle. Three separate images were acquired during each examination, and all images remained protected in the hospital's database system (ViewPoint) for subsequent analysis.

Results

Table 1: Comparison of mean uterocervical angle between term and spontaneous preterm birth groups

Outcome	N	Mean UCA (°)	SD
Term	77	101.09	9.39
Spontaneous preterm birth	20	109.66	11.22
t = 3.49, df = 95, p < 0.001			

Associated to female who delivered at term (101.09 ± 9.39°), those who spontaneously gave birth had a higher mean uterocervical angle (109.66 ± 11.22°). There was a statistically important alteration in the average uterocervical angle between the 2 cohorts (t = 3.49, df = 95, p < 0.001). The 95% CI ranged from 3.69° to 13.44°, with the mean difference being 8.57°. A substantial effect size, with Cohen's d estimated at 0.88 (95% CI: 0.37–1.38), substantiated the extent of the change.

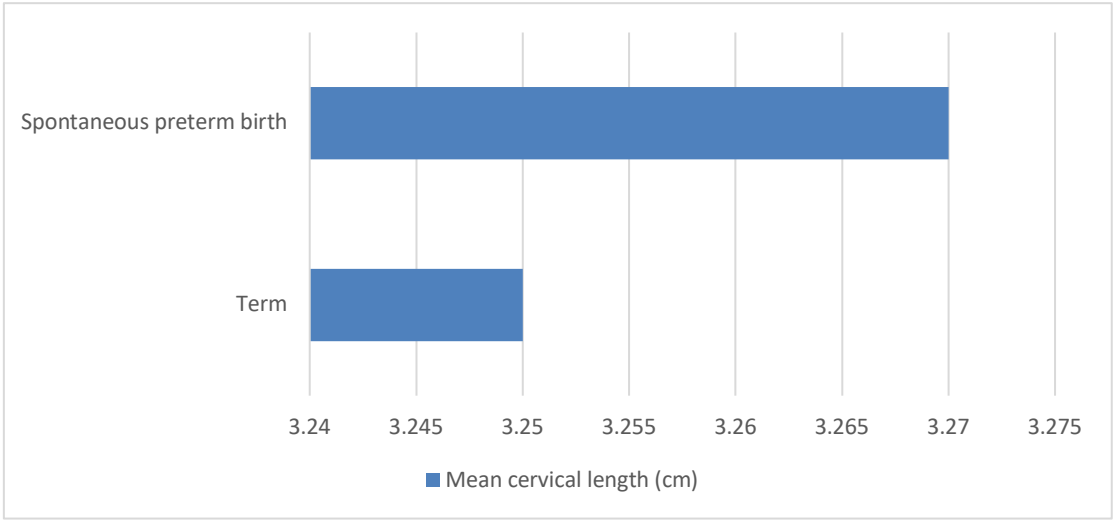


Graph 1: Boxplot of mean uterocervical angle between term and spontaneous preterm birth groups

Table 2: Comparison of mean cervical length between term and spontaneous preterm birth groups

Outcome	N	Mean cervical length (cm)	SD
Term	77	3.25	0.35
Spontaneous preterm birth	20	3.27	0.28
t = 0.148, df = 36.35, p = 0.883			

The average cervical length was 3.25 ± 0.35 cm among term pregnancies and 3.27 ± 0.28 cm among female with spontaneous preterm birth. Participants with sPTB showed a marginally higher mean cervical length associated to the term cohort. However, the alteration in mean cervical length between the 2 cohorts was not statistically important (t = 0.148, df = 36.35, p = 0.883). These findings suggest that cervical length was comparable between term and spontaneous preterm birth outcomes in the present study.

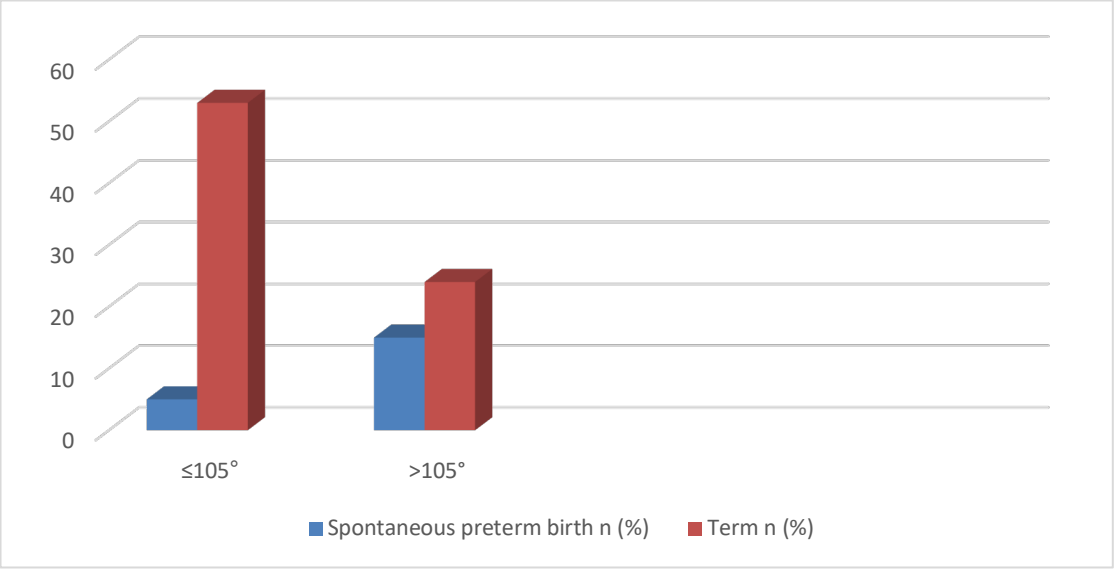


Graph 2: Bar graph showing the Comparison of mean cervical length between term and spontaneous preterm birth groups

Table 3: Association between uterocervical angle category and pregnancy outcome

Uterocervical angle group (°)	Spontaneous preterm birth n (%)	Term n (%)	Total n (%)
<105	5 (8.6)	53 (91.4)	58 (100.0)
>105	15 (38.5)	24 (61.5)	39 (100.0)
Total	**20 (20.6)**	**77 (79.4)**	**97 (100.0)**
χ^2 = 12.69, df = 1, p < 0.001			

Women with uterocervical angles greater than 105° had a larger percentage of spontaneous preterm births (38.5%) than women with angles less than 105° (8.6%). However, compared to the >105° group (61.5%), term delivery was more common in the <105° group (91.4%). There was a statistically important change in the distribution of pregnancy outcomes among the groups with different uterocervical angles ($\chi^2 = 12.69$, df = 1, $p < 0.001$). The validity of the chi-square analysis was supported by the fact that none of the expected cell counts fell below five.

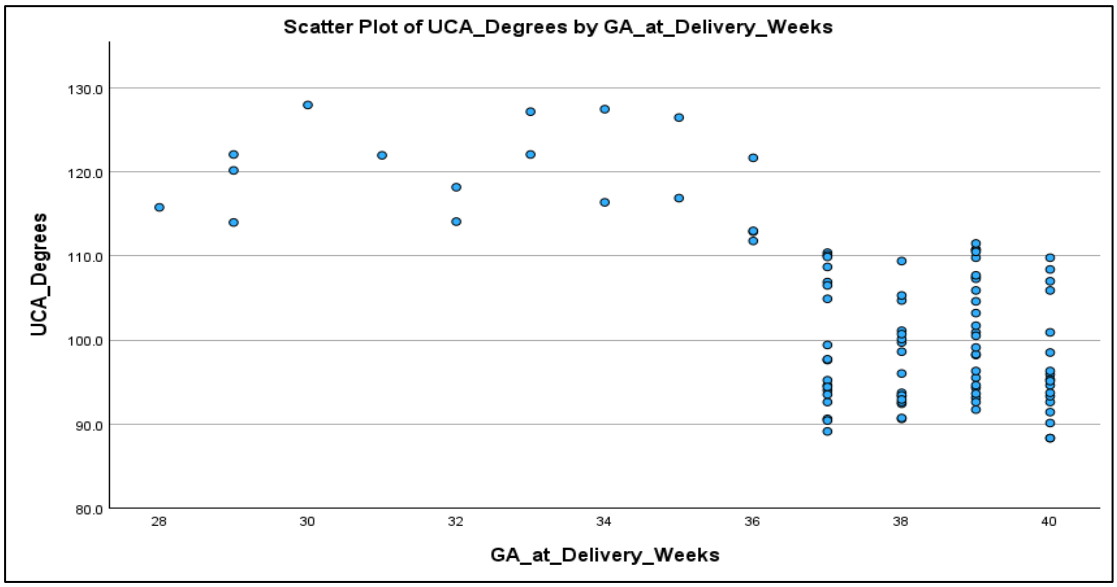


Graph 3: Bar graph showing the Association between uterocervical angle category and pregnancy outcome

Table 3: Correlation between uterocervical angle and gestational age at delivery (Pearson correlation)

Variables	r-value	p-value
UCA vs gestational age at delivery	−0.661	**<0.001**

The uterocervical angle alongside gestational age at birth presented a important negative connection (r = −0.661, p less than 0.001). The gestational age at birth dropped as the uterocervical angle rose. Based on 97 observations, this association was statistically significant at the 0.001 level.



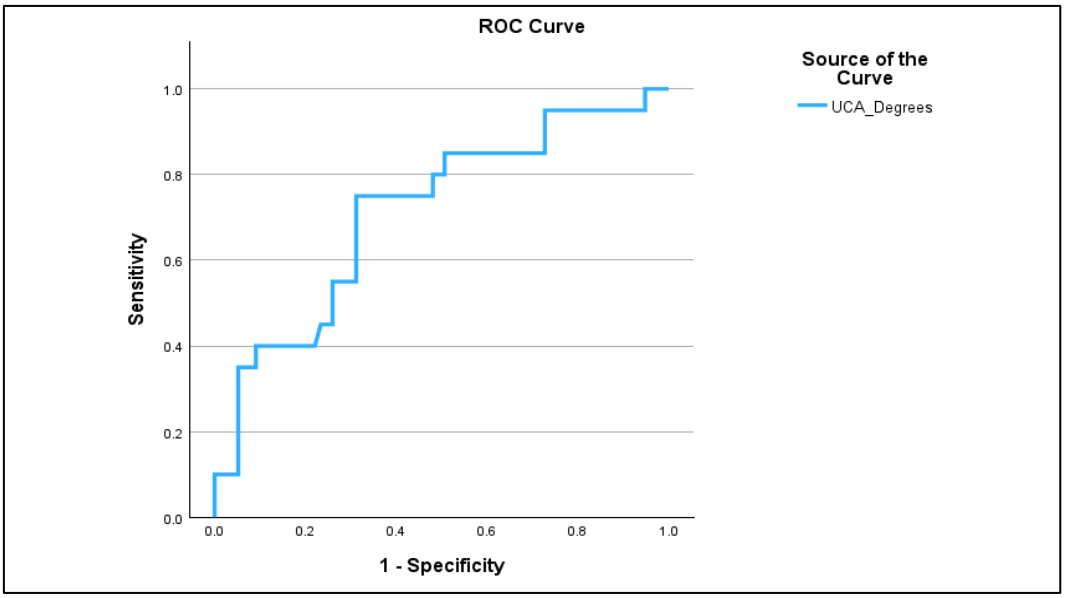
Graph 4: Scatterplot of uterocervical angle and gestational age at delivery

Table 4: Diagnostic performance of uterocervical angle (>105°) in predicting spontaneous preterm birth

'Parameter	Value (%)
Sensitivity	**75.0**
Specificity	**68.8**
Positive predictive value (PPV)	38.5
Negative predictive value (NPV)	91.4
Area under the ROC curve (AUC)	**0.713'**

75.0% of spontaneous preterm birth cases were detected by uterocervical angles larger than 105°, suggesting moderate sensitivity. With a specificity of 68.8%, slightly more than two-thirds of term births were properly identified. When the uterocervical angle was ≤105°, the positive prognostic value was 38.5% and the undesirable prognostic value was high at 91.4%, indicating a good ability to rule out spontaneous premature birth.

These results suggest that for spontaneous preterm birth in this cohort, uterocervical angle exhibits superior exclusion capability over confirmation capability. The uterocervical angle appears to have an acceptable discriminative ability in differentiating between spontaneous preterm and term babies, as indicated by the area underneath the ROC curve of 0.713.

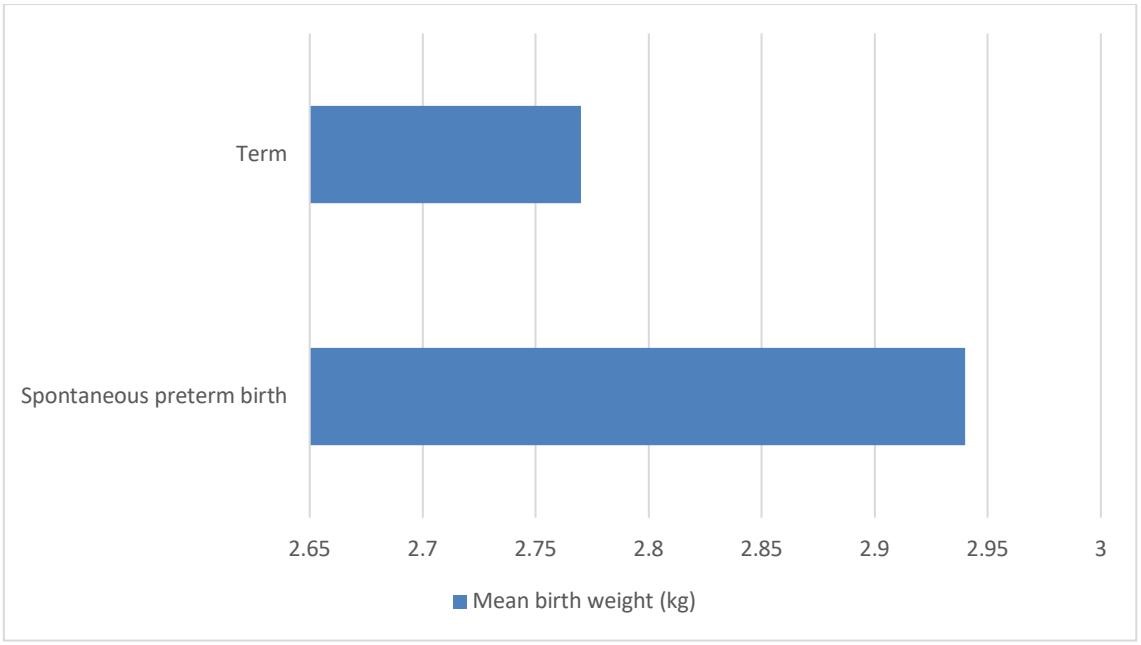


Graph 5: ROC curve of Diagnostic performance of uterocervical angle (>105°) in predicting spontaneous preterm birth

Table 5: Comparison of neonatal birth weight between term and spontaneous preterm birth

Outcome	N	Mean birth weight (kg)	SD
Term	77	2.94	0.41
Spontaneous preterm birth	20	2.77	0.56
t = -1.257, df = 24.56, p = 0.220			

The average birth weight was 2.77 ± 0.56 kg for spontaneous preterm births and 2.94 ± 0.41 kg for term pregnancies. The average birth weight of the newborns in the cohorts was < sPTB that of the term cohort. Nevertheless, there was no statistically important alteration in average birth weight between the 2 cohort (t = -1.257, df = 24.56, p = 0.220). These results show that the birth weight in the present research was similar for both term and spontaneous preterm birth outcomes.

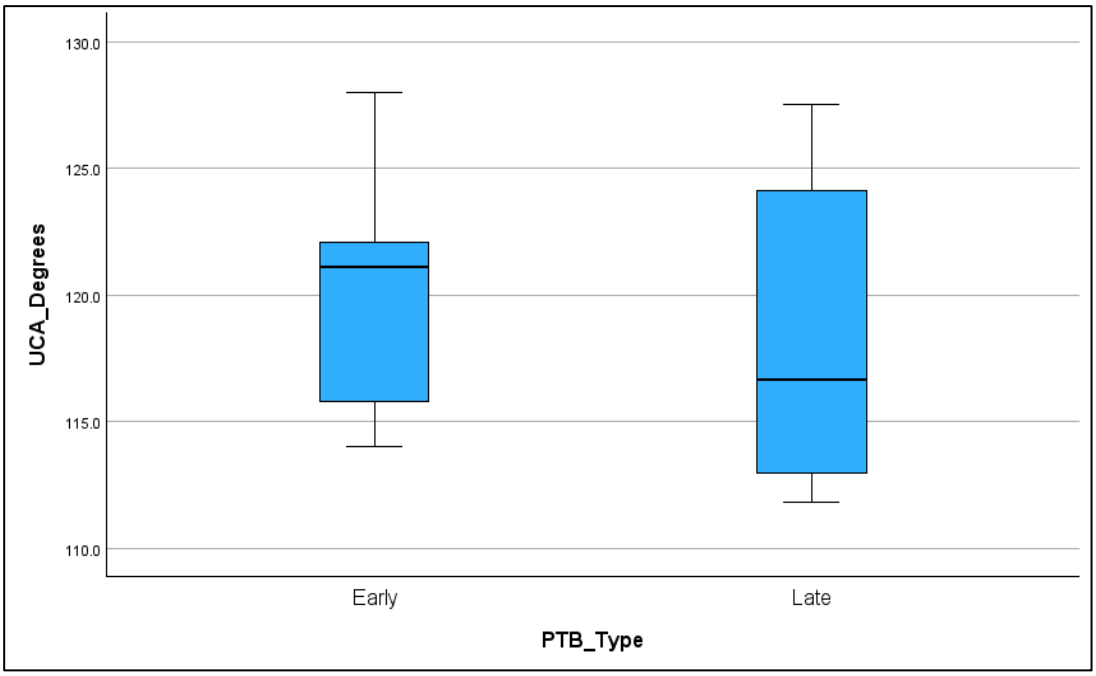


Graph 6: Bar graph showing the Comparison of neonatal birth weight between term and spontaneous preterm birth

Table 6: Comparison of mean uterocervical angle between early and late spontaneous preterm birth

PTB type	N	Mean UCA (°)	SD
Early spontaneous PTB	10	120.37	4.93
Late spontaneous PTB	8	118.34	6.19
t = 0.78, df = 16, p = 0.449			

Women who gave birth early (120.37 ± 4.93°) had a greater mean uterocervical angle than those who gave birth late (118.34 ± 6.19°). This alteration was not statistically important, according to the independent samples t-test (t = 0.78, df = 16, p = 0.449). This implies that although a greater uterocervical angle is linked to spontaneous preterm delivery, it does not substantially distinguish among initial as well as late onset preterm deliveries.



Graph 7: Boxplot of uterocervical angle between early and late spontaneous preterm birth

Table 7: Summary of key findings

'Parameter analysed	Groups / variables compared	Key finding	Statistical evidence
Uterocervical angle (continuous)	Term vs spontaneous preterm birth	Mean uterocervical angle was higher in spontaneous preterm birth (109.66 ± 11.22°) than in term births (101.09 ± 9.39°)	t = 3.49, df = 95, p < 0.001
Uterocervical angle (categorical)	<105° vs >105° and spontaneous preterm birth	Spontaneous preterm birth occurred in 38.5% of women with UCA >105° compared with 8.6% among those with UCA <105°	χ^2 = 12.69, df = 1, p < 0.001
Correlation analysis	Uterocervical angle vs gestational age at delivery	Higher uterocervical angle was associated with earlier gestational age at delivery	r = −0.661, p < 0.001
Diagnostic performance	Uterocervical angle >105° predicting spontaneous preterm birth	UCA >105° showed moderate diagnostic accuracy with high negative predictive value	Sensitivity 75.0%, Specificity 68.8%, AUC = 0.713
Neonatal outcome	Birth weight in term vs spontaneous preterm birth	Mean birth weight was lower in spontaneous preterm birth (2.77 ± 0.56 kg) than in term births (2.94 ± 0.41 kg)	t = -1.257, df = 24.56, p = 0.220'

Associated to females who delivered at term, those who gave birth spontaneously had a substantially greater mean uterocervical angle in this study (109.66 ± 11.22° vs. 101.09 ± 9.39°; t = 3.49, df = 95, p < 0.001). A statistically important association was originated (χ^2 = 12.69, df = 1, p < 0.001) between women with uterocervical angles more than 105° (38.5%) and those with angles less than 105° (8.6%). Uterocervical angle and gestational age at birth were shown to be strongly negatively correlated, suggesting that an increase in uterocervical angle was linked to an earlier delivery (r = -0.661, p < 0.001).

With a sensitivity of 75.0%, specificity of 68.8%, and an area underneath the ROC curve of 0.713, a diagnostic evaluation revealed that a uterocervical angle larger than 105° had strong exclusion potential and acceptable discriminative capacity. Although mean neonatal birth weight was minor in the spontaneous preterm birth cohort (2.77 ± 0.56 kg) than the term group (2.94 ± 0.41 kg), this alteration was not statistically important (t = -1.257, df = 24.56, p = 0.220).

Discussion

Mean Uterocervical Angle in Term and Spontaneous Preterm Birth Groups: The present study demonstrated that the mean uterocervical angle (UCA) measured by second-trimester transvaginal ultrasonography was significantly higher among women who experienced spontaneous preterm birth (sPTB) than among those who delivered at term (109.66 ± 11.22° vs. 101.09 ± 9.39°, respectively; p < 0.001). The mean difference was 8.57°, with a 95% confidence interval of 3.69°–13.44° and Cohen's d of 0.88, indicating a substantial difference between the groups. These findings suggest that a wider UCA is associated with an increased risk of sPTB. Dziadosz et al. (2016) similarly reported that UCA measurements were useful in predicting sPTB at different gestational age thresholds [10]. Farràs Llobet et al. (2018) also observed a wider mean UCA in the preterm birth group than in the term group (105.16° vs. 94.53°; p = 0.015) [11]. These findings support the potential role of second-trimester UCA assessment in identifying women at increased risk of sPTB.

Association Between Uterocervical Angle Category and Pregnancy Outcome: A statistically significant association was observed between UCA category and pregnancy outcome in the present study (χ^2 = 12.69, df = 1, p < 0.001). Spontaneous preterm birth occurred in 38.5% of women with UCA >105°, compared with 8.6% of women with UCA ≤105°. Conversely, term delivery occurred in 91.4% of women with UCA ≤105°, compared with 61.5% of women with UCA >105°. These findings indicate that a wider UCA is associated with a higher proportion of spontaneous preterm births. Dziadosz et al. (2016) reported that UCA thresholds of ≥95° and ≥105° could help predict sPTB before 37 and 34 weeks, respectively [10]. Khamees et al. (2022) also reported that a UCA threshold of ≥105° had a sensitivity of 86.1% and specificity of 60.4% for predicting preterm birth [14]. The present findings therefore support the use of UCA as a potential marker for antenatal risk stratification.

Correlation Between Uterocervical Angle and Gestational Age at Delivery: The present study identified a statistically significant negative correlation between UCA and gestational age at delivery (r = −0.661, p < 0.001). This indicates that a wider UCA was associated with earlier delivery. The finding suggests that UCA may provide

information about the timing of delivery in addition to distinguishing between term and spontaneous preterm birth outcomes. Dziadosz et al. (2016) reported that wider UCA measurements were associated with an increased risk of sPTB at different gestational age thresholds [10]. Farràs Llobet et al. (2018) likewise reported significantly wider UCA measurements among women delivering preterm than among term controls [11]. These findings are consistent with the observed inverse relationship between UCA and gestational age at delivery in the present study.

Diagnostic Performance of Uterocervical Angle: In the present study, a UCA threshold of >105° demonstrated a sensitivity of 75.0%, specificity of 68.8%, positive predictive value (PPV) of 38.5%, negative predictive value (NPV) of 91.4%, and area under the ROC curve (AUC) of 0.713. These results indicate moderate discriminatory performance, with a relatively high NPV. Thus, the selected threshold may be more useful for identifying women at comparatively low risk than for confirming that an individual will experience sPTB. Sawaddisan et al. (2020) reported an AUC of 0.7045 for a UCA threshold of ≥110°, with sensitivity of 83.3% and specificity of 61.2% [12]. Khamees et al. (2022) also demonstrated the potential of UCA ≥105° to predict preterm birth [14]. The findings support the potential utility of UCA as an adjunctive screening marker; however, its performance should be validated in larger populations before routine clinical implementation.

Comparison of Cervical Length Between Term and Spontaneous Preterm Birth Groups

In contrast to UCA, cervical length did not differ significantly between women who delivered at term and those who experienced sPTB. The mean cervical length was 3.25 ± 0.35 cm in the term group and 3.27 ± 0.28 cm in the sPTB group ($p = 0.883$). This suggests that cervical length did not significantly discriminate between the two outcome groups in the present study population. Ridout et al. (2019) reported limited predictive performance of cervical length for sPTB in women with congenital uterine anomalies, with AUC values of 0.56 and 0.59 for predicting birth before 34 and 37 weeks, respectively [13]. Khamees et al. (2022) also found no statistically significant difference in cervical length between preterm and term birth groups ($p = 0.067$) [14]. Although cervical length remains an established assessment in preterm birth risk evaluation, the present findings suggest that UCA may provide additional predictive information in this cohort. The lack of a significant difference in cervical length should, however, be interpreted in the context of the study population and sample size.

Applicability of Uterocervical Angle Across Parity Groups: The present study included 49 primigravida women (50.5%) and 48 multigravida women (49.5%). No statistically significant association was observed between parity and UCA category ($\chi^2 = 0.91$, df = 1, $p = 0.341$). This suggests that UCA distribution was not significantly associated with parity in the study population. Therefore, UCA measurement may be applicable to both primigravida and multigravida women. Nevertheless, further studies with larger samples are required to establish whether its predictive performance differs according to parity.

Overall Interpretation: The present study demonstrated that second-trimester UCA measured by transvaginal ultrasonography was significantly associated with spontaneous preterm birth. Women with sPTB had a higher mean UCA than those who delivered at term, and a UCA >105° was associated with a higher proportion of preterm births. The significant negative correlation between UCA and gestational age at delivery further supports its potential role in predicting the timing of birth. The diagnostic performance analysis showed moderate discrimination, with an AUC of 0.713 and an NPV of 91.4%. In comparison, cervical length did not differ significantly between the outcome groups. These findings suggest that UCA may serve as a useful adjunct to existing second-trimester ultrasound assessment for antenatal risk stratification. However, the results should be interpreted cautiously, and larger prospective studies are needed to validate the proposed cutoff and establish its clinical utility.

Conclusion

The present study concluded that second-trimester uterocervical angle measured by transvaginal ultrasonography is a useful sonographic marker for predicting spontaneous preterm birth. Women who developed spontaneous preterm birth had a significantly wider uterocervical angle compared to those who delivered at term. A wider uterocervical angle was associated with increased risk of earlier delivery and showed good predictive performance, particularly for identifying women at low risk when the angle was within normal range. In contrast, cervical length did not show significant predictive value in the study population. Uterocervical angle assessment was found to be simple, non-invasive, and applicable across both primigravida and multigravida women. Therefore, incorporating uterocervical angle measurement into routine second-trimester ultrasound evaluation may improve antenatal risk stratification for spontaneous preterm birth.

References

1. Hernandez-Andrade E, Hassan SS, Ahn H, et al. Evaluation of uterocervical angle by transvaginal sonography in second trimester of pregnancy as a predictor of spontaneous

preterm delivery. Ultrasound Obstet Gynecol. 2012;40(3):266-73.
2. Calò G, D'Antonio F, Monari F, et al. Uterocervical angle at 16–24 weeks' gestation in the prediction of spontaneous preterm birth. Ultrasound Obstet Gynecol. 2019;54(2):229-33.
3. Bafghi A, Youssef A, Greco E, et al. Cervical length and uterocervical angle at 11–13 weeks to predict preterm birth. Ultrasound Obstet Gynecol. 2018;52(6):757-63.
4. Romero R, Nicolaides K, Conde-Agudelo A, et al. Vaginal progesterone decreases preterm birth ≤34 weeks of gestation in women with a singleton pregnancy and a short cervix: an updated meta-analysis including data from the OPPTIMUM study. Ultrasound Obstet Gynecol. 2016;48(3):308-17.
5. Prieto-Sanchez MT, Ruiz-Martinez S, Cruz-Lemini M, et al. The uterocervical angle and cervical length in women at risk for preterm birth. Ultrasound Obstet Gynecol. 2021;57(4):606-13.
6. Martinez de Tejada B, Boulvain M, Dumps P, et al. Uterocervical angle measured in the second trimester and risk of spontaneous preterm birth. Acta Obstet Gynecol Scand. 2019;98(3):334-42.
7. Savchev S, Figueras F, Triunfo S, et al. Uterocervical angle: novel sonographic marker of preterm birth risk in women with threatened preterm labor. Ultrasound Obstet Gynecol. 2018;52(3):336-43.
8. Shazly SA, Badr DA, Greco E, et al. Uterocervical angle and prediction of preterm birth in women with threatened preterm labor. Am J Perinatol. 2019;36(2):138-44.
9. Carbone IF, Monari F, Morselli-Labate AM, et al. Cervical length and uterocervical angle in women with threatened preterm labor: prediction of preterm delivery. Ultrasound Obstet Gynecol. 2019;54(2):239-47.
10. Dziadosz M, Bennett TA, Dolin C, West Honart A, Pham A, Lee SS, et al. Uterocervical angle measurement improves prediction of preterm birth in twin gestations. Prenat Diagn. 2015;35(5):441-4.
11. Farràs Llobet A, Regincós Martí L, Higueras T, Calero Fernández IZ, Gascón Portalés A, Goya Canino MM, Carreras Moratonas E. The uterocervical angle and its relationship with preterm birth. J Matern Fetal Neonatal Med. 2018;31(14):1881-4.
12. Sawaddisan R, Kor-Anantakul O, Pruksanusak N, Geater A. Uterocervical angle measurement for preterm birth prediction in singleton pregnant women with no history of preterm birth and normal cervical length: a prospective cohort study. Eur J Obstet Gynecol Reprod Biol. 2020;252:30-5.
13. Ridout AE, Ibeto LA, Ross GN, Cook JR, Sykes L, David AL, Seed PT, Tribe RM, Bennett PR, Terzidou V, Shennan AH, Chandiramani M; Brown RG, Chatfield S, Sadeh D. Cervical length and quantitative fetal fibronectin in the prediction of spontaneous preterm birth in asymptomatic women with congenital uterine anomaly. Am J Obstet Gynecol. 2019;221(4):341.e1-9.
14. Khamees RE, Khattab BM, Elshahat AM, Taha OT, Aboelroose AA. Uterocervical angle versus cervical length in the prediction of spontaneous preterm birth in singleton pregnancy. Int J Gynaecol Obstet. 2022;156(2):304-8.