

# International Journal of Clinical Obstetrics and Gynaecology

ISSN (P): 2522-6614  
ISSN (E): 2522-6622  
© Gynaecology Journal  
[www.gynaecologyjournal.com](http://www.gynaecologyjournal.com)  
2023; 7(3): 317-321  
Received: 27-03-2023  
Accepted: 28-04-2022

**Dr. Kiran Raigar**  
PG 3<sup>rd</sup> Year Resident, OBG ND,  
Gynae Department, Govt. Medical  
Collage, Kota, Rajasthan, India

**Dr. Hemavati**  
Senior Resident, OBG ND Gynae  
Department, Govt. Medical  
Collage, Kota, Rajasthan India

**Dr. Mamta Sharma**  
Senior Professor and Unit Head  
OBG ND Gynae Department,  
Govt. Medical Collage, Kota,  
Rajasthan, India

**Dr. Aushima Vijay**  
Associate Professor, OBG ND  
Gynae Department, Govt. Medical  
Collage, Kota, Rajasthan, India

**Dr. Himantika**  
PG 3<sup>rd</sup> Year Resident, OBG nd  
Gyne Department, Govt. Medical  
Collage, Kota, Rajasthan, India

**Corresponding Author:**  
**Dr. Kiran Raigar**  
PG 3<sup>rd</sup> Year Resident, OBG, ND,  
Gynae Department, Govt. Medical  
Collage, Kota, Rajasthan, India

## Prediction of preterm labour by measurement of cervical length in first trimester (11 to 13+6 weeks) and second trimester (20 to 24 weeks) by using TVS

**Dr. Kiran Raigar, Dr. Hemavati, Dr. Mamta Sharma, Dr. Aushima Vijay and Dr. Himantika**

DOI: <https://doi.org/10.33545/gynae.2023.v7.i3b.1328>

### Abstract

**Objective:** To study the prediction of preterm labour by measurement of cervical length in first trimester (11 to 13+6 weeks) and second trimester (20 to 24 weeks) by using TVS.

**Material and Method:** This longitudinal prospective study conducted at govt. medical college hospital and JK Lon hospital Kota the Fetal. Our policy is to offer routine sonographic examinations at 11 to 13+6days and 20 to 24 weeks' gestation as part of a 2- stage screening program for chromosomal and structural abnormalities. All women with viable singleton pregnancies requesting risk assessment for chromosomal abnormalities at 11 to 13+6 days by nuchal translucency measurement and maternal serum biochemistry were offered measurements of cervical length by transvaginal sonography at 11 to 13+6 weeks (Cx1), and 20 to 24 weeks (Cx2). Maternal demographic characteristics, the obstetric history, and the history of cervical surgery were recorded during the first visit. Primigravida, miscarriage before 16 gestational weeks, preterm delivery before 34 weeks, preterm delivery before 37 weeks, and term delivery.

**Result:** In our study, mean age of study participants was 23.9 years with SD of 4.2 years. In the present study, mean gestational age at the time delivery was 35.9 weeks and its range 28 to 41 weeks. In our study, mean POG for 1<sup>st</sup> cervical length measurement was 12.1 weeks and mean cervical length was found to be 3.47 cm and mean POG for 2<sup>nd</sup> cervical length measurement was 22 weeks and mean cervical length was found to be 3.07 cm. Using ROC curve best cut off of cervical length at 11-13 weeks for preterm delivery is 3.3 cm and at 20-22 weeks is 3.0 cm. Sensitivity, Specificity, Positive predictive value and Negative predictive value to detect preterm delivery were 84.4%, 75.5%, 73.8% and 85.6% respectively at 11-13 weeks after taking cut off 3.0cm.

**Conclusion:** Our study concluded that there was significant difference in the cervical length in first trimester and second trimester among those who delivered term and preterm. Second trimester cervical length has a slight better positive predictive value, negative predictive value, specificity and sensitivity when compared to first trimester cervical length still we can predict more than 84% preterm delivery in first trimester by measurement of cervical length by transvaginal USG.

**Keywords:** Structural abnormalities, primigravida, miscarriage, bronchopulmonary dysplasia,

### Introduction

Preterm labour is defined by WHO as the onset of labour after the period of viability (20 to 28 weeks) and before 37 completed weeks of pregnancy. Preterm labour constitutes 5 to 18% of all deliveries around the globe. Preterm delivery is associated with a high prevalence of severe neurological deficits and developmental disabilities and is a leading cause of neonatal morbidity and mortality [1-2]. Preterm neonates are at increased risk of developing respiratory distress syndrome, bronchopulmonary dysplasia, sepsis, intraventricular hemorrhage, patent ductus arteriosus, necrotizing enterocolitis, and disorders related to gestational age at birth. Cervical insufficiency is the one of the cause that recently know to play an essential role in preterm delivery. Currently, mid-trimester [16-24 wk] cervical length (CL) assessment by transvaginal ultrasound (TVUS) is one of the most commonly used tools for the prediction sPTB. Maternal risks factors are UTI, low socioeconomic status, low BMI [ $< 19$ ], extreme of age, multiparity, illicit drug use smoking, heavy physical activity, congenital anomalies of uterus. Many risk factors may manifest in same gravid [3-4].

## Materials and Methods

### Study location

Study was conducted in the Department Of Obstetrics And Gynaecology, Government Medical College And Associated Group of Hospitals, Kota, and Rajasthan, India.

### Study design

Hospital based Prospective observational Study.

### Study duration

From May 2020 to December 2021

### Sample size

200 patients included in the present study.

### Sampling technique

A convenient sampling technique was used to enrolled the patients in study till the sample size completion during study period.

### Study population

Woman with singleton pregnancy presented in the Department of Obstetrics and Gynaecology, Government Medical College and Associated Group of Hospitals, Kota, Rajasthan.

### Eligibility criteria

#### Inclusion criteria

- Asymptomatic singleton pregnancy attending ANC clinic
- Women presented at both trimester [11-14 wk as well as 20-24 wk].

#### Exclusion criteria

- Women with uterine malformation and major faetal congenital anomaly.
- Women with painful uterine contraction.
- History of ruptured membranes.
- History of cervical encircalage in present pregnancy.
- PIH/GDM/anaemia.

### Methodology

This longitudinal prospective study conducted on 200 women at Govt. medical College Hospital and JK Lon hospital Kota the Fetal. Our policy is to offer routine sonographic examinations at 11 to 13+6days and 20 to 24 weeks' gestation as part of a 2-stage screening pro-gram for chromosomal and structural abnormalities. All women with viable singleton pregnancies requesting risk assessment for chromosomal abnormalities at 11 to 13+6days by nuchal translucency measurement and maternal serum biochemistry were offered measurements of cervical length by transvaginal sonography at 11 to 13+6 weeks (Cx1), and 20 to 24 weeks (Cx2). Maternal demographic characteristics, the obstetric history, and the history of cervical surgery were recorded during the first visit.

## Results

**Table 1:** In our study, mean age of study participants was 23.9 years with SD of 4.2 years. Youngest participant was 18 years old while oldest was 36 years.

|                |        |
|----------------|--------|
| Mean           | 23.990 |
| Median         | 24.000 |
| Std. Deviation | 4.1746 |
| Minimum        | 18.0   |
| Maximum        | 36.0   |

In our study, out of 200 participants, maximum 95 were in age group of 21-25 years followed by 46 participants in 18-20 years of age group.

**Table 2:** Distribution of study part participants according to age

| Age (in years) | Frequency | Percent |
|----------------|-----------|---------|
| 18-20 years    | 46        | 23.0    |
| 21-25 years    | 95        | 47.5    |
| 26-30 years    | 38        | 19.0    |
| >30 years      | 21        | 10.5    |
| Total          | 200       | 100.0   |

**Table 3:** In our study, out of 200 participants 40 had complaint of recurrent infection

| H/O recurrent infection | Frequency | Percent |
|-------------------------|-----------|---------|
| No                      | 160       | 80.0    |
| Yes                     | 40        | 20.0    |
| Total                   | 200       | 100.0   |

**Table 4:** USG measurement of study participants

| 1 <sup>st</sup> Using measurement |            | 2 <sup>nd</sup> Usg measurement |            |
|-----------------------------------|------------|---------------------------------|------------|
| POG [wk]                          | CL [In cm] | POG [wk]                        | CL [in cm] |
| Mean                              | 12.14      | 22.00                           | 3.0674     |
| Median                            | 12.00      | 22.00                           | 3.1400     |
| Std                               | .761       | 1.171                           | .15462     |

In our study, mean POG for 1<sup>st</sup> cervical length measurement was 12.1 weeks and mean cervical length was found to be 3.47 cm. And mean POG for 2<sup>nd</sup> cervical length measurement was 22 weeks and mean cervical length was found to be 3.07 cm.

**Table 5:** POG at time delivery (weeks) distribution of study participants

|              |       |
|--------------|-------|
| Mean         | 35.90 |
| Median       | 38.00 |
| St deviation | 4.413 |

In the present study, mean POG at the time delivery was 35.9 weeks.

**Table 6:** Distribution of study participants according to gestation

| Gestation | Frequency | Percent |
|-----------|-----------|---------|
| Preterm   | 90        | 45.0    |
| Term      | 110       | 55.0    |
| Total     | 200       | 100.0   |

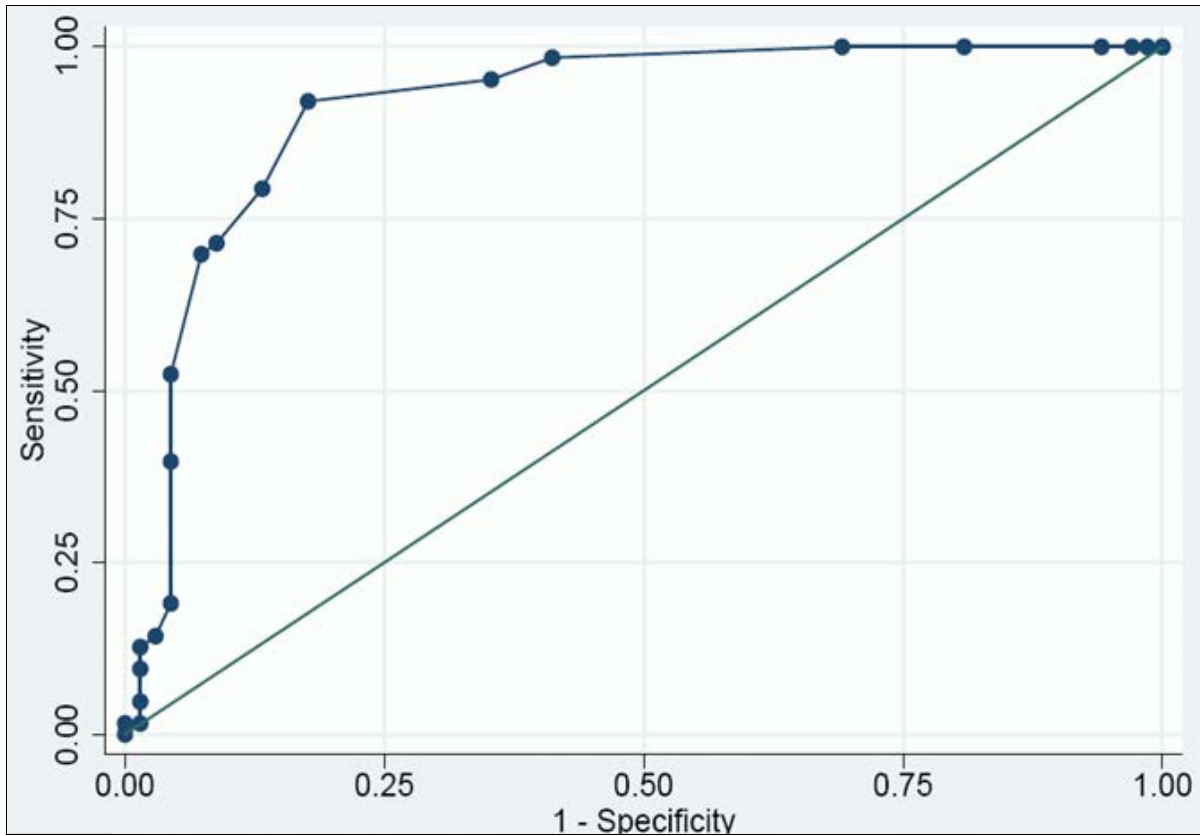
In our study out of 200 participants 110 were term pregnancy and 90 were preterm pregnancy

**Table 7:** Distribution of study participants according to IUGR:

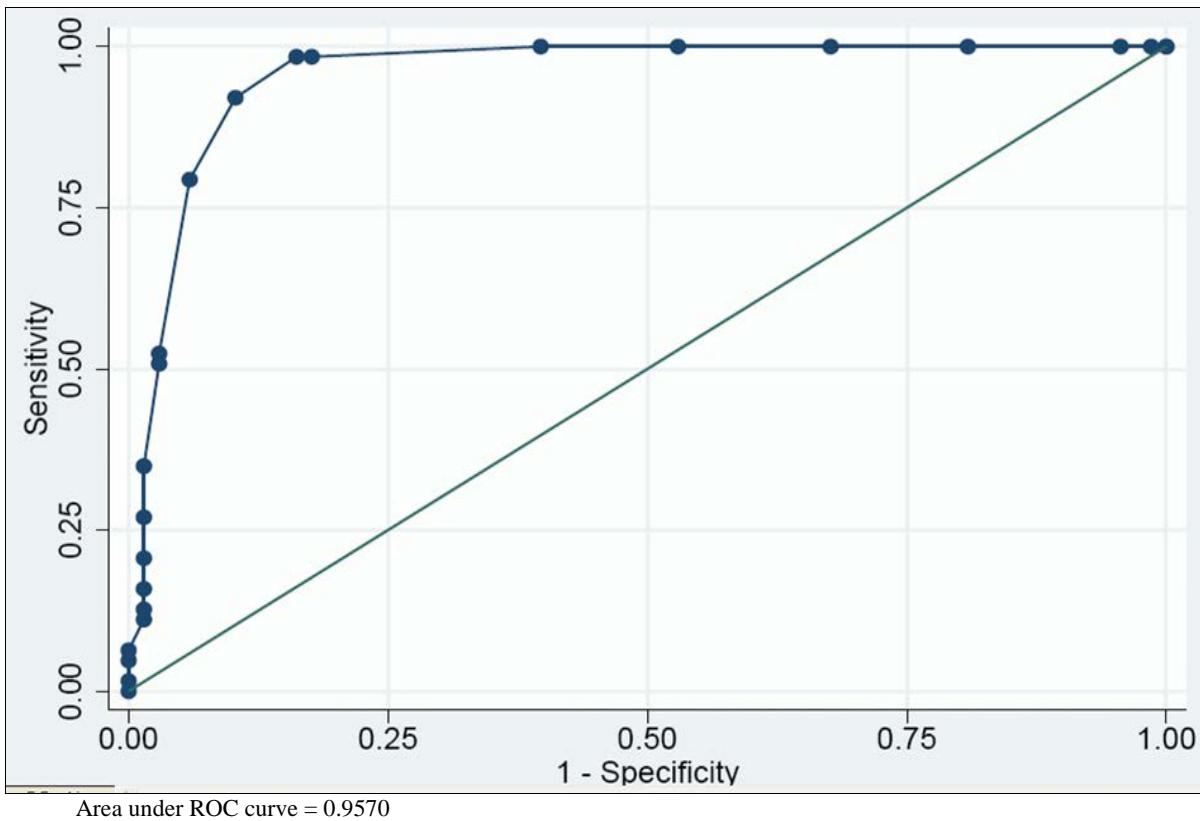
| IUGR  | Frequency | Percent |
|-------|-----------|---------|
| No    | 188       | 94.0    |
| Yes   | 12        | 6.0     |
| Total | 200       | 100.0   |

In our study, out of 200 participants, 12 had IUGR.

**Receiver operating characteristic curves for the correlation of cervical length at 11-14 weeks for term delivery**



**Receiver operating characteristic curves for the correlation of cervical length at 20-22 weeks for term delivery**



Using ROC curve best cut off of cervical length at 11-13 weeks for preterm delivery is 3.3 cm and at 20-22 weeks is 3.0 cm **Comparison of predictive values**

**Table 8:** Comparison of cervical length prediction at 11-13 week with preterm and term delivery

| Cervical length     | Gestational age at delivery |            | P-Value |
|---------------------|-----------------------------|------------|---------|
|                     | Preterm                     | Term       |         |
| Abnormal (< 3.3 cm) | 76 (84.4%)                  | 27 (24.5%) | 0.0001  |
| Normal (≥ 3.3cm)    | 14 (15.6%)                  | 83 (75.5%) |         |
| Total               | 90 (100%)                   | 110(100%)  |         |

Sensitivity = 84.4%, Specificity = 75.5%

Positive predictive value = 73.8%,

Negative predictive value = 85.6%

**Table 9:** Comparison of cervical length prediction at 20-24 week with preterm and term delivery

| Cervical length     | Gestational age at delivery |            | P-Value |
|---------------------|-----------------------------|------------|---------|
|                     | Preterm                     | Term       |         |
| Abnormal (< 3.0 cm) | 81 (90.0%)                  | 22 (20.0%) | 0.0001  |
| Normal (≥ 3.0 cm)   | 9 (10.0%)                   | 88 (80.0%) |         |
| Total               | 90 (100%)                   | 110(100%)  |         |

Sensitivity = 90.0%, Specificity = 80.0%

Positive predictive value = 78.6%,

Negative predictive value = 90.7%

Second trimester cervical length has a slight better positive predictive value, negative predictive value, specificity and sensitivity when compared to first trimester cervical length.

## Discussion

### 1. Patient Age

| Study                     | Mean Age (yrs.) |
|---------------------------|-----------------|
| Our study                 | 23.9            |
| Mukerji <i>et al.</i> [5] | 22.9            |
| Thian S <i>et al.</i> [6] | 31.2            |

### 2. Association of recurrent infection

| Study                        | History of recurrent infection |
|------------------------------|--------------------------------|
| Our study                    | 20%                            |
| Holand <i>et al.</i> [7]     | 30%                            |
| Nicole H o <i>et al.</i> [7] | 2.8%                           |

- In our study, mean POG for 1<sup>st</sup> CL @12.1 weeks and mean CL 3.47 cm and mean POG for 2<sup>nd</sup> CL measurement was 22 weeks and mean CL 3.07 cm.
- Using ROC curve best cut off of cervical length at 11-13 weeks for preterm delivery is 3.3 cm and at 20-22 weeks is 3.0 cm.
- Sensitivity, Specificity, Positive predictive value and Negative predictive value to detect preterm delivery were 84.4%, 75.5%, 73.8% and 85.6% respectively at 11-13 weeks after taking cut off < 3.3 cm.
- Sensitivity, Specificity, Positive predictive value and
- Negative predictive value to detect preterm delivery were 90%, 80%, 78.6% and 90.7% respectively at 20- 24 weeks after taking cut off < 3.0 cm.

In our study, mean POG for 1<sup>st</sup> CL @12.1 weeks and mean CL 3.47 cm and mean POG for 2<sup>nd</sup> CL measurement was 22 weeks and mean CL 3.07 cm.

| Study                        | Guzman, <i>et al.</i> [8] | Owen, <i>et al.</i> [9] | Our Study |
|------------------------------|---------------------------|-------------------------|-----------|
| Cervical length best cut off | 2.5 cm                    | 2.5 cm                  | 3.0 cm    |
| Sensitivity                  | 76%                       | 19%                     | 89.7%     |
| Specificity                  | NPV- 96%                  | 98%                     | 92/06%    |

## Conclusion

Our in first trimester and second trimester among those who delivered term and preterm. Second trimester cervical length has a slight better positive predictive value, negative predictive value, specificity and sensitivity when compared to first trimester cervical length still we can predict more than 84% preterm delivery in first trimester by measurement of cervical length by transvaginal USG. Our study also concluded that best cut off of cervical length at 11-13 weeks for is 3.3 cm and at 20-22 weeks is 3.0 cm to predict preterm delivery study concluded that there was significant difference in the cervical length.

## Conflict of Interest

Not available

## Financial Support

Not available

## References

1. Blencowe H, Cousens S, Oestergaard MZ. National, regional, and worldwide estimates of preterm birth rates in the year 2010 with time trends since 1990 for selected countries: a systematic analysis and implications. *Lancet*. 2012;379(9832):2162-2172.
2. Blencowe H, Cousens S, Chou D, *et al.* Born too soon: the global epidemiology of 15 million preterm births. *Reprod Health*. 2013;101(1):S2.
3. American college of obstetricians and Gynecologists committee on practice Bulletins obstetrics. Practice Bulletin No.171; Management of preterm labor. *Obstet Gynecol*. 2016 Oct;128(4):e 155-64.
4. Cnatingius S, Villamor E, Johanson S, Edstedt Bonamy AK, Person M, Wikstrom AK, *et al.* Maternal obesity and risk of preterm delivery *JAMA*. 2013 Jun 12;309(22):2362-70
5. Mukherji J, Anant M, Ghosh S, Bhattacharyya SK, Hazra A, Kamilya GS. Normative data of cervical length in singleton pregnancy in women attending a tertiary care hospital in eastern India. *India J Med Res*. 2011;133(5):492-496.
6. Thain S, Yeo GSH, Kwek K, Chern B, Tan KH. Spontaneous preterm birth and cervical length in a pregnant Asian population. *PLoS One*. 2020 Apr 13;15 (4):e0230125.
7. To MS, Skentou C, Chan C, Zagaliki A, Nicolaidis KH. Cervical assessment at the routine 23 week scan; standardizing techniques. *Ultrasound in obstetrics and Gynecology*. 2004;17(3):217-219.
8. Guzman ER, Walters C, Ananth CV. A comparison of sonographic cervical parameters in predicting spontaneous preterm birth in high- risk singleton gestations. *Ultrasound Obstet Gynecol*. 2001 Sep;18(3):204-10.
9. Owen J, Yost N, Berghella V, Thom E, Swain M. Mid-trimester endovaginal sonography in women at high risk for spontaneous preterm birth. National Institute of Child Health and Human Development, Maternal-Fetal Medicine Units Network. *JAMA*. 2001 Sep 19;286(11):1340-8.

**How to Cite This Article**

Raigar K, Hemavati, Sharma M, Vijay A, Himantika. Prediction of preterm labour by measurement of cervical length in first trimester (11 to 13+6 weeks) and second trimester (20 to 24 weeks) by using TVS. International Journal of Clinical Obstetrics and Gynaecology 2023;7(3):317-321.

**Creative Commons (CC) License**

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 International (CC BY-NC-SA 4.0) License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.