

AIM OF THE WORK

The aim of the work was to compare between the different methods of assessment of cervical length (trans abdominal, trans vaginal, and trans perineal) during pregnancy as a possible screening of preterm birth.

PATIENTS

This was a prospective descriptive study in which 200 pregnant women attending Elshatby hospital for antenatal care who were accepting and consenting to ultrasound examination.

Inclusion criteria:

- Singleton pregnancy.
- Patients at (20-26) weeks of pregnancy.
- Cervical dilatation less than 2cm.
- No active uterine contraction.

Exclusion Criteria:

- Patients with rupture membrane.
- Patients with cervical cerclage.

METHODS

After approval of medical ethics committee and signing a written consent all the patient was suspected to:

- Full history taking.
- Complete general examination.
- The patient undergo ultrasound examination:
 - Abdominal, with the patient placed in the dorsal supine position.
 - Vaginal and trans perineal ultrasound, with the patient in the dorsal lithotomy position.
 - The ultrasonographic examination was done using Medison X8® machine. The examination was started according to the degree of bladder fullness at admission.
 - We measured the bladder volume first by the ultrasound and started accordingly:
 - In cases with empty urinary bladder it was started vaginally:
 - The probe was placed in the anterior fornix of the vagina and care was taken to avoid undue pressure that may artificially lengthen the cervix.
 - The cervical length was measured in the sagittal view and the sonolucent endocervical mucosa will be used as a guide to the true position of the internal os.
 - Then, transperineal ultrasonographic examination was done:
 - A curvilinear probe was inserted in a latex glove containing ultrasonic gel and covered with water soluble gel and placed sagittally between the labia majora the transducer moved caudally onto perineum and also laterally or obliquely as necessary then cervical length obtained.
- Last, trans abdominal done in two phases:
 - First, with the patient having half full bladder (250-300cc) we took cervical length.
 - Then, we waited some time and took cervical length with the patient full bladder (>300cc).
 - If the patient came with full or half full we started with abdominal ultrasound examination then the patient asked to empty bladder and continue examination vaginal and trans perineal.
- All the measurement were compared each other and the difference between them was calculated.

RESULTS

This study was conducted on 200 pregnant women, conducted from El-Shatby University Maternity Hospital during the period between January 2014 and September 2014.

As regard to patients gestational age, 15(7.6%) out of the patients their gestational age ≤ 20 weeks and 185(92.4%) out of the patients their gestational age >20 weeks; in general the patients gestational age ranged between 20-26 weeks with mean \pm S.D. 23.07 ± 1.81 and the median value was 23 weeks. (Table (1), figure (1))

Table (1): Demographic data of the patients as regard to their age

Gestational Age	No	%
20	15	7.6
>20	182	92.4
Total	197	100.0
Range	20-26	
Mean\pmS.D.	23.07 \pm 1.81	
Median	23	

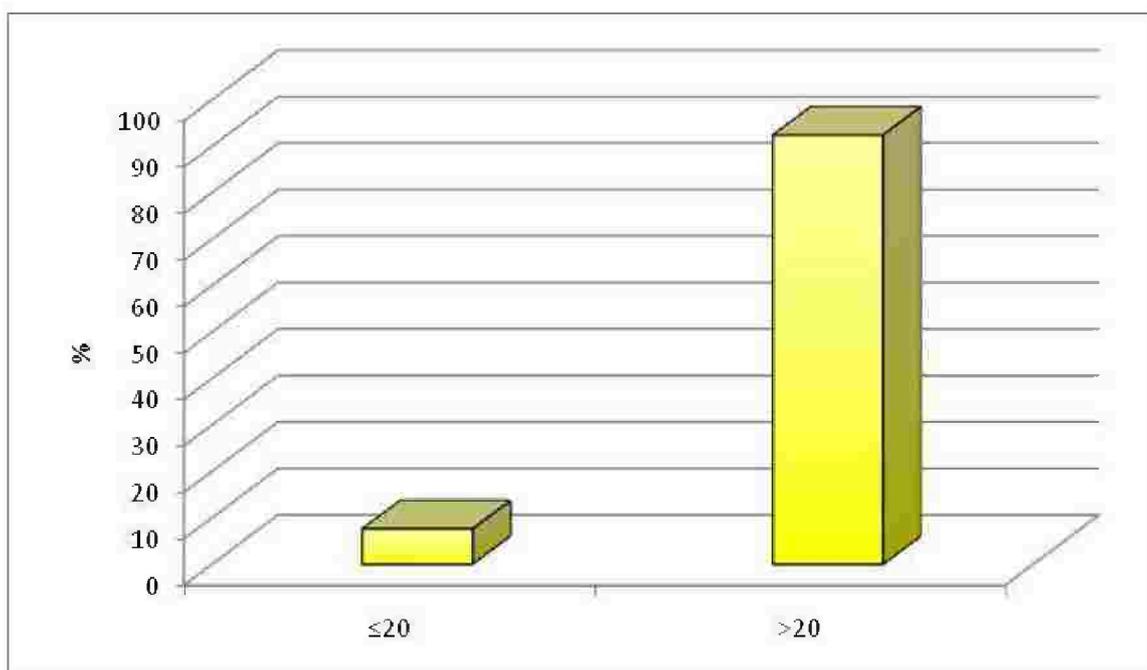


Fig. 11: Demographic data of the patients as regard to their age

In table 2 Show that significant differences between the four methods of measuring cervical length during the different gestational ages. The four methods differ significantly from each other. Trans vaginal gave the longest results followed by Transperineal at the "0.05 and 0.01" levels of significant. At the period "25 week" there non-significant differences between Transvaginal and Transperineal at the 0.05 level of significant. Also at the two periods "20 & 25 week" there is non-significant differences between Transvaginal and Transperineal at the 0.01 level of significance.

Table (2): Effect of different methods of sonographic cervical length assessment during pregnancy.

Time Methods	Cervical length (Cm)						
	At 20 Week	At 21 Week	At 22 Week	At 23 Week	At 24 Week	At 25 Week	At 26 Week
Transabdominal 2 - Half full bladder	3.78d±0.4	3.71d±0.29	3.7d±0.3	3.7d±0.4	3.71d±0.30	3.78b±0.46	3.63d±0.29
Transabdominal 2 - Full bladder	4.04c±0.4	3.95c±0.31	3.9c±0.3	4c±0.4	3.98c±0.30	4.04b±0.48	3.88c±0.33
Transperineal	4.54b±0.3	4.50b±0.27	4.4b±0.4	4.5b±0.4	4.46b±0.29	4.56a±0.47	4.29b±0.34
Transvaginal	4.84a±0.4	4.77a±0.30	4.7a±0.3	4.8a±0.4	4.70a±0.31	4.80a±0.48	4.62a±0.30
LSD at α 0.05 level, $p < 0.00001$	0.2403	0.1604	0.1608	0.1690	0.1410	0.2604	0.1887
Transabdominal 2 - Half full bladder	3.78b±0.4	3.71d±0.29	3.7d±0.3	3.7d±0.4	3.71d±0.30	3.78b±0.46	3.63d±0.29
Transabdominal 2 - Full bladder	4.04b±0.4	3.95c±0.31	3.9c±0.3	4c±0.4	3.98c±0.30	4.04b±0.48	3.88c±0.33
Transperineal	4.54a±0.3	4.50b±0.27	4.4b±0.4	4.5b±0.4	4.46b±0.29	4.56a±0.47	4.29b±0.34
Transvaginal	4.84a±0.4	4.77a±0.30	4.7a±0.3	4.8a±0.4	4.70a±0.31	4.80a±0.48	4.62a±0.30
LSD at α 0.01 level, $p < 0.00001$	0.3194	0.2123	0.2123	0.2232	0.1863	0.3447	0.2500

In table3 significant positive correlation among the four methods of measuring cervical length during the different gestational ages. High significant correlation was observed in all cases.

Table (3): High significant correlation

Correlation at 20 week	Ttransabdominal 2 - Half full bladder	Transabdominal 2 - Full bladder	Transperineal	Transvaginal
Ttransabdominal 2 - Half full bladder	-			
Transabdominal 2 -Full bladder	0.984**	-		
Transperineal	0.852**	0.949**	-	
Transvaginal	0.951**	0.948**	0.913**	-
Correlation at 21 week				
Ttransabdominal 2 - Half full bladder	-			
Transabdominal 2 -Full bladder	0.749**	-		
Transperineal	0.858**	0.698**	-	
Transvaginal	0.943**	0.721**	0.949**	-
Correlation at 22 week				
Ttransabdominal 2 - Half full bladder	-			
Transabdominal 2 -Full bladder	0.991**	-		
Transperineal	0.960**	0.955**	-	
Transvaginal	0.888**	0.869**	0.839**	-
Correlation at 23 week				
Ttransabdominal 2 - Half full bladder	-			
Transabdominal 2 -Full bladder	0.991**	-		
Transperineal	0.943**	0.946**	-	
Transvaginal	0.909**	0.900**	0.945**	-
Correlation at 24 week				
Ttransabdominal 2 - Half full bladder	-			
Transabdominal 2 -Full bladder	0.974**	-		
Transperineal	0.927**	0.897**	-	
Transvaginal	0.923**	0.907**	0.946**	-
Correlation at 25 week				
Ttransabdominal 2 - Half full bladder	-			
Transabdominal 2 -Full bladder	0.992**	-		
Transperineal	0.986**	0.982**	-	
Transvaginal	0.987**	0.984**	0.992**	-
Correlation at 26 week				
Ttransabdominal 2 - Half full bladder	-			
Transabdominal 2 -Full bladder	0.916**	-		
Transperineal	0.788**	0.802**	-	
Transvaginal	0.806**	0.865**	0.870**	-

** = Correlation is significant at the 0.01 level

Table(4): Simple correlation co-efficient "r" between all methods during the different times of pregnancy.

Time Methods	Time /week (w)						
	At 20 Week	At 21 Week	At 22 Week	At 23 Week	At 24 Week	At 25 Week	At 26 Week
Ttransabdominal 2 - Half full bladder	3.78	3.71	3.68	3.72	3.71	3.78	3.63
Transabdominal 2 -Full bladder	4.04	3.95	3.94	3.99	3.98	4.04	3.88
Transperineal	4.54	4.50	4.44	4.47	4.46	4.56	4.29
Transvaginal	4.84	4.77	4.74	4.75	4.70	4.80	4.62

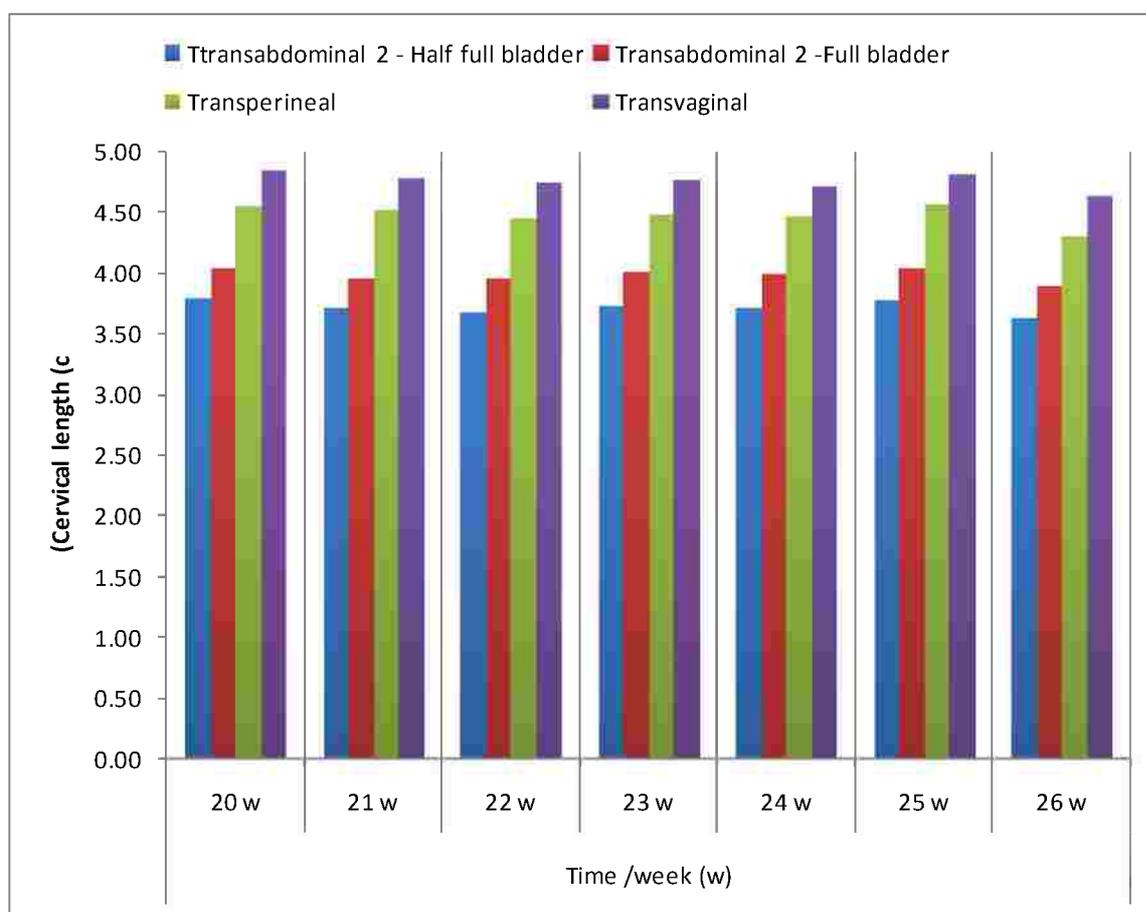


Fig. 12: Effect of different methods of sonographic cervical length during pregnancy.

In this study, The relationship between the method of transperineal measurement of cervical length as independent variable [X] and the method of transvaginal as dependent variable [Y] represented by equation 4th Degree Polynomial:

$$Y=54.32-42.64X+13.1658(X)^2-1.76(X)^3+0.087(X)^4$$

Where the values of the transvaginal measurements are calculated by the values of the transperineal measurements with determining factor equal 0.97.

The relationship between the method of transabdominal measurements with full bladder as independent variable [X] and the method of transvaginal measurements as dependent variable [Y] represented by equation:

$$Y=1/(-0.038X +0.36504338)$$

Where values of the transvaginal measurements are calculated by the values of the trans-abdominal the measurements with full bladder with determining factor equal 0.95.

The relationship between the method of transabdominal measurements with half full bladder as independent variable and the method of transvaginal measurements as dependent variable represented by equation:

$$Y=1/(-0.04X+0.36019382)$$

Where the values of the transvaginal measurements are calculated by the values of the transabdominal half full bladder with determining factor equal 0.96

Table 5: Examples for prediction of the values of the Transvaginal by the values of Transperineal, Transabdominal Full bladder and Ttransabdominal Half full bladder for example:

Gestational age/Week	Case	Transperineal	Transvaginal	Transvaginal calculated by the equation	Transvaginal – calculated transvaginal	Transabdominal 2 – Full bladder	Transvaginal	Transvaginal calculated by the equation	Transvaginal calculated by the equation	Ttransabdominal 2 – Half full bladder	Transvaginal	Transvaginal calculated by the equation	Transvaginal – calculated transvaginal
20	7	4.50	4.70	4.76	-0.06	3.93	4.70	4.69	0.01	3.70	4.70	4.71	-0.01
	13	4.30	4.60	4.57	0.03	3.80	4.60	4.58	0.02	3.60	4.60	4.63	-0.03
21	32	4.50	4.70	4.76	-0.06	3.93	4.70	4.69	0.01	3.70	4.70	4.71	-0.01
	38	4.90	5.20	5.16	0.04	4.45	5.20	5.17	0.03	4.20	5.20	5.20	0.00
22	62	5.60	5.40	5.85	-0.45	4.66	5.40	5.40	0.00	4.40	5.40	5.43	-0.03
	74	4.20	4.50	4.47	0.03	3.70	4.50	4.50	0.00	3.40	4.50	4.46	0.04
23	85	4.80	5.10	5.06	0.04	4.35	5.10	5.07	0.03	4.10	5.10	5.10	0.00
	106	4.20	4.50	4.47	0.03	3.70	4.50	4.50	0.00	3.40	4.50	4.46	0.04
24	124	4.40	4.70	4.66	0.04	3.93	4.70	4.69	0.01	3.70	4.70	4.71	-0.01
	140	4.10	4.40	4.39	0.01	3.55	4.40	4.38	0.02	3.30	4.40	4.38	0.02
25	154	4.50	4.72	4.76	-0.04	4.01	4.72	4.75	-0.03	3.70	4.72	4.71	0.01
	167	4.30	4.60	4.57	0.03	3.84	4.60	4.61	-0.01	3.60	4.60	4.63	-0.03
26	191	4.60	4.80	4.86	-0.06	4.10	4.80	4.83	-0.03	3.80	4.80	4.80	0.00
	193	4.02	4.30	4.33	-0.03	3.46	4.30	4.32	-0.02	3.20	4.30	4.31	-0.01
Average (200 case)	4.47	4.74	4.73	0.01	3.97	4.74	4.72	0.02	3.71	4.74	4.72	0.02	