

## The Diagnostic Accuracy of External Pelvimetry to Predict Dystocia in Nulliparous Women

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Article information	Abstract
<p>Article history: Received: 17 Feb 2011 Accepted: 17 Sep 2011 Available online: 25 Nov 2011</p>	<p><b>Background:</b> Dystocia is ranked as an important element in maternal mortality and disabilities across the undeveloped countries. The study has been carried out with the aim of estimating the diagnostic value of measuring external pelvic diameters of primiparous women.</p> <p><b>Materials and Methods:</b> In this descriptive study, the correlation of external pelvic diameters of 447 primiparous women, who have been referred to Um al-Banin Hospital of Mashhad city was measured, while their cervix has been dilated 5 cm. progress of labor was controlled by a researcher who was unaware about the pelvic diameters. Regarding abnormal progress of labor in cesarean or vacuum, they were set as criteria to diagnose dystocia.</p> <p><b>Results:</b> The most sensitivity was related to transverse diagonal of Michaelis Sacral Rhomboid Area (60.7%) intertrochanteric line (57%).</p> <p><b>Conclusion:</b> External measurement of pelvic diameters is useful to predict more than 60 percent of dystocia cases in the primiparous women.</p>
<p>Keywords: Dystocia Cephalopelvic disproportion Pelvimetry</p>	
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### Introduction

Dystocia of labor or abnormally slow progress of labor occurs in 25-30 percent of primiparous women and justifies two third of cesarean operations prescribed for such women [1]. Because of genetic factors, malnutrition and diseases, the most prevalent cause of dystocia in the undeveloped countries is cephalopelvic disproportion (CPD) [2]. Is dystocia of labor is not diagnosed and treated on time, it will result in death of mother, uterine rupture, postpartum hemorrhage, postpartum infections, genital system fistulas and adverse fetal outcomes such as Birth asphyxia, septicemia, nervous trauma and death [3, 4]. A total of 600000 women die because of pregnancy and labor disorders annually across the world out which 95% occur in the developing countries and the most prevalent (30%) cause of such death Is CPD [3, 5]. Most of such outcomes can be prevented through recognizing women at risk of dystocia of labor and referring them to medical centers [6]. The clinical pelvimetry (touching the inner walls of pelvis) is widely used [7, 8]. It is very irritating for the patient and it suffers from high rates of mental errors. The advanced plevimetry techniques such as plevimetry through computer-based tomography, Magnetic Resonance Imaging, radiography and ultrasound are expensive and unavailable in the developing countries [7, 10]. External pelvimetry is a simple, inexpensive and available for patients which had been introduced as the first technique to predict dystocia of labor [11].

Few studies have been conducted about predicting dystocia of labor through external pelvimetry [11]. A number of studies have reported that measuring external diameters of pelvis is hardly useful for identifying women at risk of dystocia; however, Rozenholc et al. (2007) and Liselele et al (2000) showed that some pelvic diameters particularly transverse diagonal of the Michaelis sacral rhomboid area and intertrochanteric line has high predictive value to predict dystocia. They also have emphasized the necessity of confirming their results by other societies [11, 12]. Therefore, the study was done with the aim of determining the predictive value of external measurement of primiparous women's pelvic diameters which would be useful to diagnose women at risk of dystocia.

### Materials and Methods

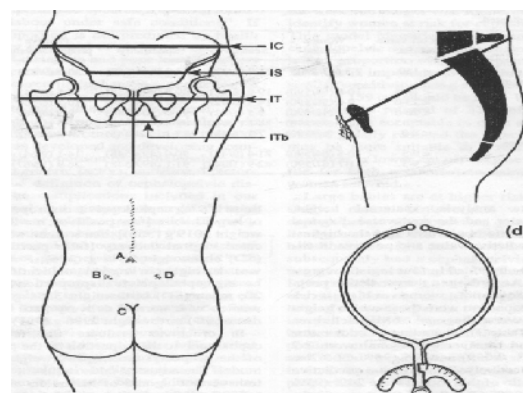
A descriptive-correlational double-blind method was used for this study in which a total of 447 primiparous women who have enrolled in maternity ward of Um al-Banin Hospital of Mashhad were studied. The women should be in age at any full-term pregnancy (FP) (38-42 weeks), their singleton pregnancy should be confirmed. They enrolled in the study since Dec. 11, 2008 to May 31, 2009. The study plan was approved by the Research Ethics Committee (REC) of Mashhad University of Medical Sciences and all research departments verified it.

Women who had hip fractures, asymmetrical pelvis, lameness, apparent narrow pelvis, severe anxiety, BMI > 30 kg/m<sup>2</sup>, or women who were younger than 18 or older than 35 or whose babies were lighter than 2500 gr or heavier than 4000, cesarean due to other reasons except dystocia were removed from the study. External diameters of mothers with cervical dilation 5cm were measured (Fig. 1).

The research responsible for controlling delivery was not informed about such sizes. Delivery was carried out through cesarean or vacuum extraction, while in the presence of effective uterine contractions in active phase of labor, the rate of cervical dilation was less than 1 cm per hour for two hours and the rate of dilation was less than 1 cm per hour in the second phase of delivery, it was considered as the criterion for dystocia and type of delivery was treated as the golden standard of the pelvic capacity.

### Results

The highest sensitivity gained in this study is related to the transverse diagonal of Michaelis Sacral which is followed by IT, IC, ITB, anterior posterior diameter of pelvis and IS (Table 1).



**Figure 1.** External measurement of the pelvic diameters and Berisky pelvimeter. Distance between iliac crests (IC), distance between anterior superior iliac spines (IS), distance between intertrochanteric line (IT), distance between ischial tuberosities (ITB), transverse diagonal of Michaelis Sacral Rhomboid Area (BD), anterior posterior diameter of pelvic inlet opening (d), Berisky pelvimeter

**Table 1.** Diagnostic value of pelvic external diameters in predicting dystocia

Variable	Sensitivity (%)	Specificity (%)	Positive indicative value (%)	Negative indicative value (%)	accuracy (%)
Second decile of transverse diagonal of Michaelis sacral ( 9.6cm)	60.7	84.1	35.4	93.7	81.2
Fourth decile of inter-trochanteric diameter ( 31cm)	57.0	47.5	13.5	88.5	48.7
Fourth decile of external intercrestal diameter	51.7	48.8	12.6	87.61	49.2
Third decile of ischial intertuberous diameter ( 9cm)	48.2	57.5	13.9	88.5	56.3
Fourth decile of antero-posterior diameter ( 20.5cm)	44.6	59.5	13.6	88.2	57.7
First percentile of interspinous diameter ( 23cm)	42.8	59.0	13.0	87.8	57.0

### Discussion

In our study, incision spots of the pelvic diameters were determined based on the best sensitivity, specificity gained from measuring their various strata and quarters. The highest sensitivity belonged to transverse diagonal of Michaelis Sacral (60.7%) which was followed by intertrochanteric line (57%), iliac crests (51.7%), ischial tuberosities (48.2%), anterior posterior diameter of pelvis (44.6%), iliac spines (42.8%).

Liselele et al set the incision spots of pelvic diameters in accordance with the 10<sup>th</sup> percentile of their society. In this study, transverse diagonal of Michaelis Sacral had the highest sensitivity (42.9%), and intertrochanteric line (38.1%), anterior posterior diameter of pelvic inlet opening (19%), iliac crests (14.3%), iliac spines (9.5%) and ischial tuberosities (7.1%) had lesser sensitivity respectively<sup>11</sup>. In Pozenholc et al. the highest sensitivity belonged to transverse diagonal of Michaelis Sacral (45.9%), and intertrochanteric line (26.5%), and anterior

posterior diameter of pelvic inlet opening (16.3%) were stood at second and third positions [12]. The results of the mentioned studies are in line with the results of our study. In our study, the obtained sensitivity rates for the pelvic diameters are higher than that in the above-mentioned studies, which it would be due to different methods used to set incision spots in our study. Spory et al. reported sensitivity 85-100% and specificity 24-56% for various pelvimetry methods using MRI [13]. In Binecy et al. cephalopelvic area index which has been measured using vaginal ultrasonography showed sensitivity 72.2%, specificity 77.9 and reliability 77.1% [14].

The obtained sensitivity for the clinical pelvimetry in our society is comparable to the more advanced methods of pelvimetry. In remote areas where the more advanced methods of pelvimetry are unavailable, the external pelvimetry can be helpful in identifying women at risk of dystocia.

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**Authors' Contributions**

MK planed the project and advised in the design, RA did the statistical analyses and contributed to the writing of the paper and data management.

**Conflict of Interest**

No Conflict.

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