Int.J.Curr.Microbiol.App.Sci (2019) *8*(11): 1213-1219

International Journal of Current Microbiology and Applied Sciences
***ISSN: 2319-7706* Volume 8 Number 11 (2019)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2019.811.142

Influence of Maternal Factors on Mode of Delivery

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Keywords

Cephalopelvic disproportion, Vaginal delivery, Dystosia

Article Info

Accepted:
10 October 2019
Available Online:
10 November 2019

A B S T R A C T

Pregnancy is one of the most critical and unique period in a woman's life cycle. The present longitudinal study was undertaken to assess the influence of certain factors on mode of delivery and birth weight in urban pregnant women visiting hospitals for regular ANC check-up. Maternal anthropometric measurements like height and weight are routinely taken in antenatal care clinics. These measurements beside the size of the foot may be used to predict the mode of delivery in nulliparous women. The objectives of the study were to investigate the relation between maternal factors and the mode of delivery in nulliparous women in Albatool Teaching Hospital. This was a cross sectional, hospital-based study. A questionnaire was used to collect basic data. Anthropometric measurements which included maternal weight, height and length of the foot were taken according to patients sayings higher number of women with average BMI [26/51(50.9%)] and underweight [6/7(85.7%)] delivered vaginally than in women with high body mass index [14/42(33.3%)] p value < 0.001, higher women with tall staure [5/7(71.4%)] delivered vaginally than in women with average [25/60(41%)] and short stature [16/33(48%)] p value =0.01.Thereis no relationship between foot size and mode of delivery. Women with high body mass index are more likely to deliver by cesarean section Women with short stature are more likely to deliver by cesarean section Foot size doesn't affect the mode of delivery.

Introduction

A pregnant woman's height has routinely been documented on her obstetric case record since studies presented a relation between maternal height, pelvic dimension, and the outcome of pregnancy.'-' Another piece of routinely recorded data is the woman's shoe size(1). Average body mass index (BMI) has increased over the past 30 years and obesity has become a global health issue (2). This tendency has a wide range of implications in the field of obstetrics as women with a higher BMI are at risk of various complications during pregnancy such as gestational diabetes, preeclampsia, macrosomia, dystocia, and stillbirths (3). Furthermore, increasing BMI is associated with an increased rate of caesarean

delivery due in part to failure of labour-progression [(4)].

Maternal height has been one of the contributory anthropometric factors that determine obstetric outcome, short stature in women is known to be associated with difficulties in labour, despite controversies on the value of maternal height as an index in determination of cephalopelvic disproportion, the fact remains that it is a useful tool in assessing pregnancies at a relatively higher risk.

Early detection of women at risk of obstetric complications remains a goal of antenatal care and the need for early referral from peripheral centers to centers capable of conducting caesarean delivery becomes important.(5)

Maternal shoe size (British size less than 4)(37) has been reported to be a predictor of CPD.(5) Conversely, a shoe size of greater than 5 is said to make disproportion.[(6)]

Cephalopelvic disproportion (CPD) occurs in Cephalopelvic disproportion was diagnosed when there was evidence of either (a) a prolonged first stage.>12 hours) in spite of effective uterine activity or)b) failure of the head to descend or evidence of severe moulding or fetal distress in late first stage with secondary arrest or prolonged second stage pregnancy where there is mismatch in size between the fetal head and the maternal pelvis, resulting in 'failure of the fetus to pass safely through the birth canal for mechanical reasons. [7]Dystocia occurs in 25-30% of nulliparous women and is regarded as the cause for two thirds of cesarean sections in these women [3,4]. If not diagnosed and treated, this condition can lead to maternal/fetal morbidity and even the mother's mortality [5-7]. Obstructed labour, the direct clinical consequence of CPD, is responsible for 8% of maternal deaths worldwide, according to figures quoted in the 2005 World Health Report of the World Health Organisation (WHO).[8]

In developing countries, a significant number of maternal deaths are attributable to the complications of obstructed labor.

Identifying women at risk for Cephalopelvic Disproportion (CPD) prepares physicians for on time treatment and enables them to minimize maternal-fetal trauma that accompanies this midwifery emergency (9).

Women who experience CPD often undergo surgical interventions such as emergency caesarean, and vacuum and forceps deliveries which cause considerable physical problems for mothers, in addition to stress and an economic burden on the family and community [(10)].

Identifying women at risk for CPD prepares physicians for on time treatment and enables them to minimize maternal-fetal trauma that accompanies this midwifery emergency [11].

Therefore, one of the main objectives of pregnancy care is the identification of high risk women for CPD. In this direction, numerous investigators have attempted to find indexes to identify high risk women during pregnancy. A number of researchers have regarded factors such as mother's age, height, weight before pregnancy, body mass index (BMI), weight gain during pregnancy, fundal height, birth weight, and foot length of the mother as risk factors. These factors, however, are controversial (10,112)

The aim of our study is to determine if anthropometric measurement (height, weight, foot size) which are not costly, non-invasive can be used as predictors to pick up women at risky at labour and this will enable the health providers to plan the mode of delivery.

Materials and Methods

This was a cross sectional hospital- based study conducted during the period of September 2017 through November 2017 to investigate the relation between anthropometric measurements (height, weight, foot size) and mode of delivery in nulliparous women at Alba tool Teaching Hospital.

Our study involves 100 women, they were selected randomly The data include sociodemographic characteristics such as age, level of education and occupation of mothers.

Information for gestational age, mode of delivery and information for socio-demographic was collected from antenatal follow up chart. Every data was collected before delivery and data which doesn't fulfill the inclusion criteria was rejected.

Mothers who undergo cesarean section due to: non-vertex presentation,obvious congenital abnormalities of fetus, abruptio placenta,preeclampsia, eclampsia, placenta previa and women's who had hip fractures, asymmetrical pelvis, multiple pregnancy, polyhydroamnions ,preterm delivery, birth weight (less than 2500 g and above 4000 g,(elective cesarean section, instrumental delivery, gestational age above 42weeks and repeat caesarean section were excluded from the study.

Height and foot length measurement, Height was measured in the standing position following standards.

Women were enrolled in study

Parturient nulliparous

ladies with single fetus

at term (≥ 37 completed weeks)

Women were excluded from the study

Diabetic

hypertensive women

preterm labour

multiple pregnancies

multiparous women

previous scar

breech presentation

any pregnant were planned for elective cesarean section.

Questionnaire was used to collect data (height, weight, age, presentation, foot size, gestational age and the mode of delivery)

The anthropometric measurements were recorded according to the patient sayings BMI was calculated as the weight in kilogram divided by the height in square meter.

Under weight were taken as BMI less than 18.5 Kg/m^2,

average weight were taken as BMI between 18.5-24.9 Kg/m^2,

overweight were taken as BMI between 25-29.9 Kg/m^2,and obese women with BMI more than 30 Kg/m^2 according to WHO classification.

Short stature were taken as height less than 160 cm

average stature were taken as height between160-169 cm, and tall stature were taken as height more than 169 cm.

Small feet were taken as the size less than 38

average feet were taken as the size between 38-40, and large feet were taken as the size more than 40.

Statistics

Data were analysed data was transferred to SPSS version 23 statistical package. Bivariate logistic analysis was carried out to distinguish the independent effect of each variable.

P-value less than0.05 were taken as statistically significant.. Comparisons were made using the Chi-square, P value <0.05 was considered significant.

Results and Discussion

Table 1 shows relation mode of delivery and different maternal anthropometric measurements

Variable Normal delivery Cephalopelvic disproportion P*)

Age (years) 24.2 ± 3.4 22.7 ± 3.3 o.oo5

Height (cm) 1.65 ± 0.061.53 ± 0.06 00

Foot length (cm) 23.7 ± 0.9 22.6 ± 0.720

This table shows that the mean maternal age is decreased in mothers complicated by CPD with P=0.005 and it is statistically significant.

One hundred women were enrolled to the study, higher number of women with short stature[17(51.5%)] and average stature [35(58.3%)] were delivered by cesarean section whereas higher number of women with tall stature [5(71.4%0)] were delivered vaginally, p value =0.01, calculated x^2 = 10.37, tabulated x^2 = 5.991, degree of freedom = 2

P value = 0.01 Cal X^2 = 10.437
Df = 2 Tab X^2 = 5.991

Table 2 shows the relation between body mass index and mode of delivery, higher number of women with low BMI [6(85.7%)] and average BMI[26(50.9 %)] were delivered vaginally, higher number of women with high BMI [28(66.6%)] were delivered by cesarean section. p value <0.001,calculated x2 =41.446 tabulated x2 = 5.5991, degree of freedom =2

P value < 0.001 cal X^2 = 41.446
Df = 2 tab X^2 =5.991

Table 3 shows the relation between foot length and mode of delivery. There was no relationship between foot length and moode of delivery, p value <0.001, calculated x2 = 49.889, tabulated x2 = 5.991, degree of freedom = 2

P value < 0.001 cal X^2 =49.889
Df = 2 tab X^2 = 5.991

In the health centers which are not equipped to perform a caesarean section, accurate prediction of women at risk for CPD is difficult. Long referral distances and poor local transport may lead to obstructed labor and uterine rupture [13-14]. Conversely, in a resource limited setting, prediction of CPD in women at risk must be sufficiently specific to avoid unnecessary referral (14). This study compared different maternal anthropometric measurements such as height, foot length, biacromial diameter, mid upper arm circumference and maternal head circumference, Michael's horizontal and vertical diameter of those mothers who give birth through spontaneous vaginal delivery and for those mothers who undergo CS for confirmed CPD. This study was designed to assess the value of recording maternal shoe size, BMI and height in obstetric case records. We studied only healthy primigravidas with single fetus whom reached the term, and excluded those patients who had an elective caesarean section carried out because of

obstetric complications and also those delivered by emergency caesarean section in early labour where cephalopelvic disproportion did not appear to be an underlying cause Maternal age is among several factors used to screen pregnant women for potential risk of labor complications [15].

Adolescents under 15 years of age experienced more obstetric complications than adult women [16]. According to this study the mean value of maternal age 22.7 years for CS and 24.2 years for normal vaginal delivery and it's statistically significant. This study agrees with another study which states as the high prevalence (89.4%) of women who were less than 18years of age indicates early start of reproductive activity in Sudan .(15,16).But another study did not find the cutoff point of less than 18 years of age as a significant risk factor for CPD [17]. This difference with may be due to chosen cut-off point, genetic, environmental, nutritional or cultural effect.

It is well established that the height of the mother is correlated to the size of the pelvis and several studies have demonstrated that mothers with CPD are shorter than those who have normal vaginal deliveries(18) which is in line with this study in which the mean of maternal height for mothers with CPD is 1.51 cm and 1.65 cm for mothers who undergo normal vaginal delivery. This study is not in line with other studies(19)] that failed to document a significant association between short stature and mode of delivery which may be due to genetic, environmental, nutritional or cultural effect. However,there is no consensus on the height below which CPD is likely to occur.Several studies have used a cutoff value of 150 cm for height to predict CPD. However, this will not be appropriate for all ethnic populations and the nutritional status of the mother and genetic factors would also determine fetal size [34]. In comparison with women with normal/tall stature, fewer women with short stature delivered vaginally. This is has been reported by earlier investigators [19,20].

In this study we found higher number of women with tall stature [5 (71.4%0)] were delivered vaginally, p value =0.01, while women with short stature[17(51.5%)] and average stature [35(58.3%)] were delivered by cesarean section. This agree with Tahir A Mahmoodetal, who found maternal height is a more useful guide to the outcome of labour in mothers taller than 160 cm tall most (80%) would deliver vaginally(21)

We found a significant increase in caesarean deliveries with increasing BMI. This is in accordance with the findings of Wispelwey *et al.,* and several larger studies due to difficulty in initiation of labour and increased induction rates, presence of medical conditions associated with obesity (hypertension and diabetes, increased depot of soft tissues in the maternal pelvis may obstruct labour and lead to dystocia or cephalopelvic disproportion.

Awonuga and his colleagues and Mahmood *et al.,* (21) found the measurement of shoe size is not useful as predictor of the mode of delivery and it is agree with the result of our study, in our study we found that there is no relationship between foot size and mode of delivery while Frame *et al.,* [12] found it useful by measuring length of the foot as women with foot length of <18cm has less chance for vaginal delivery compared to the other category of 18cm and more, as most women of foot length <18cm delivered by instrumental delivery/caesarean section than vaginally.

Table.1 Shows the relation between height and mode of delivery

Height	Vaginally	Cesarean section	Total
Short	16(48%)	17(51.5%)	**33(33%)**
Normal	25(41%)	35(58.3%)	**60(60%)**
Tall	5(71.4%)	2(28.5%)	**7(7%)**
Total	46(46%)	54(54%)	**100**

Table.2 The relation between BMI and mode of delivery

BMI	Vaginally	Cesarean section	Total
underweight	6(85.7%)	1(14%)	**7 (7%)**
Normal	26(50.9%)	25(49%)	**51(51%)**
Overweight and obese	14(33.3%)	28(66.6%)	**42(42%)**
Total	46 (46%)	54 (54%)	**100**

Table.3 The relation between foot size and mode of delivery

Foot length	Vaginally	Cesarean section	Total
Small	5(14.6%)	7(58.3%)	**12(12%0**
Average	38(48.1%)	41(51.8%)	**79 (79%)**
Large	3(33.3%)	6(66.6%)	**9 (9%)**
Total	46(46%)	54(54%)	**100**

In the present study has many limitations; the size of the sample is small and asses size of the baby were not investigated in this study, If these factors were investigated using logistic regression analyses, different results could have been found

Women with high body mass index are more likely to deliver by cesarean section Women with short staure are more likely to deliver by cesarean section Foot size doesn't affect the mode of delivery.

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How to cite this article:

Enas Jaleel Alobaidy, Raakad Kamel Saadi, Inaam Fasial Mohamed and Noor Hameed Abdul Salam. 2019. Influence of Maternal Factors on Mode of Delivery. *Int.J.Curr.Microbiol.App.Sci.* 8(11): 1213-1219. doi: https://doi.org/10.20546/ijcmas.2019.811.142