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Maternal height as a risk factor for Caesarean section

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Abstract Background: Maternal height has been reported as an obstetric risk factor, since short maternal stature may be associated with an increased incidence of obstructed labour due to cephalopelvic disproportion. **Materials and methods:** There were 373 nulliparous women who were 150 cm or less in height (total $n=5,650$) and 367 women who were below 19 years old in the study group and 48 of these women were 150 cm or less in height. There were 37 patients who were 150 cm or less in height and over 39 years old. **Results:** There was no statistically significant difference between the rates of Caesarean section in patients who were 150 cm or less in height and patients who were taller than 150 cm ($P>0.05$). However, the rate of Caesarean section was higher in patients who were 150 cm or less in height and below 19 years old ($P<0.05$) and over 39 years old ($P<0.05$). **Conclusion:** Short maternal height (<150 cm) was not associated with a greater likelihood of Caesarean section for cephalopelvic disproportion. However, patients who were below 19 years old and over 39 years old with a height of 150 cm or smaller had a greater likelihood of undergoing Caesarean section.

Introduction

Maternal height has been reported as an obstetric risk factor, since short maternal stature may be associated with an increased incidence of obstructed labour due to cephalopelvic disproportion (CPD). Dystocia secondary to CPD is the indication for over 25% of Caesarean sections (C/S) performed in the USA, where the rate of C/S increased from 5 to 10% to over 25% of all deliveries in the 1980s [5]. Mahmood et al. [2] reported an increase

risk of undergoing C/S for CPD in women shorter than 160 cm. However, they also stated that 80% of mothers shorter than 160 cm would still deliver vaginally. Molloy [3] reported a three-fold increase in the rate of C/S in women shorter than 60 in. (approximately 152 cm) when compared with taller women. Witter et al. [6] carried out a study in 4,346 patients and showed that a maternal height of less than 157 cm was associated with an increased risk of C/S. Read et al. [4] showed an increased chance of C/S for low-risk primiparas shorter than 164 cm and they also reported that height of less than 160 cm was associated with a greater risk of C/S and that a combination of small maternal height and increasing maternal age dramatically increased this risk. The objective of this prospective study was to investigate whether maternal height per se or as associated with maternal age is an obstetric risk factor in Turkey.

Materials and methods

This prospective study was carried out at Zübeyde Hanım Women's Hospital (Ankara) between May 2002 and May 2003. All the deliveries ($n=5,650$) were included in this clinical trial. There were 373 nulliparous women who were 150 cm or less in height (6.6% of the patient population). Three hundred and sixty-seven women below 19 years old were in the study group (6.5% of the patient population) and 48 of these women were 150 cm or less in height (0.8% of the patient population). There were 219 patients who were 150 cm or less in height and 35 years old or older and in this group 37 patients were over 39 years old. Statistical analysis was carried out using one-way ANOVA and Chi-square.

Results

In 12 months, 2,084 C/S operations were performed (39.1% of all deliveries). The rate of C/S was 33.2% in women who were 150 cm or less in height. There was no statistically significant difference between the rates of C/S in patients who were 150 cm or less in height and patients who were taller than 150 cm (33.2 vs. 39.4%; $P>0.05$, Table 1). However, the rate of C/S was higher

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Table 1 Modality of delivery and indications for C/S in women taller than 150 cm and in nulliparous women who were 150 cm or less in height. *NS* non-significant, *S* significant

	> 150 cm (%)	≤ 150 cm (%)	<i>P</i> value
Normal vaginal birth	60.6	66.8	NS
Caesarean delivery	39.4	33.2	NS
Previous C/S (secondary C/S)	17.3	0	S
CPD	9.2 ^a	10.7	NS
Other indications for primary C/S	12.9	22.5	S

^aAll the women who underwent C/S because of CPD were nulliparous

Table 2 The rate of C/S in nulliparous women who were 150 cm or less in height and below 19 years old vs. the rate in nulliparous women who were 150 cm or less in height and over 39 years old

Modality of delivery	≤ 150 cm, ≤ 18 years old		≤ 150 cm, ≥ 40 years old		<i>P</i> (χ^2)
	<i>n</i>	%	<i>n</i>	%	
Normal vaginal birth	19	43.8	20	54.1	< 0.05
Caesarean delivery	29	56.3%	17	45.9%	< 0.05
Total	48	100	37	100	

in patients who were 150 cm or less in height and below 19 years old than that in patients who were 150 cm or less in height and between 18 and 40 years old (Table 2). There were 48 women who were 150 cm or less in height and below 19 years old, and the rate of C/S was 56.3% ($P < 0.05$) in this patient group. There were 37 women who were 150 cm or less in height and over 39 years old and the rate of C/S was 45.9% ($P < 0.05$). The rate of C/S was significantly higher in women who were 150 cm or less in height and below 19 years old than that in women who were 150 cm or less in height and over 39 years old ($P < 0.05$).

There was no significant difference in the incidence of perineal tears, preeclampsia, ablatio placentae or placenta praevia in women who were 150 cm in height or shorter; pregnancy week at delivery was not significantly different either ($P > 0.05$).

Discussion

Dystocia due to CPD accounts for a large percentage of C/S operations performed in Turkey and all around the world. In this study, we investigated whether maternal height, a readily quantifiable maternal characteristic, was associated with a high risk for C/S performed because of CPD in Turkey.

In our study, the rate of C/S in the group of women who were 150 cm or less in height was not significantly

different from that in the group of women taller than 150 cm ($P > 0.05$). However, women who were 150 cm or less in height and below 19 years old were more likely to be delivered by C/S ($P < 0.05$). Previously, we showed that the rate of C/S was not significantly different in adolescent pregnancy [1]; however, in that study, most of the patients were taller than 150 cm. Apparently, being 150 cm or less in height and below 19 years old creates a risk factor for operational delivery, although these factors do not increase the rate of C/S per se. We also showed that women who were 150 cm or less in height and over 39 years old were more likely to be delivered by C/S (the rate of C/S in women who were 19–39 years old vs the rate in women over 39 years old, $P < 0.05$). The rate of C/S in nulliparous women who were taller than 150 cm and over 39 years old was approximately 47% and this rate was not statistically different from that in women who were 150 cm or less in height and over 39 years old (46.9 vs. 45.9%, $P > 0.05$). Since it was shown that increasing maternal age was associated with a higher chance of C/S in low-risk primiparas who were shorter than 160 cm by other researchers as well [4], the combination of these two factors (short stature and increased maternal age) seems to be useful for predicting the method of delivery. Interestingly, the rate of C/S in women who were 150 cm or less in height and below 19 years old was higher than the rate in women who were 150 cm or less in height and over 39 years old (56.3 vs. 45.9%). This result may be due to a very high rate of C/S (63.6%) in 11 adolescents who were below 16 years old, who comprised approximately 23% of this group.

In conclusion, short maternal height (150 cm or less) was not associated with a greater likelihood of C/S for CPD. However, patients who were below 19 years old and over 39 years old with a height of 150 cm or less had a greater likelihood of being delivered by C/S.

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