

HEIGHT, WEIGHT, EXTERNAL PELVIC DIAMETERS AND CESAREAN SECTION: A COHORT STUDY IN SOUTHERN PROVINCE OF RWANDA (HUYE DISTRICT).

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ABSTRACT

Height, weight, and some pelvic external diameters have been associated to primary and elective repeat cesarean section in African women. This study aimed at looking for possible relation between cesarean section rate and the abovementioned parameters in order to identify cutoff sizes allowing a timely screening of contracted pelvis at antenatal settings in our environment. A group of 152 parturients was considered out of 312 nulliparae who participated in a previous cross-sectional study on external pelvimetry at antenatal care settings in Huye District / Southern Province of Rwanda. In this prospective, longitudinal, and descriptive study, parturients were blindly delivered and operated of babies with vertex presentation by midwives, general practitioners, and specialists who did not take part in the cross-sectional survey. Results were as following: (1) cesarean section progressively decreased as height increased (< 150 cm: 33.3 %; 150 – 159 cm: 20.7 %; 160 – 169 cm: 17.9 %; ≥ 170 cm: 10 %; p = 0.412); (2) cesarean section rate was inversely proportionate to weight (< 50 Kg: 35.7 %; 50 – 59 Kg: 23 %; ≥ 60 Kg: 15.6 %; p = 0.211); (3) pelvic sizes below determined cutoff levels (i.e. Mean – SD) showed high rates of cesarean section (Biliac: < 22 cm - 31.3 % vs ≥ 22 cm - 19.9 %, p = 0.290; ASIID: < 20 cm - 22.2 % vs ≥ 20 cm - 21 %, p = 0.929; Intertrochanter: < 26 cm - 28.1 % vs ≥ 26 cm - 19.2 %, p = 0.269; Antero-Posterior: < 17 cm - 28.1 % vs ≥ 17 cm - 19.2 %, p = 0.269; Intertuberous: < 8 cm - 55.6 % vs ≥ 8 cm - 18.9 %, p = 0.009; Base of Trillat's triangle: < 11 cm - 100 % vs ≥ 11 cm - 18.9 %, p = 0.000). However, the weight aspect has to be relativized since it does not represent either the prepregnancy situation or the full gain at delivery. In conclusion, most accurate studies on more important population sizes are needed to assess the relationship between cesarean section and all these pelvic and anthropometric parameters. In case of strong and significant relationship, external pelvimetry used in relation to anthropometric parameters with a full knowledge of the clinical evolution could represent a helpful tool to predict contracted pelvis before and mostly during labor in resource-limited countries.

Key-words: Anthropometry – Pelvic Diameters – Cesarean section – Nullipara – Rwanda

RESUME

La taille, le poids et certains diamètres pelviens ont été associés à la césarienne itérative et élective chez les femmes Africaines. Cette étude avait pour but de chercher une éventuelle association entre le taux de césarienne et les paramètres susmentionnés en vue d'identifier les seuils anthropométriques et pelviens permettant le dépistage précoce des bassins rétrécis au cours des consultations prénatales dans notre environnement. Il s'agit d'une étude prospective, longitudinale et descriptive concernant 152 parturientes faisant partie de 312 nullipares sélectionnées au cours d'une étude antérieure transversale portant sur la pelvimétrie externe dans les centres de santé du District de Huye (Province du Sud du Rwanda). Tous les accouchements et césariennes étaient respectivement réalisés par des sages femmes, médecins généralistes et spécialistes qui n'avaient pas été associés à la première étude. Les résultats étaient les suivants : (1) il y avait une diminution progressive du taux de césarienne en fonction de l'accroissement de la taille (< 150 cm: 33.3 %; 150 – 159 cm: 20.7 %; 160 – 169 cm: 17.9 %; ≥ 170 cm: 10 %; p = 0.412) ; (2) le taux de césarienne était inversement proportionnel au poids (< 50 Kg: 35.7 %; 50 – 59 Kg: 23 %; ≥ 60 Kg: 15.6 %; p = 0.211); (3) les dimensions pelviennes en deçà des seuils prédéterminés (Moyenne – Ecart Type) présentèrent mutatis mutandis des taux élevés de césarienne (Bicrête: < 22 cm - 31.3 % vs ≥ 22 cm - 19.9 %, p = 0.290; Interépineux Antéro-Supérieur: < 20 cm - 22.2 % vs ≥ 20 cm - 21 %, p = 0.929; Intertrochanterien: < 26 cm - 28.1 % vs ≥ 26 cm - 19.2 %, p = 0.269; Antéro-Postérieur: < 17 cm - 28.1 % vs ≥ 17 cm - 19.2 %, p = 0.269; Biischiatique: < 8 cm - 55.6 % vs ≥ 8 cm - 18.9 %, p = 0.009; Base du triangle de Trillat: < 11 cm - 100 % vs ≥ 11 cm - 18.9 %, p = 0.000). Cependant, l'aspect relatif au poids devrait être relativisé car ne devrait être considéré que le poids prégestationnel ou le gain pondéral au moment de l'accouchement. En conclusion, des études plus approfondies portant sur des échantillons plus importants devraient être menées pour évaluer la relation entre la césarienne et ces paramètres pelviens et anthropométriques. En cas de forte relation significative, la pelvimétrie externe associée aux deux autres mensurations anthropométriques pourrait constituer, dans les pays aux ressources limitées, un outil fort utile pour le diagnostic d'un bassin rétréci avant le déclenchement du travail et surtout au cours de celui en tenant compte de son évolution.

Mots clés : Anthropométrie – Diamètres pelviens – Césarienne – Nullipare - Rwanda

INTRODUCTION

Height and weight have been shown under certain limits to have in pregnant women a relation with the risk of dystocia [1-7]. As for pelvic external diameters, and although external pelvimetry has been debatable since many years [8], some external pelvic distances have been associated to primary and elective repeat cesarean section in African women [9, 10]. This study aims at looking for a possible relationship between cesarean section rate and pelvic and anthropometric (height and weight) parameters

in our environment so that cutoff sizes could allow a timely screening of contracted pelvis at antenatal settings and during labor.

METHODOLOGY

STUDY POPULATION

We considered a group of 152 parturients out of the 312 nulliparae who participated in a previous study on external clinical pelvimetry at antenatal care settings in Huye District / Southern Province of Rwanda [11]. We only considered

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patients delivered of babies with vertex presentation. Deliveries and cesarean sections were blindly performed in different

health centers and hospitals by midwives, general practitioners, and specialists who did not take part in the abovementioned survey.

STUDY TYPE

The study was prospective, longitudinal, and descriptive.

DATA COLLECTION

From December 2007 to April 2008, the investigators regularly went over all the health centers and hospitals in the Huye District to look for deliveries of nulliparae involved in the abovementioned survey. Apart from the pelvic and anthropometric measurements (taken during the survey), the only medical parameters to be considered for this study were the mode of delivery, the fetal presentation (vertex), and singleton live birth.

DATA ANALYSIS

Chi square test (with Yates correction) was used to compare observed proportions, the difference being significant for $p < 0.05$.

RESULTS

HEIGHT OF PATIENTS AND CESAREAN SECTION

Cesarean section was more frequent in patients who were less than 150 cm (33.3 %) and less frequent in those who were 170 cm and beyond (10 %). Cesarean section rate progressively decreased as height increased, but the difference was not significant (table I).

Table I. Height of patients and cesarean section

HEIGHT (cm)	WAY OF DELIVERY		p
	Per vaginam (N=120)	Cesarean (N=32)	
< 150	14 (66.7 %)	7 (33.3 %)	0.412
150 – 159	65 (79.3 %)	17 (20.7%)	
160 – 169	32 (82.1 %)	7 (17.9%)	
≥ 170	9 (90 %)	1 (10 %)	

WEIGHT OF PATIENTS AND CESAREAN SECTION

The frequency of cesarean section was highest in patients weighing less than 50 Kg (35.7%), and lowest in those weighing 60 Kg and beyond (15.6 %). Cesarean section rate was inversely proportionate to weight, but the difference was not statistically significant (table II).

Table II. Weight of patients and cesarean section

WEIGHT (Kg)	WAY OF DELIVERY		p
	Per vaginam (N=120)	Cesarean (N=32)	
< 50	9 (64.3 %)	5 (35.7 %)	0.211
50 - 59	57 (77 %)	17 (23 %)	
≥ 60	54 (84.4 %)	10 (15.6 %)	

PELVIS DIAMETERS AND CESAREAN SECTION

Relations between pelvis measurements and cesarean section in parturient nulliparae are shown in table III

Table III. Pelvis diameters and cesarean section in parturient nulliparae.

DIAMETER (cm)	WAY OF DELIVERY		p
	Per vaginam (N=120)	Cesarean (N=32)	
BIILIAC : < 22	11 (68.7 %)	5 (31.3 %)	0.290
≥ 22	109 (80.1 %)	27 (19.9 %)	
ASIID : < 20	7 (77.8 %)	2 (22.2 %)	0.929
≥ 20	113 (79 %)	30 (21 %)	
INTERTR : < 26	23 (71.9%)	9 (28.1 %)	0.269
≥ 26	97 (80.8 %)	23 (19.2 %)	
BCQUE : < 17	23 (71.9%)	9 (28.1 %)	0.269
≥ 17	63 (80.8%)	13 (19.2 %)	
INTERTU : < 8	4 (44.4 %)	5 (55.6%)	0.009
≥ 8	116 (81.1 %)	27 (18.9 %)	
BASE/TR : < 11	0 (0.00%)	4 (100 %)	0.000
≥ 11	120 (81.1 %)	28 (18.9 %)	

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Biiliac Diameter and cesarean section

There were proportionally more cesarean sections in women with a biiliac diameter smaller than 22 cm (31.3 % versus 19.9 %). The difference was not significant.

Antero-Superior Iliac Interspinous Diameter and cesarean section

Cesarean sections rate in patients with an ASII diameter smaller than 20 cm was almost similar to that in those with a greater size (22.2 % versus 21 %). Consequently, there was no difference.

Intertrochanter Diameter and cesarean section

Intertrochanter Diameter smaller than 26 cm was associated with relatively more cesarean sections (28.1 % versus 19.2 %), but the difference was not significant.

Antero-Posterior (Baudelocque's) Diameter and cesarean section

Cesarean sections rate was also obviously higher in patients who had a Baudelocque's Diameter smaller than 17 cm (28.1 % versus 19.2 %), but the difference was not significant.

Intertuberous Diameter and cesarean section

The cesarean sections rate was highest in patients with an Intertuberous Diameter smaller than 8 cm (55.6 % versus 18.9 %). The difference was highly significant.

Base length of the Trillat's triangle and cesarean section

A base length smaller than 11 cm was associated with the highest cesarean sections rate (100 % versus 18.9 %). The difference was highly significant.

DISCUSSION

The ability to predict success for vaginal birth, apart from intrapartum factors, has always been the main preoccupation of midwives, medical practitioners and practicing obstetricians in the labor room.

The situation becomes crucial when pregnant women attend less an antenatal clinic, prefer to give birth at home, and only report in case of failure. This is the sad reality that occurs daily in rural areas of Rwanda, although the fact that after much effort antenatal clinic attendance is currently increasing in the country. The consequence is the burden borne all their life by young women who experienced a uterine rupture or an irreparable vesico-vaginal or recto-vaginal fistula (even both).

Height less than 150 cm has been shown to be associated with cesarean section in pregnant women [4, 10]. Our data demonstrate such tendency but do not show a significant relation, due probably to the fact that the sample is narrow.

Weight gain has also been incriminated into dystocia [3, 6, 7], and our data distribution seems to indicate a certain association between weight less than 50 Kg and cesarean section. The statistical significance level could also be due to a sample size problem. Besides and as we assumed it elsewhere [11], the weight aspect has to be relativized in the current study, since it was assessed in the second or third quarter of pregnancy and did not represent either the prepregnancy situation (and more precisely the prepregnancy body mass index) or the full gain at delivery.

As for pelvic diameters, the two (Intertuberous Diameter and Base of the Trillat's triangle) that show a highly significant association with cesarean section are respectively related to lower and midpelvis.

Our study aims at providing a cheap predictor tool that could be used by everyone on an individual basis and with full knowledge of the facts compared with the clinical evolution.

Thus, further and most accurate studies on more important population sizes are needed to assess the relevance of anthropometric parameters and external pelvic diameters in the prediction of contracted pelvis before and after onset of labor in resource-limited countries.

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