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Research Article

Epidemio-Clinical Factors Associated with Caesarean Section in Two Referral Hospitals (Public/Faith-Based), Far-North Region, Cameroon

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Abstract Caesarean section incurs significant cost and poses a hindrance to healthcare. The aim of the study was to determine maternal, foetal outcomes and cost. This was a cross sectional study conducted at the two health facilities. The study covered an eight month period. The rate of caesarean section was 5.69% and 6.22% at the semi-urban and rural hospital. Adolescents were predominant (27.86%) in the semi-urban group. 70% of the mothers in the rural environment were uneducated. Prenatal consultation of four was carried out by 92% of the rural women. Cephalo-pelvic disproportion remained the main indication for surgery. The type of anaesthesia was general (96.72%) and spinal (83.33%). Post-operative complications were dominated by haemorrhage and infection. The mean cost for surgery was 80.000 F in the semi-urban area. At the rural hospital the cost fixed at 19.000 and 32.000 F. The cost of surgery in the two hospitals is cheap compared to other healthcare facilities in the Country.

Keywords caesarean section; maternal and perinatal mortality; maternal morbidity; rural; semi-urban; cost

1 Introduction

With the introduction of the principle of infection prevention and the use of antibiotics, there has been a steady increase in the number of caesarean sections performed all over the world. Likewise, morbidity and mortality associated with caesarean section is on the decrease all over the world [3]. This situation is similar for both developed and the developing countries but with a varied rate for caesarean section. A study carried out in France showed a progressive increase of caesarean section rate from 10.9% in 1981 to 19.6% in 2003 [3]. The same observation was reported for Greece (13.8% to 29.9% between 1977 and 2000) [10]. The rate of caesarean section is much higher for some countries, Brazil 36% in 1996, Latin America 33% in 2005 [9]. The rate is much lower in Africa, Zimbabwe 2.2% to 16.8% in 1993 [7]. A study carried out in Dakar showed an increasing caesarean section rate of 12% in 1992 to 25.2% in 2001 [11]. The rate of cesarean section in Cameroon varies between 2% and 3%, with higher rates reported for the main teaching hospitals in Yaounde, 10.3% for CHU in 2000 and 11–13% for the Central hospital Yaounde [4]. The complications of caesarean section are again similar especially in the developing countries. Other authors [5] reported that preoperative morbidities were dominated by haemorrhage and postoperative complications by infection. However, a study carried out in Cameroon on the complications of caesarean section reported bladder injury to be the commonest (2.3%), closely followed by haemorrhage (1.9%), with fever occurring in 51.9% of the patients in the postoperative period. Added to these morbidities associated with caesarean section is the financial constraint the operation causes on the family already hard hit by the economic crisis.

The Far-North region is the most populated of the regions in the country, but is the least covered as concerns health infrastructure and personnel distribution. This notwithstanding caesarean section is practiced there and most often by less competent staff. Two health facilities, one in a rural setting (Tokombere) and the other semi urban (Regional Hospital Maroua), serve as referral centers where caesarean section is regularly carried out. General Practitioner and nurses constitute the staff at the Tokombere hospital, while the Regional hospital has the only practicing Obstetrician and Gynaecologist in the region. Tokombere is a faith-based health facility and Regional Hospital Maroua is a public hospital, a difference that may influence the rate of caesarean section, the indication, the cost and why not patient care. The study objectives were to determine the quality of antenatal care, the indications, duration of

hospitalization, maternal and foetal outcome as well as cost of caesarean section in two referral hospitals (faith-based/public).

2 Materials and methods

This was a cross-sectional and analytic study carried out between the 1st of February and 30th of September 2007, a period of eight months. The study setting was the Tokombere faith-based hospital (rural) and the Regional Hospital Maroua (semi-urban). These two hospitals serve as referral centers and carry out delivery by caesarean section. The Tokombere health district is found within one of the most populated divisions of the Far-North Region and the Regional Hospital Maroua is in the headquarters of the region. At the Regional Hospital about 100–120 deliveries are conducted each month and having served as Obstetrician and Gynaecologist in the region, the health needs of the population are clear to us. The service is a total of 24 beds, including the three beds in the labor room. The gynaecological ward at the Tokombere hospital is similar to that of the regional hospital with 20 beds. The financial constraint caused by economic crisis, the distance separating the different healthcare facilities and the under staffing contribute to the high materno-foetal morbidity and mortality in the region. During this period, all women admitted for an elective caesarean section or those indicated after onset of labor within the health facility or referred from another health district were included. Only files of patients without a precise indication for surgery were excluded from the analysis. Data collection was done using a pre-tested questionnaire. Patients were interviewed before and after surgery. The surgical term and nurses in each of the hospital was taught to file the questionnaire. The objectives of the study were clearly explained to the patients and they freely accepted to participate. Epidemiologic and clinical variables, age, marital status, profession, level of education, parity, antenatal care, indication for surgery, duration of hospitalization, complications, maternal and foetal mortality, and cost of surgery were evaluated. The rate of caesarean section was calculated as a percentage of the total number of deliveries during the period of study. Evaluating the cost of surgery for the rural hospital was easy because they practiced a fixed rate of 19.000 F CFA for patients followed up within the hospital and 32.000 F CFA for patients referred. A total of 91 women met our inclusion criteria, 61 of them in the RHM and 30 at the Tokombere faith-based hospital. All information collected remained confidential and the study had no influence on the treatment administered in the two groups.

The data was analyzed using the software Epi info 06 and presented using tables, Pie charts and histograms. The Chi square test was used to compare variables between the two hospitals and a P value $< .05$ was considered to be statistically significant.

Age group (years)	Regional Hospital Maroua		Faith-based hospital		Total	
	n	%	n	%	n	%
15–20	17	27.9	6	20.0	23	25.3
20–25	16	26.2	8	26.7	24	26.4
25–30	6	9.8	5	16.7	11	12.1
30–35	12	19.7	2	6.7	14	15.1
35–40	10	16.4	9	30.0	19	20.9
Total	61	100	30	100	91	99.8

Table 1: Age distribution.

Level of education	RHM		Faith based	
	n	%	n	%
Analphabet	17	27.9	21	70
Primary	20	32.8	5	16.7
Secondary	23	37.7	4	33.3
University	1	1.6	00	00
Total	61	100	30	100

Table 2: Level of education.

3 Results

The adolescent (15 to above 20 years) age group (27.9%) was most represented at the regional hospital Maroua, and the 35–40-year age group (30%) was at the faith-based hospital, Tokombere. The percentage of married women in the two groups was high, 95% and 90% for the RHM and the faith-based health facility, respectively (Table 1).

In the semi-urban milieu 32.8% and 37.7% had a primary or secondary level of education, while in the rural milieu 70% of the women were analphabets. The difference was statistically significant $P = .0018$ (Table 2).

In the two populations, housewife was the predominant occupation, 82% and 87% for RHM and the faith-based health facilities, respectively. The difference was statistically non-significant $P = .63$.

The Christian faith was predominant both in the semi-urban and rural areas, and the difference was statistically significant (59.1% and 60%, resp.) $P = .0025$.

High-risk factors found in the two populations consisted of previous caesarean scar, hypertension, cardiac disease and multiple pregnancies in 19.7%/26.7%, 16.4%/6.7%, 1.6%/3.3% and 8.2%/10% of the women in the semi-urban and rural milieus, respectively.

More premature pregnancies were delivered by caesarean section (53.3%) in the rural environment, with a statistically significant difference ($P = .01$) (Table 3).

In the two populations, 85% and 87%, respectively had at least an antenatal consultation. However, using the number of consultations to evaluate quality, 40.4% of the

Gestational age	RHM		Faith based	
	n	%	n	%
28–37	11	18	13	43.3
37–42	50	82	16	53.3
> 42	00	00	1	3.4
Total	61	100	30	100

Table 3: Gestational age.

Apgar score	RHM		Faith based	
	n	%	n	%
0	00	00	00	00
1–4	00	00	1	3.6
4–8	1	1.5	1	3.6
8–10	60	98.5	28	92.8
Total	61	100	30	100

Table 5: Five-minute Apgar score.

Indication	RHM		Faith based	
	n	%	n	%
Cephalopelvic disproportion	28	45.9	13	43.3
Foetal distress	7	11.5	4	13.3
Multiple pregnancy	9	14.8	2	6.7
Previous uterine scar	8	13.1	4	13.3
Foetal macrosomia	2	3.2	00	00
Others	7	11.5	7	23.3
Total	61	100	30	100

Table 4: Indications for caesarean sections.

Weight of newborn	RHM		Faith based	
(grams)	n	%	n	%
< 2000	5	8.6	2	6.3
2000–2500	5	8.6	3	9.4
2500–3500	34	55.7	19	62.5
3500–4000	11	17.1	6	21.9
4000–5000	6	10	00	00
Total	61	100	30	100

Table 6: Birth weight of newborn.

women seen at the RHM had four or more consultations against 92.3% in the faith-based hospital; the difference was statistically significant $P = .0001$. When other criteria such as prophylaxis against malaria and the use of haematinics were analyzed, a better patient care was seen for the RHM. The rate of screening for HIV was the same in the two groups (46.2%). The other routine laboratory tests done in pregnancy such as ultrasonography, blood group typing, haemoglobin electrophoresis, screening for syphilis were requested more at the RHM.

Spinal anaesthesia (83.3%) was most used in the rural setting, while general anaesthesia without endotracheal intubation (96.7%) was most used at the RHM.

Emergency caesarean section predominated in the two groups (90.2% and 86.7% for the RHM and the faith-based hospital, resp.). Cephalo-pelvic disproportion was the main indication for surgery in the two groups (45.9% and 43.3% at the RHM and the faith-based hospital, resp.) (Table 4).

All the babies were born alive with an Apgar score of five at the fifth minute (98.5% and 92.8% at the RHM and the faith-based hospital, resp.). Perinatal foetal loss of (3)4.3% and (4)12.5% of the babies was reported in the two groups (Table 5).

The number of premature deliveries was about the same for the two centers (17.2% and 15.7%, resp.). Ten percent (10%) of the babies born at the RHM were macrosomic (birth weight $\geq$ 4000 gm). In the rural area, no baby weighed more than 4000 gm (Table 6).

At delivery, the female sex was slightly predominant in the two hospitals (53% and 56%, resp., in the semi-urban and rural milieus). Post-operative morbidity was rare in the two hospitals with more than 95% uneventful postoperative follow-up. Fever was reported in 1.6% and 3.3% of the women in the semi-urban and rural milieus, respectively, and consisted mainly of endometritis and wound infection. Haemorrhage constituted the first of maternal morbidity and was commoner in the rural women (16.7%). Maternal mortality was reported in the rural milieu, in 3.3% of the women.

Most of the women were discharged within 7–10 days of admission in the two groups (85.5% and 76.7%, resp.). At the RHM, 9.8% of the women were discharged before the seventh day of hospitalization. However, more women stayed for a longer period at the rural hospital (23.3%), with a statistically significant difference $P = .009$.

4 Discussion

The rate of caesarean section was similar in the two hospitals (5.7% and 6.2% at the RHM and the faith-based hospital, resp.). These values are about the rates prescribed by WHO, though lower than that for reference hospitals of CHU Yaounde and the Central Maternity, Central hospital Yaounde [3, 10]. The caesarean section rate coupled with good materno-foetal outcome confirms the fact that these two centers serve as reference hospitals for the Far-North Region and efforts should be made to better patient referrals. Adolescents were most represented in the semi urban area (27.9%), while the 35–40 years age group was most represented in the rural milieu (30%). The proportion of adolescents is due to the fact that more school girls have unwanted pregnancy or early marriages that are common in the environment. Access to family planning or a tendency to limit family size is commoner in town

than in the rural environment. In the rural area, multiparity and non-access to family planning, coupled with the fact that the personnel is less competent may lead to the higher number of caesarean section amongst the 35–40 year age group. The results are different from those reported by Sugewe [10].

In the two groups, most of the women were married. The number of non-schooling women was high in the rural environment (70%), as against 29.5% in the semi-urban area. This behavior has as consequence early marriage and thus explains the increased number of adolescents found in the rural area. The chance for a girl child to go to school is higher in town than in the rural area. The BMI was within normal limits (93.3%) in the rural area; contrary to 54.1% in the semi-urban area. Twenty percent (20%) of the women in the semi-urban area were obese. Life style in town and change of food habits because of the cosmopolitan nature may greatly influence weight gain. In the rural area, farm work and other household activity is the burden of the woman. Obstetric risk factors seen in the two groups were similar (uterine scar, hypertension, cardiopathy and multiple pregnancies). Previous uterine scar was found in the secundiparous women in town (45.9%) and among the multiparous in the rural area (43.3%). The tendency to have more qualified staff in town may explain the difference. However, the results are similar to those reported by Sugewe [10] and Dipanda [5]. Like Sugewe [10] and Sone [9] the caesarean sections were carried out at term in the semi-urban area (82%) but lower than that reported by Akam [2] of 90.1% and higher than that of Dipanda [5] 68.6%. Though the majority of the women had at least an antenatal consultation, more women in the rural area had four or more consultations. Evaluating the quality of consultation, the women were better followed-up at the semi-urban milieu. More trained personnel are found in town and the pyramidal structure of our health system makes it possible for new knowledge and refresher courses to get to the urban centers before the rural environment.

Spinal anaesthesia was frequently used in the faith-based hospital (83.3%), while general anaesthesia without endotracheal intubation (96.7%) was the predominant type of anesthesia in the semi-urban milieu. These findings are slightly higher than that of Adisso [1], who reported an 86.7% use of general anaesthesia. Spinal anaesthesia is ideal for caesarean section since the foetus is not affected. However, it carries a risk of hypotension which may be deleterious to the mother and the foetus. On the other hand, it is risky administering general anaesthesia without intubation in situations of emergency, as the Mendelson syndrome is a common consequence. Spinal anaesthesia remains the most recommended route for caesarean sections except in situations of acute foetal hypoxia because the anaesthetic drug may affect the foetus. Loco regional or spinal anaesthesia is cheap and can be carried out by less qualified staff as was the case in the rural area.

The indications for surgery were similar in the two health facilities, with cephalo-pelvic disproportion topping the list (45.9% and 43.3% in the RHM and the faith-based hospital, resp.). The results are similar to that reported by Sugewe [10]. The personnel in the faith-based hospital was made of anaesthetic nurse and nurses, while at the RHM there is an Obstetrician and Gynaecologist plus anaesthetic nurse, and nurses. Though the caesarean section rates were similar in the two hospitals, the difference in quality of personnel influenced the indications for surgery, with foetal distress occupying the second position at the rural level, while it occupied the fourth position at the RHM. Dipanda [5] also found foetal distress as the second indication for caesarean section in his series. Multiple pregnancies were the second indication for caesarean section in the semi-urban area (14.8%). It has been shown that twin gestation is commoner amongst certain tribes in Cameroon and the cosmopolitan population distribution in town may explain this finding.

Generally, foetal outcome was again similar in the two health facilities with 98.5% and 93% good Apgar score recorded in the semi-urban and rural milieus, respectively. There was no case of intrapartum death but perinatal loss of 43.5/1000 and 25/1000% of the babies born at the RHM and the faith-based hospital was reported. This rate of perinatal loss appears lower than reported by Sugewe [10], Ouedraogo et al. [6] and that reported for different health institutions by Benin [8]. The above-mentioned prevalence is slightly higher than that reported in the EDS 2004 [7] 29/1000 and 34/1000 for the country and the Far-North Region, respectively.

Though the rate of complication was low in the series, this was dominated by haemorrhage and infection in 16.7%, 10% and 6.6%, 3.3% of the women in the rural and the semi-urban area, respectively. The reported prevalence in our series is much lower than reported by other authors [5, 6, 8]. No case of maternal mortality was reported in the semi-urban area, while a mortality rate of 1110/100.000 was seen in the rural milieu. This value is much higher than the 669/100.000 live births reported for the country [7] or the rates reported for the developed world.

Hospital stay in the two groups was similar, with the majority of patients discharged within 10 days of hospitalization. However, 5% of the patients in the semi-urban area and 20% of those in the rural area stayed more than 10 days. This difference was found to be statistically significant $P = .009$. Financial constraint, post-operation infectious complication and the distance separating home and the hospital prolonged the hospital stay. The cost of surgery was fixed for the faith-based hospital while it was varied for the RHM

with a mean of 80.000 F CFA. These amounts remain very low when compared to other health facilities in the country.

5 Conclusion

Despite the differences in the type of health facility infrastructure, cost outlay and personnel qualification, the outcome of caesarean section was similar in the two hospitals leading us to conclude that caesarean section competence could be handed to junior staff and the cost of the operation can be made cheaper. The influence of the pyramidal health delivery system was clearly demonstrated as more women were seen at antenatal care at the rural milieu, but the quality of antenatal care was better at the semi-urban center. There was a higher utilization of the spinal anaesthesia technique at the rural level than at the semi-urban milieu. In this era, when there is personnel shortage and health is becoming a burden on the budget of the family, the experience of the two health structures could be extended to other health facilities. Secondly, hands-on training of the Para-Medical Staff on emergency obstetrics, especially at the district level, will help in the reduction of maternal and foetal mortality and morbidity, thus favoring the attainment of the 5th millennium development goal by the year 2015 in the country.

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