

Monitoring of Upward Trend of C-Sections Performed Per Year at An Egyptian University Maternity Hospital: *An Economic Barrier in Low-Income Countries*

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Abstract

This study estimates the global numbers and understands the indications of C-sections at Ain Shams University Maternity Hospital (ASUMH) in Cairo, Egypt. It is retrospective study on C-sections rates and indications of 62903 women admitted to both emergency and high-risk obstetric units over a 5-year period (from January 2010 till December 2014). Data were obtained from patient records available at "Patient Records Department" at ASUMH. Missing data were collected through phone calls or direct contact with the patients or their relatives. The global rate of C-sections was 30.5%. Rates at the emergency and the high-risk units were 29.88% and 32.11% respectively. The annual rate of C-sections increased in the emergency unit significantly ($p < 0.05$) from 16.79 % in 2010 to 27.96 % in 2014; also the rate was increased in the high-risk unit significantly ($p < 0.05$) from 6.68 % in 2010 to 15.9 % in 2014. The leading causes were repeat C-sections (42.84%), failure to progress in labor (13%), PROM (7%), preeclampsia/eclampsia (6.17%), multiple pregnancy (5.64), malpresentations (4.75%) and medical disorders complicating pregnancy (4.25%). Vaginal birth after caesarean (VBAC) was attempted in 3158 women and was successful in 36.57%.

Keywords

C- section rates; indications

I. Introduction

C-section was performed in clinical situations as a life saving procedure both for the mother and the fetus. As any surgical procedure of some complexity, its indication follows the health management inequity pattern of the world: underuse in low income countries, and adequate or even unnecessary use in middle and high income countries [1-4]. In a study done by Gibbons and colleagues [5], 54 countries had rates of less than 10%, while 69 countries showed rates of more than 15%. There is a clear inverse relationship between rates of C-sections and maternal and neonatal morbidities and mortalities [6-7]. The incidence of C-sections has increased significantly in Egypt [8]. It is estimated that a C-section is carrying one of every six births today in Egypt out. This figure is almost three times higher than the early 1990s, this dramatic increase raises several concerns of medical, ethical and economic importance [9]. Further, the public health significance of this increase is strongly debated. This was based on the following statement by a panel of reproductive health experts at a meeting organized by the World Health Organization (WHO) in 1985 in Fortaleza, Brazil: "There is no justification for any region to have a rate higher than 10-15%". The panel's conclusion was drawn from a review of the limited data available at the time, mainly from northern

European countries that demonstrated good maternal and perinatal outcomes with that rate of C-sections [10]. In this study, we set out to update previously published estimates of the global numbers and the indications of C-sections and to discover why the numbers are continuously rising at a tertiary health care University Hospital in Cairo, Egypt.

II. Patients and Methods

It is a retrospective study was performed at Ain Shams University Maternity Hospital, a central tertiary referral hospital in Cairo, Egypt. Data were obtained on numbers of C-section and indications from the medical records, of 62.903 women delivered over a 5-year period (January 2010 - December 2014), available at "Patient Records Department" at ASUMH. The department of Obstetrics and Gynecology in ASUMH includes 2 units, the emergency unit and the high-risk obstetric unit. The emergency unit receives referrals from private and other public units with obstetric emergencies. Therefore, Women in the emergency unit are a mix of low as well as high-risk cases as many women just turn up for normal delivery. Cases with high risk obstetric complications admitted through the emergency unit were referred into the high-

risk unit for further management. The high-risk obstetric unit receives women referred with high-risk obstetric complications either from the emergency unit or the antenatal clinics. Both units operate independently with 24 hour working shifts. The main indications for CS documented in the notes were reported. In case of absence of an indication, maternal request or more than one indication, the cause was reported as other indications. All caesarean sections were carried out after consultation with approval of the obstetric consultant on call. Ethical approval to publish the results of this study was obtained from the ethics committee of ASUMH.

III. Results

There were a total of 62.903 women admitted at Ain Shams University Maternity Hospital during the period between January 2010 and December 2014.

Table 1 shows that the number and percentage of vaginal deliveries and C-sections at both the emergency and high-risk units.

Table 1: Overall rates of Caesarean delivery (2010-2014).

	Emergency unit (%)	High-risk unit (%)	Total (%)
Vaginal delivery	31.983 (70.12)	11.738 (67.89)	43.721 (69.5)
C- section	13.629 (29.88)	5.553 (32.11)	19.182 (30.5)
Total	45.612	17.291	62.903

On the other hand, table 2 and figures (1 & 2) show a steady increase in the rate of C-sections in both emergency and high risk units accompanied by a steady decrease in the rates of vaginal births.

Table 2: Annual rates of Caesarean section (CS) and vaginal birth (VB) over 5 years (2010-2014).

Year of study	Emergency unit (%)		High-risk unit (%)		Total
	CS	VB	CS	VB	
2010	2.143 (16.79)	7.643 (59.89)	853 (6.68)	2.123 (16.64)	12.762
2011	2.512 (17.96)	7.574 (54.15)	869 (6.21)	3.033 (21.68)	13.988
2012	2.892 (21)	7.481 (54.32)	982 (7.13)	2.418 (17.56)	13.773
2013	2.989 (26.41)	5.192 (45.87)	1.090 (9.63)	2.048 (18.1)	11.319
2014	3.093 (27.96)	4.093 (37)	1.759 (15.9)	2.116 (19.13)	11.061
Total	13.629 (21.67)	31.983 (50.84)	5.553 (8.83)	11.738 (18.66)	62903
P-value	The Chi-square statistic is 10.0513. The P value is 0.001522*. This result is significant at $p < 0.05$.		The Chi-square statistic is 5.4912. The P value is 0.019112*. This result is significant at $p < 0.05$.		

Chi square test; *significant

Figure (1): The rising trend of cesarean delivery in emergency and high-risk units.

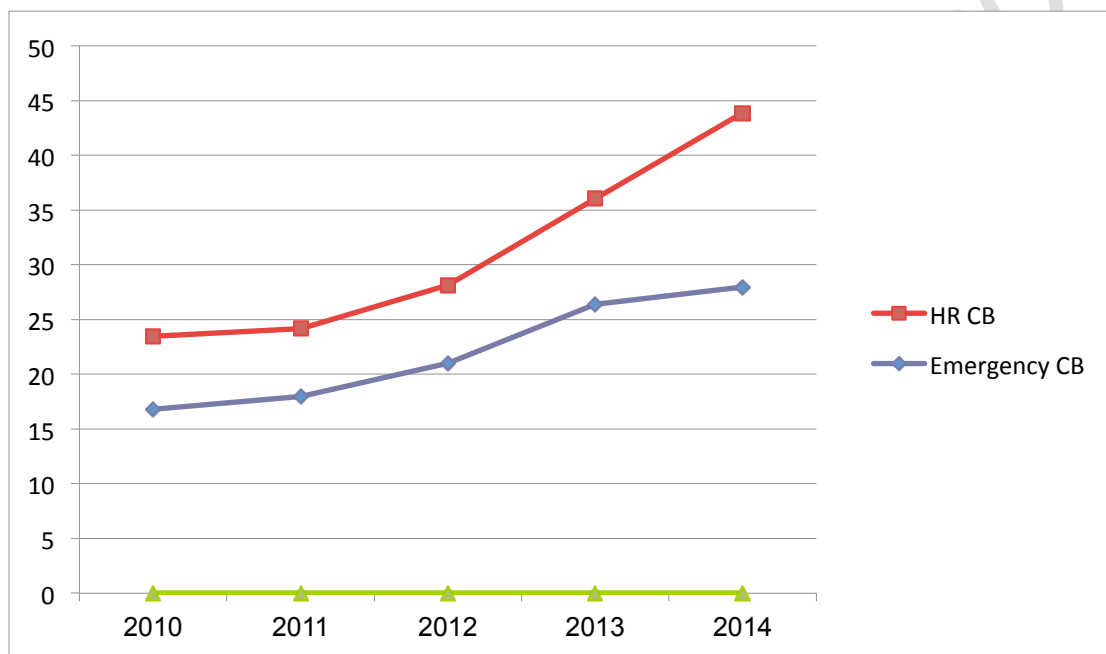


Figure (2): The trends of cesarean delivery (in red) and vaginal birth (in blue) over the over 5 years (2010-2014).

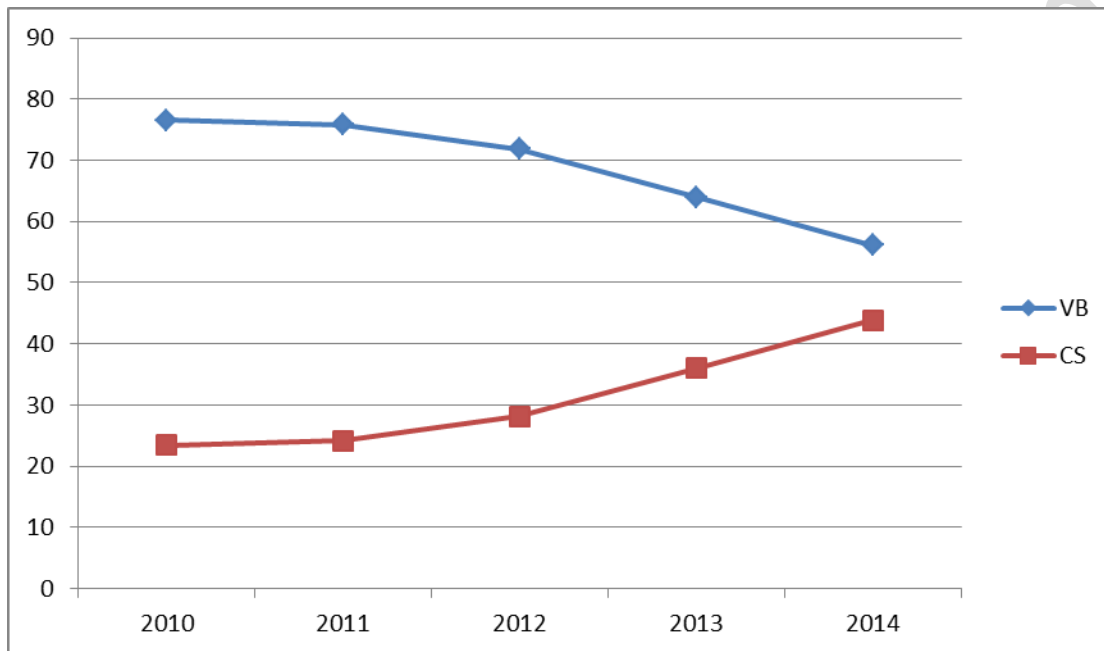


Table 3 showed that the leading indications for C-sections were repeat cesarean, followed by failure to progress in labor and preeclampsia and eclampsia. Cesarean hysterectomy was indicated in 1.7% of cases because of morbid placental adhesions after previous caesarean deliveries.

Table 3: Indications of Caesarean delivery at the emergency and high-risk obstetric units

Indication	Emergency unit	High risk unit	Total (%)
Repeat cesarean	6.391	1.826	8.217 (42.84)
Failed progress of labor	2.045	448	2.493 (13)
PROM	834	513	1.347 (7)
PE/eclampsia	768	415	1.183 (6.17)
Multiple pregnancy	661	421	1.082 (5.64)
Malpresentations	645	267	912 (4.75)
Placental previa	308	349	657 (3.43)
Abruption placentae	362	121	483 (2.52)
Acute fetal distress	295	114	409 (2.13)
Medical disorders	284	492	776 (4)
Cesarean hysterectomy	231	99	330 (1.7)
Other indications	805	488	1.293 (6.74)
Total	13.629	5.553	19.182

PROM= Premature Rupture of Membranes; PE=Preeclampsia; Other indications included maternal request

Table 4 shows that the percentage of successful attempted vaginal birth after caesarean delivery (VBAC) (n=3158). Vaginal Birth after Cesarean Delivery (VBAC) was 26.82% in the emergency unit and 9.75% in the high-risk units.

Table 4: Attempted vaginal birth after caesarean delivery (VBAC) (n=3158). Vaginal Birth after Cesarean (VBAC) was 26.82% in the emergency unit and 9.75% in the high-risk units.

Parameter	Emergency unit %	High risk unit %	Total (%)
Successful vaginal delivery	847 (26.82)	308 (9.75)	1155 (36.57)
Failed (cesarean section)	1291 (40.88)	712 (22.55)	2003 (63.43)
Total	2138 (67.7)	1020 (32.3)	3158

IV. Discussion

The current retrospective study was carried out to estimate C-section rates and indications of 62,903 women admitted to the obstetric emergency and high risk departments over a 5-year period (from January 2010 till December 2014) at a tertiary maternity hospital, Ain Shams University Maternity Hospital. The C-section rates limits used to define underuse and overuse may be a matter of concern since any classification has some constraints but it is evident that C-section rates are progressively increasing in most of countries [11]. The point-of-care is the overall rate of delivery by CS which was 30.5%. This rate is higher than other rates quoted from different parts of the world, both in the developing and developed countries [5-7]. The causes for the dramatic increase in C-section rates though not obvious are somewhat complex. In fact Ain Shams University Maternity Hospital is one of the largest tertiary referral hospitals in Cairo and manages women with any obstetric complication from a wide geographical area so the figures are nonetheless striking. The classification of obstetric services into emergency and high-risk units does not mean that cases admitted to the emergency unit were not high risk. Actually, many women in this unit were referred with life threatening obstetric complications from private practice

and public hospitals. C-section rates at the emergency and high-risk units in Ain Shams University Maternity Hospital were steadily increased from 23.47% at 2010 to 43.86% at 2014. These rates were higher than those available from other parts in Egypt and from many other Arab countries [12-14]. Nevertheless, some features are peculiar to the Egyptian case and account for the high rate of C-sections; firstly is defensive obstetrics, which is another common reason for high rates of CS. It has been observed that 82% of physicians performed CS to avoid negligence claims [15]. Also, the observed unwillingness of some doctors to allow pregnant women who previously went through a cesarean section to undergo a vaginal birth is considered one of the reasons that cesarean rates are higher than recommended with low rate of success of VBAC (36.57%). Moreover, it is clear that instrumental delivery is a lost art among Egyptian hospitals. There is absence of any evidence of attempted instrumental (ventouse or forceps) births in many private practice and public hospitals where it may have been successful, and lastly is the lack of a dedicated anesthetic staff to offer regional analgesia within the labor wards. By international standards, the rate of success of Vaginal Birth After Caesarean (VBAC) is close to 90% with a very low complication rate [15-16]. In Egypt, VBAC has also been found to be safe

with 90% success rate without complications [17] compared with only 36.57% in this study. The reason of this low success rate of VBAC at Ain Shams University Maternity Hospital is currently unclear and needs future investigations. The most common indication for CS in the present study was previous delivery by one or more C-sections. The National Collaborating Centre for Women's and Children Health in the UK [18] listed malpresentations, contracted pelvis and acute fetal compromise as main indications for CS. In this study, repeat caesarean was the leading indication for C-sections, followed by failure to progress in labor and preeclampsia and eclampsia. Caesarean hysterectomy was indicated in 1.7% of cases because of morbid placental adhesions after previous caesarean deliveries. These findings are similar to those reported by a number of other studies in developing countries, Gulfareen and co-authors (2009) found that repeat caesarean section was the commonest indication seen in 73 (19.2%) patients followed by failure of progress in 51 (13.4%) women, fetal distress in 48 (12.6%) patients and ante partum hemorrhage in 45 (11.8%) patients and other indications contributed to 16 (4.2%) of the cases [19]. In Saudi Arabia, previous single CS and previous multiple CS were also among the most common indications [20]. The reported rate of C-sections due to acute fetal distress in labor was very low (2.13%). This

may be explained by insufficient electronic fetal monitors during labor in Ain Shams University Maternity Hospital and in Egyptian public hospitals in general. It is necessary to advocate for a rationale use of CS in countries with a surplus and overuse of C-Section and deal with the problem where it originates. Concrete actions need to be taken to reverse the rapidly rising CS rate and consequently maternal morbidity and mortality [21-22]. Although it is hard to estimate an acceptable rate of CS at a tertiary referral obstetric hospital, the current rate at Ain Shams University Maternity Hospital seems to be unacceptably high. C-section arguably functions as a barrier to universal coverage with necessary health services. 'Excess' CS can therefore have important negative consequences for health equity both within and across countries. There are several successful examples in limiting unindicated cesarean sections for Egypt to learn from. For example, the US Healthy People 2000 initiative [23] which was begun in the early 1990s to decrease cesarean deliveries to 15%. Several models and approaches were used to reach the initiative aims, which were demonstrated to have strong impact on cesarean delivery rates [24]. These approaches comprise total quality treatment programs, maintained quality improvement schemes, benchmarking, active management of labor programs and incentive driven auditing [25-27]. These approaches

were implemented in several developing countries and were shown to work in low-resourced settings as well [28-29].

V. Conclusion

The rate of C-sections at ASUMH was 30.5%, which necessitates other comprehensive studies, to better understand the precise forces sustaining the rising trends in their wider context and to apply clear policies and guidelines to encourage an increase in vaginal deliveries in Egypt.

VI. References

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