

Inappropriateness in Health Treatments and its Impact on Economy: The Case of Caesarean Delivery in Bangladesh.

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1. Introduction

The expected growth in public health expenditure constitutes a relevant policy problem in almost all developing countries. Not surprisingly, improving spending efficiency while guaranteeing (or even improving) citizens' health is becoming a key challenge for policy-makers. A common suggestion to reach this goal coming from the policy-oriented literature is to improve service appropriateness: deliver appropriate services (at the lowest possible cost) would produce cost savings, while assuring citizens' health. Evidence on these potential savings is provided for instance for Bangladesh which displays a significant variation in different health facilities in the degree of inappropriateness. Moreover, this inappropriateness is shown to be strongly correlated with the expenditure. Improving the appropriateness of medical treatments could then clearly contribute to the efforts of containing public health expenditure, without reducing or limiting the quantity or quality of services to be supplied to patients.

A Caesarean section, also known as C-section is a surgical procedure in which incisions are made through a mother's abdomen (Laparotomy) and uterus (Hysterotomy) to deliver one or more babies. C-section can be a life saving operation when either a mother or her baby or both face certain problems before or during labor and delivery, although in recent times it has also been performed upon request for childbirths that would otherwise have been natural.

The incidence of C- sections is an indicator of inappropriateness commonly considered in the literature, and by policy-makers. Being a surgical procedure, a C- section is characterized by a large cost differential with respect to the alternative classical vaginal delivery (a medical procedure). Absent any therapeutic reasons, this latter treatment is generally considered an appropriate way of delivery, which can clearly help in containing health care costs.

An upward trend in the incidence of C-section deliveries is a well documented stylized fact at the international level. Both developing and developed countries have witnessed a dramatic rise in the rate of caesarian births during the last three decades (cai et al.,1998 Leung, Lam, Thach, Wan & Ho, 2001; Martin , Hamilton, Ventura, Menacker; & Park, 2002).

In the United States, where C- section was rated as the most common hospital surgical procedure (Burns, Geller & Wholey, 1995, Rutkow, 1986), it was estimated that half of the caesareans were medically unnecessary (Burns et al., 1995).

Similarly in Latin America, it was estimated that over 8,50,000 C- sections were unnecessarily performed on an annual basis (Belizan, Althabe, Barros, and Alexander, 1999). Without doubt this exposes mothers and their infants to unnecessary health risks (Schuitemaker et al., 1997) with drastic implications for the health system and the economy.

In fact, a growing body of research suggests that high C- section rates represent increased probability of negative health consequences for mother and child (Hemminki, 1991; Shearer, 1993) with probable adverse psychosocial impacts on the family (Mutryn, 1993). In addition to these negative health consequences, caesarean childbirths incur higher financial burden than vaginal deliveries (Shearer, 1993; Burns et al. 1995). This creates an economic burden not only on developed countries but more acutely on poor developing economies given their everlasting struggle with scarcity of resources.

For the lack of information and regulations to the appropriateness of C- section deliveries in Bangladesh, the incidence rate appears to be on the rise. The physicians are often responsible for inducing inappropriate demand for C-section deliveries mainly to maximize the provider's income. On the other hand the patient is faced with high economic costs, including payments to obtain drugs, to improve access and services offered for transport and to cater for care giver's services.

The majority of C-section consenting mothers comes from non-poor socio-economic background where physicians are exploiting their ability- to- pay consideration. On the other hand the above mentioned cost can become prohibitively expensive for the poor patients and their families who face catastrophic health care cost. So now it is need to take appropriate regulatory measures by the policy makers.

2. Objectives of the paper

In this perspective the present paper intends to highlight some crucial issues with regard to concerning health situation in Bangladesh. The paper in general aims depicting the general scenario of health issues in the last few

decades. Specifically in relationship with such changes the situation of this important health issues prevailing in Bangladesh concomitant with the global changes has been highlighted in this paper. Specifically the present paper aims at touching upon the following issues as follows:

- i) Analysis of the incidence rates of C-section deliveries in Bangladesh compare to the different income group level countries.
- ii) Identification of the reasons behind the high rate of C-section.
- iii) Estimation of average social costs to consumers for C-section performed mothers.
- iii) Identification of the appropriateness in performing caesarean delivery.
- iv) Identification of the economic status of the mothers who were undergone C-section deliveries.
- v) Identification of the rate of variation in the C-section by economic status.
- vi) Policy implications (suggesting specific guidelines in Health Policy to make C-sections more restrictive and case specific).
- vii) Analysis of the Global changes in the C-section rate.

3. Global Scenario of C-section Rates

An upward trend in the incidence of C-section deliveries is a well documented stylized fact at the international level. C-section rates have been progressively increasing ever since the 1970's in most of the countries in the world.

The WHO, which reviewed nearly 110,000 births across Asia in 2007-2008, found 27 percent were done under the knife, partially motivated by hospitals eager to make more money.

The Asian survey examined deliveries in 122 randomly selected public and private hospitals in 2007 and 2008 across Cambodia, China, India, Japan, Nepal, the Philippines, Sri Lanka, Thailand and Vietnam. The hospitals were located in capital cities and two other regions or provinces within each country, all logging more than 1000 births a year. China's 46 percent C-section rate was followed by Vietnam and Thailand with 36 percent and 34 percent respectively. The lowest rates were in Cambodia with 15 percent and India with 18 percent. The most dramatic findings were in China where 46 percent of births reviewed were C-section-a quarter of them were not medically necessary.

That mirrors similar results reported by WHO in 2005 from Latin America, where 35 percent of pregnant women surveyed were delivering by C-section. In Latin America, C-section rates in all eight countries surveyed earlier by WHO were 30 percent or higher-similar to the U.S. rate. In Paraguay, 42 percent of deliveries were by caesarean, and in Ecuador the rate was 40 percent.

In the USA, where C-sections are at an all-time high of 31 percent, the surgery is often performed on older expectant mothers, during multiple births or simply because patients request it or doctors fear malpractice lawsuits. A government panel warned against elective c-section in 2006. The present state of the global C-section rates according to the World Bank's classification based on GNI per capita are given below .

Table 1: Global C-section Rates

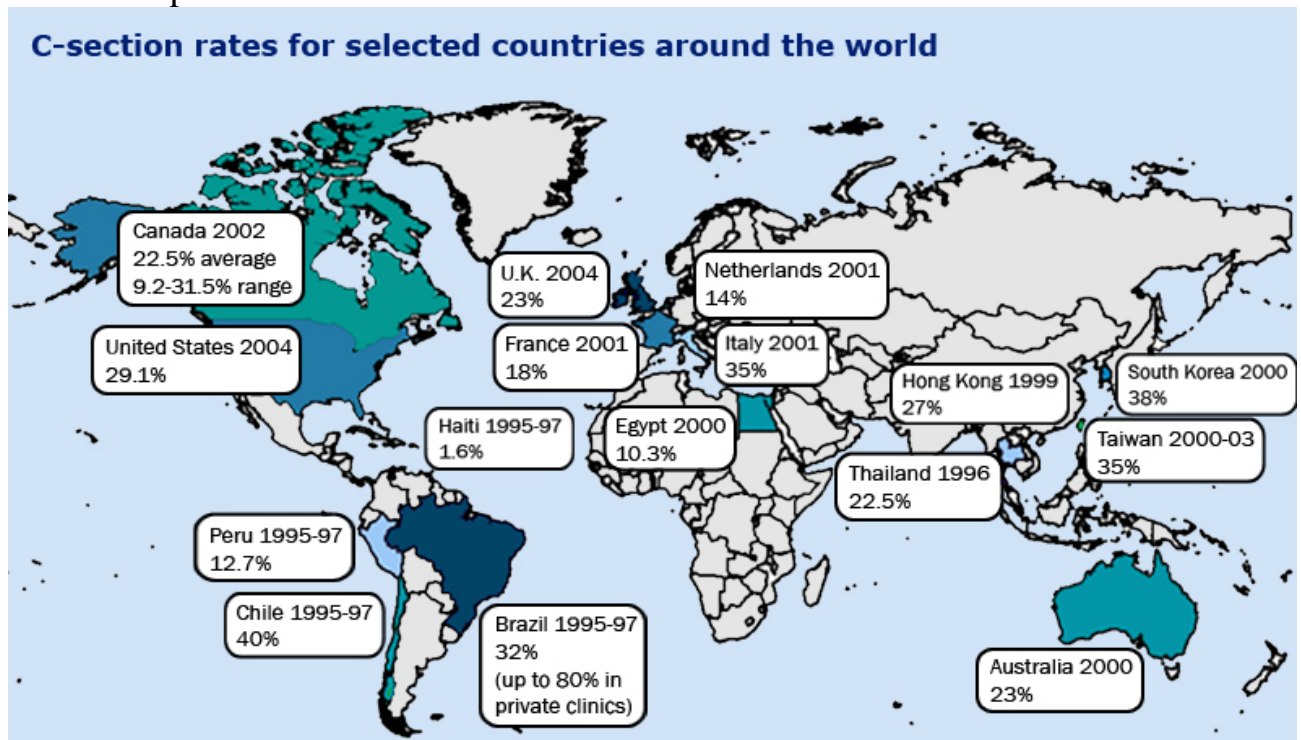
Group/ Country	Birth by C-section (%)	Average percentage of C-section	(Year)
Low Income Countries (LIC)		7.8	
Bangladesh	11.8		2009
India	7		1998-1999
Bhutan	15		2002
Vietnam	10		2002
Haiti	2		2002
Cambodia	1		2002
Lower Middle Income Countries (LMIC)		17.58	
Paraguay	18		1995-1996
Philippines	7		2003
Thailand	34		1996
Brazil	32		1995-1997
Bulgaria	17		2002
Peru	12.7		1995-1997
Ecuador	19		1999
Egypt Arab Rep.	11		2000
Upper Middle Income Countries (UMIC)		18.9	
Chile	40		1995-1997
Czech Republic	14		2002
South Africa	16		1998
Hungary	23		2002
Latvia	17		2002
Mexico	12		1987
Turkey	10.3		2000
High income Countries (HIC)		25.74	
South Korea	38		2000
USA	30.2		2005
Canada	22.5		2002
UK	23		2004
Italy	35		2001
Australia	23		2000
South Korea	38		2000
France	18		2001
Germany	22		2001
Sweden	17		2001
New Zealand	19		1999
Netherlands	14		2001
Taiwan	35		2000-2003

Source: 1. The World Health Report 2005.

2. C-section rates around globe at "epidemic" levels- pregnancy- msnbc.com

3. New media journalism, Map of World C-section rates created by Suzanne Taylor, spring 2007

The above data shows that the highest rate of C-section deliveries are still performed in most of the developed countries. The C-section rates are low in most of the developing countries but some exceptional instances of high rates are known such as in Brazil and Chile. The average incidence rate of C-section in low income countries is 7.8, in lower middle income countries is 17.58, in upper middle income countries is 18.9 and in higher income countries is 25.74. In Bangladesh, one of the least developed countries of the world, the rate of C-section has risen from 3 percent in 1999 to 11.8 percent in 2009. The C-section rates around the world are shown below by the C-section map.



Source: *New Media Journalism*, map of world C-section rates created by Suzanne Taylor, spring 2007.

4. C- section in Relation to the Socio- Economic Strata

C-section delivery is a expensive medical procedure than the natural delivery. A surgical operation like C-section costs money, which is barrier that the poor cannot overcome to avail this service. Data from home and abroad show inequalities in access to C- section by socio-economic groups. According to the study of Ronsmans C; Holtzes, Sranton (2006); there is a

significant variation in caesarean prevalence rate by poorest, middle and richest quintiles in Bangladesh.

Table -2 : Proportion of C-sections by socio- economic strata in selected countries

Country (Year)	Number of deliveries	C-sections as percentage of deliveries			
		Destitute, Ultra, poor and poor	Middle Class	Rich	All women
Nepal (2001)	4023	0.27	0.27	4.09	0.97
Pakistan (1990)	3871	0.00	0.48	8.44	2.37
India (1998)	32721	1.97	6.68	20.25	6.83
Indonesia (2002)	9749	1.08	1.71	13.70	4.49
Vietnam (2002)	1306	3.69	7.57	26.06	9.71
Bangladesh (2004)	4059	0.15	1.98	18.04	4.37
National					

Source: Chudhury,R.H .and Z.Chudhury (2008): Achieving the Millennium Development Goal on maternal mortality: Gonoshasthaya Kendra's experience in rural Bangladesh, 2nd edition, January 2008.

According to the report of recent Bangladesh Demographic and Health Survey (BDHS, 2004), there is a significant variation in caesarean prevalence rate by poorest, middle and rich quintiles in Bangladesh. The prevalence rates are 0.15, 1.98 and 18.04 respectively and the ratio between the richest and poorest is 120:1. This testifies to the gross inequality in access to C-section across different socio-economic groups in Bangladesh. The data show that nationally the rich have 120 times higher (18.04) incidence of C-sections than the poor. However, many caesareans among rich women were unnecessary and financially exploitative due to the mushrooming of private clinics and the unhandled private practice of government doctors. The unabated number of caesarean of rich women may be related to the obstetrician's own convenience and profit.

5. Probable causes of C-section in the rate

The cause of the significant variation in the C-section rates by the poorest, middle and richest quintiles in Bangladesh along with other countries may be the physician's exploitation. The doctors can induce more the rich pregnant women than the poor pregnant women to perform C-section deliveries. They are often responsible for inducing inappropriate demand for C-section deliveries mainly to maximize their income. The lack of affordability or the malpractices by the concerning doctors are creating this type of inappropriateness. In Bangladesh there is no regulation in the relevant health policy to control both inappropriate and unnecessary C-

section .The above probable causes are responsible for appearing this high rate of C-section.

6. Assessment of Socio-Economic Costs and Consequences of C-section in Bangladesh

Child birth event is comparable to the affects of technological progress on nature. Child birth is a natural phenomenon. The pregnant woman has the potentiality to deliver produce a child in the natural way. But the doctors select the C-section or the mothers are motivated or often induced by the doctors to undergo C-sections in child birth without necessary causes in many cases. For the development of medical science, the doctors do not try the natural way of delivering babies; they choose the caesarean delivery which is based on technology. The doctor treats the pregnancy as if it is a disease and when a mother becomes pregnant the doctor approaches her for treatment. At the end during the time of delivery, the doctor chooses C-section delivery instead of natural process. But it has many long term adverse effects on mothers and children which are mentioned below.

Risk for Babies

- i. **Premature birth:** If the due date was not accurately calculated, the baby could be delivered too early.
- ii. **Breathing problems:** Babies born by caesarean are more likely to develop breathing problems such as transient tachypnea (abnormally fast breathing during the first few days after birth).
- iii. **Low apgar scores:** Babies born by caesarean sometimes have low Apgar scores. The low score can be an effect of the anesthesia and caesarean birth, or the baby may have been distress to begin with. Or perhaps the baby was not stimulated as he or she would have been by vaginal birth.
- iv. **Fetal injury:** Although rare, the surgeon can accidentally nick the baby while making the uterine incision.

Risks for Mother

- i. **Infection:** The uterus or nearby pelvic organs, such as the bladder or kidneys, can become infected.
- ii. **Increased blood loss:** Blood loss on the average is about twice as much with caesarean birth as with vaginal birth. However, blood transfusions are rarely needed during a caesarean.
- iii. **Decreased bowel function:** The bowel sometimes slows down for several days after surgery, resulting in distention, bloating and discomfort.
- iv. **Respiratory complications:** General anesthesia can sometimes lead to pneumonia.
- v. **Reactions of anesthesia:** The mother's health could be endangered by unexpected responses (Such as blood pressure that drops quickly) to anesthesia or other medications during the surgery.
- vi. **Longer hospital stay and recovery time:** Three to five days in the hospital is the common length of stay, whereas it is less than one to three days for a vaginal birth.
- vii. **Risk of additional surgeries:** For example, hysterectomy, bladder repairs etc. For the above complications mother's loss the ability to hard work and the baby's health can be affected in the long run.
- viii. **Risk of further pregnancies:** Incremental risk of having a C-section with future pregnancies.

Since it is introduced that the child birth through the invented technological process of medical service instead of natural process then the consequences are that the mother and the child are both adversely affected in the long run. Without the cases where the life of the mother is threatened and unavoidable, the doctors induce the pregnant women to perform C-sections. The reason behind the selection of C-section may be adverse to the child bearing mothers and children, in essence the prime motivation may be conjectured as to maximize the earnings of the doctors.

According to the Bangladesh Demographic and Health Survey (2007), the caesarean incidence rate, place of delivery, birth order, residence of the mother, mother's education, age of the mother at birth etc. are given in the following table.

Table 3: Percentage delivered by C-section according to the background characteristics, Bangladesh 2007.

Background Characteristics	Percentage delivered by C-section	Number of birth
Mother's age of birth		
<20	6.1	2011
20-35	8.4	3728
35-49	6.0	318
Birth order		
1	12.7	2050
2-3	6.4	2577
4-5	2.6	1010
6+	1.1	420
Place of birth		
Public Sector	34.6	828
Private Sector/NGO Sector	67.3	459
Respondent mother	0.0	5148
Residence		
Urban	15.9	1249
Rural	5.4	4809
Mother's education		
No education	1.1	1658
Primary incomplete	2.2	1331
Primary complete	3.7	565
secondary incomplete	11.2	1730
secondary complete or higher	25.7	757
Wealth quintile		
Lowest	1.8	1367
Second	1.9	1312
middle	3.3	1173
fourth	6.5	1149
Highest	25.7	1056
Total =	7.5	6058

Source: Bangladesh Demographic and Health Survey, 2007.

According to the 2007 BDHS, 8 Percent of babies were born by C- sections. It records an increase of approximately four percentage points from the study report of BDHS (2004).

C-section is more common among first births (13 Percent), births in urban areas (16 percent), and especially among births in the private sector (67 percent). Education and wealth are associated with caesarean section deliveries; more than one-quarter of women who have completed secondary or higher education and women in the highest wealth quintile delivered by C- section, compared with less than 2 percent of women with no education and women in the lowest quintile.

The education rate, per capita income of urban area is higher than the rural area. The urban pregnant women are more conscious than the rural pregnant

women and different types of medical services are available for the urban pregnant women. So they can take opportunity to take services after their pregnancy, so the pregnancy related complications are minimum. So the C-section incidence rate in the urban areas should less than the rural area. But the data does not reveal the fact, what are the reasons behind it? The answer may be that the doctor may induce more to the urban pregnant rich women than the rural poor pregnant women. The cause of this inducement is that the doctors want to maximize their income to exploit the ability to pay of the rich mother. Therefore we can say that doctors income maximizations are highly related to the inducement of the higher income holder C-section mother.

Table 4: The percentages of Caesarean delivery in Bangladesh

Year	% of Caesarean delivery
1999	3 ^(a)
2004	4.37 ^(b)
2007	8 ^(b)
2009	11.8 ^(c)

Source : (a) World Health report, 2005.

(b) Bangladesh Health and Demographic Survey, 2004, 2007.

(c) Health and demographic surveillance system- Matlab: Vol. 41. Registration of health and demographic events 2007 (SR 106, 2009); an ICDDR B Publication. Registration of health and demographic events 2007 (SR 106, 2009); an ICDDR B Publication.

We can see that the percentage growth rate of C-section delivery is increasing over the years. The C-section delivery rate is increasing at an exponential rate over the years.

Measurement of Social Costs of C-section

According to the Bangladesh Demographic and Health survey 2007,

Number of households in the survey area=10400

Number of child bearing women=6058

C-section percentages in public hospital=35 percent

C-section percentages in private hospital=65 percent

Number of households across the whole country=28644938 (Household survey, 2005)

The projected number of child bearing women based on BHDS, 2007=16685676

Table 5: Average cost of C-section procedure in different Health Care

Study	In public health care (TK.)	In private health care (TK.)	NGO health care (TK.)
HEU(MOHFW)2002	8648	19764	4365
BRAC(2009)	15125	12100	

Now we consider that the C-section rate is 11.8 percent

Number of C-section performing mother =1968910

Number of C-section performing mother in Public Health Care

=1968910×35 percent = 68911

Number of C-section performing mother in Private Health Care

=1968910×65 percent =1279791

Total cost on C-section delivery based on HEU (2002) study = TK. 25.76 Billion

Total social cost of delivery =TK. (25.76×.85) Billion = TK. 21.90 Billion

= TK. 21900 Million

(85.5 percent of the child bearing pregnant women has no complication at the delivery period)

Per capita burden of pregnancy = TK. (21900÷14.18) = TK. 1544.43

Average social cost of C-section procedure= TK. 1544.43

Additional cost due to C-section = (1544.43÷47373) ×100 percent =3.26 percent of per capita income.

If it had been possible to perform natural delivery instead of C-section delivery among the pregnant women then the above-mentioned cost could be saved. This money could be easily diverted to train up a numbers of TBA's which could substantially reduce the MMR in Bangladesh to achieve MDG_s or otherwise it could possibly be spent on essential medical services for the rural poor people in Bangladesh. So the opportunity cost of C-section delivery is very high. If the doctor's inducement purpose is to maximize their income is mainly responsible for the high C-section rates then one may claim that it is creating the misallocation of resources in the economy.

As per the calculation above, it is clear that about 3.26 percent of per capita income, on the average, is required as additional cost due to C-section deliveries. Even if we assume that there is fifty-fifty chance that a randomly performed C-section procedure is inappropriate or induced, and then a serious thinking remains due at the policy level to bring about efficiency in

the allocation of scarce economic resources through control and surveillance of such inappropriate practices by the health providers in Bangladesh.

7. Conclusion and Recommendation

Conclusion:

Although the paper has made an attempt to discuss one of the important health issues prevailing throughout the whole world, nevertheless a number of important perspectives could not be elaborately mentioned in the present paper. This shortcoming of the paper occurred because of relevant information needed to appropriately focus on the issue. Further research, in the field may supplement the present version of the paper.

Recommendation:

1. Ensure to remove the information gap between the C-section mother and doctor about the appropriateness of C-section delivery.
2. Build awareness among general population of different side-effects of the C-section upon mothers and newborn babies.
3. Introduce regulations to stop unnecessary C-section.
4. Ensure charges for the Antenatal Check Up and C-section delivery are kept at an affordable level.
5. Introduce regular monitoring and accountability to curb the doctor's temptations to exploit the C-section mother.
6. Introduce litigation to stop doctor's malpractice for the C-section delivery.

8. References

- GOB, 1998** Costs and outcomes of caesarean section procedures in public, private and NGO health care facilities in Bangladesh, HEU, MOHFW
- Todaro, M.P., S.C.Smith, 2010** Economic Development, Tenth Edition, England, Pearson Education Limited, Chapter 2.
- Khan, M.R., 1997** Bangladesh Health Finance and Expenditure Pattern, Research Monograph # 14, The Institute of Development Studies, Dhaka.
- Chudhury, R.H.and Z.Chudhury, 2008** Achieving the Millennium Development Goal on Maternal Mortality: Gonoshasthaya Kendra's experience in rural Bangladesh, 2nd edition
- Khan, M.N.U., Z.Quayyum, H.-E.-Nasreen, T.Ensor and S.Salauddin, 2009** Household Costs of Obtaining Maternal and Newborn Care in Rural Bangladesh: Baseline survey, Research Monograph series # 43 .
- Say, L.R.C. Pattinson, and A.M. Gulmezuglu, 2004** WHO systematic review Of Maternal Morbidity (near miss).
- Rosefield, A., Min C.J. Freedom LP, 2007** Making Motherhood safe in Developing Countries , The New England Journal of Medicine;356(14).
- Taylor, S., 2007** Map of World C-section Rates, The New Media Journalism.
- GOB, 2004, 2007, 2008** Bangladesh Demographic and Health Survey, MOHFW
- GOB, 2010** Bangladesh Economic Review, Finance division, MOF
- GOB, 2010** Bangladesh Maternal Mortality and Health Survey, MOHFW
- WB, 2010** The World Bank's Reproductive Health Action Plan 2010-2015, April 2010
- WHO, 2005** The World Health Report