

PIDE WORKING PAPERS

No. 122

PAKISTAN INSTITUTE OF DEVELOPMENT ECONOMICS



**Determinants of Cesarean
Deliveries in Pakistan**

Saman Nazir

April 2015

PIDE Working Papers
No. 122

Determinants of Cesarean Deliveries in Pakistan

Saman Nazir

Pakistan Institute of Development Economics, Islamabad

PAKISTAN INSTITUTE OF DEVELOPMENT ECONOMICS
ISLAMABAD
2015

Editorial Committee

Dr Abdul Qayyum
Dr Durr-e-Nayab
Dr Anwar Hussain

Head
Member
Secretary

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means—electronic, mechanical, photocopying, recording or otherwise—without prior permission of the Publications Division, Pakistan Institute of Development Economics, P. O. Box 1091, Islamabad 44000.

© **Pakistan Institute of Development
Economics, 2015.**

Pakistan Institute of Development Economics
Islamabad, Pakistan

E-mail: publications@pide.org.pk
Website: <http://www.pide.org.pk>
Fax: +92-51-9248065

Designed, composed, and finished at the Publications Division, PIDE.

CONTENTS

	<i>Page</i>
Abstract	v
Introduction	1
Cesarean Section Theoretical Consideration and Analytical Framework	2
Data and Methods	5
Cesarean Deliveries in Pakistan: An Overview	6
Regional Variations in C Section Deliveries	6
The Wealth and Education Effect on Mode of Delivery	7
Place of Delivery and C Section	8
Conclusions	12
Appendix	13
References	14

List of Tables

Table 1.	C section Deliveries and Place of Delivery by Region (%)	8
Table 2.	Determinants of C Section Deliveries in Pakistan	9

ABSTRACT

Role of cesarean section (C Section) is acknowledged worldwide to safe maternal and neonatal life, and especially in countries like Pakistan where maternal health care is not satisfactory. But there is a concern on rising rates of cesarean deliveries as it is found very high in urban areas of Pakistan that is about 25%. The current study focuses on the clinical, socio-economic and demographic determinants of cesarean deliveries in Pakistan. Pakistan Demographic and Health Survey 2012-13 has been used for both bi and multivariate analysis. Clinical factors are turned out to be important determinates of C section in Pakistan. Among socio-economic factors women who are educated, increasing age, rich, living in urban area, and receiving institutional antenatal care are at higher risk of having C section. Further qualitative research is needed to answer this question like, why woman with better socio economic profile have higher C section rates.

Keywords: Cesarean Section, Maternal Health, Cesarean deliveries, Clinical Determinants, Socio-economic Determinants

INTRODUCTION

Cesarean section (C section) is a major surgical procedure that surely has medical justifications behind its induction. Many developed countries¹ have high rates of cesarean deliveries, which are rigorously criticised as no more than 15 percent deliveries should be done via C section [World Health Organisation, *et al.* (2009)]. This surgical procedure in many developed countries, is often been elected on choice of patient without any medical complication, mainly to avoid normal delivery pain. On the other hand, physicians are also been assailed for conducting C section without any medical justification for economic gains and time management. In Pakistan, increasing rates of C section are also been observed. Here high C section rates are essentially questionable as physician has the ultimate authority of decision for mode of delivery—C section deliveries are always been conducted on medical indication during intrapartum period or antenatal checkups that show any pregnancy complication which cannot be handled without surgery. In public facilities at least, there is no such practice on which C section is done on patient's request just to avoid pain and without any medical complication.

Maternal health care facilities (mainly private) are readily available in urban areas of Pakistan however standards and expertise are highly questionable in terms of infrastructure and staff training. Maternal care is of course being provided in public hospitals but the long lines in out patient departments (OPDs) and un-welcoming, over crowded, smelly, maternal emergencies/labour rooms are often been avoided by the women who can afford charges of private care. Usually, the charges for C section are almost double or more as compare to normal delivery with a wide deviation as it depends upon the facility and physician profile. The high rates of C section in these facilities might have implications on maternal care and institutional delivers in Pakistan where many women do not allowed getting proper institutional care during pregnancy and delivered at hospitals due to cultural and economic reasons.

Medically cesarean deliveries are done in case of any threat to mother or child's life, and where normal mode of delivery is not possible. There are also non-medical factor of conducting C section that usually bring more harm than

Acknowledgements: Author is thankful to Dr Durr-e-Nayab and Ms Maryam Naeem Satti for their guidance and helpful input in the study.

¹C section rates for US, UK and Singapore are 32.8 percent, 28.3 percent and 30 percent for years 2014, 2012, and 2014, respectively. (<http://www.cdc.gov/nchs>, <https://www.rcm.org.uk/news-views-and-analysis/news/london-highest-for-c-sections>, <http://www.gynaecologist.sg/gynae-news-001-caesarean.html>)

good to a woman, ranging from socio-economic cultural factors to pure economic gains. For whatever reason C section is done, it is important to point out its' unnecessary intervention. Considering the health risks to woman, there is also growing encouragement internationally in favour of vaginal birth after cesarean section (VBAC). Research shows 75 percent of the women who try for VBAC, successfully delivered virginally.²

Where rates are high, which population segment is more at risk of having cesarean deliveries, and other possible reason of its' caring out, all the questions are needed to be explored. The current study is focused on the socio-economic and medical determinants of the cesarean deliveries in Pakistan. The next section of the paper discusses the theoretical grounds and analytical framework of the study, followed by the data and method. The very next section is a review of cesarean deliveries in Pakistan, and finally the determinants and conclusions are discussed.

CESAREAN SECTION THEORETICAL CONSIDERATION AND ANALYTICAL FRAMEWORK

Role of Cesarean section in saving maternal and neonatal lives is acknowledge worldwide especially in developing countries like Pakistan where state of maternal and neonatal health is far from satisfactory. More than 50 percent of child deliveries are done at home by the traditional birth attendants (Dais in local language) and most of them are those without prior institutional antenatal care that could indicate the possible delivery complication [PDHS (2012-13)]. But at the same time statistics about the institutional deliveries show a high rate of cesarean section in Pakistan even in the public hospitals. The high rates of C section in public tertiary hospitals are often being justified by the significant number of referrals from the surrounding and periphery hospitals that are held responsible for accelerating the rates. While working on causes of increasing cesarean section rates in holy family hospital Rawalpindi, researchers have found that CRS was 34 percent in 2008 [Iftikhar, Rizvi, and Ejaz (2010)]. Fetal distresses followed by the repeated cesarean section are among the main reporting reasons. Furthermore study done at teaching hospital 'Liaquat university hospital Hyderabad' reports 35 percent of the deliveries are done by C section, main indication reported are the repeated C section, massive hemorrhage and wound sepsis [Yousaf (2009)].³

²<http://www.mayoclinic.org/tests-procedures/vbac/basics/definition/prc-20020457>

³Studies in other public hospitals in Pakistan also show a high C section rate. Studies conducted in CMH (Combined Military Hospital) Rawalpindi in 2011-12, Ayub Medical College in 2006-07 and Ganga Ram hospital in 2000-01 show 56 percent, 45 percent and 21.07 percent C section rates respectively [Shamshad (2008); Khajawa, Yousif, and Tayyeb (2004)]. However these studies carried out in hospitals by the physicians often only reports the clinical reasons of conducting C sections.

There are certain cutoffs which can show high or low C section rates in any population. Less than 5 percent of C section in any population indicates the low antenatal and maternal care and hence account for delivery complications and even maternal mortality. World health organisation recommends that no more than 10-15 percent deliveries are justifiable by C section in any population. Moreover this rate is surely not a standard to reach in any population, rather a limit that is not be exceeded [World Health Organisation, *et al.* (2009)].

High rates of C section have two serious implications. Firstly it puts pressure on the hospital surgical equipment and human resource. Secondly it has a high physical and psychological cost on women going through it. There is a growing debate on extensive use of C section that can increase the probability of negative impact on mother and child health [Wagner (2000)]. A review of 79 studies comparing outcomes of C section deliveries vs. vaginal deliveries show that C section deliveries are considerably at high risk of future medical complications [Jose, *et al.* (2007)]. Furthermore C section in first pregnancy put an additional threat of adverse outcome in second pregnancy as mother with previous C section has a high risk of prepartum hysterectomy and placenta accrete, placenta praevia and very preterm birth [Perveen (2011)]. Torkan, *et al.* (2005) while working on postnatal depression in women have found that normal delivery may lead to better psychological status and C section delivery is associated with increased risk of severe postnatal depression.

The question is why are the C sections rates are high in many countries? There are three main possible broad determinants of performing and utilising C section; (i) medical condition on which doctor takes decision of conducting C section (ii) non-medical reasons i.e. economic socio-cultural, and (iii) the institutional capacity to conduct cesarean deliveries. Among the medical reasons repeated cesarean, presumed foetal distress, failure to progress, breach births, hypertensive disorders, antepartum hemorrhage, near birth complications, postdate pregnancy are main indication of performing C sections [POST (2002); Shamshad (2008); Jabeen, *et al.* (2013)].

Literature captures non-medical reasons as supply and demand side possibilities. Doctors schedule C section for their own interest, these may encompasses economic gains, time management, minimising risk factor, or for surgical practice. Tussing and Wojtowycz (1992) have found that obstetrician sometimes perform C section to manage their time which does show a form of economic interest.

Other determinants include socio-cultural demographic and economic profile of the patients. Yassin and Saida (2012) have found that cesarean deliveries are significantly higher among the women with younger age, first pregnancy, who have received antenatal care during pregnancy, ever terminated pregnancy and resident of urban area. As opposite to this finding about mother

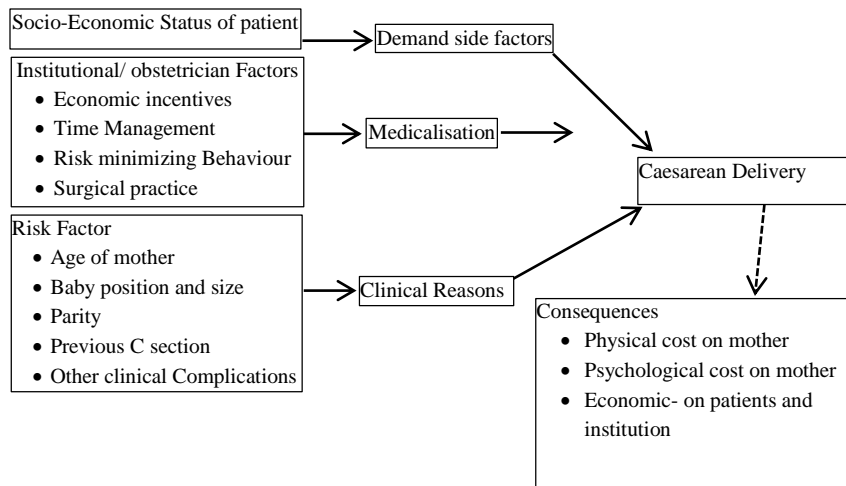
age another study found older mother, highly educated woman and Islamic women are more likely to give birth by C section [Rachatapantanakorn and Tongkumchum (2009)].

Women demand for C section delivery because of fear of long labour and vaginal delivery pain. In many developed countries, women who preference this surgical procedure without having any medical complication than natural method of delivery, are often debated as 'too push to push women'. The international Federation of Obstetricians and gynecologist (FIGO) in their statement about Cesarean Section state that 'Some countries have experienced increasing recourse to Cesarean delivery for non-medical indications. FIGO considers surgical intervention without a medical rationale to fall outside the bounds of best professional practice. Cesarean delivery should be undertaken only when indicated to enhance the well-being of mothers and babies and improve outcomes' [FIGO (2014)].

Third reason that is discussed in literature is the institutional capacity to deliver surgical obstetric care and health financing system. As Lauer, *et al.* (2010) have discussed that at aggregate level health system factors are more influential determinants of utilisation of C section than demand side or doctor preference factors. The capacity of health system and financing along with its human resource profile are found to be significantly influencing the C section rates.

In developed countries C section deliveries, apart from medical reasons and emergency calls are also planned on patients' choice. That could be one possible reason that justifies the high C section rates in those countries. But in countries like Pakistan where decision solely depends upon medical grounds the high rates of C section raises many questions. Qazi, *et al.* (2013) study on the views regarding C section among pregnant women in northwest Pakistan also shows a negative prescription of CS among population. One possible reason is utilisation of private medical care in Pakistan is high and in terms of maternal care a very reasonable proportion of population uses it not only for antenatal care but also for the child delivery services. About 48 percent of the deliveries are done in health facility; 14.6 percent in public and 33.6 percent in private health facilities [PDHS (2012-13)]. Yassin and Saida also argue that highest rates of cesarean deliveries are reported in urban areas where private sector dominates maternal care provisions. Many studies shows that C section rates in private hospitals are much higher than in public hospitals [Padmadas (2000); Ghosh (2010)].

Considering the above literature, following framework has been developed for analysis of C section determinants in Pakistan, which is an adaptation of the framework developed by Ghosh (2010).



Source: Adapted from Ghosh (2010).

DATA AND METHODS

Recent Pakistan Demographic and Health Survey 2012-13 has been used to estimate the determinants of cesarean delivers in Pakistan on national level. PDHS provides comprehensive information on demographic, maternal and child health indicators. Two earlier rounds of the survey were conducted in 1990-91, and 2006-07. The current PDHS included 14000 households as sample size for all the provinces except AJK, FATA and military restricted area.

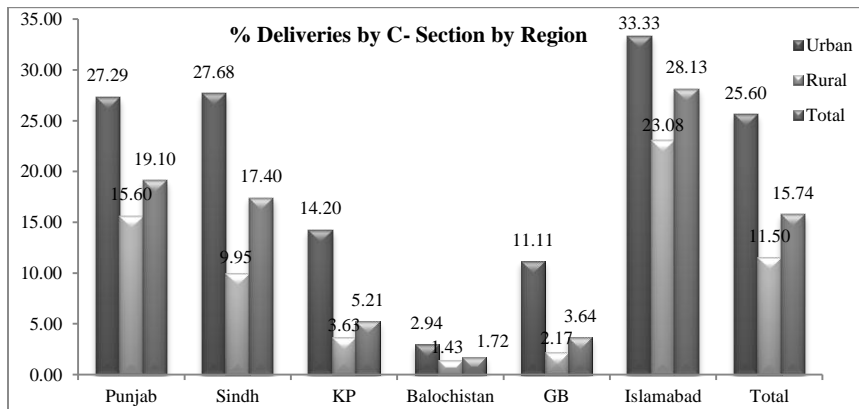
Considering the determinants under our study framework, variables have been included to capture the demand and risk factors. Economic incentive, time management and risk minimising behaviour are considered important determinates which can capture institution and physician motivations of conducting C section; however data related to these factors are not available in PDHS, and could be considered as main limitation of our study. Analysis is done for the women with most recent birth in past five years. The total sample size is 7439 women. This unit of analysis for women with most recent birth and not for all birth in last five years has been primarily chosen for three main reasons. Firstly, having a previous C section is an important clinical reason to conduct C section again to avoid the trail of scar. So the women, who have C section in recent birth, would most probably have C section in previous birth—this impact could be captured among clinical reasons. Furthermore data on antenatal care has been collected for the most recent birth from the women who have more than one live birth in last five years [PDHS (2012-13)]. Antenatal care could also be an important determinant of having C section or not during delivery. Finally, the hierarchical nature of data makes it suitable to analyses the latest birth as data has been collected for the several birth from the same women. As indicated [Yassin and Saida (2012)] many statistical techniques assume independence of observations and if it is ignored the results could be biased.

Both bivariate and multivariate analysis has been done to estimate the determinants of C section deliveries. Binary logistic regression model has been used for multivariate analysis. Dependent variable is a dichotomous variable, 0 is coded for the vaginal deliveries and 1 is for the cesarean delivery. Independent variable are mother age at delivery, birth order, place of antenatal care, place of delivery, BMI of women (current as not available for delivery time), wealth index of household, women education, terminated pregnancy ever, number of antenatal visits, size of child at birth, women working status, region, province, and previous C section delivery.

CESAREAN DELIVERIES IN PAKISTAN: AN OVERVIEW

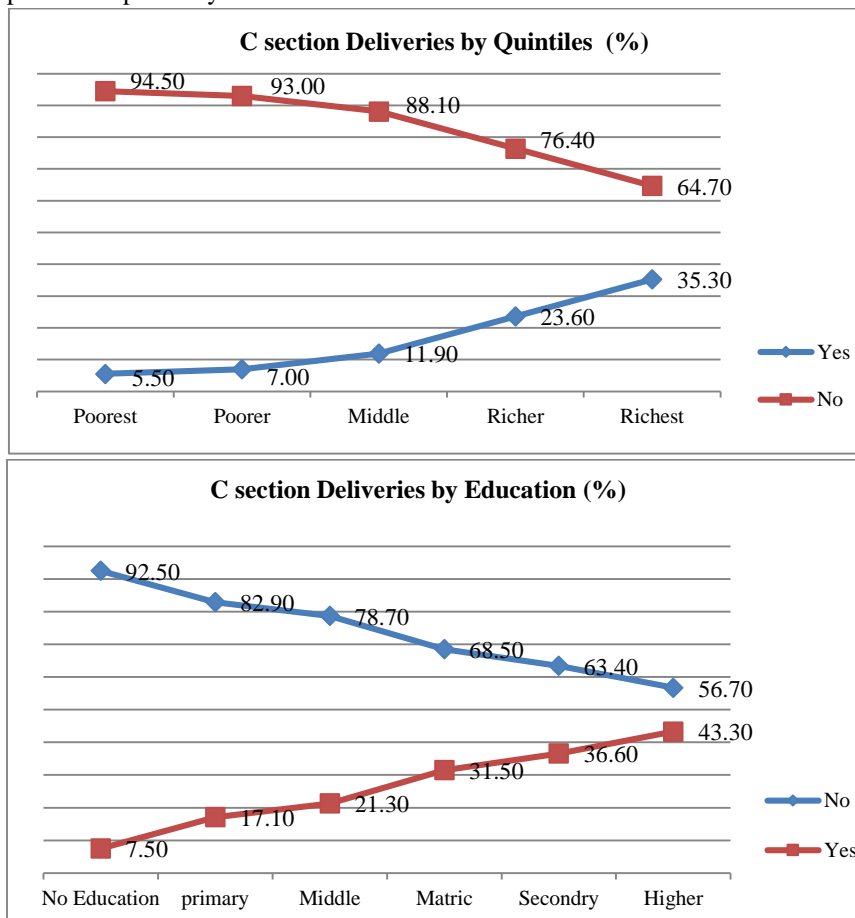
(a) Regional Variations in C Section Deliveries

Overall the C section deliveries are 16 percent in Pakistan which shows a slightly above prevalence to recommended 15 percent rate. However this figure for urban areas of Pakistan does not turn out encouraging i.e. about 26 percent deliveries are done via C section. It is easily predictable that the rate of C section would be high in urban areas than rural ones, as there medical facilities regarding maternal care are available to target population, and our findings are just as expected. In the provinces of Punjab and Sindh, C section rates in urban areas are found at higher end around 27 percent as compared to rural areas where these have been found 15 and 10 percent respectively. KP and Balochistan show much low rates than Punjab and Sindh especially in Balochistan where it seems that institutional maternal care is extremely at lower limit. The rate of C section deliveries in rural areas of Balochistan and KP are drastically low, 1.433 and 3.63 respectively. This also probably indicates both the unavailability of medical infrastructure and at the same time low utilisation of maternal care by the population. Low rate of C section also has been found for in rural GB. One of the most interesting figures came out for Islamabad, where C section deliveries are as higher as goes to 33 percent for urban and 23 percent for rural region. These sky high rates in capital city of the country may be due to easy access of medical infrastructure both public and private and socio-economic profile of the population.



(b) The Wealth and Education Effect on Mode of Delivery

In many studies it is found that women who are from better socio-economic background would have higher rates for C section deliveries [Rachatapantanakorn and Tongkumchum (2009); Ghosh (2010)]. We have also found that there is a marked difference of 30 percentage point among poorest and richest income quintiles in C section rates. There is an increasing trend of C section deliveries from poorest to richest quintiles. The richer and richest quintiles women have 23 and 35 percent C section deliveries as compare to women from the other three quintiles where this rate are lower than 12 percent. The same trend has been found in case of educational profile of women. We have found higher C section rates for the highly educated women than women with low education. In fact, low preference/utilisation of C section has been found for women with no education category, where this rate is 7.5. At the same time, women with matric, secondary and higher education show alarming percentages of C section with 21, 31 and 43 percent respectively.



(c) Place of Delivery and C Section

Utilisation of private maternal medical care is high in Pakistan and women belonging to better socio-economic background are presumed to avail private facilities more due to the affordability factor, which open up possibility of higher C section rates in these facilities. As from the previous discussion, we have found that women living in urban areas, having high income background, and from higher education profile have higher levels of C section rates. It is possible that private facilities may have higher rates of C section than public ones because the nexus of income, education and area of residence that somehow explains the decision making power of women to go for C section without having any medical complication. On the other hand, that also explains exploitation of this population group by the private maternal care facilities to make money out of unnecessary intervention of C section. We have not found any remarkable difference in C section rates between public and private facilities both in urban and rural areas. In urban areas C section rates in both facilities are almost same about 35 percent in public and 36 percent in private hospitals. Whereas in rural area this difference is only about 4 percentage point. The high rates of C section rates in public hospitals are often justified by the high number of referrals in these hospitals from the periphery medical facilities. But the high rates of C section in private facilities is somehow not justifiable as only those patients go into these facilities who can afford the huge charges of maternal care.

Table 1

C section Deliveries and Place of Delivery by Region (%)

Region		Public/Govt.	Private	Total
Urban	No	64.10	63.60	74.30
	Yes	35.90	36.40	25.70
	N	502	1085	2237
Rural	No	76.50	72.30	88.50
	Yes	23.50	27.70	11.50
	N	631	1619	5194

Determinants of C Section in Pakistan

Table 1 in Appendix shows the background characteristics of the sample population and Table 2 reports the results of logistic 3 regression models developed to capture the determinants of C section deliveries in Pakistan. First model is run for the clinical reasons that may lead to C section, the model two captures the socio-economic factors whereas the third model includes all the indicators of previous two models. Summary for all the models are included at the end of the table covering Chi Square, 2 Log likelihood, Cox and Snell R Square, Nagelkerke R Square, Predicted Percentage. Chi square for all the three models is significant.

Table 2
Determinants of C Section Deliveries in Pakistan

Independent Variables	Model 1 (Clinical)		Model 2 (Socio-Economic)		Model 3 (All Factors)	
	Regression Coefficient (b)	Odd Ratio	Regression Coefficient (b)	Odd Ratio	Regression Coefficient (b)	Odd Ratio
Clinical Reasons/ Risk Factor						
Age at Delivery	0.071	1.073***			0.033	1.034*
Previous C- Section						
Yes	3.886	48.69***			3.665	39.068**
Terminated Pregnancy Ever						
Yes	0.055	1.057			-0.123	0.884
Told about Pregnancy Complications						
Yes	0.439	1.55			0.3	1.35*
Size of the Child at Birth						
Average						
Large	0.271	1.311			0.181	1.199
Small	0.188	1.207			0.353	1.423
Birth Order						
1						
2	-1.1	0.333***			-0.936	0.392***
3+	-1.833	0.16***			-1.313	0.269***
Women BMI						
Health Weight						
Under Weight	0.421	1.524*			0.374	1.453
Over Weight/ Obese	1.123	3.073***			0.853	2.347***
Socio Economic Factors						
Province/Region						
Punjab						
Sindh			-0.443	0.642***	-0.29	0.748
KP			-1.258	0.284***	-0.971	0.379***
Balochistan			-1.393	0.248**	-1.253	0.286
GB			-1.55	0.212*	-1.019	0.361
Islamabad			-0.691	0.501	-0.687	0.503
Place of Residence						
Urban			0.143	1.153	0.493	1.636*

Continued—

Table 2—(Continued)

	Wealth Index			
1 (Poorest)				
2	-0.134	0.875	-0.68	0.507
3	0.155	1.168	0.019	1.019
4	0.502	1.652**	0.473	1.605
5 (Richest)	0.504	1.655**	0.329	1.39
	Working Women			
Yes	-0.198	0.82	0.177	1.194
	Antenatal Care during Pregnancy			
Govt.				
Private	0.457	1.58	0.86	2.364
Home	0.323	1.382**	0.342	1.408
Mix	0.24	1.271	0.054	1.056
	Antenatal Visits during Pregnancy			
No Visits				
<=2	0.299	1.349**	0.119	1.127
5-Mar	0.685	1.985***	0.694	2.002**
	Women Education			
No Education				
Primary	-0.135	0.874	-0.346	0.707
Middle	0.21	1.234	-0.336	0.715
Matric	0.327	1.387*	0.201	1.222
College/Higher	0.437	1.548**	0.214	1.239
	Institutional Factor			
	Place of Delivery			
Govt.				
Private	-0.133	0.875	-0.301	0.74
Home	-20.16	0	-20.2	0
	Model Summary			
Chi Square	487.67***	1521.403***	820.652***	
2 Log Likelihood	1493.881	4076.340	1138.309	
Cox and Snell R Square	.219	.239	.343	
Nagelkerke R Square	.346	.377	.542	
Predicted Percentage	84.6	80.5	86.9	

Note: p<=0.05*, p<=0.01**, p<=0.001.***

In the first model increasing age at delivery, and previous C section in any past delivery significantly raise the probability of having C section. Birth order is negatively associated with C section. Women weight also has a significant relation with C section delivery, where under and overweight women have 1.52 and 3.07 times more likely to end up in C section during delivery, respectively. Terminated pregnancy ever, pregnancy complication, and size of the child at birth are not turned out significant factors in clinic reasons.

The second model is capturing the socio-economic factor of having C section. The women living in all the provinces than Punjab have lesser chances of having C section; results are not significant for Islamabad region. Women of two richest quintiles have 1.65 times more chances of having C section than women from poorest quintile. Women who have antenatal care from home than govt. hospitals have 1.38 times more likely to have C section. Interestingly more antenatal visits are significantly related to like hood of C section than no antenatal visits. Finally, women from more educated group i.e. matric and college/higher are more chances to have C section than women from no educational background. Place of residence, woman working status, and place of delivery are not significant factors in socio-economic model.

In the third model age a delivery, previous C section, any pregnancy complication during pregnancy, birth order, province, area of residence, antenatal visits during pregnancy are turned out important factors determining mode of delivery. Pregnancy complication is insignificant factor in first model but here when included with all the factors of two models; it appears to be an important determinant. Like in first model, birth order is negatively but significantly associated with C section. Obese women are 2.34 times are more likely to have C section. In this model, for province variable, results are only significant for KP where women are 0.37 times less likely to have C section. As oppose to second model, where area of residence is an insignificant factor, women from urban background have 1.63 times more chances to have C section than rural counterparts. Finally women who have 3 and more antenatal visits during pregnancy are at higher risk of having C section. Results for all other indicators are not significant in this model including woman education which is significant in second model.

Results of the clinical reasons are just as expected, as the age factor, having previous C section, pregnancy complication, and low or over weight women may increase the chances of C section delivery, and often been discussed and justified in literature [Shamshad (2008); Gosh (2010)]. The negative and significant association of birth order with C section is also found in some studies [Gosh (2010)]. It is mainly because previously giving birth by C section increase the like hood of another C section, and in this way women who are delivering first time could be at higher risk of it. Women who are giving birth second or third time, and had virginal delivery previously, are also medically considered at lesser risk

of having C section in most recent birth. The women weight, in both first and third model is turn out an important factor determining likelihood of C section. Women obesity is worldwide considered culprit of many pregnancy complications ultimately makes women more vulnerable for having C section [Baeten, Bukusi, and Lambe (2001); Kabiru and Raynor (2004)].

Some results of socio-economic model are as expected like chances of having C section in all the provinces than Punjab are lesser. This may be due to the fact that in Punjab availability, accessibility and utilisation of maternal health facilities are somehow more common than other provinces. The population profile in terms of socio-economic status is also higher that makes C section chances more in Punjabi women. Moreover lesser C section likelihood in other provinces may be just due to the underutilisation of maternal health facilities. More chances of wealthier and highly educated and urban women of having C section are also expected, as these women are expected to utilise institutional maternal care and can afford to bear C section charges. Women from this background may just opt for C section to bypass normal delivery pain. More antenatal visits are turn out to be associated with more chances of having C section. This come out may due to the fact that less percentages of women regarding recommended visits of antenatal care from hospitals are found in Pakistan [PDHS (2012-13)] and only women who have any pregnancy complication may visit facility more often.

CONCLUSIONS

Since cesarean section is a major surgical operation, it does not only increase chances of woman to have another surgery in subsequent births but also cause health issues in life ahead. Many studies in teaching hospitals in Pakistan show the individual hospital cesarean rates at higher end, though we cannot find studies which show C section rates in private facilities. Pakistan Demographic and Health Survey 2012-13 has been used in this study to explore the determinants of C section at national level, and it shows high rates of C section for urban areas of Pakistan that is around 25 percent.

The current study focuses on determinates of C section deliveries in Pakistan. We have found significant relationship between area of residence, educational and wealth profile of woman with having C section in bivariate analysis. Even in multivariate analysis, among socio-economic determinants women living in Punjab, in urban area, from better economic background, having higher education, and had more than 3 visits during pregnancy are more likely to have C section in recent birth. Though from current dataset we cannot say that women of urban, educated and wealthy background opt for C section, or women of these characteristics are targeted by physicians and facilities for economic gains by conducting C section, but at least we can set an argument for the further research why C section rates are sky high in this prosperous population segment.

In multivariate analysis clinical factors are also turned out be very strong determining likelihood of C section. Previously having C section, age of woman, birth order and women BMI are strong predictors. With the admission of fact that most of the women do not document medical history of previous delivery, it is difficult for doctors to judge what type of incision a woman had on the uterus in previous birth and hence they cannot give a try to vaginal birth after C section (VBAC) strategy. But there is a strong need to educate women about VBAC and encouragement of it in medical facilities in public and private alike.

Appendix Table 1

Background Characteristics

Determinant	Percent Deliver by Cesarean Section	Total Deliveries
Age at Delivery		
<25	33.94	2524
25-29	24.27	1806
>30	41.79	3109
Previous C Section		
No	25.4	3179
Yes	74.6	416
Terminated Pregnancy Ever		
No	66.9	4932
Yes	33.1	2508
Told about Pregnancy Complications		
No	36.6	2774
Yes	63.4	2832
Size of the Child at Birth		
Large	6.43	477
Average	73.04	5416
Small	20.53	1522
Birth Order		
1	30.83	1414
2	26.4	1466
3+	42.77	4559
BMI of Women		
Under Weight	15.4	426
Healthy Weight	32.3	1330
Over Weight	29	566
Obese	23.3	315
Province		
Punjab	68.1	4178
Sindh	25.5	1714
KP	5	1113
Balochistan	0.5	348
GB	0.2	56
Islamabad	0.7	31

Continued—

Appendix Table 1—(Continued)

Region		
Urban	49.1	2243
Rural	50.9	5196
Wealth Index		
Poorest	8	1698
Poorer	9.2	1541
Middle	14.9	1464
Richer	29.5	1466
Richest	38.4	1271
Working Women		
No	84.3	5564
Yes	15.7	1856
Antenatal Care		
Home	3.29	184
Govt.	20.3	1136
Private	71.39	3995
Mix	5.02	281
Antenatal Visits During Pregnancy		
No Visits	24.41	1814
<=2	26.61	1978
3-5+	48.98	3640
Education		
No Education	55.83	4153
Primary	16.49	1227
Middle	7.89	587
Matric	10.63	791
College/Higher	9.15	681
Place of Delivery		
Public/Govt.	15.29	1137
Private	36.39	2707
Home	48.32	3594
Total Sample size in different categories may vary because of the missing cases		7439

REFERENCES

- Baeten, J. M., E. A. Bukusi, and M. Lambe (2001) Pregnancy Complications and Outcomes among Overweight and Obese Nulliparous Women. *Am J Public Health* 91.
- Boehm, F. H. and C. R. Graves (1994) Cesarean Birth. In M. E. Rivlin and R. W. Martin (eds.) *Manual of Clinical Problems in Obstetrics and Gynecology*. (Fourth Edition). Little Brown and Company, Boston. 158–62.
- FIGO (2014) FIGO Statement on Cesarean Section. International Federation of Obstetricians and Gynecologists. <http://www.figo.org/Cesarean>
- Ghosh, S. (2010) Increasing Trend in Cesarean Section Delivery in India: Role of Medicalisation of Maternal Health. The Institute for Social and Economic Change, Bangalore. (Working Paper 236).

- Iftikhar T., Rizvi Um-e-Salma, and L. Ejaz (2010) Evaluation of Causes of Increasing Cesarean Section Rate in Tertiary Care Hospital. *Journal of Sheikh Zayed Medical College* 1:1.
- Jabeen J., M. H. Mansoor, and A. Mansoor (2013) Analysis of Indications of Cesarean Sections. *Journal of Rawalpindi Medical College* 17:1, 101–103.
- José, M. Belizán, Althabe Fernando, and Luisa Cafferata María (2007) Commentary: Health Consequences of the Increasing Cesarean Section Rates. *Epidemiology* 18: 4, 485–486.
- Kabiru, W. and B. D. Raynor (2004) Obstetric Outcomes Associated with Increase in BMI Category during Pregnancy. *American Journal of Obstetrics and Gynecology* 191, 928–32.
- Khawaja, N. P., T. Yousaf, and R. Tayyeb (2004) Analysis of Cesarean Delivery at a Tertiary Care Hospital in Pakistan. *J Obstet Gynaecol* 24:2, 139–41.
- Lauer Jeremy A., P. Betrán Ana, M. Merialdi, and D. Wojdyla (2010) Determinants of Cesarean Section Rates in Developed Countries: Supply, Demand and Opportunities for Control. *World Health Report (2010)* (Background Paper, No. 29). World Health Organization.
- Padmadas, S. S., K. S. Suresh, S. B. Nair, and K. R. Anitha Kumari (2000) Cesarean Section Delivery in Kerala, India: Evidence from National Family Health Survey. *Social Science and Medical Science* 51.
- Pai, M. (2000) Unnecessary Medical Interventions: Cesarean Sections as a Case Study. *Economic and Political Weekly* 35:31.
- Perveen, S. (2011) Maternal and Neonatal Outcome at Repeat Cesarean Delivery versus Repeat Vaginal Delivery. *Journal of the College of Physicians and Surgeons Pakistan* 21:2, 84–87.
- POST (2002) Cesarean Sections. Post note October 2002 Number 184. www.parliament.uk/post/home.htm
- Qazi, Q, Z. Akhtar, K. Khan and A. H. Khan (2013) Pregnant Women View Regarding Cesarean Section in Northwest Pakistan. *Tropical Medicine and Surgery* 1:105.
- Rachatapantanakorn, O. and P. Tongkumchum (2009) Demographic Determinants for Cesarean Delivery in Pattani Hospital. *Southeast Asian Journal of Tropical Medicine and Public Health* 40:3, 602–11.
- Shamshad (2008) Factors Leading To Increased Cesarean Section Rate. *Gomal Journal of Medical Sciences* 6:1.
- Torkan, B., S. Parsai, M. Lamieian, A. Kazemnejad, and A. Montazeri (2005) Postnatal Depression in Women with Normal and Cesarean Section Deliveries. *Quality of Life Research* 14:9, Abstracts: 12th Annual Conference of the International Society for Quality of Life Research (ISOQOL). Springer.
- Tussing, A. Dale and Martha A. Wojtowycz (1992) The Cesarean Decision in New York State, 1986: Economic and Noneconomic Aspects. Lippincott Williams and Wilkins. *Medical Care* 30: 6, 529–540.

- Wagner, M. (2000) Choosing Cesarean Section. *Lancet* 356, 1677–1680.
- World Health Organization (WHO), UNFPA, UNICEF and Mailman School of Public Health. Averting Maternal Death and Disability (AMDD) (2009) Monitoring Emergency Obstetric Care A Handbook. <http://www.who.int/reproductivehealth/publications/monitoring/9789241547734/en/>
- Yassin, K. and G. Saida (2012) Levels and Determinants of Cesarean Deliveries in Egypt: Pathways to Rationalization. *The Internet Journal of World Health and Societal Politics* 7: 2.
- Yousaf, F., G. Haider, G. Shafaqat, A. Haider and M. Nasiruddin (2009) An Audit of Cesarean Sections in a Teaching Hospital. *Pakistan Armed Forces Medical Journal* 5.
- Zelop, C. and L. J. Heffner (2004) The Downside of Cesarean Delivery: Short- and Long-Term Complications. *Clinical Obstetrics and Gynecology* 47:2, 86–393.