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Comparative Study on Caesarian and Normal Delivery Childbirth in Bangladesh

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Abstract

The study is concerned with caesarian and normal delivery and its effectiveness on childbirth which has more impact on Bangladesh. We identified that, higher educated and higher income families are choosing caesarian section for childbirth because of improved safety of surgical skill to reduce the mortality rate. Although expensive, most caesarian operations are performed in private hospitals for modern medical equipment, experienced doctors and advanced medical care. A questionnaire survey design was applied in order to make a comparative study on caesarian and normal delivery childbirth. Respondents from all over Bangladesh participated in the survey. We collect 281 data from the respondents of different districts of Bangladesh by area sampling. We use descriptive and analytical research designs in determining the comparative study on caesarian and normal delivery childbirth in Bangladesh. The results of study show that the variance of children taken by caesarian delivery is less than children taken by normal delivery and children taken by caesarian delivery increase due to increased family income. It has been found that 39.5% (111) respondents are from the Urban area and 60.5% (171) from the rural zone. We can say that more than 50% of our respondents are well-educated. We also found that 53.4% of the respondents do not face any problem in C/S. We found that family income has a positive linear relationship with the C-section deliveries, which means that higher incoming people tend to have the C-section more. Finally, we observed that change in rate of caesarian delivery due to changing living places and normal delivery is recommended for the next generation. By Meta analysis we found that number of cesarean delivery baby is independent of locality and education level.

Keywords

Caesarian Delivery, Normal Delivery, Operation, Meta Analysis

1. Introduction

Generally considered safe, caesarian section does have more risk than caesarian births. Plus moms can go home sooner and recover quicker after normal delivery but improve safety of surgical skills to reduce the mortality rate in caesarian delivery.

Cesarean delivery is a surgical intervention designed to prevent or treat life-threatening maternal or fetal complications. The World Health Organization (WHO) estimated that about 5% - 15% of pregnancies would face life-threatening complications. When it is done on a timely basis, cesarean delivery provides a golden opportunity to prevent the adverse obstetric outcomes, including maternal death, stillbirth and nearly neonatal death, obstetric fistula, uterine prolapsed and sexual dissatisfaction [1]. Amount of death due to pregnancy is gradually decreasing worldwide, among all of these estimated deaths, one-fifth of the maternal deaths are recorded in southern Asia [2]. Delivery may occur either by caesarean or non-caesarean. Multiple factors associated with safe delivery practices, range from demographic to socio-economic. More than 70% of the deliveries took place at home, and only 32% of birth in Bangladesh were under safe and hygienic conditions. In recent years, caesarean delivery is one of the most common surgical procedures. Caesarean sections (C-section) are more common among first births (12.7%), births in urban areas (15.9%), and especially among births in the private sector (67.3%), whereas the public sector was 34.6%. The number of caesarean delivery has also been growing in many developed and developing countries and this increase has not been clinically justified. Over the last few years, the rates of C-section have risen substantially in many countries such as Brazil (30%), Chile (40%), the USA (24.4%) and Malaysia (15.7%). According to WHO, there is no justification for any region to have a caesarean rate higher than 10 - 15 [3].

Bangladesh has achieved remarkable success in improving maternal and child health. The majority (79%) of Bangladeshi women now receive antenatal care and 36% receive postnatal care. In 2014, overall 37% of births were delivered to informal healthcare facilities including 22% births in private facilities, of which staggering 61% and 77% of births ended in CS, respectively. A number of factors may influence this increasing rate of CS in Bangladesh, including high rate of adolescent pregnancy (35%), increasing rate of late aged pregnancy (5%), improving educational and socio-economic status of mothers, and the ongoing dual nutritional burden (co-existing conditions of under and over nutrition) [4].

1.1. What Is Caesarian Delivery?

Caesarean section, also known as C-section, or caesarean delivery, is the surgical procedure by which a baby is delivered through an incision in the mother's abdomen, often performed because vaginal delivery would put the baby or mother at risk [5].

1.2. What Is Normal Delivery?

A vaginal delivery is the birth of offspring in mammals through the vagina. It is the natural method of birth for all mammals except monotremes, which lay eggs. For humans, the average length of a hospital stay for a normal vaginal delivery is 36 - 48 hours. Surgery extends that stay [5].

2. Background of the Study

Amount of childbirth by caesarian are gradually increasing worldwide. The increasing rate of caesarian delivery than normal delivery because of improved safety of surgical skill to reduce pregnancy related mortality (Md. Iftakhar Parvej, Preferences between Caesarean Section and Normal Vaginal Delivery among the reproductive women in Bangladesh, 2021) [2]. In Bangladesh, the CS rate has increased more than eight-fold, from 2.7% in 2000 to 24% in 2014 (Mohammad Masudur Rahman, 2018) [6]. In the past few decades, a number of maternal health related strategies were adopted and implemented by the government of Bangladesh. Natural childbirth is in general, very safe but it becomes risky when a woman ignores her health care provider's recommendation. This study concludes that the overall fetomaternal outcome is better in caesarean section than the patients who underwent vaginal delivery (M Khandoker, 2020) [7]. Negative effects of caesarian section & normal delivery on childbirth cause countless infant deaths each year in the world. The place (Government clinic or Private clinic) of caesarian operation used to find out the attitude of public and private hospitals in childbirth.

Caesarian delivery known as C-section is a surgical operation which is safer than normal delivery when the baby condition isn't progressing/in distress/in abnormal position/problem with placenta. The process has now become most popular all over the world. In developing countries, like Bangladesh has also a significant role to give birth healthy baby. Maternal mortality rate decreased than that before by C-section. But it has more risk than normal delivery. Like tummy pain, abnormal vaginal discharge, heavy vaginal bleeding, blood clot in leg etc. Bangladesh Government has established Community Clinic (cc) to give births by normal delivery. In cc the number of normal deliveries conducted at 246.80% to 128, 36.26% in 2012 to 2016 [8]. In Dhaka the cost of normal delivery average is 1275 tk, 4703 tk in C-section where the monthly income of family is 4933 tk. That means every family bears the cost of 95.34% of their family income per C-section cost [9]. In 2004-2016 the rate of C-section increases from 4% to 31%. In 2016-2018 the rate is 51%. In 2018 the parents of Bangladesh paid $483 million cost for C-section which is medically unnecessary [10]. One of the major problems in modern health system is uncontrolled increase of caesarean section. This study examines the association of reported complications around delivery and socio-demographic, healthcare and spatial characteristics of mothers with CS.

3. Objectives

1) To know the pattern of caesarian and normal delivery of childbirth in Ban-

gladesh.

2) To determine the influential factor of caesarian and normal delivery.

3) To make a comparative study between caesarian and normal delivery.

4) To determine the family income effect on caesarian and normal delivery childbirth in BD.

4. Methodology

4.1. Data Collection

We have collected the data by questionnaire method from all over the country by cluster sampling. The students of first year of the department of statistics, they are involved to collect the data from each of the selected cluster (district) of the country cover. We did collect 281 of total respondents those who are targeted population by our study.

4.2. Methods

The paper used descriptive and analytical research designs in determining the comparative study on caesarian and normal delivery childbirth in Bangladesh. Different types of graph were used to show the pattern of caesarian and normal delivery childbirth. Chi-square test and Pearson Correlation were applied to find out the significant relationship between study variables. Finally, Binary Logistic Regression was used to establish the effect of the independent variables on the dependent variable and Meta analysis used to find out the independent of number of cesarean delivery baby in locality and education level. The data were analyzed by using Statistical Package for the Social Sciences (SPSS) version 25.0.

5. Ethics Statement

We have committed to the respondent in questionnaire that the information which they have provided is very confidential and we have to use this data only research purpose not unethical purpose. All respondents that did consent use this information in study purpose only. For this reason, it did not need any approval from IRB. The data were analyzed anonymously.

6. Result and Discussion

Table 1 represents the frequency and percentage for all questionnaire variables according to their classification.

From the descriptive statistics Table 2, the variance of children taken by caesarian delivery is less than children taken by normal delivery. So we conclude that caesarian delivery is better than normal delivery childbirth.

Table 3 indicates, there is weekly linear relationship between family income and children taken by caesarian delivery with a positive slope that means increase caesarian delivery due to increase family income. Also weekly linear relationship occurs between family income and children taken by normal delivery

Table 1. Frequency and percentage for all study variables according to their classification.

Variables	Classification	Frequency	Percentage (%)
Gender of respondent	Male	2	0.7
	Female	279	99.3
Where you from	Urban	111	39.5
	Rural	170	60.5
Educational qualification	Illiterate	12	4.3
	Primary	33	11.7
	Secondary	95	33.8
	Higher-secondary	71	25.3
	Graduation	70	24.9
How many children do you have	1 - 3	252	89.7
	4 - 6	29	10.3
Children taken by caesarian	0 - 2	262	93.2
	3 - 4	19	6.8
How many children taken by normal delivery	0 - 2	246	87.5
	3 - 4	33	11.7
	5 - 6	2	0.7
Family income per month	5000 - 25,000	127	45.2
	26,000 - 45,000	91	32.4
	46,000 - 65,000	37	13.2
	66,000 - 85,000	07	2.5
	>86,000	19	6.8
Cost of caesarian	0 - 25,000	208	74.0
	26,000 - 45,000	67	23.8
	>46,000	06	2.1
Cost in normal delivery	1000 - 5000	219	77.9
	6000 - 10,000	62	22.1
Place of caesarian delivery	Govt clinic	121	43.1
	Private clinic	160	56.9
Do you face any problem by caesarian delivery	Yes	132	46.6
	No	149	53.4
Recommendation for the next generation	Caesarian	55	19.6
	Normal	226	80.4

Table 2. Descriptive statistics of some important variables.

Descriptive Statistics						
variable	N	Minimum	Maximum	Mean	Std. Deviation	Variance
gender of respondent	281	1.00	2.00	1.9929	0.08421	0.007
where you from	281	1.00	2.00	1.6050	0.48973	0.240
education qualification	281	1.00	5.00	3.5480	1.11420	1.241
how many children do you have	281	1.00	2.00	1.1032	0.30477	0.093
children taken by cesarean	281	1.00	2.00	1.0676	0.25153	0.063
how many children taken by normal delivery	281	1.00	3.00	1.1317	0.35921	0.129

Continued

family income per month	281	1.00	5.00	1.9324	1.13659	1.292
cost of cesarean	281	1.00	3.00	1.2811	0.49566	0.246
cost in normal delivery	281	1.00	2.00	1.2206	0.41542	0.173
place of cesarean delivery	281	1.00	2.00	1.5694	0.49604	0.246
do you face any problem by cesarean delivery	281	1.00	2.00	1.6690	1.71362	2.937
recommendation for next generation	281	1.00	2.00	1.8043	0.39747	0.158
Valid N (listwise)	281					

Table 3. Correlation between normal delivery children and cesarean delivery children with family income.

Correlations				
		children taken by caesarian	how many children taken by normal delivery	family income per month
children taken by caesarian	Pearson Correlation	1	−0.020	0.029
	Sig. (2-tailed)		0.741	0.634
	N	281	281	281
how many children taken by normal delivery	Pearson Correlation	−0.020	1	−0.039
	Sig. (2-tailed)	0.741		0.511
	N	281	281	281
family income per month	Pearson Correlation	0.029	−0.039	1
	Sig. (2-tailed)	0.634	0.511	
	N	281	281	281

with a negative slope, that means decrease normal delivery due to increase family income.

Table 4 means, there is weekly linear relationship between parent's educational qualification and children taken by caesarian delivery with a positive slope that means increase caesarian delivery due to increase educational qualification and significant relationship with each other. On the other hand there are very weekly relationship educational qualification and normal delivery.

Table 5 shows that the facing problem in caesarian delivery is weakly correlated with recommendation for next generation significantly.

Table 6 means place of living is weakly correlated with both caesarian and normal delivery.

Regression analysis

The model is significant. The fitted regression model for those variables. Caesarian delivery = 1.008 + 0.037 * Living place. The slope 0.037 represents change of rate of caesarian delivery due to changing living places (Table 7).

Table 4. Correlation of cesarean delivery and normal delivery with educational qualification.

Correlations				
variable		children taken by cesarean	how many children taken by normal delivery	education qualification
children taken by cesarean	Pearson Correlation	1	−0.020	0.135*
	Sig. (2-tailed)		0.741	0.024
	N	281	281	281
how many children taken by normal delivery	Pearson Correlation	−0.020	1	−0.038
	Sig. (2-tailed)	0.741		0.524
	N	281	281	281
education qualification	Pearson Correlation	0.135*	−0.038	1
	Sig. (2-tailed)	0.024	0.524	
	N	281	281	281

Table 5. Correlation of cesarean delivery and normal delivery with recommendation for the next generation.

Correlations			
		do you face any problem by cesarean delivery	recommendation for next generation
do you face any problem by cesarean delivery	Pearson Correlation	1	0.030
	Sig. (2-tailed)		0.612
	N	281	281
recommendation for next generation	Pearson Correlation	0.030	1
	Sig. (2-tailed)	0.612	
	N	281	281

Table 6. Correlation between residual and delivery process.

Correlations				
		where you from	children taken by caesarian	how many children taken by normal delivery
where you from	Pearson Correlation	1	0.073	0.033
	Sig. (2-tailed)		0.225	0.584
	N	281	281	281
children taken by caesarian	Pearson Correlation	0.073	1	−0.020
	Sig. (2-tailed)	0.225		0.741
	N	281	281	281
how many children taken by normal delivery	Pearson Correlation	0.033	−0.020	1
	Sig. (2-tailed)	0.584	0.741	
	N	281	281	281

Chi-square test

This Chi-square test indicates the face problem in cesarean delivery and recommendation for next generation is significantly correlated (Table 8).

Cross tabulation analysis

The Chi-square test shows the place of cesarean delivery and facing problem is highly significant (Table 9).

Graphical representation

About 61% people live in urban area and 39% people live in rural area (Figure 1).

Figure 2 indicates about 87.5% women have 0 - 2 children, 11.7% women have 3 - 4 children and 0.7% women have 5 - 6 children in their family.

Table 7. Regression analysis of children taken by cesarean on place of residence.

Coefficients[a]										
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Correlations		
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	1.008	0.051		19.585	0.000	0.906	1.109			
	where you from	0.037	0.031	0.073	1.216	0.225	−0.023	0.098	0.073	0.073	0.073

[a]Dependent Variable: children taken by cesarean.

Table 8. Cross tabulation analysis.

			recommendation for next generation		Total
			cesarean	normal delivery	
do you face any problem by cesarean delivery	yes	Count	24	107	131
		Expected Count	25.6	105.4	131.0
	no	Count	31	117	148
		Expected Count	29.0	119.0	148.0
	21.00	Count	0	2	2
		Expected Count	0.4	1.6	2.0
Total		Count	55	226	281
		Expected Count	55.0	226.0	281.0

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	0.794[a]	2	0.672
Likelihood Ratio	1.178	2	0.555
Linear-by-Linear Association	0.259	1	0.611
N of Valid Cases	281		

[a]2 cells (33.3%) have expected count less than 5. The minimum expected count is 0.39.

Table 9. Cross tabulation analysis.

			Do you face any problem by cesarean delivery			Total
			yes	no	21.00	
Place of cesarean delivery	Govt. clinic	Count	60	60	1	121
		Expected Count	56.4	63.7	0.9	121.0
	Private	Count	71	88	1	160
		Expected Count	74.6	84.3	1.1	160.0
Total		Count	131	148	2	281
		Expected Count	131.0	148.0	2.0	281.0

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	0.824[a]	2	0.662
Likelihood Ratio	0.824	2	0.662
Linear-by-Linear Association	0.004	1	0.947
N of Valid Cases	281		

[a]2 cells (33.3%) have expected count less than 5. The minimum expected count is 0.86.

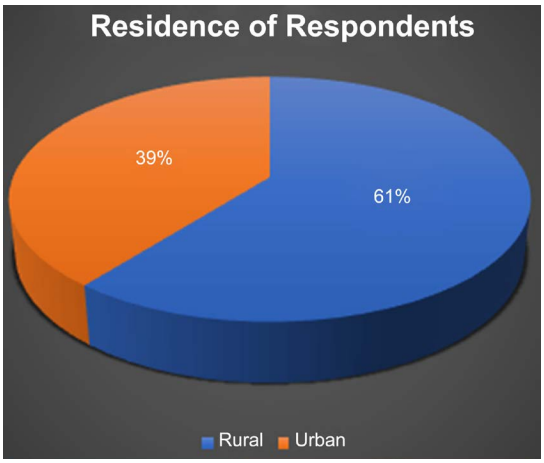

Figure 1. Pie diagram of place of residence.

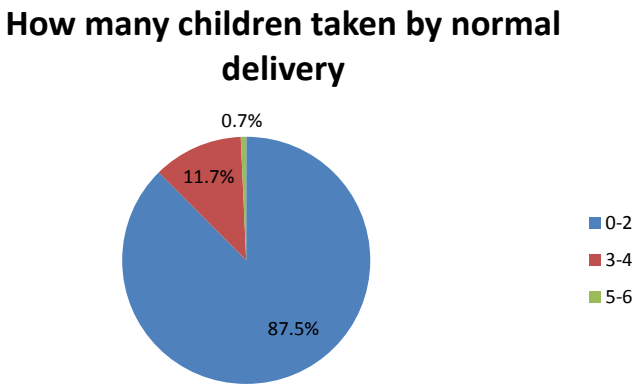

Figure 2. Pie diagram of children taken by normal delivery.

Figure 3 indicates 25% respondents who have passed their graduation, 25% passed higher-secondary, 34% passed secondary, 12% passed primary and 4% illiterate during the study.

Figure 4 presents percentage of place of caesarian delivery.

Maximum caesarian delivery about 53% occurs in private clinic (Figure 5).

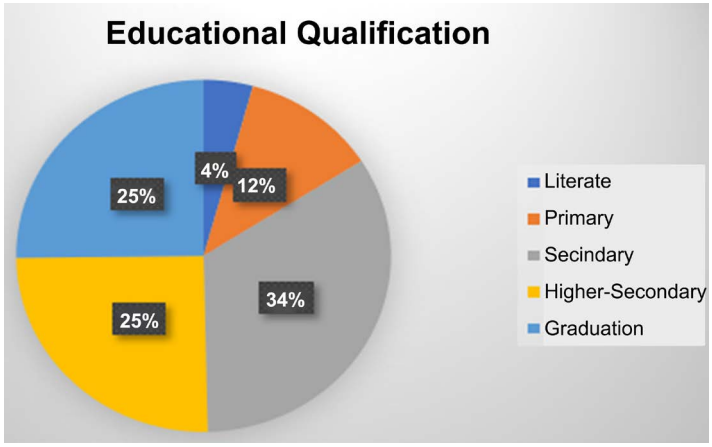

Figure 3. Percentage of educational qualification of respondent (Women).

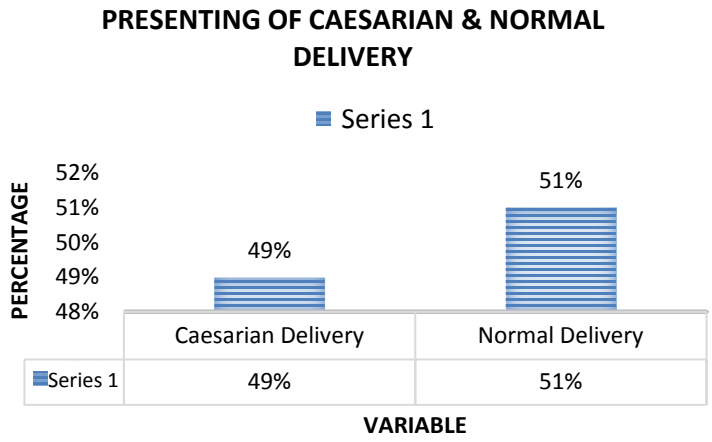

Figure 4. Percentage of caesarian and normal delivery.

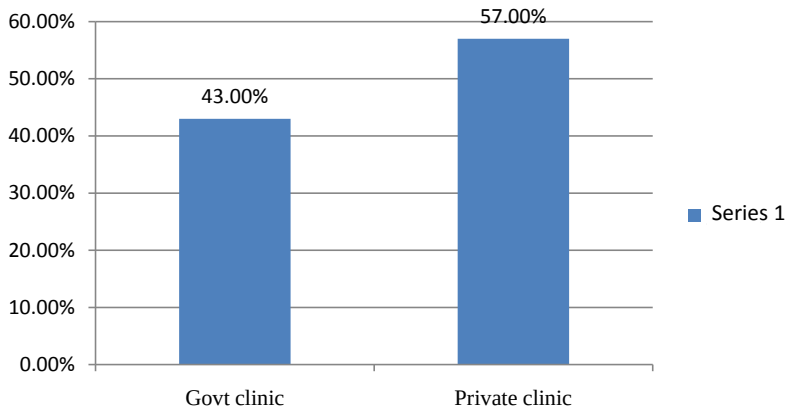

Figure 5. Percentage of place of caesarian delivery.

Figure 6 is positive trend that means normal delivery is recommended for next generation.

Binary Logistic regression analysis

This means, 27% people are facing problem in caesarian delivery in government clinic and 84% urban people are facing problem in caesarian delivery. 99% primary educated people are facing problem in caesarian delivery and 32% graduated people are facing problem in caesarian delivery. 45% people are taken baby by caesarian delivery and facing problem (Table 10).

Binary logistic regression Table 11 shows, 59% secondary educated people and 51% higher educated people are recommended caesarian delivery for the next generation. And 72% people who are taken children by caesarian delivery

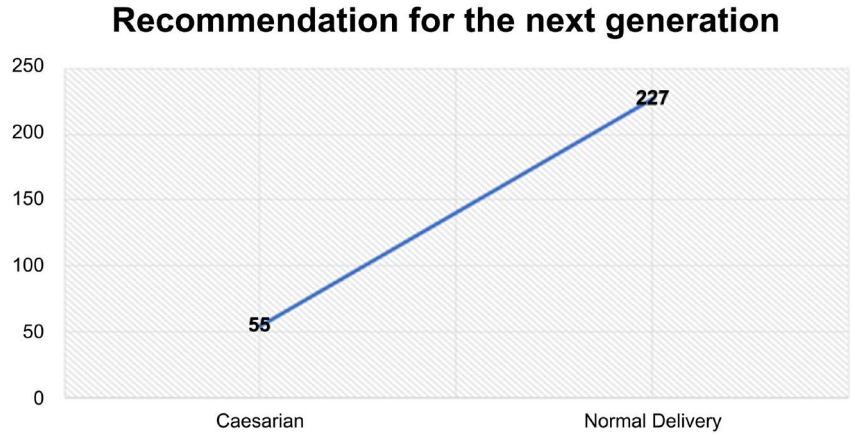

Figure 6. Recommended for next generation.

Table 10. Binary Logistic regression analysis of some significant variables.

Variables in the Equation									
		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1[a]	place of caesarian delivery (1)	0.242	0.252	0.925	1	0.336	1.274	0.778	2.089
	where you from (1)	0.614	0.252	5.938	1	0.015	1.847	1.128	3.025
	education qualification			0.653	4	0.957			
	education qualification (1)	−0.006	0.688	0.000	1	0.993	0.994	0.258	3.830
	education qualification (2)	0.158	0.627	0.064	1	0.801	1.171	0.343	3.999
	education qualification (3)	0.062	0.642	0.009	1	0.923	1.064	0.302	3.743
	education qualification (4)	0.281	0.641	0.192	1	0.661	1.324	0.377	4.656
	how many children do you have	−0.342	0.412	0.690	1	0.406	0.710	0.317	1.593
	children taken by caesarian	0.372	0.511	0.531	1	0.466	1.451	0.533	3.951
	cost of caesarian	−0.301	0.251	1.435	1	0.231	0.740	0.452	1.211
	constant	−0.171	0.914	0.035	1	0.851	0.842		

[a]Variable(s) entered on step 1: place of caesarian delivery, where you from, education qualification, how many children do you have, children taken by caesarian, cost of caesarian.

recommended caesarian delivery for the next generation. 61% people recommended government clinic for caesarian delivery. The people who spend 54% for caesarian delivery are recommended caesarian delivery (Table 11).

Meta analysis

Let us consider, H_0: Number of cesarean baby independent of location and education level (Table 12).

H_1: Number of cesarean baby depends on location and education level.

We conduct the test at 5% level of significance.

Test statistics:

Table 11. Binary Logistic regression analysis of important variables.

Variables in the Equation									
		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1[a]	education qualification			5.501	4	0.240			
	education qualification (1)	−1.438	1.129	1.622	1	0.203	0.237	0.026	2.170
	education qualification (2)	−0.520	1.100	0.224	1	0.636	0.594	0.069	5.134
	education qualification (3)	−0.666	1.114	0.358	1	0.550	0.514	0.058	4.557
	education qualification (4)	−1.141	1.106	1.064	1	0.302	0.320	0.037	2.793
	children taken by caesarian	−0.330	0.576	0.329	1	0.566	0.719	0.232	2.223
	place of caesarian delivery (1)	−0.480	0.331	2.106	1	0.147	0.619	0.324	1.183
	how many children do you have	−0.185	0.514	0.129	1	0.719	0.831	0.304	2.275
	family income per month	0.184	0.147	1.565	1	0.211	1.202	0.901	1.604
	cost of caesarian	−0.625	0.287	4.761	1	0.029	0.535	0.305	0.938
	Constant	3.590	1.376	6.805	1	0.009	36.238		

[a]Variable(s) entered on step 1: education qualification, children taken by caesarian, place of caesarian delivery, how many children do you have, family income per month, cost of caesarian.

Table 12. Meta analysis of number of cesarean delivery baby on locality and education level.

	Locality					
	Urban			Rural		
	Number of cesarean baby					
Level of education	0 - 2	3 - 4	Total	0 - 2	3 - 4	Total
Illiterate	2.89	0.11	03	10.04	0.96	11
Primary	12.52	0.48	13	16.43	1.57	18
Secondary	31.79	1.21	33	53.85	5.15	59
Higher secondary	32.75	1.25	34	34.69	3.13	38
Graduated	25.05	0.95	26	41.99	4.01	46
Total	105	04	109	157	15	172

$$x^2 = \sum\sum \frac{O_{ij}^2}{E_{ij}} - n$$

For urban area:

$$x_1^2 = \frac{3^2}{2.89} + \frac{0^2}{0.11} + \frac{0^2}{0} + \frac{13^2}{12.52} + \frac{0^2}{0.48} + \frac{31^2}{31.79} + \frac{2^2}{1.21} + \frac{33^2}{32.75} + \frac{1^2}{1.25} + \frac{25^2}{25.05} + \frac{1^2}{0.95} - 109$$
$$= 110.1982693 - 109$$
$$= 1.198 \ (P \text{ value, } P_1 = 0.878428)$$

The result is not significant at $P < 0.05$.

As $P_1 = 0.878428 > 0.05$ so H_0 is accepted.

For rural area:

$$x_2^2 = \frac{10^2}{10.04} + \frac{1^2}{0.96} + \frac{16^2}{16.43} + \frac{2^2}{1.57} + \frac{56^2}{53.85} + \frac{3^2}{5.15} + \frac{36^2}{34.69} + \frac{2^2}{3.31} + \frac{39^2}{41.99} + \frac{7^2}{4.01} - 172$$
$$= 4.125 \ (P \text{ value, } P_2 = 0.389353)$$

The result is not significant at $P < 0.05$.

AS $P_2 = 0.389353 > 0.05$ so accept H_0.

For conclusion using data of all location meta analysis can be performed by combining the P values of x^2 where combined P value is given by-

$$-2\ln P = -2\ln(P_1 + P_2)$$
$$= -2\ln(0.878428 * 0.389353)$$
$$= -2\ln(0.3420185771)$$
$$= 2.146$$

Thus $-2\ln P$ is distributed as x^2 with $2K = (2 \times 2)$ (2 location so $K = 2$) df. The tabulated value of x^2 at 5% level of significance with 4 df is 9.49 which is greater than x^2 $(-2\ln P)$. So H_0 is accepted.

The calculation can also be done by combining the values of calculated x^2 for urban and rural areas where combined x^2 is

$$x^2 = x_1^2 + x_2^2$$
$$= 1.198 + 4.125$$
$$= 5.323$$

This x^2 has (4 + 4) = 8 df, the tabulated value at 5% level of significance is 15.51 which are greater than combined x^2 so H_0 is accepted.

So this indicates that number of cesarean delivery baby is independent of locality and education level.

7. Conclusion

A caesarian section is a surgical delivery of a baby that involves making incisions in the mother's abnormal wall and uterus. The purpose of the study is to provide a certain reference for the future pregnant women in Bangladesh. The study mainly focuses on the pattern of caesarian and normal delivery of childbirth in Bangladesh and the relationship between parent's educational qualification and nature of childbirth. We found that about 80.4% of women recommend normal

delivery for the next gradations. So that the significant finding is to make a decision for the policy maker where they can have initiative to ensure normal delivery in all kinds of clinic (Government and Private) in Bangladesh. Moreover, the physical condition of the pregnant woman is not considered when analyzing the factors affecting caesarean section and normal delivery.

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Conflicts of Interest

The authors declare no conflicts of interest.

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