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Too Posh to Push: Determinants of Planned C-Section Delivery Among Indonesian Women

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ABSTRACT

Caesarean section (CS) delivery in Indonesia is on the rise and has drawn a considerable attention to its social determinants. However, information on planned CS delivery is limited in the Indonesian setting. Hence, this study aims at investigating its correlates. We employed data from the 2017 round of the Indonesian Demographic and Health Survey. The dependent variable is a nominal variable representing method of delivery (1 = natural, 2 = planned CS, 3 = unplanned CS). The explanatory variables comprise three groups, namely spatial, maternal, demographic, socio-economic variables, and access to information. We fitted simple and multivariable multinomial logit models using relative risk ratio as the measure of association. After selecting facility births only and deleting missing cases, we analysed an analytic sample of 12,225 births. Of those births we observed 22.89% were done by CS. There were slight differences related to region of residence and urban residence for both planned and unplanned CS. Higher maternal age corresponds with higher risks of both planned and unplanned CS. Complication during pregnancy was found to increase the risk of planned CS. Moreover, access to internet increases the probability of having planned and unplanned CS delivery. Furthermore, ownership of private insurance and affluence are strongly associated with planned CS delivery. These findings suggest an indication of unnecessary CS deliveries that consume resources that could otherwise be used for other health needs. Educating expectant mothers and families on the benefits of natural birth could reduce the planned c-section rates in Indonesia and save health resources.

Keywords: *C-section delivery, socio-economic status, health insurance, Indonesia*

1. INTRODUCTION

Caesarean section (CS) is a crucial intervention in preventing maternal mortality. CS is a surgical incision performed as a method of childbirth, is usually chosen based on medical indications, although there are cases when it is demanded or elective [1]. The World Health Organisation (WHO) suggest that the rate to CS should not exceed 10-15 % of all deliveries [2]. Beyond such figures, there may be an indication of caesarean deliveries based on non-clinical grounds and may indicate its overuse [3]; which has potential adverse health and financial consequences. Caesarean sections in the developing world bear higher risk of complications and deaths than in developed countries [4]. The study by Boatin and colleagues [5] analysed data from 72 low- and middle-income countries and found an indication of underuse among poorer subgroups, an indication of overuse in the richer subgroups. Moreover, medically unnecessary CS pose a higher risk of post-partum morbidity [6], and lower odds of early breastfeeding initiation [7], and also a loss of economic resources which could be used for other more beneficial objectives [8].

There is an upward trend of CS deliveries in developing countries [5, 9-12]. In Indonesia, the trend is of similar direction. Based on a recent nationally representative survey, the figure has increased from 7% to 17% in the last decade (2007-2017) [13]. A deeper analysis was done by Hatt and colleagues [14] where they assessed the trends in rates of CS delivery in Indonesia from 1986 to 2002 by wealth quintile and found an increasing trend of CS delivery especially among wealthiest women. However, they did not address other determinants as their objective was to evaluate the village midwife programme in Indonesia. Moreover, Suryati [15] analysed the data from the 2010 Baseline Health Research (Riset Kesehatan Dasar – RISKESDAS) and concluded that the CS rate in Indonesia has exceeded the WHO's recommendation. Furthermore, Sihombing, Saptarini, and Putri [16] utilised the 2013 round of RISKESDAS and determined the risk factors of CS delivery. Also, Suparmi, Kusumawardhani, and Susiloretni [17] analysed the 2013 RISKESDAS and

examined the urban-rural inequality and determinants of CS delivery. These researches, however, have not specifically explored the determinants of planned CS delivery as they were restricted by the limitations in the data. The recent Indonesia Demographic and Health Survey (IDHS) fielded in 2017 has been improved to overcome this limitation. Hence, we analysed the data from the survey to investigate the correlates of planned CS deliveries in Indonesia.

2. METHOD

Data Source and Sample Size

We employed data from the 2017 IDHS, a large scale, nationally representative household health survey funded by the US Agency for International Development (USAID). The IDHS is conducted by Statistics Indonesia (Badan Pusat Statistik – BPS) in collaboration with the National Population and Family Planning Board (BKKBN) and the Indonesia Ministry of Health (MoH). For this analysis, we selected the children recode (KR). The details on the sampling and administered questions can be read elsewhere [13].

The population of interest is all the live births in the past five years. Thus, the sample is all the live births that occur during the five years preceding the survey, which is equivalent to 17,848 children. Figure 1 depicts the sample selection process in the analysis. We first removed those delivered at home (4,963 children). Then we removed missing cases (listwise deletion; 660 children). Hence, we are left with 12,225 children as the final analytic sample.

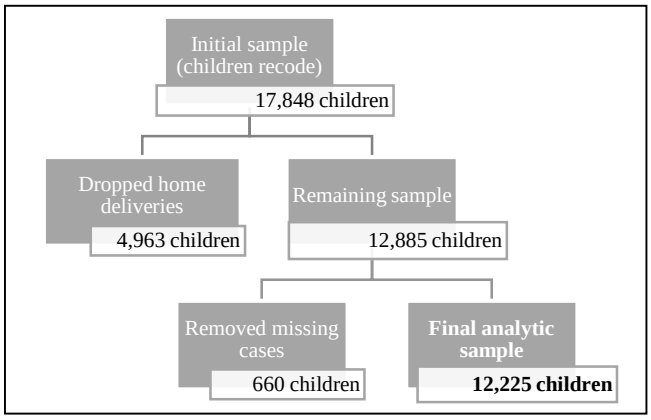

Figure 1. Sample selection process

Ethics Statement

The 2017 IDHS received ethical approval from ICF Macro Institutional Review Board (IRB), Maryland, USA. This study is a further analysis of publicly accessible secondary data that have been deidentified by BKKBN. We downloaded the 2017 data sets from the BKKB website (<http://sdki.bkkbn.go.id/?lang=id&what=dataset>). No additional ethical clearance is needed as such.

Variables Selection

The outcome variable, CS delivery, is measured by a categorical variable that takes the value of '1' if the delivery method is normal (vaginal), '2' if the delivery method is planned CS, and '3' if the delivery method is unplanned CS. This variable was formed from two questions administered in the 2017 IDHS. First, the ever-married women were asked: "Was (NAME) delivered by caesarean, that is, did they cut your belly open to take the baby out?". The second question is: "was that caesarean section procedure has been planned before?"

As for the potential explanatory variables, we selected them based on previous literature [11, 17-27]. We categorized them into several groups, namely spatial variables, maternal variables, demographic variables, access to information, and socio-economic variables. The spatial variables comprise region of residence, place of residence, and whether the distance to health facility is a big concern. The maternal variables include maternal age at birth, whether child was wanted, birth interval, any problems during pregnancy, and any problems during labor. The demographic variables consist of birth cohort, relationship to the household head, literacy of the mother, household size, education of the mother, and education of the father. Moreover, access to information was represented by frequency of reading newspaper/magazine, frequency of listening to the radio, frequency of watching the television, and internet use. Furthermore, the socio-economic variables comprise occupation of the mother, occupation of the father, health insurance ownership, and wealth index. The wealth index has been constructed by the 2017 IDHS team and the details can be read elsewhere [13].

Statistical Analysis

Since the outcome variable is a three-category variable with no order of importance (nominal), we employed multinomial logic model (MNLM) to examine the relationship between the explanatory variables and CS delivery [28]. This regression model has also been used in previous health and social research [29]. We fitted simple (not shown in results for the sake of brevity) and multivariable MNLMs with relative-risk ratio (RRR) as the measure of association. Statistical significance is evaluated at the 1%, 5%, and 10% levels. We also tested for the "Independence of Irrelevant Alternatives" (IIA) assumption and tested for combining dependent categories [30]. These two tests were performed using the "mlogtest" command [28].

3. RESULTS AND DISCUSSION

Sample Characteristics

The final analytic sample comprises 12,225 observations. It was observed that more than one in five children (22.89%) was delivered by CS method. Of which 13.25% was unplanned CS and 9.64% was planned CS (Figure 2).

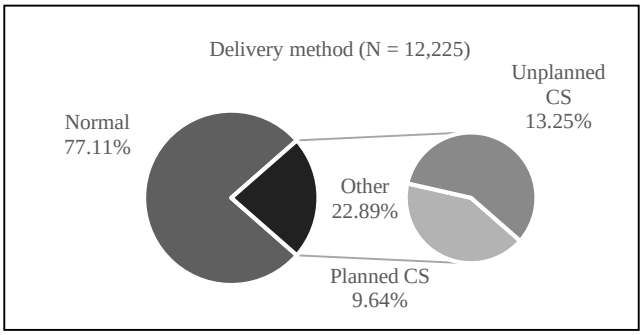

Figure 2. Delivery method of births in final the analytic sample

Table 1 presents the characteristics of the final analytic sample of 12,225 children. The sample predominantly resides in the Java region (35.77%) and in the urban areas of Indonesia (59.06%) with one out of ten (9.79%) has a difficulty in accessing health facility due to distance. Most of the births occurred when the mothers were in the 25 to 29-year age range (28.16%). The majority of the children was planned (80.74%). The majority of mothers experienced at least one problem during their pregnancy (89.16%) and their labour (71.08%).

Table 1. Sample Characteristics

Variable	Category	N	%
Region of residence	Java	4,373	35.77
	Sumatra	3,309	27.07
	Bali & Nusa Tenggara	1,176	9.62
	Kalimantan	1,066	8.72
	Sulawesi	1,663	13.60
	Maluku & Papua	638	5.22
Place of residence	Rural area	5,005	40.94
	Urban area	7,220	59.06
Far from health facility	No	11,028	90.21
	Yes	1,197	9.79
Maternal age at birth (years)	< 20	821	6.72
	20-24	2,581	21.11
	25-29	3,442	28.16
	30-34	3,107	25.42
	35+	2,274	18.60
Child was wanted	Wanted then	9,871	80.74
	Wanted later	1,279	10.46
	Wanted no more	1,075	8.79
Birth interval (years)	First birth	4,257	34.82
	< 24	762	6.23
	24-35	1,029	8.42
	36-47	1,066	8.72
	48-59	1,003	8.20
	60+	4,108	33.60
Any problems during pregnancy	No	1,325	10.84
	Yes	10,900	89.16
	No	3,536	28.92
Any problems during labour	Yes	8,689	71.08
Birth cohort	2012	675	5.52
	2013	2,391	19.56
	2014	2,358	19.29
	2015	2,436	19.93
	2016	2,662	21.78
	2017	1,703	13.93
Relationship to household head	Wife	129	1.06
	Household head	8,003	65.46
	Other	4,093	33.48
Literacy of mother	No	395	3.23
	Yes	11,830	96.77
Education of mother	No formal	79	0.65
	Primary	2,375	19.43
	Secondary	7,149	58.48
	Higher	2,622	21.45
Education of father	No formal	91	0.74
	Primary	2,584	21.14
	Secondary	7,307	59.77
	Higher	2,243	18.35
Frequently read newspaper/magazine	No	6,527	53.39
	Yes	5,698	46.61
Frequently listen to the radio	No	7,012	57.36
	Yes	5,213	42.64
Frequently watch the television	No	405	3.31
	Yes	11,820	96.69
Ever used the internet	No	5,680	46.46
	Yes	6,545	53.54
Occupation of mother	Agriculture worker	868	7.10
	Industrial worker	722	5.91
	Other	4,873	39.86
	Homemaker	5,762	47.13
Occupation of father	Agriculture worker	2,247	18.38
	Industrial worker	3,132	25.62
	Other	6,757	55.27
	Not working	89	0.73
Health insurance	None	8,029	65.68
	Private/employer	544	4.45
	Public insurance (JKN)	3,652	29.87
Wealth index	Poorest	2,096	17.15
	Poorer	2,311	18.90
	Middle	2,515	20.57
	Richer	2,572	21.04
	Richest	2,731	22.34
Total sample		12,225	100.00
Source: Authors' calculation of the 2017 IDHS data.			
Note: JKN = *Jaminan Kesehatan Nasional*.			

Regression Results

Table 2 presents the results of the final multivariable MNLM. The final multivariable MNLM is statistically significant (LR χ_104^2= 1323.99; P < 0.001) consisting of 21 explanatory variables. The model does not violate the IIA assumption and no categories of the outcome variable

needs to be combined (P < 0.001). The adjusted McFadden R2 is fairly small of 6.60%. Although several variables become statistically insignificant, they are still included in the final model due to theoretical grounds and evidence of previous research.

Table 2. Results of the Multivariable Logistic Regression Analysis

Variable		Planned CS vs normal	Unplanned CS vs normal
		s(aRRR)	*(aRRR)*
Region of residence			
	Java (Ref.)	Ref.	Ref.
	Sumatra	2.1131 ***	1.4564 ***
	Bali & Nusa Tenggara	1.2269	1.0149
	Kalimantan	1.0769	1.1472
	Sulawesi	1.5110 ***	1.0744
	Maluku & Papua	1.9308 ***	1.1509
Place of residence			
	Rural area (Ref.)	Ref.	Ref.
	Urban area	1.0599	1.0642
Far from health facility			
	No (Ref.)	Ref.	Ref.
	Yes	0.8829	0.8325 *
Maternal age at birth (years)			
	< 20	1.0358	0.6426 ***
	20-24 (Ref.)	Ref.	Ref.
	25-29	1.3986 ***	1.4224 ***
	30-34	2.4029 ***	1.8329 ***
	35+	4.1084 ***	2.4962 ***
Child was wanted			
	Wanted then (Ref.)	Ref.	Ref.
	Wanted later	0.9997	0.7800 **
	Wanted no more	1.0167	0.6949 ***
Birth interval (years)			
	First birth	0.7098 ***	2.8810 ***
	< 24	0.9496	1.0576
	24-35 (Ref.)	Ref.	Ref.
	36-47	0.8994	1.1907
	48-59	0.8405	1.1100
	60+	0.7342 ***	1.3656 **
Any problems during pregnancy			
	No (Ref.)	Ref.	Ref.
	Yes	1.2627 *	1.0188
Any problems during labour			
	No (Ref.)	Ref.	Ref.
	Yes	0.9471	1.0564
Birth cohort			
	2012 (Ref.)	Ref.	Ref.
	2013	1.1568	1.0960
	2014	1.3430 *	1.0684
	2015	1.4369 **	1.1861
	2016	1.4834 **	1.2037
	2017	1.3881 *	1.2955 *
Relationship to household head			
	Wife (Ref.)	Ref.	Ref.
	Household head	0.9480	0.5454 *
	Other	0.9612	1.1155
Literacy of mother			
	No (Ref.)	Ref.	Ref.
	Yes	1.7059	0.8908
Household size (in persons)		0.9620 *	0.9338 ***
Education of mother			
	No formal	Ref.	Ref.
	Primary	0.4735	1.9751
	Secondary	0.5178	2.1866
	Higher	0.8548	2.7069 *
Education of father			
	No formal	Ref.	Ref.
	Primary	2.0330	0.7777
	Secondary	2.6202	0.8721
	Higher	2.4821	0.7740
Frequently read newspaper/magazine			
	No (Ref.)	Ref.	Ref.
	Yes	0.9206	0.8572 **
Frequently listen to the radio			
	No (Ref.)	Ref.	Ref.
	Yes	1.0851	1.1875 ***
Frequently watch the television			
	No (Ref.)	Ref.	Ref.
	Yes	1.2500	1.1884
Ever used the internet			
	No (Ref.)	Ref.	Ref.
	Yes	1.4478 ***	1.1783 **
Occupation of mother			
	Agriculture worker (Ref.)	Ref.	Ref.
	Industrial worker	1.1270	1.0370
	Other	1.1326	1.1390
	Homemaker	1.1735	1.2063
Occupation of father			
	Agriculture worker (Ref.)	Ref.	Ref.
	Industrial worker	0.8627	0.9343
	Other	0.9562	1.0001
	Not working	1.2965	1.2956
Health insurance			
	None (Ref.)	Ref.	Ref.
	Private/employer	1.6064 ***	1.2765 *
	Public insurance (JKN)	0.9165	1.0354
Wealth index			
	Poorest (Ref.)	Ref.	Ref.
	Poorer	1.3711 **	1.1125
	Middle	1.3727 **	1.2218 *
	Richer	1.8416 ***	1.5307 ***
	Richest	2.6897 ***	1.6464 ***
Source: Model constructed using the 2017 IDHS data.			

Variable	Planned CS vs normal	Unplanned CS vs normal
	s(aRRR)	*(aRRR)*
Note: CS = caesarean section; aRRR = adjusted relative risk ratios; Ref. = reference category; JKN = Jaminan Kesehatan Nasional; *p <0.10; **p<0.05; ***p<0.01		

Discussion

Our analysis of data from 12,225 births examines the determinants of planned CS delivery or unplanned CS delivery as opposed to normal (vaginal) delivery. Our results confirm the findings of other studies that maternal age at childbirth is positively associated with the likelihood of CS delivery [9, 11, 21, 23, 25]. The higher the age group at birth, the higher the probability of the women planning a CS delivery as oppose to a normal delivery. Moreover, having problems during the pregnancy may also increase the risk of CS delivery [21, 26]. We also find a similar relationship where women who experienced at least one complication during their pregnancy are more likely to planned for CS delivery (aRRR = 1.2627). Based on the birth cohort, there is an indication of an increasing trend of planned CS in Indonesia. The values of the RRR is generally increasing. Although this relationship needs to be examined further.

Our findings confirm the studies by Hoxha and colleagues [18-20] where they argue that women with private health insurance are more likely to undergo CS than those with public insurance or no insurance at all. Women with private/employer insurance have higher probability to have CS compared to those with no insurance cover (aRRR = 1.6064). Moreover, studies have proved the positive relationship between wealth and CS deliveries [11, 22, 24], particularly elective CS [27]. In line with these studies, we also find that affluence, represented by the household wealth index, also has a positive influence the probability of CS delivery, both planned and unplanned.

Limitations and Strengths of the Study

There are several limitations to this study. First, the secondary data was collected cross-sectionally, and thus hinders the establishment of causality. Second, there are variables that potentially determine the choice of CS delivery but were not available in the 2017 IDHS. One example is the height and weight of the mother [16, 22]. Third, one might argue that whether the CS delivery was planned or not does not necessarily reflect the mother's demand for CS [31]. Complications may be found during antenatal care visits and hence the mother must opt for CS delivery. However, we assume that this is not the case as, unlike the 2012 IDHS, the 2017 IDHS lack data on complications during pregnancy. Nonetheless, this study uses a nationally representative data with large sample size and hence statistical power.

4. CONCLUSION

This paper provides observational evidence of the correlates of planned CS deliveries in Indonesia. By employing a nationally representative survey data, we observed that private health insurance ownership and higher socio-economic status corresponds to higher risk of planned CS, and these associations hold even after pregnancy and labor complications were included in the final multivariable model. Moreover, consistent with the existing literature, we also find that maternal age is positively associated with both planned and unplanned CS delivery. Furthermore, wider access to information also corresponds to higher probability of planned CS delivery. These findings indicate an increasing trend of planned and unnecessary CS deliveries. To the best of our knowledge, this paper is the first of its kind in the context of Indonesia that separates planned CS from unplanned CS. More resources should be allocated to examine how the supply of surgeons influence the uptake of CS.

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REFERENCES

[1] R. Mander, Caesarean: Just Another Way of Birth? Abingdon, Oxon: Routledge, 2007.

[2] The Lancet, "Appropriate technology for birth," vol. 326, pp. 436-7, 1985.

[3] WHO, WHO Statement on Caesarean Section Rates: Executive Summary. Geneva: World Health Organization, 2015.

[4] S. Sobhy, D. Arroyo-Manzano, N. Murugesu, G. Karthikeyan, V. Kumar, I. Kaur, E. Fernandez, S. R. Gundabattula, A. P. Betran, K. Khan, J. Zamora, and S. Thangaratinam, "Maternal and perinatal mortality and complications associated with caesarean section in low-income and middle-income countries: a systematic review and meta-analysis," vol. 393, pp. 1973-82, 2019.

[5] A. A. Boatin, A. Schlotheuber, A. P. Betran, A.-B. Moller, A. J. D. Barros, T. Boerma, M. R. Torloni, C. G. Victora, and A. R. Hosseinpoor, "Within country inequalities in caesarean section rates: observational study of 72 low and middle income countries," vol. 360, pp. k55, 2018.

[6] J. P. Souza, J. G. Cecatti, M. A. Parpinelli, M. H. Sousa, T. G. Lago, R. C. Pacagnella, and R. S. Camargo, "Maternal morbidity and near miss in the community: findings from the 2006 Brazilian demographic health survey," vol. 117, pp. 1586-92, 2010.
[7] E. Yisma, B. W. Mol, J. W. Lynch, and L. G. Smithers, "Impact of caesarean section on breastfeeding indicators: within-country and meta-analyses of nationally representative data from 33 countries in sub-Saharan Africa," vol. 9, pp. e027497, 2019.
[8] L. Gibbons, J. M. Belizan, J. A. Lauer, A. P. Betran, M. Merialdi, and F. Althabe, "Inequities in the use of cesarean section deliveries in the world," vol. 206, pp. 331.e1-.e19, 2012.
[9] R. H. Al Rifai, "Trend of caesarean deliveries in Egypt and its associated factors: evidence from national surveys, 2005-2014," BMC Pregnancy Childbirth, vol. 17, pp. 417-, 2017.
[10] R. Al Rifai, "Rising cesarean deliveries among apparently low-risk mothers at university teaching hospitals in Jordan: analysis of population survey data, 2002–2012," vol. 2, pp. 195-209, 2014.
[11] S. Mumtaz, J. Bahk, and Y.-H. Khang, "Rising trends and inequalities in cesarean section rates in Pakistan: Evidence from Pakistan Demographic and Health Surveys, 1990-2013," vol. 12, pp. e0186563, 2017.
[12] C. K. Stanton, and S. A. Holtz, "Levels and trends in cesarean birth in the developing world," vol. 37, pp. 41-8, 2006.
[13] National Population and Family Planning Board - BKKBN, Statistics Indonesia - BPS, Ministry of Health - Kemenkes, and ICF 2018 Indonesia Demographic and Health Survey 2017. (Jakarta, Indonesia: BKKBN, BPS, Kemenkes, and ICF.)
[14] L. Hatt, C. Stanton, K. Makowiecka, A. Adisasmita, E. Achadi, and C. Ronsmans, "Did the strategy of skilled attendance at birth reach the poor in Indonesia?," vol. 85, pp. 774-82, 2007.
[15] T. Suryati 2012 Proportion of C-section surgery in Indonesia exceeds the maximum standard, is it in line with medical indication? [Persentase operasi caesaria di Indonesia melebihi standard maksimal, apakah sesuai indikasi medis?]. In: Bulletin of Health System Research (Buletin Penelitian Sistem Kesehatan), pp 331-8
[16] N. M. Sihombing, I. Saptarini, and D. S. K. Putri, "Determinan persalinan sectio caesarea di Indonesia (Analisis lanjut data Riskesdas 2013)," vol. 8, pp. 63-73, 2017.
[17] S. Suparmi, N. Kusumawardhani, and K. A. Susiloretni, "Sub-national inequality of caesarean section in urban-rural area of Indonesia," vol. 4, pp. 23-32, 2019.
[18] I. Hoxha, L. Syrogiannouli, M. Braha, D. C. Goodman, B. R. da Costa, and P. Jüni, "Caesarean sections and private insurance: systematic review and meta-analysis," vol. 7, pp. e016600, 2017.
[19] I. Hoxha, M. Braha, L. Syrogiannouli, D. C. Goodman, and P. Jüni, "Caesarean section in uninsured women in the USA: systematic review and meta-analysis," vol. 9, pp. e025356, 2019.
[20] I. Hoxha, A. Fejza, M. Aliu, P. Jüni, and D. C. Goodman, "Health system factors and caesarean sections in Kosovo: a cross-sectional study," vol. 9, pp. e026702, 2019.
[21] M. Khawaja, T. Kabakian-Khasholian, and R. Jurdi, "Determinants of caesarean section in Egypt: evidence from the demographic and health survey," vol. 69, pp. 273-81, 2004.
[22] O. Nkoka, P. A. M. Ntenda, T. Senghore, and P. Bass, "Maternal overweight and obesity and the risk of caesarean birth in Malawi," vol. 16, pp. 40, 2019.
[23] M. M. Rahman, M. R. Haider, M. Moinuddin, A. E. Rahman, S. Ahmed, and M. M. Khan, "Determinants of caesarean section in Bangladesh: Cross-sectional analysis of Bangladesh Demographic and Health Survey 2014 Data," PLoS One, vol. 13, pp. e0202879-e, 2018.
[24] B. A. Ushie, E. E. Udoh, and A. I. Ajayi, "Examining inequalities in access to delivery by caesarean section in Nigeria," vol. 14, pp. e0221778, 2019.
[25] S. Yaya, O. A. Uthman, A. Amouzou, and G. Bishwajit, "Disparities in caesarean section prevalence and determinants across sub-Saharan Africa countries," Glob Health Res Policy, vol. 3, pp. 19-, 2018.
[26] M. Neuman, G. Alcock, K. Azad, A. Kuddus, D. Osrin, N. S. More, N. Nair, P. Tripathy, C. Sikorski, N. Saville, A. Sen, T. Colbourn, T. A. J. Houweling, N. Seward, D. S. Manandhar, B. P. Shrestha, A. Costello, and A. Prost, "Prevalence and determinants of caesarean section in private and public health facilities in underserved South Asian communities: cross-sectional analysis of data from Bangladesh, India and Nepal," vol. 4, pp. 2014.
[27] B. Alves, and A. Sheikh, "Investigating the

relationship between affluence and elective caesarean sections," vol. 112, pp. 994-6, 2005.
[28] J. S. Long, and J. Freese, Regression Models for Categorical Dependent Variables using Stata. College Station, Texas, USA: Stata Press, 2014.
[29] S. Irianti, and P. Prasetyoputra, "The struggle for water in Indonesia: the role of women and children as household water fetcher," vol. 9, pp. 540-8, 2019.
[30] P. Ray, "Independence of Irrelevant Alternatives," vol. 41, pp. 987-91, 1973.
[31] C. Schantz, M. de Loenzien, S. Goyet, M. Ravit, A. Dancoisne, and A. Dumont, "How is women's demand for caesarean section measured? A systematic literature review," PLoS ONE, vol. 14, pp. e0213352, 2019.