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Prevalence and Factors associated with Caesarean Section in Gynecology Unit of Ayub Teaching Hospital, Abbottabad

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ABSTRACT

Background: Cesarean section (CS) is a crucial surgical procedure in modern obstetrics, typically performed due to factors like dystocia, prior CS, fetal distress, and multiple gestations. While CS can be life-saving, it carries risks such as post-delivery complications, financial burdens, and potential psychological impacts on mothers. **Objective:** This study investigates the prevalence and factors influencing CS among women at Ayub Teaching Hospital, Abbottabad. **Materials and Methods:** This is a descriptive cross-sectional study done in Gynecology C unit of Ayub Teaching Hospital, Abbottabad from 21st July, 2024 to 08th Sept, 2024 after taking approval from ethical committee. 316 patients who underwent delivery by various methods were included in this study. Basic demographics and type of procedure were noted after taking consent from the patient. SPSS version 23.0 was used **Results:** The overall prevalence of caesarean section was around 51.58% in our study. Age of mother more than 35 years (OR: 1.33, 95% CI: 0.605-2.966), post term (OR: 1.99, 95% CI: 0.596.726), high parity (OR: 2.1, 95% CI: 1.116-3.962), large baby size (OR: 3.45, 95% CI: 0.38-31.48) and secondary education (OR: 1.25, 95% CI: 0.567-2.785) were found to increase odds of caesarean section, whereas female sex (OR: 0.91, 95% CI: 0.587-1.429) , small baby size (OR: 0.75, 95% CI: 0.473-1.282), preterm labor (OR: 0.82, 95% CI: 0.524-1.295) and age group 25-34 (OR: 0.91, 95% CI: 0.554-1.455) were found to decrease the risk of caesarean section. **Conclusion:** Prevalence of caesarean section was found to be increasing in local population. The results highlight the impact of clinical and cultural factors on delivery choices, stressing the need for tailored maternal healthcare planning.

INTRODUCTION

There are several methods of delivery of the baby including vaginal delivery, caesarean section, assisted delivery, vaginal delivery after C section (VBAC) and water birth. The caesarean section (CS) is one of the significant surgical procedure in modern obstetrics and involves delivery of the baby making incision in mother's abdomen and uterus.[1,2] The most common medical reasons for caesarean deliveries include dystocia, a prior caesarean delivery, fetal size, cephalopelvic disproportion, prolonged labor, and multiple gestations.[3] Cesarean sections can be conducted on an elective or emergency basis, depending on timing of the procedure. Elective C-sections are planned in advance during pregnancy to ensure optimal obstetric care, anesthesia, neonatal resuscitation, and nursing support. In contrast, emergency C-sections are performed in response to

acute obstetric emergencies that threaten the lives of the mother and child. [4-6]

As with any surgical procedure, there are certain risks linked to caesarean sections. Unnecessary caesarean deliveries could lead to higher rates of morbidity and mortality for mothers, neonates, and infants.[7] Caesarean deliveries can result in various issues, including post-delivery complications, financial strain on families, and severe brain damage in infants.[8] Many studies show that women who have caesarean deliveries often experience negative emotional and psychological issues, including postpartum depression and feelings of disappointment regarding their childbirth experience.[9,10] These outcomes can be devastating for both caregivers and family members.

According to The World Health Organization (WHO), the ideal rate of caesarean deliveries should fall between 5% and 15%.[11] However, there is an increase in caesarean deliveries globally and can be observed both in developing and developed countries. There is significant rise in both primary and repeat caesarean rates.[12] This trend can be attributed to various factors, including increased awareness of fetal distress— particularly through continuous electronic fetal monitoring—a more permissive stance on performing caesareans for breech presentations, the preference for abdominal delivery in cases of growth-restricted infants, delayed childbearing, higher maternal body mass, multiple pregnancies, premature births, and improved safety associated with caesarean procedures.[13]

Significant variations can be observed among different regions of the world. Rates can be as low as 3.5% in Africa and as high as 40.5% in Eastern Asia.[14] These rates can vary due to factors such as the country, particular regions within a country, the type of healthcare facility (private or public), and the qualifications and specialties of the healthcare professionals.[15] According to a study done by the World Health Organization, the caesarean section rates are predicted to increase to nearly a third (29%) of all birth by

2030. This study predicts that if the current trend continues, by 2030, the highest caesarean section rates will likely be found in Eastern Asia (63%), Latin America and the Caribbean (54%), Western Asia (50%), Northern Africa (48%), Southern Europe (47%), and Australia and New Zealand (45%).[16] In Pakistan, the overall prevalence of C section is reported to be 22%.[17] A study in Punjab found that prevalence of caesrean section to be 28.9%.[18]

C-section deliveries are often unpredictable and have undoubtedly assisted many women in safely delivering their babies. However, it's important to carefully identify the situations where C-sections are necessary. Given the rising rates of C-section deliveries, it's crucial to understand the factors contributing to their use in order to minimize unnecessary interventions and ensure that they are performed only when truly needed.[19,20] This article explores the prevalence of caesarean sections and the socioeconomic, obstetric, and other related factors among women delivering at Ayub Teaching Hospital, Abbottabad. The findings can guide key policymakers in formulating policies for maternal health care services in local population. This study aims to fill the gap in information regarding the prevalence and associated factors of caesarean sections within an institutional context. Furthermore, it can provide baseline data for future research.

MATERIALS AND METHODS

This descriptive cross-sectional study was conducted in the Gynecology C unit of Ayub Teaching Hospital, located in Abbottabad, from 21st July, 2024 to 08th Sept, 2024. Approval for the study was obtained from the hospital's ethical committee to ensure compliance with ethical standards and patient rights. The study aimed to analyze various socio-demographic and obstetric factors associated with pregnant patients, specifically focusing on the frequency and characteristics of caesarean sections. The sample size was calculated using the World Health Organization (WHO) sample size calculator. Given a proportion estimate of 28.9% of patients undergoing caesarean section, with a 5% margin of error and a 95% confidence level, the required sample size was determined to be 316 patients. The study population included all pregnant patients admitted to the Gynecology C unit during the specified timeframe. Patients were admitted through both the Outpatient Department (OPD) and the Emergency Department, ensuring a diverse patient pool that represented different emergency

and non-emergency cases. A structured data collection form was used to record each patient's socio-demographic and obstetric information. Key variables collected included age, parity (number of previous births), educational status, mode of delivery (whether vaginal or caesarean), gender of the newborn, gestational age, and the baby's birth size. These variables were chosen to provide insights into factors that might correlate with the likelihood of caesarean delivery and other obstetric outcomes. Prior to data collection, written informed consent was obtained from each participant, ensuring that patients were fully informed about the purpose, methods, and potential impacts of the study. Participants were assured of confidentiality and anonymity. Data analysis was conducted using SPSS software, version 23.0. Descriptive statistics, including frequencies, percentages, and means, were generated for each variable to provide a comprehensive overview of the study population. Data analysis was conducted using odds ratios (OR) to examine the relationship between various socio-demographic and obstetric factors and the likelihood of a caesarean section

RESULTS

In our study, a significant majority of the candidates, accounting for 53.48%, were aged between 25 and 34 years. In contrast, only 10.1% of participants were over the age of 35, totaling just 32 individuals (Figure 1). The educational background of the participants was notably basic, with 49.36% having completed only primary education, while a considerable number were entirely uneducated. This educational trend was consistent across various modes of delivery.

In terms of family size, 151 participants (47.7%) reported having three or more children. The modes of delivery varied significantly among different parity groups. Notably, caesarean sections were more prevalent among women with three or more children, with 52.28% opting for this method. Conversely, only 40.64% of participants with three or more children chose alternatives to caesarean delivery. Among those who had only one child, a greater proportion of women opted for non-caesarean deliveries (36.6% compared to 25.76%).

The gestational age of the majority of pregnant women (51.89%) fell within the normal range of 37 to 40 weeks. Only 13 women (4.11%) experienced post-term labour, defined as labor occurring after 40 weeks. The gestational age appeared to be relatively uniform across different modes of delivery.

Regarding the newborns, most (65.5%) were of average size, while only five babies (1.58%) were classified as large. Additionally, male infants were more prevalent than female infants in our study, with male births comprising 56.01% compared to 43.98% for female births (Table 1). This analysis highlights important demographic and clinical trends within our study population, revealing insights into age, education, delivery methods, gestational age, and infant gender distribution.

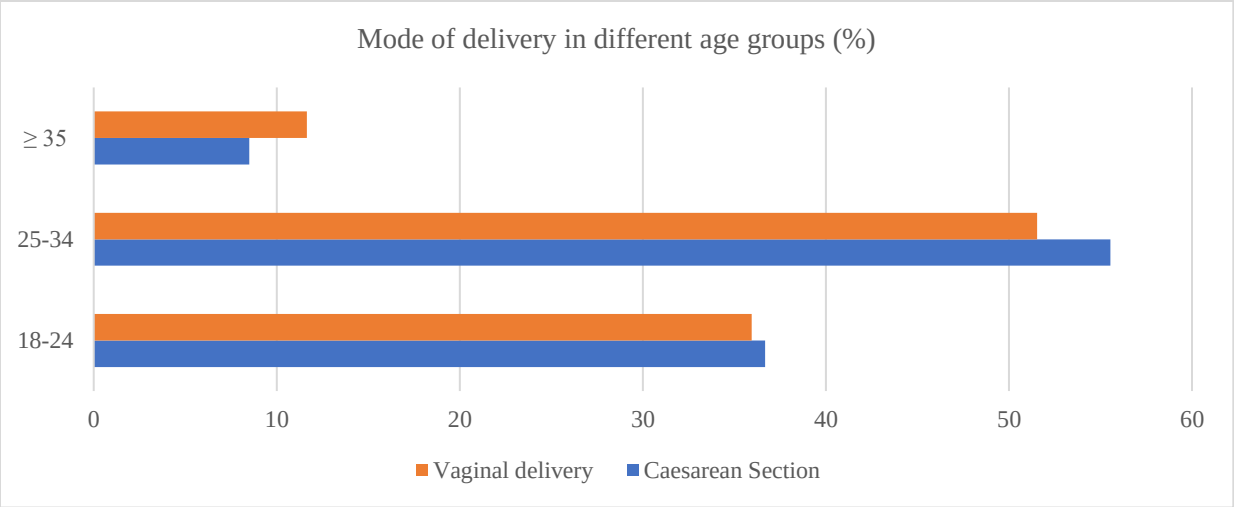
Table 2

Obstetric and socio demographic characteristics of the study population

Variable	Category	Caesarean Section		Total
		No:153 n (%)	Yes:163 n (%)	316 n (%)
Age	18-24	55 (35.94)	60 (36.8)	110 (34.8)
	25-34	85 (55.55)	84 (51.53)	169 (53.48)
	≥ 35	13 (8.49)	19 (11.65)	32 (10.1)
Level of education	No education	59 (38.56)	57 (34.4)	116 (36.7)
	Primary	74 (53.2)	82 (50.3)	156 (49.36)
	Secondary	14 (9.15)	17 (10.4)	31 (9.81)
	Higher	6 (3.92)	7 (4.3)	13 (4.11)
Parity	1	56 (36.6)	42 (25.76)	98 (31.01)
	2	26 (16.99)	41 (25.15)	67 (21.01)
	≥3	71 (40.64)	80 (52.28)	151 (47.7)
Gestational age	Normal (37-40 weeks)	77 (50.32)	87 (56.86)	164 (51.89)
	Preterm (<37 weeks)	72 (47.05)	67 (43.7)	139 (43.98)
	Post term (>40 weeks)	4 (2.61)	9 (5.52)	13 (4.11)
Baby size	Average (2.54cm)	96 (62.74)	111 (68.09)	207 (65.5)
	Small (<2.5cm)	56 (36.6)	49 (30.06)	105 (33.22)
	Large (>4cm)	1 (0.65)	4 (2.45)	5 (1.58)

Baby sex	Male	84 (54.9)	93 (57.05)	177 (56.01)
	Female	69 (45.1)	70 (42.94)	139 (43.98)

Figure 1
Mode of delivery in different age groups



The data indicate that the rate of caesarean sections decreases to 0.91 among women aged 25 to 34 years. However, this rate rises to 1.33 for women over the age of 35, suggesting an age-related trend where older mothers are more likely to undergo this surgical procedure.

Educational attainment also plays a significant role in influencing the choice of delivery method. As the level of education increases, so does the likelihood of opting for a caesarean section. Specifically, women with secondary education showed a higher rate of caesarean deliveries (1.25) compared to those with primary education (1.14) and those with higher education (1.20). This suggests that better-educated women may have more access to information or healthcare resources that lead them to choose surgical delivery.

Parity, or the number of children a woman has had, is another important factor. Women with two children exhibited the highest rate of caesarean sections (2.5), while those with three or more children had a lower rate (1.5), and women with only one child had the lowest rate of 1. This may reflect a tendency for women with two children to seek more controlled delivery methods, possibly due to their experiences in previous pregnancies.

The timing of labor also impacts the likelihood of caesarean delivery. Women presenting with preterm labor had a lower rate of caesarean sections (0.82), while those who were post-term (beyond 40 weeks) had a significantly higher likelihood (1.99) of undergoing the procedure. This may be due to increased risks associated with post-term pregnancies, leading healthcare providers to recommend surgical intervention.

Additionally, the size of the baby at birth significantly affects the delivery method. A smaller baby size is correlated with a reduced rate of caesarean sections (0.75), while larger baby size markedly increases the likelihood of a caesarean delivery (3.459). This relationship likely stems from the challenges that larger infants pose during vaginal delivery.

Lastly, the sex of the baby also influences the decision for a caesarean section. Female infants are associated with a lower likelihood of surgical delivery (0.91) compared to male infants, suggesting that factors related to baby sex may also play a role in delivery method choices (Table 2). Overall, these findings emphasize the complex interplay of age, education, parity, labor timing, infant size, and sex in influencing the rate of caesarean sections among women in our study. Understanding these factors can help healthcare providers better tailor their care and support for expectant mothers.

Table 2
Association between caesarean section and various socio-demographic and obstetric characteristics

Variable	Category	OR (95% CI)	P value
Age	18-24	1	1
	25-34	0.91 (0.554-1.455)	0.341
	≥ 35	1.33 (0.605-2.966)	0.235
Education	No education	1	1
	Primary	1.14 (0.709-1.855)	0.288
	Secondary	1.25 (0.567-2.785)	0.286
	Higher	1.20 (0.383-3.812)	0.373
Parity	1	1	1
	2	2.1 (1.116-3.962)	0.01
	≥3	1.5 (0.9-2.507)	0.05
Gestational age	Normal (37-40 weeks)	1	1
	Preterm (<37 weeks)	0.82 (0.524-1.295)	0.2
	Post term (>40 weeks)	1.99 (0.59-6.726)	0.133
Baby size	Average (2.5-4cm)	1	1
	Small (<2.5cm)	0.75 (0.473-1.282)	0.122
	Large (>4cm)	3.459 (0.38-31.48)	0.13
Sex	Male	1	1
	Female	0.91 (0.587-1.429)	0.349

DISCUSSION

This study analyzed the prevalence and determinants of caesarean section in local population. The prevalence of cesarean section was documented as 51.58%. Increased age, higher level of education, 2 or more number of children, post term labor, large baby size and male baby found to be associated with increased rate of caesarean section.

In our study, the prevalence of caesarean section was found to be 51.58%. This shows a rising trend in the rate of caesarean sections in Abbottabad as compared to a previous study (51.58% vs 47%).[21] However, the prevalence of caesarean section is still less than the prevalence of caesarean section in a study done in Hyderabad (73%). [22] A recent study done in Punjab found the prevalence of caesarean section to be 28.9%.[18] In our study the higher rates of caesarean section than Punjab could be due to better health facilities available in Punjab province.

In our study, women in the age group of 25-35 years were less likely to undergo caesarean section as compared to the women younger than 25 years of age. These results are consistent with the results of a study done by Yassin which observed that younger women are more likely to opt for caesarean section.[23] However, women above 35 years of age were more likely to select caesarean section as compared to younger ones. Same results were also reported some other studies which found that anatomical and physiological changes with ageing increases the risk of complicated pregnancies and older women tend to go with cesarean section more as a safe option.

In our study, it is observed that women with secondary education underwent caesarean section more than the women with other educational backgrounds. This observation is supported by some other studies. during futire pregnancies and opt for vaginal delivery. However, post term labor results in increased rates of caesarean section which I similar to other studies.[29,30]

Literature reports that women less baby size is not associated with increased risk of caesarean section as mothers who are informed about the less baby size wish to deliver baby by methods other than the caesarean section.[31] Same results were found in our study where women with small baby size selected caesarean section less than the women with average baby size.

Women with male baby selected caesarean section more than the women with female baby in our study. These results are similar to the other studies which also reported increased incidence of caesarean section with male fetus.

CONCLUSION

In conclusion, this study highlights the significant prevalence of caesarean sections in the gynecological unit of Abbottabad, revealing a prevalence rate of 51.58%, which is consistent with a rising trend in cesarean deliveries observed in

similar studies. Key determinants associated with higher rates of caesarean sections include advanced maternal age, higher education levels, increased parity, post-term labor, larger infant size, and male gender. These factors suggest that both clinical and sociocultural elements influence delivery method choices among women in this region. Comparatively, Abbottabad's cesarean rates align closely with rates in similar areas but remain higher than some urban region potentially reflecting differences in healthcare accessibility and resources. Overall, our findings underscore the importance of understanding local sociodemographic factors that impact delivery preferences, which could inform future healthcare planning and maternal education initiatives aimed at optimizing delivery outcomes.

REFERENCES

1. Mittal, S., Pardeshi, S., Mayadeo, N., & Mane, J. (2014). Trends in Cesarean Delivery: Rate and Indications. *The Journal of Obstetrics and Gynecology of India*, *64*(4), 251–254. https://doi.org/10.1007/s13224-013-0491-2
2. Rahman, M. M., Haider, M. R., Moinuddin, Md., Rahman, A. E., Ahmed, S., & Khan, M. M. (2018). Determinants of caesarean section in Bangladesh: Cross-sectional analysis of Bangladesh Demographic and Health Survey 2014 Data. *PLOS ONE*, *13*(9), e0202879. https://doi.org/10.1371/journal.pone.0202879
3. Penna, L., & Arulkumaran S. (2003). Caesarean section for non-medical reasons. Int J Gynecol Obstet. 82(3), 399–409. https://doi.org/10.1002/14651858.CD004660.pub3
4. Hannah, M. E. (2004). Planned elective cesarean section: A reasonable choice for some women?. *Cmaj*, *170*(5), 813-814. https://doi.org/10.1503/cmaj.1032002
5. Gedefaw, G., Demis, A., Alemnew, B., Wondmieneh, A., Getie, A., & Waltengus, F. (2020). Prevalence, indications, and outcomes of caesarean section deliveries in Ethiopia: a systematic review and meta-analysis. *Patient Safety in Surgery*, *14*(1). https://doi.org/10.1186/s13037-020-00236-8
6. Waniala, I., Nakiseka, S., Nambi, W., Naminya, I., Osuban Ajeni, M., Iramiot, J., Nekaka, R., & Nteziyaremye, J. (2020). Prevalence, Indications, and Community Perceptions of Caesarean Section Delivery in Ngora District, Eastern Uganda: Mixed Method Study. *Obstetrics and Gynecology International*, *2020*, 1–11. https://doi.org/10.1155/2020/5036260
7. Begum, T., Rahman, A., Nababan, H., Hoque, D. Md. E., Khan, A. F., Ali, T., & Anwar, I. (2017). Indications and determinants of caesarean section delivery: Evidence from a population-based study in Matlab, Bangladesh. *PLOS ONE*, *12*(11), e0188074. https://doi.org/10.1371/journal.pone.0188074
8. Verma, V., Vishwakarma, R. K., Nath, D. C., Khan, H. T. A., Prakash, R., & Abid, O. (2020). Prevalence and determinants of caesarean section in South and South-East Asian women. *PLOS ONE*, *15*(3), e0229906. https://doi.org/10.1371/journal.pone.0229906
9. Molina, G., Weiser, T. G., Lipsitz, S. R., Esquivel, M. M., Uribe-Leitz, T., Azad, T., Shah, N., Semrau, K., Berry, W. R., Gawande, A. A., & Haynes, A. B. (2015). Relationship Between Cesarean Delivery Rate and Maternal and Neonatal Mortality. *JAMA*, *314*(21), 2263. https://doi.org/10.1001/jama.2015.15553
10. Althabe, F., Sosa, C., Belizán, J. M., Gibbons, L., Jacquerioz, F., & Bergel, E. (2006). Cesarean Section Rates and Maternal and Neonatal Mortality in Low-, Medium-, and High-Income Countries: An Ecological Study. *Birth*, *33*(4), 270–277. https://doi.org/10.1111/j.1523-536x.2006.00118.x
11. Nahid, M., Zahirul, M., Chowdhury, R., & Razzaque, A. (2019). SSM - Population Health Socio-demographic, health and institutional determinants of caesarean section among the poorest segment of the

urban population: Evidence from selected slums in Dhaka, *Bangladesh. 8*, 4–13.

12. , Krychowska, A., Kosińska, K., & Karwan-Płońska, A. (2004). Comparison of indications for cesarean section in 1985-86 and 2000-01. Analysis of changes. *Ginekologia polska, 75(*12), 926-931.
13. Krychowska, A., Kosińska, K., & Karwan-Płońska, A. (2004). Comparison of indications for cesarean section in 1985-86 and 2000-01. Analysis of changes. *Ginekol Pol.* *75*(12), 926. https://europepmc.org/article/med/15751212
14. Tolla˚nes, M. C. (2009). Increased rate of Caesarean sections-causes and consequences. *Tidsskr Nor Laegeforen.* *129*(13), 1329-31. https://doi.org/10.4045/tidsskr.08.0453
15. Betrán, A. P., Merialdi, M., Lauer, J. A., Bing-Shun, W., Thomas, J., Van Look, P., & Wagner, M. (2007). Rates of caesarean section: analysis of global, regional and national estimates. *Paediatric and Perinatal Epidemiology*, *21*(2), 98–113. https://doi.org/10.1111/j.1365-3016.2007.00786.x
16. Canadian Institute for Health Information: Giving Birth in Canada: Providers of Maternity and Infant Care.Ottawa. Canada: CIHI; 2004.
17. World Health Organization. Caesarean section rates continue to rise, amid growing inequalities in access. 2021. Available from: https://www.who.int/news/item/16-06-2021-caesarean-sectionrates-continue-to-rise-amid-growing-inequalities-in-access
18. DHS, M. (2018). Demographic and health surveys. Calverton: Measure DHS;
19. Zeeshan, M., Iqbal, A., Rasul, S., Shahzad, I., Ashraf, S., & Akbar, A. (2021). Prevalence and Associated Factors of Caesarean Section in Punjab, Pakistan: Evidence from Multiple Indicators Cluster Survey, (2017-2018) Punjab. *Pakistan Journal of Medical Research, 60*(2), 62–68. https://www.pjmr.org.pk/index.php/pjmr/article/view/44
20. Rai, S. D., & Jan, R. (2019). Caesarean section rates in south asian cities: can midwifery help stem the rise? *6*(2), 4–22. https://aura.abdn.ac.uk/bitstream/handle/2164/15258/Dhakal_et_al_JAM_CaesareanSectionRatesIn_VoR.pdf?sequence=1
21. Karim, F., Ali, N. B., Khan, A. N. S., Hassan, A., Hasan, M. M., Hoque, D. Md. E., Billah, Sk. M., El Arifeen, S., & Chowdhury, M. A. K. (2020). Prevalence and factors associated with caesarean section in four Hard-to-Reach areas of Bangladesh: Findings from a cross-sectional survey. *PLOS ONE*, *15*(6), e0234249. https://doi.org/10.1371/journal.pone.0234249
22. Tahir, N., Adil, M., Fatima, S., & Khan, S. (2024). CAESARIAN SECTIONS: FREQUENCY AND INDICATIONS AT PERIPHERAL TERTIARY CARE HOSPITAL: Caesarian Sections: Frequency And Indications. *Pakistan Armed Forces Medical Journal*, *68*(2), 273–279. https://pafmj.org/index.php/PAFMJ/article/view/493
23. Haider, G., Zehra, N., Munir, A. A., & Haider, A. (2009). Frequency and indications of cesarean section in a tertiary care hospital. *Pak J Med Sci*, *25*(5), 791-6.
24. Yassin K, Saida G. (2012). Levels and determinants of caesarean deliveries in Egypt: pathways to rationalisation. *Internet J World Health Societal Politics.* *7*(2), 1–3.
25. Dankwah, E., Kirychuk, S., Zeng, W., Feng, C., & Farag, M. (2019). Socioeconomic inequalities in the use of caesarean section delivery in Ghana: a cross-sectional study using nationally representative data. *International Journal for Equity in Health*, *18*(1). https://doi.org/10.1186/s12939-019-1063-6
26. Khan, R., Blum, L. S., Sultana, M., Bilkis, S., & Koblinsky, M. (2012). An Examination of Women Experiencing Obstetric Complications Requiring Emergency Care: Perceptions and Sociocultural Consequences of Caesarean

Sections in Bangladesh. *Journal of Health, Population and Nutrition*, *30*(2). https://doi.org/10.3329/jhpn.v30i2.11309

27. Patel, A., Pusdekar, Y. V., Prakash, A. A., Simmons, E., Waikar, M., Rao, S. R., & Hibberd, P. L. (2019). Trends and determinants of increasing caesarean sections from 2010 to 2013 in a prospective population-based registry in eastern rural Maharashtra, India. *BMJ Open*, *9*(8), e024654. https://doi.org/10.1136/bmjopen-2018-024654
28. Rydahl, E., Declercq, E., Juhl, M., & Maimburg, R. D. (2019). Cesarean section on a rise—Does advanced maternal age explain the increase? A population register-based study. *PLOS ONE*, *14*(1), e0210655. https://doi.org/10.1371/journal.pone.0210655
29. Qublan, H., Alghoweri, A., Al-Taani, M., Abu-Khait, S., Abu-Salem, A., & Merhej, A. (2002). Cesarean section rate: The effect of age and parity. *Journal of Obstetrics and Gynaecology Research*, *28*(1), 22–25. https://doi.org/10.1046/j.1341-8076.2002.00008.x
30. Rénes, L., Barka, N., Gyurkovits, Z., Paulik, E., Németh, G., & Orvos, H. (2017). Predictors of caesarean section – a cross-sectional study in Hungary. *The Journal of Maternal-Fetal & Neonatal Medicine*, *31*(3), 320–324. https://doi.org/10.1080/14767058.2017.1285888
31. Prah, J., Kudom, A., Afrifa, A., Abdulai, M., Sirikyi, I., & Abu, E. (2017). Caesarean section in a primary health facility in Ghana: Clinical indications and feto-maternal outcomes. *Journal of Public Health in Africa*, *8*(2). https://doi.org/10.4081/jphia.2017.704
32. Singh, P., Hashmi, G., & Swain, P. K. (2018). High prevalence of cesarean section births in private sector health facilities- analysis of district level household survey-4 (DLHS-4) of India. *BMC Public Health*, *18*(1). https://doi.org/10.1186/s12889-018-5533-3
33. Lieberman, E., Lang, J. M., Cohen, A. P., Frigoletto, F. D., Acker, D., & Rao, R. (1997). The association of fetal sex with the rate of cesarean section. *American Journal of Obstetrics and Gynecology*, *176*(3), 667–671. https://doi.org/10.1016/s0002-9378(97)70567-2