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ORIGINAL RESEARCH

# Socioeconomic Roles in Cesarean Section Delivery in the Philippines: A Secondary Analysis of the 2022 National Demographic and Health Survey

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**Abstract**

**Background:** Cesarean section (CS) delivery should only be performed when medically indicated. However, socioeconomic disparities continue to influence CS utilization in many countries, including the Philippines. Although previous studies have examined CS rates, there is limited evidence, based on the latest national data, on how socioeconomic factors shape CS use in the Philippines.
**Purpose:** This study aimed to analyze the socioeconomic roles in CS delivery in the Philippines.
**Methods:** This study used secondary data from the 2022 Philippines National Demographic and Health Survey (NDHS). The cross-sectional study included 4,452 women aged 15–49 who had given birth within the previous three years. Seven control factors were examined: employment, antenatal care (ANC), age, education, marital status, residence, and parity. The mode of delivery was considered the outcome variable, while socioeconomic status was the exposure variable. Binary logistic regression was used for the final data analysis.
**Results:** CS was performed in 18.45% of deliveries in the Philippines. Analysis of socioeconomic status indicated that women in the poorer group were 1.758 times more likely than those in the poorest group to undergo CS (AOR 1.758; 95% CI 1.757–1.758). Women in the middle group were 2.164 times more likely than the poorest to have a CS (AOR 2.164; 95% CI 2.163–2.165). Those in the richer group were 2.718 times more likely (AOR 2.718; 95% CI 2.717–2.719), and those in the richest group were 4.787 times more likely (AOR 4.787; 95% CI 4.785–4.789) to deliver by CS compared with the poorest.
**Conclusion:** Socioeconomic disparities are strongly associated with CS delivery in the Philippines. The wealthier the mother, the more likely she is to have a CS. ANC education should be optimized by addressing psychological needs, promoting positive values, and providing a sense of security and comfort in normal childbirth. At the same time, equitable access to CS should be ensured for the poorest groups through education and insurance coverage.

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## 1. Introduction

A cesarean section is a surgical procedure in which an infant is delivered through incisions made in the mother's abdominal cavity and uterus. A cesarean section is required when there is a substantial likelihood of an adverse outcome for either the mother or the newborn (Tsegaye et al., 2019). Some indications and reasons for CS are fetal distress, prolonged labor, oligohydramnios, post-maturity, and repeat CS (Begum et al., 2017). Underutilization due to limited availability is observed in specific regions and is linked to adverse outcomes for mothers and newborns (Singh et al., 2020). Excessive use and its consequences are increasingly alarming (The Lancet, 2018). Women and their infants who undergo non-medically required cesarean deliveries might

experience harm or mortality, particularly if the procedure is performed without adequate resources, expertise, and comprehensive healthcare (Motomura et al., 2017; The Lancet, 2018).

The worldwide cesarean section rate has risen from about 7% in 1990 to around 21% currently, exceeding the World Health Organization's (WHO) target (WHO, 2021). The lowest rate is in sub-Saharan Africa at 5%, while the highest is in Latin America and the Caribbean at 42.8%. The rate is around 25% in Europe and 30% in North America (Betran et al., 2021). Over the last 20 years, the percentage of live births in the two years before the survey conducted through CS delivery in the Philippines has increased dramatically, from 7.3 % in 2003 to 19.5% in 2022, surpassing the ideal CS rate, which is between 10% and 15% of births according to the WHO (Philippine Statistics Authority, 2023; WHO, 2015). Based on the results of the 2022 Philippine National Demographic and Health Survey (NDHS), the proportion of live births delivered via CS increases with household wealth, from the lowest wealth quintile (6%) to the highest (43%) (Philippine Statistics Authority, 2023). The Philippines, an archipelagic country comprising more than 7,000 islands, faces significant challenges in delivering equitable healthcare due to its geography and uneven distribution of health resources. Rural and remote areas often lack adequate health infrastructure and human resources compared to urban centers (Dayrit et al., 2018).

The rise in cesarean section rates across settings can be attributed to non-medical factors, such as social, cultural, and economic factors, as well as changes in women's risk profiles and a reported increase in medical indications (Mylonas & Friese, 2015; Pandey et al., 2023). Besides, patient preferences also contribute to the rise of CS worldwide. Expectant mothers may request elective CS for personal reasons, even when not medically indicated (Elnakib et al., 2019). The interplay of medical indications, maternal preferences, and social determinants suggests that multiple layers of influence shape access to cesarean sections. Similarly, the current situation in the Philippines reflects notable regional differences and the heavy influence of socioeconomic factors. Cesarean deliveries are generally higher in private healthcare facilities. In several provinces, the likelihood of CS deliveries in private healthcare facilities increased by 173% (Sepehri & Guliani, 2017). This trajectory is similar to broader trends observed in low- and middle-income nations, where CS rates are frequently above the WHO-recommended 5–15% range (Beogo et al., 2017). This rise causes concerns about possible overuse, especially among affluent women, whereas poorer women may experience underuse despite medical necessity (Sandall et al., 2018).

There are significant disparities in cesarean section rates between high-income and low-income countries. While overuse of CS is a concern in some high-income countries due to convenience or defensive medicine, many low-income countries struggle to provide access to life-saving CS when needed. Access to CS may be limited in many low-income countries due to poverty, lack of health insurance, and high out-of-pocket costs (Nugraheni et al., 2020). Women in rural areas or from marginalized communities may face additional barriers to accessing healthcare services, including CS (Wyatt et al., 2021). Disparities in healthcare infrastructure between urban and rural areas can affect access to CS. Remote or underserved regions may lack adequate facilities, skilled healthcare providers, and medical equipment necessary to perform safe CS (Mumtaz et al., 2020). Addressing these disparities requires a comprehensive approach that focuses on improving healthcare infrastructure, increasing access to skilled birth attendants, addressing socioeconomic barriers, promoting evidence-based practices, and addressing cultural beliefs and systemic inequalities in maternal healthcare. Prior research on CS delivery in the Philippines has primarily focused on general trends or medical indications, without disaggregating the impact of socioeconomic level in nationally representative data (Felipe-Dimog et al., 2025; Sepehri & Guliani, 2017). Understanding how socioeconomic privilege influences maternal healthcare utilization, particularly CS uptake, is critical for developing equitable maternal health policies in the Philippines. Therefore, this study aimed to analyze the socioeconomic role of cesarean section delivery in the Philippines.

## 2. Methods

### *2.1. Research design*

This study employed a cross-sectional design and secondary data analysis from the 2022 Philippine National Demographic and Health Survey (NDHS). The NDHS is a nationally representative survey conducted at a single point in time, making it appropriate for identifying

associations between socioeconomic factors and caesarean section delivery. The 2022 NDHS data was selected since it is the most up-to-date nationally representative DHS data. Additionally, this survey followed a standardized WHO methodology that allows cross-national comparison (Philippine Statistics Authority, 2023).

*2.2. Setting and samples*

The Philippine Statistics Authority implemented the 2022 Philippines NDHS. The Commission on Population and Development (POPCOM) partially funded the purchase of handheld tablets for data gathering, while the Philippine government supplied funding for the 2022 NDHS. Through the Demographic and Health Survey Program, supported by the US Agency for International Development (USAID), the Inner-City Fund (ICF) offers technical assistance. USAID funds this program, which provides support and technical assistance in implementing population and health surveys in various nations. A nationwide survey was conducted between 2 May and 22 June 2022. Individual and home instrument interviews were used to collect data, and multistage, stratified random sampling was employed to ensure accuracy (Philippine Statistics Authority, 2023).

The NDHS uses a two-stage stratified sampling method to collect information from women aged 15-49 years across all regions in the Philippines, encompassing both urban and rural areas. We restricted the analysis to women who had a live birth within the three years preceding the survey, in line with the study objective. Out of 27,821 respondents, 4,452 women comprised the weighted sample for the study, representing 98.0% of eligible Filipino women.

*2.3. Measurement and data collection*

The study employed the mode of delivery as an outcome factor. The study divided the mode of delivery into normal/vaginal and cesarean section delivery. In the study, socioeconomic status was one of the exposure variables. It was determined by looking at its wealth quintile. The number and variety of controls, like televisions, bicycles, or cars, as well as the characteristics of the home, like having access to toilets and drinking water, and the materials used to construct the first floor, were used to evaluate households. Principal component analysis was employed in the study to determine the score. These five categories, representing 20% of the population, were transformed into quintiles of national wealth by averaging the household scores for each household member. The population was split into five socioeconomic groups based on the survey results: poorest, poorer, middle, wealthier, and richest (Philippine Statistics Authority, 2023).

The study looked at seven control variables: age group, parity, ANC, marital status, employment status, type of housing, and education level. Housing can be divided into two categories: urban and rural. The Philippines Statistics Authority's urban-rural categories are mentioned in the report (Philippine Statistics Authority, 2023). The age categories included in the study were 15–19, 20–24, 25–29, 30–34, 35–39, 40–45, and 45–49 (Philippine Statistics Authority, 2023). Meanwhile, no formal education, primary, secondary, or postsecondary education was included in the education levels (Philippine Statistics Authority, 2023). Marital status can be divided into three categories: never married, married, and divorced/widowed (Yunitawati et al., 2024). The research identified two employment groups: employed and unemployed (Yunitawati et al., 2024).

The WHO guidelines, which stipulate that completed ANC must include a minimum of 8 visits throughout pregnancy, are cited in the study (WHO, 2018). The study separated ANC into two groups: Yes and No. Furthermore, parity was determined by counting the number of live births. The three types of parity are primiparous (one or fewer), multiparous (two to four), and grand multiparous (more than four).

The dataset is publicly available upon request through the DHS Program's official website (https://dhsprogram.com). Figure 1 illustrates the conceptual framework of cesarean section (CS) delivery in the study population. Socioeconomic status, including categories from the poorest to the richest, along with maternal characteristics such as age, parity, education, marital status, employment, residence, and completion of antenatal care (ANC), are shown as determinants influencing the likelihood of undergoing CS. This conceptual framework highlights the multifactorial nature of CS delivery, integrating both socioeconomic and maternal factor variables.

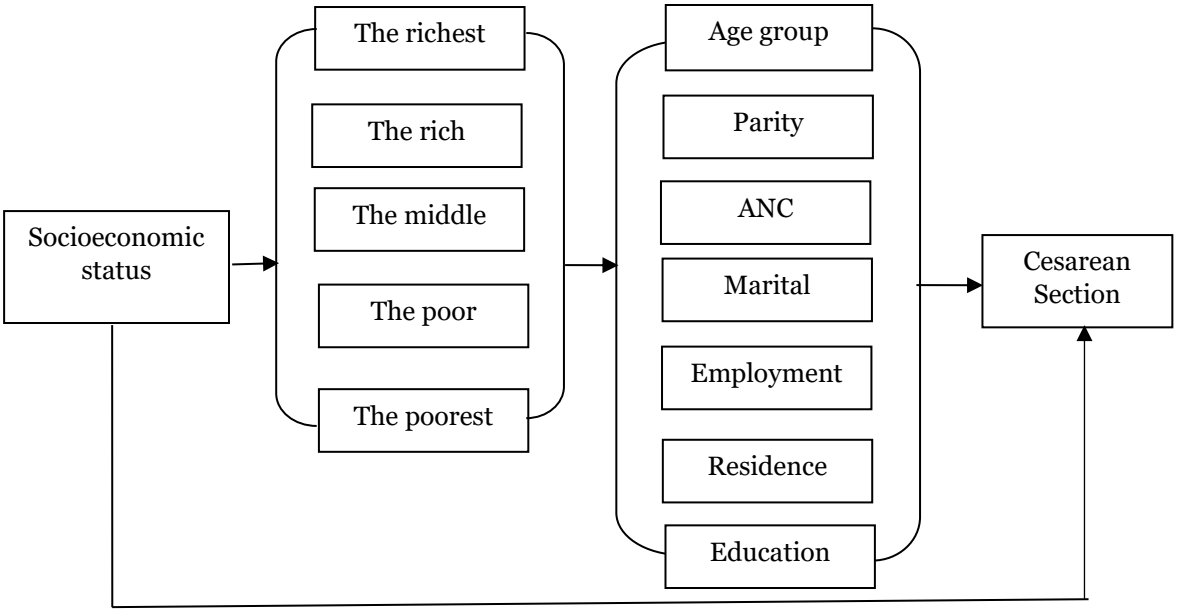


**Figure 1.** Conceptual framework of the study

*2.4. Data analysis*

This study conducted descriptive and inferential analyses. The Chi-square test was used to provide a descriptive overview of patterns and differences in socioeconomic status by mode of delivery and demographic characteristics. In the second part of the investigation, a collinearity test was used to determine whether there was a significant correlation among the independent variables. To complete the process, we ran a binary logistic regression to identify factors associated with cesarean delivery. 95% confidence intervals (CIs) were available for the study's adjusted odds ratios (AORs). Furthermore, statistical analysis was conducted using IBM SPSS 26.

*2.5. Ethical considerations*

The NDHS 2022 protocol has undergone a comprehensive review by the Institutional Review Board, which carefully followed the Human Subjects Protection regulations (45 CFR 46) established by the US Department of Health and Human Services. The data used in this study were obtained from the publicly available dataset of the Philippines' 2022 National Demographic and Health Survey (NDHS), which is managed by the DHS Program. Access to the dataset was granted after submitting a formal request through the DHS Program website (https://dhsprogram.com), where the purpose and scope of the analysis were clearly stated and approved. Regarding ethical considerations, the NDHS data are de-identified and publicly available for research purposes. All personal identifiers are removed by the DHS Program to protect participants' privacy and confidentiality. The original survey protocols, including informed consent procedures, were reviewed and approved by the ICF Institutional Review Board (IRB number: 2022-021) and the Philippines Statistics Authority (PSA).

## 3. Results

*3.1. Sociodemographic and maternal characteristics*

Table 1 presents the sociodemographic characteristics of mothers who delivered by CS in the Philippines and the findings of the bivariate analysis. The results show that 18.4% of deliveries in the Philippines occur by CS. Regarding the mode of delivery, the wealthier the mothers, the higher the proportion of CS deliveries. The richest group has the highest proportion in urban areas (68.6%). By age group, mothers aged 30-34 years have the highest proportion in the richest group (31.6%). Based on education level, mothers with higher education have the highest percentage in the richest category (79.7%).

Furthermore, regarding marital status, married mothers have the highest proportion across all socioeconomic levels. Based on employment status, employed mothers have the highest proportion in the richest group (66.0%). Regarding completed ANC, mothers who completed ANC

visits have a higher proportion than those who did not in the richest group (58.0%). Moreover, based on parity, multiparous women have the highest proportion in the richest level (56.8%).

**Table 1.** Sociodemographic and maternal characteristics (n=4,452)

| Demographic Characteristics | Socioeconomic Status | | | | | *p*-value |
|---|---|---|---|---|---|---|
| | Poorest (n=1,528) (%) | Poorer (n=1,015) (%) | Middle (n=783) (%) | Richer (n=586) (%) | Richest (n=540) (%) | |
| Mode of delivery | | | | | | <0.001 |
| Normal/vaginal | 94.0 | 87.2 | 83.0 | 76.9 | 57.7 | |
| Cesarean section | 6.0 | 12.8 | 17.0 | 23.1 | 42.3 | |
| Residence | | | | | | |
| Urban | 28.6 | 45.6 | 58.9 | 68.0 | 68.6 | |
| Rural | 71.4 | 54.4 | 41.1 | 32.0 | 31.4 | |
| Age group (year) | | | | | | <0.001 |
| 15 - 19 | 6.6 | 4.6 | 6.3 | 3.1 | 1.0 | |
| 20 - 24 | 19.1 | 24.8 | 20.6 | 21.9 | 7.9 | |
| 25 - 29 | 26.3 | 23.8 | 32.8 | 27.1 | 28.0 | |
| 30 - 34 | 23.4 | 22.4 | 22.3 | 24.5 | 31.6 | |
| 35 - 39 | 14.0 | 13.5 | 12.0 | 17.3 | 18.8 | |
| 40 - 44 | 9.4 | 9.2 | 5.2 | 6.0 | 11.9 | |
| 45-49 | 1.2 | 1.7 | 0.7 | 0.1 | 0.8 | |
| Education level | | | | | | <0.001 |
| No education | 2.8 | 0.0 | 0.0 | 0.3 | 0.2 | |
| Primary | 27.7 | 13.5 | 5.2 | 2.3 | 1.4 | |
| Secondary | 59.3 | 62.0 | 62.5 | 46.2 | 18.7 | |
| Higher | 10.2 | 24.5 | 32.4 | 51.3 | 79.7 | |
| Marital status | | | | | | <0.001 |
| Never married | 3.2 | 4.3 | 6.9 | 4.4 | 5.9 | |
| Married | 94.3 | 93.2 | 88.8 | 93.8 | 92.9 | |
| Divorced/widowed | 2.5 | 2.6 | 4.3 | 1.9 | 1.2 | |
| Employment status | | | | | | <0.001 |
| Unemployed | 67.8 | 60.9 | 58.1 | 47.8 | 34.0 | |
| Employed | 32.2 | 39.1 | 41.9 | 52.2 | 66.0 | |
| Completed antenatal care | | | | | | <0.001 |
| No | 86.5 | 75.7 | 68.5 | 57.1 | 42.0 | |
| Yes | 13.5 | 24.3 | 31.5 | 42.9 | 58.0 | |
| Parity | | | | | | <0.001 |
| Primiparous | 21.9 | 31.6 | 32.2 | 38.5 | 41.1 | |
| Multiparous | 53.0 | 51.5 | 62.2 | 56.2 | 56.8 | |
| Grand multiparous | 25.1 | 16.8 | 5.5 | 5.3 | 2.1 | |

*Notes:* % = Percentage

The study included a collinearity test in its second phase. The test results indicated that the independent variables had little to no association with one another. The tolerance value for each factor was greater than or equal to 0.10. Additionally, the variance inflation factor for each variable was less than 10.00. These findings indicate that the regression model is not multicollinear.

*3.2. Factors associated with cesarean delivery*

Table 2 presents the binary logistic regression results for CS deliveries in the Philippines. According to socioeconomic status, women in the poorer group were 1.758 times more likely than those in the poorest group to undergo CS delivery (AOR 1.758; 95% CI 1.757–1.758). Women in the middle group were 2.164 times more likely than the poorest to have a CS delivery (AOR 2.164; 95% CI 2.163–2.165). Meanwhile, those in the richer group were 2.718 times more likely than the poorest to undergo CS delivery (AOR 2.718; 95% CI 2.717–2.719). Furthermore, the richest group was 4.787 times more likely than the poorest to deliver by CS (AOR 4.787; 95% CI 4.785–4.789).

Table 2 also shows that, by residence type, mothers in rural areas in the Philippines are 1.029 times more likely to undergo CS delivery than those in urban areas (AOR 1.029; 95% CI

1.029–1.030). According to completed ANC, mothers with completed ANC are 1.681 times more likely than those without to undergo CS delivery (AOR 1.681; 95% CI 1.681–1.682). Furthermore, mothers who were primiparous or multiparous had a higher likelihood of undergoing CS delivery compared to grand multiparous mothers based on parity.

**Table 2.** Factors associated with cesarean delivery (n=4,452)

| Variables | Cesarean Section Delivery | | | |
|---|---|---|---|---|
| | *p*-value | AOR | 95% CI | |
| | | | Lower Bound | Upper Bound |
| Socioeconomic: Poorest | - | - | - | - |
| Socioeconomic: Poorer | <0.001 | 1.758 | 1.757 | 1.758 |
| Socioeconomic: Middle | <0.001 | 2.164 | 2.163 | 2.165 |
| Socioeconomic: Richer | <0.001 | 2.718 | 2.717 | 2.719 |
| Socioeconomic: Richest | <0.001 | 4.787 | 4.785 | 4.789 |
| Residence: Urban | - | - | - | - |
| Residence: Rural | <0.001 | 1.029 | 1.029 | 1.030 |
| Age: 15 – 19 | - | - | - | - |
| Age: 20 – 24 | <0.001 | 0.543 | 0.543 | 0.544 |
| Age: 25 – 29 | <0.001 | 0.997 | 0.997 | 0.998 |
| Age: 30 – 34 | <0.001 | 1.227 | 1.227 | 1.228 |
| Age: 35 – 39 | <0.001 | 1.764 | 1.764 | 1.765 |
| Age: 40 – 44 | <0.001 | 2.542 | 2.541 | 2.544 |
| Age: 45 – 49 | <0.001 | 7.524 | 7.518 | 7.531 |
| Education: No education | - | - | - | - |
| Education: Primary | <0.001 | 1.095 | 1.094 | 1.097 |
| Education: Secondary | <0.001 | 2.062 | 2.058 | 2.065 |
| Education: Higher | <0.001 | 2.972 | 2.967 | 2.977 |
| Marital: Never married | <0.001 | 1.337 | 1.336 | 1.338 |
| Marital: Married | <0.001 | 1.007 | 1.006 | 1.007 |
| Marital: Divorced/Widowed | - | - | - | - |
| Employment: Unemployed | <0.001 | 1.202 | 1.201 | 1.202 |
| Employment: Employed | - | - | - | - |
| Completed ANC: No | - | - | - | - |
| Completed ANC: Yes | <0.001 | 1.681 | 1.681 | 1.682 |
| Parity: Primiparous | <0.001 | 3.854 | 3.852 | 3.855 |
| Parity: Multiparous | <0.001 | 2.279 | 2.278 | 2.280 |
| Parity: Grand multiparous | - | - | - | - |

AOR=adjusted odds ratio

## 4. Discussion

The present study identified several key factors associated with CS delivery in the Philippines. Socioeconomic status emerged as a strong determinant, with higher wealth significantly increasing the likelihood of cesarean delivery. Each finding is discussed in the following section.

### *4.1. Socioeconomic disparities and cesarean section*

The result showed that socioeconomic disparities were associated with CS delivery in the Philippines. Socioeconomically disadvantaged individuals often face challenges in accessing healthcare facilities equipped to perform CS (Nugraheni et al., 2020). In the Philippines, healthcare infrastructure is unevenly distributed across regions, with rural areas typically having fewer hospitals and fewer skilled healthcare providers than urban areas (Chu et al., 2019; Dayrit et al., 2018). This disparity in access means that women from lower socioeconomic backgrounds may struggle to reach facilities capable of performing CS, particularly in emergencies.

Despite the Philippines having made strides in expanding health insurance coverage through programs like PhilHealth, coverage may still be inadequate for many families, leading to prohibitive out-of-pocket expenses for CS (Dayrit et al., 2018). Affordability of healthcare services, including cesarean sections, remains a significant concern for individuals with lower socioeconomic status. This financial barrier can delay seeking necessary medical care or opting for less expensive but potentially riskier alternatives (Smith et al., 2018). Furthermore,

socioeconomic disparities can also affect the quality of maternal healthcare services (Yaya et al., 2018). Women from lower socioeconomic backgrounds may receive care from facilities with limited resources or experience staffing shortages, resulting in suboptimal management of labor and delivery (Kim et al., 2018). This condition can increase the likelihood of complications that necessitate CS or lead to unnecessary CS due to inadequate monitoring or interventions during labor. The findings of this study are in line with previous research that addressing socioeconomic disparities in CS deliveries in the Philippines requires a multi-faceted approach that includes improving access to quality maternal healthcare services, expanding health insurance coverage, enhancing healthcare infrastructure in rural areas, promoting health education and literacy, and addressing social determinants of health that contribute to inequities in access to care (Lam et al., 2018; Tegegne et al., 2018).

Higher socioeconomic status contributes to the high rate of CS due to the greater financial costs required for CS (Milcent & Zbiri, 2018; P. Singh et al., 2018). This result is consistent with other studies showing that CS is more common among wealthy and highly educated women (Kumar et al., 2023). Other studies suggest that the increase in cesarean deliveries is not solely due to medical indications but also to socioeconomic factors (P. Singh et al., 2018). Moreover, the study found that the wealthier the mothers in the Philippines are, the more likely they are to undergo CS delivery. The findings indicated that women with higher socioeconomic status had higher CS rates than those with lower socioeconomic status. These results align with other studies reporting that women with higher socioeconomic status exhibit a higher proportion of CS deliveries (Ahmmed et al., 2021; Shibre et al., 2020). Previous evidence indicates that CS delivery is mainly among women with high socioeconomic status in Indonesia (Kumar et al., 2023). CS rates are lower in Eastern Indonesia, the least developed region, compared to Western Indonesia, the most developed and prosperous region (Zahroh et al., 2020). Women with higher socioeconomic profiles may prefer CS delivery due to convenience compared to the pain of vaginal birth and their ability to afford the costs. The primary barrier preventing women in the poorest households from utilizing CS is the ability to pay (Shibre et al., 2020).

However, the results of this study should be interpreted with caution, as more detailed data on the influence of socioeconomic profile would be required. Cesarean section is a surgical procedure and a life-saving intervention for both the newborn and the mother (Faruk et al., 2023). It should be noted that there is no evidence to support the notion that the need for CS should differ based on the patient's economic profile (Moquillaza-Alcantara & Palacios-Vivanco, 2023).

### *4.2. Urban-rural differences in cesarean section delivery*

This study found that women in rural areas of the Philippines had a greater likelihood of undergoing a cesarean section. This finding contradicts previous research in other Asian countries, which indicates an association between CS and urban settings (Roy et al., 2021; Verma et al., 2020). In urban areas, CS rates are strongly correlated with higher educational attainment. Women with higher education may have a better understanding of their options and choose elective CS for various reasons. Urban areas are also characterized by better-equipped healthcare facilities, which may promote CS due to financial incentives and perceived safety (Giang et al., 2022). On the other hand, rural areas are associated with scarce resources and limited access to quality education and healthcare facilities (Effendi et al., 2021). Therefore, CS in rural areas is mainly driven by medical indications such as prolonged rupture of membranes, malpresentation, preterm birth, failure to progress in labor, and preeclampsia (Abdulla et al., 2023).

### *4.3. Maternal characteristics associated with cesarean section delivery*

The results indicated that maternal characteristics associated with CS delivery in the Philippines: age group, education level, marital status, and employment status. The study showed that age was associated with CS delivery. The odds of undergoing a CS increased with age. Women aged 45-49 had higher odds than those aged 15-19, similar to findings from another study (Seidu et al., 2020). Increased maternal age is generally associated with a higher risk of poor pregnancy outcomes and complications due to biological changes, including increased risk of hypertension, eclampsia, and diabetes (Alonso-Colón et al., 2025; Ye et al., 2023). A study in Rwanda showed a different result (Nsereko et al., 2024).

This study aligns with other studies showing that higher education is associated with a greater likelihood of cesarean delivery (Amjad et al., 2018; Yunitawati et al., 2024). Maternal health

service utilization may be associated with education level, as women with higher education are more likely to use ANC and skilled birth attendants (Yadav et al., 2021). Married and unmarried women had higher odds of cesarean delivery compared to widowed/separated women, similar to findings from Ghana (Manyeh et al., 2018). In contrast to previous findings (Arunda et al., 2020), this study found that non-working women have a higher risk of CS than working women. This difference may be due to variations in women's employment categories. Other studies have shown that working women in both unskilled and skilled jobs have a lower risk of CS than non-working women (Amjad et al., 2018). Women with higher education are more aware of maternal health risks, more likely to use antenatal care and skilled birth attendants, and have greater autonomy in deciding their delivery method. Additionally, higher education often correlates with higher income (Felipe-Dimog et al., 2025).

Moreover, according to parity, primiparous and multiparous mothers were more likely than grand multiparous mothers to undergo CS delivery. These results confirmed established findings showing that higher birth order is associated with a decreased risk of CS. This finding also aligns with studies conducted in Indonesia and India, which found that grand multiparous women had a lower chance of CS (Kumar et al., 2023; Rayhan & Barua, 2020). Women with lower birth orders are at higher risk of pregnancy and delivery complications, increasing the likelihood of CS. On the other hand, a mother's age is also closely correlated with birth order. The likelihood of experiencing CS delivery is higher among women with a lower birth order. However, when birth order is controlled for, women of higher age have a greater chance of experiencing CS delivery. Thus, older women with lower birth order or those who are primiparous have a higher likelihood of undergoing CS delivery (Rayhan & Barua, 2020). This is consistent with the findings of another study, which showed that women giving birth for the first time have a higher likelihood of experiencing CS delivery. A reasonable reason is that first-time mothers may fear the birthing process and choose CS delivery (Kumar et al., 2023).

*4.4. Antenatal care (ANC) in cesarean section*

Regarding completed ANC, mothers who completed ANC were more likely than those who did not to undergo CS delivery. The importance of ANC as a predictor of access to CS has also been found in population-based studies in Southeast Asia, South Asia, and Africa (Amjad et al., 2018; de Loenzien et al., 2019; Arunda et al., 2020; Tsegaye et al., 2019; Yunitawati et al., 2024). Higher ANC visits are associated with skilled care and lower infant and maternal mortality rates (Rai et al., 2022; Shobiye et al., 2022).

According to WHO recommendations (WHO, 2018), this study found that complete ANC visits are associated with access to life-saving childbirth procedures, such as CS. Inequalities in ANC coverage among women in the Philippines were found by socioeconomic level, with the poorest group having 13.5% coverage for complete ANC and 6% CS utilization, compared with the richest group, which had 58.5% coverage and 42% CS utilization. A different result was found in France, where women from low socioeconomic levels tend to utilize CS and are less likely to attend prenatal education. The study found that prenatal education could reduce the probability of a CS by 20–40% (Milcent & Zbiri, 2018). This study found that the middle class slightly exceeded the maximum effective CS rate according to WHO recommendations, and the gap is even greater in the rich (23.1%) and the richest group (42%). The prevalence of completed ANC also increases with socioeconomic status. Previous research has emphasized that optimizing ANC for health education related to reducing non-medical causes of CS is important for reducing the global CS epidemic (The Lancet, 2018). Therefore, in the Philippines, a tailored strategy is needed to optimize ANC education. Policy actions are required to enhance accountability and equitable access, including access to ANC and CS among low-income populations, to reduce unnecessary CS deliveries and promote informed decision-making (Milcent & Zbiri, 2018).

This study provides insight into socioeconomic factors influencing access to SC procedures for mothers in the Philippines. The poorest group has limited access to SC (6%), while the richest group overuses CS (42%), far above the WHO ideal rate of 10–15% (Adeline et al., 2022; Ji et al., 2021). The dynamics of demographic conditions based on socioeconomic position provide a deeper perspective. The richest group of mothers in the Philippines mostly comes from higher education (79%), lives in urban areas (67%), and has the highest rate of complete ANC. In this study, despite improved CS coverage, it appears that ANC was not used optimally to promote rational CS use among the richest group, who also had the highest levels of ANC involvement. A

different pattern was found in France, where women from lower socioeconomic levels tend to utilize CS and are less likely to attend prenatal education.

Unlike current findings showing that mothers with complete ANC are more likely to undergo CS, a study in France shows that prenatal education can reduce the likelihood of CS by 20–40% (Milcent & Zbiri, 2018). Although previous research has highlighted the role of optimal ANC and health education in preventing non-medical CS and addressing the global CS epidemic (The Lancet, 2018), our findings suggest that other social factors may still drive the decision to undergo CS. Previous studies have identified multiple factors influencing delivery decisions, including healthcare providers, family members, especially partners who act as decision-makers, and the mothers themselves (Gallagher et al., 2022; Hanahoe, 2020; Ji et al., 2021; Sizear & Rashid, 2024). Individual factors such as fear of labor pain, cultural beliefs, lack of awareness of risks associated with unnecessary CS, and perceptions of increased safety also contribute to the higher prevalence of elective CS (Firoozi et al., 2021; Gallagher et al., 2022; Suwanrath et al., 2021). Healthcare providers must address these concerns through open communication and shared decision-making, especially during ANC. Considering the demographic profile of the richest group, which is dominated by highly educated women, employed, and living in urban areas, the use of M-health, including SMS reminders, mobile phone-based interventions, interactive voice response systems (IVRS), and mobile applications could be optimized during ANC to promote the value of normal delivery and avoid unnecessary CS (Mishra et al., 2023).

Furthermore, a multilevel stakeholder intervention is necessary to lower CS rates to WHO-recommended levels. According to research conducted in Bangladesh, higher CS rates have been associated with selective CS driven by profit motives (Sizear & Rashid, 2024). In China, policies to reduce excessive CS include midwifery training in hospitals and mandatory second opinions for non-medical CS, which have been shown to reduce CS prevalence (Ji et al., 2021). Frequent external reviews and audits of health facilities, along with feedback on CS rates, can help monitor emerging trends and identify unmet needs (Angolile et al., 2023).

## 5. Implications and limitations

Socioeconomic disparities influence access to CS deliveries in the Philippines, with wealthier mothers more likely to undergo the procedure. This disparity has implications for nursing and health practice, necessitating interventions to ensure equitable access to medically necessary cesarean sections while addressing potential overuse among higher socioeconomic groups. Nurses and healthcare professionals play a crucial role in creating a safer and more equitable maternity care system by ensuring that all women have access to the best possible birth experience, providing comprehensive antenatal care, identifying and managing potential complications, offering culturally sensitive support, and advocating for women's health, all of which contribute to better maternal and newborn outcomes.

The study's most valuable contribution is its use of large national-level data to provide insights for the Philippines. However, the variables examined in this study were limited to those available in the secondary dataset. Caution must be exercised when interpreting secondary data due to the potential bias and incomplete information. The study's broad overview could be strengthened by incorporating primary data collection to address specific questions and achieve a more nuanced understanding.

## 6. Conclusion

Based on the results, the study concluded that socioeconomic disparities are associated with CS delivery in the Philippines. The wealthier the mothers, the more likely they are to undergo CS delivery. Policymakers should ensure equal access to quality maternal care. Implementing targeted subsidies for CS based on income levels may reduce financial barriers and encourage timely medical interventions. Reducing excessive CS must be prioritized for the wealthiest groups. To optimize ANC education, it is essential to meet psychological needs for positive values, as well as a sense of security and comfort during childbirth. Equality in CS access must be assured, specifically for the poorest people, through education and insurance coverage. Achieving equal access to safe and necessary CS requires a comprehensive strategy involving provider education, regulatory reforms, community engagement, and data-driven initiatives.

Socioeconomic disparities in the Philippines are indeed associated with CS delivery, with wealthier mothers having a higher likelihood of undergoing the procedure. Future studies should

investigate the specific reasons for the preference for CS among wealthier women, examine the role of healthcare providers in influencing delivery choices, and evaluate the effectiveness of interventions to reduce unnecessary CS. Addressing these areas through further research can help policymakers and healthcare providers to reduce unnecessary CS and ensure equitable access to safe and appropriate childbirth care for all mothers in the Philippines.

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**Author contribution**

Conceptualization: DY, ADL; Methodology: DY, ADL; Investigation: DY, ADL, RDW, LL, DEE, TH, WPN, DBB; Data curation: ADL; Formal analysis: RDW; Visualization: DY, ADL, LL; Writing-Original draft: DY, ADL, RDW, LL, DEE, TH, WPN, DBB; Writing-review and editing: DY, LL.

**Conflict of interest**

The authors declare no conflict of interest.

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