ISSN:1533-9211
SEYBOLD REPORT
www.seybold-report.com

ASSESSMENT OF NURSES KNOWLEDGE REGARDING THE MANAGEMENT OF CESAREAN SECTION AT A 250-BEDDED DISTRICT HOSPITAL, CHAPAI NAWABGANJ, BANGLADESH

Mst. Israt Jahan[1], Al Araf Siddique[2], Md. Arshad[2], Md. Al Amin[3], Md. Omar Ali[2], Md. Tanjilur Rahman Abid[2], Farjana Akter[2], Md. Ismail Haque[2*]

[1]Islami Bank Nursing College, Rajshahi, Bangladesh
[2]Department of Electrical and Electronic Engineering, International Islamic University Chittagong (IIUC), Bangladesh
[3]Department of Electrical and Electronic Engineering, University of Information Technology and Sciences (UITS), Bangladesh

Abstract

This descriptive cross-sectional study was undertaken to assess nurses' knowledge concerning caesarean section management at the District Hospital, Chapai Nawabganj. A purposive sampling approach was used, and 70 nurses fulfilling the inclusion criteria participated in the study. Information was obtained through a demographic questionnaire and a Knowledge on Management of Cesarean Section Questionnaire prepared from the relevant literature. The findings indicated a moderate overall level of knowledge, with a total score of 11.00. The mean score for knowledge related to caesarean-section symptoms was 3.58; 80% of respondents recognized full-term pregnancy without pain and 78.6% identified increased vaginal bleeding. Knowledge concerning reasons for caesarean section also had a mean score of 3.58, with 90% recognizing fetal distress. The mean score for caesarean management was 3.46; 71.43% reported monitoring intake and output every four hours, while 80% supported keeping patients nothing by mouth six hours after C-section. Although most nurses demonstrated adequate knowledge, some areas of insufficient understanding remained. Pearson's correlation indicated moderate positive significant associations between knowledge and education ($r = .35$, $p < .01$) and between knowledge and income ($r = .32$, $p < .01$). The findings support the need for health education and training programs to strengthen nurses' knowledge and awareness of factors associated with caesarean section.

ISSN: 1533 - 9211

CORRESPONDING AUTHOR:

Md. Ismail Haque
ismail07rueteeee@iiuc.ac.bd

KEYWORDS:

Caesarean Section, Nurse Knowledge, Management, Maternal Health, Bangladesh

Received: 16 August 2026
Accepted: 23 October 2026
Published :11 November 2026

TO CITE THIS ARTICLE:

Jahan, M. I., Siddique, A. A., Arshad, M., Al Amin, M., Ali, O., Abid, M. T. R., Akter, F., & Haque, M. I. (2026). Assessment of nurses' knowledge regarding the management of cesarean section at a 250-bedded district hospital, Chapai Nawabganj, Bangladesh. Seybold Report Journal, 21(2), 215–228. DOI: 10.5281/zenodo.24087605

Introduction

Caesarean section (CS) is a commonly performed obstetric surgical procedure among women of reproductive age. Its use has increased considerably over recent decades in both developed and developing countries (World Health Organization 2021). Several clinical and maternal factors have been associated with this increase, including previous caesarean delivery, advanced maternal age, improved fetal monitoring and obstetric technology, prolonged or non-progressive labour, breech presentation, fetal distress, maternal obesity, and other maternal or fetal complications (World Health Organization 2021; World Health Organization 2018). When medically indicated, caesarean delivery can be a life-saving intervention that reduces maternal and neonatal morbidity and mortality. However, unnecessary or inappropriate use may expose mothers and newborns to additional health risks (World Health Organization 2021; World Health Organization 2018). Compared with vaginal delivery, caesarean section is associated with a higher risk of certain maternal complications, including postoperative infection, hemorrhage, thromboembolic complications, prolonged hospitalization, and complications in subsequent pregnancies (World Health Organization 2021; World Health Organization 2018). Therefore, safe caesarean care requires proper assessment of both mother and fetus, early recognition of complications, and evidence-based clinical decisions (World Health Organization 2018). Maternal factors such as obesity, short stature, advanced maternal age, post-term pregnancy, and antepartum or intrapartum complications may further increase the likelihood of caesarean delivery (NIPORT and ICF 2024).

The rising use of caesarean section has become a significant public health concern in Bangladesh. National evidence indicates that caesarean delivery rates have increased over time and vary according to socioeconomic status, residential setting, healthcare facility type, and geographical location (M. M. Khan et al. 2023; A national assessment of elective caesarean sections in Bangladesh 2021; Caesarean section delivery in Bangladesh 2022). Analyses of Bangladesh Demographic and Health Survey data have also identified socioeconomic and demographic characteristics as important determinants of caesarean delivery (NIPORT and ICF 2024). Higher socioeconomic status, greater maternal education, antenatal care utilization, and delivery in private healthcare facilities have been associated with an increased likelihood of caesarean delivery (A national assessment of elective caesarean sections in Bangladesh 2021; Caesarean section delivery in Bangladesh 2022). According to the Bangladesh Demographic and Health Survey (BDHS) 2022, approximately 45% of births occurring during the two years preceding the survey were delivered by caesarean section (NIPORT and ICF 2024). The rate was higher in urban areas (56.0%) than in rural areas (40.2%). Considerable regional variations were also observed, with rates of 66.0% in Khulna, 53.6% in Rajshahi, 53.1% in Dhaka, 43.1% in Rangpur, 38.9% in Mymensingh, 35.0% in Barishal, 31.0% in Chattogram, and 25.7% in Sylhet (NIPORT and ICF 2024). These variations indicate that caesarean delivery in Bangladesh is influenced by socioeconomic circumstances, access to healthcare, maternal characteristics, and health-system conditions (M. M. Khan et al. 2023; A national assessment of elective caesarean sections in Bangladesh 2021; Caesarean section delivery in Bangladesh 2022).

Recent research in Bangladesh has highlighted that caesarean delivery is influenced by multiple interconnected factors. A 2023 analysis using linked population and health-facility data found that healthcare facility characteristics, along with individual, household, and community-level factors, contribute to the likelihood of caesarean delivery (M. M. Khan et al. 2023). Similarly, a national assessment of elective caesarean sections reported associations with socioeconomic conditions, antenatal care utilization, media exposure, and access to healthcare services (A national assessment of elective caesarean sections in Bangladesh 2021). These findings suggest that the increasing use of caesarean section cannot be explained solely by medical indications; both patient-level and health-system factors must also be considered. This growing number of caesarean deliveries also increases the responsibilities of nurses involved in maternal and postoperative care. Their responsibilities include monitoring vital signs, assessing patients' physical conditions, identifying early signs of complications, providing postoperative care, supporting breastfeeding and recovery, educating mothers and their relatives, and reporting changes in patients' conditions to the medical team (Knowledge and practice regarding prevention of caesarean section wound infection among nurses 2024). Therefore, adequate nursing knowledge is essential for timely intervention and the prevention of avoidable complications associated with caesarean delivery (Knowledge and practice regarding prevention of caesarean section wound infection among nurses 2024).

Although caesarean delivery has become increasingly common in Bangladesh, relatively little research has specifically investigated nurses' knowledge of caesarean section management and care. Existing studies in Bangladesh have primarily focused on the prevalence, determinants, socioeconomic influences, decision-making processes, and outcomes associated with caesarean delivery (A national assessment of elective caesarean sections in Bangladesh 2021; Caesarean section delivery in Bangladesh 2022; M. M. Khan et al. 2023). However, less attention has been

given to the knowledge of nurses who provide direct care to women before and after caesarean surgery, particularly in district-level hospitals. This gap is important because nurses play a vital role in patient monitoring, postoperative management, health education, and the early detection of complications. The issue is particularly relevant in district hospitals, where nurses provide care to women from diverse socioeconomic and geographical backgrounds and must be able to recognize and respond promptly to postoperative complications. The 250-Bedded District Hospital, Chapai Nawabganj, serves as an important healthcare facility for the local population. However, limited evidence is available regarding nurses' knowledge of caesarean section management in this setting. Assessing their knowledge may help identify existing gaps and provide a basis for developing appropriate training and educational interventions.

The present study was conducted to assess the level of nurses' knowledge regarding caesarean section management at the 250-Bedded District Hospital, Chapai Nawabganj, Bangladesh. The findings may help identify existing knowledge gaps among nurses and contribute to improvements in nursing education, clinical practice, early recognition of complications, and the overall quality and safety of maternal care..

Literature

Caesarean birth is among the frequently used obstetric treatments for women of reproductive age. In the United States, the proportion of caesarean deliveries increased nearly fivefold between 1965 and 1990, rising from 4.5% to 22.7% and accounting for approximately one-quarter of live births (Taffel 1994). Worldwide, an estimated 20 million caesarean deliveries occur each year, making the procedure one of the most common abdominal operations performed in adults. The proportion of women giving birth by caesarean section has continued to rise in both industrialized and developing countries, including countries in Latin America and particularly Brazil (World Health Organization 2015). In the United States, approximately 1.2 million women underwent caesarean birth, representing 29.1% of all births, while the corresponding proportion in the United Kingdom was about 20%. Brazil has also reported a high caesarean rate, reaching 36.4%. These figures are above the levels discussed in earlier World Health Organization guidance. The World Health Organization stated that no region had justification for a caesarean rate above 10% to 15%, with rates not expected to be below 5% (World Health Organization 1985). Improvements in obstetric care and surgical safety have contributed to reductions in maternal and fetal mortality and morbidity associated with appropriately performed caesarean delivery. For example, maternal mortality following caesarean section was estimated to be below 1 per 1000 in the early 1990s, and the improving safety of the procedure contributed to its wider use. Nevertheless, caesarean delivery remains associated with complications. Maternal morbidity has been reported as five to ten times higher following C-section than following vaginal delivery (World Health Organization 2018). Consequently, caesarean rates above recommended levels may have adverse implications for maternal and fetal health. The World Health Organization also stated that caesarean birth rates above 15% were not justified on the basis of available evidence (World Health Organization, 1985). Despite such guidance, caesarean delivery has continued to increase, with associated effects on healthcare costs and maternal and perinatal morbidity and mortality and without evidence of a corresponding reduction in perinatal mortality (Betrán, Torloni, Zhang, & Gülmezoglu 2016). Rates differ between countries and are also related to socioeconomic conditions. The Healthy People 2000 objectives set a target of 15 caesarean births per 100 deliveries and a target of 65 repeat caesarean deliveries per 100 deliveries (U.S. Department of Health and Human Services 1991). The U.S. Department of Health and Human Services also set a benchmark of at least 35 vaginal births after caesarean (VBACs) per 100 births. During the 1990s, national caesarean rates declined from 22.7% in 1990 to 20.7% in 1996, while VBAC rates increased from 19.9% to 28.3% (National Center for Health Statistics 1999).

A. Risk factors of Caesarean section

A wide range of factors has been associated with caesarean delivery, including premature rupture of membranes, cephalopelvic disproportion, fetal distress, multiple pregnancy, breech presentation, place of birth, maternal preference, birth weight, parity, maternal height, and antenatal-care use (Haque, Sharmin, & Sharmin 2023). Breech presentation and fetal distress have been described among the important indications for caesarean delivery. Although CS can be a safe procedure when appropriately indicated, performing it without medical necessity may expose mothers and infants to immediate and longer-term health risks. Some complications are also related to the condition that led to the caesarean procedure. Obesity, large fetal size, prolonged labour, repeated pregnancies, and preterm or early labour are examples of factors associated with difficulties. Therefore, the additional risks attributable to the operation itself should be considered when there is no clear medical indication. Compared with vaginal birth, elective caesarean delivery may be associated with more short- and long-term problems for both mothers and infants (World Health Organization 2018). Brazil has reported one of the highest caesarean rates among developing countries, reaching

36.4% in 1996. Among 18 Arab countries, population caesarean rates were below 5% in Yemen, Mauritania, Sudan, and Algeria; rates between 5% and 15% were reported in Palestine, Oman, Morocco, Libya, Tunisia, Saudi Arabia, UAE, Egypt, Jordan, Kuwait, and Syria; and rates above 15% were reported in Lebanon, Qatar, and Bahrain (Al-Rifai 2014). In Oman, the caesarean rate increased over the ten-year period from 9.7% in 2000 to 15.72% in 2009, according to the Ministry of Health annual report (Annual Health Report, 2000). One benefit of caesarean section is that it can avoid serious complications associated with difficult vaginal deliveries and situations threatening the life of the fetus. Advances in medical knowledge, anaesthetic practice, and infection control have made caesarean section a relatively safe operation. In district hospitals in South Africa, most medical officers have reported themselves as proficient in performing caesarean operations.

B. Maternal Risk Factor

In North America, the four commonly reported medical contributors to high caesarean-section rates were routine repeat caesarean delivery, dystocia or non-progressive labour, breech presentation, and fetal distress (Statistics Canada, 1992). Other factors associated with caesarean delivery include short stature, pre-pregnancy obesity (Haque, Sharmin, & Sharmin 2023), post-term pregnancy, a large infant, and antepartum or intrapartum conditions such as fever (Hossain, Al Mamun, Awal, Sazzad, Karim, & Hossain 2025). Elevated intrapartum temperature has been reported to double the risk of caesarean delivery (Hossain, Al Mamun, Awal, Sazzad, Karim, & Hossain 2025). Caesarean birth is also associated with increased maternal postpartum morbidity and mortality (Kundu, Sharif, Chowdhury, Afroz, Dey, & Hossain 2024). Reported maternal mortality after caesarean delivery has been two to four times that associated with vaginal birth, while delivery-related maternal morbidity has been reported to be five to ten times higher (Patel, Singh, Moitra, & Kantharia 2012). Some research has not found lower self-esteem among women delivering by caesarean compared with women delivering vaginally (McCloskey 1988), indicating that further investigation is required regarding psychological outcomes. Other studies have associated caesarean delivery with psychological difficulties. Women giving birth by C-section may experience immediate and longer-term dissatisfaction with the birth experience, including a longer interval between birth and initial contact with the newborn than after vaginal delivery. Mothers who deliver by caesarean may also be less likely to breastfeed (White VanGompel, Main, Tancredi, & Melnikow 2018). Compared with vaginal delivery, caesarean birth may also involve longer periods in bed, greater perceived pain, and greater limitations in the mother's ability to care for her newborn (NIH State-of-the-Science Conference 2006).

C. Infant Risk Factors

Although infant mortality in the United States has declined during a period when caesarean rates increased, caesarean delivery is not generally considered to be the cause of that decline (Alhassan 2023). In contrast, caesarean birth can be associated with additional neonatal risks. These include premature birth and respiratory distress syndrome, conditions that may require intensive care and can impose substantial financial costs. Newborns delivered by C-section may also have a greater risk of meconium aspiration syndrome, which affects the lower respiratory system, and may require assisted ventilation (Sayed Mosaad, Ragb Abo Shabana, & Metwaly Mohamad 2022). Recent research has continued to evaluate neonatal outcomes following caesarean delivery, including respiratory and other health consequences (Shalaby Salama, Helmy, Elsadek Mohammed, & Mahmoud 2022).

D. Other Risk Factors

Maternal or fetal well-being is not the only factor that can influence the decision to perform a caesarean section (Li & Cui 2021). Other considerations may include reducing patient discomfort, convenience for the patient or provider, and changes in the characteristics of the reproductive population. The proportion of older mothers from higher socioeconomic groups has increased. Concerns about financial and legal consequences for practitioners (Zhu, Jiang, Pei, Zhu, & Jin 2024), together with provider financial incentives (Keeler & Brodie, 1993), have also been discussed in relation to increasing caesarean rates. In 1981, the National Institutes of Health recommended consideration of ethical, legal, and economic factors as possible influences on the use of surgical intervention (Arnolds, Smith, Banayan, Holt, & Scavone 2019).

E. Socioeconomics and Insurance Status:

Research has identified socioeconomic and insurance status as factors associated with caesarean birth (Wise & Jolles 2019). Higher caesarean rates have been reported among women with private medical insurance and among patients receiving care in private rather than public clinics (Al-Rifai 2014; Betrán, Ye, Moller, Zhang, Gülmezoglu, & Torloni 2016). Older age, marriage, higher educational attainment, and higher socioeconomic status have also been associated

with greater caesarean use (Patel, Singh, Moitra, & Kantharia 2012). Evidence concerning managed-care insurance is not consistent: one study reported lower caesarean rates among managed-care patients (McCloskey 1988), whereas another found no significant association with lower caesarean rates (Weinstein, 1997). Women without insurance or receiving Medicaid have been reported to have lower caesarean rates (Taffel 1994). Caesarean birth rates above the standard of 15 per 100 births were estimated to have cost the healthcare system more than $1 billion in 1991 (Thomas & Paranjothy 2001). The costs associated with caesarean surgery include the procedure itself, longer hospital stays, direct delivery expenses, and postoperative complications (U.S. Department of Health and Human Services 1990). Trial of labour or vaginal birth has been associated with a 14% reduction in maternal hospital charges and a 31% reduction in length of stay when VBAC patients are compared with elective repeat caesarean section (ERCS) patients. Lowering the primary caesarean rate can therefore reduce healthcare expenditure related to excess caesarean births (Lotfi, Tehrani, Dovom, Torkestani, Abedini, & Sajedinead 2014). Teaching hospitals and residency programs have been suggested as approaches for reducing caesarean rates, while Rosenstein et al. (2021) emphasized successful labour management and attempts at VBAC as possible strategies. High caesarean rates may therefore require broad interventions that consider the interactions among pregnant women, their economic, physical, and social environments, healthcare practitioners, and public-health policies.

Recent evidence from Bangladesh also shows strong socioeconomic and geographical differences in caesarean delivery. Kundu et al. (2024) reported substantial socioeconomic inequality in CS use, with higher concentrations among wealthier and more highly educated women and notable differences between urban and rural populations and regions (Kundu, Sharif, Chowdhury, Afroz, Dey, & Hossain 2024). A nationally representative 2025 study found that caesarean delivery increased from 15% in 2011 to 46% in 2022 and that use varied by region and was more likely among women with greater household wealth, higher education, and overweight or obesity (Karmakar, Tariqujjaman, Alam, Haque, Naila, & Ahmed 2025). Another 2025 investigation identified district-level variation and socioeconomic disparities in caesarean delivery across Bangladesh (Khan, Alam, Khanam, Islam, & Billah 2025). Research from Rajshahi District has additionally identified obstetric and pregnancy-related factors associated with caesarean delivery and documented maternal complications among women undergoing CS (Hossain, Al Mamun, Awal, Sazzad, Karim, & Hossain 2025). Together, these findings indicate that caesarean delivery in Bangladesh is influenced by clinical, socioeconomic, geographical, and health-system factors, whereas comparatively limited attention has been directed toward the knowledge of nurses directly involved in caesarean-section care.

Methodology

The study was carried out at the 250 Bedded District Hospital, Chapai Nawabganj, Bangladesh, which was selected as a major healthcare institution serving a large number of patients in the district. The hospital also employs a considerable number of senior staff nurses, providing an appropriate setting and available population for the study. A descriptive cross-sectional design was adopted to assess nurses' knowledge regarding caesarean-section management at this hospital. The study population comprised senior staff nurses employed at the 250 Bedded District Hospital, Chapai Nawabganj. Participant eligibility was established according to predefined criteria based on the study requirements and previous literature. Each participant was required to have at least a diploma in nursing and midwifery and to be employed at the study hospital. Participation was voluntary. Assistant nurses were not included in the study.

Sample size estimation was performed using power-analysis principles based on three components: the significance level (α), statistical power (1-β), and effect size. In the absence of relevant previous findings, conventional assumptions may be used for estimating sample size, as described by Polit and Hungler (Polit D. F., Hungler B. P., . (1987).). Accordingly, the study used a significance level of 0.05, statistical power of 0.80, and effect size of 0.40, resulting in a required sample of 70 nurses. Participants were selected through purposive sampling. This approach was chosen because the study specifically required senior staff nurses who satisfied the eligibility criteria and were directly involved in patient care at the selected hospital. Respondents who met the inclusion criteria and were available during the data-collection period were recruited. Purposive sampling enabled the researcher to obtain participants directly relevant to the study objectives within the available setting and study period. Nevertheless, this non-probability approach has limitations. Because eligible nurses did not have an equal probability of selection, selection bias is possible, and the findings may not be fully generalizable to nurses in other hospitals or healthcare settings in Bangladesh.

A. Research Instrument

A structured questionnaire was developed by the researcher after an extensive review of relevant literature and consultation with a competent faculty member. The research instrument consisted of two sections:

1) Section 1: Demographic Questionnaire

The demographic questionnaire consisted of 7 items to collect information regarding:

1. Age
2. Gender
3. Marital Status
4. Educational Level
5. Monthly Income
6. Religion
7. Service Experience

2) Section 2: Knowledge Regarding the Management of Caesarean Section Questionnaire

The researcher developed this questionnaire from relevant literature to evaluate nurses' knowledge regarding caesarean-section management. The instrument contained 15 items distributed across the following areas:

1. Knowledge of symptoms of caesarean section (5 items)
2. Knowledge of causes of caesarean section (5 items)
3. Knowledge of management of caesarean section (5 items)

Each item provided two response choices, "Yes" and "No." A correct response received one point (1), whereas an incorrect response received zero (0). Thus, the total knowledge score could range from 0 to 15, with higher scores representing greater knowledge and lower scores indicating poorer knowledge.

The respondents' knowledge level was categorized as follows:

- Low knowledge: 0–4
- Moderate knowledge: 5–11
- High knowledge: 12–15

3) Validity and Reliability of the Instrument

Content validity was assessed to confirm that the questionnaire items were relevant to the study objectives and adequately represented the intended areas of nurses' knowledge concerning caesarean-section management. A competent faculty member/subject expert reviewed the instrument, and revisions were made according to the feedback provided.

Before data collection began, ethical approval was secured from the ethical committee of Islami Bank Nursing College, Rajshahi. Permission to collect data was also obtained from the Director of the 250 Bedded District Hospital, Chapai Nawabganj. The participants received information about the study objectives, purpose, procedures, potential benefits, and possible risks. Written informed consent was obtained from every participant. Participation was voluntary, and respondents were informed that they could withdraw from the study at any stage without penalty. Participant confidentiality and anonymity were maintained throughout, and the collected information was used solely for research purposes.

B. Data Collection Procedure

Approval for the research proposal and instrument was obtained from the ethical committee of Islami Bank Nursing College, Rajshahi, and permission to conduct the study was obtained from the Director of the 250 Bedded District Hospital, Chapai Nawabganj. The researcher explained the study objectives and purpose to the nursing superintendent and nursing staff. Nurses who satisfied the inclusion criteria were invited to participate. The researcher also explained the purpose of the study, ethical considerations, voluntary participation, and the right to withdraw at any stage. Written informed consent was obtained from participants who agreed to take part. Data were collected using a structured interview questionnaire. Following collection, the information was coded, entered into the Statistical Package for Social Sciences (SPSS) version 22.0, and prepared for analysis.

C. Method of Data Analysis

Following data collection, responses were numerically coded and entered into SPSS version 22.0 for statistical analysis. Frequency, percentage, mean, and standard deviation were used as descriptive measures to summarize participant characteristics and knowledge scores. Pearson's correlation analysis was applied to examine associations between nurses' knowledge scores and relevant continuous variables. Multiple regression analysis was also considered/used to determine factors independently associated with nurses' knowledge of caesarean-section management. Relevant demographic and professional variables were entered into the regression model according to the study objectives and preliminary analysis. Statistical significance was set at $p < 0.05$. Results were presented in tables and figures.

Result Analysis

Part 1 Demographic characteristics of the sample This section presents the demographic characteristics about the sample in this study. Their demographic data were calculated and shown in Table 1

TABLE 1

DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

Characteristics	Category	Frequency (n)	Percentage (%)
Age (years)	Mean ± SD	33.40 ± 10.48	–
Sex	Male	21	30.0
	Female	49	70.0
Marital Status	Married	55	78.6
	Single	8	11.4
	Widow	7	10.0
Education Level	Diploma in Nursing	10	14.3
	Diploma in Midwifery	18	25.7
	B.Sc. in Nursing	30	42.9
	M.Sc./MPH in Nursing	12	17.1
Religion	Muslim	50	71.4
	Hindu	12	17.1
	Christian	8	11.4
Income (BDT)	Below 30,000 BDT	16	22.9
	30,001–40,000 BDT	28	40.0
	40,001–50,000 BDT	16	22.9
	Above 50,000 BDT	10	14.3
Service Experience	Less than 5 years	10	14.3
	5–15 years	50	71.4
	16–30 years	10	14.3

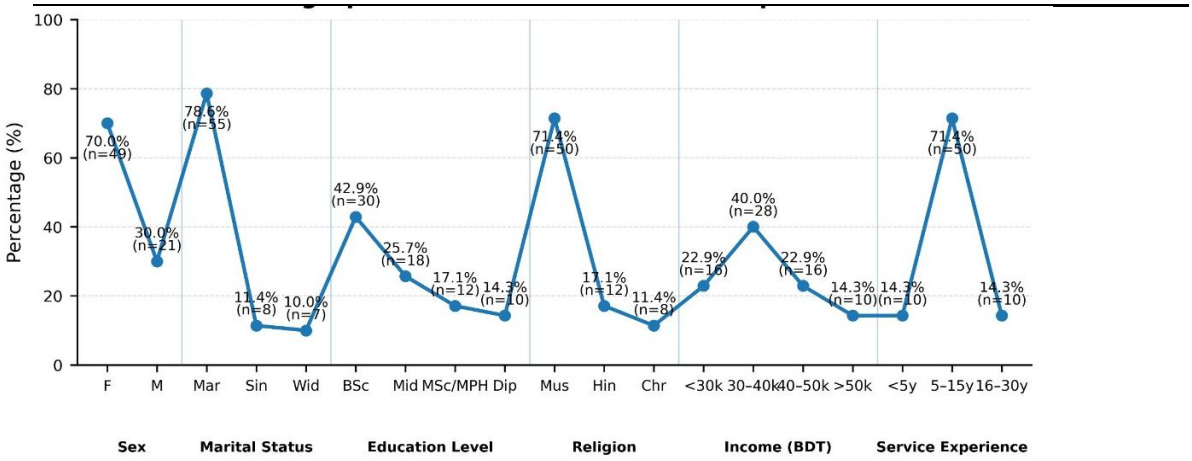


Fig. 1: DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

Table 1 presents the demographic profile of the study sample. Participants ranged in age from 25 to 54 years, with a mean age of 33.40 years (SD = 10.48). The sample included 21 (30.0%) men and 49 (70.0%) women. Regarding marital status, 55 (78.6%) were married, 8 (11.4%) were single, and 7 (10.0%) were widows. Educational qualifications included B.Sc. in Nursing for 30 (42.9%), Diploma in Nursing for 10 (14.3%), Diploma in Midwifery for 18 (25.7%), and M.Sc./MPH in Nursing for 12 (17.1%). In terms of religion, 50 (71.4%) respondents were Muslim, 12 (17.1%) were Hindu, and 8 (11.4%) were Christian. Monthly income was 30,001–40,000 BDT for 28 (40.0%) respondents, below 30,000 BDT for 16 (22.9%), 40,001–50,000 BDT for another 16 (22.9%), and above 50,000 BDT for 10 (14.3%). With respect to service experience, 50 (71.4%) had 5–15 years of experience, 10 (14.3%) had less than 5 years, and 10 (14.3%) had 16–30 years of experience.

Frequency Distribution of Respondents by Various Characteristics:

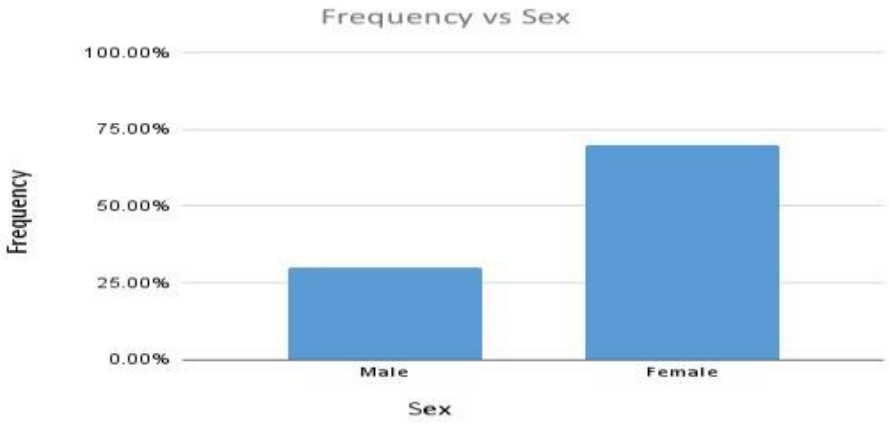


Fig. 2: Analysis of respondent frequency by gender classification

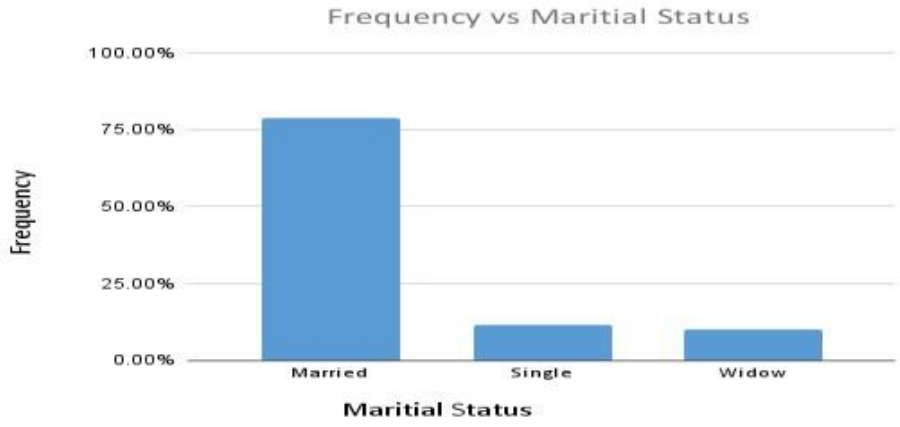


Fig. 3: Marital status and its impact on respondent distribution

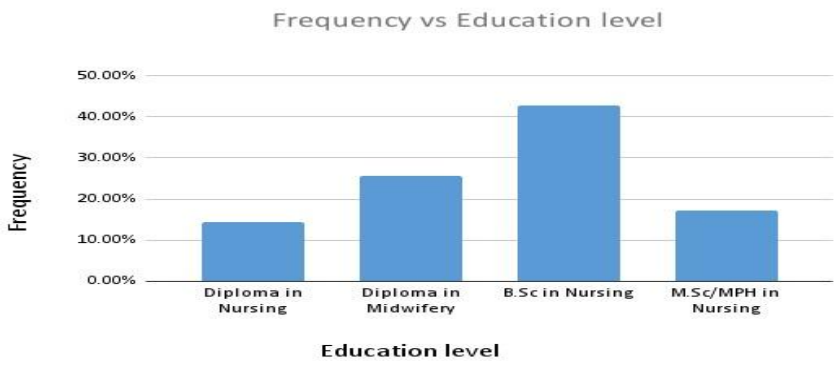


Fig. 4: Frequency distribution of respondents by education level.

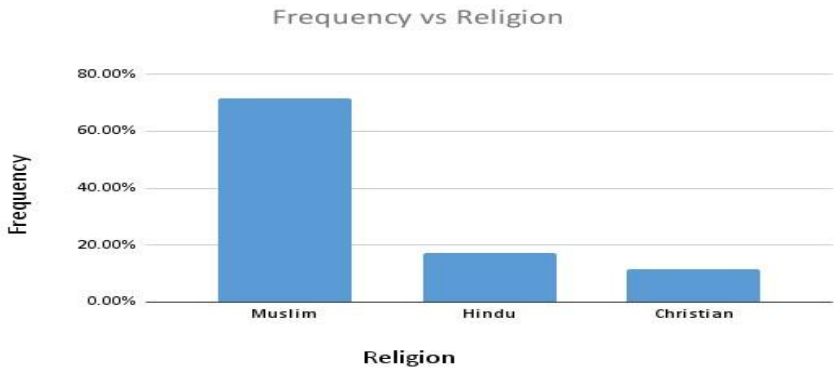


Fig. 5: Frequency distribution of respondents across different religious groups.

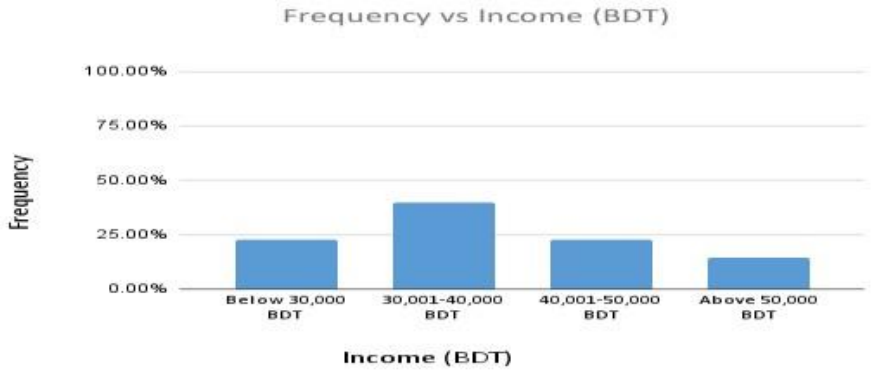


Fig. 6: Income-level frequency distribution of survey respondents.

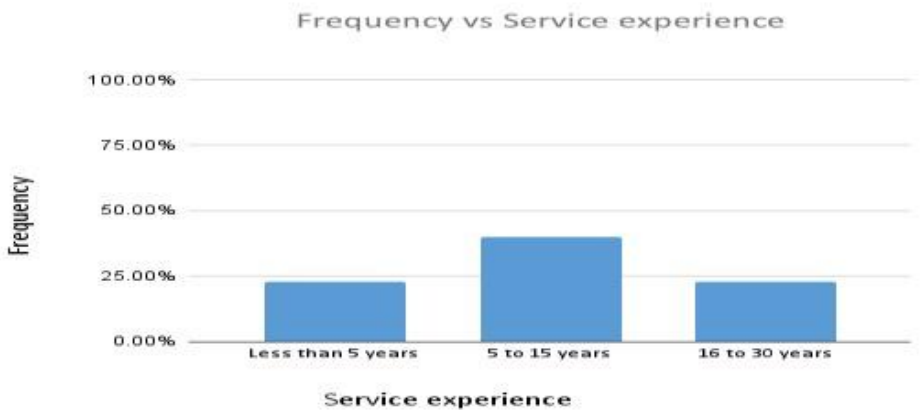


Fig. 7: Experience-based frequency distribution of respondents.

This section discussed the study results of statistical analysis addressing the questions of the study. 70 nurses met the inclusion criteria selected in this study.

TABLE II

SYMPTOMS OF CAESAREAN SECTION (MEAN = 3.58)

Variable	Findings
Full-term pregnancy without pain	80.0% respondents answered "Yes"
Worsening Pain	85.7% respondents answered "Yes"
Increased vaginal bleeding	78.6% respondents answered "Yes"
IUD indication	71.4% respondents answered "Yes"
Twin pregnancy	82.9% respondents answered "Yes"
Fetal distress	90.0% respondents answered "Yes" (Highest)
Severe infection	74.3% respondents answered "Yes"
Birth defects	77.1% respondents answered "Yes"
Prolonged pain	84.28% respondents answered "Yes"
Intake and output chart maintenance	87.1% respondents answered "Yes"
Overall Mean Score	3.58

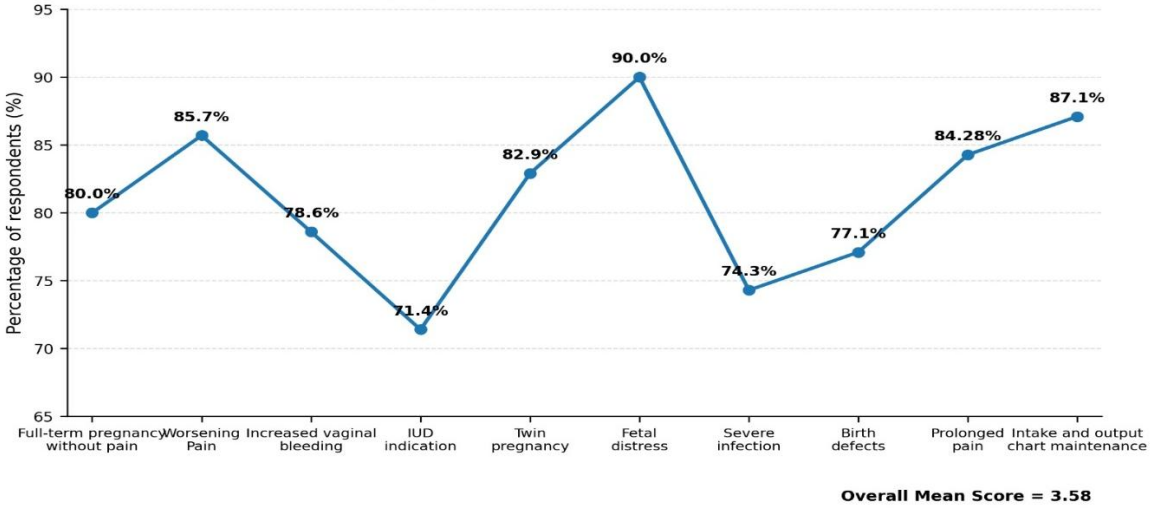


Fig. 8: SYMPTOMS OF CAESAREAN SECTION.

Table 2 shows a mean score of 3.58 for the caesarean-section symptom domain. Among the listed parameters, 56 respondents (80%) answered “yes” and 14 (20%) answered “no” for full-term pregnancy without pain. For worsening

pain, 60 (85.7%) answered “yes” and the remaining 10 (14.3%) answered “no”. Increased vaginal bleeding was identified by 55 (78.6%), while 15 (21.4%) answered “no”. IUD as an indication of caesarean section was reported by 50 (71.4%), with 20 (28.6%) answering “no”. For twin or multiple pregnancy as an indication, 58 (82.9%) answered “yes” and 12 (17.1%) answered “no”.

Causes of caesarean section Mean score was 3.58.

For this domain, 63 respondents (90%) answered “yes” and 7 (10%) answered “no” regarding fetal distress as a cause of caesarean section. Severe infection was identified by 52 (74.3%), while 18 (25.7%) answered “no”. Birth defects were identified by 54 (77.1%), with 16 (22.9%) answering “no”. For prolonged pain, 59 (77.1%) answered “yes” and 11 (22.9%) answered “no”. Maintaining an intake-and-output chart was reported by 61 (87.1%), while 9 (12.9%) answered “no”.

Part 3 Relationships between education and knowledge on management of cesarean section (n=70).

The study examined the relationship of nurses’ knowledge with income and education using Pearson’s correlation coefficient. The assumptions for Pearson’s correlation were examined, and the study variables were found to have a normal distribution. The relationship between knowledge and education was also identified as linear.

Table 3 Pearson's correlation coefficients between education and income. (n = 70)

TABLE III

PEARSON’S CORRELATION COEFFICIENT

Variable	Pearson’s Correlation coefficient
Education	.35"
Income	.32**

"p<.01”

Table 3 shows that education had a moderately positive and statistically significant association with knowledge ($r = .35$, $p < .01$). Income also demonstrated a moderately positive significant relationship with knowledge ($r = .32$, $p < .01$) among nurses at District Hospital, Chapai Nawabganj.

Conclusion

The present study evaluated nurses’ knowledge concerning caesarean-section management at District Hospital, Chapai Nawabganj. The findings emphasize the need to strengthen nurses’ clinical knowledge and competencies so that women undergoing caesarean section can receive safe and effective care. Although the participating nurses showed an overall satisfactory level of knowledge, additional improvement is required, particularly in practical aspects of caesarean-section management. Regular in-service education, continuing nursing education, clinical supervision, and appropriate institutional support should therefore be strengthened to address identified knowledge gaps and improve nursing care. Hospital authorities and nursing educators may develop focused education and training programs addressing recognition and management of complications, postoperative care, patient monitoring, and health education. Improving nurses’ knowledge and clinical competencies at district-hospital level may support timely intervention, safer maternal care, and better quality of caesarean-section management. Some biomedical technology (M. S. Rahman, M. S. Anower, M. R. Hasan, M. B. Hossain, and M. I. Haque 2017; M. S. Rahman, M. S. Anower, M. K. Rahman, M. R. Hasan, M. B. Hossain, and M. I. Haque 2017; M. A. Rahman, T. Ahmed, M. I. Haque, and M. S. Anower 2022; M. I. Haque, K. Yoshibayashi, J. Wang, G. Fischer, and J. Kirchner 2021; M. I. Haque, R. Yamada, J. Shi, J. Wang, and D. Anzai 2021; ATM Rafiqul Mawla, Abdullah Al Faisal, and M. I. Haque 2024; M. I. Haque, R. Yamamoto, J. Wang, and K. I. Kakimoto 2022; E. Kabir, M. Alam, and M. I. Haque 2025; M. I. Haque, K. Yoshibayashi, J. Wang, G. Fischer, and J. Kirchner 2021; M. I. Haque, J. Wang, and D. Anzai 2019; I. Abtahi et al. 2023; M. I. Haque et al. 2026) can be used to improve the above research concept.

Conflicts of Interest

The authors have disclosed no conflicts of interest.

Author's Affiliation

Mst. Israt Jahan[1], Al Araf Siddique[2], Md. Ismail Haque[3*], Md. Arshad[4], Md. Al Amin[5], Md. Omar Ali[6], Md. Tanjilur Rahman Abid[7]

[1]Islami Bank Nursing College, Rajshahi, Bangladesh
[2,3,4,6,7]Department of Electrical and Electronic Engineering, International Islamic University Chittagong (IIUC), Bangladesh
[5]Department of Electrical and Electronic Engineering, University of Information Technology and Sciences (UITS), Banglades

COPYRIGHT

© 2026 The Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC-BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited. See http://creativecommons.org/ licenses/by/4.0/. Seybold Report is a peer-reviewed journal published by Seybold Publications.

HOW TO CITE THIS ARTICLE

Jahan, M. I., Siddique, A. A., Arshad, M., Al Amin, M., Ali, O., Abid, M. T. R., Akter, F., & Haque, M. I. (2026). Assessment of nurses' knowledge regarding the management of cesarean section at a 250-bedded district hospital, Chapai Nawabganj, Bangladesh. Seybold Report Journal, 21(2), 215–228. DOI: 10.5281/zenodo.24087605

REFERENCES

World Health Organization, WHO Statement on Caesarean Section Rates: Frequently Asked Questions, Geneva, Switzerland: World Health Organization, 2021.

World Health Organization, WHO Recommendations: Non-Clinical Interventions to Reduce Unnecessary Caesarean Sections, Geneva, Switzerland: World Health Organization, 2018.

National Institute of Population Research and Training (NIPORT) and ICF, Bangladesh Demographic and Health Survey 2022, Dhaka, Bangladesh, and Rockville, MD, USA: NIPORT and ICF, 2024.

M. M. Khan et al., "Association of health facility characteristics with caesarean section delivery in Bangladesh: A multilevel analysis," BMC Pregnancy Childbirth, 2023.

"A national assessment of elective caesarean sections in Bangladesh and the need for health literacy and accessibility," BMC Pregnancy Childbirth, 2021.

"Caesarean section delivery in Bangladesh: A population-based analysis of trends and associated factors," PLoS One, 2022.

World Health Organization, WHO Recommendations on Maternal and Newborn Care for a Positive Postnatal Experience, Geneva, Switzerland: World Health Organization, 2022.

"Knowledge and practice regarding prevention of caesarean section wound infection among nurses," Int. J. Obstet. Nurs., 2024.

S. Taffel, "Caesarean section rates in the United States," National Center for Health Statistics, 1994.

World Health Organization, WHO Statement on Caesarean Section Rates, Geneva, Switzerland: World Health Organization, 2015.

World Health Organization, "Appropriate technology for birth," Lancet, vol. 326, no. 8452, pp. 436–437, 1985.

World Health Organization, WHO Recommendations: Non-Clinical Interventions to Reduce Unnecessary Caesarean Sections, Geneva, Switzerland: World Health Organization, 2018.

A. P. Betrán, M. R. Torloni, J. J. Zhang, and A. M. Gülmezoglu, "WHO statement on caesarean section rates," BJOG: An Int. J. Obstet. Gynaecol., vol. 123, no. 5, pp. 667–670, 2016.

U.S. Department of Health and Human Services, Healthy People 2000: National Health Promotion and Disease Prevention Objectives, Washington, DC, USA, 1991.

National Center for Health Statistics, National Vital Statistics Reports: Births and Fertility Rates, Centers for Disease Control and Prevention, 1999.

M. E. Haque, S. Sharmin, and Sharmin, "Determinants of caesarean section in Bangladesh: A multilevel analysis of BDHS 2017–2018 data," Dhaka Univ. J. Sci., vol. 71, no. 2, pp. 117–126, 2023.

M. A. Hossain, A. S. M. Al Mamun, M. A. Awal, J. Sazzad, M. R. Karim, and M. G. Hossain, "Obstetric and pregnancy-related factors associated with caesarean delivery in Bangladesh: A survey in Rajshahi district," BMJ Open, vol. 15, no. 1, Art. no. e087668, 2025.

S. Kundu, A. B. Sharif, S. S. A. Chowdhury, S. Afroz, R. Dey, and A. Hossain, "Socioeconomic and geographical inequalities in delivery by cesarean section among women in Bangladesh, 2004–2017," BMC Pregnancy Childbirth, vol. 24, Art. no. 131, 2024.

G. Karmakar, M. Tariqujjaman, A. Alam, M. A. Haque, N. N. Naila, and T. Ahmed, "Region-specific variation and determinants of caesarean delivery among ever-married women in Bangladesh," PLoS One, vol. 20, no. 9, Art. no. e0328830, 2025.

M. N. Khan, M. B. Alam, S. J. Khanam, M. M. Islam, and M. A. Billah, "Trends, district-level variations, and socioeconomic disparities in cesarean section delivery in Bangladesh," 2025.

F. M. K. Alhazmi, O. M. M. Albalawi, S. A. B. Alhazmi, H. A. M. Alanazi, A. M. T. Alenazi, A. G. Alrawali et al., "Nursing care and management post-cesarean section: Enhancing recovery and patient outcomes," Gland Surgery, vol. 9, no. 2, 2024.

I. I. Alawor, J. M. John, P. B. Divya Mol, K. V. Ann Maria, and Z. M. Argungu, "Nurses' Role in Post-Operative Pain Management after Cesarean Section at Aster Sanad Hospital, Riyadh," Sch. Int. J. Obstet. Gynec., vol. 8, no. 9, pp. 275–278, 2025.

H. Cai, Y. Wang, W. Tang, Y. Lu, J. Ji, and L. Chen, "Effects of the application of combined plan-do-check-action and enhanced recovery by nurses on patients undergoing cesarean section," Afr. J. Reprod. Health, vol. 28, no. 12, pp. 165–174, 2024.

S. Sung, B. A. Mikes, D. J. Martingano, and H. Mahdy, "Cesarean Delivery," in StatPearls [Internet]. Treasure Island, FL, USA: StatPearls Publishing, 2024.

M. Jiang and J. Xu, "A study on the effects of esketamine combined with comprehensive nursing intervention on postoperative pain, postpartum depression, and quality of life in women undergoing cesarean section," Altern. Ther. Health Med., vol. 30, no. 10, pp. 70–77, 2024.

A. R. Alhassan, "Prevalence of cesarean section among nurses: Predictors and effect on exclusive breastfeeding," SAGE Open Nurs., vol. 9, Art. no. 23779608231214214, 2023.

F. Sayed Mosaad, K. Ragb Abo Shabana, and S. Metwaly Mohamad, "Evaluate knowledge & practice of nurses regarding care of women with cesarean section," Egypt. J. Health Care, vol. 13, no. 4, pp. 997–1009, 2022.

E. S. Shalaby Salama, H. K. Helmy, A. N. E. Elsadek Mohammed, and O. E. Mahmoud, "Effect of nursing intervention program for women post-caesarean section regarding self-care on their psychological status and postoperative pain," Assiut Sci. Nurs. J., vol. 10, no. 29, pp. 112–126, 2022.

L. Li and H. Cui, "The risk factors and care measures of surgical site infection after cesarean section in China: A retrospective analysis," BMC Surg., vol. 21, no. 1, Art. no. 248, 2021.

Y. T. Zhu, Y. X. Jiang, L. Pei, W. C. Zhu, and X. G. Jin, "Application of quality control circle in the management of early ambulation after cesarean section: An observational study," Medicine, vol. 103, no. 14, Art. no. e37633, 2024.

D. E. Arnolds, A. Smith, J. M. Banayan, R. Holt, and B. M. Scavone, "National partnership for maternal safety recommended maternal early warning criteria are associated with maternal morbidity," Anesth. Analg., vol. 129, pp. 1621–1626, 2019.

G. Wise and D. Jolles, "Promoting effective care: Reducing primary cesarean births through team engagement and standardization of care at a community hospital," Nurs. Forum, vol. 54, pp. 601–610, 2019.

R. Al-Rifai, "Rising cesarean deliveries among apparently low-risk mothers at university teaching hospitals in Jordan: Analysis of population survey data, 2002–2012," Glob. Health Sci. Pract., vol. 2, pp. 195–209, 2014.

A. P. Betrán, J. Ye, A. B. Moller, J. Zhang, A. M. Gülmezoglu, and M. R. Torloni, "The increasing trend in caesarean section rates: Global, regional and national estimates: 1990–2014," PLoS One, vol. 11, no. 2, Art. no. e0148343, 2016.

H. C. Patel, B. B. Singh, M. Moitra, and S. L. Kantharia, "Obstetric referrals: Scenario at a primary health centre in Gujarat," Natl. J. Community Med., vol. 3, no. 4, pp. 711–714, 2012.

L. McCloskey, "The risk of cesarean childbirth among low risk primiparous women: Differences in three practice settings," Ph.D. dissertation, University of California, Los Angeles, Los Angeles, CA, USA, 1988, Dissertation Abstracts International, vol. 50, p. 1310.

E. White VanGompel, E. K. Main, D. Tancredi, and J. Melnikow, "Do provider birth attitudes influence cesarean delivery rate: A cross-sectional study," BMC Pregnancy Childbirth, vol. 18, p. 184, 2018.

NIH State-of-the-Science Conference, "NIH State-of-the-Science Conference Statement on Cesarean Delivery on Maternal Request," NIH Consens. State Sci. Statements, vol. 23, no. 1, pp. 1–29, 2006.

Polit D. F., Hungler B. P., . (1987). Nursing research. Philadelphia: Lippincott.

M. S. Rahman, M. S. Anower, M. R. Hasan, M. B. Hossain, and M. I. Haque, "Design and numerical analysis of highly sensitive Au-MoS2-graphene based hybrid surface plasmon resonance biosensor," *Opt. Commun.*, vol. 396, pp. 36–43, 2017.

M. S. Rahman, M. S. Anower, M. K. Rahman, M. R. Hasan, M. B. Hossain, and M. I. Haque, "Modeling of a highly sensitive MoS2-Graphene hybrid based fiber optic SPR biosensor for sensing DNA hybridization," *Optik*, vol. 140, pp. 989–997, 2017.

M. A. Rahman, T. Ahmed, M. I. Haque, and M. S. Anower, "A photonic crystal fiber based asymmetric slotted structured highly sensitive refractive index plasmonic biosensor," *J. Sensor Technol.*, vol. 12, no. 1, pp. 1–17, 2022.

M. I. Haque, K. Yoshibayashi, J. Wang, G. Fischer, and J. Kirchner, "Design and evaluation of directional antenna for shoe-mounted sensor for position identification of elderly wanderer," *Sens. Bio-Sens. Res.*, vol. 34, Art. no. 100451, 2021.

M. I. Haque, R. Yamada, J. Shi, J. Wang, and D. Anzai, "Channel characteristics and link budget analysis for 10–60 MHz band implant communication," *IEICE Trans. Commun.*, vol. 104, no. 4, pp. 410–418, 2021.

ATM Rafiqul Mawla, Abdullah Al Faisal, and M. I. Haque, "Improvement of breast cancer detection in Bangladesh with image processing," *Seybold Rep.*, vol. 19, no. 2, pp. 264–275, Feb. 2024

M. I. Haque, R. Yamamoto, J. Wang, and K. I. Kakimoto, "Measurement performance of NKN piezo material for powering shoe-mounted sensor," in *Proc. Int. Conf. Innov. Sci., Eng. Technol. (ICISET)*, 2022, pp. 324–328.

E. Kabir, M. Alam, and M. I. Haque, "Novel heterocycles as antitubercular drugs: A review," *Diagn. Microbiol. Infect. Dis.*, vol. 113, no. 3, Art. no. 116978, 2025.

M. I. Haque, K. Yoshibayashi, J. Wang, G. Fischer, and J. Kirchner, "Directive antenna design at 2.4 GHz on foot surface for wanderer location identification," in *Proc. Int. Symp. Antennas Propag. (ISAP)*, 2021, pp. 635–636.

M. I. Haque, J. Wang, and D. Anzai, "Path loss and group delay analysis at 10–60 MHz human body communication band," *IEICE Tech. Rep.*, vol. EMCJ 2019-78, pp. 19–22, 2019.

I. Abtahi et al., "Detection of brain tumor using slotted microstrip patch antenna via scattering parameter in the ISM band," in *Proc. Int. Conf. Sustain. Technol. Ind. 5.0 (STI)*, Dec. 2023, pp. 1–6.

M. I. Haque et al., "Multipath propagation's impact on estimating the size of underwater networks," *Seybold Rep.*, vol. 21, no. 1, pp. 104–121, Sep. 2026.