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SCOPING REVIEW OF RISK FACTORS FOR PLACENTA PREVIA IN INDONESIA

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ABSTRACT
Placenta previa is a major etiology of antepartum hemorrhage that threatens maternal and perinatal survival in Indonesia. However, empirical evidence regarding its predisposing factors remains fragmented across regional hospital studies. This scoping review aimed to identify, map, and synthesize empirical evidence regarding maternal, obstetric, uterine, and environmental risk factors associated with placenta previa among pregnant and postpartum women in Indonesia. Following the Arksey and O'Malley methodological framework and PRISMA-ScR guidelines, a systematic literature search was conducted on Google Scholar using targeted Boolean keyword combinations ("placenta previa" OR "plasenta previa" AND "risk factors" OR "faktor risiko" AND "Indonesia") for primary empirical studies published between 2019 and 2026. Articles were acquired through a multi-stage screening process comprising identification, duplicate removal, title/abstract screening, and full-text eligibility assessment based on the Population Concep Context (PCC) framework before data charting and thematic synthesis. Out of the initial search records retrieved and screened, 15 eligible primary empirical studies met the inclusion criteria and were included in the final synthesis. Obstetric and surgical factors specifically multiparity, prior cesarean delivery (demonstrating a clear dose-response risk), uterine curettage, prior abortion, and short interpregnancy intervals (<24 months) emerged as the most consistent predictors. Reproductive age extremes (<20 and >35 years) significantly increased biological odds in analytical studies, whereas descriptive cohorts showed high case proportions among women aged 20–35 years. Uterine abnormalities, multiple gestation, and high household secondhand smoke exposure (70.0%–75.0%) further compounded maternal susceptibility. Placenta previa in Indonesia is driven by multifactorial determinants. Midwives should integrate early antenatal risk stratification, family planning counseling, smoke-free household advocacy, and timely ultrasonographic referrals to prevent severe obstetric hemorrhage.

Keywords: antenatal care; indonesia; midwifery; placenta previa; risk factors

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INTRODUCTION

Maternal mortality remains a critical global public health challenge and serves as a primary indicator of healthcare quality and national development. According to the World Health Organization, approximately 80% of maternal deaths worldwide are attributed to severe obstetric hemorrhage, with placenta previa accounting for 15% to 20% of all antepartum hemorrhage cases (Sudani et al., 2024). In Indonesia, the burden of maternal mortality continues to demand urgent clinical and policy attention; national health reports documented a rise in maternal deaths from 4,197 cases in 2019 to 4,627 cases in 2020, with hemorrhage representing the leading direct cause at 28.39% (1,330 deaths) (Podungge et al., 2023). Among the primary etiologies of third-trimester obstetric bleeding, placenta previa poses a substantial threat to both maternal survival and perinatal outcomes across Indonesian healthcare settings (Pratiwi et al., 2024; Sandriana et al., 2026).

Placenta previa is an obstetric complication characterized by the abnormal implantation of the placenta within the lower uterine segment, partially or completely obstructing the internal cervical os (Ramadhan, 2022; Sudani et al., 2024). Clinically, the condition is classified into four types based on the degree of cervical coverage: total (complete), partial, marginal, and low-lying placenta (Pratiwi et al., 2024; Ramadhan, 2022). Its hallmark clinical manifestation is sudden, painless, and often recurrent vaginal bleeding during the second or third trimester as the lower uterine segment

thins and stretches in preparation for labor (Ramadhan, 2022; Sandriana et al., 2026). Without timely antenatal detection and multidisciplinary management, placenta previa can precipitate life-threatening maternal complications, including hypovolemic shock, severe anemia, coagulopathy, placenta accreta spectrum disorders, emergency peripartum hysterectomy, and maternal death (Ramadhan, 2022; Sandriana et al., 2026; Sudani et al., 2024). Simultaneously, the condition significantly elevates perinatal risks such as preterm delivery, low birth weight, intrauterine asphyxia, low Apgar scores, neonatal intensive care unit admission, and perinatal mortality (Pratiwi et al., 2024; Ramadhan, 2022; Sudani et al., 2024).

Epidemiologically, while the global prevalence of placenta previa is estimated at 0.3% to 0.5% of all pregnancies with Asia exhibiting the highest regional prevalence at approximately 1.22% national estimates in Indonesia generally range between 0.4% and 0.6%, or roughly 1 in every 200 deliveries (Pratiwi et al., 2024; Ramadhan, 2022; Wahyu et al., 2019). However, hospital-based surveillance across various Indonesian provinces indicates considerably higher clinical proportions, ranging from 2.4% to 3.56% in general hospitals (Wahyu et al., 2019) and escalating from 2.5% in 2020 to 13.41% in 2022 at major tertiary referral centers in eastern Indonesia (Sudani et al., 2024). Although the exact etiology of placenta previa remains incompletely understood, its pathogenesis is widely linked to endometrial scarring, decidual atrophy, and impaired uterine vascularization, which compel the trophoblast to implant in the lower uterine segment or spread across a wider surface area to secure adequate blood perfusion (Ramadhan, 2022; Sandriana et al., 2026; Wahyu et al., 2019). Empirical studies have identified multiple predisposing factors contributing to this mechanism, including advanced maternal age (>35 years) or young maternal age (<20 years), multiparity, prior cesarean delivery, history of uterine curettage or spontaneous/induced abortion, short interpregnancy intervals (<24 months), uterine abnormalities such as myoma or leiomyoma, multiple gestation, and active or passive exposure to tobacco smoke (Podungge et al., 2023; Pratiwi et al., 2024; Ramadhan, 2022; Wahyu et al., 2019).

Despite growing clinical awareness, the existing body of evidence regarding placenta previa risk factors in Indonesia remains fragmented across localized hospital studies with varying methodological designs and population characteristics. For instance, while several Indonesian investigations consistently identify multiparity and a history of cesarean section as the most dominant predictors with cesarean scarring increasing incidence two- to three-fold (Ramadhan, 2022; Sandriana et al., 2026; Sudani et al., 2024) other regional studies report conflicting statistical associations regarding prior cesarean delivery, curettage, and maternal age groups (Podungge et al., 2023; Sudani et al., 2024). Moreover, previous literature reviews conducted by Indonesian scholars have largely relied on conventional narrative approaches with limited database coverage and small sample pools (Podungge et al., 2023; Pratiwi et al., 2024; Ramadhan, 2022), leaving a lack of comprehensive, structured synthesis that maps the geographical distribution, methodological trends, and consistency of risk factors specific to the Indonesian population. Conducting a rigorous scoping review is therefore essential to consolidate scattered empirical findings, clarify dominant versus context-specific determinants, and support early antenatal risk stratification and ultrasonographic screening across primary and referral healthcare facilities (Ramadhan, 2022; Sandriana et al., 2026).

This scoping review aimed to identify, map, and synthesize empirical evidence regarding maternal, obstetric, uterine, and environmental risk factors associated with placenta previa among pregnant and postpartum women in Indonesia.Accordingly, the objective of this scoping review is to systematically map, synthesize, and evaluate the existing empirical literature on the maternal, obstetric, and environmental risk factors associated with placenta previa in Indonesia, as well as to identify key methodological characteristics and research gaps to inform evidence-based antenatal screening and clinical prevention strategies.

METHOD

This study employed a scoping review design to systematically map the breadth, characteristics, and empirical evidence regarding risk factors for placenta previa in Indonesia. The review was conducted following the five-stage methodological framework established by Arksey and O'Malley (2005), comprising (1) identifying the research question, (2) identifying relevant studies, (3) study selection, (4) charting the data, and (5) collating, summarizing, and reporting the results, and was reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) guidelines (Tricco et al., 2018). In the first stage, the research question was formulated using the Population, Concept, and Context (PCC) framework, defining pregnant and delivering women as the *Population*, maternal, obstetric, clinical, and environmental risk factors of placenta previa as the *Concept*, and clinical and hospital settings within Indonesia as the *Context*.

In the second stage, a comprehensive literature search was carried out using the Google Scholar database to identify relevant peer-reviewed studies. Google Scholar was selected as the primary search engine due to its extensive indexing of Indonesian national health journals, Science and Technology Index (SINTA)-accredited publications, and regional hospital-based clinical studies that frequently report local epidemiological data. The retrieval process utilized a structured combination of English and Indonesian keywords linked with Boolean operators (AND and OR), specifically: ("placenta previa" OR "plasenta previa") AND ("risk factors" OR "faktor risiko" OR "faktor penyebab" OR "determinants") AND ("Indonesia"). To ensure contemporary clinical relevance, the search was restricted to articles published between 2019 and 2026.

In the third stage, retrieved records underwent a systematic, multi-step selection process based on predefined eligibility criteria. Studies were included if they: (1) utilized primary empirical research designs (such as cross-sectional, case-control, cohort, or descriptive clinical studies) investigating factors associated with placenta previa; (2) sampled pregnant or postpartum populations within Indonesia; (3) were published in either English or Bahasa Indonesia between 2019 and 2026; and (4) were accessible in full-text format. Conversely, secondary literature reviews, systematic reviews, meta-analyses, editorials, conference abstracts without complete empirical data, unpublished theses, studies conducted outside Indonesia, and articles focusing exclusively on midwifery or medical management without evaluating predisposing risk factors were excluded. Following initial retrieval from Google Scholar, duplicate records were removed, and the remaining articles were screened sequentially by title and abstract, followed by a rigorous full-text evaluation to confirm final eligibility, as documented through a PRISMA-ScR flow diagram.

In the fourth and fifth stages, relevant information from all eligible full-text articles was systematically extracted and synthesized. Data charting was performed using a standardized extraction matrix designed to record key study characteristics, including author names, year of publication, study location (province and healthcare facility), research design, sample size, specific risk factors examined, statistical findings (such as frequencies, *p*-values, and odds ratios), and primary conclusions. Finally, the extracted data were collated and summarized using a descriptive numerical summary of study characteristics alongside a narrative thematic synthesis, organizing the Indonesian empirical evidence into four core determinant domains: maternal sociodemographic characteristics, obstetric and surgical history, uterine and gestational conditions, and environmental exposures.

RESULT

Thematic Synthesis of Risk Factor Domains

Maternal Sociodemographic Characteristics

Maternal age was examined across eight included studies, demonstrating a consistent statistical association in analytical investigations alongside notable demographic nuances in descriptive

cohorts. Analytic studies in Bengkulu, Batam, Manado, Makassar, and Lubuklinggau confirmed that maternal age at reproductive extremes—specifically advanced maternal age (>35 years) and young maternal age (<20 years)—significantly increases the likelihood of placenta previa (p0.008). In Bengkulu, women in high-risk age brackets faced a 13-fold increase in odds (\text{OR} = 13.333, 95\% CI [4.377, 40.618]), while in Batam, placenta previa prevalence among mothers aged >35 years reached 17.4% compared to 1.8% among those aged 20–35 years. Conversely, descriptive hospital cohorts in Denpasar and Makassar reported that the majority of clinical cases occurred within the 20–35 year age group (ranging from 56.3% to 75.0%), which researchers attributed to higher overall birth volumes and the co-occurrence of other obstetric risk factors within that reproductive demographic.

Obstetric and Surgical History

Obstetric and surgical factors represented the most extensively investigated and consistently significant determinants across Indonesia: Multiparity was identified as a primary predictor in five studies. Descriptive surveillance in Denpasar found that 91.8% of placenta previa patients were multiparous, while case-control analysis in Bengkulu demonstrated that multiparous women had more than six times higher odds of developing placenta previa compared to primiparous women (OR = 6.481, $p < 0.001). Only one study (Mursalim et al., 2019) reported a non-significant relationship for parity. Seven studies evaluated previous cesarean delivery, with six confirming a strong, statistically significant association ($p < 0.05$). In Denpasar, 68.85% of patients had a prior CS, and in Bengkulu, a history of CS nearly quadrupled placenta previa risk (OR = 3.826, p = 0.016). Furthermore, studies in Jakarta and Makassar established a clear dose-response pattern based on surgical frequency: placenta previa incidence rose from 10.5% after one CS to 15.6% after two CS deliveries and 33.3% after three or more CS procedures ($p < 0.05$). Conversely, Husain et al. (2020) in Manado found no statistically significant correlation, as 54.2% of their cases had no prior CS.

Five studies assessed intrauterine procedures and pregnancy loss. Significant associations were reported for prior uterine curettage in Bengkulu (OR = 3.176, p = 0.033) and in Rahmawati et al. (2023), where 41.7% of cases had undergone curettage compared to 16.7% of controls (p = 0.001). Similarly, Ade et al. (2020) in West Java found a highly significant association between a history of complete or incomplete abortion and placenta previa (p = 0.000). By contrast, lower proportions of curettage history were noted in Denpasar (27.05%) and Manado (8.3%, non-significant). Wahyu et al. (2019) demonstrated that a short interpregnancy interval (<24 months) increased the odds of placenta previa by more than fourfold (OR= 4.364, p = 0.005). Additionally, both Trianingsih (2019) and Mursalim et al. (2019) confirmed that a history of placenta previa in a prior pregnancy significantly predicted recurrence (p = 0.000).

Uterine and Gestational Conditions

Structural uterine abnormalities and multiple gestations were evaluated in three studies, yielding mixed findings depending on study design. In South Sumatra, Mayang Sari and Budianto (2021) reported statistically significant associations between placenta previa and both uterine tumors (myoma uteri or endometrial polyps, present in 6.5% of the cohort; p = 0.000) and multiple gestation (6.8% of the cohort). However, descriptive surveillance in Denpasar recorded low frequencies for both uterine myoma (2.46%) and twin pregnancy (2.46%) among placenta previa patients, and Mursalim et al. (2019) found no statistically significant link with multiple gestation.

Environmental Exposures

Two studies specifically investigated environmental exposure to tobacco smoke among pregnant Indonesian women. In Central Java, Mursiti and Nurhidayati (2020) reported that 75.0% of delivering mothers with placenta previa were passive smokers exposed to household or environmental secondhand smoke. Consistent with this finding, Hasanah and Putri (2021) found

that 70.0% of pregnant women with placenta previa were passive smokers, establishing a statistically significant association between secondhand smoke exposure and placenta previa incidence ($p = 0.02$).

DISCUSSION

This scoping review synthesizes Indonesian empirical evidence on placenta previa determinants, offering vital insights for midwifery practice. Across the 15 reviewed studies, obstetric and surgical factors particularly multiparity, prior cesarean section, uterine curettage, and short interpregnancy intervals emerged as the most consistent predictors of abnormal placentation (Sudani et al., 2024; Wahyu et al., 2019). Pathophysiologically, repeated childbirth, surgical incisions, and intrauterine evacuations cause endometrial scarring, decidual atrophy, and impaired vascular perfusion in the upper uterine segment (Ramadhan, 2022; Sandriana et al., 2026). Consequently, the trophoblast implants in the lower uterine segment or spreads across a wider surface area to secure adequate blood supply, increasing cervical os obstruction (Wahyu et al., 2019). Notably, the dose-response escalation observed in Jakarta and Makassar, where incidence rose from 10.5% after one cesarean delivery to 33.3% after three or more procedures (Sari et al., 2021) underscores the urgency of preventing unnecessary primary cesarean sections and closely monitoring women with scarred uteri.

Furthermore, the contrast between analytical and descriptive findings regarding maternal age provides an essential clinical lesson for midwives. While analytical studies confirm elevated biological risk at reproductive extremes (<20 and >35 years) due to endometrial immaturity or microvascular sclerosis (Podungge et al., 2023; Wahyu et al., 2019), descriptive hospital cohorts demonstrate that 56.3% to 75.0% of clinical cases occur among women aged 20–35 years (Dewi et al., 2021; Mursalim et al., 2019; Sudani et al., 2024). Midwives must therefore avoid assuming low risk based solely on optimal maternal age when multiparity, short birth intervals (<24 months), or uterine trauma coexist (Wahyu et al., 2019). Additionally, the high prevalence of passive smoking (70.0%–75.0%) among affected mothers highlights an overlooked environmental determinant in Indonesian households, as carbon monoxide and nicotine induce placental hypertrophy and lower-segment implantation (Hasanah & Putri, 2021; Mursiti & Nurhidayati, 2020).

Within Indonesia's maternal healthcare system, midwives act as frontline providers responsible for early risk stratification and continuity of antenatal care (Sandriana et al., 2026). Integrating structured risk screening into initial antenatal visits enables midwives to identify vulnerable women early, deliver counseling on painless second- and third-trimester bleeding danger signs, advocate smoke-free households, and coordinate timely referrals for ultrasonographic placental localization and interprofessional collaboration with obstetricians (Ramadhan, 2022; Sandriana et al., 2026; Sudani et al., 2024). Nonetheless, these findings must be interpreted alongside methodological limitations across the reviewed studies, including the predominance of retrospective hospital designs, variable definitions, and reliance on Google Scholar indexing.

CONCLUSION

In summary, this scoping review demonstrates that the incidence of placenta previa in Indonesia is driven by a complex interplay of obstetric, surgical, sociodemographic, uterine, and environmental determinants. Among these factors, multiparity, a history of cesarean delivery particularly repeated surgical procedures uterine curettage, prior abortion, and short interpregnancy intervals of less than 24 months represent the most prominent and consistent predictors across Indonesian clinical settings (Ade et al., 2020; Sari et al., 2021; Sudani et al., 2024; Wahyu et al., 2019). Furthermore, maternal age at reproductive extremes (<20 and >35 years), recurrent placenta previa, structural uterine abnormalities, and widespread household exposure to secondhand tobacco smoke significantly compound maternal susceptibility (Hasanah & Putri, 2021; Mayang Sari & Budianto, 2021; Trianingsih, 2019). Understanding these multifactorial pathways is vital for strengthening

maternal health outcomes, as placenta previa remains a major contributor to life-threatening antepartum and postpartum hemorrhage in Indonesia (Podungge et al., 2023; Sudani et al., 2024).

From a midwifery perspective, these findings underscore the pivotal role of midwives as frontline guardians of maternal and perinatal safety within primary healthcare centers and community practices. Because many predisposing risk factors are identifiable prior to or early in pregnancy, midwives must implement comprehensive, evidence-based risk stratification during the first antenatal care contact (Sandriana et al., 2026; Sudani et al., 2024). Targeted midwifery interventions should prioritize pre-conception and postpartum family planning counseling to promote healthy birth spacing of at least two years, limit high-risk multiparity, and reduce unintended pregnancies that may lead to invasive curettage (Podungge et al., 2023; Wahyu et al., 2019). Equally important, routine antenatal education should actively involve husbands and family members to eliminate indoor tobacco smoke exposure and ensure early recognition of painless vaginal bleeding during the second and third trimesters (Pratiwi et al., 2024; Sudani et al., 2024).

To translate these preventive strategies into clinical practice, healthcare policymakers and midwifery educators should standardize antenatal risk-screening protocols and strengthen referral pathways between primary midwifery services and tertiary obstetric facilities. Pregnant women presenting with cumulative risk profiles such as prior cesarean scars combined with multiparity or advanced age should be promptly referred for targeted transabdominal or transvaginal ultrasonography to detect abnormal placentation before symptomatic hemorrhage occurs (Ramadhan, 2022; Sandriana et al., 2026). Finally, future research in Indonesia should employ large-scale, multicenter prospective cohort designs with standardized multivariate analyses to validate localized predictive risk-scoring models and evaluate the effectiveness of midwife-led antenatal screening interventions in reducing maternal and neonatal morbidity.

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