

Evaluating the Implementation of the Birth Planning and Complication Prevention Program among Third-Trimester Pregnant Women: A Scoping Review

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ABSTRACT

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Background: The maternal mortality rate (MMR) in Timor-Leste remains among the highest in Southeast Asia and continues to pose a significant public health challenge, particularly during the third trimester of pregnancy. Birth Planning and Complication Prevention (P4K) programs are essential strategies to reduce preventable maternal complications and improve birth preparedness.

Method: A scoping review was conducted following the PRISMA-ScR framework. The review process included five stages: identifying the research question, searching relevant literature, selecting eligible studies, charting data, and summarizing and reporting the findings. Articles were retrieved from major databases and included studies published between 2016 and 2025 that examined BPCR/P4K implementation in pregnant women.

Result: The findings indicate that birth preparedness is influenced by multiple determinants, including individual factors (maternal knowledge, parity, and pregnancy intention), social support from family and community, and the quality of antenatal care (ANC) services. In addition, effective detection and monitoring of obstetric risks during the third trimester play a critical role in improving preparedness and preventing complications. However, overall implementation of P4K remains suboptimal in several settings.

Conclusion: Strengthening ANC education, enhancing family and community support systems, and optimizing third-trimester risk screening and monitoring are key strategies to improve the effectiveness of P4K implementation. These efforts are essential to reduce maternal complications and contribute to the reduction of maternal mortality in low-resource settings such as Timor-Leste.

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INTRODUCTION

The maternal mortality rate (MMR) in Timor-Leste remains one of the highest in Southeast Asia, reflecting persistent structural and systemic challenges within the national health system despite ongoing post-independence reconstruction and health sector strengthening. In 2023, the MMR was estimated at approximately 192 maternal deaths per 100,000 live births, indicating a significant public health burden that continues to threaten maternal survival and well-being (World Health Organization [WHO], 2024; Ministry of Health Timor-Leste, 2024). Although national and international stakeholders have implemented multiple maternal health interventions, progress in reducing maternal mortality has been slow and uneven, particularly across rural and remote regions.

The burden of maternal mortality in Timor-Leste is strongly influenced by geographical constraints, limited transportation infrastructure, and uneven distribution of health services. Many pregnant women residing in mountainous and hard-to-reach areas face significant delays in accessing emergency obstetric care, which contributes to preventable maternal deaths (United Nations Population Fund [UNFPA], 2023). These delays are often categorized within the “three delays model,” particularly delays in reaching healthcare facilities and receiving adequate care once at the facility level. In this context, improving preparedness during pregnancy especially in the third trimester is essential to ensure timely decision-making and access to skilled care during childbirth.

The third trimester of pregnancy represents a critical period in maternal health management, as the risk of obstetric complications increases significantly near term. Birth Preparedness and Complication Readiness (BPCR), also referred to in some national programs as Birth Planning and Complication Prevention (P4K), is a key preventive strategy aimed at reducing delays in accessing emergency obstetric care. BPCR includes identifying a place of delivery, selecting a skilled birth attendant, arranging emergency transportation, preparing financial resources, and recognizing danger signs during pregnancy (WHO, 2023). Evidence suggests that effective implementation of BPCR can significantly reduce maternal and neonatal morbidity and mortality by improving timely access to emergency care.

Despite the integration of BPCR principles into maternal health programs in Timor-Leste, implementation at the community level remains inconsistent. Community-based interventions involving health volunteers and midwives have been introduced to increase awareness and improve maternal health behaviors. However, studies suggest that the uptake of birth preparedness practices remains suboptimal, particularly in rural communities where cultural beliefs and traditional practices strongly influence childbirth decisions (Smith et al., 2022). In many areas, home births remain preferred due to cultural norms, perceived trust in traditional birth attendants, and limited access to transportation or health facilities.

In addition to cultural factors, systemic challenges within the health system further hinder effective BPCR implementation. These include shortages of skilled health personnel, uneven distribution of midwives across districts, inadequate referral systems, and limited availability of emergency obstetric services in primary health facilities (Ministry of Health Timor-Leste, 2024). Such constraints reduce the effectiveness of birth preparedness interventions, particularly for women in the third trimester who require timely and well-coordinated care planning.

Moreover, although community engagement programs and maternal health education campaigns have been implemented, evidence indicates that key BPCR indicators such as emergency transportation planning, identification of blood donors, and financial preparedness remain inconsistent across regions (UNFPA, 2023). This inconsistency suggests that awareness alone is insufficient to ensure behavioral change, especially when structural and logistical barriers persist. As a result, many pregnant women still experience unplanned home deliveries or delayed referrals during obstetric emergencies.

Another important challenge is the gap between national maternal health policies and real-world implementation. While policies strongly advocate for facility-based delivery and skilled birth attendance, the reality in many districts reflects limited infrastructure, weak referral networks, and insufficient health workforce capacity. This policy–practice gap highlights the complexity of implementing standardized maternal health programs in a decentralized and resource-limited setting such as Timor-Leste (Jones et al., 2021).

Furthermore, the post-conflict context of Timor-Leste continues to influence health system development. Although substantial progress has been made since independence, the country is still rebuilding its health infrastructure and strengthening human resources for health. These ongoing challenges contribute to disparities in service delivery and affect community trust in formal healthcare systems. Consequently, maternal health interventions must consider both systemic and sociocultural determinants to be effective.

Existing literature on maternal health in Timor-Leste has provided valuable insights into service utilization, cultural practices, and health system constraints. However, most studies are fragmented and do not specifically focus on comprehensive evaluation of BPCR or P4K implementation among third-trimester pregnant women. Furthermore, there is limited synthesis of evidence regarding the effectiveness of interventions, contextual barriers, and facilitators influencing program success. This lack of consolidated evidence makes it difficult for policymakers to identify priority areas for intervention and system strengthening.

Given these gaps, there is a clear need for a structured evidence synthesis that maps the available literature on BPCR/P4K implementation. A scoping review is particularly appropriate for this purpose, as it allows for comprehensive mapping of existing research, identification of key themes, and clarification of knowledge gaps without limiting the inclusion of diverse study designs. This approach is especially relevant in contexts where evidence is heterogeneous and scattered across different settings and methodologies.

Therefore, this scoping review aims to systematically map and synthesize existing scientific evidence on the implementation and evaluation of Birth Planning and Complication Prevention (P4K/BPCR) programs among third-trimester pregnant women in Timor-Leste and similar low-resource settings. Specifically, the review seeks to identify determinants influencing birth preparedness, including individual, sociocultural, and health system factors, as well as barriers and facilitators affecting program implementation.

The findings of this review are expected to provide a comprehensive evidence base for policymakers, healthcare providers, and development partners in strengthening maternal health strategies. In particular, the results are intended to support the Ministry of Health of Timor-Leste in improving the effectiveness of BPCR/P4K programs and reducing maternal mortality in line with Sustainable Development Goal (SDG) 3.1, which targets the global reduction of maternal mortality to fewer than 70 deaths per 100,000 live births by 2030 (WHO, 2024).

METHOD

Review Design

The review design used was a scoping review, which was selected using the Prisma-ScR scoping review method (Figure 1), which follows the reporting guidelines outlined in the PRISMA Extension for Scoping Reviews. The protocol in this study consisted of five main steps: (1) formulating the research question, (2) identifying relevant sources, (3) selecting appropriate studies, (4) extracting data, and (5) compiling, summarizing, and reporting the findings.

Eligibility Criteria

Article searches were conducted across several databases, including ScienDirect, PubMed, Wiley, Taylor, and Francis. Eligible articles were those published within the last 10 years, from 2016 to 2025.

Search Terms

In the search terms section of this scoping review, the researchers used a systematic approach to ensure that the literature search included all relevant terms related to the topic of the Scoping Review, namely Evaluation of the Implementation of the Childbirth Planning Program and Prevention of Complications for Pregnant Women in the Third Trimester.

Selection of Evidence Source

Data extraction was performed by collecting articles in Microsoft Excel format. Information from each article was organized according to specific criteria, including: Title, Author and Year, Research Objective, Method and Design, Respondents, Country, Inclusion and Exclusion Criteria, Study Results and Implications.

Figure 1. Prisma Flow Chart

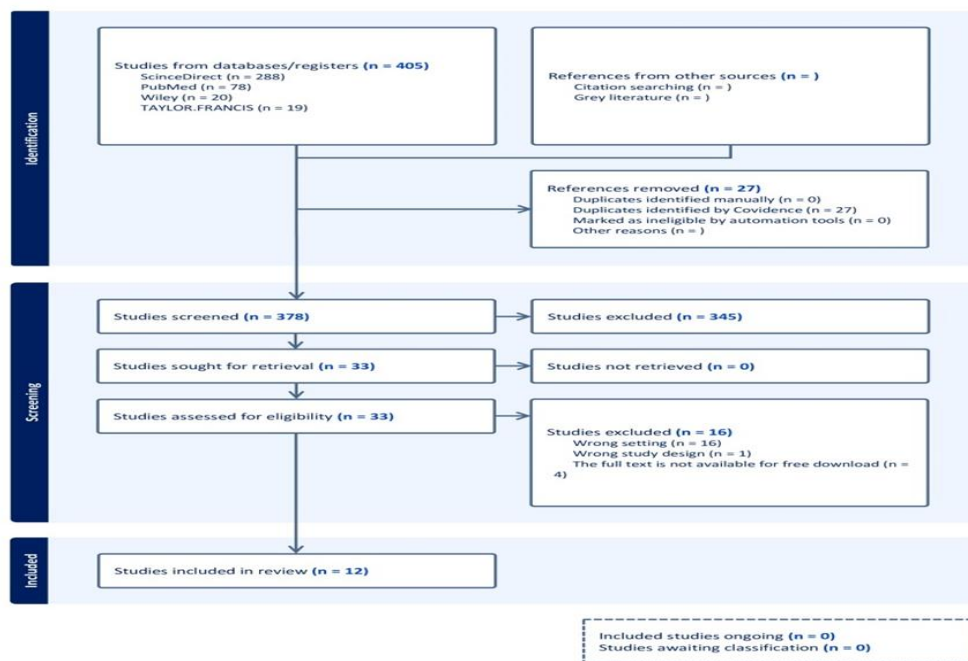


Table 1. Data Charting

No	Penulis (Tahun)	Desain	Sampel & Lokasi	Hasil Utama
A1	Anikwe (2020)	Cross-sectional	450 ibu hamil, Nigeria	BP/CR rendah (41,9%); pengetahuan BP 44,9%, CR 36,9%
A2	Teekhasaence (2020)	Cross-sectional	134 remaja hamil, Thailand	78,4% memiliki BPCR baik; ANC ≥ 4 berasosiasi signifikan
A3	Kinshella (2022)	Mixed-method	Komunitas (ibu hamil, keluarga, masyarakat), India	Intervensi meningkatkan partisipasi tokoh (39.362 orang), tetapi tidak signifikan terhadap pengetahuan & outcome klinis
A4	Chaudhary (2023)	RCT	229 ibu hamil pengguna smartphone, Nepal	Intervensi media sosial meningkatkan pengetahuan PNC (+8,07; $p=0,006$)
A5	Bogale (2019)	Cross-sectional komparatif	604 ibu hamil, Ethiopia	BP rendah (22,5%), CR 25,8%; lebih tinggi pada peserta forum
A6	Sadeh (2024)	Cohort retrospektif	3549 kehamilan, Israel	Akurasi estimasi BB janin meningkat pada trimester akhir (MPE -1,9%)
A7	Roekel (2023)	Stepped-wedge cluster RCT	11.820 ibu hamil risiko rendah, Belanda	Deteksi SGA terkait peningkatan intervensi obstetri, tidak selalu menurunkan SAPO
A8	Tsegaw (2019)	Cross-sectional	436 ibu hamil, Ethiopia	Pengetahuan BPCR 45,2%; dipengaruhi ANC, pekerjaan, kehamilan terencana
A9	Akobundu (2025)	Cross-sectional	104 ibu hamil trimester 3, Nigeria	100% mengalami LBP; berdampak pada aktivitas harian & sosial
A10	Chaudhary (2025)	Cross-sectional	Ibu hamil trimester 3, Nepal	22,3% berisiko depresi (EPDS ≥ 12)
A11	Athauda (2025)	Cohort	1002 kasus suspected FGR, Inggris	Kelompok risiko tinggi FGR lebih banyak adverse outcome (8,3% vs 3,2%)
A12	Abandeh (2024)	Cross-sectional	205 ibu hamil trimester 3, Yordania	Prevalensi kram kaki 58%; dipengaruhi paritas, edema, aktivitas

RESULTS AND DISCUSSION

Results

Selection of Evidence Sources

The selection of evidence sources in this Scoping Review was carried out to ensure that the included articles were relevant to the topic of the scoping review and in accordance with the objectives, namely to map the literature evidence regarding the evaluation of birth planning programs and prevention of complications in pregnant women in the third trimester. The article screening process in this Scoping Review used Covidence using 4 databases, namely PubMed, ScienDirect, Wiley Online Library, and Taylor & Francis. The article strategy used a combination of keywords using Mesh and Boolean to find relevant articles.

The process of selecting sources of evidence is carried out through several stages systematically using Covidence, which includes several stages using Keywords in each database, namely PubMed as many as 78 articles, ScienDirect 283 articles, Wley Online Journal as many as 20 articles, Taylor and Francis as many as 19 articles. So that the total number of articles registered is 405 articles, which is then carried out a selection stage regarding the duplication of articles as many as 27 articles so that the articles become 378 articles, then screening is carried out through titles and abstracts with the number of journals excluded as many as 345 so that it becomes 33 articles, then screening is carried out in Full Text with the number of journals excluded as many as 16 so that the total number of final articles included in relevant is 12 articles. The 12 articles will be included in the Scoping review and analyzed further, this process is to ensure that the selected articles are accurate and in accordance with the objectives of this scoping review.

Characteristics of Articles

Based on the distribution characteristics of the country of origin of the research in the articles analyzed in this scoping review came from various countries in geographical context, namely from Nigeria 2 articles with a percentage of 16.7%, from Thailand as many as 1 article with a percentage of 8.3%, from India as many as 1 article with a percentage of 8.3%, from Nepal as many as 1 article with a percentage of 8.3%, from Ethiopia as many as 2 articles with a percentage of 16.7%, from Israel as many as 1 article with a percentage of 8.3%, from the Netherlands as many as 1 article with a percentage, from London as many as 1 article with a percentage of 8.3%. The following is a diagram of the percentage of article analysis based on the country of origin, namely:

Based on the characteristics of the research design in this scoping review, most of the evidence sources are from 12 articles using Cross Sectional study research design, namely 7 articles with a percentage of 59%, Mixed Method, namely 1 article with a percentage of 8.3%, Randomized Controlled Trial (RCT) as many as 2 articles with a presentation of 16.7% and Cohort study as many as 2 articles with a percentage of 16.7%. The following diagram shows the analysis of articles based on their research design, namely:

Based on the results of a quality assessment of the 12 articles in this scoping review, which assessed the methodological quality of all articles using the JBI Critical Appraisal Tools, adjusted for each research design, the assessment results showed that all articles were 100% in the A-quality category, indicating excellent methodological quality.

Article analysis and mapping

Table 2. Analysis and Mapping of Research Article

No	Main Theme	Subtheme	Article
1	Birth planning and complication prevention program (P4K)	Planning the place of birth. Preparing transportation costs and blood donations Understanding danger signs during pregnancy and childbirth.	A1 A2 A8
2	Individual and social factors of pregnant women	Maternal education and knowledge. Planned pregnancy. Parity and gestational age. Family and social support.	A1 A2 A5 A5
3	The Role of ANC Health Services	ANC education and pregnant women's forum.	A1 A4 A5
4	Detection and prevention of complications in the third trimester	Obstetric risk screening. Monitoring the condition of the mother and fetus. Determination of timing and referral of delivery.	A6 A7 A11
5	Physical, psychological and nutritional conditions of pregnant women	Lower back pain and leg cramps. Pregnancy depression and anxiety. Diet quality and mental health.	A9 A10 A12

Discussion

This scoping review analyzed 12 scientific articles relevant to the topic of this scoping review, namely the evaluation of the implementation of the Birth Planning and Complication Prevention (P4K) Program in pregnant women in the third trimester. Most of the studies analyzed used a cross-sectional design, and all articles met the criteria for excellent methodological quality (A) based on the JBI Critical Appraisal Tools assessment. This indicates that the analyzed evidence has a high level of scientific rigor for use in mapping and synthesizing findings.

The literature review generally shows that the implementation of P4K in the third trimester encompasses several key aspects, including planning the delivery location, financial preparedness, arranging transportation and blood donations, and maternal knowledge of danger signs during pregnancy and childbirth. Although most pregnant women have designated a health facility as their delivery location, several studies still report limitations in knowledge and preparedness for complications, particularly regarding recognition of danger signs and readiness for emergency referrals.

Several determinants repeatedly found to be associated with childbirth preparedness include maternal knowledge, parity, planned pregnancy, and the regularity and timing of antenatal care (ANC) visits. In addition to individual factors, family and community support, including participation in pregnant women's forums and community-based education programs, have been shown to positively contribute to improving childbirth preparedness and mothers' ability to cope with the risk of complications in the third trimester. These findings suggest that childbirth preparedness does not exist in isolation but is influenced by the interaction of personal, social, and health care system factors.

From a health service perspective, available evidence indicates that structured and ongoing ANC education plays a crucial role in improving mothers' understanding of P4K, facilitating informed decision-making, and strengthening preparedness for obstetric emergencies. Furthermore, implementing obstetric risk screening, monitoring maternal and fetal conditions, and determining appropriate delivery timing and referrals in the third trimester are essential components in preventing maternal and perinatal complications.

In addition to service and clinical aspects, the physical, psychological, and nutritional status of pregnant women in the third trimester also emerged as factors influencing childbirth readiness. Physical complaints such as lower back pain and leg cramps, as well as psychological disorders such as depression and anxiety, have been reported to hinder maternal readiness for childbirth and optimal utilization of health services. On the other hand, good nutritional quality in the third trimester is associated with stable maternal psychological well-being, thus supporting overall childbirth readiness.

Overall, this summary of evidence suggests that childbirth preparedness in the third trimester of pregnancy, within the context of P4K implementation, is the result of an interaction of various factors, including individual factors, social support, quality of health services, and management of clinical risks and maternal health conditions. Therefore, implementing P4K in a comprehensive and integrated manner is crucial for improving childbirth preparedness and reducing the risk of maternal complications.

Theme 1: Birth planning and complication prevention (P4K) program

Birth Planning and Complication Prevention (P4K), internationally known as Birth Preparedness and Complication Readiness (BPCR), is a strategic approach to reducing maternal and neonatal mortality by ensuring that pregnant women, their families, and communities are prepared for childbirth and obstetric emergencies (World Health Organization [WHO], 2023). Based on the findings of this scoping review, P4K implementation among third-trimester pregnant women includes selecting the place of delivery, financial preparedness, transportation

arrangements, identification of blood donors, and recognition of danger signs during pregnancy and childbirth.

Determining the place of delivery was the most frequently reported indicator of birth preparedness. This finding is consistent with Teekhasaenee and Kaewkiattikun (2020), who found that pregnant adolescents who planned to deliver in health facilities demonstrated better birth preparedness. Likewise, Tsegaw et al. (2019) reported that most pregnant women had already identified a health facility for delivery, thereby reducing delays in obtaining emergency obstetric care. These findings indicate that planning the place of delivery is an important indicator for evaluating the effectiveness of the P4K program.

Similarly, preparation of financial resources, transportation, and blood donors represents essential emergency preparedness because these components minimize delays in decision-making and referral during obstetric emergencies (WHO, 2023; Tsegaw et al., 2019).

Theme 2 Individual and Socio-Cultural Factors of Pregnant Women in the Third Trimester

Maternal knowledge and education consistently emerged as important determinants of childbirth preparedness. Anikwe et al. (2020) reported that only 44.9% of respondents had adequate knowledge regarding birth preparedness, while only 36.9% demonstrated sufficient knowledge of complication readiness. Furthermore, awareness of key obstetric danger signs remained relatively low (26–32%), increasing the likelihood of delayed care-seeking during emergencies.

Regression analysis by Anikwe et al. (2020) further demonstrated that parity and the timing of the first antenatal care (ANC) visit were significant predictors of maternal knowledge regarding BPCR. Similarly, Bogale et al. (2019) found that participation in pregnant women's forums, regular ANC attendance, and focused counseling had a stronger influence on childbirth preparedness than maternal educational level alone. These findings suggest that structured health education delivered through ANC services is more influential than formal education in improving maternal preparedness.

Planned pregnancy was also associated with greater BPCR knowledge. Women with planned pregnancies were significantly more likely to demonstrate adequate birth preparedness and appropriate health-seeking behaviors than women with unplanned pregnancies (Tsegaw et al., 2019).

Parity was consistently associated with childbirth preparedness because multiparous women generally have previous childbirth experience that contributes to greater confidence and preparedness. Moreover, women who initiated ANC during the first or second trimester and completed regular ANC visits demonstrated better preparedness for childbirth and complication prevention (Rubina Atta, 2025; Khanal et al., 2015).

Family and community support, including participation in pregnant women's forums, also strengthened maternal preparedness by improving knowledge, confidence, and decision-making capacity before childbirth (Bogale et al., 2019).

Theme 3 The Role of ANC Health Services

ANC services constitute the primary platform for delivering education regarding birth preparedness and complication prevention. Health education provided during routine ANC visits improves maternal understanding of pregnancy danger signs, birth planning, emergency preparedness, and appropriate responses to obstetric complications (Rubina Atta, 2025; WHO, 2023).

Community-based interventions, such as pregnant women's forums, also provide opportunities for peer support and health education. Participation in these forums significantly

improves maternal preparedness and confidence in facing childbirth and obstetric emergencies (Bogale et al., 2019).

Although digital health education was not the primary focus of this review, evidence suggests that technology-based educational interventions can further improve maternal knowledge and engagement in maternal health services (Chaudhary et al., 2023).

Theme 4 Detection and Prevention of Third Trimester Complications

Routine obstetric screening during the third trimester is an important component of P4K implementation because it facilitates early identification of pregnancies at increased risk of maternal and neonatal complications. Third-trimester ultrasound combined with Doppler assessment has been shown to improve the detection of fetal growth restriction and other obstetric complications (Roekel et al., 2023; Sadeh et al., 2025).

Continuous monitoring of maternal blood pressure, fetal growth, and fetal well-being enables healthcare providers to identify complications promptly and make appropriate clinical decisions before delivery (Athauda et al., 2025; Sadeh et al., 2025).

Appropriate determination of delivery timing and referral according to maternal and fetal risk status has also been associated with improved perinatal outcomes while maintaining maternal safety (Athauda et al., 2025).

Theme 5 Physical, Psychological, and Nutritional Conditions of Pregnant Women

Physical discomforts during late pregnancy, particularly lower back pain and leg cramps, may reduce maternal mobility, interfere with sleep quality, and decrease participation in childbirth preparation activities. Leg cramps are highly prevalent during the third trimester and have been associated with reduced physical functioning and quality of life (Abandeh et al., 2024).

Psychological well-being is another essential determinant of childbirth preparedness. Maternal depression and anxiety during late pregnancy have been associated with lower utilization of ANC services, poorer childbirth preparedness, and delayed decision-making during obstetric emergencies (Chaudhary, 2025).

Adequate maternal nutrition contributes not only to fetal growth but also to maternal mental health. Poor dietary quality during the third trimester has been associated with an increased risk of antenatal depression, which may subsequently reduce maternal readiness for childbirth (Chaudhary, 2025).

Limitations of Evidence

This scoping review has limitations, namely that it uses a literature review approach that aims to map scientific evidence from various existing literature, without involving direct primary data collection.

CONCLUSION

The results of this scoping review indicate that childbirth preparedness among third-trimester pregnant women in the implementation of the Birth Planning and Complication Prevention Program (P4K/BPCR) is influenced by individual factors, social support, quality of health services, and the clinical condition of the mother and fetus. The main components of P4K include planning for delivery location, financial preparedness, transportation and blood donors, and knowledge of danger signs of pregnancy and childbirth. However, the level of knowledge and preparedness for complications was still found to be suboptimal.

Consistent determinants of increased childbirth preparedness include regular and timely antenatal care (ANC) visits, parity, planned pregnancy, and structured family and community support. Furthermore, obstetric risk screening, maternal and fetal monitoring, appropriate timing

and referral for delivery, and attention to the mother's physical, psychological, and nutritional condition in the third trimester are crucial for preventing complications. Therefore, strengthening the quality of ANC, family/community support, and optimizing third-trimester screening and monitoring are key to improving childbirth preparedness and reducing the risk of complications in pregnant women in the third trimester.

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