International Journal of Women's Health

Dovepress
Taylor & Francis Group

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ORIGINAL RESEARCH

Bed Rest versus Tocolytic Therapy in Threatened Preterm Labour Stratified by Cervical Length: A Randomised Controlled Trial

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Aim: Management of threatened preterm labour (TPL) frequently involves tocolytic drug administration, which may lead to unnecessary interventions and maternal complications, especially in women at low risk of imminent preterm birth. Cervical length measurement is a reliable method for assessing preterm birth risk and guiding appropriate management. However, tocolytic drugs and antenatal corticosteroids are often overused in women with adequate cervical length.

Methods: This randomised controlled trial compared the effectiveness of bed rest versus tocolytic therapy in women with threatened preterm labour and a cervical length ≥ 20 mm. Participants were allocated to either bed rest or tocolytic treatment. Primary outcomes included preterm delivery rates and birth weight. Secondary outcomes were caesarean section rates, antenatal corticosteroid use, maternal complications, and healthcare costs.

Results: Women receiving tocolytic therapy had a significantly higher rate of antenatal corticosteroid use (79%, $p < 0.0001$) and increased caesarean section rates compared with those managed with bed rest. Birth weight was higher among the bed rest group. No differences were found in preterm delivery rates or maternal complications between groups.

Conclusion: Bed rest alone is sufficient for managing threatened preterm labour in women with a cervical length ≥ 20 mm. The use of tocolytic drugs in this low-risk population may result in unnecessary interventions, higher caesarean rates, and increased healthcare costs. Bed rest is a safe, effective, and cost-efficient alternative to pharmacologic therapy in preventing preterm delivery while minimising maternal complications.

Trial Registration Page: https://www.thaiclinicaltrials.org/show/TCTR20200617001: 17/06/2020.

Plain Language Summary: Preterm labour is defined as regular uterine contractions that begin before 37 weeks of pregnancy and may lead to early birth. Doctors often give medicines called tocolytics to try to stop uterine contractions, although these medicines do not always prevent preterm birth. These drugs can sometimes cause unnecessary side effects for the mother—especially when the risk of early birth is low. Measuring the length of the cervix using ultrasound helps identify which women are more likely to deliver early.

This study compared two ways of managing women with threatened preterm labour whose cervix was not very short (20 millimetres or more): bed rest only or treatment with tocolytic drugs. Women were randomly assigned to one of the two groups. Researchers looked at how often preterm birth occurred, how many caesarean deliveries were performed, the babies' birth weights, use of steroid injections for the baby's lungs, and any side effects or extra medical costs.

The results showed that women who received tocolytic drugs had more unnecessary steroid injections and more caesarean sections. Babies in the bed rest group had slightly higher birth weights, and the rates of preterm birth and complications were similar in both groups.

Overall, the study found that bed rest alone was safe and effective for women with threatened preterm labour and a cervical length of 20 mm or more. Avoiding unnecessary tocolytic treatment can reduce medical risks for mothers and help lower healthcare costs.

Keywords: antenatal corticosteroids, bed rest, cervical length, preterm birth prevention, threatened preterm labour, tocolytic drugs

https://doi.org/10.2147/IJWH.S576580
Received: 24 October 2025
Accepted: 4 March 2026
Published: 10 March 2026

Introduction

Threatened preterm labour constitutes a significant concern for patients and healthcare systems alike. It involves the onset of regular uterine contractions leading to cervical dilation and effacement before 37 weeks of gestation, potentially culminating in preterm birth. Despite the elevated risk, approximately 50% of women hospitalised for threatened preterm labour ultimately deliver at term.[1]

Definitions of threatened preterm labour vary among studies. Some describe it as regular, painful contractions without cervical changes[2] or a cervical length of at least 30 mm.[3] Other definitions include symptoms such as pelvic pressure, backache and increased vaginal discharge.[4] Distinguishing threatened preterm labour from true preterm labour is challenging because of overlapping clinical manifestations. Consequently, most women presenting with threatened preterm labour are admitted because of the associated risk of preterm birth.

Identifying appropriate treatment strategies is essential to reduce unnecessary use of tocolytic agents, limit adverse drug effects, shorten hospital stays and minimise excessive healthcare costs. Prolonged hospitalisation imposes psychological and financial burdens on patients and their families. Moreover, unnecessary interventions exacerbate the national healthcare burden.

We hypothesised that cervical length measurement plays a key role in predicting the risk of preterm birth.[5] An undilated cervix refers to a cervix that has not yet opened, whereas a shortened cervix reflects cervical effacement, in which the cervix becomes thinner and shorter. Combining cervical length measurement with monitoring uterine contractions in women with threatened preterm labour could facilitate more appropriate clinical decision-making. However, previous studies have not adequately considered cervical length, and some women still proceed to deliver prematurely.

In uncomplicated singleton pregnancies, a normal cervical length around the mid-trimester is typically ~35–40 mm, with values above ~30 mm generally considered reassuring at 16–24 weeks.[6,7] In routine practice, a short cervix is defined as a transvaginal cervical length ≤25 mm before 24 weeks of gestation.[8]

Transvaginal sonographic measurement of cervical length, particularly when it is less than 25 mm, could help identify high-risk patients who may benefit from tocolytic therapy.[8] Without this assessment, administering or withholding medication might raise ethical concerns. While tocolytic agents carry inherent risks, including maternal complications and increased costs, the benefits may outweigh these risks in select cases.

In Thailand, no formal study has examined the management of pregnant women with threatened preterm labour without the use of tocolytic drugs. This is particularly the case for those whose cervix remains undilated or is dilated to less than 20 mm and whose cervical length is 20 mm or greater. Although a cervical length of ≤25 mm is commonly used to define a short cervix, evidence suggests that the highest risk of spontaneous preterm birth is concentrated among women with cervical lengths of approximately ≤20 mm, who are most likely to benefit from targeted interventions. Therefore, the present study evaluated a cervical length threshold of ≥20 mm to identify a population at relatively lower risk in whom conservative management could be prospectively assessed. Therefore, the present research investigated whether bed rest alone could effectively treat this cohort. The findings of this study will contribute to obstetric practice and inform national healthcare policies regarding the management of preterm labour.

Participants, Ethics and Methods

Randomisation and Interventions

A total of 264 participants were randomly assigned to either the bed rest group (n = 132) or the tocolytic treatment group (n = 132; see Figure 1). Randomisation was performed via a computer-generated sequence, ensuring allocation concealment.

In the bed rest group, participants had their cervical length measured upon admission but did not receive tocolytic treatment. Participants allocated to the bed rest group were managed with hospital-based bed rest during the initial admission period. All participants were observed in hospital for at least 1 day, with continued inpatient bed rest until uterine contractions subsided and cervical length remained stable on repeat assessment. Bed rest consisted of hospital-based activity restriction rather than strict immobilisation, and participants were encouraged to ambulate for basic

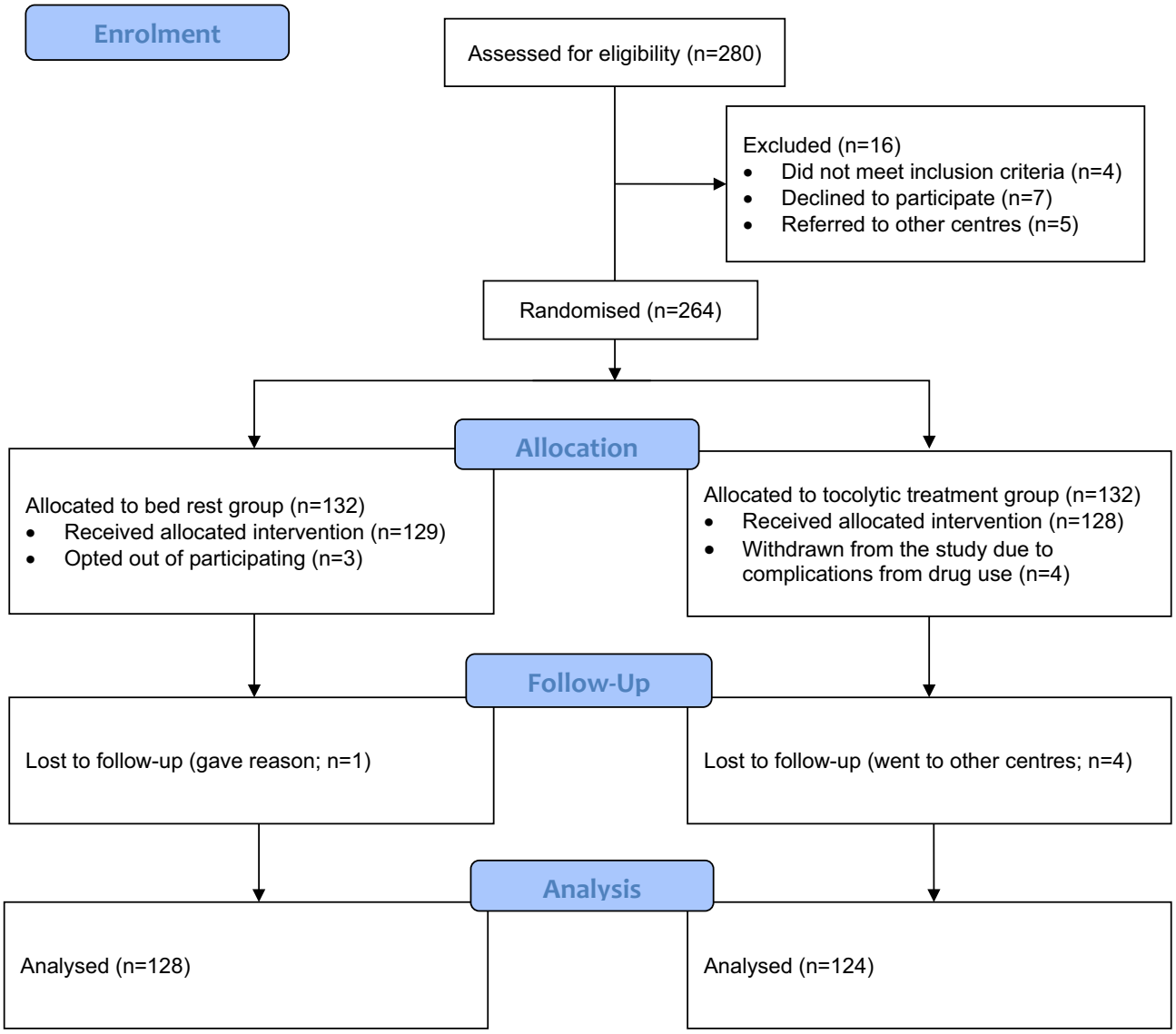

Figure 1 CONSORT 2010 flow diagram depicting participant recruitment, allocation and follow-up in the study.

activities; pharmacologic thromboprophylaxis was not routinely administered because women remained mobile and did not meet institutional criteria for prophylactic anticoagulation. Tocolytics are pharmacological agents used to temporarily suppress uterine contractions, typically for 48–72 hours, to allow administration of antenatal corticosteroids and, when necessary, transfer to a higher-level care facility. In our institution, first-line tocolytic therapy consisted of nifedipine or β-adrenergic agonists (eg, Bricanyl), with magnesium sulfate used as an alternative or second-line agent when clinically indicated. Tocolytic therapy was administered for short-term use, typically up to 48–72 hours, primarily to allow antenatal corticosteroid administration and clinical reassessment, in accordance with institutional practice.

Cervical length was assessed by transvaginal ultrasound at admission and re-evaluated every 8 hours while uterine contractions persisted, in accordance with the study protocol. Participants with a cervical length of 20 mm or greater were observed in hospital for at least one day; those with stable cervical measurements were subsequently discharged with follow-up care.

In the tocolytic treatment group, participants received tocolytics as deemed necessary by their physicians. Cervical length monitoring was performed similarly, on the basis of the clinical judgement of the attending physician.

https://doi.org/10.2147/IJWH.S576580

Digital vaginal examinations were avoided in both groups and were performed only when clinically indicated, such as in cases of suspected labour progression or rupture of membranes.

Fetal fibronectin testing was not used in this study, as it is not part of routine clinical practice at our institution during the study period; risk stratification was based primarily on transvaginal ultrasound measurement of cervical length.

Outcomes

The primary outcome was full-term delivery, which was defined as delivery at a gestational age of 37 weeks or more. The secondary outcomes were maternal and neonatal complications, types of tocolytics used and hospitalisation costs.

Sample Size Calculation

This study aimed to assess whether bed rest alone is non-inferior to tocolytic treatment in achieving full-term delivery among women with threatened preterm labour and a cervical length of 20 mm or greater. Previous data indicated a full-term delivery rate of 90% in women receiving tocolytic drugs. With a non-inferiority margin of 10%, a significance level (α) of 0.05 and a power ($1 - \beta$) of 80%, the required sample size was calculated to be 112 participants per group. All primary analyses were performed according to the intention-to-treat principle, with participants analyzed in the groups to which they were originally randomized regardless of treatment received.

To accommodate an anticipated loss to follow-up of approximately 15%, the sample size was increased to 132 participants per group, yielding 264 participants. This size ensured that the study was adequately powered to determine the non-inferiority of bed rest compared with tocolytic therapy.

Study Design and Ethics

This randomised controlled trial was conducted at Siriraj Hospital. The study protocol received approval from the Siriraj Institutional Review Board, Faculty of Medicine, Siriraj Hospital, Mahidol University (Si 924/2020). The trial was registered with the Thai Clinical Trials Registry (TCTR20200617001), 17/06/2020. Informed consent was obtained from all participants.

Participants

The study was conducted over a period spanning January 2021 to August 2024, with all research activities carried out in the labour room setting. Eligible participants were pregnant women aged 18 years or older, with gestational ages between 26 weeks and 36 weeks plus 6 days, who experienced preterm labour characterised by regular uterine contractions and a cervical length of 20 mm or more. The exclusion criteria were medical conditions requiring immediate intervention—such as infections, preeclampsia or placental complications—and prior receipt of tocolytic therapy.

Statistical Analysis

Statistical analyses were performed via IBM SPSS Statistics, version 25 (IBM Corp., Armonk, NY, USA). Continuous variables are expressed as means ± standard deviations for normally distributed data and as medians (ranges) for non-normally distributed data. The unpaired *t*-test was used to compare normally distributed continuous variables, whereas the Mann–Whitney *U*-test was applied for non-normally distributed data. Categorical variables are presented as frequencies and percentages, with comparisons made via the chi-squared test or Fisher's exact test, as appropriate.

A *p*-value of <0.05 was considered statistically significant. In the subgroup analyses, 95% confidence intervals (CIs) were calculated to evaluate differences between groups. Non-inferiority was concluded if the lower bound of the CI was greater than –10%.

Results

Participant Characteristics

Of the initial 264 participants, 128 women in the bed rest group and 124 in the tocolytic treatment group were included in the final analysis. The mean age was slightly greater in the tocolytic group (30.9 ± 6.2 years) than in the bed rest group

(29.4 ± 6.0 years), approaching statistical significance (p =0.055). Both groups had similar mean body mass indices of 26.9 kg/m^2 (p =0.969). Occupational status and income distribution did not differ significantly between the groups (p =0.938 and p =0.682, respectively). The gestational age at admission was similar between the groups (bed rest: 32.2 ± 2; tocolytic: 32.0 ± 2.2 weeks; p =0.851).

The prevalence of diabetes mellitus was significantly greater in the tocolytic group (25.0%) than in the bed rest group (11.7%, p =0.009). Multigravidity was also more common in the tocolytic group (55.6% vs 38.3%, p =0.008). The mean cervical length at admission was comparable between the groups (bed rest: 32.9 ± 7.4 mm; tocolytic: 32.8 ± 6.9 mm; p =0.924). A greater proportion of women in the tocolytic group received antenatal dexamethasone (79.0% vs 19.5%, p <0.001; Table 1).

Table 1 Demographic and Clinical Characteristics of Study Participants

Variables	Bed Rest (n=128)	Tocolytic Drug Use (124)	*p*-value
Age, y, mean (SD)	29.4 (6.0)	30.9 (6.2)	0.055
Body mass index, kg/m^2, mean (SD)	26.9 (4.6)	26.9 (4.8)	0.969
Occupation, n (%)			0.938
Housewife	20 (15.6%)	25 (20.2%)	
Employee	66 (51.6%)	60 (48.4%)	
Trade	8 (6.3%)	7 (5.6%)	
Government/State enterprise	19 (14.8%)	21 (16.9%)	
Private business	8 (6.3%)	5 (4.0%)	
Student	3 (2.3%)	2 (1.6%)	
Other	4 (3.1%)	4 (3.2%)	
Income, n (%), baht/mo			0.682
<5000	6 (4.7%)	6 (4.8%)	
5000–9999	8 (6.3%)	3 (2.4%)	
10,000–19,999	47 (36.7%)	45 (36.3%)	
20,000–49,999	55 (43.0%)	58 (46.8%)	
≥ 50,000	12 (9.4%)	12 (9.7%)	
Underlying disease, n (%)			
Diabetes mellitus	15 (11.7%)	31 (25.0%)	0.009
Gestational DM	14 (10.9%)	28 (22.5%)	
Overt DM	1 (0.8%)	3 (2.5%)	
Hypertension	7 (5.5%)	9 (7.3%)	0.613
Anemia	6 (4.7%)	8 (6.5%)	0.592
Gravida, n (%)			0.008
Primigravida	79 (61.7%)	55 (44.4%)	
Multigravida	49 (38.3%)	69 (55.6%)	
Cervical length at admission, mean (SD)	32.9 (7.4)	32.8 (6.9)	0.924
Cervical length at admission, n (%)			0.982
20.0–24.9 mm	14 (10.9%)	14 (11.3%)	
25.0–29.9 mm	32 (25.0%)	31 (25.0%)	
30.0–34.9 mm	40 (31.3%)	36 (29.0%)	
≥35 mm	42 (32.8%)	43 (34.7%)	
Gestational age at admission, mean (SD)	32.2 (2.1)	32.0 (2.2)	0.851
Tocolytic drug			
Bricanyl	–	89 (71.8%)	
Magnesium sulfate	–	34 (27.4%)	
Nifedipine	–	61 (49.2%)	
Pethidine	–	7 (5.6%)	
Antenatal dexamethasone administration, n (%)	25 (19.5%)	98 (79.0%)	<0.001

Notes: Unpaired *t*-test for normally distributed continuous data. Chi-squared test and Fisher's exact test for categorical data.

Delivery Outcomes

Compared with the tocolytic group, the bed rest group presented a significantly greater percentage of term deliveries (gestational age ≥ 37 weeks; 82.0% vs 58.5%, $p < 0.001$; Table 2). Subgroup analyses demonstrated that the bed rest group consistently achieved higher term delivery rates across various cervical length categories (25.0–29.9 mm and 30.0–34.9 mm) among primigravida and multigravida women and in participants without diabetes mellitus. The bed rest group also had better outcomes in terms of both vaginal and caesarean deliveries. However, no significant difference in term delivery rates was detected between women with diabetes mellitus in the two groups.

Maternal Outcomes

All women in the bed rest group delivered at Siriraj Hospital, and 95.2% of women in the tocolytic group delivered at the same facility ($p = 0.013$; Table 3). Vaginal delivery was significantly more common in the bed rest group (59.4%) than in the tocolytic group (39.0%, $p = 0.001$). Adverse maternal effects, particularly tachycardia, were significantly greater in the tocolytic group (23.7% vs 1.6%, $p < 0.001$). In the bed rest group, bed rest was provided exclusively in the hospital setting, with a median length of stay of 1 day (range, 1–12 days). The median length of hospital stay was shorter in the bed rest group (1 day, range 1–6) than in the tocolytic group (3 days, range 1–17, $p < 0.001$). Correspondingly, the median treatment cost was significantly lower in the bed rest group (5448.5 baht, range 1331.0–49,822.75) than in the tocolytic group (14,083.0 baht, range 760.0–185 733.75, $p < 0.001$).

Neonatal Outcomes

Compared with those in the tocolytic group, the neonates in the bed rest group had a significantly greater mean birthweight (2943.1 ± 478.0 g) than those in the tocolytic group (2730.4 ± 550.9 g, $p = 0.001$; Table 3). The Apgar scores at 1 minute were marginally higher in the bed rest group (median score of 8, range 2–10) than in the tocolytic group (median score of 8, range 1–10, $p = 0.013$). There were no significant differences between the groups in terms of neonatal complications such as respiratory distress syndrome, transient tachypnoea of the newborn, or the need for ventilatory support. The incidence of desaturation events was slightly greater in the bed rest group (3.9% vs 0%, $p = 0.061$), although

Table 2 Term Delivery Rates (Gestational Age ≥ 37 Weeks) by Intervention Group and Subgroup Analyses

Variables	Bed Rest (n=128)	Tocolytic Drug Use (118)	Difference (95% CI)	*p*-value
All subjects				
Term delivery, GA ≥37 wk	105 (82.0%)	69 (58.5%)	23.5% (11.6% to 34.8%)†	<0.001*
Subgroup by cervical length				
20.0–24.9 mm (n=26)	9 (64.3%)	6 (50%)	14.3% (–25.6% to 49.5%)	0.138
25.0–29.9 mm (n=61)	30 (93.8%)	19 (65.5%)	28.2% (5.7% to 48.8%)	<0.001*
30.0–34.9 mm (n=76)	35 (87.5%)	22 (61.1%)	26.4% (4.9% to 45.6%)	<0.001*
≥35 mm (n=83)	31 (73.8%)	22 (53.7%)	20.1% (–2.1% to 40.1%)	0.002*
Subgroup by parity				
Nulliparous (n=154)	76 (83.5%)	43 (68.3%)	15.2% (0.8% to 29.9%)	<0.001*
Parous (n=92)	29 (78.4%)	26 (47.3%)	31.1% (9.2% to 48.6%)	<0.001*
Subgroup by DM				
No (n=203)	97 (85.8%)	54 (60%)	25.8% (12.9% to 38.1%)	<0.001*
Yes (n=43)	8 (53.3%)	15 (53.6%)	–0.3% (–32.0% to 30.9%)	0.337
Subgroup by GA at admission				
GA <33 wk (n=99)	18 (72%)	39 (52.7%)	19.3% (–5.2% to 38.5%)	0.006*
GA ≥33 wk (n=147)	87 (84.5%)	30 (68.2%)	16.3% (0.8% to 33.3%)	<0.001*
Subgroup by type of delivery				
Vaginal (n =122)	65 (85.5%)	27 (58.7%)	26.8% (9.4% to 43.6%)	<0.001*
Cesarean section (n=124)	40 (76.9%)	42 (58.3%)	18.6% (0.5% to 34.4%)	<0.001*

Notes: Percentages are calculated using the number of participants with available gestational age at delivery data as the denominator. *Statistically significant for non-inferiority. †Non-inferiority was concluded for term outcome (lower bound of confidence interval was greater than –10%).
Abbreviations: DM, diabetes mellitus; GA, gestational age.

Table 3 Maternal and Neonatal Outcomes by Intervention Group

Variables	Bed Rest (n=128)	Tocolytic Drug Use (n=124)	*p*-value
Maternal outcomes			
Delivery at Siriraj Hospital, n (%)	128 (100%)	118 (95.2%)	0.013
Type of delivery, n (%)			0.001
Vaginal	76 (59.4%)	46 (39.0%)	
Cesarean section	52 (40.6%)	72 (61.0%)	
Tachycardia, n (%)	2 (1.6%)	28 (23.7%)	<0.001
Hypotension, n (%)	1 (0.8%)	3 (2.5%)	0.353
Hypokalemia, n (%)	2 (1.6%)	3 (2.5%)	0.673
LOS, median (range)	1 (1, 12)	3 (1, 91)	<0.001
Cost, baht, median (range)	5448.5 (1331.0, 49,822.75)	14,083.0 (760.0, 185,733.75)	<0.001
Neonatal outcomes			
Birthweight, mean (SD)	2943.1 (478.0)	2730.4 (550.9)	0.001
Apgar at 1 min, median (range)	8 (2, 10)	8 (1, 10)	0.013
Apgar at 5 min, median (range)	9 (4, 10)	9 (3, 10)	0.198
Sex, n (%)			0.322
Male	69 (53.9%)	71 (60.2%)	
Female	59 (46.1%)	47 (39.8%)	
Ventilator, n (%)	2 (1.6%)	4 (3.4%)	0.429
Respiratory distress syndrome, n (%)	0 (0%)	3 (2.5%)	0.109
Phototherapy, n (%)	22 (17.2%)	26 (22.0%)	0.338
TTNB, n (%)	15 (11.7%)	10 (8.5%)	0.400
Hypoglycemia, n (%)	3 (2.3%)	7 (5.9%)	0.202
Postnatal adaptation, n (%)	3 (2.3%)	6 (5.1%)	0.318
Birth asphyxia, n (%)	1 (0.8%)	4 (3.4%)	0.197
Desaturation, n (%)	5 (3.9%)	0 (0%)	0.061
Other, n (%)	13 (10.2%)	9 (7.6%)	0.512

Notes: Percentages are calculated using only participants who delivered at Siriraj Hospital, where complete maternal and neonatal outcome data were available. Unpaired *t*-test for normally distributed continuous data. Mann–Whitney *U*-test for non-normally distributed continuous data. Chi-squared test and Fisher's exact test for categorical data. Denominators differ from those in Table 2 because maternal and neonatal outcome data were available only for participants who delivered at Siriraj Hospital. Maternal and neonatal outcomes presented in Table 3 include only participants who delivered at Siriraj Hospital, as complete delivery and neonatal data were not available for women who delivered at other centres (n = 6 in the tocolytic group). Term delivery rates in Table 2 include all participants with available gestational age at delivery data, regardless of delivery location. Therefore, the denominators used for percentage calculations differ between Table 2 and Table 3.

Abbreviations: LOS, length of hospital stay; TTNB, transient tachypnea of the newborn.

this difference did not reach statistical significance. The rates of phototherapy for neonatal jaundice and transient tachypnea were similar between the two groups.

Maternal and neonatal outcomes presented in Table 3 include only participants who delivered at Siriraj Hospital, where complete outcome data were available, whereas term delivery rates shown in Table 2 include all participants with available gestational age at delivery data; therefore, the denominators used for percentage calculations differ between the two tables.

Discussion

This randomised controlled trial aimed to determine whether bed rest alone is non-inferior to tocolytic therapy in women with threatened preterm labour and a cervical length of 20 mm or greater. Our findings demonstrate that bed rest alone was sufficient and effective in this low-risk population, with a higher proportion of term deliveries, fewer caesarean sections, lower use of antenatal corticosteroids, fewer maternal adverse effects, and substantially lower healthcare costs compared with tocolytic treatment. These results directly address our research question and support our initial hypothesis that pharmacological intervention may be unnecessary in women with threatened preterm labour who do not have a shortened cervix.

To our knowledge, this is one of the first randomised controlled trials evaluating cervical length–guided conservative management using a 20-mm threshold, providing evidence that pharmacologic intervention may be safely avoided in a substantial proportion of women with threatened preterm labour.

The observed benefits of bed rest likely reflect more appropriate risk stratification using cervical length measurement. Cervical length is a well-established predictor of spontaneous preterm birth, and women with a cervical length of ≥25 mm generally have a low risk of imminent delivery; however, our findings suggest that women with cervical lengths ≥20 mm also represent a relatively low-risk population suitable for conservative management. In this context, the routine use of tocolytic drugs may expose women to avoidable adverse effects without improving pregnancy outcomes. Our findings suggest that conservative management reduces unnecessary medical interventions while maintaining maternal and neonatal safety.

Although maternal age was slightly higher in the tocolytic group and approached statistical significance, this difference is unlikely to be clinically meaningful. The absolute difference between groups was small and remained within the typical reproductive age range. Importantly, maternal age was not associated with the primary outcome of term delivery in subgroup analyses. Therefore, this finding is unlikely to have influenced the observed differences in maternal or neonatal outcomes and should be interpreted as a baseline variation rather than a clinically relevant factor.

Previous studies have consistently shown that cervical length measurement is a reliable predictor of preterm birth risk and an effective tool for guiding management decisions. Although a cervical length threshold of 25 mm is widely used to identify women at low risk,[9,10] our study specifically evaluated a 20-mm threshold and demonstrated that women above this level had similarly low risks of adverse outcomes. These findings suggest that a slightly lower threshold may also identify a population in whom conservative management is appropriate and support the use of cervical length–guided strategies to reduce unnecessary tocolytic therapy, maternal adverse effects,[11] and healthcare costs.

The management of threatened preterm labour is crucial, particularly since fewer than 10% of women with this condition deliver within 7 days of their initial assessment. This statistic underscores the importance of precise diagnostic tools, such as cervical length measurement, which has been shown to enhance clinical decision-making and perinatal outcomes while minimising unnecessary interventions.[12]

Bed rest serves as a non-invasive intervention that can alleviate the physical stress of preterm labour while allowing careful monitoring of maternal and foetal conditions. By employing bed rest in patients with cervical lengths ≥20 mm, healthcare providers can significantly reduce the costs associated with unnecessary hospitalisations and pharmacological treatments.

A cervix measuring less than 25 mm may suggest an increased risk of preterm birth.[13] A cervical length under 25 mm before 28 weeks of gestation is considered abnormal and is linked to a greater likelihood of preterm birth.[9] Our study also revealed that women with a cervical length under 25 mm who experience contractions have twice the risk of preterm birth compared with those without contractions, highlighting the importance of careful monitoring and risk stratification.[9]

Research has demonstrated that bed rest alone effectively manages contractions in women with a cervical length of 30 mm or greater, thereby minimising the need for invasive interventions.[14] Traditionally, tocolytic drugs are not recommended for women who do not have a short cervix.[9,15]

Implementing a strategy that prioritises bed rest for patients with a cervical length above 25 mm can lead to earlier recognition and management of potential complications. This proactive approach may prevent issues associated with preterm birth, such as maternal morbidity and early interventions, thus enhancing overall maternal and fetal health outcomes. Our findings suggest that while tocolytics can be essential in managing threatened preterm labour, their use should be judicious, particularly considering potential side effects that could complicate a patient's condition.[16]

Tsoi et al reported that women with a cervical length of ≥ 15 mm had a very low risk of delivery within 7 days, whereas 37% of those with a cervical length < 15 mm delivered within that timeframe. Cervical length < 15 mm was the only significant predictor of preterm delivery, making it a valuable tool for distinguishing between true and false labour in threatened preterm cases.[17]

Our study revealed that 79% of participants in the tocolytic treatment group received antenatal corticosteroids (p <0.0001), indicating potential overprescription. Additionally, these drugs were often prescribed to women with a low risk of preterm delivery, specifically, those with a cervical length between 10–30 mm and a negative fetal

fibronectin test or those with a cervical length greater than 30 mm. This finding highlights the need to optimise antenatal corticosteroid utilisation in these low-risk populations to prevent unnecessary treatments.[18]

Serial ultrasounds during bed rest can be used to monitor cervical length and prevent the overuse of drugs for labour inhibition. In women discharged after their initial episode of threatened preterm labour, serial cervical length measurements can effectively predict the risk of spontaneous preterm birth. The predictive value of cervical length cut-off points is similar across gestational ages, but after 32 weeks, a higher false positive rate may warrant gestational age-specific cut-offs. For women admitted before 32 weeks, a cervical length of 25 mm predicts a low risk of preterm delivery, whereas a 15 mm cut-off is more suitable for those admitted at or after 32 weeks.[19] Our study used a cut-off of 20 mm, which was not significantly different from the cut-off of 25 mm for the prediction of preterm birth.

Moreover, women who have a cervical length of less than 10 mm at hospital discharge or within 4 weeks post-discharge face a significantly greater risk of spontaneous preterm birth before 37 weeks. This situation underscores the importance of cervical length monitoring in stratifying risk and optimising care for women with threatened preterm labour.[20]

Our previous study[21] revealed that bed rest is comparable to pharmacological interventions, such as nifedipine and Proluton-Depot (hydroxyprogesterone hexanoate), for inhibiting contractions in threatened preterm labour. While nifedipine achieved contraction inhibition more rapidly than bed rest and Proluton Depot did, the effectiveness of bed rest as a non-invasive option highlights its potential as a valuable alternative in managing preterm labour.

Frequent cervical assessments during tocolytic treatment may contribute to an increased likelihood of initiating labour. Regular monitoring may stimulate contractions, leading to earlier labour onset.[22] The frequency of vaginal examinations for assessing cervical progression increases as labour duration extends, with over half of women undergoing three or more examinations.[23] Manipulating or stretching the cervix during an examination can stimulate uterine contractions, likely due to the release of oxytocin from the posterior pituitary gland, which may hasten delivery.[24]

In summary, prioritising bed rest for women with cervical lengths above 20 mm who are diagnosed with threatened preterm labour optimises resource utilisation. It also promotes maternal safety by avoiding unnecessary medication-related complications and early delivery. Refining clinical protocols to integrate conservative management strategies can improve the quality of care for at-risk populations, ultimately leading to better maternal and neonatal outcomes.[25]

From an implementation perspective, cervical length–guided management can be operationalised using a standardised protocol that includes transvaginal cervical length assessment at admission, repeat evaluation when contractions persist, and conservative inpatient observation for women with cervical lengths ≥20 mm who remain clinically stable Clinical outcomes such as term delivery rates, use of tocolytic therapy, antenatal corticosteroid exposure, and hospitalisation costs can be monitored prospectively to evaluate the effectiveness of this approach following implementation. Such protocol-driven management provides measurable indicators that may support integration into institutional clinical practice guidelines.

Strengths of the Study

The main strength of this study is its randomised controlled trial design, which minimises bias and allows for a robust comparison between treatment groups. Additionally, the prospective nature of the study ensures that data collection is timely and accurate. With a large sample size, the study increases the power to detect differences between interventions, leading to more reliable and generalisable results.

Limitations of the Study

One limitation is the potential for variability in clinical practices across different centres, which may affect the consistency of interventions. Additionally, heterogeneity in the type of tocolytic agents used in the intervention group may represent a potential confounding factor, as treatment selection followed institutional clinical practice rather than a single standardized regimen; however, this variability reflects real-world management and the consistency of outcomes across subgroup analyses suggests that the primary conclusions remain robust. Fetal fibronectin testing was not incorporated into the study protocol because it is not routinely used in our hospital; however, cervical length measurement alone has been shown to be a reliable tool for identifying women at low risk of imminent preterm birth. Another limitation is that the study focused on short-term outcomes, with limited data on long-term neonatal or maternal consequences. Finally, reliance on cervical length measurements alone may not capture all factors influencing preterm

labour outcomes. Future studies with longer follow-up are needed to evaluate potential long-term maternal and neurodevelopmental outcomes associated with cervical length–guided management strategies.

Conclusions

Our study highlights the importance of individualised management in women with threatened preterm labour. Specifically, we found that bed rest alone can be a viable and effective approach in women with a cervical length of 20 mm or more, potentially reducing the need for tocolytic drugs. This result is particularly relevant as tocolytic drugs can lead to maternal complications, and their overuse in women with a low risk of preterm delivery may result in unnecessary interventions. By focusing on careful assessment and monitoring of cervical length, we can avoid over-treatment, reduce maternal complications, and lower healthcare costs while still effectively managing threatened preterm labour. While neonatal outcomes were generally reassuring, these findings should be interpreted cautiously given the study's focus on short-term outcomes. This tailored approach supports cervical length–guided management as a strategy to optimise resource utilisation and maintain maternal and neonatal safety in women who may not require aggressive interventions.

Data Sharing Statement

The data from this study will be made available upon reasonable request, following publication, for use in related research within two years of study completion. Researchers may contact Saifon Chawanpaiboon at saifon.cha@mahidol.ac.th.

Ethics and Consent Statements

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee (Si 294/2020) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Written informed consent was obtained from the study participants.

Acknowledgments

The authors thank the Faculty of Medicine Siriraj Hospital, Mahidol University, for their continuous encouragement and administrative support, particularly Ms Warapohn Kaewcharoen and Ms Nattacha Palawat for their assistance throughout the study. We are also grateful to Mr. David Park for his professional English editing of the manuscript.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Funding

This study was supported by the Faculty of Medicine Siriraj Hospital, Mahidol University (Grant number [IO] R016433003), which also provided financial support for manuscript editing.

Disclosure

The authors report no conflicts of interest in this work.

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