

Literature Review: Relationship of Uterine Contractions with the Event of the First Stage of the Prolonged Active Phase

Mareti¹, Lina Mustika², Haryati³, Desty Furwanty⁴, Eka Yuanita Ratna Sari⁵, Kartika Sari⁶

¹Bachelor of Midwifery Program, Universitas Ngudi Waluyo, maretiarpan@gmail.com
²Bachelor of Midwifery Program, Universitas Ngudi Waluyo, yumnazayn18@gmail.com
³Bachelor of Midwifery Program, Universitas Ngudi Waluyo, haryatisusanto@gmail.com
⁴Bachelor of Midwifery Program, Universitas Ngudi Waluyo, destyfurwanty94@gmail.com
⁵Bachelor of Midwifery Program, Universitas Ngudi Waluyo, yuaniaeksars@gmail.com
⁶Bachelor of Midwifery Program, Universitas Ngudi Waluyo, kartikasari@unw.ac.id
Email Correspondence: yuaniaeksars@gmail.com

Article Info	Abstract
Article History Submitted, 2026-04-12 Accepted, 2026-05-19 Published, 2026-06-30	Labor and delivery are physiological events that almost all women will experience. However, mortality and morbidity in women giving birth are a major problem in developing countries. Approximately 76% of maternal deaths occur during labor. In 2025, the Maternal Mortality Rate (MMR) in Indonesia was recorded at 189 deaths per 100,000 live births. This figure places Indonesia as the country with the second highest MMR in the Southeast Asia region, only below Timor Leste, and is still far from the Sustainable Development Goals (SDGs) target of MMR below 70 per 100,000 live births by 2030. (1). Detection of uterine contractions through manual palpation shows limited accuracy, so a more objective monitoring method is needed. There are several factors that cause maternal death, one of which is prolonged labor, where prolonged labor causes an average of 8% of maternal deaths worldwide and 9% in Indonesia. Prolonged labor can have negative consequences for both the mother and the baby. The aim of this study was to determine the relationship between uterine contraction characteristics and the length of the first stage of labor during the active phase. The research method used in this literature review was a search of articles through two major electronic databases: PubMed and Google Scholar. The search process was conducted between 2021 and 2025. The conclusion of his studi was Based on the analysis of six selected articles, it can be concluded that the characteristics of uterine contractions (Uterine Contractions) have a significant and strong correlation with the occurrence of prolonged active phase of the first stage of labor
Keywords: Prolongedlabor, first stage of labor, active phase of labor, uterine inertia	

Introduction

Labor and birth are physiological events that almost all women will experience. However, despite the physiological nature of delivery, mortality and morbidity in women giving birth are major problems in developing countries (Hernawati, 2018). The delivery period is a critical period for a mother-to-be. Complications and complicating factors are risk factors for maternal death (Soviyati, 2016). Based on the 2022, the Maternal Mortality Rate (MMR) in Indonesia was recorded at 189 deaths per 100,000 live births. Uterine Contractions figure places Indonesia as the country with the second highest MMR in the Southeast Asia region, only below Timor Leste, and is still far from the Sustainable Development Goals (SDGs) target which sets the MMR below 70 per 100,000 live births by 2030.

There are several factors that cause maternal death, one of which is prolonged labor, where prolonged labor causes an average of 8% of maternal deaths worldwide and 9% in Indonesia. Prolonged labor can have a negative impact on both the mother and the baby. There are several factors that influence the length of labor, one of which is Uterine Contractions (uterine muscle contractions). The main physiological force during labor is uterine contractions. Uterine Contractions is a rhythmic wave of contractions of the smooth muscle of the uterine wall that begins in the uterine fundus area, the beginning of the wave is obtained from the pacemaker located in the uterine wall which under normal conditions leads to the cervical canal area (birth canal) which opens, to push the contents of the uterus out. If Uterine Contractions during labor is inadequate, it will trigger a prolonged labor (Nisa, 2016).

A significant problem in Indonesia is the maternal mortality rate, which is still quite high according to the 2022 Indonesian Health Profile. The maternal mortality rate in Indonesia in 2022 was 3,572, the number of maternal deaths collected from the recording of maternal and child nutrition and health programs at the Ministry of Health tends to increase every year, but decreased in 2022 compared to 2021, which was 7,389. Although there has been a decrease in maternal mortality, efforts are still needed to accelerate the reduction of MMR to achieve the SGD's target of 70 per 100,000 live births in 2030 (Indonesian Health Profile 2022, T.T.)

Death during childbirth can be caused by contraction abnormalities. Contraction abnormalities such as uterine inertia, hypertonic contractions, hypotonic contractions, and incoordinate uterine action can result in prolonged latent and active phases in the first stage of labor. The impact of Uterine Contractions on the mother is the occurrence of intrapartum infection, uterine rupture, fistula formation, pelvic floor muscle injury (Renata & Tadjudin, 2023).

While in the fetus, it has the potential to cause caput succedaneum and fetal head molasses and can even result in skull fractures if labor management is not carried out properly (Saifudin A. B, 2009). Complications in the labor process include uterine inertia, prolonged or prolonged labor, placental retention and postpartum bleeding can be caused by abnormalities in uterine contractions known as uterine inertia which is stated as a failure of the contraction mechanism and the process of retraction of uterine muscle fibers as a result of impaired myometrial function, Uterine Contractions condition is the main cause of postpartum bleeding (Ibrahim & Surya Indah Nurdin, n.d.)

On the partograph, cervical dilation can be seen shifting to the right of the alert line. Risk factors such as a Uterine Contractions history of preeclampsia require intensive monitoring by medical personnel, including routinely checking the mother's vital signs and fetal heart rate to prevent dehydration or acidosis. A thorough evaluation is also necessary to confirm the patient's progress to labor, detect any malfunctioning uterine contractions, and identify potential cephalopelvic disproportion.

Prolonged labor is one of the causes of maternal and fetal death. Prolonged labor can cause infection, exhaustion, dehydration, and postpartum hemorrhage, which can lead to maternal death (Amirrudin, 2007). Infection, injury, and asphyxia can occur in the fetus, which can increase infant mortality (Yuwansyah, 2019).

In cases of prolonged labor, the mother and baby experience distress and increase the risk of infection because it can cause increased interventions and the risk of postpartum hemorrhage and uterine atony. Complications of prolonged labor include uterine atony, lacerations, bleeding, infection, maternal fatigue and shock, asphyxia, cerebral trauma, injuries due to extraction and rotation procedures, where these complications contribute to high mortality, both maternal and infant mortality (Halimatussakdiah, 2017).

Prolonged labor remains a problem in Indonesia and Uterine Contractions condition causes morbidity and maternal mortality rates to remain high. Therefore, as a form of researcher's contribution in efforts to reduce maternal mortality rate (MMR) and maternal mortality rate (AKB), the author is interested in conducting research with the title "The Relationship Between Uterine Contractions Characteristics and Length of Labor".

The first stage of labor begins with uterine contractions and cervical dilation until it reaches full dilation (10 cm). The first stage of labor lasts 18-24 hours and is divided into two phases, namely the latent phase and the active phase. (Kurniarum, 2016). A prolonged active phase can be diagnosed by assessing signs and symptoms, namely cervical dilation passing the right alert line on the partograph. The active phase is declared prolonged with the criteria of lasting more than 12 hours in primigravida and more than 6 hours in multigravida, and a cervical dilation rate of less than 1.5 cm per hour. Uterine Contractions can be considered the presence of uterine inertia if the frequency of contractions is less than 3 contractions per 10 minutes and lasts less than 40 seconds, cephalopelvic disproportion is diagnosed if the cervical dilation and the descent of the presented fetal part do not progress, while contractions are good.

Power in Uterine Contractions case is Uterine Contractions, a force that can influence the occurrence of labor. One of the forces that plays a role in pushing the fetus during labor is Uterine Contractions. Uterine Contractions is a contraction of the uterine muscles during labor. The nature of good and perfect Uterine Contractions is symmetrical contractions, dominant fundus (the highest strength is in the uterine fundus). The presence of contractions is followed by relaxation and with each Uterine Contractions causes changes in the cervix, namely thinning and opening. Uterine Contractions means that Uterine Contractions plays an important role in helping the fetal head descend so that there is no prolonged labor. (Wijayanti, 2019) Uterine Contractions that is not normal in strength or nature causes complications in the birth canal which is common in every labor with less energy from the mother giving birth, so that labor experiences obstacles or congestion (Kurniarum, 2016). The classification of Uterine Contractions in Uterine Contractions study is divided into 3, namely: 1 = <20 mmHg 2 = 20 - 40 mmHg 3 => 40 mmHg.

Methods

Uterine Contractions research employed a literature review method, collecting, reviewing, and analyzing scientific journals relevant to the research topic. The Systematic Literature Review (SLR) approach was used to ensure comprehensive, structured, and objective results. Article searches were conducted through two major electronic databases: PubMed and Google Scholar. The search process was conducted between 2021 and 2025. PubMed: Used to search biomedical and health science journals using MeSH Terms (Medical Subject Headings) for more specific results. Google Scholar: Used to search a broader range of literature, including national and international journals (in English and Indonesian). Keywords were compiled based on the PICO framework (Population, Intervention, Comparison, Outcome) or the main research concept.

The journal selection process was carried out using the following stages (adapting the PRISMA guidelines): 1) Identification: Initial search in PubMed and Google Scholar, 2) Screening: Removal of duplicate articles (using a reference manager such as Mendeley/EndNote), 3) Eligibility: Reading abstracts and titles to ensure they meet the inclusion criteria, 4) Inclusion: Reading full text and selecting journals for final analysis.

Data extracted from selected journals includes: Author Name, Year of Publication, Title, Research Method, and Main Findings. Articles are analyzed using thematic or descriptive methods to answer the research questions, then synthesized into a comprehensive conclusion.

Results and Discussion

A literature review was conducted on 6 selected articles. The publications ranged from 2021 to 2025. The results of the journal analysis are presented in Table 1 as follows:

Table 1. Results of Journal Analysis

No	Research	Method	Results
1.	The Relationship Between Uterine Contractions Characteristics and Length of Labor at PMB Ngudi Saras Ngringo, Jaten, Karanganyar” N Kadek Sep, Yeni Anggraini, Suwarnisih 2023.	Quantitative analytic observational study with retrospective approach using secondary data and Chi-square analysis.	The study showed a significant relationship between uterine contractions and labor duration (p-value = 0.000). Adequate contractions contributed to normal labor progression, while weak contractions increased the risk of prolonged labor.
2.	Analysis of Risk Factors for Unprogressed Labor in Women Giving Birth in Lubuk Bayas Village, Perbaungan District, Serdang Bedagai Regency, North Sumatra Province" Fia Apriani, Juliana Munthe, Nurlela Fitria, Miranda Hutagaol, Isria Helena Sinurat, Ita Purnama, Mutia Arinti 2025.	Quantitative descriptive study using survey and questionnaire methods based on the 5P labor factors concept.	Most mothers experienced ineffective uterine contractions, contributing to non-progressive labor. Maternal education, occupation, and labor power factors influenced labor progression.
3.	Detection of Uterine Contractions in Women in the First Stage of Labor in the Active Phase Using Uterine Electromyography" Pratiwi, Melyana Nurul Widyawati, Kurnianingsih 2024.	Systematic review of articles from ProQuest, Scopus, ScienceDirect, Sage Journal, and Google Scholar.	Uterine electromyography was more sensitive and objective in detecting uterine contractions compared to manual palpation or tocodynamometer methods. Frequency and intensity of contractions increased approaching the second stage of labor.
4.	Factors Associated with the Incidence of Prolonged Labor in Women Giving Birth at Djoelham Binjai Regional Hospital" Galuh	Quantitative cross-sectional retrospective study.	Weak uterine contractions, cephalopelvic disproportion (CPD), and fetal weight were significantly associated with prolonged labor (p-value < 0.05).

Pravita Sari Sembiring, Erin Padilla Siregar 2023.			
5.	Identification of Factors Influencing Long First Stage of Labor: A Literature Review” Ayuning Tias Budi Lestari, Hapi Apriasih 2025.	Literature review using journal analysis and Duffy’s Research Appraisal Checklist Approach.	Factors influencing prolonged first stage of labor included parity, maternal fitness, and ineffective uterine contractions. Weak contractions delayed cervical dilation and fetal descent.
6	Factors Associated with Prolonged First Stage of Labor at Larangan Community Health Center, Fatkhan Syuhada, Yektingtyastuti 2025.	Quantitative analytical study with retrospective case-control design.	Irregular and weak uterine contractions were significantly related to prolonged first stage labor (p-value = 0.000). Adequate contractions were essential for effective cervical dilation and labor progress.

According to the results of the analysis of the journals we collected, it was found that there was a significant influence of Uterine Contractions on the occurrence of prolonged first stage in the active phase in facing the labor process. In the first journal, according to N Kadek Sep, Yeni Anggraini, Suwarnisih (2023), there is a relationship between contractions and the duration of labor. One of the forces that plays a role in pushing the fetus during labor is contractions. Contractions are contractions of the uterine muscles during labor. The characteristics of good and perfect contractions are symmetrical contractions, dominant fundus (the highest strength is in the uterine fundus). The presence of contractions is followed by relaxation and with each contraction causes changes in the cervix, namely thinning and opening. Uterine Contractions means that contractions have an important role in helping the descent of the fetal head so that there is no prolonged labor. The process of labor that is long indicates a prolongation of the first stage. The cause is the cervix fails to fully open within a reasonable period. The strength of contractions can be influenced by factors such as age, parity, labor management, labor induction, and fear and anxiety (Oxorn 2010; Purwaningsih & Siti,2010).

In the second journal according to Fia Apriani, Juliana Munthe, Nurlela Fitria, Miranda Hutagaol, Isria Helena Sinurat, Ita Purnama, Mutia Arinti (2025). The majority of mothers experience ineffective uterine contractions (80%), which causes the labor process to take longer or not progress. Uterine Contractions is a factor for labor not progressing. Study by Suharmi (2023). Test Results and Discussion Uterine Contractions study was conducted to identify risk factors that contribute to the occurrence of labor not progressing in mothers giving birth in Lubuk Byas Village, Perbaungan District, Serdang Begadai Regency, North Sumatra Province. Uterine Contractions study uses a descriptive approach because all samples are cases of labor not progressing. Therefore, the analysis was carried out univariately on each risk factor. Conclusion Most mothers giving birth with labor not progressing are in the 20-35 year age group, namely 66.7%. Most respondents have a basic education level (60%). Low levels of education can affect a mother's ability to understand information about danger signs in labor and the importance of prenatal checkups. The majority of mothers giving birth are housewives (73.3%). Employment can affect a family's economic status and access to health services.

In the third journal according to Pratiwi, Melyana Nurul Widyawati Kurnianingsih (2024) based on the results of the study, it was found that Uterine electromyography is able to detect the electrical activity of uterine muscles during contractions with high accuracy, showing patterns of frequency, duration, interval, and action potential that increase approaching the second stage of labor. Uterine Contractions technology is proven to be more sensitive than a tocodynamometer in detecting contractions. Based on several literatures that have been systematically reviewed, it can be concluded that uterine contractions in women in labor can be detected using uterine electromyography based on the electrical measurement of uterine muscles during contractions an it is hoped that it can be further developed so that a more accurate and easy-to-use uterine contraction detection tool is obtained. Uterine Contractions study only examines the measurement results of uterine contractions based on the electrical activity of uterine muscles using uterine electromyography. Furthermore, it is necessary to explain the components and how to use the uterine electromyography tool.

In the fourth journal according to Galuh Pravita Sari Sembiring, Erin Padilla Siregar (2023). The design of Uterine Contractions study was carried out with a cross-sectional approach. The sample in the study was mothers who had given birth who experienced prolonged labor at Djoelham Binjai Regional Hospital in 2023. The proportion of respondents who had prolonged labor due to weak labor <20' was 12 (40%), respondents who had prolonged

labor due to CPD with the No CPD category were 13 (43.3%), respondents who did not have prolonged labor due to weight with the Weight Category > 4000 grams were 12 (40%). The results (p value = $0.030 < 0.05$) which means that Uterine Contractions study shows that there is a significant relationship between Uterine Contractions, CPD and Baby's Weight with Long Labor at Djoelham Binjai Regional Hospital. The strength and weakness of the contractions during the labor process greatly influence the speed or length of labor. It is hoped that respondents will be more active in checking their pregnancies so that long labor does not occur by health workers either at the integrated health post or other health service facilities.

In the fifth journal, Ayuning Tias Budi Lestari and Hapi Apriasih (2025) stated that one of the forces that plays a role in pushing the fetus during labor is contractions. Contractions are contractions of the uterine muscles during labor. A good and perfect contraction is characterized by symmetrical contractions with a dominant fundus (the highest strength is in the uterine fundus). Contractions are followed by relaxation, and each contraction causes changes in the cervix, namely thinning and opening. Uterine Contractions means that contractions play an important role in helping the fetal head descend, preventing prolonged labor. Uterine inertia is a contraction that is weak, shorter, and less frequent than normal contractions. Uterine inertia is divided into primary uterine inertia and secondary uterine inertia, Primary uterine inertia is a contraction disorder that occurs since the beginning of labor, while secondary uterine inertia is a contraction disorder that occurs since the presence of strong, regular contractions and for a long time. The contractions are said to be adequate or normal if the contractions occur 3 times in 10 minutes and last 40 seconds or more, conversely, the contractions are said to be weak if the contractions last less than 3 times in 10 minutes and last less than 30 seconds. A long labor process indicates an extension of the first stage. The cause is that the cervix fails to open fully within a reasonable time. The strength of the contractions can be influenced by factors such as age, parity, labor management, labor induction, and fear and anxiety.

In the sixth journal, the results of the study on labor contraction factors showed that in the case group, most had irregular labor contractions, while in the control group, most had regular contractions. There was a significant relationship between labor contractions and the occurrence of prolonged first stage of labor at the Larangan Health Center. According to researchers, labor contractions are one of the determining factors whether labor will proceed normally, spontaneously, or will be complicated. Mothers with weak or inadequate first stage labor contractions are mostly unable to continue to the second stage of labor. Adequate labor contractions are a major factor in the process of cervical dilation during the first stage phase. If contractions are weak, irregular, or inadequate, the cervical opening process will be slow, thus prolonging the duration of the first stage. Inadequate contractions can also interfere with fetal descent and increase the risk of dystocia. Conversely, strong, regular, and progressive contractions will encourage the labor process to proceed more quickly and efficiently. Therefore, the quality of labor contractions is an important indicator in assessing the progress of labor and can directly affect the duration of the first stage of labor.

Mustaghfiroh (2022) stated that for labor to run smoothly, good labor contractions and maternal pushing power are needed, therefore, during the labor process, it is very important to monitor the frequency and duration of contractions. The results of Uterine Contractions study are in line with the research of Susilowati (2021) which explains that weak labor contractions are a risk factor for prolonged first stage of labor because power is one of the main factors in labor, the results of the Uterine Contractions square test showed a p value = 0.000. The results of Uterine Contractions study are also in line with the results of the study of Juhasova (2020) which stated that there is a relationship between Uterine Contractions contractions and prolonged first stage of labor at the University Hospital of Zurich, Switzerland with a p value = 0.001.

Prolonged labor is a prolonged labor due to delayed labor progress. Prolonged labor lasts more than 24 hours in primigravidas and more than 18 hours in multigravidas. Prolonged labor, with a prolonged active phase, can have adverse effects on both the mother and the fetus. The purpose of Uterine Contractions study was to conduct a literature review on factors influencing the occurrence of prolonged labor in the first stage of labor.

Labor and birth are physiological events that almost all women experience. However, mortality and morbidity among women in labor are a major problem in developing countries. Approximately 76% of maternal deaths occur during labor. Several factors contribute to maternal death, including prolonged labor, which accounts for an average of 8% of maternal deaths globally and 9% in Indonesia. Prolonged labor can have detrimental effects on both the mother and the baby.

Prolonged first stage of labor is labor that lasts >14 hours in primiparas and >12 hours in multiparas without cervical dilation exceeding the partograph alert line. Uterine Contractions condition can be observed in the latent phase of stage 1, when the latent phase lasts more than 8 hours with cervical dilation remaining 3–4 cm (Dwi et al., 2021). Prolonged first stage of labor can increase the risk of complications for both mother and baby. Several influencing

factors include maternal age, parity, pregnancy spacing, strength of labor contractions, maternal education, and medical care during labor (Maria, 2022).

Conclusion

Based on the analysis of six selected articles, it can be concluded that the characteristics of uterine contractions (Uterine Contractions) have a significant and strong correlation with the occurrence of prolonged active phase of the first stage of labor. Adequate contractions characterized by progressive frequency, duration, and intensity are the primary drivers of cervical dilatation and fetal head descent. Conversely, weak uterine contractions (uterine inertia) are the leading cause of cervical failure within the timeframes established by the partograph. The quality of uterine contractions is influenced by multifactorial elements, including maternal age, parity, labor management, and psychological factors. Given the high risk of morbidity associated with prolonged labor, more objective and accurate monitoring methods beyond manual palpation are required. Early detection of contraction abnormalities is crucial for healthcare providers to determine appropriate interventions, ultimately reducing maternal and neonatal mortality rates caused by childbirth complications.

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