



## RESEARCH ARTICLE

## Effectiveness Of The Application Of Respectful Midwifery Care On Prostaglandin (Pge2) Levels And Maternal Pain Perception Level In Normal Childbirth

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## ABSTRACT

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Childbirth is a natural but painful process that often results in psychological changes and adversely affects the continuation of normal childbirth. Treatment that is contrary to women's rights during childbirth and the situation of medical facilities has developed into a global issue as a contributor to maternal mortality. Therefore, it is necessary to have an approach to implementing midwifery care that prioritizes women's rights and respectful care without discrimination, as summarized in *Respectfully Midwifery Care* (RMC). This study aims to determine the effectiveness of *Respectful Midwifery Care* on prostaglandin (PGE2) levels and maternal pain perception in normal childbirth. The research uses an experimental quasi-ex design with a control group design. The sample of normal maternity mothers with term pregnancies (a term) did not suffer from complications or complications of pregnancy and childbirth, with a sample of 98 maternity mothers. The study showed a difference in prostaglandin (PGE2) levels and pain adaptation ability in mothers who were helped by midwives who RMC had trained with a value of  $p > 0.05$ . RMC affects prostaglandin levels (PGE2) and the level of pain perception of maternal pain.

## INTRODUCTION

Giving birth is one of the most extraordinary moments in a woman's life (1). This is a natural procedure where a mother gives birth to her child and starts a new life (2). Although labor is often painful and stressful, there are many beautiful things about it (3). A woman experiences enormous physical and psychological changes during labor (4). After carrying a fetus for nine months, the body will change to give birth to the little one (5). A natural component of the birthing process is

experiencing labor pain. Uterine solid contractions, pelvic dilatation, and significant hormonal changes are part of this phase that cause pain (6). The series of physiological processes known as labor lasts an average of 40 weeks (280 days), starting from the first day of the last menstrual cycle (7).

During labor, the human body produces several main hormones that regulate the progress of labor and birth and influence the perception of pain, namely oxytocin, beta-endorphin, and adrenaline. The production of these three hormones is greatly influenced by the emotional state of the woman giving birth; therefore, relaxation is essential in controlling labor pain (8).

Prostaglandins are a group of endogenously produced compounds essential in regulating human physiology. Prostaglandins of synthetic origin can be used to modulate various processes in the body, including facilitating labor (9). Prostaglandins help soften and dilate the cervix, allowing the baby to exit the uterus (10). In addition, prostaglandins are also involved in stimulating uterine muscle contractions, which cause intense pain during the birth process (11).

Every woman hopes for a painless birth; however, this pain is necessary for the birth of the baby (12). As a subjective experience, labor pain is often associated with tissue injury that is occurring or will occur. Various reasons, including pelvic floor muscle tension, uterine muscle contractions, and psychological disorders, may cause labor discomfort (13).

Several factors can trigger anxiety in mothers giving birth, including a history of previous births, which can be a traumatic event if the mother has had a negative experience. The quality of public health services can be one of the triggers for negative experiences during the birthing process, one of which is disrespectful and rude attitudes towards women when they give birth, which violates the fundamental rights of the mother, baby, and family.

Due to the possible impacts, every woman has the right and needs quality care during childbirth. To support this, the *World Health Organization* (WHO) issued recommendations in 2018 focusing on the quality of interactions between women and medical personnel. It is hoped that during the birthing process, medical personnel will uphold the dignity of women while providing necessary information and emotional support (14)

The above concept is the most effective method midwives implement to help reduce maternal mortality, which can be summed up in one concept, namely *Respectful Midwifery Care (RMC)* (15). *Respectful Midwifery Care (RMC)* has been recognized as an essential tactic for improving the standard and accessibility of maternity care. Midwives optimize the biological, psychological, social, and cultural processes of childbirth and the baby's early life. Midwives, as women's partners, respect each woman's background, situation, and views, promoting women's capacity to care for themselves and their families. Midwives respect and protect women's rights; every woman and adolescent girl has the right to be free from danger, violence/abuse, and discrimination, and women and teenage girls have the right to access sexual and reproductive health services (16).

## **MATERIALS AND METHODS**

### **Study Design**

The research design used is a *quasi-experimental design* with a control group design. In this study, the group was divided into two groups, namely the intervention group: maternity mothers who received services from midwives who had participated in Normal Childbirth Care (APN) training and trained in *Respectful Midwifery Care (RMC)* who then applied RMC and control groups: maternity mothers who received services from midwives who had participated in Normal Childbirth Care (APN) training. This study was conducted from October 2023 to March 2024 with a sample size of 108 people using the large formula of clinical judgment samples. However, in this study, the data

analyzed was 98 samples. This result was because seven people were complicated and referred to the hospital, and three people with blood samples underwent lysis.

**Inclusion and exclusion criteria**

The inclusion criteria in this study are Pregnant women in the first period with normal childbirth, full-term pregnancy (a term), and not suffering from pain, complications, and complications of pregnancy and birth. Meanwhile, the exclusion criteria are, in part, mothers who experience depression or anxiety disorders, in part, mothers accompanied by complications and pregnancy complications, and mothers who are not willing to have blood drawn.

**Blood sample collection**

The requirements for taking blood samples are carried out on mothers with a cervical opening range of 7-9 cm. The total blood sample for the prostaglandin level check was 3 cc taken through the median activity vein of 3 cc. The tube is filled with blood for prostaglandin levels using a red vacutainer tube, which is then centrifuged at 3000 rpm for 10 minutes. Prostaglandin levels were examined using the *Enzyme-Linked Immunosorbent Assay* (ELISA) method conducted at the Hum-RC laboratory of Hasanuddin University.

**Statistical analysis**

The data obtained from this study was analyzed using a statistical test of the Statistical Package for Social Sciences (SPSS) version 25 program. To determine the effect of the application of *Respectful Midwifery Care* (RMC) on prostaglandin levels and pain perception rates by trained and untrained midwives, paired t-tests were performed to see improvements before and after the intervention in both groups, and unpaired T-tests and Mann Whitney U nonparametric statistical tests were used to analyze differences in both groups.

**RESULTS**

This study aims to assess the levels of prostaglandins and the effects of pain perception experienced by mothers in childbirth. The research, conducted on 98 respondents in the Bulukumba Regency area, was described as univariate and bivariate analysis.

**Table 1: Analysis of differences in Prostaglandin (PGE2) levels in the application of *Respectful Midwifery Care* (RMC) in normal childbirth**

Variable	Kelompok		p.value
	Intervention	Control	
	Mean±SD	Mean±SD	
Prostaglandin Levels (pg/mL)	119.842±38.527	98.867±45.772	0.016

p= Independent t-test

**Table 2: Analysis of changes in maternal pain perception with the application of *Respectful Midwifery Care* (RMC) in normal childbirth**

Variable	n	Intervention		n	Control		p*
		Mean of rank	Sum of rank		Mean of rank	Sum of rank	
Pain Perception	49	35.46	1737.50	49	63.54	3113.50	0.000

p= Mann Whitney U

Table 1. showed that the results of the examination of prostaglandin levels (PGE<sub>2</sub>) in the group of mothers served by midwives who applied Respectfully Midwifery Care (Intervention Group) were obtained as many as 119,842±38,527 (pg/mL) and mothers in the control group obtained prostaglandin (PGE<sub>2</sub>) levels of 98,867±45,772 (pg/mL), with the results of the independent t-test obtaining a value of p = 0.01, which means that there was a difference in the average prostaglandin levels between the intervention group and the control group.

Table 2 shows that there is a difference in the level of pain perception between the two groups. In the intervention group, the Mean of Rank was 35.46 with a Sum of rank of 1737.50, while in the control group, the Mean of Rank was obtained at 63.54 with a sum of rank value of 3113.50. In the *Mann-Whitney U statistical test*, a value of p<0.05 was obtained, meaning there was a difference in the level of pain perception between the intervention group and the control group.

## DISCUSSION

Prostaglandins are hormone-like substances that affect several body functions, including inflammation, pain, and uterine contractions. Healthcare providers use synthetic forms of prostaglandins to treat some conditions and medications to block their effects. During pregnancy and childbirth, uterine cells produce prostaglandins to help dilate the cervix (make it comprehensive) and cause uterine contractions. These contractions help move the baby through the birth canal (9).

There are nine known prostaglandin receptors in the body where prostaglandins exert their effects. All prostaglandin receptors are members of the G protein-coupled receptor signaling family. As members of the G protein signaling family, prostaglandins can activate secondary signaling pathways by activating or inhibiting enzymes such as adenylyl cyclase and phospholipase C, leading to downstream effects (17). Through these prostaglandin receptors, prostaglandins can cause many effects in almost every body part. Prostaglandins can cause vasodilation or vasoconstriction in vascular smooth muscle cells, activate or inhibit platelet aggregation, induce labor, regulate hormones, and reduce intraocular pressure. They may also act on the central nervous system to cause fever and affect pain perception. In the stomach, prostaglandins can act on gastric parietal cells to inhibit acid secretion. In the eye, prostaglandins increase uveoscleral outflow of aqueous humor through various mechanisms, such as the relaxation of ciliary smooth muscle cells. During menstruation, endometrial cells' destruction releases prostaglandins responsible for uterine contractions to shed the uterine lining (18).

The statistical analysis results showed that prostaglandin levels in the intervention group were higher than in the control group. Meanwhile, the results of different tests showed a difference in the average prostaglandin levels between the intervention and control groups.

*Respectful Midwifery Care (RMC)* has become the main focus in pregnancy and childbirth care. This is not surprising considering the critical role played by midwives in providing respectful midwifery care, supporting and understanding the physical, emotional, and psychological needs of birth mothers. One significant benefit of respectful midwifery care is its effect on prostaglandin hormone levels. The prostaglandin hormone has a vital role in the labor process, where increasing levels of this hormone can help smooth the labor process and reduce the risk of complications. By implementing good, respectful midwifery care, mothers in labor can feel calmer and supported and have better control over the birthing process, which can help increase prostaglandin hormone levels.

Midwife support helps create a safe, calm, and loving environment, reducing the fear and discomfort often accompanying the birthing process. This can trigger the release of endorphins, which can reduce pain and increase the birth mother's feeling of well-being. Meanwhile, prostaglandins play a role in stimulating uterine contractions and preparing the body for childbirth. Additionally, midwives' emotional support can influence prostaglandin production, facilitating more effective and progressive

contractions.

Apart from prostaglandins, the human body also produces several main hormones during labor that regulate the progress of labor and birth and influence the perception of pain, namely oxytocin, beta-endorphin, and adrenaline. Too little or too much of each of these hormones can make labor slow and painful. The production of these three hormones is greatly influenced by the emotional state of the woman giving birth; therefore, relaxation is essential in controlling labor pain (8).

*Respectful Midwifery Care (RMC)* is an approach that treats every birth process with respect and care. This approach not only positively impacts the mother's well-being but also the level of labor pain, length of labor, birth trauma, and baby's well-being.

According to researchers, the level of labor pain is one aspect that greatly influences the mother's experience during childbirth. RMC pays more attention to this aspect by providing appropriate emotional and physical support during birth. This can reduce the mother's stress and anxiety levels, indirectly reducing the intensity of the pain felt. Thus, respectful midwife care can help manage labor pain more effectively.

Although there was an increase in pain before and after the intervention in this study, the increase in the perception of pain levels was higher in the control group than in the intervention group. This study showed that prostaglandin (PGE2) levels were higher than in the control group. Still, the mother's ability to adapt to the pain that occurred by stimulation and the hormone levels were better than those in the control group. This was proven by the results of measuring the perception of pain levels of respondents in the intervention group.

*Respectful Midwifery Care (RMC)* can help reduce labor pain because, through this care, midwives respect the rights and choices of mothers so that they feel more comfortable and safer during the birthing process. This can reduce anxiety and fear, which are factors that can worsen labor pain. Midwives who implement respectful midwifery care will emotionally support the mother during labor. This support can help mothers deal with pain and improve their coping. The midwife will also provide complete information and education to the mother about the birthing process. This can help the mother understand what to expect and reduce the feeling of unpredictability, which can worsen labor pain. It also encourages active participation by mothers in decision-making regarding their birth. This can increase mothers' self-confidence and control, which can help them deal with pain better.

## **CONCLUSION**

The application of *Respectful Midwifery Care (RMC)* showed an effect on prostaglandin levels (PGE2) and the level of pain perception of maternal pain.

## **Ethical approval**

This research has received ethical approval from the ethics commission of the Faculty of Medicine, Hasanuddin University, Indonesia, with the number 977/UN4.6.4.5.31/PP36/2023.

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