Original Article

# Effect of Phloroglucinol in Shortening Active Labor in Primigravidas at Term

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## Abstract

Objectives: To evaluate the difference in the average length of the active phase of labor between patients who received phloroglucinol and those who received a placebo.

Methodology: A randomized controlled trial was conducted in Holy Family Hospital, Gynae Unit 1, Rawalpindi. 60 primigravidas at term, ranging in age from twenty to thirty-five, who were in the active first stage of labor and had a singleton pregnancy were randomly assigned to two groups A and B. Group A received phloroglucinol 40mg repeated after one hour at cervical dilatation of between 4cm to 6cm. While the Group B received a placebo 10mL of normal saline. Patients were monitored for vital signs and fetal heart rate, and the progress of labor was plotted on a standard WHO partogram. Maternal outcomes were measured in terms of the average duration of labor in both groups and any untoward reaction of the drug under study by the attending obstetrician.

Results: In our study, the mean age was calculated as 27.97 + 4.25 years in Group A and 26.10 + 3.92 years in Group B, mean gestational age was calculated as 39.13 + 0.97 weeks in Group A and 39.37 + 0.96 weeks in Group B. The mean BMI of the patients was recorded as 28.47 + 2.76 in Group A and 28.37 + 2.52 in Group B. Duration of labor was recorded as 205.06 + 4.64 in Group A and 309.33 + 5.71 minutes in Group B.

Conclusion: We concluded that the mean duration of active labor is significantly shorter in patients receiving phloroglucinol when compared to those receiving a placebo.

Keywords: Active phase of labor, shortening of the duration of labor, phloroglucinol, placebo

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## Introduction

The active phase of labor begins with a cervical dilatation of 4cm, beyond which, in normal labor it progresses at the rate of 1cm/hr in Primigravida and 1.5-2cm/hr in multipara, in the presence of adequate uterine contractions and absence of any fetal malpresentation.[1] Progress slower than this is said to culminate in prolonged labor wherein the active phase lasts for >12 hrs in PG and > 8 hrs in multigravida.[2]

Prolonged labor results in an increased rate of feto-maternal morbidities i.e. maternal dehydration, ketosis, obstructed labor, chorioamnionitis, fetal distress, molding, birth asphyxia, and increased risks of NICU admission.[3] Before resorting to operative delivery due to labour dystocia resulting from slow cervical dilatation there is a need for intervention to improve cervical dilatation. Spasmolytics and spasmoanalgesics are administered to enhance cervical dilatation, and shorten the active phase of labor thus improving chances of vaginal birth.[4] One of such drug increasingly being studied is phloroglucinol primarily used as an antispasmodic analgesia in gastrointestinal colic, and renal colic. In obstetric practice, it works by relieving the edema of the cervix, lowering the cervical muscular tension thus enhancing cervical dilatation.[5] The data regarding its safety in pregnancy are not available however a large epidemiological study observed no adverse effects on women using the drug in the active phase except minor nausea.[6]

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The range of normal or tolerable rates of dilatation is rather large. Combinations of spasmoanalgesics and spasmolytics are used to shorten the initial stage of labor and to help dilate the cervix during delivery.[7] When it comes to accelerating cervical dilations, the ideal antispasmodic should function rapidly but durably, not negatively impact uterine contractility, and not put the uterus in danger of inertia. Additionally, it ought to have little negative effects on the mother as well as the fetus.[8] A number of interventions, such as the mother walking during active labor, have been proposed to promote normal labor progress. Nonetheless, no changes were observed in the length of the first stage, the requirement for oxytocin, the use of analgesia, or the mode of delivery in a well-designed randomized trial including over a thousand women in active labor and ambulation compared to standard care.[9,10] In contrast, other interventions such as the presence of a labor doula may be effective. In addition, continuous doula support was associated with a significantly shorter length of labor. The change in length of the active stage of labour by using spasmolytics has been the subject of much discussion recently. Some writers have recently increased the second stage's duration from previously limited $\leq$2 hours to 3 hours since most nulliparous women who had local anaesthesia gave birth within three hours of second-stage labour, as opposed to two hours for those who did not get local anaesthesia.[11]

Several studies[12,13,14] have been conducted to evaluate the role of phloroglucinol in the progress of labor, but the literature is sparse on it, as most of the items are small-sized local studies and not well controlled, and some end with conflicting evidence of its role. In one study[5] average duration of labor was shortened by almost 2 hours in patients who received pholoroglucinol [203.06min + 90.21min] versus [311.12min + 10.89min] in the control group p=0.0045. Anjum et al.[12] conducted a local study to assess the effectiveness of phloroglucinol in reducing the length of the first stage of labor. They found that the mean total labor duration in the drug group was 216.88 minutes, while the placebo group's duration was 358.52 minutes. These findings support the hypothesis that phloroglucinol is effective in shortening the first stage of labor. Similarly, the effectiveness and safety of drotaverine and phloroglucinol during the initial stage of labor were compared by Janjua et al.[13] The length of the first stage of labor, the rate of cervical dilatation, the mode of delivery, and maternal and fetal side effects were the main outcome measures used to draw the conclusion that both drugs are effective in accelerating labor; however, phloroglucinol is more effective in shortening the first stage of labor and its overall duration. It is also safe, requiring fewer injections, no fetomaternal side effects, and no Caesarean section. Malik et al.[14] evaluated the effects of Phloroglucinol on the augmentation of labour in primigravida. The results revealed that augmentation in the interventional group was better than the control group. However, the use of drug was not monitored for side effects.

Few studies[11,15] have been conducted to assess the effects of phloroglucinol on cervical dilatation along with the use of oxytocin to augment it during the active phase of labor, which will undoubtedly affect the length of labor and increase bias in the results. Additionally, some studies have included both primiparous and multiparous patients, which also affects the results because multiparous women experience shorter labor durations even in the absence of any method of augmentation. Keeping the aforementioned considerations in mind, we conducted a randomized controlled experiment to assess its effectiveness. As a result, we only included primigravida women who were in spontaneous labor in our research and had no alternative methods for amplification. The study's objective was to compare the mean duration of the active phase of labour in patients receiving phloroglucinol versus those receiving a placebo.

## Methodology

A Randomized controlled trial was performed at Obstetrics and Gynecology Unit-I, Holy Family Hospital, Rawalpindi. The research was started after obtaining approval from the Institutional Research Forum of Rawalpindi Medical College. The sampling strategy used was convenient sampling, and after taking into account the number of patients visiting the labor ward, a sample size of 60 was chosen. The estimation of the sample size through Power analysis was not possible as there is no consensus on medical importance of reduction in specified duration of labour.

Enrollment for this study was initiated in April 2023 and was completed in July 2023 with female participants in the age group of 20-35 years who were primigravidas, having singleton pregnancies at term with cephalic presentation, in active phase of labour with cervical dilatation of between 4cm and 6cm. Pregnancies with twins, any medical complication e.g. heart disease, obstetrical complications like eclampsia, patients with

evidence of CPD, fetal distress, and women who conceived with treatment or precious pregnancies were excluded from the study.

60 women fulfilling the selection criteria were provided with necessary information on the purpose and procedure of the study, and informed written consent was taken. The addresses and phone numbers of all study participants were noted. The attending physician took the patient's history and performed a physical examination when the patient was admitted to active labor. Every baseline analysis, such as blood type, complete blood count, random blood sugar, and urine examination was carried out. The patients were randomly assigned to two groups A and B. Group A received phloroglucinol 40mg repeated after one hour at cervical dilatation of between 4cm to 6cm. While the B Group received a placebo of 10mL of normal saline.

Regular uterine contractions and a 3–4 cm cervical dilation preceded the onset of the active first stage of labor. The length of time was noted on the monitoring chart till the presenting fetal component descended or until full cervical dilatation of 10 cm. Patients were monitored for vital signs, fetal heart rate, and progress of labour was plotted on a standard WHO partogram. Maternal outcomes were measured in terms of the average duration of labour in both groups and any untoward reaction of the drug under study by the attending obstetrician.

All data were input and analyzed with SPSS version 22. For categorical variables such as parity, frequencies and percentages were computed. The mean and standard deviations of continuous variables such as female age, gestational age, BMI, and labor length were computed. To compare the mean duration of active work in both groups, an independent sample t-test with a 5% level of significance was used. A p-value of <0.05 indicated statistical significance. Effect modifiers such as age, gestational age, parity, baseline cervical dilatation, BMI, and stratification were investigated, and a post-stratification independent sample t-test was used. P-value < 0.05 was significant. The key result was the average length of labor.

## Results

A total of 60 cases (30 in each group) fulfilling the inclusion/exclusion criteria were enrolled to compare the mean duration of the active phase of the labour in patients receiving pholoroglucinol versus those receiving a placebo. This study sought to determine whether phloroglucinol outperformed a placebo in terms of shortening the duration of the active phase of labor and speeding up cervical dilatation.

In our study, the mean age was calculated as 27.97 + 4.25 years in Group A and 26.10 + 3.92 years in Group B, mean gestational age was calculated as 39.13 + 0.97 weeks in Group A and 39.37 + 0.96 weeks in Group B. The mean BMI of the patients was recorded as 28.47+2.76 in Group A and 28.37+2.52 in Group B. Duration of labor was recorded as 205.06 + 4.64 in Group A and 309.33 + 5.71 minutes in Group B.

The p-value for comparison between controlled and experimental groups regarding stratification of onset of labour with age, gestational age, BMI, and cervical dilatation is given in the following tables:

The mean total duration of labour was lower in the treatment group compared to the placebo group, however, this was not statistically significant. There was a mean difference in the duration of the active phase of labour between the treatment group and the placebo group that is the mean duration of the active phase of labour was about 2 hours shorter compared to the placebo. This was statistically significant (p-value = 0.0001).

**Table I: Comparison of Stratification of onset of labour between control and experimental group.**

| | | Group A | | Group B | |
|---|---|---|---|---|---|
| **Variables** | | **Mean** | **SD** | **Mean** | **SD** |
| **With Age** | 20-30 years | 205.00 | 4.54 | 309.40 | 6.18 |
| | 31-35 years | 205.20 | 5.07 | 309.00 | 2.74 |
| **With Gestational Age** | 37-39 weeks | 205.30 | 4.78 | 310.41 | 5.11 |
| | >39 weeks | 204.60 | 4.55 | 307.92 | 6.34 |
| **With BMI** | Upto 30 | 204.61 | 4.54 | 309.67 | 5.97 |
| | >30 | 206.57 | 5.00 | 308.00 | 4.77 |

**Table II: Stratification for Cervical Dilatation at Baseline 4-5 cm**

| **Duration of labour** | **Group-A(n=30)** | | **Group-B(n=30)** | | **P value** |
|---|---|---|---|---|---|
| | **Mean** | **SD** | **Mean** | **SD** | |
| | 203.16 | 4.27 | 309.50 | 5.17 | 0.0001 |
| | **6 cm** | | | | |
| **Duration of labour** | **Mean** | **SD** | **Mean** | **SD** | |
| | 204.34 | 4.36 | 309.11 | 5.54 | 0.0001 |

## Discussion

The duration of the active phase is variable and affected by internal and external factors, many of which are undefined. Women with more favorable cervices at the onset of labor appear to have a shorter latent phase. By comparison, one-half of women who enter the latent phase with an unfavorable cervix go on to have a prolonged latent phase.[16] It is known that protracted labor poses risks and issues for both the mother and the fetus. The fetus is at risk for infection, hypoxia, and severe cranial molding, while the mother is at high risk for infection, ketosis, and obstructed labor. Prolonged labor is defined as any labor that lasts more than 12 hours for nulliparous women and 8 hours for multiparous women.[17] A medication that shortens labor without endangering maternal and fetal outcomes is welcomed by both the doctor and the patient in contemporary obstetrics. Typically, the cervix dilates at a pace of 1-2 cm.[1] The antispastic medication phloroglucinol can reduce cervix muscle tension and decrease cervix edema and spasm. It can be used to enhance cervical dilatation and accelerate the start of labor.[14] In patients receiving phloroglucinol, the average length of the observed active phase of the first stage of labor is shortened by about two hours.[18]

In this study, we aimed to generate indigenous data regarding the effects of phloroglucinol, in improving the progress of labour in our settings to increase the chances of successful vaginal delivery and lower the cesarean section rate secondary to failed progress in the first stage. As the drugs that enhance inadequate uterine contractions, like oxytocin are not without risks[19], and in labours where good uterine contractions are already established, phlorogiucinol as an adjunct escalates success of vaginal delivery. The mean length of the active phase of labor was shorter in the treatment group than in the placebo group, meaning that the duration of labor during the active phase was about shorter in the phloroglucinol group than in the placebo group. Statistical significance was observed, with a p-value of 0.001. This is comparable to research on other spasmolytics including phloroglucinol.[20,21] In comparison to the placebo group, the phloroglucinol group's cervix dilated more quickly.

Contradictory to our findings Yuan et al., [22] stated that phloroglucinol causes relaxation of uterine muscles and proposed its preventive role during threatened abortion. However, in agreement with previous studies[5,12,13,14,21] which evaluated the role of phloroglucinol in progress of labour, our findings also support the use of phloroglucinol for shortening the mean duration of active labour. The claim that labor proceeds more quickly taking phloroglucinol than in those not translated and is supported by the fact that labor proceeds more quickly in proportion to the rate of cervical dilatation. Despite the lower proportion of patients experiencing complications, it can be recommended that phloroglucinol be used safely in individuals as it is not linked to postpartum hemorrhage like Drotaverine hydrochloride.[23]

Limitations and Future Study: However, being the single center study focused on healthy singleton pregnancies, it needs to be validated through some multicenter studies at a local level, additionally, we did not record the side effects of the drugs being the limitation of our study, which may be addressed in coming trials. To assess the impact of this medication on the length of labor, the rate of cervical dilatation and effacement, and complicated pregnancies, more research is required.

## Conclusion

We concluded that the mean duration of active labour is significantly shorter in patients receiving pholoroglucinol when compared to those receiving placebo. The results of our study justify the hypothesis that the mean duration of active labour was shorter in patients receiving pholoroglucinol versus those receiving placebo. In order to reduce the adverse reactions, it might be helpful in promoting delayed labor and preventing needless cesarean procedures

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