

ORIGINAL ARTICLE

Dim Light Effect on Active Phase Acceleration During Labour

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ABSTRACT

Introduction: Prolonged labour is one of the most significant causes of maternal death in Indonesia. One out of five labour in Kajai primary health care centre referred to the hospital due to prolonged labour cases. This study aims to determine the effect of dim light on the length of the first stage of labour. **Methods:** This study was a Quasi-experimental design with a Control Group posttest only design at the working area of Kajai health centre, in February 2020. The participants of this study consisted of 160 women in labour, selected by consecutive sampling method. The samples were divided into two groups, the control and intervention groups. Observation sheets were used to collect data. T-Test analysis was used to assess the data in both univariate and bivariate formats. **Results:** The results showed that the control group's average acceleration of labour progress in the active phase is 348.833 minutes, and the intervention group's average acceleration of labour progression in the active phase is 304.833 minutes. The results of bivariate showed that there is a significant effect of a dim light intervention on accelerating labour's progress (*P*-Value: 0.0001). **Conclusion:** This study concluded that dim light could affect the hormones. For this stimulation contraction in the uterus occurs. It can be applied as one of a non-pharmacologic method in labour acceleration.

Keywords: Labour Acceleration; Dim Light; Active Phase of Labour

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INTRODUCTION

During child birth or delivery some women happily welcome labor and some are anxious, filled with fear and sadness (1). Factors like stress, anxiety, fear, anger, heartburn, complaints of abdominal pain, and even more frequent contractions are commonly experienced by mothers before delivery. This has a negative impact on the labor process such as prolonged labor, preeclampsia / eclampsia, and even death (2).

The world agreement Sustainable Development Goals (SDGs) targets an MMR of 91 / 100,000 for mothers giving birth and is targeted to be achieved in 2019 (3). According to the World Health Organization, there

were 295,000 maternal fatalities worldwide in 2017 (4). In Asian countries, only Singapore achieved MMR <15, which is 9 per 100,000 live births, while Indonesia's MMR in 2014 was 348 per 100,000 live births (5). Based on the health profile of West Sumatra, the MMR in West Sumatra in 2017 was 212 per 100,000 live births, while the 2018 West Pasaman District Profile stated that the MMR in Pasaman Barat Regency was 123 per 100,000 live births, and at the Kajai Puskesmas, there was 1 maternal death in 2018 (6).

Mothers and newborns can die from a variety of circumstances, including prolonged labour (4). Prolonged labour can lead to infection, tiredness, and dehydration in the mother, as well as postpartum haemorrhage, which can result in maternal death. Infection, damage, and hypoxia can occur in the pregnancy, increasing newborn mortality. Prolonged labour causes maternal mortality in the world by 8% on average and by 9% in Indonesia (7).

According to the West Sumatra Health Profile, delivery that lasts for more than 24 hours is one of the top three causes of maternal death. Before the 24-hour deadline, problems must be detected and rectified. The majority of lengthy labours are classified as stagel. Feto-pelvic disproportion, malpresentation, and malposition, as well as poor uterine action, including a rigid cervix, are the main causes of protracted labour. Both in-utero and postpartum women, protracted labour can cause bleeding. Asphyxia, which is the leading cause of infant mortality in West Sumatra, can be caused by prolonged labour and delivery (8).

Based on data from the Kajai Puskesmas, it is known that in 2018 there were 234 deliveries in the work area of the Kajai Puskesmas with 47 people referred to Yarsi Ibnu Sina Hospital and West Pasaman Regional Hospital for various indications. The most common indication found was prolonged labor for various reasons, such as Cephalopelvic disproportion (CPD), location of the child, and others. The incidence of prolonged labor at the Kajai Puskesmas occupies the top 5 incidences of prolonged labor compared to 19 other Public health centers in West Pasaman Regency (6,7).

Research conducted by Kusuma (2009) in a study stated that women who give birth need a safe, comfortable environment, family support, and dim conditions of the delivery room which factors affect the length of the labor process, which was implemented in Sarolangun District for 2 months (9). Researchers provide thick window curtains in the delivery room and provide dim lights so that the delivery room is dimly lighted. This increases the feeling of relaxation in the mother and reduces labor pains and speeds up the stage-I and stage- II processes. Based on the above description, the researchers are interested in conducting research in the Puskesmas Kajai's work area with the title Effectiveness of Low Light on Period I Labor Duration.

MATERIALS AND METHODS

This is a quasi-experimental study with Control Group posttest only design, carried in February 2020. The study population comprised of labour women in their first stage of labour in working area Kajai Public health Centre.

Sample

A sample of 160 pregnant women was taken by accidental sampling technique, the sample was divided into two groups, 80 labor women for the intervention group and 80 labor women for the control group. Before the research was conducted the researcher asked for the respondent's approval by giving informed consent. Measurements of labor duration are using partograph.

Data Analysis

Data analysis by paired sample t-test with SPSS program

to see the difference between control and intervention group post-test scores with $\alpha = 0.05$ and 95% confidence interval (CI). Before using a paired sample t-test it is assured that the data is normally distributed. To see the normality of the data Shapirowilk test ($\leq 50\%$) was used.

For comparing the two groups, summary statistics were reported as means (mean labour duration), Standard Deviation (SD), and 95% Confidence Intervals (CI) (between intervention and control group). The statistical package SPSS version 16.0 was used to conduct the analyses.

Ethical Clearance

This research gets ethical approval from Institute Kesehatan Prima Nusantara Bukit Tinggi (No.092/KEPT/IKESP/IX/2020) dated 4th September, 2020.

RESULTS

Regarding to length of active phase in intervention group was 304.833 minutes (Table I).

Table I: Average of Lenght of Active Phase in Intervention Group

Labor duration	n	Min	Max	Mean	SD
Intervention group	80	285	315	304.833	10.90718

Regarding to length of active phase in control group was 348.833 minutes (Table II).

Table II: Average Of Lenght Of Active Phase In Control Group

Labor duration	n	Min	Max	Mean	SD
Control group	80	338	362	348.833	9.04249

The average active phase duration in the intervention group is 304.833 with a standard deviation of 10.90718, while the average active phase duration in the control group is 348.833 with a standard deviation of 9.04249, paired T-test results *p*-value of 0.0001 <0.05 indicates that there was a dim light effect on reducing the duration of active phase of labour (Table III).

Table III: Effectiveness Of Dim Light On Reducing Active Phase Duration In Labour

Comparison	N	Mean (per minute)	Standar Deviasi	Standar. Error Mean	P Value
Experiment	80	304.833	10.90718	4.45284	0.001
Control	80	348.833	9.04249	3.69158	

DISCUSSION

The first stage of labor starts from the onset of uterine contractions and the opening of the cervix until it reaches a complete opening (10 cm). The first stage of labor is divided into 2 phases, namely the latent phase and the active phase, namely the Latent Phase, where the cervical opening takes place slowly starting from the beginning of the contraction which causes the thinning and opening gradually to the opening of 3 cm, lasting for 7-8 hours and the active phase (opening cervix 4-10 cm), lasts for 6 hours and is divided into 3 sub-phases. The woman will experience contractions every 10 minutes for 20-30 seconds at this point. Contractions become more frequent, occurring 2-4 times every 10 minutes and lasting 60-90 seconds. The contractions occur at the same time that the amniotic fluid ruptures and blood is discharged spontaneously. Premature rupture of the membranes is generally described as the amniotic fluid that leaks out before the 5 cm opening. This active phase of stage I can last up to 360 minutes (10).

Dim light stimulates the hypothalamus to produce the hormone endorphin, which can affect labor. Endorphins are local opioid neuropeptide chemicals and peptide hormones that make a person feel good and increases immunity (11). Endorphins are produced by the pituitary gland's central nervous system when humans are happy (laughs) and get adequate rest. This substance acts like morphine, even said to be 200 times more effective than morphine. Endorphins can cause feelings of pleasure and comfort to make a person energized (12).

Obstetrician, Constance Palinsky, reported the use of endorphins to reduce or relieve pain in mothers during giving birth (13). Beta endorphins are one of the endorphins released by the brain in times of stress or illness, and are natural painkillers equivalent to pethidine, while catecholamines with adrenergic activity cause uterine contractions, while adrenergic beta endorphin 2 inhibits labor (14). Progesterone increases the ratio of beta receptors to alpha receptors in the myometrium, thereby facilitating the continuation of pregnancy (15, 16).

Research conducted by Kusuma (2009) in a study stated that women who give birth need a safe, comfortable environment, family support and dim conditions of the delivery room have an effect on the length of the labor process (9). This kind of environment was implemented in the labour room of Sarolangun District for two months. Researchers provide thick window curtains to the delivery room and provided dim lights so that the delivery room has dim light. This increases the feeling of relaxation in the mother and reduces labor pains in the first stage of labour (17).

Respondents in another study were nulliparous pregnant women who were in full term and delivered a single

baby with a cephalic presentation in spontaneous labour and gave birth at the New Zealand Hospital, Hillerod, between March 2014 and July 2015. This study comprised of 789 women, 313 of them gave birth in the sensory room and 476 in the regular delivery room. When compared to the usual delivery room, the risk of caesarean birth was dramatically reduced (OR, some adjusted: 0.44; 95% CI 0.22-0.87); additionally, the use of oxytocin infusion was also lowered (OR, multiple adjusted: 0.71; 95 percent CI 0.50-1.03). This observational cohort study found that giving birth in a sensory delivery suite reduces the chance of caesarean delivery by one in every 23 participants (12, 18).

CONCLUSION

This study concluded that the dim light could affect the release of the hormones which can stimulate uterus contraction. It can be applied as one of a non-pharmacologic method in labour acceleration.

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