

## THE RELATIONSHIP BETWEEN PHYSICAL ACTIVITY 7 DAYS BEFORE DELIVERY AND THE DURATION OF ACTIVE PHASE OF FIRST STAGE LABOR IN PRIMIPARA MOTHERS

Nazhifa Zalfa Jundyah<sup>1</sup>, Lilik Indahwati<sup>2</sup>, Indriati Dwi Rahayu<sup>3</sup>, Tatit Nurseta<sup>4</sup>

<sup>1</sup>Program Studi S1 Kebidanan, Fakultas Kedokteran, Universitas Brawijaya

<sup>2,3,4</sup>Fakultas Kedokteran, Universitas Brawijaya

Email: [lilik\\_indah.fk@ub.ac.id](mailto:lilik_indah.fk@ub.ac.id)

### ABSTRAK : HUBUNGAN AKTIVITAS FISIK 7 HARI SEBELUM PERSALINAN DENGAN DURASI PERSALINAN KALA 1 FASE AKTIF PADA IBU PRIMIPARA

Latar belakang: Persalinan yang berlangsung terlalu lama dapat meningkatkan risiko komplikasi bagi ibu dan janin, namun risiko tersebut dapat diminimalkan melalui aktivitas fisik yang dapat mempengaruhi kemampuan aerobik dan kardiorespirasi tubuh, yang mengakibatkan peningkatan maksimal asupan oksigen maksimum yang selanjutnya dapat meningkatkan pasokan energi. Pasokan energi ini penting untuk mendukung kontraksi otot miometrium selama persalinan, terutama pada tahap awal. Tujuan: Penelitian ini bertujuan untuk mengetahui hubungan aktivitas fisik dengan durasi persalinan kala I fase aktif pada ibu primipara. Metode: Penelitian menggunakan jenis penelitian observasional dengan pendekatan cross-sectional pada 30 ibu primipara di fasilitas kesehatan Malang. Hasil: Pengambilan data dilakukan dengan pengisian kuesioner PPAQ (*Pregnancy Physical Activity Questionnaire*) dan dianalisis menggunakan uji *rank spearman*. Hasil uji analisis diperoleh  $p = 0,049$  ( $p < 0,05$ ) yang berarti ada hubungan aktivitas fisik 7 hari sebelum persalinan terhadap durasi persalinan kala I fase aktif pada ibu primipara di Fasilitas Kesehatan Malang. Kesimpulan: Kesimpulan yang didapat yaitu semakin tinggi kategori aktivitas fisik 7 hari sebelum persalinan, maka durasi kecepatan persalinan kala I fase aktif semakin meningkat.

Kata kunci: Aktifitas fisik, durasi persalinan kala I fase aktif, primipara.

### ABSTRACT

Background: Prolonged labor can increase the risk of complications for the mother and fetus, but these risks can be minimized through physical activity that can affect the body's aerobic and cardiorespiratory capabilities, resulting in an increase in maximum maximum oxygen intake which can further increase energy supply. This energy supply is important to support myometrial muscle contractions during labor, especially in the early stages. Objective: This study aims to determine the relationship between physical activity and the duration of labor in active phase I in primiparous mothers. Methods: The study used observational research with a cross-sectional approach on 30 primiparous mothers in Malang health facilities. Results: Data were collected by filling out the PPAQ (*Pregnancy Physical Activity Questionnaire*) questionnaire and analyzed using the spearman rank test. The results of the analysis test obtained  $p = 0.049$  ( $p \leq 0.05$ ) which means that there is a relationship between physical activity 7 days before delivery on the duration of labor in active phase I in primiparous mothers in Malang Health Facility. Conclusion: The conclusion obtained is that the higher the category of physical activity 7 days before labor, the duration of the active phase I labor speed increases.

Keywords: Physical activity, duration of active phase I labor, primipara.

### INTRODUCTION

Indonesia is currently working towards a maternal mortality ratio (MMR) of less than 70 per 100,000 live births by 2030. The Ministry of National Development Planning/Bapenas announced in March 2022 that Indonesia's maternal mortality rate is 305 per 100,000 live births, and the target for 2024 is 183 per 100,000 live births. Based on data from the

East Java Health Office, the number of maternal death cases is estimated to reach 499 in 2022. This number is lower than the previous year, which reached 1,279 cases. Although the MMR in East Java is expected to decrease in 2022, the government and health workers must continue to take corrective actions to achieve the SDG targets.

Birth problems occur when a pregnant woman enters labor. It starts with stage one and continues through stage two, which is the most difficult stage of labor. This can lead to problems such as dehydration, infection, and maternal pain if labor lasts too long. Fatigue can have an impact on the fetus. These include fetal asphyxia and intrauterine death, or intrauterine fetal death (IUFD).<sup>9</sup> Prolonged labor results in an increased risk of maternal and fetal complications. This risk can be minimized through physical activity, which impairs the body's aerobic and cardiorespiratory capacity, resulting in increased peak oxygen consumption (peak VO<sub>2</sub>), which in turn reduces energy consumption. This energy supply is important to support myometrial contractions during labor, especially in the early stages<sup>12</sup>

According to WHO guidelines, "physical activity refers to any movement of the body that is produced by skeletal muscles and requires the use of energy". WHO recommends that pregnant and postpartum women engage in regular physical activity. It is recommended to perform light to moderate intensity aerobic exercise for at least 150 minutes per week<sup>14,1</sup>.

The results of a preliminary study conducted in May 2023 at the Malang Health Facility had a total of 27 maternity visits. 6 out of 10 mothers said they felt more lazy to do physical activity on the 7 days before labor compared to the previous days due to the heavier body condition. There were 2 primiparous postpartum mothers, as many as 1 primiparous postpartum mother doing light to moderate physical activity not routinely in the 3rd trimester of pregnancy had a duration of labor time 1 for 15 hours 30 minutes and 1 primiparous postpartum mother doing moderate physical activity routinely in the 3rd trimester of pregnancy had a duration of labor time 1 for 5 hours 45 minutes.

Based on the results of preliminary studies, in Malang health facilities there are several mothers who have different levels of physical activity with different labor durations. So, it is necessary to conduct a study with the title "The Relationship between Physical Activity 7 Days Before Labor with the Duration of Active Phase I Labor in Primiparous Mothers in Malang Health Facilities".

## RESEARCH METHODS

This study is an observational study with a cross-sectional approach. The use of data in this study was obtained from respondents who filled out detailed physical activity questionnaires such as household & child virgin activities, transportation activities, work activities, recreational or sports activities and showed data on the duration of activities performed. Furthermore, birth observation data, and birth anatomy maps were also reviewed in this study. The sample of this study was 30 primiparous women in one of the health facilities in Malang using random sampling technique.

The inclusion criteria for this study were first birth, physiological birth, physical activity 7 days before birth with the grouping of regular, light, and moderate physical activity levels. As well as willing to be interviewed, and the ability to read and write. While the exclusion criteria of this study are referrals to first stage labor, labor with complications, and mothers who experience full opening at the first vaginal contact (VT). The data obtained were analyzed using the spearman rank test.

## RESEARCH RESULTS

Table 1 shows that the majority of respondents were in reproductive age with an age range of 20-35 years as many as 26 people (86.7%). Maternal psychology can affect the labor process can change with age, with an increase in the level of emotional maturity that tends to be better with age.<sup>9</sup>

The frequency distribution of respondents' education, most of the respondents had secondary education, namely 19 people (63.3%). The level of education plays a role in shaping a person's response to various situations, both from within and outside. some respondents in this study had a more rational response, especially to the advice of health workers in doing physical activity before childbirth.<sup>10</sup>

The frequency distribution of respondents' education showed that the majority did not work by working as housewives as many as 24 people (80%). Working mothers will have more opportunities to do light physical activities such as walking slowly and walking fast. Educational factors also play an important role in changing a person's mindset, behavior, and decision making.

**Tabel 1**  
**Karakteristik Responden Ibu Nifas Primipara di Fasilitas Kesehatan Malang Tahun 2024**

Characteristics	$\Sigma$	%
Age		
≤19 Years	4	13,3
20-35 Years	26	86,7
Education		
Low	7	23,3
Medium	19	63,3
High	4	13,3
Jobs		
Work	6	20,0
Not Work	24	80,0

Table 2 shows the speed of cervical opening duration obtained from the calculation of the opening of the cervix in the first active phase in centimeters divided by the duration of labor in hours. The results showed that most of the duration of labor in the first

phase of active respondents as much as 70%, meaning that most respondents experienced a relatively normal to fast duration of cervical opening in the first phase of active during  $\geq 1.2$  cm / hour.

**Table 2**  
**Duration of Cervical Opening Speed of Active Phase I Labor at Health Facilities in Malang in 2024**

Duration of Cervical Opening speed of Active Phase I	$\Sigma$	%
Low (<1,2 cm/hour)	9	30,0
Normal ( $\geq 1,2$ cm/hour)	21	70,0

Table 3 shows that the level of physical activity 7 days before delivery based on the Pregnancy Physical Activity Questionnaire in the mild category Light (1.5 - 3.0 METs) is as many as 17 respondents (56.7%) which can be interpreted that some mothers only do light physical activity.

has the opportunity to be changed so that it can be adjusted to the size of the birth canal.

**Table 3**  
**Physical Activity Level 7 Days Before Delivery at Health Facilities in Malang in 2024**

Physical Activity Level	$\Sigma$	%
Settle	4	13,3
Lightweight	17	56,7
Medium	9	30,0

Table 4 shows the frequency distribution of birth weight of respondents as many as 25 babies (83.3%) had normal birth weight (2500-3500 grams). Fetal weight is one of the passanger factors and can have an influence on the labor process. This factor

**Table 4**  
**Birth Weight of Infants in Health Facilities in Malang in 2024**

Birth Weight	$\Sigma$	%
<2500 gram	2	8,7
2500-3500 gram	25	83,3
>3500 gram	3	10,0

Table 5 shows that the results of the Spearman Rank correlation test have a value of  $r = 0.362$  with a  $p$ -value = 0.049. It can be concluded that the two variables have a moderate relationship with a positive relationship direction, so that the higher the level of physical activity carried out 7 days before labor, the higher the duration of the speed of opening of the cervix in phase 1 of the active phase.

**Table 5**  
**Relationship between Physical Activity 7 Days Before Delivery and Duration of Cervical Opening Speed of Active Phase 1 Labor in Primiparous Mothers in Malang Health Facilities in 2024**

Physical Activity Level	Duration of Cervical Opening Speed of Active Phase 1 Labor		Analysis	
	Low	Normal	P- Value	r
Settle	3	1	0,049	0,362
Lightweight	7	10		
Medium	2	7		

Source: Results of data processing using SPSS

Table 6 shows the results of the chi-square test p-value 0.444 with  $r = 0.801$ . It can be concluded that the weight of the baby at birth does not have no

relationship with the duration of labor in the active phase.

**Table 6**  
**Relationship between birth weight and duration of cervical opening speed during the first phase of active labor among primiparous mothers in health facilities in Malang, 2024**

Berat Bayi Lahir	Durasi Kecepatan Pembukaan Serviks Persalinan Kala 1 Fase Aktif		Analisis	
	Lambat	Normal	P- Value	r
<2500	1	1	0,444	0,801
2500-3500	7	18		
>3500	1	2		

Source: Results of data processing using SPSS

## DISCUSSION

Based on PPAQ questionnaire data on primiparous mothers in Malang Health Facility in 2024. The majority of physical activity levels 7 days before labor based on Pregnancy Physical Activity Questionnaire in the mild category Light (1.5 - 3.0 METs) as many as 17 respondents (56.7%). Physical activities carried out are homework such as preparing food, playing gadgets, playing with pets, light to heavy house cleaning such as sweeping and washing clothes, and sports such as walking, pregnant women's gymnastics, and squatting. Physical activity before labor has the purpose of affecting the pelvic floor muscles and the abdominal wall muscles will become more flexible.<sup>10</sup> After further assessment, the respondent did physical activity when she had entered the active phase of labor such as ordinary walking, squatting, crub

walking, gymball, and prostration. These physical activities are useful in accelerating the descent of the fetal head through the birth canal.<sup>6</sup>

Predisposing factors have an important role in the labor process including age, education, and work. Based on the results of the study, the majority of mothers did not work. In fact, working mothers have the opportunity to do light physical activities such as walking slowly and walking fast. Educational factors also play an important role in changing a person's mindset, behavior, and decision making. The level of education plays a role in shaping a person's response to various internal and external situations. Highly educated people tend to give rational answers when gathering information compared to people with low education.<sup>10</sup> The results showed that the majority of mothers had secondary education (63.6%) so that some respondents in this study had a more rational

response, especially to the recommendations of health workers in doing physical activity before childbirth.

Maternal psychology can influence the birthing process and may change with age, with increased levels of emotional maturity tending to be better with age. The optimal age for pregnancy and childbirth is considered to be in the range of 20 to 35 years. Pregnancy under the age of 20 can cause problems because at that stage a woman's health is not fully mature.<sup>4</sup> This study found that the majority of mothers were aged 20-35 years, namely 26 people (86.7%). The majority of respondents are considered to be able to consider in planning pregnancy and childbirth. So that during pregnancy and childbirth, the majority of respondents can follow the directions of health workers to do useful things, especially for labor, such as doing physical activity.

The factor that causes labor in the first stage is power (contraction). The body's adaptation to the respiratory system in the physical activity performed causes an increase in respiratory function that can help in doing strenuous exercise or strenuous physical activity without ventilation muscle fatigue. Basically, physical activity that is recommended in the process of labor is physical exercise that has the advantage of increasing and improving the circulatory system, especially muscles, thereby increasing the strength of muscle tone in charge of inducing contractions.<sup>11</sup> Physical activity can affect the body's aerobic and cardiorespiratory abilities, resulting in an increase in maximum oxygen consumption (VO<sub>2</sub> maximum) and in turn increasing energy supply. This energy supply is important to support myometrial contractions during labor especially in the early stages.<sup>5</sup> Therefore, mothers with mild and moderate levels of physical activity have an association with the duration of cervical opening velocity.

The results showed that 21 respondents had a normal active phase I labor duration of  $\geq 1.2$  cm/hour. According to the existing theory, nulliparous is said to have a slow opening or decline if the opening speed is less than 1.2 cm/hour.<sup>10</sup> Active phase I labor can be identified by calculating the total duration of active phase I which is seen from the duration when the opening of the cervix starts 4-10 cm. The duration of labor is based on three main factors, namely the hiss and straining energy of the mother, the birth canal, and the condition of the fetus.

A possible factor that can be adjusted is the energy or strength factor, which can be increased by increasing the physical activity of pregnant women, such as exercise. This is in accordance with the research of Ikhlasiah et al. (2012), confirming that exercise during pregnancy has a positive impact on cervical opening and regulation of uterine activity during labor.<sup>2</sup> In the research of Watkins et al (2021), it was found that higher levels of physical activity during pregnancy were associated with shorter active phase I. This is associated with increased uterine activity in mothers who do physical exercise, it is possible that noradrenaline released during exercise acts as uterine stimulation which increases uterine contractility.<sup>13</sup>

There are 4 mothers who have a sedentary physical activity level, there are 3 (75%) mothers who have a duration of cervical opening speed  $< 1.2$  cm / hour. The total number of mothers with mild physical activity level is 17 people with 10 (58.8%) mothers having duration of cervical opening speed  $\geq 1.2$  cm/hour. While from 9 mothers 7 (77.7%) mothers with moderate physical activity level at 7 days before labor, the duration of cervical opening speed  $\geq 1.2$  cm/hour. Based on these data, it can be concluded that the frequency of cervical opening duration less than 1.2 cm/hour in mothers who engage in regular physical activity is higher than in mothers who do light to moderate physical activity. Fetal weight is one part of the passenger factor and can have an influence on the labor process. Passenger is one of the factors that is still possible to be manipulated or improved in order to pass the size of the birth canal. More fetal weight can cause the duration of labor to be longer.<sup>3</sup> Seeing the results of the data obtained there were 2 respondents giving birth with a condition of birth weight  $> 3500$  grams where the baby's weight tends to be large and can extend the duration of labor. However, after analysis, these 2 respondents had normal labor duration with mild to moderate physical activity levels. So that the condition of the baby's weight at birth does not affect the duration of labor during the active phase I that occurs.

In the results of bivariate analysis that has been done, the researcher gets the results of p-value = 0.049 which means p-value  $< 0.05$ . So it can be concluded that there is a relationship between the level of physical activity 7 days before labor and the duration of labor in the active phase 1 in primiparous mothers. The results of the correlation coefficient  $r =$

0.362 which can be interpreted that the two variables have sufficient strength of the relationship with a positive relationship direction which can be interpreted that the higher the level of physical activity carried out 7 days before labor, the higher the duration of the speed of opening of the cervix at stage 1 of the active phase. The results of the cross tabulation of the category of physical activity with the duration of the speed of opening of the cervix during labor I active phase, namely 7 respondents have a category of physical activity with the duration of normal cervical opening speed.

This study is in line with the findings of research (Setyorini, 2014) which shows "the relationship between the level of physical activity carried out at 37-38 weeks of gestation on the duration of labor in the active phase 1 in primigravida at BPS "Marlina, Amd.Keb" Batu City". It has also been explained in the study that "the higher the level of activity at 37-38 weeks of gestation, the faster the transition from the first stage of labor to the active stage".<sup>8</sup> The same results described in the 2019 Rodríguez et al study state that moderate physical activity during pregnancy reduces labor time compared to those who are not pregnant.<sup>7</sup>

#### LIMITATIONS OF THE STUDY

This study has been conducted according to the procedure. However, this study only focused on physical activity 7 days before labor, in fact there is a possibility of changes in physical activity in the previous weeks. This affects the measurement of physical activity categories if there is a change in physical activity 7 days before labor due to the condition of the body before labor. This can be taken into consideration in future studies related to physical activity data collection.

#### CONCLUSIONS

The results showed that there was a relationship between physical activity 7 days before labor with the duration of labor in active phase I in primiparous mothers with a positive relationship direction, meaning that the higher the level of physical activity performed 7 days before labor, the higher the duration of cervical opening speed in active phase 1 (cervical opening speed  $\geq 1.2$  cm / hour). The majority of respondents had a mild level of physical activity 7 days before labor (METs 1.5 - 3.0) such as preparing food, playing gadgets, playing

with pets, light to heavy house cleaning such as sweeping and washing clothes, and exercise such as walking, pregnant women's gymnastics, and squatting.

#### SUGESSTION

Future researchers are expected to collect physical activity data 2-3 weeks before delivery to determine the routine physical activity carried out by respondents so that the possibility of changes in physical activity that have the potential to have an impact on the results can be minimized.

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