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Page 8-14

INCREASING LABOR POWER WITH MARYAM EXERCISE: ELECTROMYOGRAM STUDY TO MEASURE CONTRACTION FORCE

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ABSTRAK

Power dalam persalinan merupakan faktor kekuatan baik primer maupun. Kontraksi uterus akan dipantau kekuatan dan durasinya baik secara manual maupun dengan alat. Kurangnya *power* ibu saat bersalin dapat menyebabkan partus lama dan berhubungan dengan perdarahan. Senam Maryam merupakan latihan prenatal islami yang dilakukan pada Ibu hamil sebagai upaya optimasi harmonisasi antara tubuh, pikiran dan jiwa Ibu hamil yang dapat meningkatkan kesehatan fisik, psikologis, sosial dan spiritual sehingga persalinan yang cepat, mudah dan aman dapat tercapai, dengan gerakan kombinasi antara latihan standar dengan gerakan postural bowing, sujud dan duduk tawaruk seperti dalam sholat disertai dzikir dapat membantu muslimah dalam mempersiapkan *power* persalinan. Penelitian ini bertujuan untuk menjelaskan efektivitas senam Maryam terhadap *power* persalinan melalui studi elektromiogram. Penelitian ini menggunakan metode eksperimental dengan kelompok control dan post test only design yang dilaksanakan pada tahun 2019 di wilayah kerja PMB Kabupaten Sleman Yogyakarta. Sampel adalah Ibu hamil primi > 32 minggu, berjumlah 23 responden dibagi 2 kelompok dengan intervensi senam Maryam dan kontrol dengan senam hamil dasar. Hasil penelitian menunjukkan Senam Maryam memiliki efektivitas yang tinggi terhadap peningkatan *power* persalinan dan direkomendasikan untuk diterapkan oleh ibu hamil yang sehat khususnya yang beragama Islam.

Kata kunci: Maryam Prenatal, Senam hamil, Persalinan, Kontraksi

ABSTRACT

Power in labor is a factor of both primary and secondary. Uterine contractions will be monitored for strength and duration either manually or with instruments. Lack of maternal power during labor can cause prolonged pain and is associated with bleeding. Gymnastics Maryam is an Islamic prenatal exercise performed on pregnant women as an effort to optimize the harmonization between the body, mind, and soul of pregnant women who can improve physical, psychological, social, and spiritual health so that fast, easy, and safe childbirth can be achieved, with a combination movement between standard exercises with postural movements of Bowing, prostration and sitting tawaruk as in prayer accompanied by dhikr can help Muslim women in preparing for labor power. This study aims to explain the effectiveness of Maryam exercise on labor power through electromyogram studies. This study used an experimental method with a control group and post-test-only design which was carried out in 2019 in the work area of Midwife Independent Practice (PMB) Sleman Regency Yogyakarta. The sample was primi pregnant women > 32 weeks, totaling 23 respondents divided into 2 groups with Maryam exercise intervention and control with basic pregnant exercise. The results showed that Maryam exercise has a high effectiveness in increasing labor power and is recommended to be applied by healthy pregnant women, especially those who are Muslim.

Keywords: *Maryam Exercise, Pregnant Exercise, Labor, Contraction*

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Page 8-14

1. INTRODUCTION

Labor is a series of processes that begins with true contractions and ends with the expulsion of the products of conception. This process is characterized by progressive changes in the cervix and ends with the birth of the placenta[1]. In Islam, childbirth has also been described as a process that is passed with pain as the story of Maryam bint Imran's labor when giving birth to Prophet Isa Alayhissalam in QS. Maryam verses 22-26. The pain felt is contraction pain as mentioned in medical science today. Various factors affect the labor process, including the 4P+H, namely Power, Passage, passenger, Position, and Helper. Power in labor is a factor of strength both primary, namely uterine contractions, and secondary, namely the encouragement of the mother's energy when defecating. Mothers who defecate during childbirth increase intra-uterine pressure by 66% and increase the rate of fetal pushes more strongly [2].

Power factors in labor care are closely monitored and maintained by the midwife or doctor assisting the labor. The strength of contractions will be monitored for strength and duration both manually and with instrumentation. The closer to labor the strength of contractions will normally be stronger, more frequent, and longer in duration. Meanwhile, the secondary power factor of the pushing force when the mother gives birth will be maintained and supported through physical strength (fitness), food and drink intake, training in the correct technique of giving birth, and the mother's psychology (confidence and enthusiasm). Lack of maternal power during labor can cause prolonged pain and is associated with bleeding. Data states that the prevalence of prolonged labor in the world ranges from 5-6.5%. However, from the results of a retrospective study in Sweden, the incidence of prolonged labor is even greater, namely 23% [3]. In the 2017 SDKI, prolonged labor was the most reported complication of childbirth at 41% [4]. In addition, prolonged labor can cause hypoxia in the fetus and is closely related to the incidence of asphyxia or respiratory distress syndrome in newborns, which is also the highest cause of death after LBW in 2022 with a proportion of 25.3%. The second highest cause of maternal mortality published by the Ministry of Health in 2023 was hemorrhage, which amounted to 741 cases [5](Seviana et al., 2023).

Various efforts have been developed to reduce mortality and morbidity due to pregnancy, childbirth, and postpartum. The government is improving access and standards of services for pregnant women, including promoting physical activity for pregnant women as a physical preparation for childbirth. Preparation for jihad on the battlefield requires physical exercise to be strong and trained when facing the enemy. Ibn Kathir (may Allah have mercy on him) said: "Allah has commanded us to prepare the means of war to fight them by our strength, potential, facilities, and capabilities. Allah, says (interpretation of the meaning): "And prepare against them whatever force you can," meaning to the best of your ability, in the form of whatever force you can muster, including tethered horses" [6]. Likewise, training for pregnant women is a physical and mental exercise in preparing for the grueling and pain-filled labor process between life and death.

e-ISSN: 2828-4569,Volume 6, No 1, 2025
https://doi.org/10.55116/IJICM.V6I1.99
Page 8-14

Physical exercise in pregnant women not only strengthens the muscles of the pelvis, arms, and legs but also the reproductive organs including the uterus and its ligaments. The older the pregnancy, the weaker the pregnant woman will be and experience increased anxiety with various discomforts due to physiological and psychological changes. This will certainly affect the mother's power later. Education and psychological support for pregnant women at this time is very important. Various studies prove that listening to the Qoran and praying is very helpful in reducing anxiety in pregnant women [7]. Murottal has also been shown to affect human health, including fetal development [8].

Indonesia is a country with a large Muslim population and complex health problems. It is a big challenge for health programs to address and try to minimize these problems. Some studies have shown that basic prenatal exercises are not effective on labor duration. Some studies on prenatal exercises that are currently developing have high effectiveness, but there are concerns that there are cultural elements that come from beliefs outside Islam. There are still many Muslimah communities that do not accept this. Maryam exercise is an Islamic prenatal exercise performed on pregnant women as an effort to optimize the harmonization between the body, mind, and soul of pregnant women who can improve physical, psychological, social, and spiritual health so that fast, easy and safe childbirth can be achieved, with a combination of standard exercises with postural movements of bowing, prostration and sitting tawaruk as in prayer accompanied by dhikr [9]. Maryam exercise can minimize the element of tasyabbuh to prenatal training that comes from cultures that have roots outside of Islam. Tasyabbuh is something that is prohibited in Islam [10]. In addition, objective evidence still needs to be revealed regarding the effectiveness of Maryam exercise on labor power.

2. METHOD

This research conducted in 2019 in the Midwife Independent Practice (PMB) Working Area, Sleman Regency, Yogyakarta. The type of research is experimental with a two-group approach with a post-test-only design. The sample size was 23 primi pregnant women with physical exercise eligibility screening Physical Activity Readiness Questionnaire (PAR-Q). Samples taken met the inclusion criteria: gestational age >32 mg, Muslim, did not have high-risk factors for pregnancy, and willing to be a respondent. Respondents may resign or stop during the research process if they are no longer willing to follow up until completion.

Exclusion criteria are pregnant women with age < 17 years and or > 35 years, have a poor obstetric history, narrow pelvis, have heart disease, lung disease, or diseases that are contraindicated with physical exercise, or cannot give birth normally. The intervention given was Maryam exercise and control with basic pregnancy exercise, each 12 times for 4 weeks. To determine the sample in the group, randomization was carried out. Measurement of contraction strength in the second stage of labor was done using an electromyograph. The device consists of a muscle sensor, Oscilloscope data acquisition, muscle sensor-electrode connector cable, oscilloscope-muscle sensor connector cable, USB connector cable, surface electrode, and USB flash disk storage.

e-ISSN: 2828-4569,Volume 6, No 1, 2025
https://doi.org/10.55116/IJICM.V6I1.99
Page 8-14

3. RESULTS

The results of this research can be seen in the following table.

Table 1. Normality Test Results for Intervention and Control Group Data

Variable	Maryam Exercise			
	Intervention (n=11)		Control (n=12)	
	Statistic	Sig	Statistic	Sig
Contraction Strength	0,948	0,614	0,940	0,501

The results of the data normality test show that the data is normally distributed (sig>0.05) so it can be continued with the t test.

Table 1. Difference in the Strength of Period II Contractions through EMG measurement

Respondent Characteristics	Intervention (n=11)	Control (n=12)	*P*
Mean (SD)	11,509(0,356)	11,008(0,357)	0,003
Minimum	10,9	10,2	
Maksimum	12,2	11,6	

This study proved that there was a significant difference in the strength of contractions in the second stage of labor between the intervention and control groups with a mean difference of 0.501 Volt. The p-value = 0.003 < α 0.05 indicates that the difference between the two groups is significant. The effectiveness of Maryam exercise on contraction strength is high with a Cohen effect size of 1.405.

4. DISCUSSION

Maryam exercise is one of the physical exercise methods for pregnant women whose movements and implementation contain Islamic values in the form of dhikr. In addition, the movements are modified with postural bowing, prostrating, and sitting tawwaruk which are applied as an effort to practice correcting these postures that have not been properly implemented before. This exercise also instills the value of patience as well as enthusiasm in welcoming the birth of the next generation of sholih/sholiha. The dhikr that is chanted or muttered throughout the exercise is "astaghfirullah, subhanallahiwabihandihi" and the Prophet Yunus' prayer "laila ha ila anta subhanaka inni kuntu minadzolimin". Dhikr can be done anytime and anywhere except for prohibited places, the command of dhikr to obey God, a powerful means of granting prayers, as a reminder of the world hereafter, sincere and confident in the help of Allah SWT [11]. Dhikr can provide control of one's emotions in responding to thinking deviations and = excessive anxiety as a concept of serious efforts to present the role of Allah Subhanahu Wata'ala in the heart and daily life both speech, words, and deeds [12]. The Qur'an

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Page 8-14

offers solutions for anxious souls to find peace, both through reading and writing taken from the text of the Qur'an, dhikr is one of them and can be a powerful psychotherapy [13].

Pain is directly proportional to the strength of contractions during labor. The stronger the contractions, the more pain the mother feels. These contractions normally take place continuously even with increasing intensity and frequency and facing this very heavy pain requires tremendous energy and patience. This of course must be trained long before it happens and this is where the role of training in Maryam exercise, training the mother's strength physically and psychologically to be steadfast and always remember Allah throughout the labor process. The strength of uterine contractions as a primary power factor in labor has appeared since the early phase of labor in the first stage. The first stage is divided into 2 phases, namely latent (cervical opening 0-3 cm) and active phase (4-10 cm). In midwifery care in labor, the strength of contractions has been monitored since the patient came to the clinic and recorded in the partograph since the active phase (opening 4 cm). The strength of these contractions is generally measured manually using feeling in the abdominal area above the fundus (top of the uterus) and calculating the frequency every 10 minutes and the duration.

Electric waves synchronized with the myometrium can trigger adequate uterine contractions, indicating that the evolution of the uterus from pregnancy to each phase of labor is due to increased stimulation and propagation of electrical activity [14]. The Action Potential measured using EMG is the value of the electrical voltage produced by the depolarization of the cell membrane that occurs suddenly[15]. Intensive measurement of contractions using external non-invasive tocodynamometry devices is generally carried out in cases of complications or contraction abnormalities in hospitals[16]. Currently, tools have begun to be developed to measure the strength of simple contractions using EMG.

This study used an electromyograph to measure the strength of contractions in the second stage of labor. This is related to the composition of the highest power factor in the second stage. In the first stage of labor, there is no transmitting activity as a secondary power factor of the laboring mother. While in the second stage, the patient is directed to push with maximum strength according to the technique taught until the baby is born. After the birth of the baby, the activity of pushing is also no longer there.

The strength of contractions in the second stage of labor in the intervention group measured using EMG showed a stronger average in the intervention group of 11.509 volts, while the control group was 11.008 volts. This measurement starts after the complete opening (10 cm) until the birth of the baby. Data storage was done several times and then contraction strength data was taken based on the highest value of Vpp (Volt Peak to Peak) displayed by the oscilloscope.

The strength of contractions in the second stage of labor is the strength or power of the laboring mother. This power consists of the strength of uterine contractions, abdominal muscles, ligaments, and other supporting muscles as well as the strength of the mother's

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Page 8-14

delivery [17]. Hence, the electrical activity and action potentials generated from contractions during labor tend to increase [14,18], and objectively measured intra-uterine pressure using a device in stage 2 can increase by approximately 66% from stage 1 [2,14,17]. Unfortunately, the two primary and secondary power factors cannot be distinguished objectively through the results of this study. Maryam exercise has a significant effect on contraction strength (p=0.003) with high effectiveness (1.405). Maryam exercise is a combination of basic pregnancy exercises and postural prayer movements. Pregnant exercise has been shown to affect the quality of prenatal contractions [19] and postural prayer movements have been shown through EMG recording to produce agonist-antagonist movements that are important for muscle strength and health [20]. These contractions at stage 2 are the power that affects the labor process. Power at stage 2 includes contractions of the uterus, ligaments, abdominal muscles, and muscles associated with the process of defecation. In addition, the mother's strength in defecating is a secondary power [17].

5. CONCLUSION

Maryam exercise is an exercise method with Islamic values where the movements are modified from basic pregnancy gymnastics movements and postural bowing, prostrating, and sitting tawwaruk in prayer accompanied by dhikr. It is recommended for pregnant women, especially for those who are Muslim. Maryam Exercise has been proven to have high effectiveness in increasing labor power.

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Page 8-14

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