

Original Research Article

The Effect of Fetal Weight and Uterine Contractions on the Duration of Labor

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Abstract: Background: Prolonged labor is defined as labor that has lasted 12 hours or more but is not followed by birth. The incidence of prolonged labor is quite high; it is known that 1 in 5 maternity mothers experience prolonged labor. The case of prolonged labor is included in the list of the 10 highest cases at Srikandi General Hospital Jember, Indonesia. Prolonged labor lasting > 12 hours is associated with severe postpartum hemorrhage, which is the second leading cause of death in East Java and the leading cause of maternal death in Jember Regency. Several factors are thought to affect the duration of labor including uterine contractions and fetal weight. **Purpose:** This study aims to determine the effect of fetal weight and uterine contractions on the duration of labor at Srikandi IBI General Hospital, Jember, East Java, Indonesia. **Methodology:** This is an observational analytic study using a cross-sectional design. The population consists of mothers who give birth at Srikandi General Hospital, Jember: 119 mothers who give birth with a sample size according to the Slovin formula of 92 mothers who give birth determined through Systematic Random Sampling. Research variables were assessed through partographs. Data were analyzed by path analysis. **Findings:** fetal weight has no significant effect on the duration of labor in both the first and second stages (t value = -0.07; 0.91). Uterine contractions had a significant effect on the duration of the second stage (t value = -2.22; -3.65) but did not significantly affect the duration of the first stage of labor (t value = -0.73; -1.13). **Conclusion:** This study shows that the more adequate uterine contractions, the shorter the duration of the second stage of labor. There may be other factors that influence the duration of labor including age, parity, nutritional status, maternal nutrition, psychology, family assistance, and non-pharmacological care. Further research is needed to examine the effect of these variables on labor.

Keywords: Fetal weight, uterine contractions, duration of labor.

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INTRODUCTION

Prolonged labor is defined as labor that has lasted 12 hours or more but is not followed by the birth of a baby. In some cases, it was found that the cervix did not dilate more than 4 cm after 8 hours of adequate contraction. Prolonged labor can also be indicated by an image of the cervical dilatation shifting to the right of the alert line on the partograph. Women with complete dilatation and have an urge to squeeze, but not accompanied by descent of the lowest part of the fetus are often classified as obstructed in the second stage of labor progress (World Health Organization, 2017). The incidence of prolonged labor is quite high, it is known that 1 in 5 maternity mothers experience prolonged labor (Nystedt and Hildingsson, 2014). Research at Oslo University Hospital and Drammen Hospital in

Buskerud found that prolonged labor lasting > 12 hours was associated with severe postpartum hemorrhage (Nyfløt *et al.*, 2017). The Indonesia Health Profile 2020 reports that 127 of 226 mothers died in East Java due to bleeding with a percentage of 56.2%, which is also the second cause of death (Dinas Kesehatan Provinsi Jawa Timur., 2020). Bleeding is the main cause of maternal death in Jember where it is known that at least 22 mothers died from bleeding out of 61 maternal deaths (Dinas Kesehatan Provinsi Jawa Timur., 2020). Thus, prolonged labor is an indirect cause of maternal mortality. The labor process is influenced by 3 main factors, namely power (uterine contractions and exertion), passage (birth canal conditions), passanger (fetus, placenta and membranes) (Subramaniam A, Alan, Tita, 2020). Research by Qonitun and Fadilah

shows that power is the most dominant factor in influencing labor duration (Umu Qonitun and Siti Nur Fadilah, 2018). Several studies reveal that BMI, increase in maternal weight during pregnancy, uterine contractions, location and weight of the fetus significantly affect the incidence of prolonged labor (Sri Yohanna, 2016; Hong and Paek, 2018) . Cases of prolonged labor are included in the list of the 10 highest cases handled at Srikandi General Hospital Jember, Indonesia. Throughout 2021, there were 139 patients treated with a diagnosis of prolonged first stage and 125 patients treated with a diagnosis of prolonged second stage (RSU Srikandi Jember, 2022). Seeing the magnitude of the impact of prolonged labor, this study aims to determine the effect of fetal weight and uterine contractions on the duration of labor. Similar research has never been performed at Srikandi General Hospital Jember, East Java, Indonesia. By knowing the factors that influence the duration of labor, it is expected that efforts can be made to prevent prolonged labor.

EXPERIMENTAL SECTION

This type of research is an observational analytic study using a cross-sectional design. This research is an explanation (explanatory or confirmatory) the subjects of this study were mothers who gave birth at Srikandi General Hospital Jember with a population according to the average number of deliveries per month: 119 deliveries. The sample size was determined

based on the Slovin formula, which dictates the minimum sample in this study to be 92 deliveries. Sampling technique is using Systematic Random Sampling. Deliveries with medical interventions in the form of accelerated labor or planned caesarean sections were not sampled in this study, because they could affect the variable duration of labor. Variables of fetal weight and uterine contractions as well as duration of labor were assessed through a research instrument in the form of a partograph which is commonly used in the supervision of normal delivery care (Adriandz, 2016). The data obtained is then analyzed by path analysis because it has more than 1 dependent variable. The results of the analysis are concluded based on the t-value, where t-value > 1.96 is equivalent to p value < 0.05 which indicates a significant influence between variables, thus otherwise (Latan H, 2013).

RESULTS AND DISCUSSION

The fetal weight variable was assessed in grams; the uterine contraction variable was assessed based on the frequency of contractions in 10 minutes and the duration of contractions in seconds. The independent variable, namely the duration of labor was assessed as the average time of opening in the first stage and the length of the second stage in minutes. All research variables are ratio data, and statistical testing with path analysis was carried out with the results as listed in table 1.

Table 1: Analysis of the effect of dependent variables on independent variables

Independent Variable	Dependent Variable	t-value	Estimate	Notes
Contraction frequency	Stage Duration I	-0,73	-0,11	Insignificant
	Stage Duration II	-2,22	-0,26	Significant *
Contraction duration	Stage Duration I	-1,13	-0,17	Insignificant
	Stage Duration II	-3,65	-0,43	Significant*
Fetal weight	Stage Duration I	-0,07	-0,01	Insignificant
	Stage Duration II	0,91	0,07	Insignificant

Based on the results of the analysis, it is known that uterine contractions, both frequency and duration, have a significant effect on the duration of the second stage of labor, with t values of -2.22 and -3.65, respectively (t-value > 1.96, equivalent to p-value <0.05). The direction of the influence of these variables is negative, which means that the more frequent and the longer duration of uterus contractions, the shorter the duration of the second stage of labor. The second stage of labor is a period marked by the complete opening of the cervix until the fetus is born. (World Health Organization, 2018) states that in the second stage there is an expulsive uterine contraction which causes a woman to have an unconscious desire to push and expulsion of the fetus occurs. In the second stage, the mother increases uterine contractions that are already adequate with an increase in intra-abdominal pressure as a result of her contracting the diaphragm and abdominal wall muscles. Thus, the fetus is encouraged to open the pelvic diaphragm and vulva, so that the

duration of the second stage is more efficient (Saifuddin, 2016). The results of this study are also in line with research from (Ardhiyanti and Susanti, 2016) which states that uterine contractions < 2 times in 10 minutes with a duration of < 40 seconds increase the incidence of prolonged labor, which means that if the contractions are adequate, then labor will be more effective. Thus, this supports the results of research (Ardhiyanti and Susanti, 2016) which states that power is the most dominant factor in influencing the duration of labor.

Nevertheless, the results of this study indicate that uterine contractions, both their frequency and duration, do not have a significant effect on the duration of the first stage of labor. Meanwhile, fetal weight has no significant effect on the duration of labor both in the first and second stages, where this variable has a t value < 1.96. This is not in line with several previous studies which state that contractions and fetal weight affect the

duration of labor (Nisa and Rizki, 2015; Sri Yohanna, 2016; Hong and Paek, 2018; Umu Qonitun and Siti Nur Fadilah, 2018). The results of this study indicate the possibility of other factors that affect the duration of labor including maternal age. As opinion (Nisa and Rizki, 2015; Ardhiyanti and Susanti, 2016; Chen *et al.*, 2018; Lundborg *et al.*, 2021), maternal age < 20 years and > 35 years have a tendency to have a longer duration of labor. In this study, the age of the respondents was not homogeneous, where there were still 23.9% of respondents who were at an age prone to experiencing prolonged labor. Another factor that may affect the duration of labor is parity, which according to (Nisa and Rizki, 2015; Fatriyani Ishmah, 2020) in their study stated that primigravida had the potential for longer labor duration than multigravida. In this study, there are still 42.39% of respondents who are primigravida, so it is possible that this can also be a bias in the results of the study.

Friedman in (World Health Organization, 2018) explained that the clinical picture of uterine contractions, frequency, intensity, and duration cannot be relied upon to measure the progress of labor which is identical to the duration of labor. What is useful for assessing the progress of labor is the dilatation and descent of the fetus, which may be influenced by several factors. Different nutritional intakes allow different energy adequacy so that it can result in differences in the duration of labor as research (Delpisheh, 2013; Febriyanti and Moita, 2018; Hadiani and Resmana, 2018). The nutritional status of obese mothers is thought to prolong the duration of labor (Carlhäll, Källén and Blomberg, 2013). Mothers giving birth with husband and family assistance may have a shorter duration of labor (Delpisheh, 2013; Di, Curug and Ii, 2018) because it affects the psychology which is one of the important factors in influencing the duration of labor (Evi Soviati, 2016). (Delpisheh, 2013) mentions several non-pharmacological cares such as Massage, Birth ball; Acupressure, Water birth delivery and parturient position are considered as factors that influence the duration of labor. In this study, several factors that influence the duration of labor have not been controlled, where age and parity still vary. Meanwhile, nutritional status, nutrition, psychology, and husband/family assistance, as well as non-pharmacological care have not been studied. Thus, further research is needed by controlling several supporting and inhibiting factors that also affect the duration of labor, as well as increasing the sample size so that it can be known with certainty the effect of contractions and fetal weight on the duration of labor.

CONCLUSION

Based on the results of this study, it can be concluded that adequate uterine contractions can affect the efficiency of the duration of the second stage of labor but have no effect on the duration of the first stage of labor. Meanwhile, the weight of the fetus does not

affect the duration of labor either in the first or second stages.

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REFERENCES

- Adriandz (2016) *Buku Acuan Persalinan Normal*.
- Ardhiyanti, Y., & Susanti, S. (2016). Faktor Ibu yang Berhubungan dengan Kejadian Persalinan Lama di RSUD Arifin Achmad Pekanbaru. *Jurnal Kesehatan Komunitas*, 3(2), 83–87. Available at: <https://doi.org/10.25311/keskom.vol3.iss2.108>.
- Carlhäll, S., Källén, K., & Blomberg, M. (2013) 'Maternal body mass index and duration of labor', *European Journal of Obstetrics and Gynecology and Reproductive Biology*, 171(1), 49–53. Available at: <https://doi.org/10.1016/j.ejogrb.2013.08.021>.
- Chen, H., Cao, L., Cao, W., Wang, H., Zhu, C., & Zhou, R. (2018). Factors affecting labor duration in Chinese pregnant women. *Medicine*, 97(52), 1-8. Available at: <https://doi.org/10.1097/MD.00000000000013901>.
- Delpisheh, A. (2013) 'Bpjuv06I02P161-167', 6(2), pp. 161–167.
- Di, P., Curug, K. S., & Ii, L. K. (2018) 'Juni, Tahun 2018 : 86 -93', 3, pp. 86–93.
- Dinas Kesehatan Provinsi Jawa Timur. (2020). Profil Kesehatan Provinsi Jawa Timur 2019. *Dinas Kesehatan Provinsi Jawa Timur.*, p. tabel 53. Available at: www.dinkesjatengprov.go.id.
- Evi, S. (2016). Faktor-Faktor Yang Berhubungan Dengan Lama Persalinan Di Rsd'45 Kuningan Jawa Barat Tahun 2015. *Midwife Journal*, 2(1), 33–43. Available at: <https://media.neliti.com/media/publications/234056-faktor-faktor-yang-berhubungan-dengan-la-a95339f3.pdf>.
- Fatriyani Ishmah, D. (2020). Perbedaan Lama Persalinan Pada Primigravida Dan Multigravida. *Jurnal Ilmu ...*, 6, 82–90. Available at: <http://jurnalilmukebidanan.akbiduk.ac.id/index.php/jik/article/view/125%0Ahttps://jurnalilmukebidanan.akbiduk.ac.id/index.php/jik/article/download/125/115>.
- Febriyanti, S. N. U., & Moita, P. H. (2018). Perbedaan Lama Persalinan Ibu Bersalin Yang Diberikan Susu Formula dan. *The Prosiding Seminar Nasional Unimus*, 1, 164–169.
- Hadiani, D. N., & Resmana, R. (2018). Kemajuan Persalinan Berhubungan Dengan Asupan Nutrisi.

- Care : Jurnal Ilmiah Ilmu Kesehatan*, 6(3), 231. Available at: <https://doi.org/10.33366/cr.v6i3.993>.
- Hong, Y. C., & Paek, U. S. (2018). Factors prolonging the duration of the second stage of labor. *JMS - Journal of Medical Society*, 32(2), 128–134. Available at: https://doi.org/10.4103/jms.jms_36_18.
 - Latan, H. (2013). *Structural Equation Modeling Konsep Dan Aplikasi Menggunakan Program LISREL 8.80*.
 - Lundborg, L., Liu, X., Åberg, K., Sandström, A., Tilden, E. L., Stephansson, O., & Ahlberg, M. (2021). Association of body mass index and maternal age with first stage duration of labour. *Scientific reports*, 11(1), 1-10. Available at: <https://doi.org/10.1038/s41598-021-93217-5>.
 - Nisa, F., & Rizki, L. K. (2015). Analysis of The Factors Affecting The First Stage of Labor Length Period in Lilik Maternity Hospital Sidoarjo. *International Nursing Conference: The Proceeding of The 7th International Nursing Conference. Surabaya* [Preprint].
 - Nyfløt, L. T., Stray-Pedersen, B., Forsen, L., & Vangen, S. (2017). Duration of labor and the risk of severe postpartum hemorrhage: a case-control study. *PloS one*, 12(4), e0175306. Available at: <https://doi.org/10.1371/journal.pone.0175306>.
 - Nystedt, A., & Hildingsson, I. (2014). Diverse definitions of prolonged labour and its consequences with sometimes subsequent inappropriate treatment. *BMC Pregnancy and Childbirth*, 14(1), 1–11. Available at: <https://doi.org/10.1186/1471-2393-14-233>.
 - RSUD Srikandi Jember. (2022). *Daftar 10 Besar Penyakit Rawat Inap*.
 - Saifuddin, A. (2016). *Ilmu Kebidanan Sarwono Praawirohardjo Edisi Keempat, cetakan Kelima*.
 - Sri Yohanna, W. (2016). Analisis Faktor-Faktor Yang Berhubungan Dengan Persalinan Lama Analysis of Factors Related to the Old Labor.
 - Subramaniam, A, & Alan Tita, J. R. (2020). *Obstetric Management of Labour and Vaginal Delivery. In: Chestnit's Obstetric Anesthesia*.
 - Umu, Q., & Siti Nur, F. (2018). Faktor Persalinan Lama Pada Ibu Bersalin di Rsud Tuban. *Jurnal Kesehatan*, 7(1), 51–57. Available at: [Journal.stikesdrsoebandi.ac.id](http://journal.stikesdrsoebandi.ac.id).
 - World Health Organization. (2017). *Managing Complications in Pregnancy and Childbirth, Integrated Management of Pregnancy And Childbirth*.
 - World Health Organization. (2018). *Intrapartum care for a positive childbirth experience*. Available at: <http://apps.who.int/iris/bitstream/10665/260178/1/9789241550215-eng.pdf?ua=1%0Ahttp://www.who.int/reproductivehealth/publications/intrapartum-care-guidelines/en/>.

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