

Intervention of Kusuma Milk-Shake Drink on Cervical Dilatation and Duration of Labor: Experience from Bengkulu, Indonesia

Dwie Yunita Baska, Elly Wahyuni, Nispi Yulyana

Department of Midwifery, Polytechnic of Health-Ministry of Health Bengkulu, Indonesia

Abstract

Background: Labor processes require energy consumption regulated by a complex nervous system and hormonal response. Thus, the intensity of maternal nutritional intake since pregnancy should be highly considered for physiological delivery. Nutrients that are high in energy and provide fast-decomposing glucose intake should be chosen by the mothers. Kusuma is a kind of drink made from dates, milk, and honey. This study aimed to analyze the effect of Kusuma milk-shake drink implementations on cervical dilatation and duration of labor.

Methods: An experimental study was conducted by post-test only with a controlled group design, including 34 mothers with term pregnancy, which was intervention groups and controls. A completely randomized design in two different places was conducted. Data were analyzed using Shapiro-wilk, independent sample T-test, and Mann-Whitney.

Results: There was a significant effect of Kusuma milk-shake implementation on cervical dilatation ($p=0.000$). The dilatation process was found to be 5.5 times faster, and the duration of labor ($p=0.000$) was observed to be 9.7 hours faster than the control group.

Conclusions: Implementation of the Kusuma milk-shake has a significant effect on the acceleration of cervical dilatation and the duration of labor. This research is expected to improve the quality of midwifery services as an effort to realize the concept of a Continuum of Obstetric Care.

Keywords: Cervical dilatation, duration of labor, Kusuma milk-shake

Introduction

Based on the World Health Organization (WHO), 70–80% of pregnant women are estimated to have a low mortality risk during childbirth to postnatal period.¹ Southeast Asia is accounted for approximately 1/3 of global maternal deaths. The Indonesian Basic Health Research 2018 results indicated a maternal mortality rate (MMR) of 305 per 100,000 live births, while the maternal mortality ratio in Bengkulu Province was reported an MMR of 111 per 100,000 live births.² High cases of MMR are found in mothers during the labor or postpartum phases.³ Labor is a series of processes by which the products of conception, which first stage of labor begins with regular uterine contractions and ends with complete cervical dilatation at 10 cm.^{3,4} Labor processes require energy consumption, which is regulated by a complex nervous system and hormonal response. Hormonal

and metabolic changes as well as physical and psychological adjustments during labor may lead to energy imbalances (impaired glucose homeostasis) and mental stress, which in turn can cause the mother to experience fatigue during the labor process.^{5,6} Energy imbalance during labor can inhibit the action of glycolytic enzymes and interfere with chemical reactions in muscle cells, resulting in the inhibition of muscle contraction and cervical dilatation.⁷ Weak uterine contractions or inadequate contractions are caused by non-smooth labor.^{8,9}

One of the non-pharmacological therapies to trigger the performance of the oxytocin hormone and accelerate the first stage of labor is to consume fresh dates (*Phoenix Dactylifera*),⁷ which have important nutrients. The sugar content in dates can be directly absorbed by the body. Several studies indicate that dates are able to induce labor and stimulate the infant to be easily expelled from the uterus.

Correspondence: Dwie Yunita Baska, SST, M.Keb, Department of Midwifery, Polytechnic of Health-Ministry of Health Bengkulu, Jalan Indragiri 3 Padang Harapan, Bengkulu, Indonesia, E-mail: baskadwi@gmail.com

Spontaneous births occurred in 96% of pregnant women who have consumed dates compared to 79% of pregnant women who did not.¹⁰⁻¹² Dates contain high proportions of carbohydrates, B vitamins, calcium, magnesium, potassium, and phytochemicals (carotenoids, polyphenols, tannins, and sterols), which have been shown a beneficial effect for health, especially pregnant women. These fruits have been traditionally consumed during pregnancy or the postpartum as one of the most common fruits in various regions across Asia and Africa.^{9,13,14} This herbal also contains the hormone potuchin, 3 a type of oxytocin hormone, which is responsible for triggering contractions of the uterine muscles during the labor process, and also helps shrink the uterus to reduce postpartum bleeding.^{13,15} Energy requirements during labor are approximately 50–100 kcal/hour to prevent maternal exhaustion and dehydration.^{16,17} Insufficient energy during the labor process will cause the mother to be exhausted.¹⁸ These conditions will affect the adequacy of uterine contractions and cervical dilatation, which can increase the risk of prolonged labor.^{18,19} It is estimated that 8% of all women giving birth are affected by prolonged labor, with a prevalence of 33% being primiparous and 7% being multiparous. Prolonged labor is able to increase maternal complications, including postpartum hemorrhage and infection, and may increase the risk of fetal distress and asphyxia in the newborn.^{6,20}

Good nutritional intake is essential to supply the energy demand for uterus contraction.¹² Ideal nutrition for women during pregnancy and childbirth should be in the form of foods that are high in carbohydrates, high in calories, and low in residue, as well as in liquid or semi-solid form.^{7,17} Therefore, the aim of the study was to analyze the effect of Kusuma's milkshake drink on women during pregnancy until delivery, particularly related to cervical dilatation and duration of labor.

Methods

This research was experimental, with a post-test only with a controlled group design. A completely randomized design and a simple computer randomization method was performed.^{5,10} This research was carried out at two independent midwifery practices (IMP) in Bengkulu City, from August to November 2021. Ethical clearance was obtained from the Research and Development Unit of the Health Polytechnic, Ministry of Health, Bengkulu, with

the ethical No. KEPK.M/175/10/2021.

All third-trimester pregnant women aged 21–35 years with a gestational age of 37–40 weeks term pregnancy were included. The inclusion criteria in this research were nulliparous/primigravida and multigravida women, singleton pregnancy with a cephalic presentation, had no history of medical and obstetric problems during pregnancy, no obstetrics complications and chronic disease designated as having low-risk pregnancy, never had an elective cesarean section due to fetal distress, and was willing to consume nutritional dates milk-shakes regularly. This Kusuma milkshake was made using 6 grains (\pm 60–67 grams) of Premium Tunisia Dates that had been pulverized and separated from the seeds, which were then shaken together with Ultra High Temperature (UHT) milk (150–200 mL), and \pm 15 grams/1 table spoon honey, before consumption. This treatment was given for approximately 4 weeks and was consumed once a day until the in-partu phase. The sample size was determined using the Lemeshow formula, recruiting 34 mothers with a-term pregnancies which were 17 mothers as the intervention group and 17 as the control group). In the control group, mothers were asked to consume fruit juices or local fruit juices provided by the researcher.

The data were analyzed using the SPSS-26 computerized system by testing the normality of the data prior to performing parametric statistical analysis through the Kolmogorov-Smirnov test and the Shapiro-wilk test. Furthermore, the homogeneity test (optional) was then carried out, followed by an independent sample t-test if the data were normally distributed, or the Mann Whitney test if the data were not normally distributed.

Results

The difference in the mean results of cervical dilatation measurements in the control group and the intervention group effect of Kusuma milk-shake was shown in Table 1, the effect of Kusuma milk-shake intervention on cervical dilatation during labor was shown in Table 2, and the effect of Kusuma milk-shake intervention on the duration of labor was shown in Table 3.

The average cervical dilation of the intervention group compared to the control group was 6.53 cm \pm 1.281 vs. 3.18 cm \pm 0.951, respectively, which was significantly different ($p=0.000$). There was an effect of date milkshake intervention on cervical dilatation

Table 1 Mean Differences in Cervical Dilatation and Labor Duration between Women Who Consumed Kusuma Milk-shake and Those Who Did Not During Normal Vaginal Delivery

| Variable | Control Group | | | | Intervention Group | | | |
|--------------------------|---------------|-----|------|-------|--------------------|-----|------|-------|
| | Min | Max | Mean | SD | Min | Max | Mean | SD |
| Cervical Dilatation (cm) | 2 | 5 | 3.18 | 0.951 | 4 | 8 | 6.53 | 1.281 |
| Labor Duration (hours) | 5 | 11 | 7.00 | 1.904 | 3 | 5 | 4.12 | 0.697 |

Table 2 Effect of Giving Kusuma Milk-Shake on the Cervical Dilatation Process in Women with Normal Vaginal Delivery

| Cervical Dilatation | Ranks of Mann-Whitney Test | | | Result (%) | Z | p-value |
|--------------------------|----------------------------|-------|--------------|------------|--------|---------|
| | N | Mean | Sum of ranks | | | |
| Cervical Dilatation (cm) | 17 | 9.32 | 158.50 | 5.50 | -4.842 | 0.000 |
| Labor Duration (hours) | 17 | 25.68 | 436.50 | | | |

Table 3 Effect of Giving Kusuma Milk-Shake on the Duration of Labor in Women with Normal Vaginal Delivery

| Labor Duration | Ranks of Mann-Whitney Test | | | Result (%) | Z | p-value |
|--------------------------|----------------------------|-------|--------------|------------|--------|---------|
| | N | Mean | Sum of ranks | | | |
| Cervical Dilatation (cm) | 17 | 25.26 | 429.50 | 12.5 | -4.654 | 0.000 |
| Labor Duration (hours) | 17 | 9.74 | 165.50 | | | |

during labor in women with normal vaginal delivery. The average range of labor dilatation was found to be 5.5 times faster than the control group.

Moreover, the control group needed a longer labor duration of 7 hours±1.904 compared to the intervention group, which only needed 4.12 hours±0.697 duration of labor (p=0.000). There was an effect of the date milk-shake intervention on the duration of labor in women with normal vaginal delivery. The labor dilatation was found to be 5.5 times faster in the intervention group compared to the control group.

Discussion

The basic ingredients of the Kusuma milk-shake drink are dates, milk, and honey, which are high in nutrients and benefits. The drink does not provide harmful side effects to the health of the mother and fetus. This study has shown that the process of cervical dilatation is 5.5 times faster during labor, which would likely accelerate of labor's progress. This

is evidenced by the existence of significant difference in the average duration of labor. Physiological labor occurs in a short time without complications. Active labor can be diagnosed accurately once the cervix is dilated to about 5 cm or more and uterine contractions have started to become adequate.^{3,21} The progress of labor is well monitored through partograph sheets, which can also assess the welfare of the fetus during the labor process. The progress of the second stage of labor, which lasts 1 to 2 hours, is monitored to ensure fetal safety.¹⁶ Inadequate uterine activity might significantly lead to abnormal labor.²⁰ Thus, several important issues that should be highly considered during the labor process, include the need for fluid nutrition and energy intake from decomposing semi-solid foods, such as Kusuma milk-shake, all of which are to support the mother's caring and loving attitude, as well as a gentle delivery process without other interventions, that may endanger the safety of mother and fetus.^{11,17,21}

Dates contain certain stimulants that strengthen the uterine muscles in the

last few months of pregnancy, specifically strengthening uterine contractions during labor.¹⁸ Dates are known as fruits with high nutrient content, such as carbohydrates, fiber, calcium, potassium, B complex vitamins, magnesium, and iron. Dried dates contain 70% carbohydrates compared to wet dates, which contain 60% carbohydrates in the form of glucose and fructose. These two types of sugar do not have harmful effects as they are processed from natural sources. This natural glucose and fructose are easily absorbed by the body and are able to replace lost energy.^{10,22,23} Consequently, the energy from the sugar produced is essential for increasing strength during labor. In addition, dates contain the hormone potuchin,^{3,13,24} the hormone that is able to bind the uterus and uterine muscles, thereby reducing postpartum bleeding.^{3,25} The oxytocin hormone can help stimulate contractions in the uterine muscles and facilitate labor process. This hormone also stimulates the contraction of the veins around the mother's breasts, stimulating the mammary glands to produce breast milk.^{12,26,27}

Women of reproductive age who consume dates during the last trimester of pregnancy have been shown to have an increasing cervical dilatation compared to women who did not.²⁸ However, the type of delivery between the groups is not different in those who consumed dates and those who did not.^{12,28} In this study, the Kusuma milk-shake has an effect on the duration of labor duration by 12.5%. The faster the duration of labor is experienced by mothers who give birth through spontaneous vaginal delivery.^{14,29} The intervention group administered the date milk-shake drink was more effective than the control group.

Active labor can be diagnosed accurately once the cervix has dilated to about 5 cm or more with uterine contractions. Once the threshold for cervical dilatation is reached, normal progression of delivery can be expected, depending on parity, within 4 to 6 hours.^{1,8} Progress during the first 2 hours in the second stage of labor is monitored to ensure fetal safety. Consequently, normal delivery is unrealistic for most women, regardless of parity, while unassisted women would spontaneously deliver within about 10 hours of delivery as the ideal time.¹⁸ Inadequate uterine activity is considered to be the cause of the increasing number of abnormal labor.^{7,21} Thus, other interventions should be highly considered before cesarean delivery is resorted to for the management of non-progressive labor.^{6,20}

Interestingly, previous research has shown that dates are high in prostaglandins. Thus, it might be useful in the labor process. Prostaglandins are formed in the uterus in response to the secretion of oxytocin and Corticotropin-releasing hormone (CRH). Prostaglandins have been found to be very effective in stimulating uterine muscle contractions. During labor and delivery, prostaglandins may increase uterine contractions stimulated by oxytocin.^{19,21} The consumption of dates provides an effect on the progress of labor.¹⁸ Similar research also indicated that dates are able to induce labor and stimulate the infant to be easily expelled from the uterus. Spontaneous births occurred in 96% of pregnant women who consumed dates compared to 79% of pregnant women who did not. Moreover, the use of oxytocin for labor induction was significantly lower in women who consumed dates (28%) compared to women who did not (47%), and the latency period was shorter in pregnant women who consumed dates.^{10,11}

The limitation of the study is the fact that the exact macro and micro nutrient have not been fully explored. Collaboration for further study on the potential of dates is needed to design the Kusuma milk-shake industry.

In conclusion, the implementation of Kusuma milk-shake has proven to have a significant effect on the acceleration of cervical dilation and the duration of labor. Furthermore, this intervention may improve the quality of midwifery services independently as well as in other health care facilities, as an effort to prevent complications during childbirth, and realize the concept of Continuum of Obstetric Care.

References

1. Hogan DR, Stevens GA, Hosseinpoor AR, Boerma T. Monitoring universal health coverage within the Sustainable Development Goals: development and baseline data for an index of essential health services. *Lancet Glob Health*. 2018;6(2):e152–e168
2. Dinas Kesehatan Provinsi Bengkulu. Profil kesehatan Provinsi Bengkulu 2018. Bengkulu: Dinas Kesehatan Provinsi Bengkulu; 2019.
3. Kuswati K, Handayani R. Effect of dates consumption on bleeding, duration, and types of labor. *J Midwifery*. 2019;4(1):85–91.
4. Luwarsih HW, Ruhjana R. Analisis faktor-

- faktor yang berhubungan dengan jenis persalinan pada ibu hamil di Puskesmas Temon I Kulon Progo [Minor thesis]. Sleman: Universitas 'Aisyiyah Yogyakarta; 2014.
5. Ozkan SA, Kadioglu M and Rathfisch G. Restricting oral fluid and food intake during labour: a qualitative analysis of women's views. *Int J Caring Sci.* 2017;10(1):235-242
 6. Jayanti ID. Lama kala I fase aktif ibu bersalin yang mengkomsumsi asupan sari kurma dan air gula. *Oksitosin.* 2014;1(1):13-17.
 7. Martasari BL, Cahyadi W, Nugraha GI, Husin F, Susiarno H, Hidayat YM, et al. The effect of mixed-fruit juice on uterine contractions and cervical dilatation during the first stage of delivery. *Glob Med Health Commun.* 2019;7(1):7-14.
 8. GBD 2019 Universal Health Coverage Collaborators. Measuring universal health coverage based on an index of effective coverage of health services in 204 countries and territories, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet* 2020;396(10258):1250-1284.
 9. Ahmed IE, Mirghani HO, Mesaik MA, Ibrahim YM, Amin TQ. Effects of date fruit consumption on labour and vaginal delivery in Tabuk, KSA. *J Taibah Univ Med Sci.* 2018;13(6):557-563.
 10. Nasiri M, Gheibi Z, Miri A, Rahmani J, Asadi M, Sadeghi O, et al. Effects of consuming date fruits (*Phoenix dactylifera* Linn) on gestation, labor, and delivery: an updated systematic review and meta-analysis of clinical trials. *Complement Ther Med.* 2019;45:71-84
 11. Al-Kuran O, Al-Mehaisen L, Bawadi H, Beitawi S, Amarin Z. The effect of late pregnancy consumption of date fruit on labour and delivery. *J Obstet Gynaecol.* 2011;31(1):29-31.
 12. Romadloniyah NS, Oktaviani FN, Arifin I. Kurma (*Ruthab*) untuk mencegah keguguran dan melancarkan persalinan. *An-Nadaa.* 2020;7(1):55-60.
 13. Chen M, Zadok E. Kurma; secure geodistributed multi-cloud storage gateways. *Proceedings of The 12th ACM-International System and Storage Conference; 2019 June 3-5; Haifa, Israel.* New York: Association for Computing Machinery; 2019.
 14. Primurdia EG, Kusnadi J. Aktivitas antioksidan minuman probiotik sari kurma (*Phoenix dactylifera L.*) dengan isolat *L. plantarum* dan *L. casei*. *Jurnal Pangan dan Agroindustri.* 2014;2(3):98-109.
 15. Mohammadierad R, Mohammad-Alizadeh-Charandabi S, Mirghafourvand M, Fazil F. Effect of saffron with or without date sugar on intensity of pain and anxiety during labor in primiparous females: a randomized, controlled trial. *Iran Red Crescent Med J.* 2018;20(S1):e61289.
 16. Kordi M, Meybodi FA, Tara F, Nematy M. The effect of date consumption in late pregnancy on the onset of labor in nulliparous women. *Iran J Obstet Gynecol Infertil.* 2013;16(77):9-15
 17. Kordi M, Meybodi FA, Tara F, Fakari FR, Nemati M, Shakeri M. Effect of dates in late pregnancy on the duration of labor in nulliparous women. *Iran J Nurs Midwifery Res.* 2017;22(5):383-7.
 18. Suroso S, Paryono P. Pengaruh konsumsi sari kurma pada akhir kehamilan terhadap kemajuan persalinan kala I dan jumlah perdarahan saat persalinan pada primipara di wilayah kerja Puskesmas Klanten Selatan. *Interest.* 2016;5(1):41-5.
 19. Saragih EFM, Kumorowulan S, Fatmsari D. The effect of dates palm (*Phoenix dactylifera*) on uterus involution among mother with postpartum. *IJNHS.* 2020;3(3):430-5.
 20. Purnama Y, Dewiani K, Yusanti L. Effect of labor camera on the duration of the second stage labor in primipara. *GMHC.* 2021;9(2):103-9.
 21. Astari RY, Dewi DY. Konsumsi kurma pada akhir kehamilan terhadap percepatan kala 1 persalinana. *Wellness Health Mag* 2019;1(2):177-85.
 22. Ali Z, Li J, Zhang Y, Naeem N, Younas S, Javeed F. Dates (*Phoenix dactylifera*) and date vinegar: preventive role against various diseases and related in vivo mechanisms. *Food Rev Int.* 2022;38(4):480-507.
 23. Zulfadli Z. Kurma dalam al-Quran (kajian tahlili terhadap QS. Maryam/19:25-26) [Minor thesis]. Gowa: UIN Alauddin Makassar; 2015.
 24. Agustina E, Purnamasari R, Lusiana N. Effect of extract meat dates (*Phoenix dactylifera L*) to oxytocin levels in pregnant mice (*Mus musculus L*). *Health Notions.* 2017;1(2):71-5.
 25. Taavoni S, Fathi L, Nazem Ekbatani N, Haghani H. The effect of oral date syrup on severity of labor pain in nulliparous. *Shiraz E-Med J.* 2018;20(1):e669207.
 26. Fitriyana NI. Potensi bioaktivitas pangan fungsional dari edamame (*Glycine max L.*) dan kurma (*Phoenix dactylifera L.*)

- untuk peningkatan kualitas asupan gizi kelompok rawan pangan 1000 HPK (ibu hamil, ibu menyusui, anak dibawah 2 tahun) di wilayah lingkaran kampus Universitas Jember. In: Nurismanto R, Rosida DF, Hapsari N, editors. Prosiding Seminar nasional: pengembangan sumber daya lokal untuk mendorong ketahanan pangan dan ekonomi. 2013 December 18; Surabaya. Surabaya: UPN Veteran Jawa Timur; 2013.
27. Hawwin EA. Pengaruh pemberian sari buah kurma (*Phoenix dactylifera*) terhadap gambaran histopatologi paru menciit yang dipapar asap rokok [Minor thesis]. Jember: Universitas Jember; 2016.
28. Razali N, Mohd Nahwari SH, Sulaiman S, Hassan J. Date fruit consumption at term: effect on length of gestation, labour and delivery. *J Obstet Gynaecol.* 2017;37(5):595-600
29. Putri EBP, Putri FK, Sulaiha S. Perbandingan kadar flavonoid dan vitamin C pada infused water goji berry (*Lycium barbarum*) dan air nabeez kurma (*Phoenix dactylifera* L.). *Med Technol Public Health J.* 2020;4(1):32-7.