

Original Research

The Effect of Mixed Juice of Young Green Coconut And Date Fruits On The Duration of Active Phase of Labor

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ABSTRACT

Background: *The delivery process need a lot of energy from food. Juice preparation is one of the recommended food forms during labor. This study was purposed to analyze the effect of giving mixed juices of young green coconut and dates on the duration of the active phase of the first stage of labor.*

Methods: *A quasi-experiment with a post-test only with control group design include 18 pregnant women (10 intervention and 8 control. Purposive sampling was used, respondents were multigravida (P2-P4) in active phase of labor, without previous section caesarean, no augmentation with oxytocin, estimated birth weight was 2500-4000 gr, singleton pregnancy, aterm labor, and without any other complication during delivery at Alian Public Health Center, Kebumen Regency in October - December 2020. The intervention group given 500 mL of mixed juice of young green coconut and dates during the first stage of labor and control group received standard care. Mann-Whitney test was used to analyze median difference between two groups.*

Results: *There was no difference in the duration of the active phase of the first stage of labor between the intervention and control group (P-value 0,756). There was no difference of the rate of cervix dilatation between the two groups (P-value 0,408). The median of the active phase of the first stage of labor was 197,5 minutes and 147,5 minutes respectively. The median of rate cervix dilatation in the intervention group was 1,96 cm per hour and 1,94 cm per hour respectively. The rate of cervix dilatation in both groups was in normal category. Respondent in standard group was not forbidden eating and drinking, so both groups received enough energy and hydration during labor.*

Conclusion: *Mixed juice of young green coconut and dates can be given during labor to fulfill the energy need during labor.*

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INTRODUCTION

As a country with a population of more than 200 million people, the number of births in Indonesia is high, whether according to the 2017 Indonesian Health Demographic Survey, the total fertility rate is 2.4 children per woman (Heri, 2019). This

rate means that each woman will give birth to 2-3 children during her lifetime. However, the experience of childbirth is a painful and traumatic event when the labor process is normal (Abdollahpour & Motaghi, 2019).

One of the experiences that causes traumatic feelings in labor is the long labor process duration with pain during uterine contractions (Abdollahpour & Motaghi, 2019). The contraction in the upper uterine segment stimulates the labor process by encourages the descent of the fetus and relaxation in the lower uterine segment which opens the cervix, causing the process of releasing the product of conception (Ebrahimzadeh Zagami et al., 2015). When the labor process enters the true labor, the contraction will be at a regular interval. As labor progress, these contractions become stronger, and the interval between each contraction will be shorter. This contraction process by the myometrium requires a large amount of energy and fluids. The energy requirements of the active phase of labor are estimated at 50 to 100 calories per hour, and it is comparable with moderate energy requirements in aerobic exercise (Direkvand-Moghadam et al., 2013). Physiologically, maternal glucose levels increase during labor, but in the long labor process, these levels will decrease and eventually non-oxidative metabolism occurs (Scheepers et al., 2001).

The duration of labor varies considerably from person to person, especially for the first stage of labor. According to the World Health Organization (WHO), the duration of labor in the active phase of labor (5-10 cm opening) is usually no more than 12 hours at the first birth and 10 hours in subsequent deliveries. The median duration of labor for the first stage of the active phase was 4 hours in nulliparous women and 3 hours in multiparous women (WHO, 2018a). The second stage of labor varies widely. WHO recommendation shows the duration of stage II of labor in nulliparous lasts up to 3 hours and in multiparous lasts up to 2 hours (WHO, 2018b).

During the labor process, the mother feels a lot of discomfort caused by pain and anxiety which can reduce the desire to eat and drink (Abdollahpour & Motaghi, 2019). With an enormous amount of energy needs accompanied by a decrease in the mother's appetite for labor and the long duration of labor, it can cause the body to run out of reserves of glucose in the blood. If glucose in the blood is not available for metabolic needs during childbirth, the body will burn fat stored in the body for anaerobic respiration which results in a waste product in the form of lactic acid generation (Scheepers et al., 2001). There was an increase in blood lactate 0.070 mmol/L per minute during the second stage of labor in the mother and 0.032 mmol/L per minute in infants (Nordström et al., 2001). An animal experimental study showed that uterine lactate was increased from 2 to 9 mmol/L during labor, and this increase can stimulate uterine inflammation in rats (Madaan et al., 2017). Lactic acid is an indicator of fatigue. Increased lactic acid can directly affect the labor process by weakening the contractions to slow labor. Prolonged labor can lead to fetal distress, fatigue in the mother, reduced contractions, thus increasing the risk of labor with operative measures.

To meet the hydration and nutritional needs of women in labor, the American College of Nurse-Midwives has issued a recommendation not to prohibit meals and drinks during labor. The association recommends the consumption of isotonic drinks and energy drinks during childbirth, while the recommended types of food are soft foods that are easy to digest (American College of Nurse Midwives, 2016).

One type of natural isotonic drink is young coconut water. Young coconut water is easily absorbed by the body, so it can replace lost body fluids quickly. Research shows consumption of young coconut water can reduce worker fatigue (Rajagukguk et

al., 2018). In childbirth, previous research has shown that consumption of young coconut water can affect the speed of labor, which can speed up the process of stage I and stage II of labor (Susilawati, 2019).

Feeding is very important to increase energy intake in labor. With the limitations of mothers in labor, providing food in preparations that are easy to consume and easy to digest will be of great help (American College of Nurse Midwives, 2016). One type of high energy food is dates. Dates are easy to eat, easy to digest, have high energy content, and also other good nutrients (Ahmed et al., 2018). Providing additional energy in childbirth is proven to be able to accelerate the labor process so that the fatigue experienced by giving birth will be lighter. This is evidenced by Andriani (2018), where the levels of lactic acid in mothers who are given mixed fruit juice are lower than those given normal care (Andriani et al., 2018).

In the Holy Qur'an, it is known that dates were consumed by Mary when she gave birth to Prophet Isa. This can be interpreted that the consumption of dates may prove the delivery process. A study has proven that consumption of dates at the end of pregnancy affects cervical ripening so that a better BISHOP Score is obtained (Kordi et al., 2014). Many people also believe that dates contain substances that can strengthen uterine contractions so that they can accelerate the labor process. Research showed consumption of date palm juice at the end of pregnancy can accelerate the labor process (Astuti et al., 2018). Other research showed consumption of 7 dates has a good effect on duration of the stage of labor (Ahmed et al., 2018).

To the knowledge of researchers, until this research was done, there has been no research on the combined effects of giving young coconut and dates. For this reason, researchers were interested in examining how the effect of giving mixed juice of young coconut and dates on the duration of labor in laboring mothers.

MATERIALS AND METHOD

A quasi-experimental study with a post-only control group design was used in this study. Respondents in this study were multigravida (P2-P4) in active phase of labor, without previous section caesarean, no augmentation with oxytocin, estimated birth weight was 2500-4000 gr, singleton pregnancy, at term labor, and without any other complication during delivery at Alian Public Health Center, Kebumen Regency, Central Java in October - December 2020. The number of respondents in this study was 10 respondents in the intervention group and 10 respondents in the control group, but 2 respondents in the control group had precipitated labor and excluded from the analysis. The sampling technique used purposive sampling. Women were considered to be in active labor once the cervix was effaced, dilated 4 cm, and the women was experiencing regular contractions. Estimated date of delivery was determined using last menstrual period.

Respondents in the intervention group were given mixed juice during the first stage of labor and respondents in the control group were given standard care by continuing to eat and drink. The mixed juice formula consists of 500 ccs of coconut water, dates, Himalayan salt, and young coconut flesh which was given fresh. The type of coconut used was Green Coconut and the type of dates is Tunisian Dates. The progress of labor was monitored using a partograph.

The duration of labor for the first stage of the active phase is obtained from the total duration of the examination result in the first active phase to complete the cervical opening. The rate of cervical dilatation in the active phase is the quotient between the

length of the active phase of the first stage of labor and the difference between the cervical opening at the beginning of the active phase examination with the time of completion of cervical opening in cm/hour.

Mann Whitney-U test was used to comparing the two continuous variable (median between two groups). This research has received ethical approval from the Medical / Health Research Bioethics Commission, Faculty of Medicine, Sultan Agung Islamic University Semarang No.385 / XI / 2020 / the Bioethics Commission.

RESULTS

Study Sample Characteristics

Based on Table 1, 61% respondents have basic education include elementary school and junior high school. Most of the respondents are housewives (88%), most of them are the birth of the second child (61% of the total respondents), and 83% respondents are in reproductive age (20-35 years old).

Table 1. Respondent Characteristic

Characteristic	Total (N=18)
Education	
- Basic Education	11 (61%)
- Middle Education	5 (27%)
- High Education	2 (11%)
Occupation Status	
- Work	16 (88%)
- Housewife	2 (11%)
Parity	
- P2	11 (61%)
- P3	5 (27%)
- P4	2 (11%)
Age	
- 20-35	15 (83%)
- >35	3 (16%)

Labor Duration of Intervention and Control Group

The duration of the active phase of the first stage of labor was recorded from the length of the delivery process from the cervical dilation ≥ 4 cm to complete the cervical opening (10 cm). However, the initiation of the cervix dilatation for each respondent in the two groups varies. Based on table 2, data shows that the median duration of labor for the first stage of the active phase in the intervention group is longer than in the control group (197.5 minutes versus 147.5 minutes). Nevertheless, it is not statistically significant (P-value 0.756 <0.05).

Table 2. Difference of Duration of Active Phase Labor in Intervention and Control Group

Group	Median	Min-Max	P-value
Intervention (minute)	197,5	90-420	0,408
Control (minute)	147,5	100-420	

Rate of Cervical Dilatation

Table 3. Active Phase Dilatation Rate in Intervention and Control Group

Group	Median	Min- Max (cm/hour)	P-value
Intervention (cm/hour)	1,96	0,8-4	0,756
Control (cm/hour)	1,94	1,14-4,66	

Table 3 shows the median cervical dilatation rate in the first stage of the active phase of the intervention group of 1,96 cm/hour while in the control group it was 1,94 cm/hour. This value shows the median of dilatation rate in the control group is slightly higher than the intervention group, but the results of the Mann-Whitney U test showed a P-value of $0.756 > 0.05$, which means there is no difference in dilatation rate between respondents who were given mixed juice of dates and young coconut compared to given standard care.

DISCUSSION

This study found that the median of rate of cervical dilatation in the two groups lasted 2 cm/hour. This value was much faster than the observation target on the partograph of 1 cm/hour. Recent studies have also shown the rate of cervical dilatation in the first stage of the active phase between 1.2-1.5 cm/hour (Hutchison et al., 2020).

The median duration of the active phase of labor in the intervention group was 197.5 minutes or 3.3 hours and in the control group was 145.5 minutes or 2.42 hours. This value is different from research in Norway that the duration of the active phase in nulliparous is 445 minutes (Østborg et al., 2017). According to a study in the United States, the period of labor in the first stage of labor until 6 cm of the cervical dilatation between nulliparous and multiparous was the same, but then the cervical dilatation was faster in multiparous than nulliparous (Chen et al., 2018). Previous studies also reported that duration of cervix dilatation was different for each cm of dilating, for example at 4-5 cm dilating for 1.67 hours, at 5-6 cm dilating for 0.75 hours, at 6-7 cm dilating for 0.92 hours, at dilating of 7-8 cm for 0.58 hours and at dilating of 8-10 cm for 0.75 hours (Oladapo et al., 2018).

In this study, both the intervention group and the control group had a relatively fast delivery duration. One of the factors that can affect the duration of labor is the level of physical activity. A study shows that physical activity during pregnancy is associated with a faster duration of labor in stage I and II (Rodríguez-Blanque et al., 2019). In this study, the research location was a rural area and most of the respondents were housewives who were accustomed to doing moderate daily physical activity.

Many factors can affect the duration of labor. A retrospective study in 1753 partographs by Gunnarson (2017) stated that the strongest predictors for estimating the duration of labor were infant weight, use of oxytocin or epidurals, and spontaneous rupture of the membranes. Every 1 kg increase in the baby's body weight can increase the first stage of labor by 40%. Spontaneous rupture of the membranes can hasten the duration of the 1st stage of labor by 31% (Gunnarsson et al., 2017).

The result of this study is not in line with previous study that gave only green coconut water during the first stage of labor which affects shorter duration of first stage of labor by 54 minutes (Wardhani et al., 2019). Although in this study there was no effect between the administration of mixed juice of young coconut and dates on the duration of the first stage of labor in the mother, the results showed that the active phase duration was relatively fast with a median of 197.5 minutes. This shows that the provision of the mixed juice can be given to mothers in labor. Young coconut water is a natural electrolyte and isotonic liquid that is safe for consumption (Lingga, 2014). Administration of isotonic fluids at delivery can reduce ketosis in women without increasing gastric volume (Kubli et al., 2002). The administration of isotonic fluids alone limits the intake of calories into the body and can result in ketosis (American College of Nurse Midwives, 2016). Dates contain high carbohydrate. The main sugar

found in date flesh was fructose, glucose, and sucrose and glucose; glucose and fructose were in major sugar in all cultivars (Assirey, 2015). Each 100 g of dates contains 314 kcal. The carbohydrate content in Tunisia dates is around 77.31-88.02% of the dry preparation (Parvin et al., 2015). The addition of calories by adding dates to the juice increases the energy concentration of coconut water which can prevent ketosis.

Dates is not only rich in carbohydrate, but also rich in many kinds of minerals (calcium, phosphorus, potassium, sodium, magnesium). Dates contain essential amino acid which must be proven by diet such as aspartic acid, proline, glycine, histidine, valine, leucine, and arginine (Assirey, 2015). Phytoestrogens, the chemical structure similar to that of estradiol, also found in dates fruit, including isoflavones, coumestans, and lignans (Tang et al., 2013). Dates increase respond of uterine muscle better to oxytocin, so uterine contraction become more effective. Stimulating oxytocin receptors in central nervous system decreases anxiety followed by initiation, progression, and acceleration of the delivery (Kordi et al., 2014). Date is effective in oxytocin receptors and causes more effective cervical dilutions; therefore, consumption of dates in late pregnancy will decrease the need for oxytocin and prostaglandins for induction and speeding up labor (Al-Kuran et al., 2011). Date fruit contain necessary and unnecessary fatty acids that can produce prostaglandins. Prostaglandin is known playing important role in cervix ripening, acceleration of delivery progress, increase uterine contraction, and inducing labor (Bagherzadeh Karimi et al., 2020).

This research still has many limitations. Collecting data on respondents who vary from 4 cm to 8 cm cervical opening can increase the risk of bias. The characteristics of the respondents in this study were not homogeneous between the intervention group and the control group so that the results of the study still had the risk of bias. In this study, both groups did not restrict food intake. According to the food intake data obtained, respondents in the control group still had food intake during the first stage of labor, in the form of water, sweet tea, and bread.

CONCLUSION

There was no significant statistical difference on labor duration and cervical dilation rate in multigravida who given mixed juice of green coconut and dates and standard care. This conclusion was supported by result of this study that showed median duration of active phase of labor was 197,5 minutes in intervention group and 147,5 minutes in control group (P value 0,408 > α 0,05). The active phase dilation rate was 1,96 cm/hour in intervention group and 1,94 cm/hour in control group (P value 0,756 > α 0,05). Even so, giving mixed juice can still be used as alternative nutrition for women in labor because it is made from natural ingredients and is easy to consume. Health workers must always meet nutritional and hydration needs at the time of delivery and prioritizes using foods that are easy to consume and drinks that are easily absorbed by the body.

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