

## Effect of Dates in Late Pregnancy on the Duration of Labor in Nulliparous Women

### Abstract

**Background:** Long-term delivery is an important significant issue which is associated with mortality and fetal and maternal disorders. Based on the previous studies, consumption of dates affects uterine contractions and duration of delivery processes. This study aimed to study the effect of date consumption in late pregnancy on the duration of delivery processes in nulliparous women in 2013. **Materials and Methods:** This randomized clinical trial was conducted among 182 nulliparous women 18–35 years who presented to OmAlBanin Hospital in Mashhad in 2013. The comparison has been made between 91 pregnant women who consumed 70–76 g dates daily from the 37th week of pregnancy and 91 pregnant women who did not consume dates. Data collection tool was a questionnaire and a checklist of daily dates' intake. Data were analyzed using the Statistical Package for the Social Sciences software and statistical tests – chi-square and Mann–Whitney test, and  $P$  value  $<0.05$  was considered significant. **Results:** The average length of active phase ( $P = 0.0001$ ), length of second phase ( $P = 0.0001$ ), and third phase ( $P = 0.004$ ) in two groups had statistically significant difference. The average length of the second phase ( $P = 0.03$ ) and the third phase ( $P = 0.02$ ) in case of spontaneous start of delivery in the intervention group was significantly lower than the control group. Use of oxytocin to accelerate delivery had a significant difference between the two groups ( $P < 0.001$ ). **Conclusion:** According to the results of this study, consuming dates in late pregnancy was effective in decreasing length of labor processes and reduced the need of oxytocin for labor acceleration. Thus, it is recommended to consume dates in women without contraindications.

**Keywords:** Fruit, Iran, pregnancy

### Introduction

Long labor is an important and significant issue, especially in developing countries as it is associated with mortality as well as fetal and maternal disorders.<sup>[1]</sup> Prevalence of long labor is 2.6–2.17%, which is the cause of 8% maternal deaths in developing countries.<sup>[2]</sup> Sixty percent of primary cesarean in the United States is attributed to the unnatural development of laboring.<sup>[3]</sup> Ineffective contractions of uterine are among the most common causes for unnatural development of laboring and consequently a prolonged labor, which leads to increase in level of cesarean and induction of labor.<sup>[1]</sup> Lack of adequate uterine contractions are influenced by different physical and mental factors. Today, scientists focus on mother's physical and mental needs including the need for energy.<sup>[4]</sup> In late pregnancy, as the level of prolactin increases, pregnant women feel the need of more nutrients. This energy is

stored in the body and can be used at the time of delivery.<sup>[5]</sup>

The amount of energy needed for labor can be compared with that of aerobic exercises; it is estimated to be between 50 and 100 kcal per hour.<sup>[4,5]</sup> Because smooth muscles need energy 20–400 times more than skeletal muscles, the best materials for supplying energy are fat acids, which provide muscles with more energy than glucose; therefore, storing fats is very integral in late pregnancy.<sup>[5]</sup> Dates are among those energizers which have lots of carbohydrates most of them include fructose, glucose, and sucrose.<sup>[6]</sup> Chemical composites found in dates differ depending on weather conditions, planting area, age of tree, and process of fruit growth. The mineral content differs in various types of dates; however, 15 different types of minerals have been determined in it, including potassium, calcium, chlorine,

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Access this article online

Website: [www.ijnmrjournal.net](http://www.ijnmrjournal.net)

DOI:  
10.4103/ijnmr.IJNMR\_213\_15

Quick Response Code:



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**How to cite this article:** 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. Iranian J Nursing Midwifery Res 2017;22:383-7.

Received: December, 2016. Accepted: January, 2017.

zinc, phosphorus, iron, magnesium, and sodium, together<sup>[7]</sup> with saturated and unsaturated fatty acids such as oleic, linoleic, and linoleic acids.<sup>[8]</sup> Fatty acids play an important part in making prostaglandins apart from supplying and providing energy.<sup>[5]</sup>

Increase in the level of prostaglandins in pregnant women causes uterine contractions during the term.<sup>[9]</sup> Therefore, dates can be helpful in storing energy and strengthen uterine muscles.<sup>[10]</sup> Dates play a part in prevention of postpartum hemorrhage,<sup>[6]</sup> spontaneous labor, and speeding up the delivery progress.<sup>[4,8,9]</sup> According to studies of Kordi *et al.* and Yusefi *et al.*, consuming dates in late pregnancy had a role in spontaneous labor.<sup>[11,12]</sup> Results of the study performed by Alkuran *et al.* showed that length of the latent phase of the first stage of labor was shorter in the group consuming dates, and average cervical dilation at the time of admission was significantly higher than that in the group consuming dates.<sup>[10]</sup> Dates affect oxytocin receptors and make uterine muscles respond better to oxytocin, resulting in more effective uterine contractions.<sup>[10,13,14]</sup> Oxytocin receptor concentration increases 200–300 times during pregnancy, especially in late pregnancy. This increase in concentration results in increase in myometrium sensitivity to oxytocin.<sup>[2,5]</sup> Stimulating oxytocin receptors in central nervous system decreases anxiety followed by the initiation, progression, and acceleration of the delivery. Because of few studies conducting regarding the effect of consuming dates on the duration of delivery,<sup>[15]</sup> the researcher decided to study the effect of consuming dates in late pregnancy on the duration of labor stages in nulliparous women in 2013.

## Materials and Methods

This randomized clinical trial (registered in the IRCT with the code of 201304072956N4) was conducted among 182 nulliparous women aged 18–35 years who went to OmAlBanin Hospital in Mashhad in 2013. Entry criteria to the study included mothers aged 18–35 years who were in their 37–38th week of pregnancy (based on the first day of the last menstruation or sonography of the first 3 months of pregnancy), singleton pregnancy with cephalic presentation, and having no medical and midwifery problems in 26–30 weeks of pregnancy. Obstetric complications, women who had elective or emergency cesarean due to fetal distress, and those who consumed dates less than 2 weeks in the intervention group were excluded from the study. Eleven individuals in the intervention and 17 individuals in the control group were excluded from the study. First, a preliminary study was carried out among 30 individuals to determine sample size. Then, sample size was measured using the formula of comparing averages with that of the length of the first stage of labor. Considering  $\alpha = 0.01$  and  $\beta = 0.1$  and 95% confidence coefficient, ( $S_1^2 = 130$ ,  $S_2^2 = 235$ ,  $\bar{X}_1 = 350$ ,  $\bar{X}_2 = 433$ ) 83 individuals in each group accounting for 10% sample attrition, 91 individuals were calculated in each group. At

first, 210 individuals were entered into the study, among which 28 were excluded from the study for not meeting the inclusion criteria. Finally, the study was conducted among 182 individuals. The participants were categorized in one of the two groups of dates' consumption and lack of dates' consumption in a manner that days of the week were numbered 1–6 from Saturday to Thursday and 1, 2, 3 numbers were written on one side and 4, 5, 6 were written on the other side of the paper placed in a draw bag. Then, the first paper selected was named intervention and the second one named control group in such a manner that 3 days of the week (Saturday, Sunday, and Monday) were given to the dates' group and the other 3 days (Tuesday, Wednesday, and Thursday) were given to the control group and this order was maintained till the end of the study. The mothers were required to go to the midwifery clinic on the specified day. Therefore, 91 individuals were put in the intervention and 91 were put in the control group. Data collection tool was a questionnaire (personal information, pregnancy, follow-up form- information about labor, and its development) and a checklist of daily dates' intake. Validity of the questionnaire, follow-up form, and checklist of the daily intake of dates were determined by the content validity method. These tools were provided in the form of preliminary questionnaires studying the most updated books and articles in the field of study and delivered to 10 faculty members of Mashhad University of Medical Sciences; the final tools were developed after reviewing and applying necessary suggestions and corrections. Reliability of personal and obstetric and follow-up forms was confirmed through evaluation agreement with coefficient correlation equal to 0.90. The intervention group was given 7 packs of 70–75 g (6–7) dates in the 37th week of pregnancy. The mothers were required to carry on consuming one pack (70–75 g) every day on the three so-called days. The dates used in this study were Mazafati dates of Bam whose nutritional ingredients were specified by the experiment before the start of the study. According to the results, there was 160 kcal energy in 100 g of this type of date, consisting of approximately 70% of carbohydrates, 3.5% protein, and 0.1% fat. Moreover, the amount of dates was determined according the study performed by Alkuran and Khadem under the supervision of a nutritionist.

The control group was required not to consume dates during this period and routine care was given to the participants. After teaching the onset symptoms of delivery in both the groups, mothers were required to go to the hospital at the onset of labor pains by notifying the researcher. In case labor does not continue till the end of 40 weeks of pregnancy, more time was given to both the groups until 41 weeks of pregnancy if fetal heart rate tests were normal and the intervention group was required to carry on consuming dates. If the delivery did not start until 41 weeks of pregnancy, she would be taken to the maternity clinic and the researcher would go to this place

to control development of the labor and fill the information regarding the labor in related questionnaires. Then, the information was decoded and analyzed using the Statistical Package for the Social Sciences (IBM SPSS Statistics) software (version 14<sup>th</sup>), and *t*-test, chi-square tests, and Mann–Whitney test were performed. Moreover,  $P = 0.05$  was considered statistically significant.

### Ethical consideration

The sampling was started after approval for the study was obtained by the disciplinary committee of Mashhad university with Code 910732. After reviewing the proposal by the Ethics Committee, the objectives of the study were described to the participants and written consent was given. Sampling was started with regard to the ethical codes and confidentiality of the participants' information.

### Results

The two groups were homogeneous in terms of age ( $P = 0.89$ ), body mass index ( $P = 0.49$ ), amount of calorie consumed at the start of the research ( $P = 0.89$ ), the calorie consumed at the time of reception (0.44), and the weight of the new born at birth ( $P = 0.42$ ) in such a manner that the average age in the intervention and control group was 23.51 (3.67) and 23.58 (3.73), average BMI was 27.70 (3.26) and 27.40 (2.96), average weight at the time of the birth was 3195.38 (554.80) and 3247.52 (370.30) g, respectively. Moreover, the two groups had no statistically significant difference in terms of sports activity (0.40), sexual intercourse (0.52), taking nonsteroid pain-killer drugs during pregnancy (0.11), and taking pain-killer drugs during labor (0.80).

The cervical dilatation average at the time of reception in

the maternal clinic had a statistically significant difference between two groups ( $P < 0.0001$ ) in such a manner that it was 4.05 (1.63) in the intervention group and 2.54 (1.74) in the control group. The average length of active phase and the length of second and third phases in the two groups had statistically significant difference [Table 1]. The average length of the second and the third phase in case of spontaneous start of delivery in the intervention group was significantly lower than the group control; however, there was no significant difference between average length of active phase of labor in the two groups ( $P = 0.24$ ). There was no significant difference between the average length of active phase and second and third stages of labor in cases of labor induction in the intervention and control groups [Table 2].

Spontaneous start of labor in the intervention group was significantly more than the control group (94.50% compared to 41.30%) ( $P < 0.001$ ). Using oxytocin to speed up labor in the intervention group was less than the control group (5.50% compared to 48.70%) ( $P < 0.001$ ).

### Discussion

General result of the study showed that consuming dates in late pregnancy was effective in the duration of nulliparous labor and shortened the length of active phase, as well as the second and the third stages of the labor compared to the control group. Moreover, average cervical dilation at the time of reception, being the most important factor to estimate development of the labor in women who consumed dates, was significantly more than the women who did not. It appears that dates helps in more effective uterine contractions by better preparation of the cervix as well as saving energy, needing less time for complete dilation

**Table 1: Comparison of the length of active phase and second and third stage in the separation group by minute**

Variables	Mean (SD)		N	Mann-Whitney (P value)
	Intervention	Control		
Active phase	329.00 (249.00)	547.80 (392.10)	91	0.0001
Second stage	33.60 (13.70)	42.10 (17.10)	87	0.0001
Third stage	5.10 (2.50)	6.80 (7.00)	178	0.004

**Table 2: Comparison of the length of active phase and second and third stage in spontaneous and induction group by minute**

Variables	Mean (SD)		N	Mann-Whitney (P value)
	Intervention	Control		
Spontaneous labor				
Active phase	304.00 (222.70)	330.40 (202.80)	86	0.24
Second stage	33.40 (13.20)	40.00 (17.30)	51	0.03
Third stage	5.10 (2.50)	6.20 (3.30)	137	0.02
Labor induction				
Active phase	769.00 (303.30)	855.70 (390.70)	5	0.74
Second stage	38.00 (22.50)	45.40 (16.60)	36	0.42
Third stage	5.60 (2.50)	7.70 (10.30)	41	0.47

of the cervix, and shortening the labor.<sup>[10]</sup> Carbohydrates are considered to be an important source of energy in the body having the highest digestibility among food groups.<sup>[16]</sup> Dates are nutritional fruits made mostly of simple sugars.<sup>[6]</sup> Most of the energy used during delivery is supplied using oxidative pathway. Maternal glucose is the most important source of energy and the physiologic need to glucose during the labor is 10 g per hour.<sup>[4,16]</sup> Adequate sources of energy are needed to maintain physical power of the person during labor activity, and consuming dates in late pregnancy and during labor can be helpful in supplying and saving energy.<sup>[4,10,11]</sup> Dates have a significant importance in saving energy and overcoming fatigue and hunger due to the high level of calories.<sup>[12]</sup> Moreover, tannin found in dates plays an important part in contractions of smooth muscles of the cervix.<sup>[13,17]</sup> Kordi *et al.* (2008) showed that the length of the active stage and second stage of the labor in nulliparous women consuming date honey syrup during the labor was significantly shorter than the placebo group and usual care. In their study, amount of date consumption was equal to 132 g date honey syrup during the labor; however, consuming dates did not continue in our study by the start of labor.<sup>[4]</sup> Using oxytocin to speed up labor in the intervention group was less than the control group in our study. Alkuran in his study showed that date is effective in oxytocin receptors and causes more effective cervical dilutions; therefore, the need for oxytocin and prostaglandins for induction and speeding up labor in women consuming dates is less in late pregnancy.<sup>[10]</sup> The effect of oxytocin in developing labor, delivery, and cervix recovery to the previous state before childbirth and breastfeeding has been approved.<sup>[4,10,11,13,14]</sup> Oxytocin receptors' stimulation in the central nervous system decreases stress and accelerates the labor.<sup>[15]</sup> Oxytocin can directly stimulate oxytocin receptors or causes cervical dilutions indirectly by stimulating the production of prostaglandins in decidua and amniotic cells.<sup>[9]</sup> In a study reported by Alkura *et al.* (2011) on two groups, one consuming dates and the other not consuming dates, length of the latent phase was shorter in the dates-consuming group; however, length of active phase and the length of the second and third stages of the labor had no significance difference with the control group which differs with the results of our study.<sup>[10]</sup>

The reason for this was probably longer period of consuming dates and women accepting to have cervical dilutions in the maternal clinic in our study. Results of this study showed that, in case of labor induction in women consuming dates, length of labor stages become shorter but it is not statistically significant, which is because of small number of samples and the need to study with the sample size suffices. In a study done by Khadem *et al.* (2007) regarding the effect of consuming dates with oxytocin on the prevention of postpartum hemorrhage, the results showed that dates had semi-oxytocin effect, increased uterine sensitivity, stimulated cervical contractions, and

decreased postpartum hemorrhage. Nutritional and medical properties of dates decrease postpartum hemorrhage and can be a suitable alternative for oxytocin.<sup>[13]</sup> Moreover, the amount of required energy during the labor was estimated to be 50–100 kcal per hour;<sup>[4,5]</sup> glucose content of dates is an important source of energy supply in the body and the best nutritional material for cervical dilutions.<sup>[8,10]</sup> Sherbovastav *et al.* (2009) showed that serum containing dextrose shortens labor duration by 20%, and this decrease is not accompanied by fetal and maternal complications.<sup>[18]</sup> Rahmani Beilandi *et al.* (1388) in their study concluded that women consumed nutritious carbohydrates such as orange juice and dates had a shorter second stage of delivery than those who did not eat anything.<sup>[19]</sup> Using carbohydrates during pregnancy supplied patient's energy for the delivery due to increase in energy conduits such as adenosine triphosphate; moreover, it prevents from creating harmful metabolites created during anaerobic cycle, and in case of no access to carbohydrates and negatively, affect the strength of cervical dilutions and shortens labor term.<sup>[16,19]</sup>

Among the strong aspects of this study one was using a natural and accessible material for speeding and shortening of the labor. However, this study has some limitations including there was no possibility of double-blinding the study, and the accurate complete control of the pregnant mothers' regiment was beyond the researcher control. Moreover, the amount of effective dose of date was unknown, which was partly specified according to previous studies as well as comments of the dietitian. Duration of consuming dates to affect labor and the exact time of starting to consume it was not completely specified. In this article, the minimum amount of time to consume date for having optimized effect was considered to be 2 weeks with the comments of dietitian. Other limitations of this study were the lack of examination of the cervix before the intervention.

## Conclusion

According to the results of this study, consuming dates in late pregnancy was effective in decreasing the length of labor processes and reducing the need to oxytocin for labor acceleration. Moreover, it is recommended to consume dates in women without contraindications.

## Acknowledgments

This study is part of a research thesis proposal approved by the Mashhad University of Medical Sciences with Project No. 910732. The authors would like to thank all the mothers who participated in this study.

## Financial support and sponsorship

Mashhad University of Medical Sciences.

## Conflicts of interest

There are no conflicts of interest.

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