



Original Article

Effects of date fruit consumption on labour and vaginal delivery in Tabuk, KSA



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Received 12 September 2018; revised 2 November 2018; accepted 4 November 2018; Available online 27 November 2018

المخلص

أهداف البحث: ثبت أن ثمار التمر لها فوائد صحية عديدة. تهدف هذه الدراسة إلى تحديد آثار ثمار التمر في تسهيل بداية وتطور الولادة.

طرق البحث: أجريت هذه الدراسة السريرية العشوائية المحكمة على 89 مشاركة لتقييم آثار ثمار التمر التي أعطيت في بداية المخاض على سير الولادة. تناولت 26 مشاركة ثمار التمر فقط، وأعطيت 32 مشاركة ثمار التمر متبوعة بشرب الماء، وأدرجت 31 في مجموعة التحكم.

النتائج: كان هناك تأثير إيجابي ذو دلالة إحصائية لاستهلاك (الرتب) ثمار التمر على نتائج الأمهات لكل من المرحلتين الأولى والثالثة من المخاض. بالإضافة إلى ذلك، كان هناك علاقة ذات دلالة إحصائية بين عوامل سلامة الجنين مثل صفاء السائل السلي، وانتظام معدل قلب الجنين، وظهور انتفاخ بفرور الرأس، والنبض، والتجه، والنشاط، والتنفس درجة (أبجار) عند خمس دقائق. ولم تظهر العوامل الأخرى لسلامة الأم والجنين أي علاقة ذات دلالة إحصائية بين من تناولن ثمار التمر أثناء الولادة.

الاستنتاجات: أظهرت الدراسة الحالية تأثيراً واعداً لثمار التمر (الرتب) على مدة مرحلة الولادة. لم يلاحظ أي فروق ذات دلالة إحصائية بين من تناولن التمر ونظرائهن فيما يتعلق بتوسع عنق الرحم، وتمزق الأغشية، وقوة، وتكرار، وانتظام تقلص الرحم، وتقارير قياس توكو وعوامل سير الولادة لدي الأمهات. بالإضافة إلى ذلك، كانت درجة أبجار عند خمس دقائق أفضل بين الأطفال الذين تناولن أمهاتهم ثمار التمر.

الكلمات المفتاحية: ثمار التمر؛ الولادة؛ نتائج الولادة؛ تطور الولادة؛ الرطب

Abstract

Objectives: The date fruit has been shown to possess several health benefits. This study aims to determine the effects of date fruit consumption on the onset and progression of labour.

Methods: A randomised controlled clinical study was conducted on 89 participants to assess the effects of date fruit consumption on the onset and progression of labour. Twenty-six participants consumed date fruits alone, and 32 consumed date fruits followed by drinking of water. Thirty-one served as controls.

Results: There was a significant positive impact of consuming (rutab) date fruits on maternal outcomes in both the first and third stages of labour ($p < 0.05$ and $p < 0.001$, respectively). In addition, there was a significant relationship with the foetal well-being factors, such as healthy liquor, foetal heart rate, presence of caput, and Appearance, Pulse, Grimace, Activity, and Respiration (APGAR) score at 5 min ($p < 0.05$). The other maternal and foetal well-being factors showed no significant relationship with consumption of date fruits during labour.

Conclusion: The present study showed a promising effect of (rutab) date fruit consumption on the duration of the stages of labour. No significant differences were observed between the date fruit consumers and their counterparts regarding cervical dilatation; rupture of membranes; strength, frequency, and regularity of uterine contractions; tocometric reports; and maternal progression factors. Additionally, the APGAR score at 5 min was better among the infants whose mothers consumed date fruits.

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Peer review under responsibility of Taibah University.



Production and hosting by Elsevier

Keywords: Date fruit; Delivery; Labour outcomes; Labour progression; Rutab

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Introduction

In the holy Quran, the holy book of Islam, Allah instructs the Virgin Mary, Mariam, to consume date fruits when she gives birth to prophet Isa; peace will be upon him as well as the prophet Mohammed (And shake toward you the trunk of the palm tree; it will drop upon you ripe, fresh dates).¹ Therefore, not surprisingly, date fruits are commonly referred within the Islamic tradition as beneficial to pregnant women. We might use this as a 'pre-scientific' magical background to assess the effects of date fruit consumption on the onset until the final stage of labour. The date fruit (*Phoenix dactylifera*) appears to be a reasonable food choice for pregnant women as a part of a well-balanced diet. It contains a high percentage of carbohydrate, fat, 15 types of salts and minerals, proteins, and vitamins.²

The saturated and unsaturated fatty acids, such as oleic and linoleic acids, in date fruits³ play an essential part in the production of prostaglandins apart from contributing and providing energy.⁴ The increase in the levels of the latter in pregnant women causes uterine contractions during term.⁵ Therefore, date fruit consumption can be helpful in saving energy and strengthening the uterine muscles. This fruit also contains hormones that help the uterus stretch and be prepared for infant delivery.⁶ Its consumption is helpful in storing energy and strengthening the uterine muscles.⁷ Thus, it prevents postpartum haemorrhage, spontaneous labour, and speeding up of the delivery progress.^{2,8} According to Kordi et al. and Yusefy et al., consuming date fruits in late pregnancy has a significant role in spontaneous labour.^{9,10} Al-Kuran et al. reported that the duration of the latent phase of the first stage of labour was shorter in the group that consumed date fruits and that the average cervical dilation at the time of admission was significantly higher than that in the group that consumed date fruits.⁷ Date fruits affect oxytocin receptors and make the uterine muscles respond better to oxytocin, resulting in much more effective uterine contractions.^{7,11,12}

In a recent non-randomised clinical trial comparing date fruit to oxytocin in controlling postpartum haemorrhage, it was found that the ingestion of date fruits significantly reduced the amount of haemorrhage compared to the administration of oxytocin in the first hour following placental delivery owing to the presence of compounds in date fruits that mimicked the action of oxytocin.¹¹ Drinking of water following consumption of date fruits during labour may be more effective in the promotion of labour than administration of intravenous fluids alone. A recent study conducted in the KSA

investigated the effect of eating date fruits and drinking water versus intravenous fluid administration during labour on labour and neonatal outcomes; there was a significantly shorter median duration of the second and third stages of labour in the study group than in the control group.¹³

The consumption of date fruits in late pregnancy has favourable results in shortening labour stages, without influencing labour outcomes. In a Jordanian study, the effect of late pregnancy consumption of date fruits on labour and delivery was determined starting from late weeks of pregnancy; a comparison between the two groups showed significant outcomes in cervical dilatation on admission, status of the amniotic membranes, type of onset of labour, and less need for prostin/oxytocin utilisation. The study had concluded that the consumption of date fruits in the last 4 weeks before labour significantly reduced the need for induction and augmentation of labour and yielded a more favourable, but non-significant, delivery outcome.⁷

Furthermore, it was found that eating date fruits increases pain tolerance and plasma anti-oxidant capacity for 4 h. Following consumption, date fruit digestion extracts are absorbed and used by the cells shortly after consumption.^{2,3,14} The authors also found no significant differences in the duration of labour; rate of augmentation; mode of birth; Appearance, Pulse, Grimace, Activity, and Respiration (APGAR) score; and umbilical artery and vein pH, although a sufficient statistical power was not obtained to draw reliable conclusions on the effect of drinking on labour outcomes.¹⁵

Materials and Methods

Study design

This study was an interventional hospital-based randomised controlled trial (RCT) conducted in King Fahd Specialty Civil Hospital, Tabuk, KSA on pregnant women who were admitted for normal vaginal delivery, during the season of rutab in 2017. The study was conducted from August 2017 to December 2017. Rotana rutab date fruits were used. After study explanation and obtaining consent, the women enrolled in the study were requested to join one of three groups in an open-label manner, with an instruction against cross movement.

Sample characteristics

Eighty-nine women were enrolled in the study, of which 32 (35.96%) consumed date fruits followed by drinking of 250 mL of water; 26 (29.21%) consumed date fruits alone; and 31 (34.83%) did not consume any date fruits (served as controls). Participants with high-risk pregnancy, contracted pelvis, pre-eclampsia, and uterine atony were excluded. Specific parameters were measured on arrival of the participants to the labour suite: uterine contraction frequency and strength and cervical dilatation upon admission (cm); the intactness of the amniotic membranes was also assessed. Labour progression was assessed using a partogram. A nurse and an obstetrician specialist carefully filled up the

partogram and were trained on how to fill up the questionnaire before starting the study.

Materials

Fresh date fruits (Rotana rutab) and drinking water were purchased from the local vegetable and fruit market at Tabuk, KSA. Seven pieces of fresh Rotana rutab date fruits were prepared in a disposable plate. The first group was given seven pieces of the fresh Rotana rutab type, followed by 250 mL of drinking water. The second group was given seven pieces of the fresh Rotana rutab type without water. The third group was not given any date fruits nor drinking water and therefore considered as controls. The date fruits were prepared by trained nurses.

The date fruits were immediately given after inclusion of the women in the study group; seven pieces of the fruit were repeatedly given in case of immediate vomiting following the ingestion of the date fruit in either group.

Setting and sampling technique

This study was conducted at the labour room of the Department of Obstetrics and Gynaecology in King Fahd Specialty Civil Hospital, Tabuk, KSA. The hospital capacity is 500 beds, with a number of admissions to the labour room ranging from 9 to 25 admissions per day for two shifts a day. The simple random sampling technique was used to select the participants in the study.

Outcome assessment

The primary outcome of this study was the effect of date fruit consumption on labour progression.

Inclusion and exclusion criteria

Any pregnant women admitted to King Fahd Specialty Civil Hospital in Tabuk, KSA for vaginal delivery (onset of labour after assessment by the team) who agreed to participate in the study were included. Patients with high-risk pregnancy, contracted pelvis, pre-eclampsia, and uterine atony were excluded.

Data collection and analysis

Data were collected using a structured questionnaire and analysed using the SPSS program version 20.00 (SPSS Inc., Chicago, IL, USA). ANOVA and the chi-square test were used to compare the numerical and categorical variables. A p value of <0.05 was considered statistically significant.

Results

There were 89 participants (primigravida: 23.86%, multipara: 69.32%, and grand multipara: 6.82%); a poor obstetric history was observed in 6.17%. Most participants (97.62%) underwent tocometric studies (56.96% continuous vs. 43.04% periodic). The tocometric findings were normal

in 93.42% and suspicious in only 6.58%; no pathological features were noted. The uterine contraction strength was good in 44.26%, moderate in 44.26%, and poor in 11.8%; the uterine contractions were regular in 64.52% and irregular in 35.48%. The heart rate and blood pressure were abnormal in only a minority of the patients (1.18% each); however, the maternal temperature was almost normal in 100%, and the maternal blood sugar level was normal in 100%. Table 1 displays the other clinical characteristics of the study groups.

Table 1: Basic and clinical characteristics of the study groups.

Characteristics	Frequency (n)	Percentage (%)
Parity		
Primigravida	21	23.86
Multipara	61	69.32
Grand multipara	6.0	6.82
Poor obstetrical history	5	6.17
Tocometry (performed)	82	97.62
Tocometry type		
Continuous	45	56.96
Periodic	34	43.04
Tocometric findings		
Normal	71	93.42
Suspicious	5.0	6.58
Pathological	0.0	0.00
Uterine contraction strength		
Good	27	44.26
Moderate	27	44.26
Poor	7.0	11.48
Uterine contraction regularity		
Regular	20	64.52
Irregular	11	35.48
Maternal temperature progression		
Normal	85	100
Abnormal	0.0	0.00
Maternal blood pressure progression		
Normal	84	98.82
Abnormal	1.0	1.18
Maternal heart rate progression		
Normal	84	98.82
Abnormal	1.0	1.18
Maternal blood sugar level progression		
Normal	85	100
Abnormal	0.0	0.0
Postpartum haemorrhage	8.0	9.52
Labour onset time/shift		
Shift 1 (morning)	53	60.23
Shift 2 (evening)	35	39.77
Fluids used during labour		
Ringer's lactate	31	51.67
Dextrose 5%	18	30.0
Dextrose 10%	2	3.33
Normal saline	3	5.0
Dextrose 5% in normal saline	1	1.67
Not given	5	8.33
Labour pain intensity		
Mild	16	21.05
Moderate	42	55.26
Severe	18	23.68
Physical exercises at the latest gestational weeks		
Performed	4	6.35
Not performed	59	93.65

The cervical dilatation at baseline was 4.04 ± 1.94 cm (median \pm IQR: 4.0 ± 1.75) among the patients who consumed date fruits only, 4.23 ± 1.60 cm (median \pm IQR: 4.0 ± 2) among the patients who consumed date fruits followed by water, and 3.97 ± 2.43 cm (median \pm IQR: 4.0 ± 3) among the controls. Table 2 illustrates the cervical dilatation progression among the participants.

The duration of the first stage of labour was 210.14 ± 177.13 , 224.43 ± 157.25 , and 362.46 ± 292.12 min in the patients who consumed date fruits and date fruits followed by water and controls, respectively. The duration of the different stages of labour is also shown in Table 2.

Table 2 also illustrates the time of membrane rupture (103.20 ± 123.42 min in the patients who consumed date fruits, 168.05 ± 145.58 min in those who consumed date fruits followed by water, and 172.26 ± 169.10 min in the controls). The frequency of uterine contractions was higher among the patients who consumed date fruits only than among those who consumed date fruits followed by water (9.50 ± 9.79 contractions/hour vs. 4.38 ± 3.96 contractions/hour).

Spontaneous vaginal, instrumental, and caesarean deliveries were reported in 48.19%, 3.61%, and 4.82%, respectively, while normal foetal presentation was observed in 98.82%; liquor or blood-stained meconium was observed in 31.77%. The other foetal and maternal factors are shown in Table 3.

Table 2 shows the maternal blood loss amount: 302.27 ± 126.75 ml in the patients who consumed date fruits alone, 297.20 ± 130.78 ml in those who consumed date fruits followed by water, and 287.50 ± 157.2 ml in the controls.

The APGAR score at 1 min was lower among the patients who consumed date fruits only than among those who consumed date fruits followed by water (7.77 ± 2.02 vs. 8.59 ± 1.02); the score was 8.25 ± 1.14 in the controls. Table 2 shows the APGAR scores at 1 and 5 min.

Comparative analysis (Tables 4 and 5)

Maternal factors

There was a significant positive impact of consuming date fruits on the duration of the first stage (210.14, 224.43, and 362.46 min) and third stage of labour (5.50, 5.45, and 2.17 min in the patients who consumed date fruits with water and date fruits alone and controls, respectively).

There was no significant difference between the two study groups and control group regarding cervical dilatation on admission. Moreover, date fruit consumption did not affect the labour outcomes related to cervical dilatation. Maternal progression outcome factors, such as spontaneous vaginal delivery, transfer to an obstetric unit, administration of regional analgesia, episiotomy, caesarean delivery, instrumental delivery using forceps or ventouse, and blood transfusion, were found to have no significant relationship with date fruit consumption during labour. There was no difference in the duration taken for the membrane to rupture between the study groups. The placentae were delivered without any complications in both the study and control groups.

Table 2: Labour progression and foetal outcomes in the study groups.

Factors	Date fruit consumers	Date fruit with water consumers	Controls
Cervical dilatation (hour 0)			
Min-max	0-7	0-7	0-9
Mean \pm SD	4.04 ± 1.94	4.23 ± 1.60	3.97 ± 2.43
Median \pm IQR	4.0 ± 1.75	4 ± 2	4 ± 3
Cervical dilatation (hour 1)			
Min-max	0-10	0-10	1-10
Mean \pm SD	5 ± 2.47	5.63 ± 2.71	5.07 ± 2.45
Median \pm IQR	5 ± 2	5 ± 3	5 ± 3.25
Cervical dilatation (hour 2)			
Min-max	0-10	0-10	1-10
Mean \pm SD	6.46 ± 2.72	6.76 ± 3.02	6.03 ± 2.72
Median \pm IQR	6.50 ± 4.50	7 ± 6	6 ± 5.25
Cervical dilatation (hour 3)			
Min-max	0-10	0-10	2-10
Mean \pm SD	7.58 ± 3.17	7.45 ± 3.01	6.97 ± 2.66
Median \pm IQR	10 ± 5.50	10 ± 5	7.50 ± 5
Cervical dilatation (hour 4)			
Min-max	0-10	0-10	2-10
Mean \pm SD	7.96 ± 3.04	7.90 ± 2.48	7.77 ± 2.62
Median \pm IQR	10 ± 4	10 ± 5	9 ± 4
Duration of the stage of labour			
First stage			
Min-max	10-660	30-650	30-1320
Mean \pm SD	210.14 ± 177.13	224.43 ± 157.25	362.46 ± 292.12
Median \pm IQR	170 ± 310	180 ± 216.25	262.50 ± 333.75
Second stage			
Min-max	3-99	1-60	4-120
Mean \pm SD	23.59 ± 23.73	20.50 ± 13.94	31.17 ± 27.25
Median \pm IQR	17.50 ± 25.75	21.50 ± 20.75	23.75 ± 35.88
Third stage			
Min-max	1-20	1-10	1-7
Mean \pm SD	5.45 ± 4.50	5.50 ± 3.10	2.17 ± 1.50
Median \pm IQR	4 ± 6	5 ± 8	2 ± 2
Membrane rupture			
Min-max	2-33	0.50-12.0	0.00
Mean \pm SD	9.50 ± 9.79	4.38 ± 3.96	0.00
Median \pm IQR	6.0 ± 9.0	2.50 ± 6.50	0.00
Uterine contractions			
Min-max	0-370	0-590	0-660
Mean \pm SD	103.20 ± 123.42	168.05 ± 145.58	172.26 ± 169.10
Median \pm IQR	50 ± 110	142.50 ± 215.0	120.0 ± 141.0
Estimated blood loss amount (ml)			
Min-max	100-600	75-600	100-600
Mean \pm SD	302.27 ± 126.75	297.20 ± 130.78	287.50 ± 157.2
Median \pm IQR	300 ± 212.50	300 ± 200	212.50 ± 237.5
APGAR score at 1 min			
Min-Max	1-9	5-10	4-9
Mean \pm SD	7.77 ± 2.02	8.59 ± 1.02	8.25 ± 1.14
Median \pm IQR	9 ± 3	9 ± 0.50	9 ± 1
APGAR score at 5 min			
Min-max	5-10	8-10	8-10
Mean \pm SD	9.20 ± 1.36	9.88 ± 0.44	9.57 ± 0.59
Median \pm IQR	10 ± 1	10 ± 0.0	10 ± 1.0

APGAR, Appearance, Pulse, Grimace, Activity, and Respiration.

Table 3: Labour outcomes and foetal well-being factors.

Factors	Frequency (n)	Percentage (%)
Spontaneous vaginal delivery	40	48.19
Transfer to an obstetric unit	1	1.21
Regional analgesia (epidural and/or spinal)	0	0
Episiotomy	33	39.76
Caesarean delivery	4	4.82
Instrumental delivery (forceps or ventouse)	3	3.61
Complete placental delivery	78	100
Incomplete placental delivery	0	0
Normal foetal presentation	84	98.82
Meconium- or blood-stained liquor	27	31.77
Normal foetal heart rate	58	74.36
Presence of caput	24	31.17

Table 4: Maternal outcome factors.

Factors	Statistical value*	p value
Cervical dilatation	0.53	0.588
Stage of labour		
Stage 1	3.93	0.024
Stage 2	1.71	0.188
Stage 3	8.64	<0.001
Rupture of membrane	1.12	0.333
Uterine contraction strength	3.89**	0.421
Uterine contraction frequency	3.02	0.072
Uterine contraction regularity	0.85**	0.654
Tocometric findings	5.06**	0.079
Maternal progression factors	10.55**	0.394
Estimated blood loss amount	0.070**	0.932

*ANOVA, **chi square test.

Table 5: Foetal well-being factors.

Factors	Statistical value*	p value
Foetal presentation	2.73**	0.256
Liquor	7.11**	0.029
Foetal heart rate	13.99**	0.030
Caput	6.78**	0.034
APGAR score (1 min)	2.10	0.130
APGAR score (5 min)	3.52	0.035

*ANOVA, **chi square test.

APGAR, Appearance, Pulse, Grimace, Activity, and Respiration.

Foetal outcomes

There was a significant relationship between the foetal well-being factors, such as clear or meconium- or blood-stained liquor, foetal heart rate, presence of caput, and APGAR score at 5 min, and date fruit consumption. The foetal presentation and APGAR score at 1 min showed no significant association with its consumption.

Discussion

In the present study, the women who consumed date fruits before labour had short first and third stages of labour; there

were no significant differences between the date fruit consumers and their counterparts regarding cervical dilatation; rupture of membranes; strength, frequency, and regularity of uterine contractions; tocometric reports; maternal progression factors; and estimated blood loss amount. Regarding foetal outcomes, the date fruit consumers were less likely to have meconium liquor staining, foetal heart rate variability, and caput and had better APGAR scores at 5 min. A recent RCT¹⁶ concluded that date fruit consumption did not expedite the onset of labour but reduced the need for augmentation with oxytocin in contrast to the present findings.

In a case–control study⁷ conducted in Jordan, in which 69 pregnant women who consumed six pieces of date fruits daily for 4 weeks were compared to controls who consumed no date fruits, the duration of the latent phase of the first stage was shorter in the date fruit consumers, which is in line with the current findings. A short duration of the first and third stages of labour was also found in a recent clinical trial¹⁷ conducted on 91 women who consumed 70–76 g of date fruits from the 37th gestational week, supporting the current findings. Another previous study⁷ observed a higher cervical dilatation and intact membranes among date fruit consumers in contrast to the present observation. The number of pieces, duration of consumption, dryness, and type of the date fruits consumed could explain the differences between the two studies. A higher mean cervical dilatation among date fruit consumers was found in the study by Kuran et al.¹⁸; their findings are not in agreement with those in the current study. A plausible explanation could be the different numbers of pieces of date fruits consumed. Kuran and colleagues used 70–75 g of date fruits from the 37th gestational week until delivery; in the current study, seven pieces of date fruits at the onset of labour were given. Several mechanisms have been proposed for the effect of date fruit consumption on labour progression, including the influence on oxytocin receptors, better cervical preparation, and reinforcement of prostaglandin synthesis.^{7,19} Date fruits have anti-oxidant and anti-inflammatory properties and are rich in calcium, which may contribute to the contraction of the smooth muscle of the uterus.^{11,20} Furthermore, they are known to contain 15 types of salts and minerals, in addition to high percentages of vitamins, carbohydrates, and fat. It is hypothesised that date fruits stimulate the uterine muscle to respond more favourably to oxytocin, thus preparing the uterus and cervix for delivery.

The short duration of the first and third stages of labour despite the lack of an effect of date fruit consumption on uterine contraction and cervical dilatation in the present study could be explained by the better preparation of the cervix and saving of energy, leading to a more effective uterine contraction ending in a shorter time for complete dilatation of the cervix and shortening of labour duration.¹⁷ Date fruits are made mainly of simple sugar, and the oxidative pathway is the primary pathway of energy (10 g of glucose is needed every hour). They are a dominant and readily accessible source of energy that provides, saves, and maintains mothers' power during labour.^{7–9,21} Khadem et al.¹¹ found a lesser amount of postpartum haemorrhage in contradiction to our study, in which no significant

difference was found between the pregnant women who consumed date fruits at the onset of labour and controls. The lesser liquor, presence of caput, and variability in the heart rate and better APGAR score at 5 min could be explained by the shorter first stage of labour reported in the current trial. In the holy Quran, date fruits have been introduced as a healthy diet to Mary at the time of giving birth; according to Islamic Hadith, if date fruits were not an abundant food source, God would not have given it to Mary. Among the strong aspects of the current trial is the use of a cheap and readily available source, besides examining the cervix before the intervention and the regular use of tocometry during labour. The limitation of the present study is that we could not control for the diet of the participants. Further trials with the specification of the appropriate number of pieces or amount of date fruits to be consumed and duration of date fruit consumption are needed.

Conclusion

The present study showed favourable effects of date fruit consumption on the duration of the first and third stages of labour. No significant differences were evident between the date fruit consumers and their counterparts regarding cervical dilatation; rupture of membranes; strength, frequency, and regularity of uterine contractions; tocometric reports; maternal progression factors; and estimated blood loss amount. The women who consumed date fruits were less likely to have meconium-stained liquor, caput, and foetal heart rate variability. The APGAR score at 5 min was significantly better among the infants whose mothers consumed date fruits.

Conflict of interest

The authors have no conflict of interest to declare.

Ethical approval

The ethical committee of the University of Tabuk approved the study.

Consent

Informed consent was obtained from all participants included in the study.

Authors' contributions

I.E. Ahmed, HOM, and MAM conceived and designed the study; TQA collected the data; and YMI interpreted and analysed the data. All authors contributed equally in drafting and critically revising the manuscript before submission. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

Acknowledgment

The authors would like to acknowledge the Deanship of Scientific Research, University of Tabuk, Tabuk, KSA for the financial support provided under grant number S-1438-0055 and King Fahd Specialty Civil Hospital administrators and medical personnel, in particular the nurse staff who shared their experience in this study.

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How to cite this article: 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 Sc** 2018;13(6):557–563.