The Journal of Obstetrics and Gynaecology

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Journal of Obstetrics and Gynaecology

ISSN: 0144-3615 (Print) 1364-6893 (Online) Journal homepage: http://www.tandfonline.com/loi/ijog20

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To cite this article: Nuguelis Razali, Siti Hayati Mohd Nahwari, Sofiah Sulaiman & Jamiyah Hassan (2017): Date fruit consumption at term: Effect on length of gestation, labour and delivery, Journal of Obstetrics and Gynaecology, DOI: 10.1080/01443615.2017.1283304

To link to this article: http://dx.doi.org/10.1080/01443615.2017.1283304

Published online: 13 Mar 2017.

JOURNAL OF OBSTETRICS AND GYNAECOLOGY, 2017
http://dx.doi.org/10.1080/01443615.2017.1283304

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ORIGINAL ARTICLE

Date fruit consumption at term: Effect on length of gestation, labour and delivery

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ABSTRACT

Labour induction and augmentation with Prostaglandin and Oxytocin are well established as standard practice worldwide. They are safe when used judiciously, but may be associated with maternal and neonatal morbidities. Other safer alternatives have been studied including dates consumption during late pregnancy with various outcomes. The aim of this randomised controlled trial was to investigate the effect of date fruit consumption during late pregnancy on the onset of labour and need for induction or augmentation of labour. A total of 154 nulliparous women with an uncomplicated singleton pregnancy were randomly allocated to either dates-consumer (77) or control group (77). The women in the dates-consumer group had significantly less need for augmentation of labour and longer intervention to delivery interval. There was no significant difference in the onset of spontaneous labour. Dates consumption reduces the need for labour augmentation but does not expedite the onset of labour.

IMPACT STATEMENT

- Dates fruit consumption during late pregnancy has been shown to positively affect the outcome of labour and delivery. In this study, date consumption reduced the need for labour augmentation with oxytocin but did not expedite the onset of labour. Therefore, dates consumption in late pregnancy is a safe supplement to be considered as it reduced the need for labour intervention without any adverse effect on the mother and child. This further supports the finding of earlier studies.

KEYWORDS

Randomised trial; pregnancy; dates fruit; induction or augmentation of labour

Introduction

Pregnancy and labour are physiological processes and therefore all uncomplicated pregnancies should end up in normal labour. Normal labour has been defined by the World Health Organization (WHO) as 'spontaneous in onset, low-risk at the start of labour and remaining so throughout labour and delivery'. The infant is born spontaneously in the vertex position between 37 and 42 completed weeks of pregnancy. After birth, mother and infant are in good condition (World Health Organization 1996). Unfortunately, some patients will need induction of labour due to the presence of medical or obstetrical complications of pregnancy. Some women who went into spontaneous labour will need augmentation of labour because of dysfunctional labour caused by inefficient uterine contractions. A survey, which included nearly 300,000 deliveries in 24 countries showed that approximately 10% of the deliveries were induced, ranging from 1.4% in Nigeria to 35.5% in Sri Lanka (World Health Organization 2011). The rate of augmentation of labour due to ineffective uterine contraction in a study from Sweden ranged between 18.6% and 40.5% of all deliveries and the trend was increasing over time (Oscarsson et al. 2006). A variety of methods are used for induction and augmentation of labour, either alone or in combination, such as stripping of the membranes, artificial rupture of membranes (ARM) and medical agents (prostaglandins, oxytocin). The policy of labour induction compared with expectant management in post-term women has been shown to be associated with fewer perinatal deaths and fewer caesarean sections (Gulmezoglu et al. 2012). However, induction of labour should not be taken lightly as it is not without risks. Induced labour can give rise to increased complications, such as bleeding, caesarean section, uterine hyper stimulation and rupture (World Health Organization 2011).

Apart from the associated complications, a Cochrane review has also shown that women who undergo IOL tend to be less satisfied with their birth experience (Dowswell et al. 2010). To avoid induction of labour, women have been shown to resort to complementary and alternative medicine (CAM) (Skouteris et al. 2008; Smith and Cochrane 2009). Common CAM therapies used include herbal medicine such as raspberry leaf, castor oil and evening primrose oil; acupuncture, homeopathy and self-help techniques such as nipple stimulation (Hall et al. 2012). In a local study in Malaysia involving 460 women, herbal medicine was used by 34.3% of participants during pregnancy, while 73% utilised herbal medicines during labour, because of a belief that it may shorten and ease labour (Law and Soon 2013).

The date fruit, *Phoenix dactylifera*, is a fruit that is known to contain a high percentage of carbohydrate, fat, 15 types of

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salts and minerals, proteins and vitamins such as riboflavin, thiamine, biotin, folic and ascorbic acid that are essential for the body (Al-Shahib and Marshall 2003). Surah Maryam verses 22 to 26 describe a divine revelation to Maryam during the pain of childbirth '… shake towards you the trunk of the palm tree; it will drop upon you ripe, fresh dates. So eat and drink and be contented…' Based on these verses, Islamic scholars in interpreting the Holy Quran perceived that one of the best food for women during and after delivery are dates.

Only a few literatures are available in investigating the relationship of date fruit with labour. A non-randomised study by Al-Kuran et al. demonstrated more spontaneous labour with higher mean cervical dilatation upon admission with reduced need for augmentation of labour in women who consumed dates during pregnancy (Al-Kuran et al. 2011). In a randomised trial by Kordi, women who consumed date fruit in late pregnancy were noted to have higher mean cervical dilatation and increased success rate of labour induction compared to the non-consumer group (Kordi et al. 2014). Therefore, we postulate that the use of dates in late pregnancy may facilitate birth and therefore reduce the need for induction and augmentation of labour and hence improve the delivery outcome.

Materials and methods

This randomised controlled trial was carried out in the antenatal clinic, University Malaya Medical Centre (UMMC), Malaysia from 25 November 2013 to 25 July 2014. Ethical approval for the trial was obtained from the UMMC Medical Ethics Committee (approval number 1023.9, dated 30 October 2013).Written consent was obtained from all participants. Healthy primigravida without any chronic illnesses or antenatal complications (low-risk pregnancies) who has completed 36 weeks of gestation were approached to participate in the study.

The exclusion criteria were non-primigravida and all primigravida with antenatal complications. Antenatal complications are defined as multiple pregnancy, placenta praevia, history of antepartum haemorrhage, ruptured membranes, hypertension, diabetes, other medical illnesses, foetal growth restriction, foetal anomalies or any contraindications to vaginal delivery.

Women who fulfilled the criteria were approached and given an information leaflet about the study. At the initial contact stage with potential participants, the study was presented as a study on date consumption by participant to hasten delivery. The randomisation sequence was done using sealed envelope numbered 1–10 equally assigned with randomisation for dates-consumers and control group. Hence, they would be assigned to either dates-consumers or control group. Once the selected numbered envelope was taken up, the remaining numbered envelopes would serve as an option for subsequent patients in each group later. The selected numbered envelope was considered void and was not allowed for reselection until replacement. Subsequently, a new batch of sealed and numbered envelopes would replace the old batch of envelopes once it was exhausted.

An additional information leaflet was given to participants allocated to dates-consumers. This leaflet reinforced the information given in the advice or counselling session. The first group of women were given a supply of date fruit and instructed to take seven pieces per day until the onset of the active phase of labour and to keep a note of their intake. Seven pieces of dates equated to a daily intake of approximately 80 g. The weight was chosen based on studies done by Al-Kuran et al. and Kordi, in which patients were given 60–67 g and 70–75 g of date fruit each. The consumption of date fruit would be discontinued if the patient was in the active phase of labour, or on the day she was scheduled for induction of labour. It was also discontinued, if the patient needed immediate delivery or developed any obstetrics complications during the recruitment period. The patients were given a simple diary sheet, instructed to update regularly their date fruit consumption and to return the diary by hand on the next antenatal visit or collected in the postnatal ward after delivery. They were given a weekly supply of date fruit, and on every visit their dates-consumption diary will be collected and random capillary glucose monitoring was done. Any participant who consumed less than four dates per day or has any adverse effects during dates fruit consumption such as diarrhoea, nausea or vomiting or any derangement in random capillary glucose reading were excluded from the study.

The second group of women (control group) was not given date fruit and was asked regarding any alternative medicine, herbal remedies or regular fruit intake taken during their pregnancy. They would be excluded if they mentioned date fruit as part of their diet intake during pregnancy. The control group was asked to abstain from date fruit intake.

All women included in the study were managed according to standard obstetrics care. Foetal well-being was evaluated by ultrasonography and intermittent foetal auscultation during antenatal period or electronic foetal monitoring in labour.

The primary outcome was the onset of spontaneous labour. Other outcome measures were duration of pregnancy (as represented by gestational age at delivery), the interval between intervention and delivery, the cervical dilatation upon admission (cm), duration of the various stages of labour, induction and augmentation of labour, mode of delivery (normal vaginal delivery, assisted vaginal delivery or caesarean section), neonatal Apgar score at 5 min, neonatal arterial cord blood pH, admission to the neonatal care unit and indication for neonatal admission as well as maternal estimated blood loss during delivery and maternal haemoglobin status prior and after delivery. The latent phase of labour was taken as the time from admission until the cervical os was 4 cm dilated; duration of the latent phase of labour was based on the women's report (self-reporting).

Labour was considered to be established when contractions were occurring at least once in every 4 min, and the cervical dilatation was, at least, 4 cm. In our unit, patients with uncomplicated pregnancy will be offered induction of labour at 40 weeks plus 7 days and 24 h after prelabour rupture of membranes in term pregnancy. Tablet Dinoprostone was inserted per vagina if the cervix was unfavourable, or if the cervix was favourable (typically for a Bishop score >6)

amniotomy was performed followed by oxytocin infusion. The need to start oxytocin after established labour was considered to be for labour augmentation. The duration of active labour was taken as the interval from the time of diagnosed established labour to the time of delivery. Duration of the first stage of labour (active phase) is defined as the time from cervical dilatation of 4–10 cm; duration of the second stage of labour as the time from full cervical dilatation until delivery of the foetus; duration of the third stage as the time from delivery of the foetus until delivery of the placenta. All these information was also recorded.

These parameters, as well as physical age and gestational age, were also recorded and entered into SPSS 20 statistical software. Independent sample *T*-test was applied to compare mean values. Pearson Chi-square test was used for cross tabulations of categorical variables; with Fisher's exact test used for small sample size. A *p* value less than .05 was considered statistically significant in this study.

Results

The recruitment and the in-trial flow chart are depicted in Figure 1. A total of 179 women were screened for eligibility; 10 women refused to participate. 169 women consented and randomly assigned; 84 women were assigned to the dates-consumers group and 85 women were assigned to the control group. However, only 77 women in each group were analysed as 13 women were lost in the follow-up and two were excluded. The pregnancy outcomes of the 13 women were unobtainable because they delivered in a different centre and attempted to phone interviews were unsuccessful. Two women in the intervention group were excluded due to non-compliance ($n = 1$) and the other one had suspicious CTG during antenatal follow-up. Pregnancy outcomes were extracted from the women's charts and hospital central records.

The baseline characteristics of participants ($n = 154$) are shown in Table 1. Figure 2 shows the maternal age distribution of the participants. The majority of the participants were within 25–29 year of age. Gestational age at recruitment was (mean ± SD) 37.66 ± 0.9 weeks in dates-consumers group and 38.17 ± 1.2 weeks in the control group after randomisation.

The primary outcomes of the study such as pregnancy duration and labour induction rate, as well as the data of main outcomes, are displayed in Table 2. Pregnancy duration, as represented by the gestational age at delivery was (mean ± SD) 39.14 ± 1.2 in the dates-consumer group versus 39.17 ± 1.2 weeks in the control group ($p = 1.000$), which is not significant.

The mean interval from intervention to delivery was significantly longer (mean ± SD) 1.64 ± 1.2 versus 1.01 ± 0.8 weeks ($p < .001$) in the dates-consumer group. The onset of spontaneous labour was not significantly different, 68/77 (88%) compared to 65/77 (84%) ($p = .48$, relative risk 1.04, 95%CI 0.92–1.18) in the dates-consumers group compared to control group, respectively. However, the likelihood of requiring augmentation of labour was significantly less in the date consumer group, 29 (37%) versus 39 (50%) ($p = .04$, relative risk 0.7, 95%CI 0.50–0.99).

The study also found that there was no significant difference in the mean of cervical dilatation on admission and mode of delivery. The latent, first and third stage of labour were found to be of shorter duration in the dates-consumers group compared to control group. However, the difference was not statistically significant.

Secondary outcomes of the study are displayed in Figure 2 and Table 3. Most of the neonates were in average size between 2.5 to 3.5 kg (Figure 3). There were no significant

Table 1. Baseline characteristics in the two study groups.

Variables	Dates-consumers ($n = 77$)	Control group ($n = 77$)
Maternal age	27.73 ± 0.3	28.35 ± 0.4
Races		
i) Malay	68 (88%)	48 (62%)
ii) Chinese	7 (9.1%)	20 (26%)
iii) Indian	2 (2.6%)	8 (10%)
iv) Others	0	1 (1.3%)
Gestational age at recruitment (weeks)	37.66 ± 0.9	38.17 ± 1.2

Values are given as mean ± SD (range), or as number (percentage %).

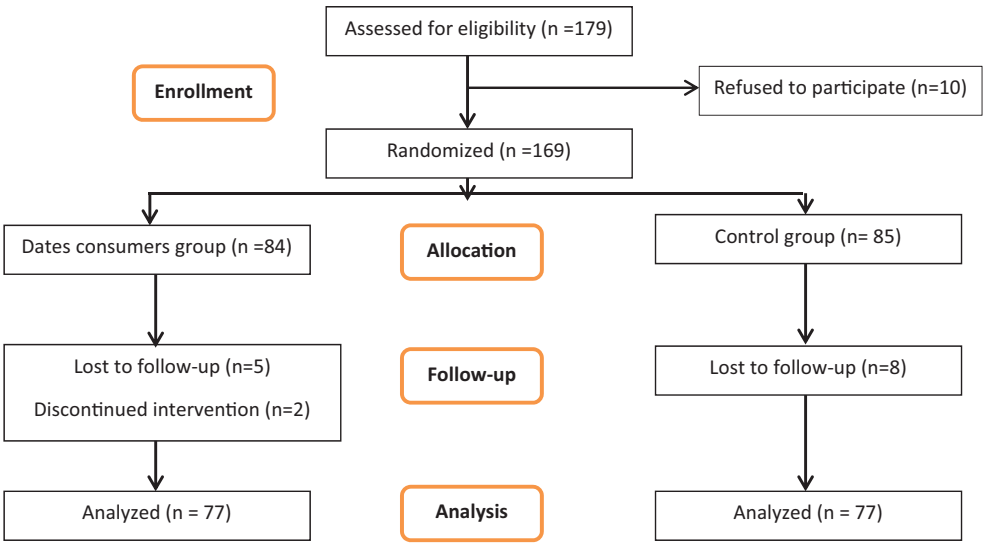

Figure 1. Procedures for the selection and follow-up of participants.

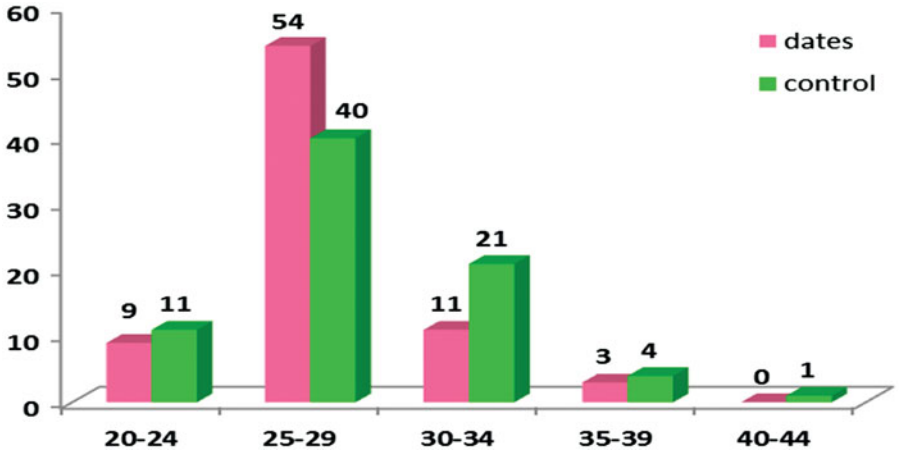

Figure 2. Distribution of maternal age in dates-consumers group and control groups.

Table 2. Primary/delivery outcomes of 154 women in two groups.

Admission and delivery parameters	Dates-consumers group ($n = 77$)	Control group ($n = 77$)	p Value	RR (95%CI)
Gestational age on admission (weeks)	39.14 ± 1.2	39.19 ± 1.2	1.000	N/A
Intervention to delivery interval (weeks)	1.64 ± 1.2	1.01 ± 0.8	<.001	N/A
Type of onset of labour:				
i) Spontaneous labour	68 (88%)	65 (84%)	.4	1.04 (0.9–1.2)
ii) Need for labour induction	9 (11%)	12 (15%)	.17	0.59 (0.28–1.2)
iii) Need augmentation	29 (37%)	39 (50%)	.04	0.7 (0.5–0.9)
Mode of delivery				
i) SVD	54 (70%)	54 (70%)	.856	1.25 (0.45–3.41)
ii) Caesarean section	15 (20%)	13 (17%)	.763	0.69 (0.211–2.28)
iii) Assisted vaginal delivery	8 (10%)	10 (13%)	.901	1.15 (0.59–1.44)
Cervical dilatation on admission	3.30 ± 0.264	2.90 ± 0.217	.241	N/A
Duration of stages of labour (min):				N/A
i) Latent phase	527 ± 364	724 ± 594	.051	–
ii) First stage of labour	255 ± 172	280 ± 174	.569	–
iii) Second stage of labour	54 ± 161	38 ± 29	.399	–
iv) Third stage of labour	9.6 ± 9	10 ± 8	.735	–

RR: relative risk; CI: confidence interval; N/A: not applicable.

Table 3. Secondary outcome results of 154 women in two groups.

Secondary outcome	Dates-consumers group ($n = 77$)	Control group ($n = 77$)	p Value
Apgar score at 5 minutes			.605
i) <6	1 (1.3%)	1 (1.3%)	
ii) 7–8	0	1 (1.3%)	
iii) 9–10	76 (98.7%)	75 (97.4%)	
Umbilical cord blood pH			.276
i) pH <7.1	6 (7.8%)	2 (2.6%)	
ii) pH >7.1	71 (92.2%)	75 (97.4%)	
Base excess	−3.123 ± 4.56	−3.655 ± 3.78	.433
Estimated blood loss			.533
i) <500 ml	71 (92.2%)	67 (87%)	.955
ii) 500 ml	3 (3.9%)	6 (7.8%)	1.000
iii) >500 ml	3 (3.9%)	4 (5.2%)	.478
Maternal haemoglobin levels (g/dL)			
i) Prior delivery	11.7 ± 1.2	11.9 ± 1.3	.123
ii) Post delivery	11.5 ± 1.4	11.9 ± 1.5	.069

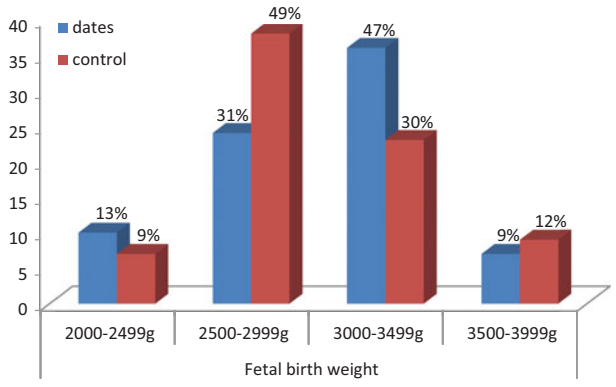

Figure 3. Distribution of foetal birth weight of 154 women of dates-consumers and control groups.

differences in the neonatal outcome with the majority of the neonates having good Apgar score (more than 7 at 5 min) and umbilical artery pH at delivery (more than 7.1). There was no neonatal intensive care unit admission of neonates in the study population. This study result also revealed there was no statistically significant difference in maternal estimated blood loss as well as maternal haemoglobin levels.

Discussion

The study result revealed that date consumption in the late pregnancy was not associated with a significant increase in onset of spontaneous labour. However, it significantly reduced the need for augmentation of labour with oxytocin. Al-Kuran et al. in their study also showed significantly reduced need for labour induction or augmentation but

higher rates of spontaneous labour. Dates fruit was hypothesised to stimulate the uterine muscles to respond more favourably to oxytocin, therefore, prepares the uterus and cervix better for delivery (Al-Kuran et al. 2011). Khadem et al. in a study comparing the effects of date fruit and oxytocin in the prevention of postpartum haemorrhage, found that date fruit has an oxytocin-like effect that leads to the increased sensitivity of the uterus, stimulates uterine contractions and reduces mean postpartum haemorrhage (Khadem et al. 2007).

Both groups (dates-consumers and control group) had a similar duration of pregnancy as both groups presented at 39 weeks of gestation. This is similar to the finding of the study by Al-Kuran et al. (2011). Our study data showed that the interval between intervention and delivery was shorter in the control group; 1.06 ± 0.8 weeks versus1.64 ± 1.2 (p value $<.001$) (Al-Kuran et al. 2011; Kordi et al. 2014). However, it should be noted that the control group was recruited at a later gestation compared to the intervention group, and this could explain the shorter interval between intervention to delivery. Therefore, it could be assumed that most women will go into labour at about the same gestational age and dates consumption does not expedite this process. There was no statistically significant differences noted in the mode of delivery, mean cervical dilatation, duration of various stages of labour and estimated blood loss between dates-consumers and control group. Our finding of mean cervical dilation on admission was different from other related studies that noted significantly higher cervical dilation in dates-consumers group presented in labour (Al-Kuran et al. 2011; Kordi et al. 2014). Fortunately, 70% of the of the study population delivered uneventfully via spontaneous vaginal delivery with $p = .856$.

Prostaglandins and oxytocin are the common medical agents used to stimulate uterine contractions and to induce or augment labour (Hayes and Weinstein 2007). To ensure the safety of oxytocin for cervical ripening or labour induction, it must be used appropriately with the most important safety measure being the ability to titrate the infusion accurately. In low-resourced setting, this might be difficult to implement due to inconsistent electricity supplies, limited or no infusion pumps and unstable supply chains (Smid et al. 2015). Even though our study did not show a significant difference in the onset of spontaneous labour, there was a significant reduction in augmentation rates. Therefore, dates might be a supplement to consider for consumption in the late pregnancy to avoid the usage of oxytocin or prostaglandin. It is also reassuring as there were no differences noted in the maternal and neonatal outcomes for both groups in this study.

There are several limitations to this study. Firstly, the exact amount of dates fruit that need to be taken to make a positive outcome was not known. We have estimated the amount required based on the two previous related studies. More studies are needed to estimate the exact amount needed. Secondly, the duration of the latent phase of labour was based on the women's report. Therefore, it could not be objectively verified and may be prone to recall error. Similarly, the intervention depended entirely on maternal recall on dates consumption. Lastly, the intervention group received more attention than the control group and this could potentially affect the outcome of the study.

Random blood glucose was monitored in all dates-consumers participants during each antenatal visit. Even though there was no reported abnormal blood glucose level; a more accurate blood testing can be done such as serum fructosamine or HbA1c.

Conclusions

Although the definitive role of dates fruit consumption in the late trimester of pregnancy is still yet to be established, the existing studies suggest that it may be beneficial in increasing the chances for having spontaneous onset of labour with normal progress thus help to reduce the need for induction and augmentation of labour. We hope that these findings will contribute to the limited existing literature on the benefit of date consumption in pregnancy.

Acknowledgements

There is no funding received for this study.

Disclosure statement

The authors report no conflict of interest.

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