

# The Impact of the Fruit and Seed of Date on Childbirth Stages and Pregnancy Complications

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**ABSTRACT:** This review aimed to investigate the effects of date fruit products on childbirth and pregnancy-related complications. MeSH keywords were systematically searched in scientific databases, and 16 articles were reviewed. It was found that consuming 7 date fruits (average of 80 g) per day for 2–4 weeks before the estimated date of delivery leads to a better cervical dilatation at admission or improvement of Bishop score, a decrease in the need for induction or stimulation of labour and an increase in effective uterine contractions, which, in turn, decreases the duration of pregnancy and the different stages of labour. Additionally, date fruit products can improve blood pressure parameters in pregnant women at risk of preeclampsia and accelerate episiotomy healing.

**Keywords:** Pregnancy; Childbirth; Date Fruits.

THE WORLD HEALTH ORGANIZATION (WHO) defines natural childbirth as the “spontaneous onset of low-risk labour and its continuation between 37 and 42 weeks of a full pregnancy”.<sup>1</sup> If labour is not progressing, it can be stimulated or induced by several means. These methods are used in isolation or combination, such as by stripping the membranes and using prostaglandins and oxytocin.<sup>2</sup> If the cervix is not favourable, it should be prepared by mechanical methods first.<sup>1</sup>

Induction of labour by oxytocin occurs in over 25% of deliveries.<sup>3</sup> When the duration of labour increases, long-term induction occurs with several adverse effects, including prolonged latent phase, hyperactive uterus, chorioamnionitis, increased risk of uterine rupture, fetal hypoxia, acidaemia, postpartum haemorrhage, and caesarean section.<sup>3,4</sup> Furthermore, labour induction may lead to maternal discomfort and a significant financial burden.<sup>1,5,6</sup> However, these methods accelerate labour and reduce the caesarean section rate.<sup>7</sup> In recent times, researchers have paid more attention to resolving labour problems by using complementary therapies and reducing the rate of cesarean section and maternal and fetal complications.<sup>8</sup>

It appears that the use of complementary and alternative medicine is safer than chemical drugs for improving fertility and reducing childbirth and postpartum complications.<sup>9</sup> The use of herbal medicines throughout pregnancy has a prevalence of 6–9% in developed countries such as Canada and the USA, up to 50% in Australia and Eastern Europe, 69%

in Russia, and 51–63% in Iran.<sup>10,11</sup> Notably, most parts of date products (fresh date fruit, date syrup, ‘Lagmi’) are common in traditional medicine.<sup>12</sup>

Date fruit extract has various properties; it can be used to prevent and treat pregnancy complications such as cardiovascular disease (preeclampsia and diabetes) and help wound healing and genital injuries.<sup>13,14</sup> Therefore, date fruits seem to be a sensible food choice for pregnant women as part of a balanced diet. Hence, the present systematic review investigated the effect of date fruit products on the childbirth process and pregnancy complications.

## Methods

This review used the preferred reporting items for systematic reviews and meta-analyses guidelines (PRISMA), according to which the following steps were performed: systematic literature review, organising documents to review, abstracting and evaluating the quality of each experimental study, combining data and writing a report.<sup>15–17</sup>

### SEARCH STRATEGY

Relevant articles from 2000 to 2022 were systematically searched on Web of Science, PubMed, Scopus, ProQuest, and Google Scholar according to Medical Subject Headings keywords (MeSH): ‘Parturitions’ OR ‘Birth’ OR ‘Births’ OR ‘Childbirth’ OR ‘Childbirths’; ‘Pregnancy’ OR ‘Pregnancies’ OR ‘Gestation’; AND ‘Phoenix dactylifera’ OR ‘Date Palm Trees’ OR ‘Date Palm Tree’ OR ‘Palm Tree, Date’ OR ‘Palm Trees, Date’

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OR 'Tree, Date Palm' OR 'Trees, Date Palm' OR 'Date Palms' OR 'Date Palm' OR 'Palm, Date' OR 'Palms, Date' OR 'Dates, Palm' OR 'Date, Palm' OR 'Palm Date' OR 'Date Palm Fruit' OR 'Date Palm Fruits' OR 'Fruit, Date Palm' OR 'Fruits, Date Palm' OR 'Palm Fruit, Date' OR 'Palm Fruits, Date' OR 'Date Fruit' OR 'Date Fruits' OR 'Fruit, Date' OR 'Fruits, Date' OR 'Palm Dates'.

### ELIGIBLE CRITERIA

Clinical trials published between 2000–2022 that investigated the effect of date fruit products on the stages of labour and pregnancy complications were included in this review. Studies were selected in Persian and English.

The following studies were excluded: case reports; comments; letters; and studies that had inconsistent data, in which the full text was inaccessible, that were published before 2000 and that did not have appropriate quality. The PICO criteria were as follows: participants (primiparous or multiparous mothers with term birth and mothers with vaginal childbirth); interventions (date fruit products [date fruit, date syrup, date-honey syrup, Lagmi] consumed during pregnancy, childbirth and postpartum period); comparison (placebo or without intervention or routine care); and outcome (the rate of cervical dilatation, postpartum haemorrhage, Bishop score, the duration of each stage of labour and delivery and mean blood pressure).

### STUDY SELECTION

Titles and abstracts of all studies reviewed during the electronic and manual search process were evaluated based on the inclusion criteria. Subsequently, the 2 researchers independently reviewed the full article texts and had discussions to resolve their differences during disagreements. Afterward, a table was prepared using a review of various articles to present the information related to the effect of date fruit usage on childbirth stages and pregnancy complications.

### QUALITY ASSESSMENT

Risk of bias (RoB) assessment was performed through the Cochrane RoB 2 tool for the selected studies, following the Cochrane Handbook for Systematic Reviews of Interventions.<sup>18</sup> The tool has 5 domains that can be used to determine the overall RoB. The assessment of RoB for the second domain, which focuses on deviations from the intended interventions, was used to measure the impact of assignment to the intervention. Each domain was evaluated using one of three options: 'low RoB', 'some concerns' or 'high RoB'; 2 authors assessed the RoB for each study, and

any disagreements were resolved through discussion [Table 1].

### DATA EXTRACTION

The 2 authors separately reviewed published scientific studies to evaluate their quality. Afterward, they exchanged views and resolved any existing disagreements. The collected information was summarised, including reference, region, participants, sample size, intervention group, comparison group, type of product, and outcomes [Table 2].

## Results

A total of 894 studies were screened for this review; 31 duplicate articles and, after analysis, 400 studies with irrelevant titles and abstracts were removed. Subsequently, 432 studies that did not meet the inclusion criteria were removed. The 31 remaining studies were reviewed in their entirety and 15 studies were omitted [Figure 1]. Ultimately, 16 studies on the effect of using date fruit products in pregnancy and childbirth (with a sample size of 1,616 pregnant women and 15 rats) were included in this review [Table 2]. The articles were published between 2000 and 2022, and the countries in which the studies were conducted were Iran (n = 9), Indonesia (n = 2), Pakistan (n = 1), Malaysia (n = 1), Saudi Arabia (n = 1), Tunisia (n = 1) and Jordan (n = 1). The intervention involved date fruits in 13 studies and date syrup, 'Lagmi', and date honey syrup in 1 study each.

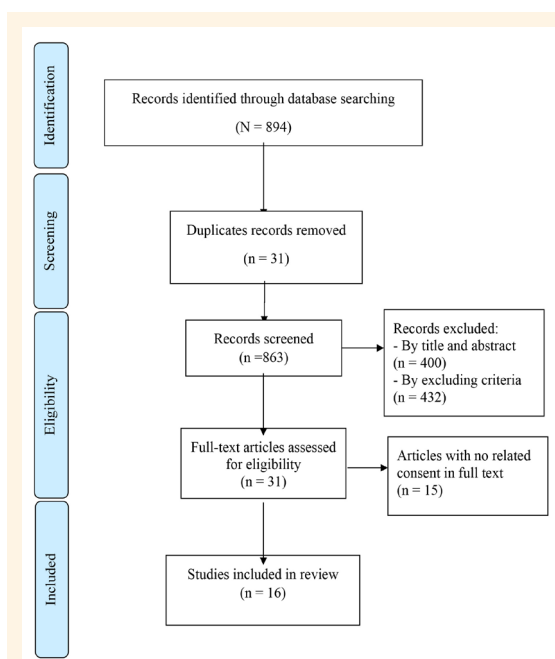


Figure 1: Flowchart of the study selection process

**Table 1:** Risk of bias assessment summary showing the authors' judgments for each risk of bias domain for each included study<sup>14,19–29,31–33,50</sup>

Author and year of publication	Domains				
	Randomisation process	Deviation from the intended interventions	Missing outcome data	Measurement of the outcome	Selection of the reported results
Husaideh and Mappaware <sup>32</sup> (2020)	+	+	+	+	+
Royani <i>et al.</i> <sup>31</sup> (2019)	+	+	+	+	+
Quershish and Khan <sup>50</sup> (2019)	+	+	+	+	+
Fathi <i>et al.</i> <sup>26</sup> (2018)	+	+	?	+	+
Ahmed <i>et al.</i> <sup>14</sup> (2018)	+	+	?	+	+
Kordi <i>et al.</i> <sup>22</sup> (2017)	+	+	+	+	+
Razali <i>et al.</i> <sup>25</sup> (2017)	+	+	+	+	+
Yadegari <i>et al.</i> <sup>29</sup> (2016)	+	+	–	?	+
Abdennabi <i>et al.</i> <sup>33</sup> (2016)	+	+	?	+	+
Kariman <i>et al.</i> <sup>21</sup> (2015)	+	+	?	+	+
Jadidi <i>et al.</i> <sup>24</sup> (2015)	+	+	+	+	+
Kordi <i>et al.</i> <sup>20</sup> (2013)	+	+	?	+	+
Mojahed <i>et al.</i> <sup>27</sup> (2012)	+	+	?	–	+
Al-Kuran <i>et al.</i> <sup>19</sup> (2011)	+	+	+	+	+
Kordi <i>et al.</i> <sup>23</sup> (2010)	+	+	?	+	+
Khadem <i>et al.</i> <sup>28</sup> (2007)	–	+	+	?	+

+ = low risk; – = high risk; ? = some concerns.

## THE IMPACT OF USING DATE FRUITS ON DIFFERENT STAGES OF LABOUR

### IMPROVING BISHOP SCORE AND CERVICAL DILATATION AT ADMISSION

Pregnant women who consumed 6 or 7 date fruits or 70–76 g of date fruits daily for 4 weeks before the estimated date of childbirth or from the 37th week of gestation had significantly high dilatation at admission and their Bishop scores were higher than the participants in the control group.<sup>19–22</sup>

### SPONTANEOUS CHILDBIRTH AND THE NEED FOR INDUCTION AND STIMULATION OF LABOUR

Consumption of 6 date fruits or 70–76 grams of date fruits or date honey syrup (132 g) daily 1–4 weeks before the estimated date of childbirth or from the 37th week of gestation reported significantly less need for induction or stimulation of labour in the intervention group and the rate of spontaneous childbirth was significantly higher.<sup>20,22,23</sup> Moreover, consuming 7 date fruits daily 2 weeks before childbirth causes a higher spontaneous childbirth rate and a lower need for

induction.<sup>24</sup> In contrast, the results of a study by Razali *et al.* illustrated no statistically significant difference between the intervention and control groups in terms of the need for induction and stimulation of labour and spontaneous childbirth.<sup>25</sup>

### LATENT PHASE DURATION OF THE FIRST STAGE OF LABOUR

The consumption of 6–7 pieces of date fruits daily 4 weeks before the estimated date of childbirth caused shorter latent phase length.<sup>19,25</sup>

### ACTIVE PHASE DURATION OF THE FIRST STAGE OF LABOUR

Pregnant women who consumed 7 pieces or 70–76 g of date fruits or 132 g of date honey syrup/date syrup had a significantly shorter active phase.<sup>14,22,23,26</sup>

### DURATION OF THE SECOND STAGE OF LABOUR

The duration of the second stage of labour in the participants who consumed 7 pieces or 70–76 g date fruits daily, especially 1–4 weeks before childbirth and until labour, was significantly shorter than average.<sup>14,22</sup>

**Table 2:** Details of studies included in this review<sup>14,19–29,31–33,50</sup>

Author and year of publication	Region	Participants (N)	Intervention	Comparison	Date product name	Outcome
Husaideh and Mappaware <sup>32</sup> (2020)	Indonesia	Pregnant women at 8 weeks with a high risk of preeclampsia and eclampsia (N = 40)	N = 30 100 g/daily/for 8 weeks	N = 10 without intervention	Date fruits (Ajwa dates)	Significant reduction in - MAP (98.90–85.03) - ROT (30.13–10.07) - Sftt-1 (4.02–1.72)
Royani <i>et al.</i> <sup>31</sup> (2019)	Indonesia	Pregnant women having 1 of the preeclampsia risk factors (N = 40)	N = 30 7 pieces/daily/for 8 weeks	N = 10 without intervention	Date fruits (Ajwa dates)	Significant reduction in - MAP (85.03 ± 4.38) - ROT (10.07 ± 8.09)
Quershi and Khan <sup>50</sup> (2019)	Pakistan	At the risk of cardiac diseases (N = 150) 2) Allopathic therapy + Ajwa date fruits (N = 50)	N = 100 1) Ajwa date fruits alone (N = 50)	N = 50 routine allopathic medicine	Date fruits (Ajwa dates)	Significant improvement of cardiovascular diseases, especially in symptomatic patients
Fathi <i>et al.</i> <sup>26</sup> (2018)	Iran	Nulliparous (N = 80)	N = 40 6 pieces of date fruits blended in 150 ml water/ every 30–60 min/ depending on maternal request	N = 40 without intervention	Date syrup	Significant decrease in mean length of active phase of labour
Ahmed <i>et al.</i> <sup>14</sup> (2018)	Saudi Arabia	Primi and multigravida (N = 89)	N = 58 1) 7 pieces of date fruits alone (N=26) 2) 7 pieces of date fruits + 250 ml of water (N = 32)	N = 31 without intervention	Date fruits (Rotana rutab)	Significant decrease in: - Duration of the first stage of labour in the date fruits and date fruits + water consumers (210.14 ± 177.13 vs. 224.43 ± 157.25 min) - Duration of the second stage of labour in date fruit + water consumers (20.50 ± 13.94 min).
Kordi <i>et al.</i> <sup>22</sup> (2017)	Iran	Nulliparous women (N = 182)	N = 91 70–76 g/daily/ from the 37th week of pregnancy	N = 91 without intervention	Date fruits (Mazafati dates of Bam) Date fruits	Significant decrease in: - Length of active phase (329.00 ± 249.00 min) - Second phase (33.60 ± 13.70 min) - Third phase (5.10 ± 2.50 min) - Need of oxytocin for labour acceleration 5.50%) - Significant increase in spontaneous start of delivery (94.50%)
Razali <i>et al.</i> <sup>25</sup> (2017)	Malaysia	Nulliparous (N = 154)	N = 77 7 pieces (approximately 80 g)/daily/for 36th weeks of gestation to onset of labour	N = 77 without intervention	Date fruits	Significant decrease in: - Augmentation of labour - Latent phase of the first stage (364 ± 527 min)
Yadegari <i>et al.</i> <sup>29</sup> (2016)	Iran	Nulliparous (N = 90)	N = 45 100g/daily/for 2 hours to 10 days after delivery	N = 45 without intervention	Date fruits (Mazafati dates of Bam)	Significant decrease in the rate of bleeding 2–10 days after birth
Abdennabi <i>et al.</i> <sup>33</sup> (2016)	Tunisia	Wistar rats (N = 15)	N = 10 1) Lagmi/ topically/twice/ daily (n = 5) 2) CICAFLORA/ topically/twice / daily (n = 5)	N = 5 without intervention	The sap of the date palm 'Lagmi'	Complete healing in the Lagmi group on the 12th day of the intervention

**Table 2 cont'd:** Details of studies included in this review<sup>14,19–29,31–33,50</sup>

Author and year of publication	Region	Participants (N)	Intervention	Comparison	Date product name	Outcome
Kariman <i>et al.</i> <sup>21</sup> (2015)	Iran	Nulliparous (N = 110)	N = 55 7 pieces/daily/ from the 38th week to the onset of labour	N = 55 without intervention	Date fruits (Bam Mazafati Rutab)	- Significant increase in Bishop score (7.3 ± 2.7) - Significant decrease in duration of the active phase of labour (216.02 ± 16.4 min)
Jadidi <i>et al.</i> <sup>24</sup> (2015)	Iran	Nulliparous (N = 110)	N = 55 7 pieces/daily/ from 38th weeks to the onset of labour	N = 55 without intervention	Date fruits (Bam Mazafati Rutab)	Significant increase in: - Spontaneous onset of labour (63.5%) - Bishop score (7.3 ± 2.7) - Cervical dilatation (4.62 ± 0.305 cm)
Kordi <i>et al.</i> <sup>20</sup> (2013)	Iran	Nulliparous (N = 210)	N = 105 70–75 g/daily/ from the 37th week of pregnancy to onset of labour	N = 105 without intervention	Date fruits (Bam Mazafati Rutab)	- Significant decrease in the need for induction Significant increase in: - Cervical dilatation (4.05 ± 1.63 cm) - Spontaneous start of labour (80%)
Mojahed <i>et al.</i> <sup>27</sup> (2012)	Iran	Multi and nulliparous (N = 95)	N = 44 20 units oxytocin in 1,000 mL dextrose-sodium chloride serum + 100 g date fruits + 1 glass of warm water/ immediately after delivery of the placenta	N = 51 20 units oxytocin in 1,000 mL dextrose sodium chloride serum	Date fruits (Bam Mazafati Rutab)	Significant reduction in postpartum haemorrhage (68.5 mL (
Al-Kuran <i>et al.</i> <sup>19</sup> (2011)	Jordan	Primi and multigravida (N = 114)	N = 69 6 pieces/daily/for 4 weeks before the estimated date of delivery	N = 45 without intervention	Date fruits	Significant increase in: - Cervical dilatation - Proportion of intact membranes - Spontaneous labour (96%) Significant decrease in: - Use of prostin/ oxytocin (28%) - Latent phase of the first stage of labour (510 min)
Kordi <i>et al.</i> <sup>23</sup> (2010)	Iran	Nulliparous (N = 90)	N = 30 132 g date honey syrup/for the dilation of the cervix 4 cm to delivery	N = 60 1) Placebo (N = 30) 2) Routine care (N = 30)	Date honey syrup	- Significant increase in spontaneous progression of labour (96.7%). - Significant decrease in labour duration (351 min).
Khadem <i>et al.</i> <sup>28</sup> (2007)	Iran	Multi and nulliparous (N = 62)	N = 31 50 g/immediately after delivery of the placenta	N = 31 10 unit of intramuscular oxytocin	Date fruits (Deglet noor date)	Significant decrease in mean blood loss 3 hours after delivery.

MAP = mean arterial pressure; ROT = roll over test.

#### DURATION OF THE THIRD STAGE OF LABOUR

Most studies that performed the intervention before the labour did not have a statistically significant difference in the duration of the third stage of labour.<sup>19,25</sup> However, the results of 2 studies reported

that the duration of the third stage of labour in the intervention group (7 pieces or 70–76 g date fruits eaten daily) was significantly shorter.<sup>14,22</sup> Conversely, the duration of the third stage and the mean blood loss were lower with the intervention of 50–100 g date fruits daily up to 10 days after childbirth.<sup>27–30</sup>

### DATE FRUITS AND BLOOD PRESSURE DURING PREGNANCY

A study demonstrated that daily consumption of 7 pieces or 100 g Ajwa date fruits per day by pregnant women at risk of preeclampsia and eclampsia for 8 weeks significantly reduced mean arterial blood pressure and roll-over test.<sup>31,32</sup>

### DATE FRUITS IN WOUND HEALING (EPISIOTOMY)

The presence of phenolic and flavonoid compounds of 'Lagmi'(date palm sap) indicated that 'Lagmi' is an important source of known anti-inflammatory compounds and has a wide range of antioxidants that stimulate wound healing mechanisms and perform biological functions.<sup>33,34</sup>

## Discussion

The analysis of the reviewed studies showed that consuming 7 (equivalent to approximately 80 g) date fruits per day during the last 2–4 weeks of pregnancy leads to a reduction in the need for induction or stimulation of labour and duration of pregnancy. Moreover, consumption of date fruits by pregnant women before labour causes more cervical dilatation or improvement of Bishop score at the time of admission and reduction of the duration of the latent phase of the first stage of labour.

Most studies examined the effect of the consumption of date fruits during labour and demonstrated a decrease in the duration of the active phase of the first and the second stages of labour.<sup>14,22–24,35,36</sup> Furthermore, studies that performed the intervention with date fruit consumption for several days after childbirth reported a decrease in the third stage of labour.<sup>14,22,27,29</sup> The results of a meta-analysis showed that date fruit consumption reduces the duration of the active phase and improves the Bishop score but no significant difference was observed during the first, second, and third stages of labour.<sup>35</sup>

Several theories may explain these findings. First, in the last weeks of pregnancy (34–35 weeks), changes in estrogen and progesterone levels induce uterotonic receptors such as oxytocin and prostaglandins in the myometrium.<sup>37</sup> Moreover, date fruits are rich in saturated and unsaturated fatty acids, which can be converted to eicosanoids and, eventually, to prostaglandins.<sup>21,38</sup> Second, the abundance of serotonin and calcium in date fruits can contribute to uterine smooth muscle contractions by performing oxytocin mimicry activities.<sup>28,39</sup> Third, childbirth is a process with high energy consumption, and a pregnant woman

needs 50–100 kcal per hour or 10 g of glucose per hour during labour.<sup>22,35</sup> Therefore, date fruits with high nutritional value, especially high content of glucose and fructose can meet pregnant women's energy needs during labour.<sup>39</sup> Not consuming energy-generating food during labour leads to increased ineffective uterine contractions and an increased duration of the second stage of labour and possible instrumental vaginal delivery.<sup>40</sup> Other studies demonstrated that resolving food intake limitations during labour and injecting dextrose solution compared to normal saline reduces the duration of labour and postpartum haemorrhage.<sup>30,41,42</sup> Instead of triglycerides and free fatty acids, glucose is the primary metabolite of uterine smooth muscle nutrition during pregnancy, thus playing an important role in the formation of adenosine triphosphate and muscle contraction.<sup>43</sup> Following the consumption of date fruits, the extract is digested, absorbed, and used immediately by the cells. Later, plasma levels of antioxidants are increased for 4 hours.<sup>39</sup> In general, it can be said that date fruits possess energy, oxytocin-like effects, anti-inflammatory and antioxidant impacts.<sup>14</sup> Accordingly, the results of a clinical trial study revealed that oral consumption of date syrup significantly reduces labour pain in nulliparous women.<sup>44</sup>

An important known aetiology of preeclampsia and eclampsia is endothelial damage.<sup>45</sup> Concentrations of antiangiogenic substances such as sFlt-1 in maternal serum increase before the onset of symptoms of preeclampsia;<sup>46</sup> thus, high-risk pregnant women's use of Ajwa date fruits prevents preeclampsia syndrome in the third trimester by reducing the incidence of antiangiogenic cases.<sup>47</sup> Braga *et al.* found that this fruit is a potent inhibitor of angiotensin-converting enzyme, which can effectively control blood pressure.<sup>48</sup> Besides, in some Arab countries, such as Morocco, date fruits are traditionally used for high blood pressure.<sup>49</sup>

One of the strengths of this systematic review is that it informs decisions about the effectiveness of the amount and the duration of the consumption of date fruit products during pregnancy and childbirth stages. One of the limitations of this study is that a small number of studies have been conducted on the effect of date fruit on pregnancy blood pressure and preeclampsia. However, the effect of using date fruit extract on human wounds and episiotomy wounds has not been sufficiently studied; hence, it is recommended that clinical trials be performed to evaluate this aspect.

Despite rigorous endeavors to execute a thorough and precise search across various scientific databases, it is plausible that certain pertinent studies may have been overlooked due to constraints related to resource accessibility, the application of particular

search terminologies, or the limited dissemination of specific publications. Furthermore, although the integrity of the studies was evaluated utilizing standardized and validated assessment instruments, there exists the potential for human error in the scoring or interpretation of the evaluative criteria. These constraints may impact the ultimate findings, notwithstanding the diligent attempts made to mitigate such biases.

## Conclusion

Date fruits can be used to reduce the duration of pregnancy and childbirth time, increase effective uterine contractions, reduce gestational blood pressure, and reduce wound healing time. Thus, healthcare providers can recommend the use of date fruits during pregnancy, childbirth, and the postpartum period.

## AUTHORS' CONTRIBUTION

FA and FAR conceived, designed, and wrote the paper. ZAK, MJB, FR, and FZ reviewed and interpreted the data. All authors approved the final version of the manuscript.

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