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7 **The Impact of the Fruit and Seed of Date on Childbirth Stages and**
8 **Pregnancy Complications**

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20
21 **Abstract**

22 The present study aimed to investigate the effects of date fruit products on the childbirth process
23 and pregnancy complications. MeSH keywords systematically were searched in scientific
24 databases. Finally, 16 articles were reviewed. Overall results of studies illustrated that using
25 seven date fruits per day(average of 80 grams per day) for 2 - 4 weeks before their estimated
26 date of delivery leads to a better cervical dilatation at admission or improvement of bishop
27 score, decrease in the need for induction or stimulation of labor and by increasing effective
28 uterine contractions, decrease duration of pregnancy, and duration of the different stages of
29 labor. Also, date fruit products can improve blood pressure parameters in pregnant women at
30 risk of preeclampsia and accelerate episiotomy healing.

31 **Keywords:** Pregnancy; Childbirth; Phoenix dactylifera; Date Fruits; Date Palm Fruit.

32

33 **Introduction**

34 The World Health Organization (WHO) defines natural childbirth as the "spontaneous onset of
35 low-risk labor and its continuation between 37 and 42 weeks of a full pregnancy." If labor is
36 not progressing, several means can stimulate or induce labor. These methods are used alone or
37 in combination, such as stripping the membranes and using prostaglandins and oxytocin.(1) If
38 the cervix is not desirable, the cervix should first be prepared by mechanical methods.(2)

39
40 Induction of labor by oxytocin occurs in more than 25% of deliveries.(3) With increasing
41 duration of labor, long-term induction occurs with several adverse effects. These effects include
42 prolonged latent phase, hyperactive uterus, chorioamnionitis, and increased risk of uterine
43 rupture, fetal hypoxia, acidemia, postpartum hemorrhage, and cesarean section.(3, 4)
44 Furthermore, labor induction may lead to maternal discomfort and a significant financial
45 burden.(1, 5, 6) However, these methods accelerate the labor process and reduce the cesarean
46 section rate.(7) Recently, researchers have paid more attention to resolving labor problems
47 using complementary therapies and reducing the rate of cesarean section and maternal and fetal
48 complications.(8)

49
50 It seems that the use of complementary and alternative medicine is safer than chemical drugs
51 for the improvement of fertility, childbirth, and postpartum complications.(9) Using herbal
52 medicines throughout pregnancy is 6% to 9% in developed countries such as Canada and the
53 United States, up to 50% in Australia and Eastern Europe, 69% in Russia,(10) and 51% to 63%
54 in Iran.(11) The use of most parts of date products (fresh date fruit, date syrup, "Lagmi") is
55 common in traditional medicine.(12)

56
57 Studies indicate that date fruit extract has different properties, and it can be used to prevent and
58 treat pregnancy complications such as cardiovascular disease (preeclampsia and diabetes) and
59 help wound healing and genital injuries.(13, 14) Date fruits seem to be a sensible food choice
60 for pregnant women as part of a balanced diet. Therefore, the present systematic review study
61 investigated the effect of date fruit products on the childbirth process and pregnancy
62 complications.

63

64 **Methods**

65 When reporting the article protocol, the PRISMA (preferential reporting items for systematic
66 review and meta-analysis) guidelines were followed.(15, 16) Also, according to PRISMA
67 guidelines, the following steps were performed: systematic literature review, organizing
68 documents to review, abstracting and evaluating the quality of each experimental study,
69 combining data, and writing a report.(17)

70 *Search Method*

71 Relevant articles from 2000 to 2022 were systematically searched on Web of Science, PubMed,
72 Scopus, ProQuest, and Google Scholar. Furthermore, articles were searched according to
73 Medical Subject Headings (MESH) keywords: 1. "Parturitions" OR "Birth" OR "Births" OR
74 "Childbirth" OR "Childbirths"/ 2. "Pregnancy" OR "Pregnancies" OR "Gestation"/ "Phoenix
75 dactylifera" OR "Date Palm Trees" OR "Date Palm Tree" OR "Palm Tree, Date" OR "Palm
76 Trees, Date" OR "Tree, Date Palm" OR "Trees, Date Palm" OR "Date Palms" OR "Date Palm"
77 OR "Palm, Date" OR "Palms, Date" OR "Dates, Palm" OR "Date, Palm" OR "Palm Date" OR
78 "Date Palm Fruit" OR "Date Palm Fruits" OR "Fruit, Date Palm" OR "Fruits, Date Palm" OR
79 "Palm Fruit, Date" OR "Palm Fruits, Date" OR "Date Fruit" OR "Date Fruits" OR "Fruit, Date"
80 OR "Fruits, Date" OR "Palm Dates"../ 4. 1 AND 2 AND 3.

81

82 *Eligible Criteria*

83 Inclusion criteria: Clinical trial studies that investigated the effect of date fruit products on the
84 stages of labor and pregnancy complications. Besides, there were no language restrictions in
85 article selection. The translator was asked to translate for articles other than Persian or English.

86

87 Exclusion Criteria: Studies include case reports, comments, letters, studies with inconsistent
88 data, lack of access to the full text of studies, studies published before 2000, and studies that do
89 not have appropriate quality. The PICO criteria are as follows: **P**articipants: Healthy
90 primiparous or multiparous mothers with term birth; Mothers with vaginal childbirth;
91 **I**nterventions: Date fruit products (date fruit, date syrup, date-honey syrup, Lagmi) during
92 pregnancy, childbirth, and postpartum period; **C**omparison: Placebo, without intervention or
93 routine care; **O**utcome(Measurement): The rate of cervical dilatation, postpartum hemorrhage,
94 bishop score, the duration of each stage of labor and delivery, and mean blood pressure.

95

96 Studies type: Clinical trials related to evaluating the impact of date fruit products on childbirth
97 and its complications in the period 2000 to 2022 were included in this review.

98

99 *Selecting Articles*

100 Titles and abstracts of all studies reviewed during the electronic and manual search process
101 were evaluated based on inclusion criteria. Subsequently, the two researchers independently
102 reviewed the full text of the articles. They talked to each other to resolve their differences when
103 disagreeing. Afterward, a table was prepared using a review of various articles. This table can
104 best show the information related to the effect of date fruit usage on childbirth stages and
105 pregnancy complications to make a decision.

106

107 *Quality assessment*

108 Risk of bias (RoB) assessment was performed through the Cochrane RoB 2 tool for included
109 studies, following the Cochrane Handbook for Systematic Reviews of Interventions.(18) The
110 tool has five different areas that are used to determine the overall risk of bias (RoB). The
111 assessment of RoB for the second area, which looks at deviations from the intended
112 interventions, was used to measure the impact of assignment to the intervention. Each area was
113 evaluated using one of three options: "Low RoB," "Some Concerns," or "High RoB." Two
114 authors assessed the RoB for each study, and any disagreements were resolved through
115 negotiation.(Table1)

116

117 *Data Extraction*

118 The two authors separately reviewed published scientific studies and evaluated their quality.
119 Afterward, they exchanged views and resolved the existing disagreements. The collected
120 information, including reference, region, participants, sample size, intervention group,
121 comparison group, type of product, and outcomes, are summarized in Table 2.

122

123 **Results**

124 In the present study, 16 articles out of 894 articles were included. Articles were screened in
125 three stages. In the first stage, 31 duplicate articles were excluded. After studying the title and
126 abstract of the articles, 400 articles with irrelevant titles and abstracts were deleted.
127 Subsequently, 432 articles with exclusion criteria were excluded. Furthermore, the full text of
128 31 articles was reviewed, and 15 studies were omitted. Eventually, 16 qualified studies that

129 examined the effect of using date fruit products in pregnancy and childbirth (sample size of
130 1616 pregnant women and 15 rats) were evaluated (Table 2). The flowchart of the study
131 selection process is indicated in Figure 1. Additionally, the imported articles were selected from
132 the published articles from 2000 to 2022. The countries in which the studies were conducted
133 are Iran (n=9), Indonesia (n=2), Pakistan(1), Malaysia(1), Saudi Arabia(1), Tunisia (n=1), and
134 Jordan (n=1), respectively. The intervention in 13 studies, was with date fruits, 1 study was with
135 date syrup, 1 study with "Lagmi", and 1 study was with date honey syrup.

136

137 *The impact of using date fruits on different stages of labor*

138 Improving bishop score and cervical dilatation at admission:

139 Pregnant women who consumed 6 or 7 date fruits or 70-76 grams of date fruits daily, 4 weeks
140 before the estimated date of childbirth or from 37th weeks of gestation illustrated that dilatation
141 at admission was significantly higher, and Bishop score were higher than the control group.(19-
142 22)

143

144 Spontaneous childbirth and the need for induction and stimulation of labor:

145 Consumption of 6 date fruits or 70-76 grams date fruits or date honey syrup(132 gr) daily 1-4
146 weeks before the estimated date of childbirth or from week 37th weeks of gestation reported
147 significantly less need for induction or stimulation of labor in the intervention group, and the
148 rate of spontaneous childbirth was significantly higher.(20, 22, 23) Also consuming 7 date fruits
149 daily for 2 weeks before childbirth causes a higher spontaneous childbirth rate and lower need
150 for induction.(24) In contrast, the results of a study by RAZALI et al. illustrated no statistically
151 significant difference between the intervention and control groups in terms of the need for
152 induction and stimulation of labor and spontaneous childbirth.(25)

153

154 *Latent phase duration of the first stage of labor*

155 Two studies demonstrated consumption of 6-7 pieces of date fruits, 4 weeks before the
156 estimated date of childbirth cause shorter latent phase length.(19, 25)

157

158 *Active phase duration of the first stage of labor*

159 Pregnant women who received 7 pieces or 70-76 gr of date fruits, or 132 gr date-honey syrup,
160 or date syrup had significantly shorter active phase.(14, 22, 23, 26)

161

162 *Duration of the second stage of labor*

163 The duration of the second stage of labor in the participants who received 7 pieces or 70-76 gr
164 date fruits especially 1-4 weeks before childbirth and stopped during labor, was significantly
165 shorter.(14, 22).

166

167 *Duration of the third stage of labor*

168 Most of the studies that performed the intervention before labor did not have a statistically
169 significant difference in the duration of the third stage of labor(19, 25). However, the results of
170 two studies reported that the duration of the third stage of labor in the intervention group (7
171 pieces or 70-76 gr date fruits) was significantly shorter(14, 22). However, the duration of the
172 third stage and the mean blood loss were lower with the intervention of 50-100 gr date fruits up
173 to 10 days after childbirth.(27-30)

174

175 *Using date fruits and blood pressure during pregnancy*

176 The results of a study demonstrated that daily consumption of 7 pieces or 100 gr / daily Ajwa
177 date fruits by pregnant women at risk of preeclampsia and eclampsia for 8 weeks significantly
178 reduced mean arterial blood pressure and roll-over test.(31, 32)

179

180 *Using date fruit in wound healing (episiotomy)*

181 The presence of phenolic and flavonoid compounds of "Lagmi"(date palm sap) indicated that
182 "lagmi" is an important source of known anti-inflammatory compounds and has a wide range
183 of antioxidants that stimulate wound healing mechanisms, and also have biological
184 activities.(33, 34)

185

186 **Discussion**

187 The results of included studies showed that using seven date fruits (equivalent to 80 gr per day)
188 during the last 2-4 weeks of pregnancy leads to a reduction in the need for induction or
189 stimulation of labor and duration of pregnancy. Also, consumption of date fruits by pregnant
190 women before labor causes more cervical dilatation or improvement of bishop score at the time
191 of admission, and reduction of the duration of the latent phase of the first stage of labor.

192

193 Most studies examined the effect of the consumption of date fruits during labor and illustrated
194 a decrease in the duration of the active phase of the first stage of labor,(14, 22-24, 35) and the

195 second stage of labor.(22, 23, 36) Besides, studies that performed the intervention with date
196 fruit consumption for several days after childbirth reported a decrease in the third stage of
197 labor.(14, 22, 27, 29) However, the results of the meta-analysis study showed that the date fruit
198 consumption reduces the duration of the active phase and improves the bishop score. However,
199 no significant difference was observed during the first, second, and third stages of labor.(35)

200

201 Several theories may explain these findings. First, in the last weeks of pregnancy (34 - 35 weeks
202 of pregnancy), changes in estrogen and progesterone levels induce eutroton receptors such as
203 oxytocin and prostaglandins in the myometrium.(37) Also, date fruits are rich in saturated and
204 unsaturated fatty acids, which can be converted to icosanoids and eventually to
205 prostaglandins.(21, 38) Second, the abundance of serotonin and calcium in date fruits can
206 contribute to uterine smooth muscle contractions by performing oxytocin mimicry
207 activities.(28, 39) Third, childbirth is a process with high energy consumption, and a pregnant
208 woman needs 50 to 100 kcal /hour or 10 g of glucose /hour during labor.(22, 35) Therefore, date
209 fruits with high nutritional value, especially high content of glucose and fructose can meet
210 pregnant women's energy needs during labor.(39) Additionally, not consuming energy-
211 generating food during labor leads to increased ineffective uterine contractions and increases
212 the duration of the second stage of labor and instrumental vaginal delivery.(40) Other studies
213 demonstrate that resolving food intake limitations during labor, (41) and injecting dextrose
214 solution compared to normal saline reduces the duration of labor,(42) and postpartum
215 hemorrhage.(30) Instead of triglycerides and free fatty acids, glucose is the main metabolite of
216 uterine smooth muscle nutrition during pregnancy. It plays an important role in the formation
217 of adenosine triphosphate and muscle contraction.(43) Following the consumption of date
218 fruits, the extract is digested, absorbed, and used immediately by the cells; afterward, plasma
219 levels of antioxidants are increased for 4 hours. (39) In general, it can be said date fruits have
220 energy, oxytocin-like effects, anti-inflammatory and antioxidant impacts.(14) Accordingly, the
221 results of a clinical trial study revealed that oral consumption of date syrup significantly reduces
222 the labor pain in nulliparous women.(44)

223

224 The important known etiologies of preeclampsia and eclampsia is endothelial damage.(45)
225 Concentrations of antiangiogenic substances such as sFlt-1 in maternal serum increase before
226 the onset of symptoms of preeclampsia.(46) Thus, using Ajwa date fruits by high-risk pregnant
227 women prevents preeclampsia syndrome in the third trimester by reducing the incidence of

228 antiangiogenic cases.(47) Bragma et al. found that this fruit is a potent inhibitor of angiotensin-
229 converting enzyme, which can effectively control blood pressure.(48) Also in some Arab
230 countries, such as Morocco, date fruits are traditionally used for high blood pressure.(49)

231

232 One of the strengths of this study is that systematically reviewing the studies conducted in this
233 field, and helps to make a better decision about the effectiveness of the amount and duration of
234 consumption of date fruit products during pregnancy and childbirth stages. One of the
235 limitations of this study is the small number of studies about the effect of date fruit on pregnancy
236 blood pressure and preeclampsia. However, the effect of using date fruit extract on human
237 wounds and episiotomy wounds has not been studied so far; hence, it is recommended that
238 clinical trials be performed to evaluate it.

239

240 **Conclusion**

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

245

246 **Authors' Contribution**

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

249

250 **Conflicts of interest**

251 Authors state no conflict of interest.

252

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255

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Table 1. Risk of bias assessment summary: authors' judgments about each risk of bias domain for each included study

Reference	Domains				
	Randomization Process	Deviation from the intended interventions	Missing outcome data	Measurement of the outcome	Selection of the reported results
Housaideh (2020)(32)	+	+	+	+	+
Royani (2019)(31)	+	+	+	+	+
Quershii (2019) (50)	+	+	+	+	+
Fathi (2019)(26)	+	+	?	+	+
Ahmed (2018)(14)	+	+	?	+	+
Kordi (2017)(22)	+	+	+	+	+
Razali (2017)(25)	+	+	+	+	+
Yadegari (2016)(29)	+	+	-	?	+
Abdennabi (2016)(33)	+	+	?	+	+
Kariman (2015) (21)	+	+	?	+	+
Yousefi jadidi (2015)(24)	+	+	+	+	+
Kordi (2013)(20)	+	+	?	+	+
Mojahed (2012)(27)	+	+	?	-	+
Al-Kuran 2011(19)	+	+	+	+	+
Kordi (2010)(23)	+	+	?	+	+
Khadem (2007)(28)	-	+	+	?	+

400 +:Low risk; -: high risk; ?:some cocerns

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Table2. Details of included studies

Author,year(ref)	Region	Participants(N)	Intervention	Comparison	Date product name	Outcome
Housaideh (2020)(32)	Indonesia	Pregnant women at 8 weeks with a high risk of preeclampsia and eclampsia N:40	N=30 100 gr/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) -Sflt-1(4.02–1.72)
Royani (2019)(31)	Indonesia	Pregnant women having one 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 (2019) (50)	Pakistan	At the risk of cardiac diseases N:150	N=100 1: Ajwa Date fruits alone(N=50) 2: Allopathic therapy + Ajwa date fruits(N=50)	N=50 Routine allopathic medicine	Date fruits (Ajwa Dates)	-Significant improvement of Cardiovascular diseases, especially in symptomatic patients.
Fathi (2019)(26)	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 labor.
Ahmed (2018)(14)	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 labor in the date fruits & date fruits + water consumers (210.14 ± 177.13 Vs. 224.43 ± 157.25 min)

						- Duration of the second stage of labor in date fruit + water consumers(20.50 ± 13.94 min).
Kordi (2017)(22)	Iran	Nulliparous Women N:182	N=91 70–76 g / daily /from the 37 th week of pregnancy	N=91 without intervention	Date fruits (Mazafati dates of Bam)	Significant decrease in : -Length of active phase (329.00±249.00 min) -Second phase (33.60 ±13.70 min) - Third phase(5.10±2.50min) - Need of oxytocin for labor acceleration 5.50%) Significant increase in Spontaneous start of delivery (94.50%)
Razali (2017)(25)	Malesia	Nulliparous N:154	N=77 7 pieces(approximately 80 g)/daily/from 36 th weeks of gestation to onset of labor	N=77 without intervention	Date fruits	Significant decrease in: -Augmentation of labor -Latent phase of the first stage (364±527 min)
Yadegari (2016)(29)	Iran	Nulliparous N:90	N=45 100gr/daily /From 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 (2016)(33)	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.
Kariman (2015) (21)	Iran	Nulliparous N:110	N=55	N=55 without intervention	Date fruits(Bam Mazafati Rutab)	-Significant increase in Bishop score (7.3±2.7)

			7 pieces / daily/ from 38 th weeks to the onset of labor			-Significant decrease in duration of active phase of labor (216.02±16.4 min)
Yousefi jadidi (2015)(24)	Iran	Nulliparous N:110	N=55 7 pieces / daily/ from 38 th weeks to onset of labor	N=55 without intervention	Date fruits(Bam Mazafati Rutab)	-Significant increase in: -Spontaneous onset of labor (63.5%) -Bishop score(7.3±2.7) -Cervical dilatation (4.62±0.305 cm)
Kordi (2013)(20)	Iran	Nulliparous N:210	N=105 70-75 gr/daily/from the 37 th week of pregnancy to onset of labor	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 labor(80%)
Mojahed (2012)(27)	Iran	Multi and nulliparous N:95	N=44 20 unites oxytocin in 1000 ml dextrose - sodium chloride serum + 100 gr date fruits + one glass of warm water/ immediately after delivery of the placenta	N=51 20 unites oxytocin in 1000 ml dextrose sodium chloride serum	Date fruits(Bam Mazafati Rutab)	-Significant reduction in postpartum hemorrhage (68.5 ml)
Al-Kuran 2011(19)	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 labor in (96%) Significant Decrease in: -Use of prostin/oxytocin (28%) -Latent phase of the first stage of labor (510 min)

Kordi (2010)(23)	Iran	Nulliparous N:90	N=30 132 gr date honey syrup / from 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 labor (96.7%). -Significant decrease in labor duration(351 min).
Khadem (2007)(28)	Iran	Multi and nulliparous N:62	N=31 50 gr /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.

CT: Clinical Trial, MAP: Mean Arterial pressure, ROT: Roll over Test, RCT: Randomized Clinical Trial, APGAR: Appearance, Pulse, Grimace, Activity, and Respiration, min: minute, gr:gram

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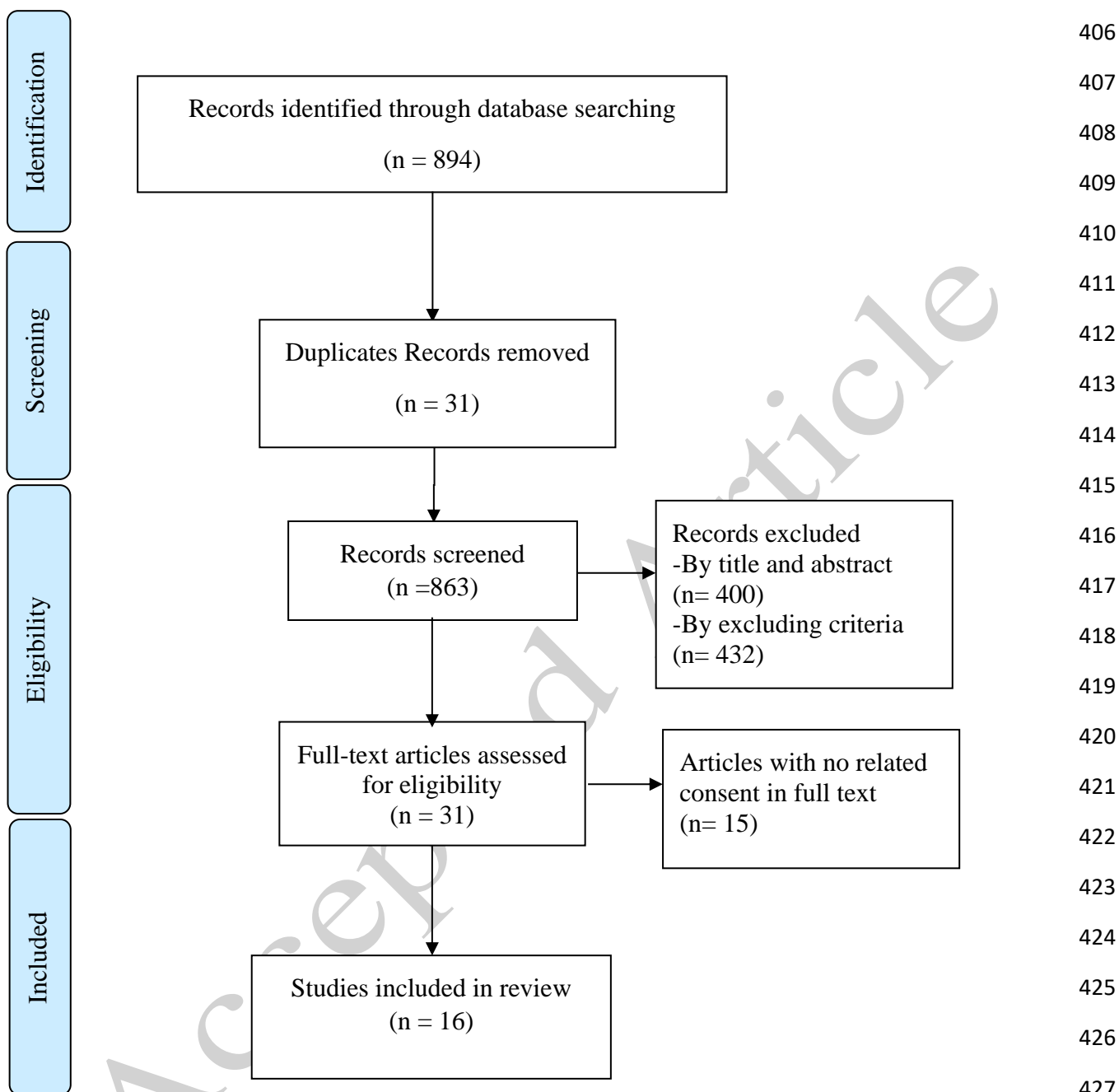


Figure 1. Flowchart of the study selection process