The Effect of Honey Saffron Syrup on Labor Progression in Nulliparous Women

Abstract

Background: Labor duration is one of the factors affecting the pregnancy outcome. Objective of the present study is to determine the effect of honey saffron syrup on the labor progression in nulliparous women.

Methods: The nulliparous women with inclusion criteria were randomly divided into three equal groups. For first group, the saffron syrup prepared with honey and for second group, saffron syrup prepared with sugar and in the control group the placebo were orally administered every two hours. Collected data were analyzed using Fisher's test with $p < 0.05$ as significant.

Results: The mean of labor duration in the two intervention groups was significantly lower than the control group (p=0.000). The duration of the first stage of labor in the honey saffron syrup group was significantly lower than the sugar saffron syrup group (p=0.016)

Conclusion: Saffron syrup with hone is effective in progression first, second and third stage of labor.

Key Words: Saffron, honey, labor, term pregnancy, nulliparous

Introduction

Childbirth is one of the most important events in women's lives and is considered as one of the significant indicators of health in any country that is associated with profound psychological, social and emotional effects for the mother and her family(1). Four factors of uterine contraction, pelvic condition, embryo's condition and mental status of the mother are involved in labor progression. In case of a disorder in any of these factors, labor will be prolonged and accompanied by complications for the mother and the fetus(2). Uterine contraction is the effective force at the first stage of labor; based on the characteristics of uterine contraction, the first stage of labor is divided into two latent phases, including the beginning of uterine contractions to 3 to 4 cm dilatation and the active phase of 4-10 cm dilatation(3). The mean duration of active phase of labor in nulliparous women is 4.9 hours and the maximum duration is 11.7 hours. The prolongation disorder of active phase of labor is described as less than 1.2 cm/h dilatation in nulliparous women, and less than 1.5 cm/h dilatation in multiparous women; the prevalence of this disorder is 25% in nulliparous women and 15% in multiparous women(4).

A prolonged labor leads to an increase in the level of stress, anxiety, fatigue, depression, maternal and fetal infections, postpartum hemorrhage due to uterine atony, hospitalization costs and psychological distress for the mother, and also increases the need for emergency cesarean(5). Prolonged labors are regarded as major causes of maternal mortality, most of which are due to the inability to diagnose such labors timely(6). Several factors such as mother's fear and anxiety, fatigue, therapeutic interventions, obesity, breech presentation and epidural analgesia affect a labor to prolong(7).

Since labor duration is one of the factors affecting the outcome of pregnancy and maternal and fetal complications(8), active involvement in labor has long been considered in labor acceleration to prevent a difficult labor. Pharmaceutical and non-pharmaceutical methods have also been used to accelerate the progress of delivery(9). Non-pharmacological treatments include thermal therapy(10), ice massage, acupuncture and pressure acupuncture(11), reflexology and massage(12), aromatherapy(13), relaxation tehnique(14), special trainings like breathing technique(15), music therapy(16), hypnosis(17), carbohydrates(18), and medicinal plants(19). Medicinal herbs are used extensively throughout the world due to numerous reasons; because of cost-effectiveness, fewer side effects than chemical drugs, as well as easy access they are regarded as common treatments for diseases and are the strategies of The World Health Organization from 2014 to 2023(20). Saffron is one of the medicinal herbs used in labor(21); it has an inducing effect on the uterine smooth muscles and can increase the spontaneous contractions of the uterus(22).

In traditional and Chinese medicine saffron is used for labor speed up and difficult births, menorrhagia, postpartum hemorrhage(23), and facilitating the placenta delivery(24). Consumption of saffron in the critical period of pregnancy, the first trimester, which is the formation of organs, can damage the fetus(25). However, through a balanced consumption (0.5 to 2 grams per day) after the first trimester of pregnancy causes elasticity in the uterine tissue and helps to facilitate delivery; saffron has its effects through direct stimulation of the uterus smooth muscles and relaxation on the cervix. A difficult delivery can be prevented with the right use of saffron through labor(21). Ali Akbar Sichani et al. reported that saffron could increase the cervical preparedness during pregnancy and also reduce the mean of labor duration at the first and second phases, but had no effect on the third phase(26). Saadi et al. also discovered that saffron was effective on cervical preparation, but had no effect on reducing the length of the first and second phases of labor(21). In a study, Mohammadi Rad et al., demonstrated that saffron reduced the duration of the First stage of labor, but did not affect the second phase(27).

Uterine muscle contractions during labor require a rich source of glucose, if this source is not obtained through diet the body begins to metabolize protein and fat, and ketosis occurs. As a result, inertia occurs to the uterus muscles leading to a prolonged First stage of labor(1), labor induction, labor with forceps and postpartum hemorrhage(28). Honey contains a mixture of water, carbohydrates and minerals that contain glucose, fructose and sucrose. Glucose is metabolized rapidly to supply energy, but fructose is slowly released in the bloodstream and thus preserving the individual’s energy, which is why honey can be an effective source of carbohydrates and a suitable alternative to glucose(29). Rahmani et al. discovered that consuming food rich in carbohydrates during labor did not affect the duration of the First stage of labor to reduce, but shortened the duration of the second phase of labor(30). Pareh et al. argued that glucose reduces labor duration significantly without increasing complications(31). In a study by Fathi et al., consuming honey syrup and date syrup was associated with a decrease in the duration of the active phase of labor and the mean of pain intensity(32).

Medicinal plants have been paid attention to due to the lack of complications and cost-effectiveness compared to chemical drugs for reducing labor duration, and most studies have considered the effect of honey and saffron on the progress of labor (20). Consequently, this study was conducted to determine the effect of honey saffron syrup on labor duration in nulliparous women referring to Imam Khomeini Hospital in Dvandarreh (In Kurdistan provinece in Iran) in 2018.

Methods

The present study is the result of a Master's dissertation in Midwifery that was approved by the Committee on Ethics of Kurdistan University of Medical Sciences (IR.MUK.REC.1396.368) and was registered on the website of the Iranian Clinical Research Center (IRCT20171210037807N1) before sampling. This random, double blind control clinical trial was performed on 90 nulliparous low-risk women at Imam Khomeini Hospital in Divandarreh, affiliated to Kurdistan University of Medical Sciences in 2018. The inclusion criteria were: women aged 18-35, nulliparity, gestational age 38-41 weeks, impulsive starts of labor pain, estimated fetal weight by the examiner or sonography between 2500-4000 gr, cephalic presentation, singleton pregnancy, body mass index 8-19/30 kg/m^2, test without natural stress, no use of oral hypoglycemic and insulin-lowering drugs, anti-coagulants, nonsteroidal anti-inflammatory drugs, hypertension drugs and herbs, benzodiazepines, barbiturates, narcotics, antidepressants and alcohol, and willingness to participate in the study. Exclusion criteria included: history of surgery on the cervix and birth canal, presence of cesarean indication (placental abruption, no progression, meconium, pelvic stenosis, fetal distress), embryonic development of any abnormality, growth restriction and cardiovascular diseases (embryo), allergy to saffron, history of or mental illness, chronic and systemic diseases, passing more than 12 hours from the amniotic sac rupture and the mother's withdrawal from the study.

The research units that had inclusion criteria were selected and randomly assigned to three groups of 30 subjects using closed packets. The sample size was calculated to be 26 subjects per group using the following equation; considering the probability of sample drop, 30 subjects were considered for each group. Finally, by excluding 3 samples from the study, 87 samples were collected.

The tools applied for collecting data were a three-part questionnaire and a partograph form. In the first part of the questionnaire, questions were asked about demographic profile (age, level of education, occupation, place of residence, husband's education level and job). The second part of the questionnaire included questions on midwifery information (date of the first day of the last menstruation, gestational age, type of pregnancy, infant's gender and weight). The third part of the questionnaire was the registration form for the labor phases duration. Partograph form was also used as a tool for the progression of labor in this study. The content validity method was used to determine the validity of the questionnaire. Partograph is an effective tool that is recommended in the country protocol and is used in all birth centers of the country to determine the progress of labor.

The researcher referred to the maternity ward in different shifts, and after determining the samples, intervention started at 4 cm dilatation. In the first intervention group (saffron syrup prepared with honey containing 750 mg saffron and 75 g honey in 450 ml of water) and the second intervention group (saffron syrup prepared with sugar containing 750 mg saffron and 15 g sodium saccharin in 450 ml of water) and the control group received placebo (containing 15 g sodium saccharin plus saffron food coloring in 450 ml of water) orally. It should be noted that the syrups were manufactured by the Shafa Medicinal and Herbal Company of Kurdistan and were prepared in similarly-shaped containers and were coded by the pharmacist. The researcher and the research units were unaware of the codes; therefore, the double blinded form of the study was preserved. Before the intervention, the researcher controlled the uterus contractions, fetal heartbeat, and the mother's vital signs and recorded them in the partograph. Afterwards, 150 cc of the syrup was given to the subject by the

researcher in the honey saffron syrup group at the onset of the active phase of labor. 150 cc of the syrup was repeated every two hours up to 3 times during the labor.

In the sugar saffron syrup group, saffron syrup was used with sugar in the same condition and in the control group, placebo was used in the same condition. During the whole research process, the researcher conducted control and registration of all the examinations in all three groups of intervention and control. Subsequently, the duration and intervals of uterine contractions and the number of fetal heart rate were checked every 30 minutes and the rate of opening of the cervix, cervical effacement, station and water bag position were examined every two hours by a vaginal examination in accordance with the national protocol and were recorded in the partograph. The researcher was also present on the patient's bedside during the second stage and after the labor to the end of the third stage. The duration of the labor phases was recorded in the related registration form; it was measured by Hanhart stopwatch. In case of abnormal progression of labor (cervical dilatation of less than 1 cm/h and descending less than 1 cm/h in the First stage or the second phase of labor for more than two hours), the subjects were excluded from the study and decisions were made on the continuation of the labor process by the gynecologist. After the end of the study, the syrups codes were delivered to the statistical counseling in a sealed envelope and the researcher was unaware of the codes during the entire study process. Fisher's test was used to analyze the data and SPSS software version 23 was also used. Results were reported at a significance level of 0.05.

Results

The studied units were included in the study from April 27 to September 22, 2018; 87 nulliparous women completed the study in three groups. One subject from the intervention group 2 (saffron syrup plus sugar) due to the lack of descent in the second phase and two subjects from the placebo group due to the lack of progression in the First stage were excluded from the study. In the group of honey saffron syrup, three subjects received the syrup only once (150 cc); however, 15 (50%) subjects in the group of honey saffron syrup, 12 (41.37%) subjects in the sugar saffron syrup group and 6 subjects (21.42%) in the placebo group received the syrup twice (300 cc) and the rest received the syrup three times (450 cc).

The results of the study indicated that the mean age of the subjects was 25.63 years old. The majority (96.55%) were housewives and more than half (56.67%) had undergraduate education. About half of the subjects (48.28%) lived in the village and half (51.72%) were in the city. The groups did not have a significant statistical difference in terms of demographic and midwifery characteristics (Table 1 & 2).

The results indicated that the duration of the first, second and third phases of labor after intervention was lower in both intervention groups than in the placebo group and was statistically significant ($p = 0.000$). The duration of the first stage of labor in the honey saffron syrup group was significantly lower than that of the sugar saffron syrup group ($p = 0.016$), but the length of the second and third phases of labor between the two intervention groups did not show a significant difference ($p = 1.000$) (Table 3).

Table 1- Frequency distribution of demographic profile of the studied groups

Demographic profile	Intervention group 1	Intervention group 2	Placebo	Statistical test	P Value
Age				Fisher	p=0.214
• 18-22	7(23.33)	3(10.34)	10(35.71)		
• 23-26	12(40.00)	12(41.38)	4(14.29)		
• 27-30	8(26.67)	8(27.59)	10(35.71)		
• 31-34	2(6.67)	3(10.34)	2(7.14)		
• 35-38	1(3.33)	3(10.34)	2(7.14)		
Level of education				Fisher	p=0.858
• Uneducated	6(20.00)	4(13.79)	2(7.14)		
• Primary school	5(16.67)	8(27.59)	10(35.71)		
• Middle school	9(30.00)	7(24.14)	7(25.00)		
• Diploma	8(26.67)	8(27.59)	7(25.00)		
• Academic	2(6.67)	2(6.90)	2(7.14)		
Occupation				Fisher	p=0.538
• Housewife	30(100)	27(93.10)	27(96.43)		
• Employed	0(00.00)	2(6.90)	1(3.57)		
Place of residence				Fisher	p= 0.663
• Urban	14(46.67)	17(58.62)	14(50.00)		
• Rural	16(53.33)	12(41.38)	14(50.00)		

Table 2 - Frequency distribution of midwifery profile of the studied groups

Midwifery profile	Intervention group 1	Intervention group 2	Placebo	Statistical test	p value
Pregnancy age				Fisher	p=0.521
• 37-37,6	3(10.00)	5(17.24)	1(3.57)		
• 38-38,6	10(33.33)	7(24.14)	5(17.86)		
• 39-39,6	10(33.33)	11(37.93)	13(46.43)		
• 40-40,6	7(23.33)	6(20.69)	9(32.14)		
Type of pregnancy				Fisher	p=0.702
• Wanted	26(86.67)	27(93.10)	24(85.71)		
• Unwanted	4(13.13)	2(6.90)	4(14.29)		
Infant's sex				Fisher	p=0.663
• Female	14(46.67)	17(58.62)	14(50.00)		
• Male	16(53.33)	12(41.38)	14(50.00)		
Infant's weight				Fisher	p= 0.963
• <2500	1(3.33)	2(6.90)	1(3.57)		
• 2500-4000	28(93.33)	26(89.66)	27(96.43)		

• >4000	1(3.33)	1(3.45)	0(00.00)

Table 3- Comparison of the duration of labor stages in the study groups

Duration of labor phases	Intervention 1	Intervention 2	Placebo	P Value	Inter-group comparison		
					Intervention 1 with placebo	Intervention 2 with placebo	Intervention 1 with Intervention 2
The first labor stage(minute)	208.93	254.03	305.75	0.000	0.000	0.005	0.016
The second labor stage (minute)	25.36	25.41	43.92	0.000	0.002	0.002	1.000
The third labor stage(second)	226.56	225.03	378.28	0.000	0.000	0.000	1.000

Discussion

The conclusion of the study revealed that oral consumption of honey saffron syrup is effective on the labor progress in nulliparous women. The results indicated that the duration of phases one, two and three had a significant statistical difference between two groups of honey saffron and sugar saffron syrups and control group. In a study by Ali Akbar Sichani et al. (2017), saffron has been reported effective in increasing cervical preparation and reducing the duration of the first and second phases of labor(26). In addition, in the study by Mohammadi Rad et al. (2018), saffron reduced the anxiety and pain during labor and reduced the length of the active phase of labor(27), which is consistent with the results of the present study that saffron has a positive effect on reducing the length of labor phases. Saffron has an important role in stimulation and intensity of uterine contractions due to increased function of smooth uterine muscles because of the presence of crocin, crocetine, alfa carotene, anthocyanin, lycopene, zigzantin, tannin, picrocrocin and safranal(33).

However, in the study by Ali Akbar Sichani et al. (2017), saffron did not affect the reduction of the third phase of labor(26). Furthermore, in a study by Saadi et al. (2016) saffron did not have any effect on reducing the first and second phases of labor(21), which is not consistent with the results of the present study. The reason for this difference can be due to the

difference in the time of taking the medicine, which in these studies the consumption of saffron was before the onset of labor pain at 8-hour intervals. In this study, taking saffron was repeated at the beginning of the active phase of labor every 2 hours. The same variation in the time and manner of saffron consumption caused the results of the studies to be contradictory.

Subsequently, Saadi et al. (2016) (21) and Ali Akbar Sichani et al. (2017) demonstrated that saffron is effective on the cervical preparedness(26). Cervical preparation is important for the success of labor induction; however, moderate consumption of saffron (0.5-2 g per day) increases elasticity in the uterus tissues and has a relaxant effect on the cervix(21). Therefore, saffron may improve the progression of labor by the same mechanism of cervical effacement, which is consistent with the current study that saffron reduces the phases of labor.

Additionally, the duration of the First stage of labor in the honey saffron syrup group was significantly lower than that of the sugar saffron syrup group ($p=0.016$). However, the length of the second and third phases of labor was not significantly different between the two intervention groups ($p=1.000$). Honey saffron syrup seems to have been more effective in providing glucose for uterine contractions on the progression of the First stage of labor. Short duration of the active phase of labor in the saffron honey group compared to the saffron group plus artificial sugar may be related to the supply of glucose required for uterine muscle contractions. Uterus muscle contractions require a rich source of glucose during labor; if glucose is not available, the uterus muscles develop inertia(1). Honey can be an effective source of carbohydrates and an alternative to glucose due to having 75-80% carbohydrate(34). These results were consistent with the results by Kurdi et al. (2010) demonstrating that the consumption of date honey (containing 100 g of carbohydrate) during labor significantly reduced the duration of the active phase of labor compared to placebo and routine care groups(35). Moreover, based on the results by Fathi et al. (2015), the use of honey and dates reduces the active phase of labor significantly compared to the control group(32).

In a study by Pazandeh et al. (2010), the use of pharmaceutical methods, such as oxytocin to enhance labor is associated with increasing maternal and fetal complications like fetal distress, the appearance of meconium in amniotic fluid, increased uterine contractions, and an increased need for cesarean and in some cases atony and tiredness of the uterus followed by postpartum hemorrhage(36). However, there were no reports of similar symptoms in this study. In addition, more studies are recommended to be conducted with higher number of samples and doses.

The current study was accompanied by limitations such as individual and genetic differences and psychological status that are factors influencing the progress of labor, which were beyond the control of the researcher. One of the strengths of this study is the lack of similar studies on the use of saffron and honey combinations with a specific dose on labor progression. The other strengths are having a double-blind random control group as well as controlling interventional variables through random allocation and inclusion and exclusion criteria.

Conclusion

The overall result of this study indicated that the consumption of honey saffron syrup is effective on the progress of labor. Therefore, it seems that the findings of this study can be used in clinical services to prevent abnormal progression of labor and reduce the number of long labors.

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