

The Effect of Ramadan Fasting on Outcome of Pregnancy

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Abstract: Background: Results of studies on effects of Ramadan fasting on outcome of pregnancy is controversial. This study is designed to evaluate effect of Ramadan fasting on outcome of pregnancy. Materials & methods: This cohort study included 317 pregnant women divided to non-fasting group (control) and fasting group. Fasting group divided to 3 groups according to days of fasting to 1-9 days, 10-19 days, 20-30 days. Perinatal outcome evaluated with fetal heart rate, Fetal movement, blood pressure, route of delivery, fetal weight & height & head circumferences, APGAR score and NICU admission. Results revealed that in There was not any significant difference between groups regarding maternal blood pressure, mode of delivery, fetal weight & height & head circumferences, APGAR score and NICU admission.

In Conclusion: Fasting of Ramadan (despite days of fasting) hasn't any effect on outcome of pregnancy and fetal health.

Key words: Fasting • Ramadan • Pregnancy Outcome

INTRODUCTION

Ramadan is one of the largest and respected in Islam and Muslims are fasting, one of the five duties required of Muslims to keep away eating, drinking, smoking and sexual activity. Ramadan follows the lunar calendar and the solar year and the lunar year AD 11 or less days per year, then 10 days ahead of Ramadan in the Islamic world than in the previous years. Therefore Ramadan so on, so all seasons of working hours should be refrain from eating and drinking in different seasons varies from 12 to 18 hours in day [1].

Although the general opinion is that fasting Muslims are beneficial to human health and the commandment of God, but in Islam, fasting has been recommended as damage to the health of pregnant women and their fetuses refrain from fasting and even if fasting is harmful for human body or fetus is guilty of fasting itself [1-2].

The effect of fasting on the body, it must be said that the lack of blood sugar (hypoglycemia) and subsequent changes in lipid metabolism, are increased levels blood ketone. It is safe in pregnant and non-pregnant but if blood ketone levels get too high, leading to a decrease in the blood PH (acidosis), which leads to the degradation of proteins in the body acidosis and tissue damage, organ failure and even death [3].

Ketoacidosis is a major cause of intrauterine death in severe cases even before the increase in blood ketones and blood glucose concentrations may be harmful to pregnant women. Because body needs energy in the placenta and fetus in pregnant women is higher. Hence the need to increase energy and blood sugar levels in pregnant women puts them below the reproductive condition [3-4].

Increase speed to reach the so-called accelerated starvation ketoacidosis by measuring the levels of metabolites and hormones in women's bodies during

starvation. This is especially will be in the case when there is hunger in 16 hours lasting [5]. Other studies also showed signs clearly accelerated starvation fasting in women [5-7]. Some studies have concluded that elevated ketone levels in relation to fetal brain damage and reduced IQ in the future, mental and learning disabilities, as well as hunger and hypoglycemia increase the corticotropin-releasing hormone (CRH), which is a stress hormones and cause premature delivery and fetal growth retardation [7-9].

The increased concentrations of ketone and hypoglycemia associated with decreased amniotic fluid volume and decrease the frequency of fetal heart rate (fetal heart rate acceleration). Fetal heart rate should increase when the baby moves. If does not happen indicate that the fetus does not receive enough oxygen, therefore the oxygen reduction as a result of hypoglycemia [10]. Miraghani and colleagues (2005) conducted a study investigated on women in the Arab emirate during Ramadan showed that reducing the frequency of fetal breathing movements increased and decreased fetal heart rate in pregnant women during Ramadan, when blood sugar levels hypoglycemia had not yet emerged [11].

Another study in 2004 showed that 31% of Iranian women in their urine before breakfast with PKU and 61% who were hypoglycemia [12].

The study also Rahimi in Tehran (Iran) on 420 women, including 130 women non-fasting and 290 fasting during the first trimester of pregnancy showed that the effect of fasting with low birth weight (LBW) with = 20 days of fasting in the first trimester of pregnancy was associated. Then researcher concluded that fasting because of damage to the fetus in the first trimester of pregnancy is not permitted [13].

As mentioned above, several studies on various aspects of the effect of fasting on pregnancy have given conflicting results moreover every year a large number of pregnant women to do their divine duty. Therefore we need more research in this area and the effect of fasting on pregnancy outcome seems necessary. The present study aimed to investigate the effect of fasting on the course and outcome of pregnancy in Iran.

MATERIALS AND METHODS

This is a cohort study that was carried out on pregnant women referred to Taleghani Hospital, province Arak (a city in Iran) during 2012-2013 AD. After obtaining

informed consent, 317 women who had inclusion criteria were selected.

Inclusion criteria included healthy pregnant women and gestational age of 28 weeks or more have been pregnant singleton sets.

In this cohort study of 159 pregnant women who were willing to fasting and 159 pregnant women who had no desire to fast entered the study. Fasting people depending on their willingness to three groups including 1-9 days, 10-19 days and were 20-30 days.

Therefore, the cases group were divided into three groups: pregnant women, fasting every other day a pregnant women matched for age, parity, gestational age, BMI matched controls were selected and participated.

After selection of the case study, the groups' demographic data such as maternal age, gestational age, blood pressure, fundal height was measured and these are related to prenatal care visits also obtained during the physical examination was made of the questionnaire. The study groups were followed until delivery and gestational age at delivery, mode of delivery, birth weight, Apgar was born, height, weight, head era and need to stay in the neonatal intensive care were recorded and the control comparing the results were announced to the general.

In analyzing the data, measures of central (mean, median) and measures of dispersion (standard deviation and mean deviation) in different groups, t-test and Mann-Whitney U-test and Pearson's correlation varies according to the method logistic regression model was used. Significance level of 5% was considered and SPSS16 software was used.

RESULTS

The mean age of the women and husband in case group was 26.5 ± 5.8 and 31.1 ± 5.5 years respectively and the mean BMI in case group was 29.4 ± 6.5 observed.

Mean education study group were 90% high school graduates and 10% of academic degree.

The study subjects (fasting) 98.7% had one child and 1.3 percent have had 2 children and in non-fasting group all of them had no children and all those who had their first pregnancy and 71.5% of the labor they had normal and 28.5percent were caesarean.

In case and control groups between in number of gestational birth, number of labor, number of children there was not significant difference. Other demographic characteristics of the study groups are presented in Table 1.

Table 1: Comparison of the frequency distribution of maternal demographic characteristics of the case and control group

Variables	Groups study	Groups study			Control group	Total	P Chi-square
		1-9 days	10-19 days	20-30 days			
Type of Childbirth	Natural	19(45.2%)	8(88.9%)	9 (100%)	77(78.6%)	113(71.5%)	0.08
	Caesarean	23(54.8%)	1(11.1%)	0	21(21.4%)	45(28.5%)	
	Total	42(100)	9(100)	9 (100%)	98(100)	158(100)	
Ultrasound	Yes	8(9.8%)	0	1(5.6%)	0	9(2.8%)	0.06
	No	84(90.2%)	13(100)	17(94.4%)	203(100)	307(97.2%)	
	Total	82(100)	13(100)	18(100)	203(100)	316(100%)	
Autoimmune disease	Yes	0	0	0	1(5%)	1(3%)	0.9
	No	83(100)	13(100)	18(100)	202(99.5%)	316(100%)	
	Total	83(100)	13(100)	18(100)	203(100)	316(100%)	
Chronic kidney disease	Yes	1(1.2%)	0	0	0	1(3%)	0.4
	No	82(98.8%)	13(100)	18(100)	203(100)	316(100%)	
	Total	83(100)	13(100)	18(100)	203(100)	316(100%)	
High Blood Pressure	Yes	0	0	(%)0	1(5%)	1(3%)	0.9
	No	83(100)	13(100)	(100)18	202(99.5%)	316(100%)	
	Total	83(100)	13(100)	(100)18	203(100)	(100) 317	
Diabetes During Pregnancy	Yes	0	0	0	2(1%)	2(6%)	0.7
	No	83(100)	13(100)	18(100)	201(99%)	315(100%)	
	Total	83(100)	13(100)	18(100)	203(100)	317(100%)	
Ectopic Pregnancy	Yes	0	0	0	1(5%)	1(3%)	0.06
	No	83(100)	13(100)	18(100)	202(99.5%)	316(100%)	
	Total	83(100)	13(100)	18(100)	203(100)	317(100%)	
Method of preventing pregnancy	No	20(24.1%)	4(30.8%)	4(22.2%)	57(28.4%)	85(27%)	0.9
	Ocp	22(26.5%)	2(15.4%)	3(16.7%)	39(19.4%)	66(21%)	
	IUD	1(7.7%)	6(7.2%)	16(8%)	2(11.1%)	25(7.9%)	
	wd	4(22.2%)	15(18.1%)	52(25.9%)	4(22.2%)	75(23.8%)	
	Kandom	14(16.9%)	2(15.4%)	3(16.7%)	28(13.9%)	47(14.9%)	
	DMPA	5(6%)	0	2(11.1%)	9(4.54%)	16(5.1%)	
	Total	83(100)	13(100)	18(100%)	203(100)	315(100%)	
Induction	Unanswered	0	0	0	2(1%)	2(6%)	0.1
	Yes	38(45.8%)	10(76.9%)	8(44.4%)	124(61.1%)	180(56.8%)	
	No	45(54.2%)	3(23.1%)	10(55.6%)	77(37.9%)	135(42.6%)	
	Total	83(100)	13(100)	18(100)	203(100)	317(100%)	
Sex baby	Girl	8(32%)	1(100%)	0	17(68%)	24(60%)	0.2
	Son	7(53.8%)	0	1(100%)	8(32%)	16(40%)	
	Total	13(100)	1(100%)	1(100%)	25(100)	40(100%)	

The effect of fasting on blood pressure in control group on systolic blood pressure mean was 11.7±2.1 and the effect on fasting group in 1-9 days was 11.8±3.4, in 10-19 days was 12.1±3.1 and in 20-30 days was 11.3±2.2 respectively that this difference was no significant (P> 0.05).

The effect of fasting on uterine height in control group was 22.8±18.3 Cm and in the fasting group in 1-9 days was 30.9±13.9 Cm, in 10-19 days was 33±10.4 Cm and in 20-30 days was 32.9±11.9 Cm respectively that this is difference was no significant (P>0.05).

The effect of fasting on fetal movements felt by mother in the control group only in 3 cases (1.5%) and fasting 1-9 days one case (1.2%) reported decreased fetal

movements and in 97.3% of patients of your baby's movements reported normal.

The effect of fasting on the delivery in the control group 33 case (16.3%) in 1-9 days, (37.8%) in group 10-19 days number of cases (15.4%) and in the 20-30days 1 case (5.6%) with cesarean. In the control group 83.7% and 1-9 days (62.5%) and in 10to 19 days 84.6% and 20-30 days 94.4% of normal deliveries, which according to P = 0.7 this difference was not statistically difference.

The effect of fasting on weight, height and head circumference of infants in the control group, the mean birth weight of 3104±371 g and in fasting in 1-9 days 3168±677 g, in 10-19 days 3195±391 g and 20-30 days 3331±442 grams, this difference was not statistically significant according to P = 0.6.

Table 2: Comparison of mean and standard deviation (SD±M) of variables pregnancy test in case and control groups

Variables	Groups study				P (ANOVA)
	Case group (based on days pregnancy)			Control group	
	1-9(n=83) SD±M	10-19(n=13) SD±M	20-30 (n=18) SD±M	Control group (n=203) SD±M	
Age	5.3±26.5	4.5±27.3	7.2±26.5	6±26.5	0.1
Weight	14.6±81.2	23± 83.7	11.7±79.4	11.4±75	0.1
Length	6.2±164.2	6.3± 64.4	5.1±162	5.5±163.7	0.3
BMI	7.9±31.7	7.5±30.9	7.6±31.5	5.4±28.2	0.2
Partner age	5.4±31.1	2.2±33.1	5.5±31.1	5.8±31	0.2
Pregnancy G	0.8±1.7	0.9±2.1	1.1±2	1±1.8	0.7
Pregnancy P	0.7±1.3	0.4±1.2	1±1.5	0.6±1.3	0.5
Pregnancy C	0.7±1.3	0.5±1.4	1.5±2.3	0.7±1.4	0.8
Pregnancy age	5.6±36.6	1.8±38	8.9±35.3	1.9±38.2	0.1
Age marriage	2.8±20.1	2.4±19	4.6±21.2	2.6±19.2	0.1
Hypertension	2	2	0±2	0.1±2	0.5
Cure	0.1±2	2	0±2	2	0.9
Abort baby	0.2±2	0.3±1.09	0.4±1.8	0.3±1.9	0.4
Age abort	3.1±9.3	8	2.1±9.3	2.1±7.8	0.1
Num3month	1	1	0±1	0.5±1.2	0.5
Num3month2	0	0	0	1	0.8
GA	13.9±36.8	10.4±37	11.8±36.8	18.3±36.2	0.5
BW	677.3±3168.3	361.6±3195.4	442.3±3031.1	371.6±3104.8	0.6
Length baby	2.7±50.6	1.1±51	2.7±50.8	2.3±54.3	0.7
Head baby	1.7±35.7	0.8±35.4	1.2±35.3	1±34.8	0.5
APGAR1min	1.1±8.7	0.4±8.8	2.1±8.1	0.7±8.8	0.3
APGAR5min	1.2±9.7	0.4±9.8	2.3±9.2	0.5±9.9	0.5
NICU Admission	2.4±2.8	2	0.2±1.9	0.2±2	0.3

The effect of fasting on mean height of neonatal in the control group was 50.4±2.3 cm and the group of fasting days 1-9 days 50.6±2.7, in 10-19 days 51±1.1, in 20-30 days was 50.8±2.7 cm that this difference were not statistically significant (p=0.7).

The head circumference of infants in control group was 34.8±1 cm, in fasting with 1-9 days were 35.7± 1.7 cm, in 10-19 days 35.4±0.8 and in 20-30 days were 35.3±1.2 cm, according to P = 6.5 this difference is not statistically significant.

The Apgar Score: The Apgar score in the first minute and five minutes, was 8.8±0.7 and 9.9±0.5 respectively in the control group. Apgar score in fasting group 1-9 days were 8.7± 1.1 and 9.7±1.2 in fasting 10-19days were 8.8±0.4 and 9.8±0.4, in 20-30 days were 8.1±2.1 and 9.2±2.3 respectively with respect to P=0.3 this difference was not statistically significant.

The rate of admission to neonatal intensive care in the control group was 2±0.2, in fasting with 1-9 days 2.4±3.8, in 10-19 days 2 and in 20-30 days was 1.9±0.2 respectively that this difference was not significant (P = 0.3).

The mean BMI in the control group was 28.2±5.4, in fasting group 1-9 days 31.7±7.9, in 10-19 days 30.9±7.5, in 20-30 days 31.5±7.6 observed that due to the further adoption of alpha error ($\alpha=0.05$), there was no statistical difference among the various other demographic variables between the two groups in table 2.

DISCUSSION

The results showed that regardless of the number of days of fasting effect not adverse on fetal growth and maternal and fetal indices.

The effect of fasting on blood pressure, regardless of the number of days, fasting had no effect on systolic blood pressure of pregnant women who corresponded with the findings of the study Danesh in 2002. The systolic and diastolic blood pressure in this study between the mean fasting and non-fasting subjects compared to baseline blood pressure in the middle of the month and last month was not a significant difference, [3], in other study systolic and diastolic blood pressure, no significant differences in fasting and non-fasting individuals had been achieved [14].

Regardless of the effect of fasting on the days of fasting uterine height is the height of the uterus also expresses itself in the growth of the fetus inside the womb. In other words, the negative effects of fasting on fetal growth, at least not in the short term.

This also corresponded with the results of Naderi and colleagues in 2004. In this study in a case-control two groups of patients were selected and divided into two groups of 51 subjects in the fasting group were fasting for at least 20 days and were compared with a control group and concluded that no significant difference in the volume of amniotic fluid, birth weight, blood pressure, fundal height was observed in both groups [12]. In another study in 2002 also corresponded with knowledge of the significant differences in fasting and non-fasting patients were seen at the height of the uterus [2].

The effect of fasting on auscultation of fetal heart at least in the short-term adverse effects on the fetus' heartbeat. This with study Hisham. Mirghani in 2005 corresponded. In this study, the effect of intermittent maternal fasting on fetal heart rate was 136 ± 10 and 136 in the control group which was not statistically significant [11].

Of course, one study concluded that a strong relationship between variation in fetal heart rate and uterine disorders in people development and created psychomotor and language disabilities in childhood [15].

The effect of fasting on fetal movements felt by the mother, regardless of fasting days, it does not affect the baby's movements and this also corresponded with Danesh study. He felt that the study of fetal movements and fetal heart auscultation research in maternal fasting and non-fasting in Ramadan before 45.5% at the end of Ramadan and 75.6%, respectively that increase was due to higher gestational age and there was no significant difference between the two groups [10].

Regardless of the effect on the fasting days of delivery, pregnant women and those with a study on the effects of maternal fasting during Ramadan, preterm delivery was examined corresponded.

In the aforementioned study examined 402 pregnant women were divided into two groups: one group of 201 to fasting and 201 did not fasting. The cesarean rate in the fasting group was 28.4% and non-fasting group 39.3% respectively that was this difference was statistically significant and fasting means to reduced the cesarean. In this study generally had arrived at the conclusion that fasting does not increase the rate of preterm deliveries [10].

The researchers concluded that Ramadan fasting during Ramadan has no effect on neonatal growth indices of Arab and Nasrallah study on total of 4343 pregnant women in the province Hamedan (Iran) were examined and concluded that fasting has no effect on birth weight [8]. They point out that although the occurrence low birth weight infants in parturient fasting in the second trimester [10].

The largest and perhaps most famous study on the effect of fasting on birth weight is a study that was conducted on 13,351 births neonatal term in Birmingham, England conducted in 1990 by Cross et al. concluded that fasting had no effect on mean birth weight. Cross et al (1990) concluded that the rate of low birth weight among pregnant women fasting during the second three months of pregnancy is [9]. In Saudi Arabia, the prevalence of low birth weight infants born during Ramadan than 415 birth about 9.9 percent weight below 2500 g vs. 6.3% from 4865 infants in the months other than Ramadan [15].

In some studies the relationship between eating and being hungry for long and preterm birth have been reported. In this study the frequency of eating less than 3 times per day was associated with an increased risk of premature delivery [15].

Hunger for more than 13 hours of corticotrophin (CRH) releasing hormone levels during pregnancy by increasing (CRH) increases the risk of preterm delivery [16].

CONCLUSION

It could concluded that the Ramadan fasting during pregnancy on the parameters evaluated, there was no significant difference between the groups it does not seem healthy fasting for pregnant women and health indicators impaired intrauterine growth of the fetus is exposed to prenatal care they provided.

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