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Original Article

Effect of Fasting of Expected Mothers on Birth Weight of Newborn in a Tertiary Care Hospital of Karachi

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Abstract

Background: Dietary limitations and improper time of rest during Ramadan of expected mothers could influence the health of newborns, especially the birth weight.
Objective: To determine the effect of Ramadan fasting on fetal birth weight.
Study type, settings & duration: This prospective study was conducted at Jinnah Postgraduate Medical Centre (JPMC), Karachi during May-June 2019 (Ramadan 1440 Hijri).
Methodology: After taking informed written consent, pregnant females visiting the Obstetrics and Gynecology ward of JPMC in Ramadan for pre-natal examination were enrolled. A pretested questionnaire was used to gather information regarding, demographics, medical history, family history, number of days of fasting and information of the fetus was recorded. Pregnant female were divided in three groups: Non- fasting (Group 1), Mothers with less than 19 days of fasting (Group 2), and mothers with more than of 20 days of fasting (Group 3).
Results: Complete information of 477 pregnant women was obtained. Amongst them, 149 (31.2%) were in Group 1, 225 (47.2%) were in Group 2, and 103 (21.6%) were in Group 3. None of the demographic variable showed any significant association with fasting mothers of three groups, except history of hypertension. Mean birth weight of newborns of mothers of Group 2 was 83 grams lower and of mothers of Group 3 were 103 grams higher than the weight of newborn of the mothers of Group 1. But these differences were statistically insignificant. Statistically insignificant differences were also observed in each trimester.
Conclusion: Fasting of pregnant mothers during Ramadan have no significant effect on the weight of their newborns.
Key words: Ramadan fasting, expected mothers, weight of newborn, low-socio economic group.

Introduction

The health of the babies is correlated with the environment spent during the pregnancy. Prenatal support, dietary habits and stress play important roles in healthy fetal outcomes. Dietary limitations and improper time of rest could influence the health of newborns. Food restrictions not only enhance the risk of low baby weight but also increase the chance of cardiovascular diseases in later life.[1]

It is obligatory that all adult Muslims must fast from dawn to dusk during the month of Ramadan, except for some certain conditions. One of them is the pregnancy, in which the women are exempted from this religious obligation if they feel that fasting could be harmful to the fetus and their health. According to a Hadith, "Allah has relieved the traveler of the obligation of fasting and half of prayers and he has relieved the pregnant and nursing women of the obligation of fasting".[2]

The pregnancy of a vast number of Muslim women coincides with Ramadan and even though they are allowed to postpone their fasting, they prefer to fast to avoid the feeling of guilt and share the spiritual experience with society.[3] Question arises whether this adherence affects the health of the neonatal. Many studies with a large sample size,

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NK conceptualized the project, performed the statistical analysis and also did the drafting, revision & writing of manuscript. SMH, HS, ZR & SI did the data collection. NK, SMH, HS, ZR & SI did the literature search.

such as Savitri et al[1] (n=139,322), Jurges[4] (n=1,000,000), showed that there was no significant difference in terms of the birth weight of the newborn. However, some other large scale studies Lee et al[5] (n=9,744) and Shahri[6] (n= 11 million) showed negative effects in size and weight of the newborns. Several other international studies[3,7] with low sample sizes showed no significant difference between the weight of the newborn among fasting and non-fasting mothers. Recently three studies[8-10] were conducted in Pakistan, but in all the three studies, pregnant mothers of 1st trimester were not considered. However, Savitri[7] showed that fasting in 1st trimester affected more severely to the fetus as compared to other trimesters. Therefore, this study was planned to be conducted in the largest tertiary care hospital of Karachi to observe the weight of outcomes of mothers fasting in Ramadan. The objective of the study was to determine the effect of Ramadan fasting on birth weight of newborns.

Methodology

This prospective study was conducted at Jinnah Postgraduate Medical Centre (JPMC), Karachi during May-June 2019 (Ramadan 1440 Hijri) and followed each case up to the delivery of the newborn. All the pregnant women who have visited the Obstetrics and Gynecology ward of JPMC in Ramadan for pre-natal examination were invited to participate in the study. The objective of the study was explained and written informed consent was taken from each participant. Information regarding, demographic, socio-economic parameters (monthly income, education), medical history (co-morbidities, smoking, drugs being used, surgery), family history were recorded. The number of days of fasting and information regarding the fetus was obtained in follow-up calls after Ramadan and after the delivery. The females were divided into three groups: No fasting (Group 1), fasting less than 19 days (Group 2), and fasting of 20 and more days (Group 3). The data were analyzed using SPSS (ver. 22). Chi-square/Fisher Exact test was applied to find the association between fasting/no-fasting mothers versus categorical responses. Analysis of variance along Tukey post-Hoc was applied to test the difference of means of age, maternal and fetus weight for fasting and non-fasting mothers. The p-value less than 0.05 was used for statistical significance.

The ethical approval was obtained from Institutional Review Board (IRB) of Jinnah Sindh Medical University, Karachi vide IRB # 112-21.

Results

Five hundred eleven pregnant women enrolled in the study. However, 34 mothers could not be followed due to either non-cooperation or lost cases. Hence, the response rate was 93%. In remaining 477 cases, 149 (31.2%) mothers were in Group 1, 225 (47.2%) were in Group 2, and 103 (21.6%) were in Group 3. The mean age and weight of the mothers was 25.18±4.78 years and 62.9±11.6 kg, respectively. The mean age of the mothers of the three groups (25.8±4.8 years, 24.8±4.7 years and 25.1±5.1years) were statistically insignificant (*p*=0.134). Similarly, the mean weight of the mothers of three groups (63.4±11.5 kg, 62.6±11.6 kg, and 62.9±12.1 kg) were also insignificant (*p*=0.794) (Figure).

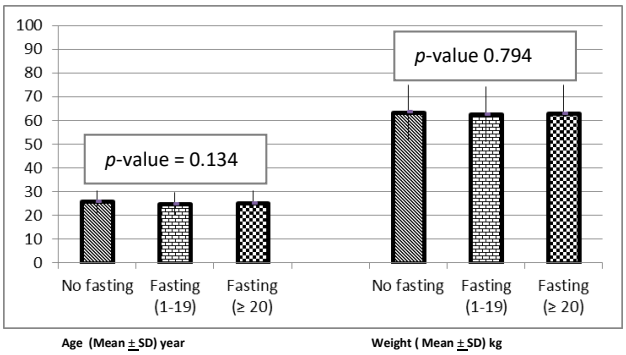

Figure: Summary statistics of age and weight of fasting and non-fasting mothers with comparison.

Forty-seven percent of the respondents were educated up to the secondary school. Ninety-seven of the women indicated that their family income was up to Rs. 50,000/- per month only and the almost same percentage (97.7%) of women were housewives. The percentage of women in 1st, 2nd, and 3rd trimesters was 3.6%, 35.6%, and 60.8%, respectively. Sixty-nine percent mothers fasted for at least one day during that Ramadan. Three (0.6%) pregnant females were suffering from hypertension, 8 (1.6%) were diabetes and 3 (0.6%) were epileptic.

One hundred fifty-nine (33.3%) women conceived first time and 0.4% indicated having multiple pregnancies in the past. Three hundred forty-two (71.7%) respondents were using folic acid and 315 (66.6%) women were using iron supplements for prenatal care. The multivitamin and calcium supplements were used by 42% and 27% of the women, respectively.

Table-1 shows the association of fasting/non-fasting mothers with respect to the categorical responses regarding demographic variables, history, use of vitamins and iron. Since

some of the positive responses were very few, therefore chi-square was not valid for such cases. Hence, two groups of fasting mothers were merged into one group to use Fishers Exact test instead of chi-square test. None of the variable showed any significant association, except history of hypertension (p=0.009). Eleven percent of non-fasting mothers reported the history of hypertension, while only 5% of the fasting mothers indicated the hypertensive history. Furthermore, occupation was marginally significant (p=0.051).

Table 1: **Comparison of response variables with fasting/ non-fasting mothers.**

Response variables	*Expected mothers*		*p-value*
	Non Fasting	*Fasting (1-30 days)*	
Education			
Matriculation or less	75 (50.3)	152 (46.3)	0.418
More than matriculation	74 (49.7)	176 (53.7)	
Income <20,000	103 (79.1)	226 (68.9)	0.926
20,000-50,000	42 (28.2)	91 (27.7)	
>= 50,000	4 (2.7)	11 (3.4)	
Occupation			
Housewife	148 (99.3)	316 (96.3)	0.051*
Working	1 (0.7)	12 (3.7)	
Hypertension			
Yes	17 (11.4)	16 (4.9)	0.009
No	132 (88.6)	312 (95.1)	
Diabetes			
Yes	2 (1.3)	5 (1.5)	0.619*
No	147 (98.7)	323 (98.5)	
Epilepsy			
Yes	0 (0.0)	3 (0.9)	0.324*
No	149 (100.0)	325 (99.1)	
Drug or alcohol use			
Yes	4 (2.7)	7 (2.1)	0.467*
No	145 (97.3)	321 (97.9)	
Smoking			
Yes	1 (0.7)	1 (0.3)	0.528*
No	148 (99.3)	327 (99.7)	
Reproductive Track Anomaly			
Yes	3 (2.0)	2 (0.6)	0.179*
No	146 (98.0)	326 (99.4)	
Any past surgery			
Yes	29 (19.5)	56 (17.1)	0.527
No	120 (80.5)	272 (82.9)	
Use of Folic acid			
Yes	107 (71.8)	235 (71.6)	0.970
No	42 (28.2)	93 (28.4)	
Use of Iron supplement			
Yes	104 (69.8)	211 (64.3)	0.242
No	45 (30.2)	117 (35.7)	
Use of Multivitamins			
Yes	57 (38.3)	143 (43.6)	0.273
No	92 (61.7)	185 (56.4)	
Use of Calcium			
Yes	44 (29.5)	86 (26.2)	0.452
No	105 (70.5)	242 (73.8	

The mean weight of newborns of fasting and non-fasting mothers, categorized by trimester exposed in Ramadan, is shown in Table-2. The mean weight of newborns of fasting mothers of Group 2 was 83 grams lowers and fasting mothers of Groups 3 was 103 higher than non-fasting mothers of Group 1. Considering the 1st trimester, the mean weight of the newborns of fasting mothers of Group 2 was 149 gm lower and fasting mothers of Group 3 was 288 grams lower than the newborns of non-fasting mothers of Group 1.

Even though, these numbers were noticeably large enough, but due to small sample size, they were statistically insignificant (p>0.05). The weight of newborns of the fasting mothers of Group 3, was higher than the weight of the newborns of fasting mothers of Group 2 for the 2nd trimester and it was significantly different.

Discussion

In this study almost all (97%) of the expected mothers indicated that their family income was less than Rs. 50,000/- per month and 47.6% respondents indicated that their education level was matriculation or less. These two factors indicate that the respondents belonged to a lower socio-economic group, as expected from the site of the study. Around 69% of the pregnant female fasted at least one day in Ramadan. This outcome is almost the same as Parveen,[8] Gul,[9] and Hossain,[10] but is lower than Mubeen study.[11] None of the difference between fasting and non-fasting mothers for demographic, co-morbidity diseases, smoking and pre-natal supporting medicines was statistically significant, except for hypertensive patients. It may be due to the seriousness of the disease prevented them to fast in significant numbers. The occupation also showed marginal significance (p=0.051) in favor of fasting working women. Working environment could have influenced to fast in higher percentage as compared to sitting at home. However, Safari[3] and Parveen[8] do not agree with this result.

The main results of this study showed that there was no significant difference between the weight of newborns of fasting and non-fasting mothers, as well as within each trimester. These results are in line with findings of the studies conducted by Safari,[3] Savitri,[7] Parveen,[8] Gul,[9] and Hossain et al.[10] Safari[3] reported that the mean values of the newborns of non-fasting, 1-10 days fasting, 11-20 days fasting, and more than 20 days of fasting were 3.35 kg, 3.0 kg, 3.33, 3.52 kg respectively. Savitri[7] showed that the mean values of the newborns of non-fasting, 1-15 days fasting, and more than 15 days were 3.44kg, 3.58 kg, and 3.37 kg respectively. Parveen[8] reported that the

Table 2: Comparison of mean weight of fetus among fasting and non-fasting mothers categorized by trimesters.

Trimester	Fasting mothers (yes/no)						p-value	Total	
	No fasting		Fasting (1-19 days)		Fasting (≥ 20 days)				
	n	Mean ±SD	n	Mean ±SD	n	Mean ±SD		n	Mean ±SD
1st	5	3020±492a	7	2871±355a	5	2732±469a	0.584	17	2874±419
2nd	50	2893±526ab	77	2675±647a	43	3000±505b	0.009	170	2821±593
3rd	94	2757±488a	141	2752±471a	55	2865±468a	0.297	290	2775±477
Total	149	2812±503ab	225	2729±535a	103	2915±485b	0.010	477	2795±519

mean weight of newborns of fasting mothers for less than 15 days and more than 15 days as 2.79 kg and 2.74 kg, respectively. Gul[9] has shown that the mean weight of newborns for fasting mothers for less than 10 days and more than 10 days as 2.86 kg and 2.82 kg, respectively. Hossain[10] stated that the weight of newborns for the fasting mothers for less than 7 days and more than 7 days as 2.83 kg and 2.87 kg, respectively. All these five studies showed statistically insignificant differences within their respective mean values. The 1st trimester showed quite a lower mean value of 288 gm of the weight of newborns of fasting mothers of Group 3 as compared to the mothers of Group 1, but due to the small sample sizes, this noticeably large difference was also not statistically significant.

As it was mentioned earlier that, the cohort of this study belonged to the lower middle class and it is usually the practice in this socio-economic class not to visit the gynecologist in early pregnancy. That is why we have very low participants of expected mothers of 1st trimester. In all three trimesters, there was no significant difference in fetus weight of fasting and non-fasting mothers. These results are consistent with Savitri,[1] afari,[3] Parveen,[8] Gul,[9] and Savitri.[12] However, Jurges[4], and Savitri[7], showed some significant difference between mean weights of new-born, if the 1st trimester of pregnancy occurs during the Ramadan period. A large-scale study is needed to make any solid conclusion regarding this subject.

Many pregnancies are overlapped with the month of Ramadan and before this month emerged many pregnant women seek advice from their Gynecologist/doctor regarding fasting during the month of Ramadan. Unfortunately, there are no guidelines available for Pakistani Gynecologist/ doctor to advise them appropriately. Large-scale studies were conducted in Netherlands,[1] Germany,[4] and USA.[6] In all these studies, it was assumed that all the Muslim mothers, who have overlapped their pregnancies in Ramadan, were fasting. It is not a very valid assumption. Because many muslim mothers, especially the working ladies both in Pakistan and western countries could take the allowance of not fasting due to pregnancy. Furthermore, the weight of newborns also affected due to genetics. Very few prospective studies[8-10] have been conducted in Pakistan to understand the outcomes of the pregnancies for fasting mothers if their pregnancies overlay with Ramadan. However, in all the three studies, the authors did not include the pregnant women of 1st trimester. Therefore, this study was conducted to observe the outcome of the pregnant fasting mothers of all the three trimesters in a tertiary care hospital of Karachi.

Muslim women observe significant changes in lifestyle during Ramadan in eating habits, alteration in sleeping patterns, and reduction in physical activities. Most of the Muslim men perform extra night prayer of Tarawih, which compensates for the reduction of physical activities of the daytime, but fewer women practice this physical activity. However, nutrition restriction is the main factor that could affect the outcomes of the pregnancy.

Even though, almost all the procedures of this hospital are free of cost. But the perception of the low quality of services in public hospitals kept the middle and upper-middle socio-economic classes away from these hospitals. That is why about half the respondents of this study had only up to 10 years of schooling, which agreed with many other studies.[2,8,9,13,16]

The results of this study should be read with cautious due to following limitations:

The study was conducted in a single government hospital of Karachi. The sample size is not big enough, especially in 1st trimester, to make a strong conclusion. Dieting habits of the expected mothers were not considered.

Therefore, a larg multi-center study covering most of the socio-economic groups, including other affecting factors, such as dietary habits should be conducting to make a stronger conclusion and develop a better guidelines for fasting expected mothers. Furthermore, longitudinal studies for cognitional and other growth factors of newborns of fasting mother could also be conducted**.**

Ramadan fasting does not affect the weight of newborn babies, but fasting in the 1st trimester should be carefully observed.

Conflict of interest: None declared.

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