

## **EFFECT OF RAMADAN FASTING ON THE NUTRITIONAL STATUS OF NEWBORN**

**KALPANA, C.A. AND HABEEBA, B.**

*(Department of Food Science and Nutrition,  
Avinashilingam Institute for Home Science and Higher Education for Women,  
Coimbatore - 641043)*

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### **Introduction**

Fasting is voluntarily not eating food for varying lengths of time. Fasting is thought to be beneficial as a preventive measure to increase overall health, vitality and resistance to disease, used as a method of mental and spiritual rejuvenation and is being observed by all major religions in the world<sup>1</sup>. In Islam, fasting for one month is an obligatory practice during the holy month of Ramadan, the ninth month of the Islamic calendar. Every day, during the month of Ramadan, Muslims refrain from eating and drinking from sunrise to sunset. According to Islamic laws, children below the age of 12, patients, travellers, pregnant women, women who are menstruating and lactating mothers are exempted from fasting<sup>2</sup>. Though pregnant women are an exception, many pregnant women prefer to fast during Ramadan.

Nutrition during pregnancy is very important for both the mother and the foetus and in the absence of adequate nutrition, the development of the foetus takes place at the expense of the mother. Nutrition is considered to be one of the major factors in determining the future well-being of a child. Hence, the

present study was planned to find the effect of Ramadan fasting on the nutritional status of newborn. With this in view, the study was conducted with the following objectives:

- study the socio economic and obstetric history of pregnant women
- determine their dietary pattern in the fasting and the non fasting period
- analyse the nutrient content of the special food consumed during fasting period
- evaluate the effect of fasting on the nutritional status of new born

### **Materials and Methods**

#### ***Selection of area and sample***

The study was carried out in two hospitals of Coimbatore city of Tamilnadu. These hospitals were selected for the study as majority of Muslims in and around Coimbatore visited these hospitals. Necessary permission was obtained by the investigator from the hospital authorities. Nausea and vomiting are the most common problems of the first trimester reported in 70-80 per cent of pregnancies and this interferes with the

dietary intake of the pregnant women affecting their nutritional status<sup>3</sup>. There are 11 to 14 per cent chances for pregnant women to deliver preterm in the 8<sup>th</sup> month of pregnancy<sup>4</sup>. Hence 30 pregnant women in their second trimester of pregnancy were identified for the study. Out of these, 15 women observed fasting during Ramadan month and the remaining 15 did not observe Ramadan fasting taking into consideration the advice of doctors.

#### ***Eliciting the background details***

Details regarding age, type of family, income level, gynaecological information regarding the first pregnancy and subsequent pregnancies, complications in previous pregnancies, dietary pattern, food habits and frequency of food consumption during fasting and non-fasting period, food fads and taboos were collected through administering a specially designed interview schedule.

#### ***Nutrient analysis of the special food (Nonbu kanji) consumed during fasting***

During the fasting period a special gruel called Nonbu kanji is prepared in every mosque and distributed to all the Muslims as well as people belonging to other religion as a special food during Ramadan, with the motive of providing food for the poor who fasted during Ramadan. Approximately 250-300 ml of Nonbu kanji per day was consumed by the pregnant women for a period of 30 days. Apart from this no other special foods are consumed during Ramadan fasting by the pregnant women. Nonbu kanji was prepared in the laboratory and analysed for

carbohydrates, protein, fat, iron, calcium, vitamin C, thiamine, riboflavin and fibre using standard methods suggested by National Institute of Nutrition<sup>5</sup>.

#### ***Assessment of food and nutrient intake***

Diet survey was conducted for all 30 pregnant women on ordinary days and only for the 15 fasting pregnant women during Ramadan fasting. From the data collected, the mean food intake of each pregnant woman was obtained and the mean nutrient intake was computed using the ICMR Food Composition Tables<sup>6</sup> and compared with the Recommended Dietary Allowances for Indians<sup>7</sup>.

#### ***Evaluation of the effect of fasting on the nutritional status of newborn***

##### ***History of delivery***

Information regarding presence of complications in parturition such as ante partum hemorrhage, abnormal presentation, oligohydramnios, foetal distress, cephalo pelvic disproportion, presence of labour less than or greater than 12 hours due to complications and the type of delivery were collected for both fasting and non fasting pregnant women.

##### ***Fundal height***

The fundal height which reflects fetal growth typically increases as pregnancy progresses and provides a gross estimate of the duration of pregnancy<sup>8</sup>. Fundal height was measured using a measuring tape from the top of the pubic bone to the top of the uterus (fundus) in the final examination of the pregnant women with the help of a nurse.

### ***Anthropometric measurements of the newborn***

#### **Crown-heel length and body weight**

The crown-heel length of the new born baby was measured using an infantometer. The body weight of the infant was determined using a baby weighing scale.

#### **Head circumference**

Head circumference helps to assess brain growth and brain development in premature and small for gestational age infants. The measurement was taken using a narrow flexible, non-stretchable tape. The infant's head was made steady and the circumference was measured by passing the tape firmly above the eyebrows and ears and sounds the occipital prominence at the back of the head.

#### **Chest circumference**

A narrow, flexible, non-stretchable tape was wrapped around the chest of the infant at the nipple level. The measurement was taken at resting phase between respiration and the readings were taken.

#### **Mid upper arm circumference**

Mid upper arm circumference of all the infants was measured at the midpoint between the acromian and the ulnar process with the arm held vertically and fore arm supinated using a tape which was placed gently but firmly to avoid compression on the underlying soft tissue.

#### **Statistical analysis**

The data obtained were consolidated, tabulated, analyzed and interpreted using appropriate statistical methods.

### **Results and Discussion**

#### ***Socio-economic background of the pregnant women***

About 56.3 per cent of the pregnant women in fasting group and the non fasting group (40 %) were between 20 -24 years of age. In the fasting group 29.1 per cent were housewives and in the non fasting group, 27.3 per cent were housewives. An equal percentage of women among both groups were self employed (fasting 27.5% and non fasting 27.3 %). Most of the family members in both the groups showed educational levels of upto high school which included the fasting group (42.1%) and non fasting group (41.8 %). It was found that 50 per cent of fasting and 53.3 per cent of non fasting group had 4-6 members in their families. Based on the HUDCO classification, it was found that among the fasting group 93.8 per cent were having a monthly income above Rs. 7,500 while it was 93.4 per cent in non fasting group, only 6.2 per cent of families of fasting group and 6.6 per cent of non fasting group had a monthly income of Rs. 4500-7500.

#### ***Mean food intake of pregnant women***

Table I presents the mean food intake of pregnant women during fasting and non fasting period.

Consumption of cereals was significantly less during the fasting period (-34.3 %) when compared to the non fasting period (-25.3 %). Intake of pulses was less (8.3%) during normal period, but was found to be high (126.6%) during the fasting period. Green leafy vegetables were consumed in very small

**TABLE I**  
**Mean Food Intake of Pregnant Women During Fasting and Non Fasting Period**

Period	Details	Cereals (g)	Pulses (g)	Green leafy vegetables (g)	Other vegetables (g)	Roots and tubers (g)	Fruits (g)	Fats and oils (g)	Sugar and jaggery (g)	Milk and milk products (ml)
Fasting (N=15)	Suggested intake	300	60	150	100	100	200	30	20	500
	Actual intake	197	136	4.8	194.5	68.4	79.6	50	33.8	155.9
	Per cent deficit / excess	-34.3	+126.6	-96.8	+94.5	-31.6	-60.2	+66.7	+69	-68.6
Non fasting (N=15)	Actual intake	224	55	6.3	123.6	102.2	124.3	42.3	44.7	440.2
	Per cent deficit / excess	-25.3	-8.3	-95.8	+23.6	+2.2	-37.9	+41	+123.5	-11.9

amounts in both normal and fasting period. Intake of other vegetables, fats and oils increased among both groups of pregnant women, but it was higher in the fasting period. Consumption of roots and tubers and fruits was less than the standard recommendations during fasting whereas the roots and tuber consumption was higher and fruits consumption was in deficit during the non fasting period. Sugar and jaggery consumption was higher in both the groups, while milk intake was very less during the fasting period (-68.8 %) and slightly below standard values (-11.9%) during non fasting period.

#### ***Mean nutrient intake of pregnant women***

The mean nutrient intake of pregnant women during fasting and non fasting period is presented in Table II.

A deficit in the energy intake both in the fasting (-5.3%) and non fasting period (-20.1%) was observed. This might be due to the deficit in the consumption of cereals. Intake of protein was higher during the fasting period but a deficit by 0.3 per cent during non fasting period was observed. Fat intake was much higher in non fasting period than fasting period. Calcium, beta carotene and iron intakes were deficient in both the groups. Thiamine and riboflavin were taken in excess during fasting period, when compared to the non fasting period. Folate was taken in less amounts in both the periods and vitamin C intake was much higher during the fasting period which was significantly higher than non fasting period.

#### ***Nutrient content of the special food (Nonbu kanji)***

Nonbu kanji, the special food consumed during Ramadan fasting was prepared and its nutrient contents were analysed. Moisture content of Nombu kanji was 76 g per cent and the fiber content was 1g. Carbohydrate content of the kanji was 43.6g. The protein content of the kanji was 36.3g and fat content was 5.8 g. Calcium content of the kanji was 40.7 mg. Thiamine and riboflavin contents were 0.05mg and 0.6mg respectively. Nombu Kanji contained 3.6 mg of iron and 3.6 mg of vitamin C. Overall it was a good source of protein, carbohydrates and calcium with a high moisture content, which helped in rehydration. Iron, vitamin C and riboflavin content of the kanji were found to be less.

#### ***Obstetric history of the pregnant women***

It was found that 56.3 per cent of pregnant women in fasting group were in their 4th month of pregnancy and 53.3 per cent of the non fasting pregnant women were in their 5th month of pregnancy. Majority of non fasting (86.7%) and all the fasting pregnant women visited the doctor once in a month and 43.8 per cent of pregnant women had pica. It was found that all of them were taking medicinal supplements in the form of tablets on a daily basis. Pregnant women in the fasting group were also taking supplements regularly after they break the fast each day. Most of them were taking iron and calcium supplements. Majority of the pregnant women in the fasting group (93.8%) had nausea and vomiting and 80 per cent in the

TABLE II  
Mean Nutrient Intake of Pregnant Women During Fasting and Non Fasting Period

Period	Intake (Kcal)	Energy (g)	Protein (g)	Fat (mg)	Calcium (mg)	Iron (mg)	Beta carotene (mcg)	Thiamine (mg)	Riboflavin (mg)	Folic Acid (mg)	Ascorbic Acid (mg)
Fasting (N=15)	Recommended Allowance	2175	65	30	1000	38	2400	1.1	1.3	400	40
	Actual intake	2060	64.8	45.8	847	11.1	918	0.99	1.61	158.6	123
	Per cent deficit / excess	-5.3	-0.3	+52.6	-153	-70.8	-61.8	-10	-23.8	-60.4	+207.5
Non fasting (N=15)	Actual intake	1738	77.3	87.7	949	14.8	1014	1.24	1.70	167.9	72.5
	Per cent deficit / excess	-20.1	+24.6	+192.3	-5.1	-61.1	-57.8	+12.7	+30.8	-58	+81.3

non fasting group. Edema was present in 43.8 per cent of pregnant women in the fasting group and 60 per cent in the non fasting group. Hypertension was present in 6.6 per cent of pregnant women of the non fasting group.

Hundred per cent of live births occurred in both fasting and non fasting group. There were no incidents of miscarriage and still births and 13.4 per cent of women in the non fasting group had oligohydramnios. Among the majority of pregnant women, labour persisted for less than 12 hours and 50 per cent of the fasting group and 46 per cent of the non fasting group of pregnant women delivered normally while the remaining underwent caesarean section.

#### ***Fundal height of pregnant women***

Fundal height is a measure of the size of the uterus used to assess fetal growth and development. It is measured from the top of the uterus to the top of the pubic bone in centimeters. Measuring the fundal height can be an indicator of proper fetal growth. The mean fundal height in both the fasting and non fasting group was similar (31.6 cm and 31.1 cm). No significant difference was observed between the groups.

#### ***Anthropometric measurements of the newborns***

Anthropometric measurements such as crown heel length, weight, head circumference, chest circumference and mid arm circumference of the newborn are presented in Table III.

The mean crown heel length was less when compared to standard values among

all the male infants born to pregnant women in the fasting group while among the female infants it was found to be increased by 2.0 per cent. Among the non fasting group, crown heel length of the male infants was higher by 1.0 per cent while the female infants it was 0.8 per cent. The mean weight of the infants in both groups was 2.9 kg. It was found that the mean head circumference of male infants was normal and the female infants was 0.9 per cent less in the non fasting group. The head circumference of the male infants was in excess by 2.1 per cent and the female infants had 0.3 per cent in excess. Chest circumference was higher than the standard values in both the groups. It was much higher in the fasting group (4.3 %) in the male infants and 6.5 per cent in the female infants. In the non fasting group, the chest circumference of female infants was higher than the standard value by 1.85 per cent and among males by 2 per cent. The mid upper arm circumference of all the infants was deficit when compared to the standard. The mid upper arm circumference of both male and female infants was deficit by 7.2 per cent in the fasting group. There was no significant difference in the mid arm circumference of the fasting group and non fasting group.

#### **Summary and Conclusion**

The findings of the study revealed that there were changes in the dietary pattern of pregnant women during the fasting period. Nonbu kanji consumed during fasting was rich in carbohydrates, proteins, calcium and fats. No effect on the weight gain, fundal height and pregnancy outcomes was observed

TABLE III  
Mean Anthropometric Measurements of the Newborn

Groups	No.	Crown -heel** length (cm)		Weight** (kg)		Head circumference* (cm)		Chest circumference* (cm)		Mid upper arm circumference* (cm)	
		Mean ± SD	% Excess / deficit	Mean ± SD	% Excess / deficit	Mean ± SD	% Excess / deficit	Mean ± SD	% Excess / deficit	Mean± SD	% Excess / deficit
<b>Standard</b>											
Male	-	50	-	3.3	-	33.8	-	32.5	-	11.0	-
Female	-	48.5	-	3.2	-	33.7	-	32.3	-	11.0	-
<b>Fasting group</b>											
Male	7	49.1±2.4	-1.8	2.9±0.3	-12.2	34.5±1.6	+2.07	33.9±1.5	+4.3	10.2±1.5	-7.2
Female	8	49.5±2.6	+2.0	2.98±0.3	-6.9	33.8±2.5	+0.3	34.4±2.93	+6.5	10.2	-7.2
<b>Non fasting group</b>											
Male	6	50.5±1.7	+1.0	2.93±0.4	-11.2	33.8±1.9	0	33.4±1.6	+2.76	10.05±1.6	-8.6
Female	9	48.9 ±1.9	+8	2.96±0.2	-7.5	33.4±1.7	-0.9	32.9±1.8	+1.85	10.03±1.7	-6.4

\*\* ICMR (1995)<sup>9</sup>\* Ghosh (1981)<sup>10</sup>

from the study. Further there were no complications during pregnancy and parturition among the fasting pregnant women. No change was observed in the nutritional status of the newborn of the fasting

women when compared with the newborns of the non fasting group. Thus it may be concluded that fasting during Ramadan had no adverse effect on the nutritional status of the newborn.

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