



Original Research Article

## Impact of Nutrition Counseling on the Fetal Outcome and KAP Score of the Gestational Diabetics

Khushpreet Kaur<sup>1</sup>, Anita Kochhar<sup>2</sup>

<sup>1</sup>M. Sc. Student, <sup>2</sup>Professor,  
Dept. of Food and Nutrition, College of Home Science, PAU, Ludhiana.

Corresponding Author: Khushpreet kaur

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### ABSTRACT

The incidence of gestational diabetes is increasing all over the world and becoming the problem of significant importance. Nutritional counseling is effective in improving the disease related knowledge of subjects and fetal outcome of gestational diabetics. To study the impact of nutrition counseling on the fetal outcome and KAP score of gestational diabetics, sixty subjects between the age group of 20-40 years were selected from Dayanand Medical College and Hospital and other local hospitals of Ludhiana. The subjects were divided into two groups viz. experimental (E) and control (C) group. General information, family history of disease, dietary intake and anthropometric measurements was recorded. In group E nutrition counseling was imparted for three months at 15 days interval about gestational diabetes, signs & symptoms, risk factors, complications, management, dietary management and importance of exercise in the management of gestational diabetes mellitus. The subjects of group E faced less complications as compare to group C. Data revealed that 16.7 and 46.7 percent of the subjects were faced complications in group E and C at the time of delivery. 60 and 83.3 percent of babies of gestational diabetes subjects faced complications in group E and C at the time of birth. There was also significant increase in the knowledge, attitude and practice score obtain by subjects in group E. Quantum of knowledge of the subjects regarding the disease improves 3.55 times. Therefore, it can be reported from the results that nutrition counseling significantly improved the fetal outcome and KAP score of gestational diabetics.

**Keywords:** Gestational diabetes, Fetal outcome, KAP score, Nutrition counseling.

### INTRODUCTION

Gestational diabetes mellitus (GDM) is diagnosed when higher than normal blood glucose levels first appear during pregnancy. Pregnant women need two or three times more insulin than normal. If the body is unable to produce this much insulin, gestational diabetes develops. Gestational diabetes is usually diagnosed during routine screening. It often does not cause any

symptoms at all. However, high blood glucose can cause some symptoms, including: Excessive thirst, excessive appetite, increased urine production, having a dry mouth, feeling extremely tired, weight loss, impaired vision, poor wound healing. Women who have had gestational diabetes are at an increased risk of developing type 2 diabetes. If gestational diabetes is not well looked after it may result in problems such

as a large baby, miscarriage and stillbirth. The incidence of gestational diabetes mellitus is increasing all over the world and becoming the problem of significant importance. The literature reports indicate that worldwide prevalence of gestational diabetes mellitus has found to range from 0.6 to 13.7%. The prevalence in India varies from 3 to 15 %. Approximately 650,000 women give birth in England and Wales each year, and 2-5% of pregnancies involve women with diabetes. Approximately 87.5% of pregnancies complicated by diabetes are estimated to be due to gestational diabetes, with 7.5% being due to type 1 diabetes and the remaining 5% being due to type 2 diabetes. The prevalence of type 1 and type 2 diabetes is increasing (Sachdev 2011, NICE 2008).

Any woman can develop gestational diabetes, but some women are at greater risk. Risk factors for gestational diabetes include: family history, gestational diabetes in previous pregnancy, excess weight before pregnancy, irregular menstrual cycles, excess of amniotic fluid in amniotic sac, non-white race like black, Hispanic, American Indian or Asian. In gestational diabetes, pancreas work overtime to produce insulin, but the insulin does not lower blood glucose levels. Although insulin does not cross the placenta, glucose and other nutrients do. So, extra blood glucose goes through the placenta, giving the baby high blood glucose levels. This causes the baby's pancreas to make extra insulin to get rid of the blood glucose. Since the baby is getting more energy than it needs to grow and develop, the extra energy is stored as fat. This can lead to macrosomia, or a "fat" baby. Babies with macrosomia face health problems of their own, including damage to their shoulders during birth. Babies with excess insulin become children who are at risk for obesity and adults who are at risk for type 2 diabetes.

Gestational diabetes is managed by monitoring blood sugar levels before breakfast and 2 hours after meals, monitoring urine, managing diet and exercise, monitoring weight gain, taking insulin, if necessary. Insulin is currently the only diabetes medication used during pregnancy, controlling high blood pressure. Nutritional needs increase during pregnancy, especially in the second and third trimester of pregnancy. Nutritional counselling to mothers early in pregnancy can help improve dietary intake during pregnancy (Kumari *et al* 2009). Keeping in view importance of nutrition counseling in the management of gestational diabetes the present study was designed to study the impact of nutrition counseling on the fetal outcome and KAP score of gestational diabetics.

## **MATERIALS AND METHODS**

A sample of 60 patients suffering from gestational diabetes in the age group of 40-60 years were selected from Dayanand Medical College & Hospital and other local hospitals of Ludhiana city and were equally divided into two groups viz. Experimental (E) and Control (C). Nutrition counseling was imparted to group E, while group C was not be given any nutrition counseling. A well-structured questionnaire-cum-interview schedule was developed to elicit information pertaining to general information, medical history of the subjects, dietary intake and anthropometric measurements of the subjects. A multiple choice questionnaire was designed to test the knowledge of the subjects regarding gestational diabetes and diet. There were three parts of the questionnaire. In Part I questions regarding knowledge, in Part II questions regarding attitude and in Part III questions regarding aspect of practices. This questionnaire was used to pre-test the knowledge regarding diet, its importance,

gestational diabetes, its causes, risk factors, complications, management and importance of exercise. Nutrition counseling was imparted for the period of 3 months at every 15 days interval regarding gestational diabetes, its signs & symptoms, causes, risk factors, complications, management, dietary management and importance of exercise. Booklet containing all the above mentioned information along with food exchange lists, weekly sample menu was distributed among all the subjects. Special emphasis was given to make them aware of balanced diet, increased consumption of fibrous foods like fruits with peels, vegetables, whole grains and pulses and increased physical activity. Nutrition knowledge of the subjects was assessed by questionnaire based on knowledge, attitude and practice (KAP). After imparting nutritional counseling for a period of three months, the subject's knowledge regarding gestational diabetes and its dietary management was assessed using the same questionnaire. The post test was done to assess the gain in knowledge. Anthropometric measurement of newborn i.e. weight, crown heel length, head circumference, chest circumference, mid upper arm circumference were also recorded.

## **RESULTS AND DISCUSSION**

General information of the subjects in the present study revealed that 70 and 83.3 percent of the subjects were in the age group of 20-30 years, while 30 and 16.7 percent of the subjects were in the age group of 31-40 years in group E and C respectively. It was found that majority of subjects i.e. 56.6 percent were belonged to Hindu religion, 36.7 percent belonged to Sikh religion and only 6.7 percent belonged to Muslim religion in group E. The subjects belonged to Hindu, Sikh and Muslim religion was 43.3, 53.3 and 3.4 percent in group C respectively. It was observed that

10 percent of the subjects were studied up to high school in group E and none in group C, while 13.3 and 13.3 percent of the subjects up to higher secondary, 36.7 and 36.7 percent of the subjects were graduate and 40 and 50 percent of the subjects were post graduate in group E and C respectively. Majority of subjects i.e. 83.3 and 76.7 percent belonged to joint families in group E and C respectively. Percentage of subjects who belonged to nuclear families was 16.7 and 23.3 percent in group E and C respectively. Further it was found that 16.7 and 23.3 percent of the subjects belonged to families having 2-4 members and 66.6 and 66.7 percent of subjects were in the category of 4-8 members in group E and C respectively. Rest of the subjects i.e. 16.7 and 10 percent had above eight members in their families in group E and C respectively (Table 1).

### **Family history of the subjects**

The family history of the subjects is given in Table 2. Majority of the subjects i.e. 93.3 and 90 percent had family history of diabetes, only 6.7 and 10 percent of the subjects had no family history of diabetes in group E and C respectively. 42.9 and 37 percent of the subjects whose mother was suffering from diabetes, whereas none of the subject and 14.81 percent of the subjects whose father was suffering from diabetes in group E and C respectively. 21.4 and 25.9 percent of subjects whose grandparents were suffering from diabetes. 14.3 and 11.1 percent of the subjects whose mother-in-law was suffering from diabetes, whereas 3.57 percent of the subjects whose father-in-law was suffering from diabetes in group E and none of the subject in group C. 17.9 and 11.1 percent of subjects whose grandparents-in-law were suffering from diabetes. The data revealed that 66.7 and 73.3 percent of the subjects diagnosed disease in 5<sup>th</sup> month, 33.3 and 26.7 percent of the subjects diagnosed

disease in 6<sup>th</sup> month in group E and C respectively. All the patients were on diet control i.e. 100 percent means no patient was taking any medicine for gestational diabetes.

**Table 1: General information of the subjects**

Parameters	Group E (n=30)	Group C (n=30)
Age		
20-30	21 (70)	25 (83.3)
31-40	9 (30)	5 (16.7)
Religion		
Hindu	17 (56.6)	13 (43.3)
Sikh	11 (36.7)	16 (53.3)
Muslim	2 (6.7)	1 (3.4)
Education		
High school	3 (10)	-
Higher secondary	4 (13.3)	4 (13.3)
Graduate	11 (36.7)	11 (36.7)
Post graduate	12 (40)	15 (50)
Family type		
Nuclear	5 (16.7)	7 (23.3)
Joint	25 (83.3)	23 (76.7)
Family size		
2-4	5 (16.7)	7 (23.3)
4-8	20 (66.6)	20 (66.7)
>8	5 (16.7)	3 (10)

Figures in parenthesis indicate percentages  
n = number of subjects in each group

**Table 2: Family history of diabetes of the subjects**

Particulars	Group E (n=30)	Group C (n=30)
Family history		
Yes	28 (93.3)	27 (90)
No	2 (6.7)	3 (10)
If yes then		
Mother	12 (42.9)	10 (37)
Father	-	4 (14.8)
Grand parents	6 (21.4)	7 (25.9)
Mother-in law	4 (14.3)	3 (11.1)
Father-in-law	1 (3.6)	-
Grand parents-in-law	5 (17.9)	3 (11.1)
Diagnose of disease		
5 <sup>th</sup> month	20 (66.7)	22 (73.3)
6 <sup>th</sup> month	10 (33.3)	8 (26.7)
Medicines		
Yes	-	-
No	30 (100)	30 (100)

Figures in parenthesis indicate percentages  
n = number of subjects in each group

**Table 3: Complications of gestational diabetes**

Particulars	Group E (n=30)	Group C (n=30)
Complications		
Yes	5 (16.7)	14 (46.7)
No	25 (83.3)	16 (53.3)
Diseases		
High blood pressure	2 (40)	5 (35.7)
Eclampsia	2 (40)	3 (21.4)
Polyhydramnios	1 (20)	4 (28.6)
Intrauterine death	-	2 (14.3)

Figures in parenthesis indicate percentages  
n = number of subjects in each group

### Complications of the subjects

Complications of gestational diabetics and complications to the babies of gestational diabetic mothers are presented in Table 3 and 4 respectively. The present study revealed that 16.7 and 46.7 percent of the subjects were faced complications in group E and C at the time of delivery. It was further seen that, subjects i.e. 40 and 35.7 percent faced problem of high blood pressure, 40 and 21.4 percent faced problem of eclampsia, 20 and 28.6 percent faced polyhydramnios and none of the subject and 14.3 percent faced problem of intrauterine death in group E and C respectively (Table 3).

It was observed (Table 4) that 60 and 83.3 percent of babies of gestational diabetes subjects faced complications in group E and C at the time of birth. It was further seen that, subjects i.e. 16.7 and 20 percent faced problem of macrosomia, 38.9 and 36 percent faced problem of preterm birth, 11.1 and 12 percent faced problem of respiratory distress syndrome, 5.5 and 8 percent faced problem of low blood sugar, 27.8 and 24 percent faced problem of jaundice in group E and C respectively.

**Table 4: Complications to the babies of gestational diabetes**

Particulars	Group E (n=30)	Group C (n=30)
Complications		
Yes	18 (60)	25 (83.3)
No	12 (40)	5 (16.7)
Disease		
Macrosomia	3 (16.7)	5 (20)
Preterm birth	7 (38.9)	9 (36)
Respiratory distress syndrome	2 (11.1)	3 (12)
Low blood sugar	1 (5.6)	2 (8)
Jaundice	5 (27.8)	6 (24)

Figures in parenthesis indicate percentages  
n = number of subjects in each group

### Anthropometric profile of newborn of the subjects

Table 5 depicted that the mean weight of the newborn of subjects was 2500±1.0 g and 3500±1.0 g in group E and C respectively. The average weight of newborns is 2700-2800 by ICMR. Mean

crown heel length of the newborns of subjects was  $40\pm 2.5$  cm and  $48\pm 3.5$  cm in group E and C respectively. The average crown heel length of newborns is 47.4-48.5 by ICMR. Mean head circumference of the newborns of subjects was  $33\pm 2.5$  cm and  $37\pm 3.5$  in group E and C respectively. The average head circumference of newborns is 32.6-33.5 by ICMR. Mean chest circumference of the newborns of subjects was  $32\pm 1.5$  cm and  $35\pm 4.5$  in group E and C respectively. The average chest circumference of newborns is 30.2-33.5 by ICMR. Mean mid upper arm circumference of the newborns of subjects was  $12\pm 2.0$  cm and  $16\pm 3.0$  in group E and C respectively. The average mid upper arm circumference

of newborns is 12.0-12.2 by ICMR. Anupama and Dakshayani (2013) conducted the study on 200 newborn babies to determine the effect of common maternal illnesses like pregnancy induced hypertension, gestational diabetes mellitus and maternal anaemia on the anthropometric measurements of newborn babies in comparison to the babies born to healthy mothers showed a significant decrease in the anthropometric parameters in the newborns born to mothers with pregnancy induced hypertension and anaemia. There was a significant increase in the anthropometric parameters in babies born to mothers with gestational diabetes mellitus.

**Table 5: Anthropometric parameters of newborns of the subjects**

Variables	Group E (n=30)	Group C (n=30)	Standard values #
Weight (g)	$2500\pm 1.0$	$3500\pm 1.0$	2700-2800
Crown heel length (cm)	$40\pm 2.5$	$48\pm 3.5$	47.7-48.5
Head circumference (cm)	$33\pm 2.5$	$37\pm 3.5$	32.6-33.5
Chest circumference (cm)	$32\pm 1.5$	$35\pm 4.5$	30.2-33.5
Mid upper arm circumference (cm)	$12\pm 2.0$	$16\pm 3.0$	12.0-12.2

#: ICMR (1999)

n = number of subjects in each group

### Knowledge, attitude and practices of the subjects (KAP)

Table 6 presented that the mean knowledge scores of pre and post nutrition counseling were  $8.4\pm 2.9$  and  $8.7\pm 2.8$  and  $29\pm 1.8$  and  $9.9\pm 1.5$  in group E and C respectively. Regarding the attitude scores, mean scores of pre and post nutrition counseling were  $4.2\pm 0.9$  and  $4.1\pm 0.9$  and  $15.4\pm 0.9$  and  $6.4\pm 0.9$  in group E and C respectively. The mean practices scores were  $5.7\pm 0.7$  and  $5.8\pm 0.7$  and  $20.7\pm 0.6$  and  $7.9\pm 0.8$  in the subjects of group E and C before and after nutrition counseling respectively. Kaur and Chawla (2006) reported diet counseling imparted to the subjects, improve nutrition knowledge, attitude and practices test score. Srivastava *et al* (2007) reported that nutrition counseling is effective in improving blood

profile as well as nutrition and disease related knowledge of subjects by increasing intake of balance diet and physical activity. It was observed that majority of the subjects i.e. 66.7 percent obtained knowledge scores <10, followed by 33.3 percent who obtained 10-20 before (pre-test) nutrition counseling in group E. After nutrition (post-test) counseling all the subjects obtained knowledge score, between 20-30 in group E. However, less change was observed in group C before and after nutrition counseling. Regarding the attitude scores, it was found that 66.7, 33.3 percent of the subjects obtained scores between 0-10, 10-20 and none of the subject obtained scores between 20-30 in group E before nutrition counseling. After nutrition counseling all the subjects obtained scores between 10-20 in group E, while less change was observed in



group in C. Regarding the practices scores, present stud indicates that 46.7, 53.3 percent of the subjects obtained scores between 0-10, 10-20 respectively and none of the subject obtain scores between 20-30 in

group E before nutrition counseling. After nutrition counseling corresponding values were 16.7, 83.3 percent of the subject in group E, while less change was observed in group C. (Table 7)

**Table 6: Gain in KAP scores obtained by the subjects before and after nutrition counseling**

Parameters	Group E (n=30)					Group C (n=30)				
	Pre test	Post test	Paired t-value	Gain in score	Quantum of improvement	Pre test	Post test	Paired t-value	Gain in score	Quantum of improvement
Knowledge	8.4±2.9	29±1.8	15.56*	20.6	3.44	8.7±2.8	9.9±1.5	1.45 <sup>NS</sup>	1.2	1.14
Attitude	4.2±0.9	15.4±0.9	11.65**	11.2	3.69	4.1±0.9	6.4±0.9	1.53 <sup>NS</sup>	1.4	1.29
Practices	5.7±0.7	20.7±0.6	13.98*	15	3.63	5.8±0.7	7.9±0.8	1.54 <sup>NS</sup>	2.1	1.36
KAP score	18.4±1.5	65.1±1.1	19.65*	46.8	3.55	19.5±1.5	24.1±2.4	1.89 <sup>NS</sup>	4.7	1.24

<sup>NS</sup>: Non significant

\*: Significant at 1%

\*\* : Significant at 5%

**Table 7: Distribution of KAP scores obtained by the subjects before and after nutrition counseling**

Parameters	Group E (n=30)		Group C (n=30)	
	Before	After	Before	After
Knowledge				
0-10	20 (66.7)	-	25 (83.3)	26 (86.7)
10-20	10 (33.3)	-	5 (16.7)	4 (13.3)
20-30	-	30(100)	-	-
30-40	-	-	-	-
Attitude				
0-10	20 (66.7)	-	15 (50)	16 (53.3)
10-20	10 (33.3)	30(100)	15 (50)	14 (46.7)
20-30	-	-	-	-
Practices				
0-10	15 (46.7)	5(16.7)	10 (33.3)	12 (40)
10-20	15 (53.3)	25(83.3)	20 (66.7)	18 (60)
20-30	-	-	-	-

Figures in parenthesis indicate percentages  
n = number of subjects in each group

## SUMMARY AND CONCLUSION

The results of the present study suggest that nutrition counseling is effective in improving fetal outcome and KAP score of gestational diabetics. Fetal outcome of experimental group faced less complications like macrosomia, preterm birth, respiratory distress syndrome, low birth sugar and jaundice, as compare to control group. Anthropometric measurements of newborns were within range in group E, while in group C measurements were not within range. Nutrition counseling improved actual practices followed by the gestational diabetics. Hence it can be inferred from the study that nutrition counseling can be an effective measure for brining favorable and significant changes in the fetal outcome as

well as KAP score of the gestational diabetics.

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