

## Original Article:

## Compliance to dietary counseling provided to patients with type 2 diabetes at a tertiary care hospital

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**Abstract:**

**Objectives:** To observe the compliance to dietary counseling by trained dietitians provided to subjects with type 2 diabetes at a tertiary care hospital. **Method:** Compliance to dietary counseling of 72 type 2 diabetics attending BIDE was assessed through comparison of food habits at first and second visit (made after three months). Compliance was indicated by decrease in number of dietary modifications needed in diet at second visit as compared to that at first visit. **Results:** Fifty percent of the subjects were males. Mean age of the subjects was 52.3 ±10.7 years. On the first visit 66.7% had very inadequate and 29.2 % had poor diets while at 2nd visit only 19.4% had very inadequate and 1.4 % had poor diet. Overall compliance to dietary counseling was very good by 19.4% good by 37.5%, fair by 33.3% and poor by 9.7 % of the subjects. Diet quality improved for 94.5% of subjects. **Conclusion:** Compliance rates were sufficiently high to bring positive changes in diets of people with diabetes. Universal availability of dietary counseling to diabetics has potential to improve patients' diet and thus can contribute to controlling diabetes complications rate

**Keywords:** type 2 diabetes, dietary compliance, dietary counseling.

**Introduction:**

Diabetes mellitus needs therapeutic control generally involving strict, rigorous and permanent lifestyle changes that include dietary interventions, physical activity, strict medication regimes and good metabolic control [1]. Nutrition therapy is essential for the treatment of diabetes and it is well recognized as a keystone of management in patients who have diabetes [2].

Dietary adjustments are an integral part of the management of diabetes. Persons having diabetes often need personal guidance so as to enrich their knowledge and thus aid suitable selection of foods and intake of balanced diet [1]. The goal of dietary counseling for diabetes management is to is found to be helpful in improving the diets in affluent countries having high rates of literacy, easily available information about food compositions and a wide range of food choices. The impact of such guidance needs also to be evaluated in a variety of settings because compliance to various dietary suggestions may differ according to type of recipients. Such assessments could help in determining the areas needing focus during dietary guidance in particular kind of population.

Though there is considerable evidence about health related benefits of lifestyle modifications for people with type-2 diabetes, it has often been observed that compliance to lifestyle related recommendations is not satisfactory among South Asians [3-5]. In order to be effective dietary guidance always needs to be tailored to suit the patient's lifestyle, specific therapeutic goals and level of motivation. To promote compliance, sensitivity to cultural, ethnic and financial constraints is of prime importance. [6,7]. However lack of relevant data has been pointed out as a constraint in assessing the effectiveness of guidance and

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understanding the reasons for non compliance. In low resource communities where services of the dietitians are available to only a minority of people with diabetes it is important to make attempts to enhance the cost-effectiveness of these services by monitoring and evaluating the impact of dietary guidance on the diet and health of people with diabetes[8-10].

It is hypothesized that "Appropriate dietary counseling given by trained dietitian can improve dietary compliance in type 2 diabetes"

In this study we assessed the compliance to dietary counseling given by dietitians in a tertiary care setting. This assessment could help in exploring the usefulness of dietary counseling, barriers to compliance and in exploring strategies for more effective dietary guidance.

#### **Methods:**

Setting: In Pakistan professional dietary guidance is not available to a vast majority of people with diabetes. Individual dietetic guidance is not provided in most public and private diabetes clinics. In a few private hospitals, where it is provided, the costs are high and only very affluent people use these services. Baqai Institute of Diabetology & Endocrinology (BIDE) is one of the rare institute where professional and individual dietary guidance is provided without extra costs to all the patients consulting the physicians. Subjects for this study were recruited from the OPD of BIDE after taking informed consent. Overall the patients represent middle income group. Data for 1<sup>st</sup> visit was collected from 201 type 2 diabetics consecutively who made their 1<sup>st</sup> visit to BIDE OPD between May 2004 to July 2004. For second visit data was collected from those patients had been enrolled in the study in first phase and made second visit to BIDE OPD from August to November 04. As only 72 out of original 201 patients made the second visit during this period the compliance rate was assessed only for 72 patients and all the results presented in this paper are based on data collected from these 72 patients at first and second visit.

From the data available for initial cohort of 201 subjects, characteristics of patients who came or did not come for follow up visit were compared. It was revealed that the two groups did not differ significantly in mean age or proportion of males and females.

#### **Data collection:**

Information about clinical profile including height and weight; and about dietary habits was recorded at first visit to BIDE. Dietary guidance was provided as usual by qualified and the researcher who was an experienced dietitian. Special data collection forms were designed to for recording of demographic, clinical and dietary data by the researcher at first and second visit. Participants were asked to keep informal record of their diet to support their verbal reports at 2<sup>nd</sup> visit. Each new registrant at BIDE is scheduled to make a follow up visit after three months period. The subjects were contacted again after 3 months during usual follow up visit that were made with or without reminding phone calls.

The usual dietary counseling being given at BIDE aims at bringing the subject's diet closer to dietary recommendations given by American Diabetic Association for type 2 diabetics in its guidelines [11]. Dietitians do this by assessing the diet and other relevant characteristics of the subject and giving individualized guidance to each subject as needed so as to bring their nutrient intake closer to ADA recommendations. For example in order to increase calcium intake milk intake at bedtime is suggested to those patients whose diet appear to be deficient in calcium and to whom taking milk at bedtime is acceptable. Thus recommendations in food intake made to subjects of this study are not universal dietary recommendation but are the ones that were needed by at least some members of this particular group in order to improve their diets.

Understandably the patients having inadequate or inappropriate diets need a greater number of modifications in food intake to make their diet adequate. To develop a criteria for assessing diet quality and compliance rates, on the basis of observations of modifications usually required by similar patients at BIDE, the maximum possible variety of modifications (n=23) was estimated. Numbers of modifications needed in a patient's diet were calculated at both initial and follow-up visit. Patients were categorized as having relatively good, adequate diet, very inadequate diet or poor diet on the basis of range of dietary modifications required. Diets requiring 1-6, 7-12, 13-18, or >18 modifications were labeled as being good, adequate diet, very inadequate diet and poor diets respectively. Diet quality was

assessed at both visits. Substantial decrease in number of dietary modification needed at 2<sup>nd</sup> visit (shifting the subject from one quartile to another) indicated improvement in diet quality.

Compliance to dietary counseling was also assessed on the basis of difference in the number of dietary modifications required at first and second visit. Decrease in number of modification needed at second visit indicated compliance to dietary recommendations.

At the follow-up visit a few additional questions were asked to assess the reasons for non compliance to particular dietary modifications.

### Data entry and analysis

Data was entered on SPSS 10 for analysis. Paired sample t-test was conducted to assess statistical significance of differences in number of dietary modifications needed at 1<sup>st</sup> and 2<sup>nd</sup> visit by the subjects. Chi-Square test was conducted to assess statistical significance of differences in proportion of subjects having good or poor diets at 1<sup>st</sup> and second visit.

**Table 1: Age and sex of the subjects.**

| Age                | Sex of the patient |        |       |
|--------------------|--------------------|--------|-------|
|                    | Male               | Female | Total |
| Mean               | 53                 | 52     | 53    |
| Maximum            | 74                 | 75     | 75    |
| Minimum            | 22                 | 35     | 22    |
| Count              | 36                 | 36     | 72    |
| Standard Deviation | 12                 | 9      | 10    |

**Table 2: Dietary modifications needed at first and second visit in subjects diets**

| Number of Changes needed | Visit     |           |
|--------------------------|-----------|-----------|
|                          | 1st visit | 2nd visit |
| Mean                     | 16        | 8         |
| Maximum                  | 21        | 13        |
| Minimum                  | 10        | 2         |

### Results:

Age and sex distribution of subjects is given in table 1. A total of 72 patients were studied. Out of these 50% were females and 50% were males. Mean age of male and female subjects was 53 ±12 and 52 ±9 years respectively. Majority of the patients were Urdu-speaking (63.9%), next higher proportion was of Punjabis-speaking (15.9 %) and Sindhi-speaking and Pushto-speaking were 8.3% each.

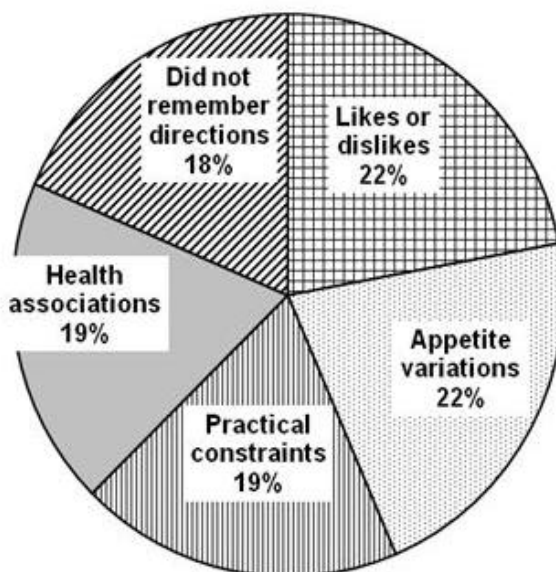
Compliance to dietary counseling was assessed by comparing number of dietary modifications needed at 1<sup>st</sup> and 2<sup>nd</sup> visit. Mean number dietary modifications needed at 1<sup>st</sup> and 2<sup>nd</sup> visit were 16 and 8 respectively (**table 2**). Details of type of dietary modifications suggested and rate of compliance to specific suggestions are given **table 3**.

To explore the statistical significance of the association in number of dietary modification needed at 1<sup>st</sup> and 2<sup>nd</sup> visit by the subjects paired sample ttest was done. There was significant negative correlation between number of dietary modifications needed at 1<sup>st</sup> and 2<sup>nd</sup> visit  $r=-0.149$   $P<0.001$ .

Level of compliance was assessed by grouping subjects in quartiles according to percentage of dietary suggestion followed. A small proportion (9.7%) had poor compliance, 33.3% had fair compliance, 37.5% had good compliance and 19.4% had very good compliance.

Reasons for non compliance are presented in (figure 1).

**Figure 1: Reasons for non compliance**



**Table 3: Need for various types of modifications in subjects diets and rate of compliance to those modifications.**

| S.No | Dietary Modifications Suggested (n= 72).                  | Subjects who needed modifications |       | Subjects who complied to modifications |       |
|------|---|-----------------------------------|-------|--|-------|
|      |   | n                                 | (%)   | n                                      | (%)   |
| 1    | Take appropriate amount and type of CHO at Breakfast      | 46                                | 63.89 | 27                                     | 59.38 |
| 2    | Include Animal Protein in Breakfast                       | 68                                | 94.44 | 21                                     | 30.85 |
| 3    | Include cooked Vegetable in Breakfast                     | 66                                | 91.67 | 50                                     | 75    |
| 4    | Include Plant Protein in Breakfast                        | 68                                | 94.44 | 25                                     | 36.17 |
| 5    | Avoid Sugar (in tea) at Breakfast                         | 13                                | 18.06 | 13                                     | 100   |
| 6    | Take fresh vegetables (salad) at Lunch                    | 67                                | 93.06 | 34                                     | 50.54 |
| 7    | Include Cooked Vegetable in Lunch                         | 30                                | 41.67 | 8                                      | 26.19 |
| 8    | Include Plant Protein in Lunch                            | 33                                | 45.83 | 16                                     | 47.83 |
| 9    | Take appropriate amount and type of CHO at Midmorning     | 64                                | 88.89 | 37                                     | 58.43 |
| 11   | Take appropriate amount and type of CHO at Lunch          | 37                                | 51.38 | 20                                     | 54.05 |
| 12   | Take appropriate amount and type of CHO at Teatime        | 62                                | 86.11 | 37                                     | 60.47 |
| 13   | Include Cooked Vegetable intake at Dinner                 | 29                                | 40.28 | 29                                     | 100   |
| 14   | Include Plant Protein at Dinner                           | 28                                | 38.89 | 20                                     | 71.79 |
| 15   | Include Animal Protein at Dinner                          | 18                                | 25    | 14                                     | 80.00 |
| 19   | Take fresh vegetables (salad) at Dinner                   | 67                                | 93.06 | 37                                     | 54.84 |
| 17   | Take appropriate amount and type of CHO at Dinner         | 50                                | 69.44 | 27                                     | 53.62 |
| 18   | Take low Bedtime Snack                                    | 50                                | 69.44 | 28                                     | 56.52 |
| 16   | Include PUFA/MUFA containing fats in diet                 | 67                                | 93.06 | 29                                     | 43.01 |
| 22   | Decrease Quantity of Fat Consumed                         | 52                                | 72.22 | 51                                     | 98.61 |
| 21   | Include Soluble fiber in diet                             | 72                                | 100   | 51                                     | 71.00 |
| 20   | Take slow low glycemic index drink (e.g. Milk) at Bedtime | 52                                | 72.22 | 16                                     | 30.56 |
| 23   | Include Appropriate amount of Fruits in daily diet        | 50                                | 69.44 | 50                                     | 100   |

Most of the subjects did not give any specific reason for non compliance to particular dietary recommendations and thus the number was not enough for summarizing reasons for non-compliance to each recommendation separately. A total of 227 comments regarding non-compliance to various recommendations were available for analysis. The comments were categorized in five groups according to type of reason. All those comments that mentioned

non-compliance due to perceived effect of food on health were grouped as 'health associations'. Lack of financial resources and difficulty in buying or cooking were grouped as 'practical constraints'.

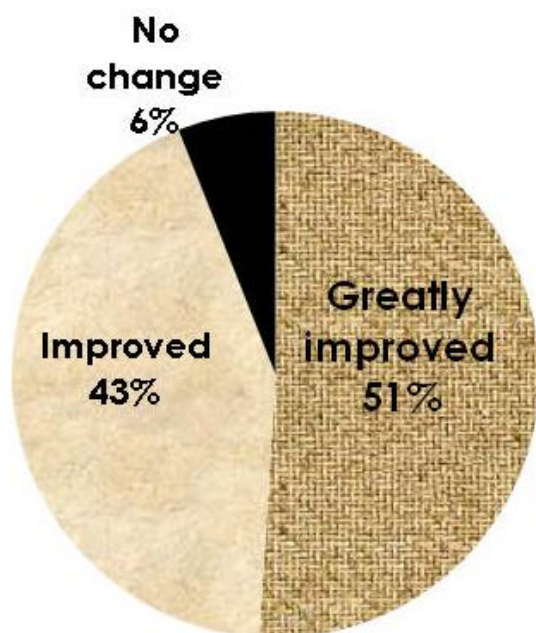
Variations in quality of subjects' diets of at 1<sup>st</sup> and 2<sup>nd</sup> visit are given in table 4.

Table 4: Quality of patients' diets at first and second visits

| Diet Quality       | Diet quality at first visit |             | Diet quality at second visit |             |
|--------------------|-----------------------------|-------------|------------------------------|-------------|
|                    | Numbers                     | Percentages | Numbers                      | Percentages |
| Adequate           | 0                           | 0           | 31                           | 43.1        |
| Partially Adequate | 3                           | 4.2         | 26                           | 36.1        |
| Inadequate         | 48                          | 66.7        | 14                           | 19.4        |
| Very Inadequate    | 21                          | 29.2        | 1                            | 1.4         |

At first visit, none of the patient had good diet and 29.2 % of patient had poor diet. At 2<sup>nd</sup> visit 43.1% had good diet and only 1.4 % of patient had poor diet. Differences in proportion of subjects having various diet qualities at first and second visit was assessed through chi-square test and were found to be statistically significant ( $P < 0.001$ ). In terms of improvement of diets at individual level transition in category of diet quality was assessed. At second visit a small proportion (5.6%) of patients remained in the same category of diet quality (termed no change), 43.1% of the patient moved to next higher diet quality category (termed improved) and 51.4 % of the patients moved up two categories (termed greatly improved) (Figure 2).

Figure 2: Improvement in diet quality at 2nd visit



#### Discussion:

In this study we have examined the compliance rate of nutrition therapy provided

at a tertiary care setting to type 2 diabetics and also tried to explore the reasons for non compliance. Though this study is limited in scope and did not have the ideal methodological rigor required for such studies, the findings nevertheless are very valuable as no such study has ever been reported from this area. It documents the efficacy of dietary guidance, provides advocacy for provision of professional dietary guidance to all the people with diabetes in Pakistan, and identifies the difficulty to bring about change dietary habits.

This study provides valuable evidence that dietary advice given by a professional dietitian is effective in modifying dietary behavior; and thus has a great potential for influencing the outcome of treatment. These observations have been reported from several large and small studies from developed countries but rarely from low resource countries like Pakistan [12]. Observations of South Asian people living in developed countries manifest that they have relatively poorer compliance rates than indigenous people [3-5]. The positive impact of dietary guidance observed in this study has implications for health policy makers of South Asia as well as of developed countries where South Asians are living. The positive impact of dietary guidance evidenced here indicates that even among those populations or subgroups of populations where behavior change is expected to be difficult, understanding of the subjects, sensitivity to their circumstances and professional competence to explore and suggest acceptable and beneficial dietary modifications results in a clearly positive impact on quality of diet of subjects [13]. Due to lack of standardized healthcare services and availability of authentic records conducting a randomized controlled trial for assessing efficacy of dietary guidance in local settings or estimating its cost

effectiveness are challenging tasks; however attempts in this direction are desperately needed [14]. The authors of this study feel that this study is a very small but a very important step in this direction.

This study provides valuable information to diabetes healthcare professionals about food habits of local people and thus would assist them in providing culture and area specific dietary guidance. It is observed in this study (table 2) that diets of majority of people need inclusion of fruit and vegetables, low-fat-milk, fiber and protein rich foods, reduction in intake of total fat, saturated fat and refined carbohydrates and need better distribution of carbohydrates to make their diets adequate. These observations are important health care messages to be considered by health care physicians. Similarly findings regarding reasons for non-compliance highlight the need for better and more specific dietary guidance as well as education of people with diabetes. For example appropriate diabetes education could clarify many inappropriate assumptions about food-health relationships, enhance level of motivation and encourage self management. Better understandings of dietary issues could broaden the spectrum of food choices for persons with diabetes and thus promote compliance. Further research work is needed to enhance our understanding of reasons for patients' non-compliance to dietary counseling. However at current level of non-compliance dietary guidance is found to be effective in this study and this observation makes the case strong for 1) provision of free/ low cost diet counseling service to all the people with diabetes even among low resource communities and 2) promoting education and training of dietitians so as to assure availability of dietitians for all the people with diabetes, and 3) regulating the professional status of dietitians with the healthcare settings so as to ensure optimum utilization of their services.

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