



## RECENT TRENDS IN NUTRITIONAL SCIENCE FOR DIABETES MELLITUS CONTROL

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### ABSTRACT

Diabetes mellitus (DM) adversely affects health & life. DM is a life style disorder aggravated by nutritional imbalance, lack of exercise and absence of focused approach. The objectives of the present study were therefore, to prepare a holistic nutrition education package (HNEP) for DM and to use it to assess its impact in DM control in a group of middle aged women (MAW). An HNEP for DM was designed. From a larger group of diabetic MAW, a study sample of 70 with non insulin dependent diabetes (NIDDM) and having Glycosylated hemoglobin (HbA1c) more than 7 was formed. Data about dietary practices, exercise, BMI, focused approach was collected before and after HNEP administration. Education session was repeated fortnightly for six months. HbA1c levels were reassessed at 4 months and 6 months. Assessment at the end of 6 months revealed that adoption of breakfast + lunch + snacks + dinner pattern was 7.14% before and 84.29% after the HNEP. Lunch + dinner pattern was 58.57% before which shifted to 4.29% after HNEP showing significant positive change in healthy dietary practices. Food intake as per Recommended Dietary Allowances (RDA) improved from 21.43% to 95.71% and fatty food consumption decreased from 91.43% to 14.29% whereas roughage food consumption increased from 15.71% to 90.00%. Regular exercise regime adoption improved from 7.14% to 56.71% due to HNEP. BMI assessment showed significant reduction in overweight category from 51.43% to 22.86% and normal weight category had positive shift from 12.86% to 48.57%. Blood test for HbA1c level revealed that 22.86% respondents achieved < 7 level at the end of 4 months and 72.86% achieved < 7 level at the end of 6 months of HNEP application. DM was perceived as a nutrition related disorder and not a disease by 100% respondents and 100% respondents agreed that the trio of diet + exercise + determination is the main determinant of diabetes control. HNEP has a positive, wide ranging and sustainable impact in DM control.

**Keywords** – Diabetes, Nutritional Education, Recent trends, Nutritional science

### INTRODUCTION -

Diabetes Mellitus (DM) is a life style disorder increasing alarmingly in men as well as women. India is emerging as the capital of diabetes in the world. DM adversely affects mainly health, working capacity and family budget. DM though genetically linked is precipitated & aggravated by factors like improper nutrition, lack of exercise, ignorance & mis-concepts. DM is actually a nutrition related disorder to a great extent. 50 to 60 % diabetics do not achieve the glycemic control target of HbA1C below 7 percent.<sup>(1)</sup> This is probably because, firstly, diabetics consider DM as a disease & hence give more importance to medicine induced blood glucose control than nutrition induced DM control. Secondly, diabetics are not aware of the role of diet / food in DM control. Nutritionists acting synergistically with health professionals can educate & guide diabetics and supervise their DM control. Appropriate nutritional modifications can help a diabetic in learning to achieve self control, thereby increasing his / her capacity to manage DM. The present study was therefore aimed at creating a holistic nutrition education package (HNEP) & assessing its impact on DM control in middle aged women (MAW) in the age group of 35 – 45 years.

### OBJECTIVES:

- 1) To prepare a holistic nutrition education package (HNEP) for diabetes mellitus (DM).
- 2) To assess its efficacy in middle aged (35-45 yrs) diabetic women.

### METHODOLOGY:

Holistic nutrition education package (HNEP) in the form of small book was prepared in regional Marathi language. It combined nutrition education in DM along with emphasis on strong will necessary for a diabetic and physical exercise helpful for a diabetic. HNEP included self explanatory diagrams, tables, quotations and answers to frequently asked questions.

From a large group of diabetic middle aged women (MAW), visiting the nutrition consultancy clinic, a study sample of 70 with non insulin dependent diabetic (NIDDM) and having glycosylated hemoglobin (HbA1c) more than 7 was formed for the study. Diet higher in fat and lower in carbohydrate was associated with worse HbA1c levels.<sup>3</sup> Data related to dietary practices, food intake, type of food, exercise pattern, BMI, HbA1c levels, focused approach etc was recorded 'before and after' application of HNEP.

A pilot study was conducted and then HNEP was applied on a study group. A copy of HNEP was given to each respondent. Interactive education sessions were undertaken previously. Power point presentation format

using a laptop was used in follow up sessions of small groups. Length of the study was for the duration of 6 months. Reevaluation of HbA1c levels was done at 4 months of the study. The primarily assessed parameters mentioned above were reassessed at the end of six months.

**RESULTS AND DISCUSSIONS:**

**Table 1 : Dietary Practices**

| Dietary pattern | Before HNEP |       | After HNEP |       |
|-----------------|-------------|-------|------------|-------|
|                 | No.         | %     | No.        | %     |
| L + D           | 41          | 58.57 | 03         | 4.29  |
| B + L + D       | 11          | 15.71 | 04         | 5.71  |
| B + L + S + D   | 05          | 07.14 | 59         | 84.29 |
| L + S + D       | 13          | 18.57 | 04         | 05.71 |

(B – Breakfast; L – Lunch; S – Snack; D – Dinner)

Adoption of breakfast + lunch + snacks + dinner (B+L+S+D) pattern was 07.14% before & 84.29% after the HNEP application. Lunch + Dinner (L+D) pattern was 58.57% before HNEP which shifted to 04.29% after HNEP application showing significant positive change in healthy dietary practices.

**Table 2 : Dietary intake as per RDA**

| Before HNEP |       | After HNEP |       |
|-------------|-------|------------|-------|
| No.         | %     | No.        | %     |
| 15          | 21.43 | 67         | 95.71 |

Dietary intake as per recommended dietary allowances (RDA) improved from 21.43% before HNEP to 95.71% after HNEP application.

Determined and positive mental drive necessary for diabetics was stressed upon in the HNEP & diabetics were encouraged to practice the same. It probably resulted in the better dietary intake as per RDA, by the respondents.

**Table 3 : Type of food**

| Type          | Before HNEP |       | After HNEP |       |
|---------------|-------------|-------|------------|-------|
|               | No.         | %     | No.        | %     |
| Fat rich      | 64          | 91.43 | 10         | 14.29 |
| Roughage rich | 11          | 15.71 | 63         | 90.00 |

Table 3 reveals that, consumption of fat rich food, which was as high as 91.43% before HNEP decreased to 14.29% after HNEP application. The respondents of the study had low intake (15.71%) of roughage rich food before HNEP. Application of HNEP resulted in 90.00% respondents consuming roughage rich food. Consumption of roughage rich diet helps

diabetics in prevention of unhealthy weight gain which is detrimental for them.

Regular exercise regime was followed by only 05 respondents (7.14%) before HNEP application. The knowledge and determination gained because of the HNEP, helped 46 respondents (65.71%) adopt regular exercise regime. Regular exercise helps in many ways. Firstly it reduces body fat. Secondly it increases number of insulin receptors as well as their level of activity. Thirdly, regular exercise results in consumption of blood glucose.

**Table 4 : Body Mass Index (BMI)**

| BMI          | Before HNEP |       | After HNEP |       |
|--------------|-------------|-------|------------|-------|
|              | No.         | %     | No.        | %     |
| Normal       | 09          | 12.86 | 34         | 48.57 |
| Under weight | 06          | 08.57 | 07         | 10.00 |
| Over weight  | 36          | 51.43 | 16         | 22.86 |
| Obese        | 19          | 27.14 | 13         | 15.57 |

BMI assessment among the respondents showed significant reduction in overweight category from 51.43% to 22.86% because of HNEP application. Percentage of obese respondents decreased from 27.14% to 15.57% as a result of HNEP. Normal BMI was achieved by as many as 48.57% respondents because of HNEP application, which is a significant when compared to only 12.86% respondents were having normal BMI before HNEP.

**Table 5 : Glycosylated hemoglobin HbA1c**

| HbA1c | Before HNEP |     | After HNEP |       |           |       |
|-------|-------------|-----|------------|-------|-----------|-------|
|       |             |     | 04 months  |       | 06 months |       |
|       | No          | %   | No         | %     | No        | %     |
| ≥ 7   | 70          | 100 | 54         | 77.14 | 19        | 27.14 |
| < 7   | 00          | 00  | 16         | 22.86 | 51        | 72.86 |

Table 5 reveals that blood tests for HbA1c showed marked improved as a result of HNEP application. As per the study design, all (100%) respondents had ≥ 7 HbA1c level at the initial stage. When HbA1c levels were assessed 4 months after HNEP application; 16 respondents (22.86%) had achieved HbA1c level of < 7 indicating good DM control. At the stage of 06 months after HNEP application 51 respondents (72.86%) achieved HbA1c level of < 7, while 19 respondents (27.14%) continued to have ≥ 7 HbA1c.

The study also revealed that 6 months after HNEP application; 58(82.86%) respondents

realized importance of exercise. DM was perceived as a nutrition related disorder & not a disease by 100% respondents. All the respondents (100%) agreed that the trio of diet + exercise + determination is the main determinant of DM control. Statistical co-relationship between HNEP & DM control showed significant co-relation for Dietary practices (0.1273), Dietary intake (0.1452) & BMI (0.0843) at 0.05 level of significance. Holistic Nutritional Education Package (HNEP) application has a positive, wide ranging and sustainable impact on DM control.

**CONCLUSIONS:**

HNEP has a positive, wide ranging and sustainable impact in DM control. HNEP, being holistic, enables diabetics in self help for DM control. Because of HNEP, diabetics get to know the concept & nature of DM as a disorder; the relationship between diet & DM control; role of exercise & DM control; role that a determined mind of a diabetic can play in sustained improvement in and maintenance of DM control etc. Newer trends in Nutritional science can benefit diabetic persons. HNE can be an effective tool in Nutrition science.

**IMPLICATIONS:**

Diabetes mellitus, being a nutrition related disorder, can be more effectively managed for longer term if health care professionals & nutrition consultants act synergistically for the benefit of diabetic persons. Holistic nutrition education is a recent scientific trend for nutritionists in extension education activity for the masses in control of diabetes – an NCD.

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