CHAPTER VI
DISCUSSION

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CHAPTER VI
DISCUSSION

6.1. Introduction

This chapter presents a brief summary of the study undertaken and major findings derived for it. The present study was aimed at analyzing the role of lifestyle changes in the development and management of type 2 Diabetes Mellitus in Kerala through the Homoeopathic approach.

The objectives of the study were as follows:

- To find out the efficacy of Homoeopathic medicines in the management of Type 2 Diabetes Mellitus.
- To evaluate the relevance of lifestyle as an adjunct to Homoeopathic medicine in the management of Type 2 Diabetes Mellitus.
- To analyse the role of dietary changes in the development of Type 2 Diabetes Mellitus.
- To ascertain the impact of lack of exercise in the development of Type 2 Diabetes Mellitus.
- To study the influence of stress in the development of Type 2 Diabetes Mellitus.
- To study the relevance of positive family history in the development of Type 2 Diabetes Mellitus.
Discussion

The hypothesis of the study was that the lifestyle changes as an adjunct to Homoeopathic medicine are quite effective in the management of Type 2 Diabetes Mellitus.

6.2. Brief Summary of the Study

The investigator has adopted survey, co-relational and an experimental research designs for the study. Cross sectional survey design was used to analyse the role of lifestyle changes in the development of Type 2 Diabetes Mellitus in Kerala. Experimental study was used to analyse the role of lifestyle changes in the management of Type 2 Diabetes Mellitus. Formal experimental design was adopted with control group. Single blind experiment was designed for the study.

The people of Kottayam and Ernakulam districts of the Kerala state constitute the population for the present study. Those who satisfied the diagnostic criteria for Diabetes Mellitus according to World Health Organization (FBS >126mg/dl and PPBS >200mg/dl), irrespective of sex and come under the age group of 25 -65years were included in the experimental study. Type I Diabetes Mellitus, Secondary Diabetes Mellitus, FBS > 200 mg/dl, PPBS above 300 mg/dl, HbA1C above 9, cases with complications and Diabetes with more than 10 years of duration were excluded from the study. Those who come under the age group of 25-65years were included in the cross sectional survey.
Discussion

From the different sampling techniques, the investigator selected a stratified random sampling technique for the Cross sectional survey. The sample size was 1000. They were selected randomly from each homogenous group. Thus the sample so selected will be the true representative of the entire population, chosen for the study.

A simple random sampling was selected for the experimental study. Two-group simple randomized design was adopted in the present study. In this form, initially, all the population is defined and then from the population, a sample was selected randomly. The investigator selected 100 diabetic patients as ‘control group’ by simple random method and 100 diabetic patients as ‘test’ or ‘experimental group’ by the same method.

Data were gathered from both primary and secondary sources. A Standardized questionnaire was prepared for the Cross sectional survey and a standard proforma was prepared for the Experimental study. The data were analyzed, on the basis of the objectives and hypothesis, using descriptive and inferential statistics.

6.3. Major Findings

6.3.1. Cross Sectional Survey

Cross sectional survey design was used to analyse the role of lifestyle changes in the development of type 2 diabetes mellitus. Those who came
under the age group of 25-65 years, irrespective of sex, were included in the survey. The sample size was 1000.

Non parametric test form of independence of samples from a population-Chi-square test – at 1 per cent level of significance was administered to know the significance of lifestyle changes in the development of type 2 diabetes mellitus.

Out of 1000 studied, 326 were diabetic (32.6%). The descriptive study of age shows that 6.44% were between the age group of 25-35, 16.87% were between 35-45, 37.73% were between 45-55 and 38.95% were between the age group of 55-65. The chi-square test results show that age is not significant in the development of type 2 diabetes mellitus. Only those who came under the age group of 25-65 yrs (high risk group) were included in the survey.

Out of 326 diabetics 39.87% were males and 60.13% were females. And the results show that gender is significant in the development of diabetes mellitus. Females are more affected by the disease (p < 0.001).

Data from the National Family Health Survey (NFHS) of 2005-06 suggested that the number of women who have diabetes ranges from 0.28% women in Rajasthan to 2.54% women in Kerala (highest).

The descriptive study of the area shows that 58.28% were urban and 41.72% were rural. And the result shows that area is significant in the development of
type 2 diabetes. Urban populations are more vulnerable to the disease (p < 0.001).

Figures based on NFHS in 2005-06 suggest the prevalence of Type2 Diabetes in Urban Cities of India is highest in Kerala (Ernakulam-19.5%- Menon et al. and Thiruvananthapuram-16.3%- Raman et al.).

The religion-wise study reveals that 59.8% were Hindu, 33.4% were Christians and 6.74% were Muslims. And religion is not found significant in the development of diabetes. Out of 326 diabetics 12.88% were Government employees, 39.57% were Private employees and 47.54% were housewives. The education-wise study shows that 81.9% have school education, 12.9% were degree-holders, 0.3% was post graduates and 4.9% were professionals. The income-wise study shows that 20.85 % were low income group, 76.99% were middle income group and 2.14% belonged to the high income group.

The inferential statistical analysis has revealed that only area and gender are significant in the development of type 2 diabetes. The remaining socio-demographic factors including age, religion, occupation and education do not exert any influence in the development of the disease.

The descriptive study of diet shows that 10.74% of Diabetics had regular diet and 89.29% had irregular diet, 31.59% take fast food, 60.43% had increased fat intake, 57.97% were over-eaters, 90.18% were non-vegetarians. The analysis showed that the diet is significant in the development of type 2 diabetes. Irregular diet (p < 0.001), fast food (p < 0.001), fatty food (p <
0.001) and over-eating (p < 0.001) have decisive roles in diabetes. So undoubtedly we can say that dietary changes have a role in the development of type 2 diabetes.

Misra et al. 2009 suggested that whole grains are rich in components like dietary fiber, starch, fat antioxidant nutrients, minerals, vitamins and phenolic compounds that have been linked to the reduced risk of obesity, insulin resistance, dyslipidemia and Type2 Diabetes.

The study shows that 98.16% of diabetics were those who did not take regular exercise and thus exercise is found significant in the development of the disease (p < 0.001). So lack of exercise has a positive impact on the development of type 2 diabetes.

Physical activity and weight control are critical factors in diabetes prevention in subjects with both normal and impaired blood glucose regulation (Hu et al.).

Out of 326 diabetics 69.94% had domestic stress and 17.48% had occupational stress and inferential statistical analysis suggested that domestic stress is significant in the development of disease (p < 0.001). So stress has influence in the development of type 2 diabetes.

The study of addictions has shown that 21.17% were smokers and 15.64% were alcoholics but the addiction has not been found to wield any influence in the development of type 2 diabetes at 1per cent level.
Out of 326 diabetics 93.87% had positive family history and chi-square result shows that family history is significant in the development of the disease \( (p < 0.001) \). So family history is relevant in the development of type 2 diabetes. Viswanathan et al.1996 in their study found nearly 75% of the Type2 Diabetes patients have first degree family history of diabetes.

The study showed that 35.58% were Obese, 50.31% were Hypertensive and 53.07% were suffering from Hypercholestraemia. The analysis has revealed that obesity, hypertension and Hypercholestraemia are significant in the development of type 2 diabetes.

**6.3.2. Experimental Study**

Experimental study was used to analyze the role of lifestyle changes in the management of type 2 diabetes mellitus. The investigator selected 100 diabetic patients as ‘control group’ and 100 diabetic patients as ‘test group’. Single-blind trial was adopted for the study.

In the control group, the lowest FBS level before treatment was 120 and the highest FBS level were 198. The lowest PPBS level was 180 and the highest was 295. The lowest HbA1C level was 6.4 and highest was 8.6. The mean FBS level before treatment was 161.91, mean PPBS level was 248.53 and mean HbA1C level was 7.77.

In the test group, the lowest FBS level before treatment was 120 and the highest FBS level were 196. The lowest PPBS level was 182 and the highest PPBS level was 293. The lowest HbA1C level was 6.5 and the highest level
was 8.4. The mean FBS level before treatment was 162.09, mean PPBS level was 248.10 and mean HbA1C level was 7.763.

In the control group, the lowest FBS level after treatment was 112 and the highest was 140. The lowest PPBS level was 160 and the highest was 230. The lowest HbA1C was 6.4 and the highest 8.2. The mean FBS level after treatment was 127.37, mean PPBS level was 185 and mean HbA1C level was 7.31.

In the test group, the lowest FBS level after treatment was 100 and the highest was 140. The lowest PPBS level was 130 and the highest was 216. The lowest HbA1C was 5.8 and the highest was 8.2. The mean FBS level after treatment was 117.44, mean PPBS level was 150.42 and mean HbA1C level was 6.49.

The FBS reduction level in test group and control group may vary in relation to the age. For making a comparison of FBS reduction level of different age groups in control and test group, the mean FBS reduction level have been computed.

From the analysis it is obvious that, in the control group, the highest FBS reduction level was in the 25-35 age group (28.76) and the lowest in the 55-65 age group (13.17). In 35-45 age group it was 22.89 and in 45-55 age group FBS reduction level was 15.76. In the test group also the highest FBS reduction level was in the 25-35 age group (38.34) and the lowest in the 55-
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In 35-45 age groups the FBS reduction level was 29.62 and in the 55-65 age group it was 15.61.

The PPBS reduction level in test group and control group may vary in relation to the age. For making a comparison of PPBS reduction levels of different age groups in control as well as test group, the mean PPBS reduction level have been computed. From the analysis it is obvious that, in the control group the highest PPBS reduction level was in the 25-35 group (33.81) and the lowest in the 55-65 age group (17.24). In 35-45 age group it was 26.32 and in 45-55 age group PPBS reduction level was 21.21. In the test group also the highest PPBS reduction level was in the 25-35 age group (47.49) and the lowest in the 55-65 age group (29.61). In 35-45 age group the PPBS reduction level was 40.08 and in the 55-65 age group it was 37.13.

The HbA1C reduction level in test group and control group may vary in relation to the age. For making a comparison of HbA1C reduction levels of different age groups in control as well as test group, the mean HbA1C reduction level have been computed.

From the analysis it is obvious that, in the control group the highest HbA1C reduction level was in the 25-35 group (9.28) and the lowest in the 55-65 age group (2.61). In 35-45 age group it was 7.40 and in 45-55 age group HbA1C reduction level was 3.53. In the test group also the highest HbA1C reduction level was in the 25-35 age group (21.17) and the lowest in the 55-65 age group.
group (13.62). In 35-45 age group the HbA1C reduction level was 16.52 and 55-65 age group it was 13.95.

In order to ascertain whether the mean FBS reduction levels of various age groups differ significantly or not, F test has been applied and the difference in the mean FBS reduction level of different age groups is found to be statistically significant at 1 per cent level in control and test groups.

In order to ascertain whether the mean PPBS reduction levels of various age groups differ significantly or not, F test has been applied and the difference in the mean PPBS reduction level of different age groups is found to be statistically significant at 1 per cent level in control and test groups.

In order to ascertain whether the mean HbA1C reduction levels of various age groups differ significantly or not, F test has been applied and the difference in the mean HbA1C reduction level of different age groups is found to be statistically significant at 1 per cent level in control group. But there is no age wise difference in the mean HbA1C reduction level in test group.

Since there exists statistically significant difference in the mean blood sugar reduction levels of different age groups, pair wise multiple comparisons using Turkey’s HSD test have been worked out to determine the mean blood sugar reduction level of which group differs significantly.

The results of the test show that difference in FBS reduction level in test group was significant at 1 per cent level in groups of age between 25-35 and
Discussion

35-45, 25-35 and 55-65, 35-65 and 45-55 and 35-45 and 55-65. The difference in FBS level in control group was significant at 1 per cent level between the age groups 25-35 and 45-55, 25-35 and 55-65 and 35-45 and 55-65.

The difference in PPBS reduction level in test group was significant at 1 per cent level between the age groups 25-35 and 35-45, 25-35 and 45-55, 25-35 and 55-65 and 35-45 and 55-65. The difference in PPBS reduction level in the control group was significant at 1 per cent level only between the age groups 25-35 and 45-55 and 25-35 and 55-65.

The difference in HbA1C reduction level in control group was significant at 1 per cent level between the age groups 25-35 and 35-45, 25-35 and 45-55, 25-35 and 55-65 and 35-45 and 55-65. The difference in HbA1C reduction level in test group was not significant.

The blood sugar reduction level (FBS, PPBS and HbA1C) in both control and experimental group was more in younger age groups. So the Homoeopathic medicines as well as lifestyle changes as an adjunct to Homoeopathic medicines are more effective in younger age groups.

The FBS reduction level may vary in relation to gender. For making a comparison of gender difference, the mean FBS reduction levels have been computed. From the analysis, it was found that, the mean FBS reduction level of male in control group was 20.16 and female was 20.12. In test group the mean FBS reduction level of male was 26.24 and female was 26.34.
The PPBS reduction level may vary in relation to gender. For making a comparison of gender-wise difference, the mean PPBS reduction levels have been computed. The analysis showed that PPBS reduction level of male was 24.63 and female was 24.66 in the control group and in the test group, the mean PPBS reduction level of male was 38.68 and female was 38.47.

The HbA1c reduction level may vary in relation to gender. For making a comparison of gender-wise difference, the mean HbA1c reduction levels have been computed and the mean HbA1c reduction level of male was 6.07 and female was 5.34 in the control group. In the test group the mean HbA1c reduction level of male was 15.72 and female was 16.87.

The results of inferential statistical analysis of significance of difference of FBS reduction levels between gender groups corroborates with the finding of descriptive analysis that the gender difference in the FBS reduction level is negligible in the study groups. The t test results of significance of difference at the PPBS reduction level between gender groups justify that the gender difference in the PPBS reduction level is insubstantial. The t test results show that the gender difference is not significant in the HbA1c reduction level in both the study groups.

So the Homoeopathic medicines and lifestyle changes along with medicines are equally effective in both gender groups.

The FBS reduction level may vary in relation to area. For making a comparison of area-wise difference in FBS reduction level, the mean FBS
reduction levels have been computed. From the analysis, it was found that, in the control group the mean FBS reduction level in urban areas was 19.15 and in rural areas was 20.8. In the test group the mean FBS reduction level in urban areas was 25.37 and in rural areas was 26.90.

The PPBS reduction level may vary in relation to area. The mean PPBS reduction levels of both groups have been computed. The descriptive analysis shows that in control group, the mean PPBS reduction level in urban areas was 22.96 and in rural areas was 25.76. In test group, the mean PPBS reduction level in urban areas was 36.71 and in rural areas was 39.82.

An analysis shows that in control group, the mean HbA1c reduction level in urban areas was 5.98 and in rural areas was 5.52. In test group, the mean HbA1c reduction level in urban areas was 17.10 and in rural areas was 15.78.

The results of inferential statistical analysis show that the significance of difference at the level of FBS reduction between areas is nil. The area-wise difference in PPBS reduction level was not significant in control and test groups. In control and test groups, the area-wise difference in HbA1c reduction level was not significant.

So the Homoeopathic medicines and lifestyle changes along with Homoeopathic medicines are equally effective among both urban and rural areas.

The FBS reduction level may vary in relation to the duration of diabetes. The mean FBS reduction levels of control and test group have been computed. In
control group, the FBS reduction level was the highest in 0-2yrs (24.35) and the lowest in 5-10yrs (15.36) duration. The FBS reduction level in test group was the highest in 0-2yrs (32.74) and lowest in 5-10yrs (18.74) duration. The PPBS reduction levels of control and test group have been computed. The PPBS reduction level in control group was the highest in 0-2yrs (28.13) and the lowest in 5-10yrs (20.64) duration. The PPBS reduction level in test group was the highest in 0-2yrs (42.79) and the lowest in 5-10yrs (34.10) duration.

The HbA1C reduction level in control group was the highest in 0-2yrs (7.33) and the lowest in 5-10yrs (5.70) duration. The HbA1C reduction level in test group was the highest in 0-2yrs (18.29) and the lowest in 2-5yrs (13.72) duration.

In order to ascertain whether the mean FBS reduction level of various durations differs significantly or not, F test has been applied. The difference in the mean FBS reduction levels of different duration is statistically significant at 1 per cent level in control and test groups.

In order to ascertain whether the mean PPBS reduction level of various durations differs significantly or not, F test has been applied. The difference in the mean PPBS reduction levels of different duration is statistically significant at 1 per cent level in test group only.

In order to ascertain the mean HbA1C reduction level of various durations differs significantly or not, F test has been applied. The difference in the
mean HbA1C reduction level of various durations is not statistically
significant in control and test groups.

Since there exists statistically significant difference in the mean FBS
reduction of different durations in control and test groups, pair wise multiple
comparisons using Turkey’s HSD test were made to determine mean scores
of which groups differ significantly. The difference in mean FBS reduction
level was significant at 1 per cent level only between the durations 0-2yrs and
2-5yrs and 0-2yrs and 5-10yrs.

Since there exists statistically significant difference in the mean PPBS
reduction of different duration in test group, pair wise multiple comparisons
using Turkey’s HSD test were made to determine mean scores of which
groups differ significantly. The difference in mean PPBS reduction level was
significant at 1 per cent level only between the durations 0-2yrs and 5-10.

To find out the effect of control group, observations were analyzed
statistically by using paired t-test and the result shows that the mean FBS
reduction level in control group was 34.54(t value 16.309, p < 0.001), mean
PPBS reduction level was 64.47(t value 20.644, p < 0.001) and mean HbA1c
reduction level was 0.456(t value 10.49, p < 0.001). From a statistical
analysis, it is found that the blood sugar reduction level in control group is
significant at 1 per cent level. So, undoubtedly we can say that homoeopathic
medicines are effective in the management of Diabetes Mellitus.
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To find out the effect of test group, observations were analyzed statistically by using paired t test. The mean FBS reduction level in test group was 44.65 (t value 18.882, p < 0.001), mean PPBS reduction level was 97.68 (t value 29.978, p < 0.001) and mean HbA1c reduction was 1.27 (t value 17.995, p < 0.001). From a statistical analysis, it is found that the blood sugar reduction level in test group is significant at 1 per cent level. So, the lifestyle changes have an impact on reducing blood sugar level.

Comparison between the control group and study group was done by t-test. The mean difference in FBS level in control group was 20.14 and in test group was 26.29 (t value -3.88, p < 0.001). The mean difference in PPBS level in control group was 24.64 and in test group was 38.58 (t value -9.54, p < 0.001). The mean difference in HbA1c level in control group was 5.70 and in test group was 16.31 (t value -9.64, p < 0.001). The result shows that blood sugar reduction level in test group is significant at 1 per cent level. The test group is found more effective in reducing blood sugar level. So, undoubtedly we can say that lifestyle changes as an adjunct to Homoeopathic medicine are quite effective in the management of type 2 Diabetes mellitus.

It has been demonstrated that treatment outcome in diabetic patients is far from optimal in India (Raheja et al. 2001; Nagpal and Bhartia 2006). Ramachandran et al. in 2008 analyzed and compared the clinical profile and glycemic outcome in known diabetic cases in South Indian urban and semi-urban populations and found that the clinical outcome in known diabetic
cases was far from satisfactory even in the city where specialized diabetes care was available.

Homoeopathy is economical, simple, without side effects and it can reach out to the rural areas also. Lifestyle changes as an adjunct to Homoeopathic medicine are quite effective in the management of type 2 Diabetes mellitus. Judicious administration of Homoeopathic medicines along with healthy lifestyle, we can effectively manage type 2 Diabetes mellitus.

6.4. Lifestyle modifications

Healthy diet, relaxation, stress management, sensible exercise, yoga, meditation and visualization are the main tools at our disposal to control diabetes.

The major lifestyle operations, advised for diabetics are

- Relief of stress by relaxation exercises or yoga.
- Increased physical activity; exercise regularly.
- Stop smoking and tobacco consumption.
- Stop alcohol consumption.
- Eating at regular intervals, and in proper quantities and composition that ensures a balanced intake of all nutrients.
- Drastically reduce intake of saturated fats and simple sugars.
- Eat a healthy diet.
- Reduce weight if over-weight.
The blood glucose and insulin response to various carbohydrates are not similar. Individual foods containing the same caloric amount of carbohydrate may elicit a widely different response in plasma glucose levels. Some carbohydrates like sugar increase the blood glucose quickly, while others like starch (potato, rice) increase it slowly. These variations can be quantified using the glycemic index.

Glycemic index of some foods are as follows:

<table>
<thead>
<tr>
<th>Glycemic index (in %)</th>
<th>Food stuff</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Glucose</td>
</tr>
<tr>
<td>80-90</td>
<td>Cornflakes, Carrot, Potatoes (mashed), Maltose, honey, idli</td>
</tr>
<tr>
<td>70-79</td>
<td>Bread, millets, rice (white), broad beans, Potato (new), uppama</td>
</tr>
<tr>
<td>60-69</td>
<td>Buck wheat, noodles (white), peas</td>
</tr>
<tr>
<td>50-59</td>
<td>Pongal, sweet corn and potato chips</td>
</tr>
<tr>
<td>40-49</td>
<td>Noodles (whole meal), beans, sweet Potato, orange (juice), peas (dried)</td>
</tr>
<tr>
<td>30-39</td>
<td>Black eyed peas, apple, skimmed Milk, curd, tomato soup, ice-cream Kidney beans, lentils (all dals), fructose</td>
</tr>
<tr>
<td>10-19</td>
<td>Soya beans, groundnuts</td>
</tr>
</tbody>
</table>
Table 86
Optimum Daily Needs in Calorie intake/Kg of Desirable Body Weight

<table>
<thead>
<tr>
<th>Body weight</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sedentary</td>
</tr>
<tr>
<td>Obese</td>
<td>20</td>
</tr>
<tr>
<td>Standard weight</td>
<td>30</td>
</tr>
<tr>
<td>Under weight</td>
<td>35</td>
</tr>
</tbody>
</table>

When instructing on the diet regime the following points are stressed.

1. It is not a reduction in the diet; on the other hand, it is a modulation to suit the particular need of the individual. This concept will help to reduce the psychological resistance in accepting the diet.

2. The patient and his spouse are counseled together, so that the latter will understand the principles and help to provide the diet appropriately.

3. The dietary articles are prescribed in terms of weight and on that basis the actual quantities are determined and adopted.

4. The diet is prescribed in the form of the primary food materials such as rice, meat, fish, and the like so that the patient can choose items from the menu within the limit his prescribed quantity.
5. Many patients are under the wrong impression that reducing the food below the prescribed in-take will be beneficial.

6. Both the quantity of diet and its timing are important since other aspects of management such as medication and exercise are timed in relation to the diet. As far as possible, the diet should be attuned to the cultural habits and socio-economic condition of the patient.

7. At all follow-up visits enquiry on the diet is made and the need for strict adherence stressed.

8. As far as possible, the patient’s likes and dislikes are considered in the formulation of the diet. And such a participatory prescription ensures better compliance.

9. The calories are derived from 3 principle sources- carbohydrates, protein and fats. Each component has its own importance and it should be so arranged that 60% of the calories should come from carbohydrate and 20% each from protein and fat.

10. Nutritional recommendations for diabetics:

   - Fat: 20-35% of total calorie intake. Saturated fat < 7% of the total calories. Less than 200mg / day of dietary cholesterol. Two or more servings of fish / week provide n-3polysaturated fatty acids and minimal Transfat consumption.
Carbohydrate: 45-65 % of the total caloric intake (low carbohydrate diets are not recommended). Amount and type of carbohydrate is important. Sucrose-containing foods may be preferable with adjustments in medication.

Protein: 10-35 % of the total caloric intake (high protein diets are not recommended)

Other components: Fiber-containing foods will reduce postprandial glucose and lighten the adverse effects of nonnutrient sweeteners.

Diets in Kerala are cereal-based and have high carbohydrate content (about 70%). Good metabolic control can be achieved with high carbohydrate diets, provided the caloric intake is optimized. Such a diet achieves better patient compliance and has no adverse effect leading to long-term complications. The American Diabetic Association and the European Diabetic Association study groups have modified the conventional dietary recommendations. In an attempt to reduce cardiovascular morbidity and mortality, they have recommended a liberalized use of carbohydrates in the diet up to 50 – 60 % of the calories. Modification in the type of carbohydrate can be achieved by increasing the intake of legumes and pulses, green leafy vegetables and other vegetables, which will increase the content of complex carbohydrates and fiber.
Invisible fat is derived in a fair amount from cereals, legumes and seeds and contributes to 5-10% of the total energy intake. Milk and milk products contribute approximately 40-45% of the total fat content in vegetarian diet. Milk fat is a saturated fat.

Vegetable proteins derived from cereals and lentils do not contain cholesterol. They have high fiber content. Animal protein is rich in saturated fats and tends to increase cholesterol and triglycerides. Lean meat and fish are to be preferred to fatty meat in order to minimize the risk.

The dietary salt should be less than 6 gm/day. Alcohol intake will increase the risk of hyperglycemia and hypertriglyceridemia. Alcohol is an additional source of calories, without any nutritional value.

Dietary management of diabetes should be so designed as to meet the total nutrient and health needs, not just blood glucose needs. Begin with an assessment of the individual’s usual eating habits including his/her food likes and dislikes, eating and work schedules, as well as treatment goals identified by the health care team. The better the dietary management fits into one’s usual routine, the more likely it is to be successful.

The Plate Method is a simple method for teaching meal planning. A 9-inch dinner plate serves as a pie chart to show proportions of the plate that should be covered by various food groups. This meal planning approach is simple and versatile. Vegetables should cover 50 per cent of the plate for lunch and...
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dinner. The remainder of the plate should be divided between starchy foods, such as bread, grains, or potatoes, and a choice from the meat group.

In Diabetic exchange diets system, food is separated into six categories based on macro nutrient content (i.e., starch, cereals, grains, pasta, bread, beans, and starchy vegetables, non-starchy vegetables, fruits, milk, and fats). Design a daily meal plan based on a set amount of servings from each category. The Food Exchange method allows the patient to measure rather than weigh food. This saves time and encourages compliance. Any food may be substituted for another within the same food exchange list. All meals and snacks should be eaten at about the same time each day.

In Carbohydrate Counting system, counts the grams of carbohydrate in various foods, and adjusts the amount of carbohydrate consumed during the day as a reflection of blood glucose levels. One choice from the starch, fruits, milk, or sweets and dessert list supplies about 15 grams of carbohydrate. Each selection is considered one carbohydrate choice. A meal plan outlines the number of carbohydrate choices a person may select for meals and snacks. This method requires great diligence in diet and blood glucose monitoring.

My Pyramid strives to put the Dietary Guidelines for Americans into action. It provides a conceptual framework for selecting the kinds and amounts of various foods, which together provide a nutritious diet. My Pyramid focuses on variety and on reducing the amount of added fat and sugar in the diet.
With any of the diet planning methods mentioned above, the nutrition facts label, found on most foods, can provide much useful information. Counting carbohydrates, total grams of carbohydrates per serving are listed on the label, along with grams of sugars and dietary fibers.

The exchange lists method of diet planning, exchanges can be developed for new foods based on the grams of protein, carbohydrate and fat provided per serving. The serving sizes given on labels may not be the same as those used in the Exchange Lists for Meal Planning.

Using the My Pyramid in menu planning, pay close attention to the per cent daily value column of the nutrition facts label. Look for foods that have low per cent daily values for fat, saturated fat and cholesterol, and high percent daily values for fiber. Also note the calories per serving, calories from fat, and the trans fat content. Effective diabetic-management requires a healthy regular lifestyle which should include a regular balanced diet, regular exercise and sensible weight control.

Diabetic Food Pyramid:-Nutrition experts say that there is no one diet for diabetes, but people with diabetes should follow the nutrition guidelines in the Food Pyramid. Diabetes Food Pyramid was designed by the American Diabetes Association. Diabetic food pyramid guide with group of foods based on their carbohydrate and protein content because these foods affect blood glucose levels, which is indeed the primary concern to people with diabetes. Find differences like potatoes and other starchy vegetables in the
grains, beans and starchy vegetables group instead of the vegetables group, cheese is in the meat group instead of the milk group.

Grains and Starches:- Situated at the base of the pyramid, these are foods contain mostly carbohydrates. Bread, cereal, rice, and pasta are food in this group mostly made of grains, such as wheat, rye, and oats. Starchy vegetables like potatoes, corn, and peas also belong to this group, along with dry beans such as black eyed peas and pinto beans. Starchy vegetables and beans are in this group because they have about as much carbohydrate in one serving as a slice of bread.

Vegetables (6-11 servings per day): Vegetables are full of vitamins, minerals, fiber, and naturally all of them are low in fat. Vegetables that should be at the top of food list should be dark green and deep yellow vegetables, such as spinach, kale, broccoli, romaine lettuce, carrots, cucumbers, chilies and peppers. Try to get fresh or frozen vegetables rather than canned vegetables because they have less sauces, fats and salt added.

Fruits (3-5 servings per day): Fruits are fabulous because they provide important vitamins, minerals, and fiber. Fruits also contain carbohydrates. Most dietitians recommend consuming whole fruits rather than juices because of the fiber contained. Avoid fruits and fruit juices that contain sweeteners or syrups added.

Milk (2-4 servings per day): Milk products contain a lot of protein and calcium as well as many other vitamins. When looking at milk or yogurt, try
to choose low-fat or nonfat milk products for the great taste and nutrition without the saturated fat.

Regular exercise as part of the therapeutic intervention should be practiced by all diabetics, irrespective of the physical activity entailed in their regular occupation. Maximum benefit is derived from exercise such as brisk walking (4-5 kms/hr), swimming, cycling and such aerobic exercises. While starting the exercise programme in persons above the age of 35 years clinical assessment of their cardiovascular status should be made and introduction of the exercise regimen should be gradual, so as not to precipitate any acute cardiovascular events.
Discussion

Figure 15
Diabetic Food Pyramid
For the average middle-aged diabetic, the following exercise regimen is adequate.

- Walk 3kms on level ground over a period of 45 minutes
- Swim for 30 minutes at average speed without cardiovascular distress.
- Cycle on level ground at 8km/hr for 30 minutes.

Regular sports and games activities can be undertaken and should be encouraged by those who are competent to do them, with special provision made for the diet and medications.

Before an exercise program is initiated, a fair control of blood glucose is to be ensured and a thorough clinical evaluation of the patient should be made, particularly in regard to the complications of diabetes such as hypertension, coronary artery disease, peripheral vascular disease, retinopathy and nephropathy.

- Choose an enjoyable physical activity that is appropriate for the current fitness level.
- Exercise every day, and at the same time of day.
- Carry food that contains a fast-acting carbohydrate lest the patient should become hypoglycemic during or after exercise.
- Carry a diabetes identification card
Yoga is an ancient practice of moving the body into different poses to achieve a healthy body, an attentive mind and a relaxed spirit. Several in-depth studies have identified the beneficial effects of yogic practices in diabetics. Patients with diabetes demonstrate a significant fall in fasting and postprandial blood glucose values and HbA1c, with reduction in the requirement of medication. There was a salutary effect on the lipid profile with a fall in serum cholesterol, triglycerides and an increase in HDL cholesterol. Certain “Asanas” (specific postural manipulations which have to be learnt under supervision) have been identified as useful in the control of diabetes. Thus, yogic practices have a useful role in the control of diabetes and prevention of its long term complications. Patients with diabetes show a significant fall in their fasting and postprandial blood glucose values and HbA1c, with a reduction in the requirement of medication. There occurs a salutary effect on the lipid profile with a fall in serum cholesterol, triglycerides and an increase in HDL cholesterol.

There are ways to fight stress:

- Start an exercise program or join a sport team.
- Take a dance lesson or join a dance club.
- Start a new hobby or learn a new craft.
- Volunteer at a hospital or charitable institution.
Discussion

Stress blocks the body from releasing insulin in people with type 2 diabetes, so getting rid of stress may be more helpful for these people. Some people with type 2 diabetes may also be more sensitive to some of stress hormones. Relaxing can help by blunting this sensitivity.

There are many ways to relax:

- **Breathing exercise**: Sit or lie down with uncross legs and arms. Take in a deep breath. Then push out as much air. Breathe in and out again, this time relaxing the muscles on purpose while breathing out. Keep breathing and relaxing for 5 to 20 minutes at a time. Do the breathing exercises at least once a day.

- **Progressive relaxing therapy**: This technique can be learned in a clinic or from an audio tape. Tense muscles and then relax them.

- **Exercise**: Another way to relax the body is by moving it through a wide range of motion. Three ways to loosen up through movement are circling, stretching, and shaking parts of the body. To make this exercise more fun, move with music.

- **Replace bad thoughts with good ones**: Each time you notice a bad thought, purposefully thinks of something that make happy or proud. Or memorize a poem, prayer, or quote and use it to dispel the bad thought.
Discussion

6.5. Merits of Homoeopathy

Homoeopathy is a system of medicine which works on nature’s law of cure. Homoeopathy has a great role to play, for the prevention of diabetes mellitus, management and control of it and to reduce morbidity and mortality. Proper understanding of Homoeopathic concept of disease and constitutional treatment can bring smile to suffering community.

Homoeopathy as a science of medical treatment has a philosophy of its own and its therapeutics based on certain fundamental principles.

Treatment of diabetes mellitus in homoeopathy is based on law of similars, by administration of drugs which have been experimentally proved to possess the power of producing a similar suffering, as diabetes, in healthy human being.

The suitableness of a medicine for any diabetic patient does not depend on its accurate homoeopathic selection alone, but likewise on the proper size of dose too. The smallness of the dose does not allowed the drug to do any organic damage nor do these any risk of drug addiction and drug effects.

Human being is a holistic entity. So we have to consider his emotional, mental, and physical level in a integral manner. Treat the man who is suffering from diabetes, not the disease ‘diabetes’. Two persons suffering from diabetes may not be treated with the same medicine. Homoeopathy considers the peculiar presentation of the disease through the patient
(constitution, mental peculiarities and modalities etc). According to homoeopathy, the production of diabetes is due to affection of Psora, Syphilis and Sycosis. Deficiency of Insulin is due to the miasm ‘psora’ and proliferations are due to miasm ‘sycosis’ and complications (destructive changes) are due to the miasm ‘syphilis’.

Three modes of treatment, organ remedies, constitutional remedies and antimiasmatic remedies are available in homoeopathy. By proper administration of homoeopathic medicines (antimiasmatic medicines), we can prevent or delay the onset of diabetes, especially in high risk population (primary prevention), and by proper administration of homoeopathic medicine (constitutional medicines), we can prevent or delay the complication of diabetes(secondary prevention).

The merits of homoeopathy in the management of Diabetes are,

1. No drug induced complications
2. No drug dependency
3. Mental and physical approach – Holistic approach
4. Cost effective, non toxic and simple
5. Primary and secondary prevention
6.6. Summary

This chapter deals with a brief summary of the study undertaken and major findings derived for it. New data on the prevalence of Diabetes and the role of lifestyle changes in the development and management of Type2 Diabetes Mellitus in Kerala underscore the need for a major public health initiative aimed at prevention and control of the condition. The lifestyle modification plays a major role in preventing the onset of Type 2 Diabetes and lifestyle changes as an adjunct to Homoeopathic medicines are significantly effective in the management of Type 2 Diabetes Mellitus.