

AN ANALYTICAL STUDY OF THE ROLE OF LIFESTYLE CHANGES IN THE DEVELOPMENT AND MANAGEMENT OF TYPE 2 DIABETES MELLITUS IN KERALA- A HOMOEOPATHIC APPROACH.

Introduction

Diabetes Mellitus is a chronic disorder characterized by hyperglycemia with or without glycosuria, resulting from an absolute or relative deficiency of insulin. Clinically, diabetes is characterized by a wide spectrum of disorders, ranging from asymptomatic hyperglycemia to abnormalities in various vital organs like heart, brain, retina and peripheral vessels. Once regarded as a single disease entity, diabetes is now seen as a heterogeneous group of diseases, resulting from a diversity of aetiologies, environmental and genetic, acting jointly. Diabetes is a long term disease with variable clinical manifestations and progression. Diabetes is mainly classified into two categories – primary and secondary. Primary diabetes is again classified into two types – Type I diabetes and Type 2 diabetes.

Context of the study

Diabetes is a major public health problem all over the world. Its prevalence varies among different populations, being very high to the extent of 40 percentage of all those above the age of 15yrs. By the year 2025, the number of people suffering from diabetes in the world is estimated to be 350 million, of which 70 million will be in India. Type 2 Diabetes is the most common type in

India, accounting for more than 95 percentage of the total. Recent studies have shown that the prevalence is increasing at the rates of 10 to 13 percent in urban and 2.4 percentage in rural areas. The incidence increases with age and 58 percent of the Indian diabetics have a positive family history.

Diabetes Mellitus – A Lifestyle Disease

Diabetes is a lifestyle disease. The youth segment of the community is the prime asset of any nation. When the health of this particular group deteriorates, it is the overall development of the nation that suffers. Diabetes affects the most productive period of life and it will stifle the prosperity of a whole country.

Type 2 Diabetes is considered to be a multifactor or complex disease as it involves a wide variety of ramifications, arising from the complex interaction between various genetic and environmental factors in its pathogenesis. Multiple evidences suggest that there exists a genetic predisposition, transmitted through the family bond. Identical twins invariably develop the disease when exposed to the same environmental factors. In genetically predisposed individuals several environmental factors precipitate the onset of diabetes.

Obesity – The current obesity epidemic due to the modern sedentary life is a major factor that predisposes Type 2 Diabetes. Obese persons show a relative resistance to the action of insulin, owing to the reduction in the number of insulin receptors on the target cells. Obesity, particularly central adiposity has

been accepted as a risk factor and the risk is commensurate with both the duration and degree of obesity.

Physical Inactivity & Sedentary Lifestyle – They are found to create a congenial condition for the disease to set in. Most of the diabetics are physically inactive. Sedentary lifestyle appears to be an important risk factor. Lack of exercise can slacken the interaction between insulin and its receptors.

Diet – Highly saturated fat intake has been associated with a higher fasting glucose. Sweet foods, rich in refined carbohydrate, consumed frequently will increase the demand for insulin secretion. High intake of dietary fiber will reduce the level of blood glucose.

Alcohol – Excessive intake of alcohol can increase the risk of diabetes by damaging the pancreas and liver, promoting obesity in the process.

Stress – Surgery, trauma and stress can act as causatory or precipitating factors.

One of the most striking epidemiological features of diabetes is that its incidence is now quite high in the lower strata of the society whereas it was almost unknown among the poor people a few decades ago (WHO 2005)

An Epidemiology of Diabetes Mellitus

According to the World Health Organization, 171 million people worldwide or 2.8 percentage of the global population suffer from Diabetes Mellitus. Its incidence is increasing rapidly, and it is estimated that by 2030, this number will almost double (Wild et al.2009). Diabetes mellitus occurs throughout the world

but it is more common (especially type 2) in developed countries. The greatest increase in its prevalence is, however, expected to occur in Asia and Africa.

The International Diabetes Federation recently published its findings revealing that in 2007, the country with the largest number of people with diabetes was India (40.9 million), followed by China (39.8 million), the United States (19.2 million), Russia (9.6 million) and Germany (7.4 million). The disease is not one that affects only the rich, though it is most likely to affect those with a sedentary lifestyle and who consume diets that are indiscriminate and imbalanced.

Prevention of Diabetes Mellitus

The active search for disease among apparently healthy people is the fundamental aspect of prevention. This is embodied in screening. Screening of the high risk group is considered more urgent and imperative. Screening test is recommended because a large number of asymptomatic diabetics are unaware that they have the disorder. The disease may be present for up to a decade without oppressive symptoms. The treatment may favourably alter the natural history of diabetes. 50 percentages of the victims are found to have already developed complications at the time of the diagnosis.

The preventive measures comprise maintenance of normal bodyweight through adoption of healthy nutritional habits and adequate physical exercise especially in the high-risk population. Since alcohol and smoking indirectly increase the risk, they should be avoided. (Primary Prevention)

As soon as the disease is detected, it must be adequately treated. The aim of treatment is (a) to maintain blood glucose level as close within the normal limits as is practicable and (b) to ensure ideal bodyweight. Proper management of the diabetic is most important to prevent complications. The diabetic should take a major share of the responsibility for his own care under medical guidance. Patients should carry an identification card, showing his name, address, telephone number and the details of treatment he is receiving (Secondary Prevention).

Diabetes is a major cause of disability resulting from the numerous complications it is likely to generate. The main objective at the tertiary level is to organize “Diabetic clinics”. There is a great need to establish such clinics in Panchayats and Cities alike. At this level should begin basic, clinical and epidemiological research. It has also been recommended that local and national registries for diabetics should be established (Tertiary Prevention).

Homoeopathic Approach

Homoeopathy is a system of medicine, which works on nature’s law of cure. The term homoeopathy is a combination of two Greek words ‘homoeo’, meaning similar and ‘pathos’ means suffering. It is a system of drug therapeutics, based on the “Law of similars” or ‘likes be treated by likes’. The basic concept of the disease in this system is that all natural diseases are due to the derangement of the vital force in an individual. When there is an adverse influence on the vital force, its state is deranged and it produces abnormal

sensations, functions and secretions. This will later on lead to structural or tissue changes.

Homoeopathy has a great role to play in the prevention or management and control of diabetes mellitus as well as in reducing morbidity and mortality resulting therefrom. Proper understanding of homoeopathic concept of disease and constitutional treatment can bring great relief to suffering humanity.

By proper selection and administration of homoeopathic medicines, we can prevent or delay the onset of diabetes, especially in high risk population (primary prevention), and by judicious administration of homoeopathic constitutional medicine, we can prevent or delay the complications caused by diabetes (secondary prevention)

Need for and significance of the study

Diabetes is an 'iceberg disease'. Although increase in both the prevalence and incidence of Type 2 diabetes have occurred globally, they have been particularly dramatic in societies undergoing economic transition, in newly industrialized countries and developing countries. It will be the leading cause of morbidity and mortality in the world in the foreseeable future (WHO 2005).

Once considered as a disease of the middle age and the elderly, it has recently escalated in all age groups and is now seen in younger age groups, including adolescents, especially among high risk population. The majority of diabetic patients develop the disease during the most productive period of their life. This

will have major implications with respect to health care needs and costs as they are most likely to live up to an older age to develop the chronic complications of diabetes (Kumar et al. 2008).

Currently, 'Health Action by People' has undertaken a cross-sectional study on the prevalence of Type 2 diabetes and a few cardiovascular risk factors among selected rural and urban communities. The picture that emerges is quite disturbing. The prevalence, even in the rural areas of Kerala, is similar to or even higher than that reported from urban India. In absolute terms, approximately 16 million men and 14 million women are suffering from type 2 Diabetes. If factor Impaired Glucose Regulator (IGR) is also taken into consideration, Kerala has at least 51 million people with impaired glucose metabolism (Ramankutty et al).

Homoeopathy is a holistic form of medicine. Cost wise, there is no other medical system in the world which is as inexpensive as homoeopathy. It is economical so that it can reach out to the poorer sections of the society. No patient, who aspires for a speedy cure without side effects, can ignore homoeopathy.

Statement of the problem

The rate of growth of diabetes in India is greater than that in any other country in the world because of its increased urbanization and westernization of lifestyle habits. The earlier onset, delayed diagnosis and inadequate care lead to an

increase in morbidity and mortality which, in turn, adversely affect the country's productivity and prosperity. Data from the Indian Council for Medical Research (ICMR) study demonstrate that periodic screening can reduce the ratio of new cases of diabetes to known cases (R.M. Anjana et al.)

One's habits profoundly affect one's well-being for better or for worse. The rate of lifestyle related diseases in Kerala is higher than the rate of these disorders in other states. Risk factors for lifestyle related disorder in Malayalees manifest at young ages. Modern man, in spite of his advanced technologies, is denied many of the conditions that make for physical well being. He is constantly faced with forces that impair health. There is little need for physical work, so he remains under exercised. His inclination to eat too much of food, that is nutritionally poor, makes matters worse. He is constantly stimulated and has little opportunity to relax. His physical demands are low while his emotional pressure is high.

The term- 'diabetes capital' of India suits Kerala. The population in Kerala has increased susceptibility to type 2 Diabetes. Unfortunately, there is still inadequate awareness about the real dimensions of the problem among the general public in Kerala. There is also a lack of awareness about the existing intervention for preventing diabetes and the management of the complications resulting therefrom. The existing primary health care systems are not only inadequate but are ill-equipped to cope with the additional challenges, posed by this chronic non-communicable disease. The socio-economic implications of

the problem have not been properly assessed either by the government or by the welfare agencies.

The research problem is stated as '**An analytical study of the role of lifestyle changes in the development and management of Type 2 Diabetes Mellitus in Kerala – A Homoeopathic approach**'.

Objectives of the study

1. To study the efficacy of homoeopathic medicine in the management of Type 2 Diabetes.
2. To evaluate the relevance of lifestyle as an adjunct to Homoeopathic medicine in the management of Type 2 Diabetes.
3. To analyse the role of dietary changes in the development of Type 2 Diabetes.
4. To ascertain the impact of lack of exercise in the development of Type 2 Diabetes.
5. To study the influence of stress in the development of Type 2 Diabetes.
6. To study the relevance of positive family history in the development of Type 2 Diabetes.

Operational definitions

1. **Diabetes Mellitus-** is a heterogeneous metabolic disorder characterized by common features of chronic hyperglycemia with disturbance of carbohydrate, fat and protein metabolism. Hyperglycemia or high blood sugar is a condition in which an excessive amount of glucose circulates in the blood plasma.

2. **Type 2 Diabetes Mellitus**- formerly called Diabetes Mellitus Type II; Non insulin dependent Diabetes Mellitus, NIDDM or Adult onset Diabetes, is a non-autoimmune, complex, heterogeneous and polygenic metabolic disease condition in which the body fails to produce enough insulin, characterized by abnormal glucose homeostasis.
3. **Fasting Blood Sugar (FBS)** - A method of learning how much glucose there is in a blood sample taken after an overnight fast. Normal FBS is 70-110mg/dl; when it goes above 126mg/dl is Diabetes Mellitus; the ailment is termed Diabetes Mellitus.
4. **Post Prandial Blood Sugar (PPBS)** - refers to blood glucose measurements taken 1-2 hours after a meal. Normal PPBS is below 140mg/dl; when it rises beyond 200mg/dl, the state becomes Diabetes Mellitus.
5. **Glycosylated haemoglobin (HbA1C)** - is a form of hemoglobin which is measured primarily to identify the average plasma glucose concentration over prolonged periods of time. It is formed in a non-enzymatic glycation pathway by hemoglobin's exposure to plasma glucose. This serves as a marker for average blood glucose levels over the months prior to the measurement. 4-6 is Non –Diabetic, 6-7 shows good control, 7-8 indicates fair control, and > 8 signifies poor control of Diabetes Mellitus.
6. **Positive family history** - familial risk for early-onset of type 2 diabetes mellitus.

7. **Diet** - the customary amount and kind of food and drink consumed by a person from day to day; more narrowly, a diet planned to meet specific requirements of the individual, including or excluding certain foods.
8. **Exercise** - is physical activity that is planned, structured, and repetitive for the purpose of conditioning any part of the body.
9. **Stress** - Stress is the body's reaction to a change that requires a physical, mental or emotional adjustment or response.
10. **Obesity** - is a medical condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health, leading to reduced life expectancy and/or increased health problems. Body mass index (BMI), a measurement which compares weight and height, defines people as overweight (pre-obese) if their BMI is between 25 and 30 kg/m², and obese when it is greater than 30 kg/m².
11. **Hypertension** – is defined as a repeatedly elevated blood pressure exceeding 140 over 90 mmHg -- a systolic pressure above 140 with a diastolic pressure above 90.
12. **Hypercholestraemia** - refers to levels of cholesterol in the blood that are higher than normal (more than 200mg/dl).

Hypothesis

Lifestyle changes as an adjunct to Homoeopathic medicine are quite effective in the management of Type 2 diabetes

Methodology

The investigator has adopted survey, co relational and 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.

Population

Kottayam and Ernakulam districts of the Kerala state constitute the universe for the present study. Those who satisfied the diagnostic criteria for Diabetes Mellitus according to World Health Organization, 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 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.

Sampling technique

Both simple and stratified random techniques were used to draw the required samples for the study. 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. A simple random sampling was selected for the experimental study. The investigator selected 100 diabetic patients as 'control group' by simple random method and 100 diabetic patients as 'test' or 'experimental group' by simple random method.

A Standardized questionnaire was prepared for the Cross sectional survey and a standard proforma was prepared for the Experimental study. The duration of the trial of each sample was six months. The assessment criteria were FBS, PPBS, and HbA1C. Secondary data were collected from medical books, journals, magazines, internet and previous researches done in this area.

The data collected were entered in the master sheet of the computer. Each subject of the sample was given an identification number and entered serially. The data were classified according to the different variables studied and were recorded in the master sheet. The data were analyzed on the basis of the objectives and hypothesis, by applying descriptive and inferential statistics using SPSS.

Scope of the study

Prevention is better than cure. From a public health stand-point, the only cost-effective way of dealing with diabetes is to prevent it. Type 2 diabetes is associated with an affluent lifestyle and is more likely to develop in genetically predisposed individuals who eat too much and exercise too little. Effective health education has shown promising results in the primary prevention.

Screening of high-risk people is essential because early detection and effective control of hyperglycemia in asymptomatic diabetics helps to reduce morbidity (Secondary prevention).

Lifestyle changes as an adjunct to Homoeopathic medicines help to prevent or delay the onset of Type 2 Diabetes Mellitus, especially in the high risk population (primary prevention). By proper administration of homoeopathic constitutional medicine along with lifestyle changes, helps in preventing or delaying the complications of diabetes (secondary prevention). The scope of the study also includes the prevention of Diabetes through identification of high risk subjects and early intervention in the form of health education.

“Homoeopathy is the latest and refined method of treating patients economically and non-violently.”(Mahatma Gandhi)

Conclusions

Based on the findings of this study the following conclusions were drawn:

1. Women are more ($p < 0.001$) vulnerable to type 2 diabetes mellitus than men. This is patently obvious in the case of Kerala State.
2. Urban population is more ($p < 0.001$) prone to type 2 diabetes mellitus than rural inhabitants.
3. In the age group from 25yrs to 65yrs, age is not significant ($p < 0.504$) in the development of type 2 diabetes mellitus.

4. Dietary changes have a significant role in the development of type 2 diabetes mellitus. This signifies that controlled diet can keep the disease at bay.
5. Irregular diet ($p < 0.001$), fast food ($p < 0.001$), fatty food ($p < 0.001$) and overeating ($p < 0.001$) are contributory factors in the development of type 2 diabetes mellitus.
6. Lack of exercise has a significant impact ($p < 0.001$) on the development of type 2 diabetes mellitus.
7. Domestic stress exerts significant influence ($p < 0.001$) in the development of type 2 diabetes mellitus.
8. Positive family history is a crucial factor ($p < 0.001$) in the development of type 2 diabetes mellitus.
9. Obesity ($p < 0.001$), hypertension ($p < 0.001$), and hypercholesterolemia ($p < 0.001$) are congenial to the development of type 2 diabetes mellitus.
10. Age is significant ($p < 0.001$) in the management of type 2 diabetes mellitus. Homoeopathic medicines and lifestyle changes as an adjunct to Homoeopathic medicines are more effective in the younger age groups (25 – 45yrs, $p < 0.001$).
11. Gender is not significant in the management of type 2 diabetes mellitus. Homoeopathic medicines ($t = 0.02$, $p < 0.984$) and lifestyle changes as an adjunct to Homoeopathic medicines ($t = 0.04$, $p < 0.967$) are equally effective among both men and women.

12. Geography is not significant in the management of type 2 diabetes mellitus. Homoeopathic medicines ($t = -0.759$, $p < 0.450$) and lifestyle changes as an adjunct to Homoeopathic medicines ($t = -0.639$, $p < 0.524$) are equally effective in both urban and rural population.
13. Duration of the disease is important in the management of type 2 diabetes mellitus, especially FBS ($p < 0.001$) and PPBS ($p < 0.001$). It is observed that disease less than 5yrs duration has better prognosis ($p < 0.001$).
14. Homoeopathic medicines are significantly effective in the reduction of FBS ($t = 16.309$, $p < 0.001$), PPBS ($t = 20.644$, $p < 0.001$) and HbA1c ($t = 10.49$, $p < 0.001$). So Homoeopathic medicines are effective in the management of type 2 diabetes mellitus.
15. Lifestyle changes as an adjunct to Homoeopathic medicines are significantly effective in the reduction of FBS ($t = 18.882$, $p < 0.001$), PPBS ($t = 29.978$, $p < 0.001$) and HbA1c ($t = 17.995$, $p < 0.001$). So lifestyle changes have a significant role in the management of type 2 diabetes mellitus.
16. Lifestyle changes as an adjunct to Homoeopathic medicines are far more effective in the reduction of FBS ($t = -3.88$, $p < 0.001$), PPBS ($t = -9.54$, $p < 0.001$) and HbA1c ($t = -9.64$, $p < 0.001$) than Homoeopathic medicines administered alone. So lifestyle changes as an adjunct to Homoeopathic medicines are significantly more effective in the management of type 2 diabetes mellitus.

Recommendations

The impact of type 2 Diabetes Mellitus is considerable; as a lifelong disease, it increases morbidity and mortality, decreases the quality of life and causes a heavy economic burden to themselves, their families and the society. Based on the findings of the study, the researcher proposes the following recommendations to the Government of Kerala.

1. Government should start a Diabetes Cell under Kerala University for Health Sciences (KUHS) and the aim of the cell should be the control and prevention of Diabetes Mellitus in Kerala.
2. The Diabetes Cell should include a Homoeopathic Diabetic Research Wing. Epidemiological studies, preventive and treatment programmes should be conducted and monitored through this Cell.
3. Establish Homoeopathic Diabetic Research Units in all Homoeopathic Medical Colleges and District Hospitals.
4. Diabetic Awareness Programmes should be conducted in all the Panchayats including educational institutions at regular intervals through medical camps, exhibitions, seminars, rallies and by means of folk arts.
5. Create awareness through public education, media campaigns, general practitioner training and screening camps organised by the State Government.

6. Educate women through women's organisations like the Kudumbasree Programme. Health clubs for women should be promoted.
7. Introduce compulsory physical exercise, including Yoga, in all educational institutions.
8. Introduce health education curriculum in schools and work places. Distribute pamphlets and advertise in magazines and newspapers about lifestyle diseases, importance of healthy lifestyles and the efficacy of Homoeopathic medicines.
9. Screening of high risk individuals is urgent. It should be started from the school level itself .To facilitate this a state level administrative machinery is an imperative necessity.
10. Registries of Diabetes should be established in Kerala at all levels.

The study was aimed at analysing the role of lifestyle changes in the development and management of Type 2 Diabetes Mellitus in Kerala through the Homoeopathic approach. The study has many implications in the prevention and management of Type 2 Diabetes Mellitus in Kerala. The investigator hopes that the Government would consider the recommendations and initiate the remedial measures with all the seriousness due to the problem under review.

References

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