FOOD HABITS AND LIFESTYLE DISEASE WITH REFERENCE TO DIABETIC PATIENTs

[1]Mrs. Umarani, [2]Dr.K.Somasundaran,
[1]Research Scholar, [2]Research Supervisor, Assistant Professor
[1]Department of Sociology, Annamalai University.
Email - umarani040583@gmail.com

Abstract: *The major environmental factors that lead to type 2diabetes are Sedentary lifestyle and over nutrition leading to obesity (Harris, 1991). Sedentary lifestyle is more common in urbanized societies. Dietary advice is essential upon diagnosis of diabetes. Usual advice Includes:*

- *Reducing intake of fatty foods*
- *Eating mainly vegetables, fruit, cereal, rice and pasta(using wholemeal products where possible)*
- *Eating only small amount of refined sugar (jam, sweets etc.)*
- *Eating at regular intervals*
- *Carrying glucose tablets, sweets or products in case of hypoglycaemia*
- *Exercising regularly, not only does it help reduce hyperglycaemia, but it also reduces insulin resistance by reducing obesity.*

*Most cases are preventable with healthy lifestyle changes and some can even be reversed .Taking steps to prevent and control diabetes doesn't mean living in deprivation. While eating right is important, patients don't have to give up sweets entirely or resign themselves to life time of " health food." Carbohydrates have a big impact on your blood sugar levels – more so than fats and protein. In general, patients should limit highly refined carbohydrates like white bread, pasta, and rice, as well as soda, candy, and snack foods. Focus instead on high – fibre complex carbohydrates- also known as slow- release carbs. Slow-release carbs help keep blood sugar levels even because they are digested more slowly, thus preventing the body from producing too much insulin. They also provide lasting energy and help people stay full longer (**Gross, 2005**).*

Keywords*: Food habits, Diabetic, Carbohydrates,*

1. INTRODUCTION:

The major environmental factors that lead to type 2 diabetes are sedentary lifestyle and over nutrition leading to obesity (**Harris**, **1991**). Sedentary lifestyle is more common in urbanized societies.

Dietary advice is essential upon diagnosis of diabetes .Usual advice include:

- reducing intake of fatty foods
- eating mainly vegetables, fruit ,cereal , rice and pasta(using whole meal products where possible)
- eating only small amount of refined sugar (jam, sweets etc.)
- eating at regular intervals
- carrying glucose tablets, sweets or products in case of hypoglycaemia
- exercising regularly, not only does it help reduce hyperglycaemia, but it also reduces insulin resistance by reducing obesity.

Most cases are preventable with healthy lifestyle changes and some can even be reversed. Taking steps to prevent and control diabetes doesn't mean living in deprivation. While eating right is important, patients don't have to give up sweets entirely or resign themselves to life time of "health food." Carbohydrates have a big impact on your blood sugar levels-more so than fats and protein. In general, patients should limit highly refined carbohydrates like white bread, pasta, and rice, as well as soda, candy, and snack foods. Focus instead on high - fibre complex carbohydrates- also known as slow- release carbs. Slow- release carbs help keep blood sugar levels even because they are digested more slowly, thus preventing the body from producing too much insulin. They also provide lasting energy and help people stay full longer (**Gross, 2005).**

2. REVIEW OF LITRETURE

2.1. SOCIO-ECONOMIC:

Rapid urbanization and industrialization have produced advancement on the social and economic front in countries such as India which are transitioning between agrarian and industrial capitalism and this transition has resulted in dramatic lifestyle changes leading to lifestyle related diseases. The transition from a rural to an urban lifestyle, consumption of diets rich in fat and calories combined with a high level of mental stress has compounded the

problem further. There are several studies from various parts of India which reveal a rising trend in the prevalence of type 2 diabetes in the urban areas **(Ramachandran, 2001)**.

2.2. FOOD HABITATIONS:

In many (western) countries, people's diet changed substantially in the second half of the twentieth century, generally with increases in consumption of meat, dairy products, vegetable oils, fruit juice, and alcoholic beverages and decreases in consumption of starchy staple foods such as bread, potatoes, rice, and maize flour .Their aspects of lifestyle also changed, notably, large reduction in physical activity and large increases in the prevalence of obesity (**Key TJ .2002).**

2.3. OBESITY:

Central obesity – the association of obesity with type 2 Diabetes is well known. Even with an acceptable body weight range, weight gain could increase the risk of diabetes. An excess of body fat specially concentrated within the abdomen has an increased risk of diabetes. The cut- off limit for waist circumference for Indians have been recommended to be 90 cm for males and 80 cm for females. Abdominal obesity is defined by waist circumference above these limits **(Gunnel Bistro 2016).**

2.4. CAUSE:

The reduction in the prevalence of complication over the past 40 years is undoubtedly due to greater appreciation of risk factors for factors for those complications and consequent improvements in patient management (Chaturvedi 2007, 4). The sudden development of short-term complication , such as ketoacidosis and sever hypo glycaemia that can lead to coma and , if untreated death , are a daily threat to many people worldwide with diabetes who have major difficulty in accessing essential treatment supplies (including insulin) **(Lefebvre & Slink, 2006).**

2.5. TYPE OF DIABETES MELLITUS:

The first widely accepted classification was published by the WHO in 1980 (Second Report, 1980). Two major classes of diabetes mellitus were proposed: IDDM (Type1) and NIDDM (Type 2). Other types as well as gestational diabetes were also included. The modification from of 1985 (Diabetes Mellitus Report of a WHO Study Group, 1985) was widely accepted and is used internationally. It was recommended that the terms "insulin – dependent diabetes mellitus" and "non –insulin dependent diabetes mellitus" should no longer be used, because patients were classified according to treatment rather than pathogenesis. The terms Type 1 and Type 2 were introduced to describe the cases which are primarily due to pancreatic islet beta –cell destruction the former and the common major form of diabetes resulting from defect in insulin secretion in the latter **(Goodpaster, 2010).**

2. OBJECTIVES:

- To study the socio-economic background of the diabetes patients
- To study the awareness about diet to be followed by diabetes patients and Whether the diet is followed by the patients
- To know their life style
- To formulated suitable measured prevent or maintain patient with diabetes.

3. METHODOLOGY OF THE STUDY:

3.1. RESEARCH DESIGN:

Descriptive research designing was for conducting this study

3.2. SAMPLING METHODS:

130 respondents are selected in the basis of purposive sampling method was used.

3.3. TOOLS OF THE STUDY:

The tools used in the study is structured stet of interview method which are to be provided personally by the respondents

3.3. TOOLS OF ANALYSIS:

Statistical techniques were used for the analysis of data by using the SPSS Package (Statistical Packages for Social Sciences). Statistical techniques like simple table method and Chi-square have beeen used to test the relationship between several categorical variables.The data was planned to be analysed on the basis of the objectives of the study, the quantitative analysis was planned.

4. RESEARCH HYPOTHESIS:

- There is a significant relationship between age of the respondents and their food habits and lifestyle disease of diabetic patient.
- There is a significant relationship between education of the respondents and their food habits and lifestyle of the diabetic patient.
- There is no association between rural / urban of the respondents and their food habits and lifestyle of the diabetic patient.

Table 1
Demographic Profile

(N=130)

	Sub Samples	Number of Respondents	Percentage
Age	Below 40	19	14.6
	41 to 60	61	46.9
	60 and above	50	38.5
Sex	Male	66	50.8
	Female	64	49.2
Caste	SC	48	36.9
	MBC	40	30.8
	BC	12	9.2
	OC	30	23.1
Religion	Hindu	81	62.3
	Muslim	8	6.2
	Christian	41	31.5
Marital Status	Married	79	60.8
	Unmarried	8	6.2
	Widow	12	9.2
	Widower	31	23.8
Education	Illiteracy	9	6.9
	Primary	60	46.2
	Secondary	13	10.0
	Higher Secondary	12	9.2
	Degree	36	27.7
Occupation	Government employee	40	30.8
	Private employee	32	24.6
	Business	35	26.9
	Unemployed	23	17.7
Nature of work	Sedentary	60	46.2
	Non Sedentary	70	53.8
Area of living	Village	6	4.6
	Town	124	95.4
Income	Below 20,000	53	40.8
	20,000 to 40,000	59	45.4
	Above 40,000	18	13.8
Type of House	Hut	19	14.6
	Semi-pucca	82	63.1
	Pucca	29	22.3
Nature of House	Own	26	20.0
	Rent	85	65.4
	Lease	19	14.6

The above table shows the demographic profile of the respondents. Regarding age group of the respondents nearly half (46.9%) of the respondents belong to the age group of 41 to 60 years, 38.5 per cent of them belong to the age group of 60 years and above and 14.6 per cent of them belong to below 40 years. **Merely more than half (50.8%) of the respondents are male and 49.2 per cent of them are female. More than one third (36.9%) of the respondents are scheduled caste, 30.8 per cent of the respondents belongs to most back ward community, 23.1 per cent of them belong to others cast and the remaining 9.2% of them belong to back ward community. More than half (62.3%) of the respondents are Hindus, 31.5% of the respondents are Christians and the rest of 6.2 per cent of them are to Muslims. More than half (60.8%) of the respondents are married, 23.8 per cent of them are widower, 9.2 per cent of the respondents are widow and rest 6.2 per cent of them are unmarried. Nearly half (46.2%) of them are studied up to primary level, 27.7 per cent of them are completed their graduation, 10.0 per cent of the respondents completed their secondary education and 9.2 per cent of the respondents completed their higher secondary level and the remaining 6.9% of them are illiterates. Less than one third 30.8 per cent of the respondents are government employees, 26.9 per cent of the respondents doing business, 24.6 per cent of the**

respondent are Private employees and 17.7 per cent of them are unemployed. More than half (53.8%) of the respondents doing non sedentary work and rest 46.2 per cent of them doing sedentary work .Majority (95.4%) of living in town and the rest 4.6 per cent of them living villages. Majority (45.4%) of the respondents individual monthly income is Rs 20,000 - 40,000, 40.8 per cent of the respondents monthly income in below Rs 20,000 and the rest 13.8 per cent of the respondents monthly income Rs 40,000 and above. Majority (63.1%) of them dwell in a semi-pucca, 22.3 per cent of the respondents are in pucca and the rest 4.6 per cent of them dwell in hut. Large number (65.4%) of respondents staying in rented house, 20.0 per cent of them staying in their own house .and the rest (14.6%) of them staying in leased house.

Table 2

Distribution of the Respondents by Food Habits

Food Habits	Number of Respondents	Percentage
Vegetarian	33	25.4
Non-vegetarian	97	74.6
Total	130	100.0

Regarding food habits of the respondents the above table shows that the majority (74.6%) of the respondents taking only non-vegetarian food, and the rest 25.4 per cent of the respondents are vegetarians.

Table 3

Distribution of the Respondents by Food Items they Take Before and After Affected by Diabetes

	Before Affected		After Affected	
	Yes	No	Yes	No
Raggi	59 (45.38%)	71 (54.62%)	118 (90.77%)	12 (9.23%)
Wheat	119 (91.54%)	11 (8.46%)	130 (100.0%)	0
Rice	130 (100.0%)	0	130 (100.0%)	0
Direct Sugar	130 (100.0%)	0	106 (81.54%)	24 (18.46%)
Vegetables grow below the ground	130 (100.0%)	0	130 (100.0%)	0

Regarding the food item the respondents take before and after affected by the diabetes the above table shows that 45.38 per cent of the respondents take ragi before affected by the diabetes and 90.77 per cent of them take ragi after affected by the diabetes, majority (91.54%) of them take wheat before affected and all are taking wheat after affected, all the respondents are taking rice both before and after affected by diabetes, all are taking direct sugar items before affected and 81.54 per cent taking direct sugar items after affected; all are taking vegetables grow below the grownd level before and after affected and all are taking non vegetarian before and after affected by diabetes. It could be concluded take after affected by the diabetes the number of respondents taking ragi increased from 45.38 per cent to 90.77 per cent, all are taking rice and vegetables grow under the ground level even before and affected by diabetes and to all are taking direct sugar before affected by the diabetes and it is decreased to 81.54 per cent after they affected.

Table 4

Distribution of the Respondents by Diet Control they Follow

	Yes	No	Total
Reducing intake of fatty foods	110 (84.6%)	20 (15.4%)	130
Eating mainly vegetables	126 (96.9%)	4 (3.1%)	130
Fruits	120 (92.3%)	10 (7.7%)	130
Cereal	125 (96.2%)	5 (3.8%)	130
Rice	130 (100.0%)	0	130
Eating small amount of refined sugar (jam, sweets etc.)	41 (31.5%)	89 (68.5%)	130
Eating at regular intervals	95 (73.1%)	35 (26.9%)	130

The above table shows of the respondents' dietary pattern. All the respondents taking rice, followed by majority 96.9 per cent of them add r mainly vegetables in their food and most 96.2 per cent of them taking cereal, large number 92.3 per cent are taking fruits, majority have reduce intake of fatty foods, large number of them eating at regular intervals, 31.5 per cent taking small amount of food items refined by direct sugar. It could be concluded that all the respondents take rice in their daily food and they also taking vegetables, fruits and rice. However they have reduced intake of fatty foods and following the habit of eating at intervals.

Table 5
Distribution of the Respondents by Age Group and Food Habits

Age group	Food habits		Total
	Vegetarian	Non-Vegetarian	
Below 40 years	5 (3.8%)	14 (10.8%)	19 (14.6%)
41 to 60 years	19 (14.6%)	42 (32.3%)	61 (46.9%)
60 years and above	9 (6.9%)	41 (31.5%)	50 (38.5%)
Total	33 (25.4%)	97 (74.6%)	130 (100.0%)

Calculated chi-square value	Degrees of freedom	Probability Value
2.518	2	0.284 (NS)

NS – Not Significant

The above table shows the age group and food habits of the respondents. Among 74.6 per cent of the respondents who are non-vegetarians merely one third (32.3%) are belong to the age group of 41-60 years, 31.5 per cent belong to the age group of 60 years above and 10.8 per cent belong to the age group of below 40 years. Among 25.4 per cent of the respondent vegetarian 14.6 per cent belong to 41-60 years, 6.9 per cent belong to 60 years and above and 3.8 per cent belong to below 40 years. The table reveals that majority (74.6%) of the respondents are non-vegetarians and among the most (32.3%) of them belong to age group of 41-60 years. However the relation between age group and vegetarian / non vegetarian is not statistically significant.

Table 6
Distribution of Respondents by Education and Food Habit

Education	Food habits		Total
	Vegetarian	Non-Vegetarian	
Illiteracy	2 (1.5%)	7 (5.4%)	9 (6.9%)
Primary	14 (10.8%)	46 (35.4%)	60 (46.2%)
Secondary	5 (3.8%)	8 (6.2%)	13 (10.0%)
Higher Secondary	5 (3.8%)	7 (5.4%)	12 (9.2%)
Degree	7 (5.4%)	29 (22.3%)	36 (27.7%)
Total	33 (25.4%)	97 (74.6%)	130 (100.0%)

Calculated chi-square value	Degrees of freedom	Probability Value
3.705	4	0.447 (NS)

NS – Not Significant

With respect to the relationship between education and food habit of respondents the above table exhibits that 25.4 per cent are vegetarians, among them 10.8 per cent studied up to primary level, 3.8 per cent each studied up to secondary and higher secondary level respectively, and 5.4 per cent of them studied up to degree level and 2 respondents are illiterate.74.6 per cent of the respondents who are non-vegetarian, among them 35.4 per cent of them studied up to primary level, 22.3 per cent studied up to degree level, 6.2 cent studied up to secondary level and 5.4 per cent are illiterates and studied up to higher secondary level respectively. The table reveals that majority (74.6%) of the respondent are non-vegetarians and among them most of them are studied up to primary level. Whereas the chi-square value shows that the relationship between education and food habit is not statistically significant.

4.1. DIET AND LIFE STYLE CHANGES:

According to American Diabetes Association (ADA) (2012) Medical nutrition therapy is an essential component of diabetes management; unfortunately, patient adherence to nutrition principles is one of the most challenging aspects of diabetes care. A goal of medical nutrition therapy is to achieve and maintain blood glucose concentrations as close to normal as possible by balancing food intake with anti-diabetic drug therapy and physical

activity levels. More than 30%of the total daily caloric intake should come from fats; 10%to 20% from protein, and the balance of daily calories from carbohydrates. Exercise improves insulin sensitivity and glycaemic control, especially in patients with mild diabetes or a high degree of insulin resistance.

4.2. QUALITY OF LIFE:

Richard. **R (2000)** stated that quality of life is also increasingly recognized as an important health outcome in its own right, representing the ultimate goal of all health interventions. More than 70 years ago, the World Health Organization stated that health was defined not only by the absence of disease and infirmity, but also by the presence of physical, mental, and social well–being (World Health Organization: Handbook of Basic Documents (1952).Though health care providers sometimes focus on medical outcomes alone when assessing the efficacy of their interventions, any person with diabetes will confess that these outcomes are truly meaningful only to the extent that they affect physical, emotional, and social well-being- that is, quality of life. Diabetes is a demanding disease. Almost every diabetic person feels that diabetes powerfully affects their lives, and most feel burdened by the manifold demands of their disease, an experience that could be called "diabetes overwhelmus," since so many people feel overwhelmed by the continuous burden of their disease and its management. These emotional and social burdens may be compounded by the acute physical distress of hypoglycaemia or hyperglycaemia and by the chronic physical distress of diabetes –related complications. It seems clear that diabetes can affect a person's quality of life. But what is quality of life? In the most general terms, quality of life may be thought of as a multidimensional construct in incorporating an individual' subjective perception of physical, emotional, and social well – being, including both a cognitive component (satisfaction) and an emotional component (happiness).

4.3. LIFE STYLE:

Kelin (2011) has stated that the term" life style is rather a diffuse concept often used to denote "the way people live reflecting a whole range of social values attitudes and activities' It is composed of cultural and behavioural patterns and lifelong personal habits (example) smoking, alcoholism etc., that developed through processes of socialization. Life styles are learnt through social interaction with parents, peer groups, friends and sibling and through school and mass media. Health requires the promotion of healthy life style. In the last 20 years, a considerable body of evidence has accumulated which indicates that there is an association between health and life style of individuals. Many current day health problems especially in the developed countries (e.g. Coronary heart disease, diabetes) are associated with life style change. In developing countries such as India were traditional life styles till persisting risks of illness and death are connected with lack of sanitation, poor nutrition and personal hygienic. Elementary human habits, customs, cultural patterns and socio-economic conditions. Life style diseases (also sometimes called diseases of longevity or diseases of civilization interchangeably) are defined as diseases linked with the way people live their life. This is commonly caused by alcohol, drug and smoking abuse as well as lack of physical and unhealthy eating.

Diseases that impact on our life style are heart disease, stroke, obesity and type 2 diabetes.

4.4. DIABETES IN INDIA:

India Medical Research (2011) found that diabetes is fast gaining the status of a potential epidemic in India with more than 62 million diabetic individual currently diagnosed with the disease. In 2000, India (31.7 million) topped the world with the highest number of people with diabetes mellitus followed by China (20.8 million) with the United States (17.7 million) in second and third place respectively. According to **(Wild et al 2004)** the prevalence of diabetes is predicted to double globally from 171 million in 2000 to 366 million in 2030 with a maximum increase in India. It is predicted that by 2030 diabetes mellitus may afflict up to 79.4 million individuals in India, while China (42.3 million) and the United States (30.3 million) will also see significant increases in those affected by the disease. India currently faces an uncertain future in relation to the potential burden that diabetes may impose upon the country. Many influences affect the prevalence of disease throughout a country, and identification of those factors is necessary to facilitate change when facing health challenges.

5. TYPES OF DIABETES MELLITUS:

As per Goodpaster, (2010) the first widely accepted classification was published by the World Health Organization WHO in 1980 (Second Report, 1980). Two major classes of diabetes mellitus were proposed: Insulin dependent diabetes mellitus (IDDM) Type 1 and non –insulin dependent diabetes mellitus (NIDDM) Type 2. Other types as well as gestational diabetes were also included. The modified form of 1985 (Diabetes Mellitus: Report of a World Health Organization WHO Study Group, 1985) was widely accepted and is used internationally. It was recommended that the terms "insulin- depended diabetes mellitus", and "non – insulin – dependent diabetes mellitus" should no longer be used, because patients were classified according to treatment rather than pathogenesis. The terms type 1 and type 2 were introduced to describe the cases which are primarily due to pancreatic islet beta – cell destruction the former and the common major form of diabetes resulting from defects in insulin secretion the latter.

5.1. RISK FACTORS FOR PREDIABETES AND TYPE 2DIABETES:

Researchers don't fully understand why some people develop prediabetes and type 2 diabetes and others don't. It's clear that certain factors increase the risk, however, including:

- Weight, Inactivity, Family history, Race, Age, Gestational diabetes, Polycystic ovary syndrome, High blood pressure, Abnormal cholesterol and triglyceride levels. **(Tuomilehto, 2003).**

6. CONCLUSION:

In general, treatment of diabetes aims to do what the body of a diabetic patient would normally do – maintain a proper balance of insulin and glucose. Living well with diabetes means keeping the level of glucose in the blood as close to normal as possible. The three elements for controlling type 1diabetes are food, exercise and insulin. In many people with type 2 diabetes, diet and exercise alone can control blood glucose levels. A health care team will be able to suggest a specific lifestyle or exercise plan depending on age, lifestyle and overall health. The study was conducted in Poducherry to understand the diabetic patients' awareness about after effect of diabetes. Further it is to find whether there is a change in their lifestyle and problems faced by them because of the diabetes including economic and social problems. With respect to person profile of the respondents belonging to the age group of 41-60 years, most of them are male, large number of them are scheduled caste, and most of them Hindus. Majority of them are married and most of them studied up to primary level. Regarding the occupation, majority are government employees and most (46.2%) of them doing sedentary work. Large number of individual monthly income is Rs. 20,000-40,000. As far as the nature of dwelling is considered more than half of them are dwelling in semi-pucca house, more than half (65.4%) of them are staying in rented house and majority (41.2%) of the respondents paying Rs 40,000-60,000 as house rent.

With respect to dietary practices the result shows that majority (76.4%) of the respondents are non-vegetarian. After affected by diabetes the number of respondents taking ragi increased from 45.38 per cent to 90.77 per cent. All are taking rice and vegetables grown under the ground level before and after affected by diabetes and all are taking sugar directly before affected by diabetes and it is decreased to 81.54 per cent affected by diabetes. When diet control followed is considered all of the respondents take rice in their daily food and taking vegetables and fruits. However they has reduced the intake of fatty foods and following the habit of eating at intervals. More than half of the respondents don not eat junk food. When considering the relationship of socio-economic variables, age group, sex, marital status, educational level, occupation and individual income per month, the results shows that among majority of the respondents who are non-vegetarian majority of them belongs to 41-60 years of age group, most of them are female, large number (42.3%) of them are non-vegetarians, majority of them studied up to primary level, most of them are government employees and majority are earning Rs. 20,000-40,000 per month as individual income. Majority of the respondents' body weight is 70 kilograms and more. However the relationship between these variables with the food habit is not significant.

Regarding the respondents' awareness about the importance of physical exercise the findings shows that all are doing physical exercise, among the majority are doing yoga, when considering the relationship between socio-economic variables and physical exercise, among those who are doing yoga, majority belongs to the age group of 60 years or more, most of them are male and large number of them studied up to primary level. Majority of them are private employees and most of the respondents' individual income per month is between Rs 20,000-40,000. Regarding the respondents' life style, especially smoking, drinking alcohol and using tobacco the number of respondents who are smoking is decreased from 19.2 per cent to 2.3 per cent after being affected by diabetes. There is no change in use of tobacco and use of alcohol is decreased from 17.7 per cent to 3.8 per cent.

When considering the problems faced by the respondents, for majority of them the duration of period affected by diabetes is less than five years, more than half (69.2%) of them are aware of the complication and the rest (30.8%) of them are not aware of the complication. Majority of them are taking tablets and most of them takes twice a day. Even though a person is severely affected or their glucose level is not controlled, it is advised to take insulin but normally people prefer to take tablets rather than insulin because it is easier. It is evident from this study. Regarding treatment aspects and expenditures made for the treatment, majority of them spends Rs. 2000 and more per month. More than half of them for allopathy treatment, majority visit doctor monthly once, large number of them has to be accompanied by others while visiting doctors. Great majority (84.6%) of them visits the doctors by going on their own and from vehicles and most of them are satisfied with the doctor's treatment. Majority of them has weight loss. Just more than half of them have body pain and discomfort; most of them are affected by hypertension other than diabetes. More than half of them never felt a situation when they were in control of the situation.

REFERENCE:

1. Ramachandran A, Snehalatha C, Kapur A, Vijay V, Mohan V, Das AK, et al.(2001), Diabetes Epidemiology Study Group in India (DESI). High prevalence of diabetes and impaired glucose tolerance in India: National Urban Diabetes Survey. Diabetologia; 44: 1094-101.
2. Key TJ ALLEN NE, Spencer EA. (2002 Sep), The effect of diet on rick of cancer Lancet 14; 360 (9336) :861-8 Review, PMID; 12243933
3. Lefebvre, P &D=Slink, M. 2006Diabetes fights for recognition. International Diabetes Federation, Belgium. www.thelancet. Com. Vol. 368, 1625-1626

4. HARRIS M. (1991): Epidemiologic Correlated of NIDDM in HISPANICS, : 639-648.Whites and blacks in the US population. Diabetes care; (supply 3) Diet Diabetes.
5. GROSS J.L., DE AZEVEDO M.J., SILVEIRO SP., CANANI L.H., CARAMORI M.L., ZELMNOVITZ T.(2005): Diabetic nephropathy: diagnosis , prevention, and treatment . Diabetes Care; 28:164-176.
6. American Diabetes Association, Diagnosis and classification of diabetes mellitus, Diabetes care 2012; 30:s42-s47.
7. RICHARD R. R (2000).: Diabetes and Quality of Life, Diabetes Spectrum; 13:21.
8. Klein, J (2011). How Lifestyle habits affected diabetes. Available at: http:// www. Life.Guiana .com
9. Indian Medical Council Research Diabetes Atlas, 6th edition Indian Council of Medical Research –India Diabetes (ICMR- INDIA B STUDY. Diabetologia 2011 Dec: 54 (12) 3022-7. Doi: 10.1007/0012511-2291-5. Pub 2011 sep 30.
10. GOODPASTER B., DETANY A., and OTTOD. Et al (2010), Effect of diet and physical activity interventions in severely obese adults: randomized trial. JAMA; 304-16:1795-1802.
11. TUOMILEHTO J., LINDSTORM J., ERIKSSON. Et al (2003). for the Finnish diabetes study group: Prevention of type 2 diabetes mellitus by change in life-style among subject with impaired glucose tolerance NEJM; 344:1343-1350.