Nutritional status and Healthy life style measures approach among type 2 diabetes patients

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Abstract

Nutritional status of an individual is dependent on the provision of sufficient nutrients and the good utilization of these nutrients. Nutrients needed by human body for good nutritional status are provided by food. Food is essential for human existence and nourishes the body. Diabetes mellitus is characterized by chronic hyperglycemia and disturbance of carbohydrate, fat and protein metabolism associated with an absolute or relative deficiency of insulin secretion or insulin action. People can improve their health via exercise, enough sleep, maintaining a healthy body weight, limiting alcohol use and avoiding smoking.Diabetes management is the balance between diet and timely medication. Health is one of the important factors contributing towards happiness. Maximum patients were taking hariya .

Key words: Nutritional status, obesity, food consumption pattern

Introduction

Lack of adequate nutritional knowledge, poor dietary practices and obesity contribute greatly to high prevalence of diabetes (Kenya et.al 2011). These changes in human behavior and lifestyle have largely led to the rising prevalence and incidence of diabetes in both rural and urban settings (World Health Organization 2011). The understanding of risk variables associated with type 2 diabetes is very crucial for its prevention, better management and effective treatment (Khullar, et.al2015). Dietary management of type 2 diabetes among patients is one way to prevent or delay the long-term effect of the condition. Diabetic individuals worldwide are routinely advised to adopt a healthful eating behavior, which requires modifications in food habits, beliefs and meal patterns on a lifelong basis (Summit Report2007) WHO defines diabetes as a chronic disease that results either when the pancreas does not produce enough insulin or when the body cannot effectively utilize the insulin it produces. Diabetes mellitus is the most prevalent type of diabetes characterized by hyperglycemia (World Health Organization. 2005**)**.

Diabetes Mellitus is characterized by chronic hyperglycemia and disturbance of carbohydrates, fat and protein metabolism associated with an absolute or relative deficiency of insulin secretion or insulin. Life style related diseases are now killing more Indians than the infectious ones. Dietary factors also influence the risk of developing type 2 diabetes consumption of sugar sweetened drinks in excess is associated with an increased risk. The type of facts in the diet are also important with the saturated fats and trans fatty acid increasing the risk and polyunsaturated and monounsaturated fat decreasing the risk. Eating lots of white rice appear to also play a role in increasing risk. Greater leafy-green vegetables consumption was correlated to 14% decrease in risk of Type 2 diabetes (Carter et al. 2010). Vegetables play a remarkable role in human nutrition and health since they charge dietary fiber, phytochemicals, vitamins, and minerals (Dias et al.2011). Vegetable intake has been highly correlated with improved gastrointestinal health, and reduced risk of heart attack, some types of cancer and chronic ailments such as diabetes (Dias 2012). It was observed that in some varieties that 200 g of onions contain chromium up to 20% of the daily requirements (Swamy et al.2013).

A number of lifestyle factors important to the development of type 2 DM, are physical inactivity, sedentary lifestyle, cigarette smoking and generous consumption of alcohol (Hu et al. 2001). Environmental toxins may contribute to the recent increases in the rate of type 2 DM. A weak positive correlation has been found between the concentrations in the urine of bisphenol A, a constituent of some plastics, and the incidence of type 2 DM (Lang et al.2008). The risk of obesity is linked to chronic heart disease and diabetes in a country like India, even though when compared to the global population, Indians tend to have a lower rate of obesity and overweight (Kaveeshwar and Cornwall 2014). Large amounts of high fructose corn syrup used in the manufacturing of soft drinks, raises blood glucose levels and BMI to the dangerous levels. Elevated intake of white rice was associated with an increased risk of T2DM (Nanri et al. 2010). A varied diet high in fruits, vegetables, pulses and nuts was

associated with lower cholesterol, indicating that more traditional diets may have a healthier profile (Mishra et al.2011).

Dietary therapy is showing a bright future in the prevention and treatment of diabetes. Cereal grains form the staple diet for humans in most of the countries are increasingly being used to treat diabetes and other associated disorders in view of their anti- diabetic and anti lipidemic potential. It is concluded that cereal grains are not only the potential sources of energy but also possess the therapeutic role in preventing metabolic disorders and decreasing the risk factors for cardiovascular and renal diseases (Singhal and Kaushik, 2016).

Objective

- To find out suitable measures to minimize diabetes mellitus

HYPOTHESIS

- Socio-economic status influence the food habits of diabetic mellitus patient
- Unhealthy life style behaviour and dietary habits leads to obesity resulting diabetes.
- Dietary intervention and healthy life style measures approach is more effective than drug therapy.

RESEARCH METHODOLOGY

This present study was conducted in selected hospitals such as Raj hospital (60), Sewa Sadan hospital (60), Guru Nanak hospital (60), Rims hospital (60) and Medanta hospital (60) of Ranchi district. Total 300 diabetic patients were purposively selected. The information regarding diabetes of the diabetic patients were collected through a specially designed scheduled. The collected data were coded, tabulated and analyzed for drawing the relevant interferences.

***Anthropometric measurement*:** Anthropometry is the measurement of body size, weight and proportions. Measures obtained from anthropometry can be sensitive indicators of health, development and growth. Anthropometric data acts as an important tool in the evaluation of nutritional status of the individuals Height, weight and mid arm circumference was therefore, recorded of the subjects interviewed.

LEVEL OF NORMAL BLOOD SUGAR

In healthy people, insulin prevents a large rise in blood sugar after eating. The normal blood sugar level-

Before breakfast	-	70 and 110 milligrams per-deciliter (mg/dL).
After a meal	-	Exceed 180 mg/dL.

Obesity until recently was considered a cosmetic nuisance, personal issue and social problem, but now it poses as a major health hazard in later years, causing morbid condition and at times early death. Now considered a metabolic disorder, its prevalence has increased globally and threatens the health of the individual.
Obesity is defined in terms of body weight over height Body mass index (BMI) is expressed as

BMI = Weight in kg/ Height in m^2

Normal BMI is between 18 and 25. Below 18 is considered underweight. Between 25 and 29.9 is overweight. Between 30 and 35 is obese.
BMI over 35 is considered morbidly obese. Waist-to-hip ratio should not exceed 0.8 (Howkins and Bourne 2011). Obesity can be defined as the presence of excess adipose tissue in the body. More than 20% of the ideal weight indicates excess weight, and more than 30% indicates obesity. BMI is the index of obesity. It is calculated as the ratio of body weight in kg to height square in meters.

BMI Scale

15-19	Underweight
20-24.5	Ideal weight
25-29	Overweight
Greater than or > 30	Obese
Greater than or > 35	Morbidly obese

To loose weight one have to consume food of less calorific value or burn calories through brisk exercise (Arora. A 2007).

Finding

- Meal duration

Studies on diabetes help to create awareness to improve the Life- Style of the people struggling with this dreaded disease every day. Absence of adequate nutrients can cause certain disease. Deficiencies, excesses and imbalance in the diet can produce negative impacts on health.

Table 1: Meal duration of type 2 Diabetes patients

Duration of meals	Number	Percentage
½-1 hours	29	9.67
2-hours	154	51.33
3-hours	38	12.67
More than 3 hours	79	26.33
Total	300	100
M=75		
S.D=56.99		

Table 1 shows that the interval between two meals of 51.33% type 2 Diabetes patients were 2 hour, followed by 26.33% patients with gap between meals were more than 3 hours and only 9.67% having interval of 1/2–1 hours. Among the categories of pre diabetes, the prevalence of impaired fasting glucose was substantially higher than that of impaired glucose tolerance (Ramachandran et. al. 2003).

Addictions

Diabetes is a major cause of morbidity, mortality, and economic burden to the society.

Table 2: Addictions of Diabetes type 2 patients

Addictions	Number	Percentage
Yes	221	73.67
No	79	26.33
Total	300	100

Majority of diabetes type 2 patients (73.67%) were addicted for hariya, champagne) whereas 26.33 % were not taking anything (**Table 2).**

Use of smoking, pan and tobacco

Smoking is a cause of type 2 diabetes, which is also known as adult-onset diabetes. Smokers have a greater risk of developing type 2 diabetes. The risk of developing diabetes increases with the number of cigarettes smoked per day. Smoking reduces glucose to tolerance and sensitivity to insulin and increase the risk of developing type-2 diabetes. Consumption of tobacco in any form is an important risk factor of arteries and enhances blood clothing.

Table 3: Use of smoking, pan, and tobacco of type 2 diabetes patients

Use smoking	Number	Percent
Occasional or rarely	22	9.95
Chain smoker	56	25.34
2-3 time in a day	27	12.22
Once a week	116	52.49
Total	221	100
M=66.34		
S.D=55.25		

Regarding use of smoking, pan and tobacco chewing by type 2 diabetes patients, 52.49 % were habitually taking once in a week followed by chain smoker 25.34%, 2-3 time in a day 12.22% and occasional 9.95% (Table 3). Despite increasing evidence of the metabolic risks caused by the interplay between smoking and diabetes,

prevalence of smoking remains high among people with diabetes. In a country such as Switzerland, it is estimated that 20.8% of people with diabetes are current smokers (Le Boudec et. al 2016)

- Alcoholic Beverages

Alcohol, in particular beer and certain wine, also have high amounts of carbohydrates, which can raise blood sugar levels. Alcoholic drinks are high in calories, so alcohol and type 2 diabetes can affect one another. It is difficult for type 2 diabetes patients to lose weight, consuming empty calories from alcohol.

Table 4: Alcoholic Beverages of diabetes type 2 patients

Alcoholic	Number	Percentage
Daily	**38**	**40.86**
Weekly	**11**	**11.83**
Monthly	**07**	**7.53**
Occasionally or rarely	**37**	**39.78**
Total	**93**	**100**
M=23.25		
S.D=15.54		

In case of taking alcoholic beverages by diabetes type 2 patients, majority of them (40.86%) were consuming daily, followed by 39.78% rarely or occasionally, 11.83% weekly, and only 7.53 % monthly (Table 4).

- Food Consumption Pattern

Meat and fish are rich in proteins (18-22%) of high biological value and are a fair source of B vitamins. Fatty fish contains some vitamin A and D. Large fish are rich in phosphorus, but are deficient in calcium. Small fish eaten with bones are good sources of calcium. Fish is a rich source of omega 3 fatty acids that prevent coronary artery disease. Fats and oils serve mainly as sources of energy and provide the essential fatty acids. The common vegetable oils and fats do not contain carotene or vitamin A. Many of them are good sources of vitamin E. Fat also exists in a daily diet from invisible sources like milk, meats and nuts, other than the cooking medium. Daily allowance of 3-4 teaspoons of healthy cooking oil is sufficient make the diet palatable. Protein foods are rich in protein and are needed to build muscle cells. They also contain minerals, like iron, and essential vitamins. Oily fish is rich in omega oils, which are beneficial to the heart. Increasing the amount of fiber you eat and reducing your fat intake, especially saturated fat can help manage your cholesterol and will help control diabetes. Choose carbohydrate foods with a low GI but which also have a high fiber content. For example: bread, rice, potatoes and pasta.

Table 5: Food Consumption Pattern (oil, non - veg, beverages, cookies)

Food Stuff	Never	Daily	Twice	Weekly	Monthly	Occasion
Oil and oil products /Ghee	59	25	10	69	68	69
Refined	59	19	35	69	44	74
Mustard oil	35	265				
/Fish	102	28	12	58	58	42
Egg	102	20	20	25	67	66
Meat	102	5	5	12	105	71
Beverages (Drink) / tea or coffee	12	167	33	-	56	32
Sugar	82	93	--	16	87	22
Cake, ice-cream, chocolate, candy	33	--	--	26	--	241
Biscuits	9	168	39	44	14	26
Salty snacks	40	45	-	78	89	48
Junk	89			38	173	

In case of food consumption pattern 69 respondents reported weekly or occasionally consumption of ghee, followed by 265 respondents using mustard oil twice in a day, 102 never taking fish, followed by 89 junk food,

59 refined, 241 occasionally taking ice-cream, cake chocolate candy, 173 respondents respondent consuming junk food in a month, 168 daily consuming biscuits, 167 twice time tea or coffee etc (Table 5).

Saturated fat contributes to raise cholesterol, which increases the risk of heart attack and stroke. Saturated fat is found in butter, lard, cream, fat on meat. Unsaturated fat in diet helps to lower blood cholesterol. Unsaturated fat comes in two forms monounsaturated and polyunsaturated. Monounsaturated fat is found in olive oil, canola (rapeseed) oil, nuts such as peanuts, almonds and cashew nuts. Polyunsaturated fat is found in sunflower, corn and soya oils. Oily fish is rich in a specific polyunsaturated fat called omega 3 that is very heart protective. It reduces inflammation and helps lower cholesterol (INDI 2014). Obesity is a disorder in which an excess of fat accumulates in the body. Weight control become very important as over weight is closely associated with other health problems such as renal disorders, diabetes and cardiovascular disease.

Nutritional Status of the Respondents and BMI

Nutritional status is the state of our body as a result of the foods consumed and their use by the body. It can be good, fair or poor. BMI is very easy to measure and calculate and is therefore the most commonly used tool to correlate risk of health problems with the weight at population level Like any other measure it is not perfect because it is only dependent on height and weight and it does not take into consideration different levels of adiposity based on age, physical activity levels and sex. (WHO2007). Diet plays significant role in controlling the diabetes. The objective of diabetic diet is to maintain ideal body weight by providing adequate nutrition along with normal blood sugar levels in blood. the diet plan for a diabetic is based on height, weight, age, sex, physical activity and nature of diabetes.

Table 6: Nutritional Status of the Respondents and BMI

BMI	**Nutritional status**	Number	Percent
<18.5	Underweight	20	6.67
18.5- 22.9	Normal weight	42	14.00
23.0-24.9	Pre – obesity	29	9.66
25-29.9	Obesity class I	88	29.33
30-39.9	Obesity class II	98	32.67
>40	Obesity class III	23	7.67
	Total	300	100

The maximum diabetic patients (32.67%) were belonging to obesity class II (30-39.9) followed by 29.33% obesity class I (25-29.9), 14% normal weight (18.5-22.9), 9.66% pre-obesity (23- 24.9), 7.67% falls under obesity class III (> 40) and only 6.67% underweight (<18.5). (Table-6)

- Measures to control diabetes

Good health is a vital part of the great experience of living. Every age has made new discoveries about health and providing man with new weapons to fight disease. Today steady progress is being made in the field of education, medicine and surgery as well as public health. Attempts are being made to give everyone a fair chance to lead a healthier life. Health affects not only individuals but also the whole community. India has one of the richest cultural heritages associated with the use of medicinal plants. It represents an example of intimate link between biological and cultural diversity. The Indian civilization has given the vast knowledge about the uses of plants for food and health care. Plants have played an important role in medicine. The uses of medicinal plants for health have evolved through centuries. In spite of the advance technology in modern medical science, the use of medicinal herb has become an important part of daily life as many people depend on herbal drugs. In our country medicinal plants offer easy available, low cost, safe health care solution and having no any side effects. In remote areas, the rural communities depend greatly on indigenous knowledge for health care. Thus the traditional knowledge of plants for better health condition of the people should be promoted.

The goal of every individual is happiness. Health is maintained by certain regularities in behavior regarding diet, exercise, rest and medication when necessary. There are many diseases and disorders that can be alleviated with the use of medicinal herbs for all ailments, either to heal them, to prevent them or simply to alleviate them (Dey and Ghosh, 2016).

Table 7: Measures to control diabetes

Measurement	Number	Percent
Medicine	62	14.49
Medicine /diet	41	9.58
Medicine /exercise	25	5.84
Fenugreek	62	14.49
Indar jow	41	9.58
Insulin leaf	5	1.17
Tulsi pata	26	6.07
Fry coriander	4	0.93
Munga leaf	8	1.87
Lotus seed	3	0.70
Bitter	11	2.57
Goole	9	2.10
Patanjali	1	0.24
Neem	15	3.50
Mix vegetable juice	8	1.87
Blackberry	28	6.54
Herbal medicine	25	5.84
Periwinkle	12	2.80
Rose	1	0.25
Apple	11	2.57
Paneer flower	12	2.80
Pumpkin	12	2.80
Madhumeh churn	6	1.40
Total	428	100

Maximum (14.49 %) respondents were taking medicine, followed by medicine and diets both (9.58 %), medicine and exercise (5.84 %) to control sugar level. They were also using fenugreek seeds (14.49%) followed by indar jow (9.58%), tulsi leaf (6.07%), herbal medicines (5.84%), neem (3.5%), bitter gourd and apple (2.57%) to control their sugar level (Table 7).

Fenugreek seeds aid in maintaining the blood glucose levels in non-insulin dependent diabetics. The fiber present in the seed may be responsible for this. Extracts of garlic can lower serum cholesterol levels and prevent heart diseases. Ajoene, which is an unsaturated polysulphide substance form allium, has hypotensive action. Ginger is known to possess antioxidant properties (NIN 2002). Ginger help in the detoxification of carcinogens (NIN-2001-2002). Ginger can kill ovarian cancer cells. The gingerol in ginger act as natural cough suppressant. Consumption of raw or cooked onion is believed to aid in maintenance of normal glucose levels. Onion can lower blood sugar cholesterol and lipoid levels and is also useful in preventing heart disease. Onion has stimulative, diuretic and expectorant properties. (Srilakshmi 2007). Diabetic meal plan, physical activity, and medication are all balanced to help blood glucose levels normal (Zammit et.al. 2001). The relationship between selected lifestyle behaviors independently, and in combination with other lifestyle behaviors, and dietary quality by diabetes status were alcohol consumption, sleep adequacy, on a special diet, supplement intake, smoking status, and physical activity. Measures of dietary quality were calculated using data from the first 24-hour dietary recall. Multivariable Linear Regression was used to examine relationships among lifestyle behaviors independently, and in combination with total, after adjusting for demographic and health characteristics.

Table 8: *Regression* of Socio-economic status vs Veg and N Veg Food habits

Veg Food habits		N Veg Food habits	
Multiple R	0.2253	0.2253	
R Square	0.0508	-1.4803E-16	
Adjusted R Square	0.0076	-0.0455	Alpha=.05
Standard Error	0.5070	0.5222	
Observations	300	300	

Table 9: ANOVA of regression for Socio-economic status vs Veg and N Veg Food habits

ANOVA	Socio-econ status *vs* Veg Food habits				Socio-econ status *vs* N. Veg Food habits			
	df	*MS*	*F-cal*	*Sign F*	*df*	*MS*	*F-cal*	*Sign F*
Regression	1	0.3024	1.1763	0.2898	1	-8.882E-16	-3.257E-15	0.2898
Residual	22	0.2571			22	0.2727		
	Co-eff	*Std Error*	*t Stat*	*P-value*		*Coefficients*	*Standard Error*	*t Stat*
Intercept	0.5591	0.1391	4.0195	0.0006		0.5591	0.1391	4.0195
Veg	-0.1613	0.1487	-1.0846	0.2899		-0.1613	0.1487	-1.0846

It shows that there is no positive relationship between socio-economic status and the food habits of diabetic mellitus patient, r (300) = .22 and p>.05

Table 10: t-Test: Two-Sample Assuming Equal Variances

Variables	*Variable 1*	*Variable 2*
Mean	0.4247	0.5727
Variance	0.2452	0.2470
Observations	299	110
Pooled Variance	0.2456	
Hypothesized Mean Difference	0	
Df	407	
t Stat	2.6774	
P(T<=t) one-tail	0.0039	
t Critical one-tail	1.6486	
P(T<=t) two-tail	0.0077	
t Critical two-tail	1.9658	
t:=2.677		

It shows that there is a positive relationship between unhealthy life style behaviour and dietary habits which leads to obesity resulting diabetes.

Table 11: t-Test: Two-Sample Assuming Unequal Variances

Variables	*Variable 1*	*Variable 2*
Mean	0.7586	0.857
Variance	0.184	0.1231
Observations	203	203
Hypothesized Mean Difference	0	
Df	389	
t Stat	-2.5331	
P(T<=t) one-tail	0.0059	
t Critical one-tail	1.6488	
P(T<=t) two-tail	0.0117	
t Critical two-tail	1.9661	

: t=2.5331

This shows that there is a positive relationship between dietary intervention and healthy life style measures approach is effective than drug therapy.

Conclusion

Individual's nutritional status is dependent on the provision of sufficient nutrient substances as and the good utilization of these nutrients. Deficiency of any nutrients affect health of an individual.

Diabetes is a progressive disease it comes slowly without warning if not treated properly. The most important and basic treatment of diabetes is through diet.

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