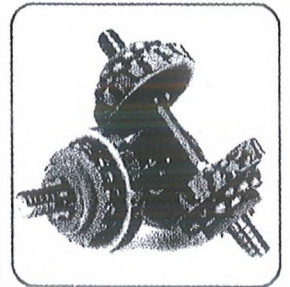
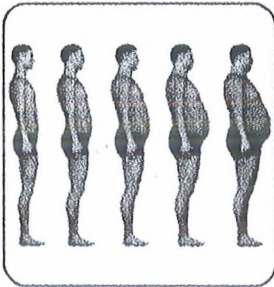
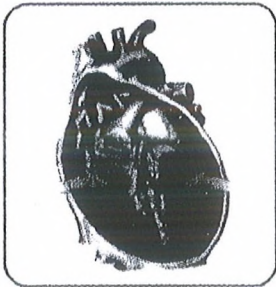


# OPTIMIZING NUTRITIONAL SUPPORT IN HEALTH AND DISEASE



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## **ESTIMATION OF BLOOD GLUCOSE AND INSULIN LEVELS OF SELECTED ADOLESCENTS AND YOUNG ADULT**

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### **Abstract**

Diabetes mellitus is now emerging as a pandemic among the adolescents and young adults, which is a tender, impressionable and transient age. Every silver lining has a cloud, thus the shift with development from food scarcity to food surplus is accompanied by rise in diabetes, obesity and all its associated health consequences. The objective of the study is to estimate the life style, dietary pattern, blood glucose and insulin levels of adolescents and young adults of both diabetic and non diabetic parents. A total of 300 subjects (150-adolescents and 150 - young adults) in the age group of 14-40 years consisting of both males and females, of diabetic and non-diabetic parents were selected. Socioeconomic status, lifestyle pattern and dietary pattern were obtained using a pre structured questionnaire and anthropometric measurements were measured. Biochemical estimation such as fasting blood glucose (Enzymatic GOD-POD method) and insulin levels (immuno radiometric assay) was done for the selected 100 sub-samples, consisting of 50 adolescents and 50 young adults. The results of blood glucose and insulin level were normal for the majority of the adolescents and young adults, except one male and two females whose blood glucose and insulin level were elevated and were diabetic. Consumption of aerated drinks, fast foods, fried foods and processed foods were found to be high. Snaking habit in-between meals and intake of coffee/tea was also found high. Physical activity was found to be low. Individual diet counselling was given on dietary practices and lifestyle pattern to be followed in order to prevent and control diabetes in future and to have a healthy lifestyle for all the selected subjects like adopting proper meal timing with balanced diet, regular exercise, etc., were emphasized. Myths and facts on diabetes and obesity were discussed and changes in eating patterns were also suggested to the selected sample.

### **Introduction**

Adolescence represents a window of opportunity to prepare for a healthy adult life. It is recognized as one of the physically healthiest times of life - parenthetically it is also one of the physiologically most tumultuous periods of life. It is also a timely period to shape and consolidate healthy eating and life style behaviour, thereby preventing or postponing the onset of nutrition related chronic diseases in adulthood.

In the present world, health consciousness is gaining momentum, but due to sedentary life styles and industrialization, several health problems have crept into peoples' lives among which diabetes seems to be very predominant. According to Chadha (1995) internal migration, urbanization and exposure to modern diet and life style increases the risk of chronic diseases. As compared to the earlier generations, the present generation consumes twice as much higher ratio of saturated to unsaturated fatty acids, much more sugar and salt and perhaps fewer carbohydrates and micronutrient. The adoption of this type of diet is one of

the primary etiological factors for the increase of many non-communicable disease and has put the nation's health at risk.

Today, India leads the world with its largest number of diabetic subjects. It has also been estimated that presently 19.4 million individuals are affected by diabetes and these numbers are expected to increase to 57.2 million by the year 2025 which is approximately 1/6<sup>th</sup> of the world's population (Iyer, 2003). Indian diabetics tend to be younger and are more likely to fall prey to complications. 80 per cent not aware that they suffer from diabetes.

Factors contributing to the increased prevalence of diabetes are sedentary life style, high calorie / high fat diet and obesity. Many of the health behaviours evident in young people, may be the precursor of patterns of illness or affliction in later years. Children and adolescents generally feel vigorous and healthy even when they are accumulating diet related risk factors that will influence disease development later in life (Brown, 2002).

"Adolescent obesity is like an epidemic". Reduced food variety, excessive refining of food and saturated fat, with sedentary life style unmasks predisposition to non-insulin dependent diabetes and increases the likelihood of complication. An energy dense diet (especially, high fat, high alcohol, low dietary fibre) predispose towards obesity and therefore to type II diabetes. Culture, urbanization and other changes in lifestyle, levels of income, even culinary skills can all affect diet and therefore health (Wahlquist, 2001). According to Krentz (2000), type II diabetes is 3 times more among obese than the non-obese.

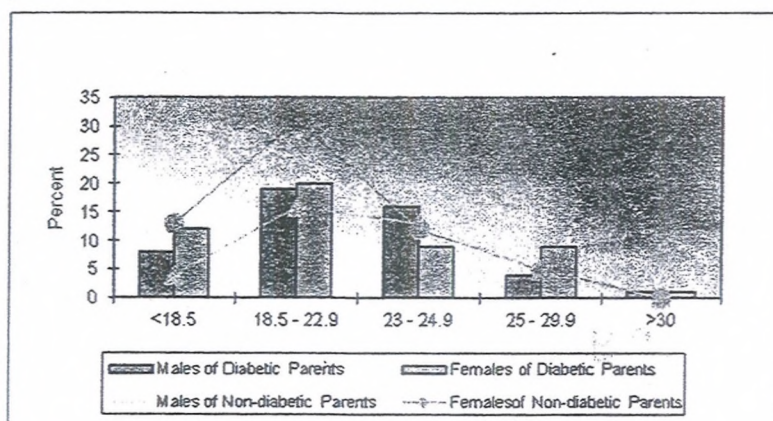
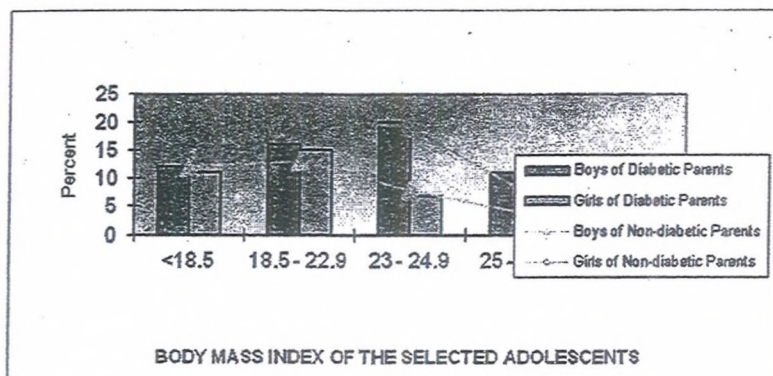
#### **Materials and Methods**

A total of 300 subjects were selected for the study by simple random sampling method, of which 150 were adolescents and another 150 were young adults, in the age group of 14-40 years consisting of both males and females, of diabetic and non-diabetic parents. Socioeconomic status, lifestyle pattern and dietary pattern were obtained using a pre structured questionnaire. Anthropometric measurements were measured and the Body Mass Index and Waist Hip Ratio were calculated. Biochemical estimation such as fasting blood glucose (Enzymatic GOD-POD method) and insulin levels (immuno radiometric assay) was done for the selected 100 sub-samples, consisting of 50 adolescents and 50 young adults. Individual diet counselling was given on dietary practices and lifestyle pattern to be followed in order to prevent and control diabetes in future and to have a healthy lifestyle.

#### **Results and Discussion**

20 per cent of boys and seven per cent of girls of diabetic parents were at the risk of obesity. Eleven per cent of boys and seven per cent of girls were in grade I obesity. In the case of children of non-diabetic parents, eight per cent of boys and 19 per cent of girls were in grade I obesity and four per cent of boys and eight per cent girls were in grade II obesity. Risk of type II diabetes increased progressively with increasing levels of initial BMI and also with the duration of over weight and obesity (Wannamethee, 2000).

Among adults of diabetic parents 16 per cent of males and nine per cent of females and four per cent of males and nine per cent of females were in grade I and grade II obesity respectively. Similarly among adults of non-diabetic parents, 13 per cent of males and 12 per cent of females and five per cent of males, five per cent of females were in grade I and II obesity respectively.



11 per cent of boys and 32 per cent of girls had normal waist hip ratio and 31 per cent of boys and five per cent of girls had slightly high waist hip ratio. Similarly, in the case of children of non-diabetic parents, nine per cent of boys and 13 per cent of girls had higher waist hip ratio .19 per cent of males and 13 per cent of females, and 12 per cent of males and four per cent of females respectively had a slightly higher WHR, while seven per cent of males and one per cent of females had very high WHR. Similarly, in children of non-diabetic parents, four per cent of males and three per cent of females had a very high WHR.

Diabetes is the complication of obesity whose incidence goes up at the steepest gradient with the degree of overweight. The risk of developing diabetes is greater in people whose obesity is mainly intra-abdominal rather than on the hips or buttocks (subcutaneous), i.e., people with a high ratio of waist : hip circumference (Truswell, 1999).

**Table 1** Familial tendencies among the selected adolescents and young adults of diabetic parents

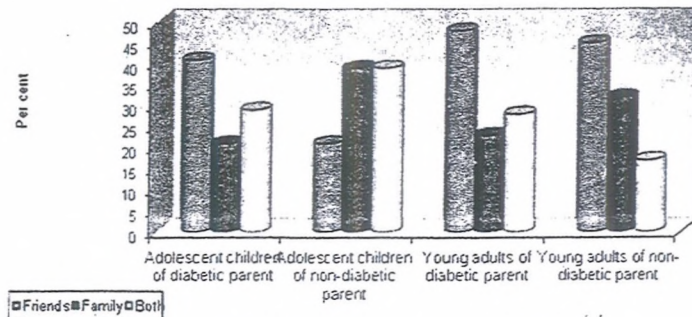
Family History	Adolescents (N=75)				Young Adults (N=75)			
	Boys		Girls		Males		Females	
	No	%	No	%	No	%	No	%
<b>I Degree Relatives</b>								
Father	17	23	11	15	20	27	21	28
Mother	19	25	15	20	11	15	10	13
Both Parents	10	13	3	4	5	7	8	11
<b>II Degree Relatives</b>								
Maternal	25	33	22	29	16	21	25	33
Paternal	16	21	15	20	23	31	15	20

Of the 150 sample selected, whose parents were diabetic, 61 per cent of adolescent boys and 39 per cent of adolescent girls and 49 per cent of males and 52 per cent of female young adults had either their father, mother or both having diabetes (1st degree). About 47 per cent of adolescents and 41 per cent of young adults had maternal history of diabetes and 31 per cent of adolescents and 38 per cent of young adults had paternal history of diabetes.

According to Kaufman (2002), most persons who develop type II diabetes have family members with type II diabetes. A recent review had concluded that having a parent with NIDDM increases by two-four fold on offspring's chance of developing this condition.

Not much physical activity was noticed among both adolescent and young adults. Walking is the most commonly performed exercise among the young adults. Most of the selected female sample did not perform any exercise. The habit of smoking was noted among 18 per cent of adolescents and 19 per cent of young adults. Majority of the smokers smoked about 5-10 cigarettes per day.

Teenagers' preferred to have foods whatever is available in the hotels, fast food restaurants, canteen and bakery shops. Fast foods was consumed daily by almost majority of the sample. Chinese foods, tandoori items and snacks were also preferred by most of the selected sample.



HABIT OF DINING OUTSIDE AMONG THE SELECTED SAMPLE  
Figure 6

The consumption of food outside home has become a common practice among most of the families, preferably during weekends. Both adolescents and young adults had decreased their energy intake at home and increased the energy intake at restaurants and fast food places.

It was evident that consumption pattern of carbonated and other beverages by adolescents and young adults have increased tremendously now a days.

30% of adolescent and 21% of young adults were vegetarians while 61.5 % of adolescents and 67% of young adults were non-vegetarians. Chicken, fish and eggs were the most commonly consumed non-vegetarian foods by the selected adolescents and young adults of diabetic and non-diabetic parents. Pork and beef were rarely consumed by the selected sample. Maximum number of sample included egg in their diet, 23 per cent of adolescents and young adults had egg every day.

School students skip lunch as a way to control their weight and skip breakfast because of perceived time constraints. Among the young adults, females (58%) skip breakfast frequently compared to males (35%) of diabetic parents. The reason for skipping of meals among young adults was to reduce weight and also because of the hurried and busy living in the urban areas like Chennai, where they don't get time to have food leisurely.

It was observed from the interview that majority of the sample took 3 meals a day, mainly rice with the combination of sambar, dhal, porriyal and kootu. Consumption of oil-rich foods such as dosai, poori, vadai, bonda and varuval items was high among the entire sample.

95 per cent of selected adolescents and 90 per cent of young adults of diabetic and non-diabetic parents most commonly used sunflower refined oil. Gingelly oil (52%), coconut oil (36%) and groundnut oil (15%) was used in moderate amounts. Only a very small population of 15 per cent sample used vanaspathi and 54 per cent sample used ghee.

Preference of sweets were more among adolescent girls compared to that of boys of diabetic parents and more among boys compared to girls of non-diabetic parents. Among young adults females crave for sweets more compared to that of males.

Majority of the sample consumed fried items, such as bajji, bonda, chips, mixture and pakoda and other baked items like biscuits, cakes, puffs and chocolates, with about two servings. They took the snack items, while watching the TV, with the peer group and in between meals. Seven per cent had a habit of reading books while snacking. This led them to indulge in liberal intake of foods. The order of preference among young adults were chips, biscuits, puffs, pakoda, bajji, mixture, bonda and cake respectively.

Considering the importance of diet counselling, to prevent diabetes mellitus in future, individual diet counselling was imparted to the selected sub sample (75 adolescents and 75 young adults) for 10-15 minutes. Leaflet on Ten Commandments for diabetic management along with foods to be included and avoided were also given. Handouts on salient features of these were also given away at the end of the counselling session. Charts consisting of risk factors of o Changes in life style pattern like adopting a proper meal timing with balanced diet food, regular exercise, etc., were emphasized. Myths and facts on diabetes and obesity were discussed and changes in eating patterns were also suggested to the selected sample.

#### **Summary and conclusion**

Most people consider diabetes to be an adult disease as its incidence rises with advancing years and symptoms rarely occur before the age of 40. But, in actuality, the disease process begins much earlier. The individual must be able to identify and realize the risk factors that predispose them to disease condition. Thus, eating patterns, which are, established during adolescence shape the dietary pattern later in life. This is because, younger children and adolescents have more control over their eating habits and more access to food outside the home experiment more with food choices, deviate more from 3 meal a day eating pattern and are more likely to snack (Dwyer, 2001). According to the biochemical estimation blood glucose and insulin level were normal for the majority of the adolescents and young adults, except one male and two females whose blood glucose and insulin level were elevated and were diabetic.

#### **Recommendations**

In developing countries like India, the rising socio-economic status, dietary errors and sedentary life style could cause premature onset of diabetes mellitus, which may further lead to cardiovascular disease. Thus, universal screening of adolescents and young adults for their serum lipid profile and blood glucose followed by timely educational interventions like dietary / lifestyle modifications and attitudinal change are needed to curb the rising incidence of diabetes mellitus in future.

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**EFFECT OF CURRY LEAVES SUPPLEMENTATION ON THE FASTING SERUM LIPID PROFILE AND FASTING PLASMA GLUCOSE LEVEL IN DYSLIPIDEMIC ADULT MEN**

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**Abstract**

Cardiovascular diseases are the most prevalent cause of death and disability in both developed as well as developing countries. Diabetes and cardiovascular risk is on the increase in India and especially South India. Dietary interventions should ideally be the first line of treatment to control lipid levels and therefore, a study was done to determine the effect of curry leaves powder supplementation on the fasting serum lipid profile and plasma glucose of dyslipidemic adult men. Eight dyslipidemic adult men were given curry leaves (15 g) for a period of sixty days and fasting serum lipid profile and fasting blood sugar level were monitored at day one and day sixty one. The results indicated that there was a decrease in the weight from  $87.1 \pm 13.4$  to  $85.7 \pm 13.8$  kg. BMI of the subjects also decreased significantly ( $p < 0.05$ ) from  $31.4 \pm 4.8$  to  $31.1 \pm 4.7$  kg/m<sup>2</sup>. The hip circumference showed a significant ( $p < 0.05$ ) decrease from  $103.4 \pm 6.5$  to  $102.9 \pm 6.2$  cm. There was a significant ( $p < 0.001$ ) decrease in the mean total cholesterol and LDL-C at the end of the sixty days. Significant ( $p < 0.05$ ) decrease was also seen in the triglyceride level, VLDL-C total cholesterol to HDL-C ratio. The mean HDL-C of the experimental group subjects significantly ( $p < 0.05$ ) increased at the end of the study period. Therefore if curry leaves are taken on a regular basis it will have a beneficial effect on the anthropometric and lipid parameters risk factor for CVD in dyslipidemic individuals.

**Introduction**

Cardiovascular diseases are the most prevalent cause of death and disability in both developed as well as developing countries (Chaturvedi and Bhargava, 2007). South Asians have a much higher prevalence of metabolic syndrome, diabetes, insulin resistance, central obesity and dyslipidemia (Bedi et al., 2006). Metabolic syndrome which is a constellation of several cardiovascular risk factors like hypertension, obesity, impaired glucose tolerance, increased triglycerides and low high density lipoprotein cholesterol has also become common in India (Ramachandran, 2003). Dyslipidemia is defined as an abnormal plasma lipid status. Disorders of lipid metabolism are common and prominent in diabetes and are an important risk factor for the high frequency of atheromatous complications in the disease (Amos, 1997). According to the National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III) guidelines, dietary interventions should be the first line of treatment to control lipid levels (NCEP, 2002). In a research by Xie (2006), it was revealed that dietary supplement with curry leaves reduces total serum cholesterol, LDL-C, VLDL-C, increase HDL-C and decrease the release of lipoprotein into circulation in rats.

**Dyslipidemia:** Dyslipidemia, by definition, is a combination of increased blood lipid levels and lipoprotein concentration and can be caused by environmental, genetic, and pathologic risk factors (McKenney and Hawkins, 2001). Dyslipidemia can be the result of a primary cause, secondary cause, or a combination of both (Rodondi, 1996). Cholesterol and triglycerides can produce three forms of dyslipidemia. They are as follow: