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PLANNING AND EXECUTION OF DIABETES AWARENESS AND SCREENING CAMP IN AN EDUCATIONAL INSTITUTION

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ABSTRACT

Diabetes has emerged as a major healthcare issue in India and is projected that every fifth diabetic person will be an Indian by 2030. In developing countries like India this problem is further compounded by rapid urbanization and associated increase in stress and diabetes. A one day diabetes awareness screening camp was conducted in an educational institute situated in a rural area. A complete participant history was obtained and parameters like blood pressure, random blood sugar (RBS), and body mass index were evaluated Each participant was individually counselled on signs, symptoms, prevention and management of diabetes with appropriate educational material. A higher mean RBS level was noted in smokers, older participants, in known diabetics and in participants with a family history of diabetes. Additionally, a higher average RBS was noted in low family income group and in participants with low educational background. Awareness of symptoms, knowledge of prevention and management of diabetes are important for dealing with this worldwide burden of diabetes. This study was small but successful attempt to spread the awareness and education on diabetes.

Keywords: *Diabetes; Random blood Sugar; Screening; Socioeconomic Status.*

INTRODUCTION

Diabetes, a metabolic disorder, has emerged as a major healthcare issue in India. There were an estimated 40 million people with diabetes in India in 2007, as per the Diabetes Atlas published by the International Diabetes Federation (IDF)[1]. This number is predicted to rise to almost 70 million people by 2025 and the countries with the largest number of diabetic population will be India, China and USA by 2030 [1]. It is estimated that every fifth person with diabetes will be an Indian [1]. Due to these sheer numbers, the economic burden of diabetes in India is amongst the highest in the world. The real burden of the disease is however due to its associated complications which lead to increased morbidity and mortality[2]. According to the World Health Organization (WHO), mortality from diabetes, heart disease and stroke associated costs were about $210 billion in the year 2005 in India [2]. Much of the heart disease and stroke in these estimates was secondary to diabetes. WHO estimates that diabetes, heart disease and stroke together will cost about $ 333.6 billion over the next 10 years in India alone [2]. The most common risk factors for the development of diabetes include advanced age, genetic predisposition and/or a strong family history, obesity, sedentary lifestyle and stress[3, 4]. Among Indians onset of diabetes is seen at least 10 to 15 years earlier than the western population. In general, incidence of diabetes increases with age[5]. Due to the advances in medical technology and discovery of new drugs, life expectancy has increased and hence the sheer number of diabetics in India. Family history and genetic predisposition increase the risk of development of diabetes. Specifically, the risk for a child to develop diabetes with a parental history is as high as 50 per cent. A high incidence of diabetes is also seen among the first degree relatives. Indians have been found to be more insulin resistant as compared to the Caucasian population[6]. It is postulated that, Indians have a higher level of insulin to achieve the same the blood glucose control leading to insulin resistance[7].

Metabolic disorder defined by a cluster of factors consisting of abnormal fats (dyslipidemia), high blood pressure, obesity, and abnormal glucose levels is highly prevalent among Indians and is a major risk factor for cardiovascular morbidity and mortality[8]. Sedentary lifestyle and inactivity are thought to be independent factor for the development of type II diabetes. Excess body fat and central obesity (waist circumference of 90 cm for men and 80 cm for women) increases risk of diabetes[8]. In rapidly developing countries like India this problem is further compounded by rapid urbanization and associated increase in stress. Modernization has also brought about increase in socioeconomic status and changes in eating habits, mainly a shift towards fast foods. Taken together, these factors have contributed to the high incidence of diabetes in India.

Multiple studies from various parts of India have revealed a rising trend in the prevalence of type II diabetes in the urban areas. An increase of 12.1% in

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the prevalence of diabetes was noted in National Urban Survey of year 2000[9]. In addition, socio-economic transition in rural areas has led to a rise from 2.4% to 6.4% in the incidence of diabetes[9]. Although this trend is well accepted among medical personnel, awareness in general population was found to be only 25 per cent. The fact that diabetes is a metabolic disorder and may be preventable is not well known in the general population. In fact a study demonstrated that only 22 per cent of the population thought that diabetes could be prevented[10]. Though the awareness levels increased with education, only 42.6 per cent of postgraduates and professionals including doctors knew that diabetes was preventable. The knowledge of risk factors was even lower. Only 11.9 per cent of the study subjects reported obesity and physical inactivity as risk factors. Even amongst the known diabetics, only 40.6 per cent were aware that diabetes could lead to some organ damage and complications. Many people (46 %) with diabetes felt that it was a temporary phenomenon[10].

There is ample evidence to suggest that preventive measures to reduce the burden of diabetes are needed. The US Diabetes Prevention Programme, the Finnish Diabetes Prevention Programme and the Chinese Study have conclusively proved that lifestyle modification including weight loss, increased physical activity and dietary changes can prevent or delay the onset of diabetes. The need of the hour is direct public education and mass media campaigns, awareness about diabetes and its complications. There is a need to spread the message that diabetes is preventable and we need to have a behavioural change to adopt a healthy lifestyle. In the present study, one day diabetes screening camp was undertaken to evaluate the incidence of abnormal random blood sugar level and to spread awareness of diabetes among general population.

METHODS

A diabetes screening camp was conducted on the campus of Krupanidhi College of Pharmacy, Carmelaram, Varthur hobli, Bangalore. The event was adequately advertised among the teaching, non-teaching and supporting staff on the campus. Advertisement brochures which were printed in English as well as in the local language Kannada, were distributed in the surrounding community and in villages within a radius of 8 kms to generate awareness of this event. Forms were created to record appropriate information of each participant. Each form consisted of patient specific information (name, gender, age, height, weight, blood pressure, social history, medical and medication history), socioeconomic information (educational and financial status) as well as family medical history. After registration, a written consent was obtained from each participant. Pharmacy students obtained a complete patient history from each participant and the information provided was recorded on a printed form. Further, body weight, height, blood pressure were recorded. Random blood sugar levels were measured using a commercially available glucometer (Bayer ® ™Contour TS ™ Blood Glucose Meter). Participants were then taken to an auditorium to view a short educational film on diabetes in local language Kannada. Meanwhile, the data created for each participant was analysed to calculate body mass index (BMI), and to prepare individualized counselling material. Previously printed patient educational materials (in Kannada as well as in English) were assembled to create an individualized patient educational package. The patient education material consisted of information on diabetes including risk factors, tips for healthy lifestyle modifications, diet and exercise Suggestions for preventing diabetes as well as for living a healthy life with diabetes. After viewing the film, each participant was individually counselled with the use of appropriate printed educational material.

The data collected from all the participants was recorded in a spread sheet format and analysed using the software JMP 8® ™ academic license from SAS® Inc. for any statistical significance. Data analysis was performed to evaluate participation in the screening against factors like gender, age, and socioeconomic status. Values obtained for random blood sugar were analysed against various parameters like age, gender, BMI, socioeconomic status, genetic predisposition and social habits. Data is expressed as percentages or as a possible trend.

RESULTS

The diabetes awareness camp was conducted on Thursday, May 30th, 2013, from 10 am to 4 pm and we recorded random blood sugar from 255 participants. A sample patient history form and consent form is represented in Table 1. The overall demographic distribution (Table 2) suggests a higher participation by women (Male: Female = 42:58) and by participants aged 40 years or less (<40 yrs = 63.5%; 40-60 year = 25.5%; and >60 years = 11%). Most of the participants were non smokers (90%) and teetotallers (81.1%) and food intake pattern suggested more than two meals a day. Analysis of data on educational background suggests that most of the participants had college education (Bachelors' degree or above = 81.1% participants) and belonged to a middle income group (monthly income >30,000; 83.14%). Majority of the participants had blood pressure within the normal range (66.6%) and BMI below 24 (60.2%).

RBS=

KRUPANIDHI COLLEGE OF PHARMACY

PATIENT HISTORY FORM

Name: Age & DOB

Gender: Married/Single Blood Pressure

Height: Weight: BMI:

Smoker/Nonsmoker Current Use: Y/N sticks /day

Alcohol Use: Y/N Drinks per day/Week/Month

Diet: Veg / Nonveg Meals/day

Water consumption (glasses/day):

Education/Income Prescription History

Education		Monthly Family Income			Name	Sig	duration	Current Use Y/N
<high school		<10,000						
High School		10-30 thou						
Bachelor's		30-50 thou						
Master's or more		>50,000						

Medical History

Do you suffer from any of the following?

Headache	Allergies	Sleeplessness
Heartburn	Belching	Chest Tightness
Increased Urination	Difficulty in Urination	Frequent UTIs
Dizziness	Severe Weight Loss	Severe Weight Gain
Weakness	Palpitation	Memory loss

	Self	Family Members			
		Sibling	Mother	Father	Grand Parents
High Blood Pressure					
Diabetes					
Heart Disease					
Asthma					
Renal Disease					

I, , am voluntarily giving the above stated information. Further, I understand that the data obtained from the study including the questionnaire, blood glucose results, BMI values and blood pressure readings will be utilized to generate scientific data and may be published in scientific journals. I understand that my name and other personal information provided remains confidential.

Name: Signature: Date:

Pharmacist:

Table 2: *Participant Demographics*

Gender	Male	42%
	Female	58%
	<40	
Age (years)	40-60	25.5%
	>60	11%
Smoking	Smoker	10%
	Non smoker	90%
Alcohol	Alcoholic	19.9%
	Non alcoholic	81.1%
Educational Background	High School and less	19.9%
	Bachelors' degree or above	81.1%
Income (INR thousands)	monthly income >30,000	83.14%
	monthly income <30,000	16.89%

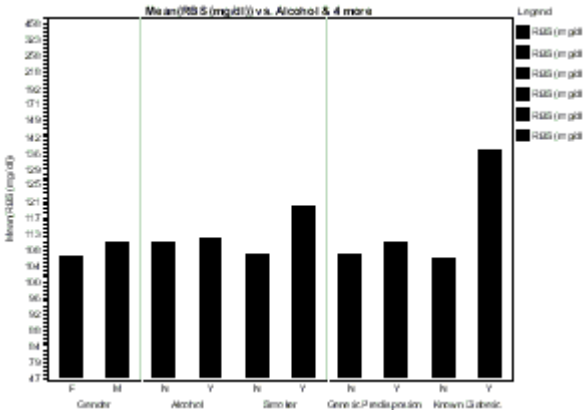

Fig. 1: Average random blood sugar level among various groups: *F=Female, M=Male, N=No, Y=Yes*

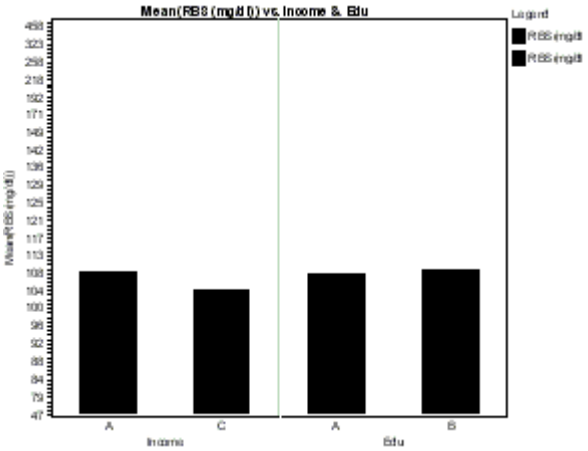

Fig. 2: Average Random Blood Sugar level in dif ferent socioeconomic groups: *income(A=less than 30,000 Rupees per month=more than 30,000 Rupees), Edu=Education (A=High school or less, B=Bachelor degree or more).*

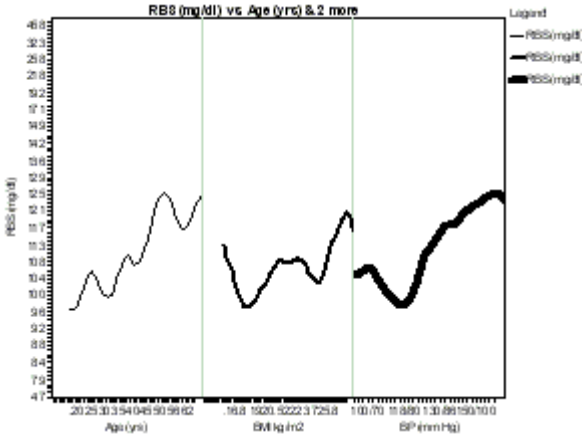

Fig. 3: *Effect of Age, BMI and BP on Random Blood Sugar*

Although, a very low number of participants were known diabetics (7.6%), a substantial number of participants had a strong family history of diabetes (64.7%). Random blood sugar test revealed that 14.9% of participants had blood glucose levels above the normal limit (>140 mg/dl). A higher value of mean random blood sugar was noted in male participants and in known diabetics as well as in participants with a family history of diabetes. On the other hand, average RBS was found to be similar in teetotallers and non teetotallers. Smokers had a higher average RBS than non smokers. In participants with lower family income (<30,000 per month), a higher mean random blood sugar was noted as compared to participants with a higher family income (>30,000).

A graph of random blood sugar values plotted against parameters like BMI, blood pressure and age suggest that there is trend towards increase in random blood sugar values with increase in BMI, blood pressure and age. Meaningful statistical analysis like regression or correlation could not be performed due to limited participation (n=255).

DISCUSSION

The overall participation in the diabetes screening camp was 255, suggesting that the advertising campaign had an impact in the surrounding community. The higher participation by women could be due to the fact that this camp was conducted on a week day. In the surrounding community availability of male participants on a week day during working hours (8 am - 4 pm) is limited and had an impact on participation. Additionally, the screening camp was conducted in our educational institute which has a predominantly female teaching staff. Transport was provided from surrounding villages and resulted mainly in participation by elderly (11%), while the other participants were mainly from educational institutes from our campus. This seems to have an impact on the social habits of the participants. Specifically, most of the participants were non smokers

and teetotallers habituated to more than two meals a day. Majority of the participants belonged in the high educational background group (Bachelor's degree or higher; 81.1%) which mainly consisted of the teaching staff on the campus. This is consistent with the fact that most participants belong to the middle income group.

The incidence of diabetes in India is as high 12.1% and it is suggested that this rate is higher in the urban area as compared to the rural area[5]. The data obtained from the present study had 7% known diabetic patients. Although, the number seems lower than the national average, many participants had a strong family history of diabetes and a few had higher than normal RBS levels. Most participants were staff members from the campus hailing from urban areas while few were from surrounding farming community. The distribution of urban and rural participants in our study may have impacted the results obtained. Meaningful statistical analysis can not be performed to validate this hypothesis due to the limited number of participants. RBS test is not a confirmatory test for diagnosis of diabetes. Some of these participants may be pre-diabetic or diabetic. Participants with high RBS levels were counselled to visit their primary care physician and undergo further testing for diabetes. Currently, the incidence of diabetes in these participants is not known. The low number of participation in our study could be partly due to the lack of awareness among people.

In the present study incidence of diabetes was found higher in men consistent with the survey done by the World Health Organization (WHO) [11]. Participants with a history of diabetes had a higher level of RBS suggesting a poor control of disease. Many surveys have suggested that the rate of diabetes associated complications is higher in India as compared to the western countries mainly due to a poor control of blood glucose[11]. Family history of diabetes has been a well established risk factor for the development of diabetes and in our study patients with a strong genetic predisposition (history of diabetic parents) had abnormal RBS.

The higher average RBS values in smokers as compared to non smokers needs further evaluation since only a small number of smokers participated in our study. Moderate alcohol consumption tends to reduce incidence of Type II diabetes[12]. On the other hand, high alcohol consumption is a risk factor for diabetes. In the present study average RBS values were similar in teetotallers and in non teetotallers. In the patient history form we did not evaluate the amount and the frequency of alcohol consumption. Hence, effect of alcohol consumption on RBS could not be evaluated.

Knowledge of signs and symptoms of diabetes will be key factors for self reporting and prevention of the disease. A study conducted in Canada evaluated self reporting of diabetes among Indian population. In this study self reporting increased from 1.5% to 1.9% and to 2.5% for those with high level of education and household wealth respectively [13]. In the present study a higher average mean RBS was noted in low educational background group and in low monthly family income group as compared to the high educational background group and high monthly family income group.

A trend towards high RBS values was noted with increase in age, BMI and blood pressure. Obesity and high waist circumference are known risk factors for diabetes. American Diabetes association has reported that prevalence of hypertension is almost two times higher in diabetic patients as compared to non diabetics[14]. Taken together, the findings of the present study are in agreement with previously reported findings worldwide. Due to the limited number of sample size meaningful statistical analyses could not be performed. Overall, need for awareness of symptoms, knowledge of prevention and management of diabetes are important for dealing with this worldwide burden of diabetes. This study was small but successful attempt to spread the awareness and education on diabetes.

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