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A STUDY OF POTENTIAL DIABETICS IN RURAL AREA OF WESTERN MAHARASHTRA

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INTRODUCTION

The Diabetics capital of World with as many as 50 million people suffering from it, India has a great challenge to face.

The recent World Health Organisation report suggests that over 19% of World's Diabetic Population resides in India, with prevalence of 20% of current Global Diabetic Population estimated 100 million people worldwide as per statistics of International Diabetic Federation. Thus over 35 million Diabetic subjects, and likely to double in two decades, translating it upto 80 million by year 2030. This rising trend poses a significant health concern due to Diabetes in India.[1]

The study by Indian Council of Medical Research (ICMR) in 1970 reported prevalence of 2.3% in urban areas which increased to 12-19% in year 2000. Correspondingly in rural part of Western Maharashtra, its prevalence rateshad increased from 1% to 4-10% even upto 13.2% in some areas. Thus it is clear that both in Urban and Rural India prevalence rates of Diabetics are on a rapidly increasing rate estimated ratio 2:1 or 3:1.[2]

It is estimated by IDF that in India more than half (52.1%) of all people with Diabetes are unaware of the disease. Evidence shows poverty and poor access to health care couple with low education and socio-economic status are reason behind it. Unfortunately India's majority population (70%) resides in rural areas. Seldom screening in rural areas, result in a much greater burden on undiagnosed patients in rurals. Hence there is urgent need to screen, diagnose and provide appropriate care.

Diabetes is non-communicable disease also known as Madhumeh, is a group of common Metabolic disorder that shore the phenotype of Hyperglycaemia with disturbance of Carbohydrate, fat and Protein metabolism resulting from defect in Insulin secretion effected by Genetic and environmental factors of individual. Earlier the diagnosis better is chance of preventing it. Adherence to medication and lifestyle plays vital role and helps Diabetics to lead a normal life. However the unmonitored may increase risk of Cardiovascular, Renal, Neural and visual disorder to diabetic.

Government of India initiated National Diabetic Control Programme. It is necessary to develop cost effective method for early diagnosis. The present study was planned as an initiative to identify undiagnosed Diabetic subjects based on Indian Diabetes Risk Score (IDRS) using 4 fundamental parameters with minimum time and effort in screening.

The Research study was conducted with prime objectives to Study Prevalence of Potential Diabetics in Rural Area - Kasegaon, Karad. District: Satara, Part of Western Maharashtra. It was also aimed to study Prevalence of Diabetics among these Rural Populations in the age group of 30 to 40 years and also to suggest recommendations for early diagnosis by Screening for Diabetes.

MATERIAL AND METHODS

The study was conducted as a community based cross-sectional (descriptive) study carried out in the field practice area of Rural Health Centre (RHS) of Kasegaon, Karad, District-Satara, Western Maharashtra under the Department of Community Medicine, Krishna Institute of Medical Sciences, Karad. The area covers a population of 20,000. It was performed on adults between 30 to 40 years of age and who were willing to participate for the study project. The adults in between age group of 30 to 40 years are 12.3% of total population of Kasegaon. Thus number of Adults in reference population was 2460. Now further calculations are as below:-

$N = 4 \times p \times q / L^2$

$= 4 \times 20 \times 80 / 25$

$= 256$

p = Prevalence of Diabetics in community. (20%)[3]

q = 100 - p

L = Allowable error (5%)

Study Subjects: All individuals between 30 to 40 years residing in village.

Sample size: Minimum 256 so it will be 300.

Sampling method: Random selection of households & till study subjects fulfil the sample size.

Analysis: Rates & inferential statistics using suitable statistical test.

Waist circumference was measured at the mid point between the lowest rib and highest point of the iliac crest while the subject would be breathing quietly at the end of expiration. Sitting Blood pressure was also measured and the averages of the 2nd and 3rd readings wasnoted as average Blood pressure.

The IDRS (Indian Diabetes Risk Score)[4] was calculated using the tabular questionnaire as shown below using the 4 basic parameters of:-

- Age of Person
- Waist circumference
- Physical activity
- Family history
- One can find the score on any randomly selected individual for severity of risk of potentiality of diabetes in the individual's life.

Criteria" was presented for the selection of the person included in our study-

Inclusion criteria

Age between 30 to 40 years.

Exclusion criteria

Secondary cases of hyperglycemias such as pregnancy, corticosteroid therapy and other pharmacotherapy leading to hyperglycemias, chronic calcific pancreatitis or any other organic disease producing hyperglycemias.

The research study was granted **Ethical Clearance** by the Ethical committee of the institute of Krishna Institute of Medical Sciences, Karad for carrying out the research studies on sample population in Kasegaon.

Based on the collected information from the questionnaire, we compared these values from the statistics of the data Table of Indian Diabetes Risk Score. It acted as a Risk calculator, developed by V. Mohan, a diabetologist and diabetes researcher from Chennai, India.[5]

As India has emerged as a diabetes capital of the world with one diabetic in or around every family, one always wonders- Should he/she get himself/herself screened for diabetes ?

The Calculator gives results interpreted as - On Adding all 4 Parameters[6]

"A score of more than 60 should compel you to get yourself checked for Diabetes."

* A score of:-

-≥60: Very "High Risk" of having diabetes. Oral Glucose Tolerance Test is recommended to rule out diabetes. If this is not possible, at least a random sugar of fasting blood sugar test shall be done.

- 30 - 50: "Moderate" Risk of having diabetes. Regular monitoring and check up sugar are suggested.

- <30: "Low" Risk of having diabetes.

*Thus it helped as a convenient practical tool for easy identification of potential diabetic population, raising appropriate awareness about diabetes and having a cost-effective screening of people in rural region of Kasegaon, Karad in Western Maharashtra.

RESULTS

Table 1: Distribution of respondents according to Socio-demographic profile.

Age (Years)	**Number**	**Percentage**
30 to 34	115	44.23%
35 to 40	145	55.77%
Total=	260	100%
Sex	**Number**	**Percentage**
Male	154	59.23%
Female	116	40.77%
Total=	260	100%
Education status	**Number**	**Percentage**
Literate-	184	70.77%
10th passed	28	10.77%
12th passed	62	23.85%
Graduated	94	36.15%
Illiterate-	76	29.23%
Total=	260	100%
Socio-economic status	**Number**	**Percentage**
Upper class	28	10.77%
Upper middle	42	16.15%
Middle	88	33.85%
Lower middle	75	28.85%
Lower	27	10.38%
Total=	260	100%
Occupation	**Number**	**Percentage**

Housewife	75	28.85%
Business	34	13.08%
Labourer	69	26.54%
Agriculture	20	7.70%
Service	45	17.30%
Others	17	6.54%
Total=	260	100%

In our study, as per Table 1, a Total of 260 respondents were interviewed.115(44.23%) induviduals belonged to age group of 30 to 34 years, whereas 145(55.77%) belonged to the other half of age group of 35 to 40 years. Majority of the people were males (59.23%), 154 in number, and the female section was 116(40.77%). Majority were literate, 184 (70.77%) with 36% graduated subjects, 29.3%, i.e. 76 were illiterate. Most of them were Middle Class people, 88 in number, occupying 33.85% of the sample population.28.85% were lower middle class and our respondents were majorly Labourers (26.5%), 69 in number, followed by Service duty people (17.3%),45 in number. But, a vast majority was seen in female respondents who were Housewives by Choice, 75 in number (28.85%).

Table 2: Distribution of respondents according to family history of diabetes.

Diabetes prevalence in family	Number	Percentage
One parent member-diabetic	127	48.75%
Both parents-diabetic	94	36.20%
None parent-diabetic	39	15.05%
Total=	260	100.00%

From the values in Table 2, a big majority of the respondents had diabetes prevalence in Family, 221 induvisuals(85%), having either one(49%) or both the parents diabetic(36%).

Table 3: Distribution of respondents according to physical activity At Work/Home.

Type of physical activity	Number	Percentage
Vigorous exercise/heavy physical activity	36	13.85%
Moderate exercise/moderate physical activity	103	39.62%
Mild exercise/mild physical activity	79	30.38%
No exercise/sedentary physical activity	42	16.15%
Total=	260	100.00%

According to physical activity categories as mentioned in Table 3, due to life style variations and professions, 103 respondents constituted the majority of 39.6% accepting of doing Moderate exercise in daily routine, which are non- challenging tasks and light sweat is seen after 10 minutes of routine physical work-out.

Table 4: Distribution of respondents according to their waist circumference (in cms.)

Waist circumference (in cms.)	Number	Percentage
< 80 cm (Female); < 90 cm (Male)	56	21.54%
80-89 cm (Female); 90-99 cm (Male)	128	49.23%
> 90 cm (Female); > 100 cm (Male)	76	29.23%
Total=	260	100.00%

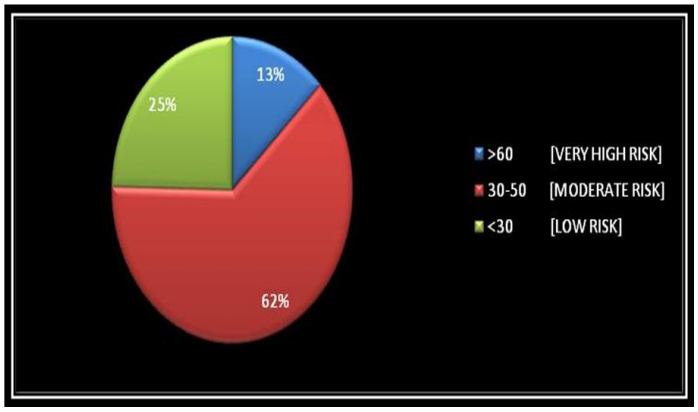
From Table 4 displayed above, we know that 128 respondents (49.23%) had a waist circumference of 80 to 89 cm in females and 90 to 99 cm in males forming the major group. On combining the data and sorting up the Results, we reach to the Analytical result of Risk categorization in Potential Diabetics as mentioned in Table 5 and visually interpreted in the pie chart in Table 6.

Table 5: Distribution of respondents according to I. D. R. S. category.

Score and interpretation	Number	Percentage
>60 [very high risk]	34	13.01%
30-50 [moderate risk]	162	62.34%
<30 [low risk]	64	24.65%
Total=	260	100.00%

Our study reveals that in Table 5, the majority, 162 respondents (62.3%) out of the 260 respondents of our sample size were on a MODERATE RISK OF POTENTIAL DIABETES, due to their score marks falling in the 30 to 50 group. These group of people belonged to the 35 to 40 age group, mostly males, belonging to middle level of socio-economic class, mostly labourers (males) or Housewives (females: due to their sedentary life), with majority having one parent diabetic only and most of them performing moderate physical activity in day-to-day life, and having either waist circumference in range of 80-88 cm in females or 90-99 cm in males.

Table 6: Pie chart visual interpretation of respondents according to I.D.R.S category.



In table 6, a visual representation of Table 5 is presented; 162 people (62%) backed the majority being in the Moderate Risk Category, followed by 64 people (24%) in the Low Risk Category and then succeeded by 34 people (13%) in the High Risk Category in terms of Potential Diabetics.

34 respondents were able to score above 60 (13%) and grouped under high risk of potential diabetes, were counselled to cut down their dietary intake, increase physical activity and practice a healthy and regular routine every day. They were people of the age group of 35 to 40 years mainly, mostly females, belonging to middle level of socio-economic class, mostly housewives with sedentary life style and mild exercise doers in majority, with one parent diabetic in most of the respondents in high risk category and having waist circumference more than or equal to 90 cm in these female respondents, i. e. mostly obese induvisuals.

64 respondents were on a safe side by scoring below 30, being at LOW RISK OF Potential Diabetes (24.7%) due to their active and healthy life styles, were encouraged to promote awareness of practicing healthy life style and decrease chances of developing Diabetes in future.

DISCUSSION

In this study, we used simplified Indian Diabetes Risk Score for identifying High Risk, Moderate Risk and Mild Risk 'Potential' Diabetics in Rural Community of Western Maharashtra. This is of great significance as use of such Scoring system can prove to be a cost effective tool for screening of Diabetes in Minimal Time and Labour. Further, use of this Risk Factor-Scoring would be of great help in countries like India where there is a marked explosion of Diabetics and over half of them remain Undiagnosed till later stages of complications.

As per the data referred in Table 5, 13% of the population had High Risk Score for developing Diabetes in future. In a similar study conducted at Pondicherry by Dr. Sanjay Kumar Gupta *et al.* 19% of the population were found at high risk and another study done in Chennai by Dr. Mohan *et al.* Described 43% of the population under the High Risk Category. Also, another study conducted in Urban areas of Pondicherry had 31.2% High Risk subjects. These risk differences may be due to variance in life-styles of the population as our study was done in a topographically and different genetic make-up group of induvisuals of different

region's rural community, whereas the study of Dr. Mohan is based in a metropolitan city and the other study was in the urban area of Pondicherry.

Various other studies conducted in different countries used different parameters for diabetes risk scores, mainly anthropometric measurements, demographic and behavioural factor, to detect Potential Diabetics. We, in our study, used IDRS system of scoring, suitable for detecting undiagnosed Potential Diabetics in Kasegaon, Western Maharashtra. Compared to other studies, IDRS has following merit:- It's simple to use, scores are easily obtainable and have been drawn from a random and large sample size from a representative city in India, the demography of which is similar to rest of India.

According to the study, in Table 1, we can make out that people with sedentary life style are on a greater verge of developing Diabetes in future as per the data collected to assess Potential Diabetics. Along with this, Mild Physical Activity is also associated to contribute a major fraction of High Risk Potential Diabetics; which produced results alike the study done by Dr. Sanjay Kumar Gupta *et al.* in Rural community in Pondicherry. Also, study conducted by Ramchandran*et al*. in South India, 47% of the people who were in the category of High risk and Moderate Risk of Potential Diabetics had a positive Diabetes Family History, and our study also found the same trend of 85% subjects had either one or both parents Diabetic, referring to Table 2 of our study. This difference is attributed to the different life style, genetic drift in population in different topographic regions in India and varied Socio-economic status of the Respondents. Hence, the different factors almost showed comparatively similar trend in our as well as different cities in India.

CONCLUSION

This study was purposely conducted to Estimate the Usefulness of Simplified Indian Diabetes Risk Score for identifying Potential Diabetics in the rural community of Western Maharashtra with minimal Time and Labour; and therefore, suggest them preventive measures to cut down their Risk of having Diabetes in future. Use of IDRS can make Mass- Screening for Diabetes in India more easy and Cost-effective.

We also saw that from the analysis of the results of our Data, as shown in table 5, majority of the subjects were on Moderate Risk of Potential Diabetes, mainly due to their sedentary life style and socio-economic, genetic and professional modalities when taken into consideration.

They were in the age group of 35 to 40 as per table 1, and need consultation and regular check ups to prevent their risk of being undiagnosed till later stages of Diabetes.

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