ORIGINAL RESEARCH PAPER
Volume - 12 | Issue - 08 | August - 2023 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

RISK FACTORS AND CLINICO- METABOLIC ASSOCIATIONS OF DIABETES

Medical Science

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ABSTRACT

Introduction: Diabetes Mellitus (DM) has become a well-known chronic progressive Non-Communicable Epidemic on global stages. The risk of developing diabetes increases with some risk factors including family history, age, obesity and lack of physical activity. **Methods:** This was a hospital based cross sectional study conducted among 100 (48 females &52 males) individuals aged 25 years and above, attending outpatient clinic of SVMC Hospital, Pondicherry. A predetermined & pretested questionnaire based on IDRS (Indian Diabetes Risk Score) determining simple anthropometric and socio-demographic variables was used to interview the participants. Information gathered (Table). Subjects with other chronic diseases such as hypertension, renal and liver diseases and infectious diseases were excluded. **Results:** 61 of 100 (61%) with waist>90 cm, 48 of 100 (48%) doing less or no exercise while 51(80.9%) out of 63 participants having family history of diabetes were in High-Risk group for Diabetes. As shown in Table, IDRS ≥ 60 was more than 96% both in smoking as well as alcohol consumption followed by students, service persons. **Conclusion:** This study revealed that there is a significant association between certain demographic and clinical variables and fasting Blood Sugar. Also, further studies to modify the risk factors are highly recommended to control and reduce the DM prevalence.

KEYWORDS

Diabetes Mellitus, Overweight, Insulin resistance, incidence, risk factors

INTRODUCTION

Diabetes, a serious long-term condition, is considered one of the great global health challenges of the twenty-first century. An estimated 463 million people had diabetes in 2019, and this is expected to reach 578 million by 2030 and 700 million by 2045 (1). It is one of the leading causes of morbidity and mortality worldwide (2) and a major problem in India. In 2012, 60% of all deaths in India were due to noncommunicable diseases (NCDs), including cardiovascular diseases (26%), chronic respiratory diseases (13%), cancer (7%), diabetes (2%) and other NCDs (12%) (3). This can be evident in its economic development, urbanization, and nutritional transition [6]. India, with 69.2 million people with T2DM, is the country with 2nd highest number of people living with diabetes mellitus worldwide next to China (4).WHO projects that diabetes will be the 7th leading cause of death in 2030 (5).

The greatest increase in the prevalence of diabetes mellitus is reported from low and middle-income countries (6). Asia, being the epicentre for the epidemics of diabetes, is responsible for more than 60% of the global burden of diabetes mellitus (7).

This is primarily driven by dietary transitions and insufficient or lack of physical activity altering the physiological milieu leading to overweight or obesity and diabetes (8). Care for chronic diseases like diabetes poses challenges characterized by the need for sustained compliance to treatment, prevention or management of associated complications (3). This requires the continuous engagement of health systems in the continuum of care at all stages (9).

In nutshell, the modernization and resultant shift in lifestyle to more sedentary activity with higher-fat diets and obesity are the causes of the increased prevalence of diabetes mellitus.

MATERIALS AND METHODS

This was a hospital based cross sectional study conducted among 100 apparently healthy individuals aged 25 years and above, attending outpatient clinic of SVMC Hospital, Pondicherry. Study population consisted of 48 females and 52 males. Subjects were selected using simple random sampling technique. A predetermined & pretested questionnaire based on IDRS (Indian Diabetes Risk Score) determining simple anthropometric and socio-demographic variables was used to interview the participants. Information gathered include demographic factors such as age, gender, family history, education, alcohol, smoking, family history, hip waist ratio, hypertension, level of physical activity, marital status, Body Mass Index (BMI) and results of fasting Blood Sugar (Table). The exclusion criteria included subjects with other chronic diseases such as hypertension, renal and liver diseases and infectious diseases. SPSS software, was used for data entry and analysis. The data were presented as scores using a predefined scoring system for each variable. Participants with IDRS value < 30 were categorised as low risk and those with scores ≥ 60 as high risk for diabetes.

Table. Distribution of Study Participants according to IDRS (Indian Diabetes Risk Score) Score

Variables	IDRS <60(%)	IDRS ≥ 60 (%)	Total (out of 100)
Age (years)			
>25	63(98.4)	1(1.6)	64
26-40	13(81.3)	3(18.7)	16
41-55	6(54.5)	5(45.5)	11
> 56	1(11.1)	8(88.8)	09
Education			
Graduate	4(11.1)	32(88.9)	36
Post Graduate	15(23.4)	49(76.6)	64
Residence			
Urban	22(34.4)	42(65.6)	64
Rural	19(52.8)	17(47.2)	36
Marital status			
Married	3(10.7)	25(89.3)	28
Un married	4(5.9)	64(94.1)	68
Widow/separated	1(25)	3(75)	04
Occupation			
Business	1(5.9)	16(94.1)	17
Service	4(13.3)	26(86.7)	30
House hold	0(0)	1(100)	01
Student	2(5.6)	34(94.4)	36
unemployed	1(6.3)	15(93.7)	16
BMI			
Underweight	5(26.3)	14(73.7)	19
Normal	7(30.4)	16(69.6)	23
overweight	18(31.1)	40(68.9)	58
Hypertension			
Low (>60/90 mm Hg	6(35.3)	11(64.7)	17
Normal =80/120 mm Hg	24(47.1)	27(52.9)	51
High <90/140 mm Hg	5(15.6)	27(84.4)	32
Physical activity			
Mild	2(4.2)	46(95.8)	48
Moderate	16(43.2)	21(56.8)	37
Heavy	13(86.7)	02(13.3)	15
smoking			
No	6(100)	0(0)	6
Yes	1(1.1)	93(98.9)	94
Alcohol			
No	8(88.8)	1(11.1)	9
Yes	3(3.3)	88(96.7)	91
Family history			
Yes	12(19.1)	51(80.9)	63
No	19(51.4)	18(48.6)	37
Fasting sugar			
70-108 mg/dl	29(42)	40(58)	69

110-124 mg/dl	9(34.6)	17(65.4)	26
>126 mg/dl	1(20)	4(80)	5
Waist hip ratio			
<0.85	35(89.7)	4(10.3)	39
>0.85 (truncal obesity)	2(3.3)	59(96.7)	61
Risk factors			
Diet and life style	1(2.3)	43(97.7)	44
Stress	0(0)	45(100)	45
Associated factors	0(0)	11(100)	11

RESULTS

This study included 100 participants, 61 of 100 (61%) with waist>90 cm, 48 of 100 (48%) doing less or no exercise while 51(80.9%) out of 63 participants having family history of diabetes were in High-Risk group for Diabetes. As shown in Table, IDRS ≥ 60 was more than 96% both in smoking as well as alcohol consumption. Similar pattern was seen in students followed by service persons (due to stress and unhealthy life style). Urban participants (65.6%) as well as more educated (76.6%) individuals have high IDRS score.

DISCUSSION

The South-East-Asia-Region ranked third in the prevalence of diabetes in 2019 with India ranking second to China (8). The prevalence of diabetes is projected to rise by the year 2045, with a nearly equal proportion from high-income (11.9%) and middle-income (11.8%) countries; and 4.7% in low-income countries (10). Few other recent epidemiological surveys, showed the prevalence of DM in India ranged from 5 to 17% (11).

According to above result, Prevalence of diabetes risk increases with increasing age. This is similar to a study conducted in Kancheepuram by Geetha Mani et al (12) & Abhishek Arun et al (13) but in the study by Nagalingam S. et al (14) risk decreased with increasing age. In our study, individuals having waist size more than 85 cm have the highest risk (96.7%) and the one having waist size less than 80 cm have the lowest risk (10.3%) i.e. prevalence of diabetes risk increases with increasing waist size, which is similar to Geetha Mani et al & Abhishek Arun et al. Our study shows that individuals who perform very limited or no physical activity have greatest risk (95.8%) i.e., prevalence of diabetes risk increases by limiting physical activity & only 4.2%, individuals who don't do any physical activity found out to be normal, i.e., absence of physical activity leads to Diabetes and more physical activity minimises the risk of Diabetes Mellitus. According to the above data, when there is family history of diabetic the chances are highest (80.9%) for diabetes. Genetics plays an important role, but it is not the only factor. By means of modifying life style, we can delay the onset of the diabetes.

Our cohort attracts special attention in that in spite of being a semi-urban cohort, the incidence is still high in comparison to the two studies from urban south India (15) and the one from rural south India (16) . It is to be noted that high incidence of diabetes is reported from other low- and middle-income countries too. Latifi et al. in 2016 reported a Diabetes Mellitus Type 2(T2DM) incidence rate of 21.9 per 1000-person year from Iran (17) . Again, this conversion rate (60% or 86.41 per 1000 person years) is much more than the conversion rates from other studies in India. Mohan et al. reported that 40.5% of baseline prediabetes participants converted to T2DM within 8 years of follow-up (18). Another recent study from South India reported incidence rate of 58.9% or 78.9 per1000 person-years (15).

The final model showed that being 50 years or older and with no physical activity, unhealthy life style will increase the risk of having a high IDRS score, hence will be at high risk of diabetes.

These findings highlight the impending burden of diabetes especially given the high population base and demographic transition in India. The survey also points out that almost half of diabetics are unaware of their raised fasting glucose status and that early diagnosis and treatment are primary for preventing complications, ensuring longevity and better quality of life.

CONCLUSION

Diabetes is a multifactorial disease as observed in our studies. Despite creating so much awareness its prevalence and risks are increasing. As diabetes is a preventable disease, it should be controlled by modifying life style and diet.

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