



## INVESTIGATION ON THE PREVALENCE AND RISK FACTORS OF TYPE 2 DIABETES MELLITUS AMONG THE RURAL POPULATION IN STATE OF TAMILNADU

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### ABSTRACT

**Background:** Diabetes mellitus is a common health problem in this world, causing a huge burden for individuals, families, and communities. It is a clinical syndrome characterized by hyperglycaemia due to absolute or relative deficiency of Insulin. **Methods:** A cross-sectional study carried out among 530 type 2 diabetic mellitus patients in rural field practice area of Tamil Nadu. The objectives of the study were to estimate the prevalence of risk factors for Type 2 diabetes mellitus among the population in rural areas of Tamil Nadu. Data was analyzed using the SPSS version 20.0 software. **Results:** Among the 530 people were studied in age group of 20-70 (aged  $45 \pm 18.7$  years). Majority (48%) were more than 50-70 years of age. In this study, 272 of the participants were female and 258 were male. In relation to residence area, 412 (78%) were Rural people and 118 (22%) were Urban people. The data result was expressed as mean and standard deviation. A probability value is less than 0.05 and it was considered statistically significant. The risk factors of physical inactivity, Illiteracy, Mixed diet, Stress, hypertension, overweight/obesity, Tobacco smoking, Alcohol intake, Family history of diabetes and Sedentary workers were investigated. **Conclusions:** It concluded that the prevalence and risk factors of type 2 diabetic mellitus is high. It is required to reduce the trouble for rising type 2 diabetic mellitus in the society. The risk factors were significantly associated with the high rate of complications of diabetes. It suggests that on focusing of interventions to prevent and control the type 2 diabetic mellitus.

**KEYWORDS :** Diabetes, Prevalence, Risk factors, Statistical analysis.

### INTRODUCTION

Diabetes Mellitus (DM) is a major emerging clinical health problem in this world. Anemia is a common problem in diabetes<sup>1</sup>. It is a clinical syndrome characterized by hyperglycaemia due to absolute or relative deficiency of Insulin<sup>2</sup>. Diabetes prevalence has been rising more rapidly in developing countries of the world where the disorder predominantly affects younger adults in the economically productive age group<sup>3</sup>. Type 2 DM comprises about 90% of diabetic population of any country. Diabetic nephropathy is a chronic micro vascular complication of poorly controlled diabetes mellitus (DM), leading to end stage renal disease<sup>4</sup>. The highest increase in Diabetes Mellitus prevalence is amongst low and middle-income countries, predominantly within the 40-59 years age group, although a tendency is seen for onset at a younger age. According to WHO, 80% of Diabetes deaths occur in low and middle income countries<sup>5</sup>. The diabetic nephropathy is estimated to turn into the most frequent cause of ESRD in the developing world. About 20% to 30% of people with either type 1 or type 2 diabetes develop nephropathy, whose incidence increases with the duration of diabetes<sup>6-8</sup>. Microalbuminuria significantly increases the relative risk of development of diabetic nephropathy and is a risk factor for adverse cardiovascular outcomes<sup>9</sup>. In diabetic patients, glycemic control i.e. maintaining the normal blood sugar levels plays a very significant role in averting the risk of developing both acute & chronic complications. Diabetes is a major cause of morbidity and mortality throughout the world especially more alarming in developing countries. Diabetes is among the leading causes of kidney failure and screening for early signs of diabetes related to kidney disease is a cost saving intervention and feasible for developing countries. Microvascular complications including nephropathy, retinopathy and neuropathy are initiated by chronic hyperglycemia<sup>10</sup>.

Diabetes Mellitus is emerging as a major health-care challenge for India. According to the International Diabetes Federation (IDF) estimates, India had 62 million diabetic

subjects in the year 2013 which is more than 7.1% of India's adult population. An estimate shows that nearly 1 million Indians die due to Diabetes Mellitus every year<sup>11</sup>. In India, the prevalence of diabetic nephropathy ranges from 32% to 57% and overt proteinuria is found in 5% to 28% of diabetic patients<sup>12</sup>. Diabetes mellitus contributes to a third of all patients in dialysis units in India. Diabetic nephropathy is a major public health concern, because dialysis and kidney transplantation therapy are almost completely inaccessible to most diabetic patients in India<sup>13,14</sup>. According to International Diabetes Federation (IDF) in 2013, 382 million people had diabetes worldwide of which Type 2 makes up about 90% of the cases. This is equivalent to 8.3% of the adult people with equal rates in both men and women. More than 80% of diabetic patient's deaths obtain in little and middle-income countries. The number of group with diabetes is estimated to rise to 592 million by 2035<sup>15,16</sup>. The risk factors for type 2 diabetic mellitus disease are tobacco use, alcohol use, unhealthy diet and lack of physical activity. Metabolic risk factors include overweight, obesity, hypertension Family history of diabetes. The objectives of the study were to determine the prevalence of risk factors for type 2 diabetic mellitus disease among the rural population in state of Tamil Nadu.

### MATERIALS AND METHODS

A cross-sectional study carried out the prevalence of risk factors of type 2 diabetic mellitus among 530 populations in around Tamil Nadu. The study was analyzed in type 2 diabetic mellitus patients of 20-70 years of age in practice area at Tamil Nadu and South India. This study was carried out from eight month in the duration of March 2022-October 2022. The researcher employed a cross-sectional quantitative design. It provides a framework for the surveillance of type 2 diabetic mellitus disease risk factors, was used. This is a sequential process, starting with gathering questionnaire-based data on key risk factors, then moving on to taking simple physical measurements, followed by biomedical measurements. After obtaining informed consent, the selected participants will be interviewed using a pre-tested, semi-structured

questionnaire. Self-reported history of use of tobacco smoking, alcohol consumption, physical activity and dietary habits as well as history of hypertension and Family history of diabetes were obtained from the respondents.

**RESULTS**

The result of the study samples were included 530 Type 2 DM patients. The age of the participants ranges from 20 to 70 years (mean age 45 ± 18.7). Majority (48%) were more than 60 years of age A total of 530 patients in which majority of 272 (51%) patients were female and 258 (49%) were males. The clinical parameter of diabetic patients is shown in Table 1. Out of 530 patients 412 are residing in rural area and 118 are residing in urban area. The distribution of the Type 2 DM patients based on Education and there are 356 patients with Illiterate levels and 174 patients with High education levels. It reveals the distribution of the patients based on Economic status. Out of 530 patients 26 are Good, 84 patients medium and 420 are low. Around 70% belonged to unemployed occupation and 30% having employed occupation. Among the study population, 76.5% were married, 23.5% were single. About 98% of the study populations belong to the Hinduism, 1.5% was Christianity and 0.5% belongs to the Muslims. Most patients (72%) had smoked and 28% were smoking stopped at the time of data collection. The majority of patients (82%) were classified as overweight and 28% were in normal weights. The most of these patients (86%) were found as hypertension.

**Table 1: Socio-demographic characteristics of the study population.**

Sl. No.	Variables	Diabetic patients N=530	'p' value
1.	Age in year (a) 20-30 years (b) 31-50 years (c) 51-60 years (d) >60 years	32 (6) 88 (17) 154 (29) 526 (48)	0.001 (S)
2.	Gender (a) Male (b) Female	258 (49) 272 (51)	0.144 (NS)
3.	Residence (a) Urban (b) Rura	118 (22) 412 (78)	0.001 (S)
4.	Education (a) Illiterate (b) Literate	356 (67) 174 (33)	0.001 (S)
5.	Occupation (a) Employed (b) Unemployed (c) Student	161 (30) 318 (60) 51 (10)	0.001 (S)
6.	Marital status (a) Single (b) Married (c) Divorce	156 (29) 374 (71) -	0.004 (S)
7.	Religion (a) Muslim (b) Christian (c) Hindu (d) Other (specify)	6 (1) 12 (2) 512 (97) -	0.002 (S)
8.	Socio-economic status (a) Upper class (b) Middle class (c) Lower class	26 (5) 84 (16) 420 (79)	0.001 (S)

S- Significant; NS-Not Significant. p < 0.05 level of significant.

The studied risk factors for Type 2 diabetic mellitus, which included tobacco use, alcohol consumption, physical activity, Body Mass Index (BMI), Blood Pressure, Family history of diabetes and Mixed diet were used to categorize the

respondents into those who were considered to be at risk for developing a Type 2 diabetic mellitus disease according to study area (Table 2).

**Table 2: Risk factors associated with Type 2 diabetic mellitus.**

Risk factors	Diabetic patients N=530	
	Number	Percentage
Tobacco use		
Smoker	258	49
Non smoker	272	51
Alcohol consumption		
Drinkers	258	49
Non-drinkers	272	51
Physical Activity		
Sedentary	412	78
Active	118	22
BMI		
Overweight	434	82
Normal weight	96	18
Blood Pressure		
Hypertensive	454	86
Normal	76	14
Family history of diabetes		
YES	134	25
NO	396	75
Mixed diet		
VEG	141	27
NON-VEG	389	73

**Statistical analysis**

Statistical analysis was performed using SPSS software program, version 20.0. The results were expressed as mean and standard deviation. The patient's data were analyzed by analysis of variance test. The results were considered significant when the p value was found to be <0.05 in a confidence interval of 95%.

**DISCUSSION**

Among the 530 people were studied in age group of 20–70. Majority (48%) were more than 60 years of age. In this study, the majority of female 51% than male were representing 49% of the sample. The present study revealed that the prevalence of Diabetes Mellitus was more in females than males. Krentz et al., (2001)<sup>17</sup> have reported that the prevalence was higher in females. It observed that the Type 2 diabetic mellitus diseases were higher in the age group of >60 years (48%) and lower <20 (6%) and moderate level of >60 up to 30 years (29%) which was statistically significant. The rural patients were 78% in higher than urban area (22%). Similar results were obtained by Solanki et al., (2015)<sup>13</sup>. The prevalence of Diabetes Mellitus was 10.4% in Tamilnadu (13.7% in urban area and 7.8% in rural area), 8.4% in Maharashtra (10.9% in urban area and 6.5% in rural area) and 13.6% in Chandigarh (14.2% in urban area and 8.3% in rural area). National Urban Diabetes Survey reported the prevalence of Diabetes Mellitus in urban population as 12.1%. The present studies, Out of 530 patients 26 are Good, 84 patients medium and 420 are low. Around 70% belonged to unemployed occupation and 30% having employed occupation.

Among the study population, 76.5% were married, 23.5% were single. This is supported by study of Bhatti et al., (2007)<sup>18</sup> have reported that the prevalence of Diabetes Mellitus among higher, middle and lower SES group was 21.49%, 66.7% and 12.25% respectively. The major risk factors for Type-2 Diabetes Mellitus diseases are tobacco and alcohol abuse, a sedentary lifestyle, and an unhealthy diet. In the present study, the prevalence of Type-2 Diabetes Mellitus diseases risk factors among the adult (40-60 years) age group in the rural community<sup>13</sup>. The majority people were having educational

qualification below higher secondary and also having to lower middle or lower socioeconomic class and majority of them were unemployed. The present study revealed that the risk factors of Diabetes Mellitus were high among non-vegetarians (73%) as compared to those having vegetarians (27%). In contrast to this, Liu S et al., (2004)<sup>19</sup> found that high intake of green leafy or dark yellow vegetables were associated with reduced risk of Diabetes Mellitus. The present study found that 258 (49%) diabetic subjects were smokers and 272 (51%) diabetic subjects were non-users. In contrast to this, Solberg L et al., (2004)<sup>20</sup> in his study had linked smoking with increasing insulin resistance which later on induces full blown Diabetes Mellitus. The present study found that diabetic subjects were 258 (49%) alcohol drinkers and 272 (51%) diabetic subjects were non-drinkers. In contrast to this, Kao et al., (2001)<sup>21</sup> have found that high alcohol intake increases Diabetes Mellitus. The present study revealed that out of total 530 diabetics, 396 (75%) diabetic subjects were having no family history of Diabetes and 134 (25%) were having family history of Diabetes. Scott AR et al., (2013)<sup>22</sup> have found that the greatest risk of Diabetes Mellitus was observed in those with a bi-parental history of Type 2 Diabetes Mellitus. Out of 530 diabetic subjects, 434 (82%) diabetics were having raised BMI and 96 (18%) diabetics were having with BMI in normal range. From the results of the study 86.5% are physically inactive, BMI (14.5%), 10% has blood pressure and which is consistent with studies by Oommen<sup>23</sup>, Tagurum<sup>24</sup> and Sandhu<sup>25</sup>. This result shows that the study population was following metabolic risk factors of 86% were blood pressure, 78% were hypertensive, 78% was Sedentary, and 73% of the non-veg were respectively. The similar studies were reported and showed that the prevalence of diabetes among rural population<sup>26</sup>. The physical inactivity is an independent factor in triggering the epidemic of Diabetes Mellitus. Out of 530 diabetic patients, 412 (78%) diabetics were having sedentary lifestyle and only 118 (22%) diabetics were having moderate physical activity<sup>26</sup>.

## CONCLUSION

It concluded that the prevalence and risk factors of Type 2 diabetic mellitus diseases is high. It is required to reduce the trouble for rising DM diseases in the society. It is suggests that on focusing of interventions to prevent and control the DM diseases. The high burden of Type 2 diabetic mellitus diseases were observed and their association of socio-demographic behavioral risk factors. The prevalence of DM is higher in urban area as compared to rural area. Although age is a non-modifiable risk factor, Diabetes Mellitus can be prevented by adopting healthy lifestyle, regular exercise and maintaining normal bodyweight. The prevention of growth of risk factors for DM diseases can be achieved by rising health awareness programs focusing essentially on reducing tobacco usage, alcohol consumption and metabolic risk factors.

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