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## **PREVALENCE OF RISK FACTORS FOR TYPE 2 DIABETES MELLITUS IN THE URBAN POPULATION- A COMMUNITY BASED CROSS SECTIONAL STUDY**

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### **ABSTRACT**

In the new millennium, people are facing serious challenges in the health care due to rising trends in the non communicable diseases, due to demographic and epidemiological changes, as well as economical globalization. Rapidly rising in prevalence of DM all over the globe at alarming rate. Over the past 30 years, the status of diabetes has changed from being considered is a mild disorder of elderly to the one of the major cause of morbidity and mortality affecting the youth and middle aged people. A cross-sectional study was conducted in Ashok Nagar, Belagavi, among the middle age group i.e. 30-60 years. The study population included On 400 subjects Data was analysed by using SPSS software version 20. Frequency and percentage were used to analyse the descriptive results. Chi-square test was used to find the association between demographic variables and risk factors for T2DM. Prevalence of risk factors for T2DM was found to be 23% obesity, 14% alcohol, 67% and 77% had sedentary and moderate lifestyle at work time. Prevalence of central obesity assessed by BMI and WHR were 42.3% and 67.2% respectively. This prevalence among women was higher than men. study demonstrated a significant higher prevalence of behavioural and biological risk factors for DM in urban population in South India, with significant gender difference. Three fourth of the participants had one or more risk factors for DM. Men had higher prevalence of DM risk factors.

**Keywords:** *Diabetes Mellitus, Risk Factors, Urban Area, Non-Communicable Disease*

### **INTRODUCTION**

In the new millennium, people are facing serious challenges in the health care due to rising trends in the non communicable diseases, due to demographic and epidemiological changes, as well as economical globalization. There is dramatic decrease in life expectation, along with changes in life style leading to epidemics of non-communicable diseases like cardiovascular diseases, cancer, diabetes, depression etc (Health & Family Welfare Government of India Planning Commission, 2010). The estimated diabetes prevalence for adults between the ages of 20 and 79 years worldwide for 2012 was 382 million and it is expected to affect 592 million people by 2035. It is estimated that 175 million people have undiagnosed type 2 diabetes mellitus (T2DM) (IDF Diabetes Atlas; pdf 2013). In India during the year 2013, there were estimated 65.1 million cases of diabetes mellitus and it is expected to affect 109.0 million people by 2035 (Mohan *et al.*, 2007). Diabetic patients, if undiagnosed or inadequately treated, develop multiple chronic complications leading to irreversible disability and death, micro vascular complications like diabetic renal disease, diabetic retinopathy and neuropathy are serious health problems resulting in deterioration of the quality of life and premature death (Rama Lakshmi *et al.*, 2011); Diabetes is a leading cause of 10-20% blindness in 20-70years aged patients with diabetes.10-20% develops kidney disease, and the risk of leg amputation is 15-40 times greater for a person with diabetes than non diabetic. Recent studies have shown a rapid conversion of impaired glucose tolerance to diabetes in the Southern states of India, where the prevalence of diabetes among adults has reached approximately 20% in urban populations and approximately 10% in rural population. The economic burden of treating diabetes and its

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complications is considerable. The primary prevention of diabetes is urgently needed in India to curb the rising burden of diabetes (Ramachandran *et al.*, 2009).

Diabetes mellitus is preceded by risk factors, family history, tobacco consumption, alcohol consumption, low fruit intake, high sodium intake, low nuts and seeds intake, low vegetable use, low whole grain use, high processed meat intake, sedentary lifestyle and stress (Bhutani *et al.*, 2014).

## **MATERIALS AND METHODS**

### **Methodology**

The present study was conducted in Ashok Nagar, urban field practice area of Jawaharlal Nehru Medical College, KLE University, Belagavi, to know the prevalence of risk factors for T2DM among the middle age group i.e. 30-60 years. The study population included on 400 subjects during the period of September 2014 – February 2016.

Sample size was calculated based on the prevalence of previous study conducted in Ashok Nagar, urban field practice area using the formula  $4pq/d^2$  and reached to 400. Persons aged 30-60 years, were included in the study. Persons diagnosed with type 1 diabetes mellitus and Gestational diabetes. The study has been under taken at Ashok Nagar, urban field practice area which includes 6 areas. Among which Ashok Nagar was picked randomly for study purpose. Ashok Nagar consists of total 2048 families with 9212 population.

Systematic random sampling was done in persons aged 30-60 years. Subjects of this study include general population of Ashok Nagar, urban field practice 111area of, Jawaharlal Nehru Medical College, KLE University, Belagavi. Subjects of this study include general population of Ashok Nagar, urban field practice 111area of, Jawaharlal Nehru Medical College, KLE University, Belagavi. A pre-tested semi structured questionnaire was be used for collection of data by interview method which includes 1) Demographical information, 2) Family history of diabetes, 3) Anthropometry, 4) Habits, 5) Dietary habits, 6) Physical activity.

Appropriate clinical examinations such as waist circumference, waist hip ratio and body mass index, was carried out for the purpose of data collection, after obtaining written informed consent. Earlier to pilot study and data collection, ethical clearance from Institutional Ethics Committee (IEC) of J.N.M.C, KLE'S was obtained for the study. Informed consent was taken from every participant before collecting the information.

Informed consent was translated into local language Kannada. Collected data was analyzed by using the statistical package for social sciences (SPSS) version 20. Frequency and percentage were used to analyze the prevalence of risk factors type 2 diabetes mellitus. Chi-square test was used to find the association between demographic variables and the risk factors.

## **RESULTS AND DISCUSSION**

### **Results**

The present study showed that majority 124 (31%) were between the age group 41-45 years whereas least 16 (4%) were between age group 56-60 years. Male participants were 164 (41%) and female participants were 236 (49%).

The present study showed that 192 (48%) participant had normal BMI, followed by 92 (23%) participants had overweight BMI and minimal 28 (7%) participants were underweight. And 248 (62%) respondents were non-obese and remaining 152 (38%) were obese. 352 (88%) of the participants did not have smoking habit and 48 (12%) were had smoking habit. And 66.7% of participants had 5-6 cigarette smoking per day, and 33.3% participants had more than 6 cigarette per day. 344 (86%) of the participants did not consume alcohol and 56 (14%) consumed alcohol. And the alcoholics 57.1% consumed it 4 to 5 days a week, 43% consumed it 2 to 3 days a week. 260 (65%) were sedentary at work. 308 (77%) and 160 (40%) were involved in moderate and vigorous physical activity at their work. And 244 (61%) were sedentary at work. 176 (44%) and 128 (32%) were involved in moderate and vigorous physical activity at their leisur time. And 280 (70%) participants were found to be sedentary during travel to work

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**Table 1: The Study Participants According to their Work Time Related to Physical Activities**

Work Related P A		Number	%
Sedentary Work	Yes	260	65
	No	140	35
	Total	400	100
Moderate Work	Yes	308	77
	No	92	23
	Total	400	100
Vigorous Work	Yes	160	40
	No	240	60
	Total	400	100

**Table 2: The Study Participants According to their Leisure Time Related to Physical Activities**

Leisure Time Related to P A		Number	%
Sedentary Work	Yes	244	61
	No	156	39
	Total	400	100
Moderate Work	Yes	176	44
	No	224	56
	Total	400	100
Vigorous Work	Yes	128	32
	No	272	68
	Total	400	100

**Association between Socio-Demographic Variables and Risk Factors**

The present study showed that there was a significant association in between gender and BMI as the p-value is less than 0.05. The present study showed that there was a significant association in between sex and Waist: Hip ratio as the p- value is (p<0.05).

**Table 3: Association in between Gender and Body Mass Index (BMI)**

BMI	Men (%)	Women (%)	Total (%)
Underweight	08 (4.9)	20 (8.5)	28 (7)
Normal	100 (61)	92 (39)	192 (48)
Overweight	36 (22)	56 (23.)	92 (23)
Obese	20 (12.2)	68 (28.8)	88 (22)
Total	164 (100)	236 (100)	400 (100)
$\chi^2= 23.181$	d f= 3	p- value : 0.000	

**Table 4: Association in between Gender and Waist: Hip Ratio**

Waist: Hip Ratio	Men (%)	Women (%)	Total (%)
Non Obese	116 (70.7)	132 (55.9)	248 (62)
Obese	48 (29.3)	104 (44.1)	152 (38)
Total	164 (100)	236 (100)	400 (100)
$\chi^2=$	D F= 1	P- value : 0.003	

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### **Discussion**

The present study showed that majority 124 (31%) were between the age group 41-45 years whereas least 16 (4%) were between age group 56-60 years. Male participants were 164 (41%) and female participants were 236 (49%). The present study showed that 192 (48%) participant had normal BMI, followed by 92 (23%) participants had overweight BMI and minimal 28 (7%) participants were underweight. A study conducted in Pondicherry where overweight were 315 (51%) (Gupta *et al.*, 2009). The present study showed that 248 (62%) respondents were non-obese and remaining 152 (38%) were obese. A study conducted in rural area of Tamil Nadu where obesity (BMI>30) was 9.14% (Sanjay *et al.*, 2010). A study conducted in rural area of Venganoor of Kerala where 27.8% of the subjects were found to be obese, while 20.3% of the subjects reported raised waist circumference (Tiwari *et al.*, 2008). The present study showed that 256 (64%) of the respondents had no family history of DM, 92 (23%) were not aware about diabetes, 36 (9%) father had diabetes and 16 (4%) mother had diabetes. A study conducted in Pondicherry where majority 422 (68.50%) of the respondents had no family history of DM. Minimal 194 (31.50%) of the participants had family history of DM (Gupta *et al.*, 2009). A study conducted in rural area of Tamil Nadu where majority 1715 (88.58%) of the respondents had no family history of DM (Sanjay *et al.*, 2010).

The present study showed, 352 (88%) of the participants did not have smoking habit and 48 (12%) were had smoking habit. And 66.7% of participants had 5-6 cigarette smoking per day, and 33.3% participants had more than 6 cigarette per day. A study conducted in rural area of Venganoor of Kerala where 38.5% of participants were ever smokers (Tiwari *et al.*, 2008). The present study showed, 344 (86%) of the participants did not consume alcohol and 56 (14%) consumed alcohol. And the alcoholics 57.1% consumed it 4 to 5 days a week, 43% consumed it 2 to 3 days a week. A study conducted in rural area of Venganoor of Kerala where 5.5% of participants were in the habit of consuming alcohol (Tiwari *et al.*, 2008). A study conducted in United States Men who consumed higher amounts of alcohol had a reduced risk of diabetes (P for trend < 0.001). The present study showed, 260 (65%) were sedentary at work. 308 (77%) and 160 (40%) were involved in moderate and vigorous physical activity at their work. And 244 (61%) were sedentary at work. 176 (44%) and 128 (32%) were involved in moderate and vigorous physical activity at their leisure time. And 280 (70%) participants were found to be sedentary during travel to work. A study conducted from 1992 to 1998 in the Nurses' Health Study, where 2-h/d increment in TV watching was associated with 14% increases in risk of diabetes. And 2-h/d increment in sitting at work was associated with 7% increases in risk of diabetes. A study conducted in Pondicherry where majority respondents 558 (90.50%) indulged in mild to moderate physical activity (Gupta *et al.*, 2009). The present study showed that there was a significant association in between gender and BMI as the p-value is less than 0.05. A study conducted in Pondicherry where BMI (>30) 53 (44.54%), difference between two groups are significantly high (Gupta *et al.*, 2009). The present study showed that there was a significant association in between sex and Waist: Hip ratio as the p-value is (p<0.05). A study conducted in rural area of Tamil Nadu where in general population males (>1) 3.56% and among females (>0.85) 32%. Male and Female waist hip ratio was significantly high (p<0.05) % (Sanjay *et al.*, 2010).

### **Conclusion**

The prevalence of risk factors of behavioural and biological increased with advancing age; lesser or no education was a significant factor for higher prevalence of tobacco use; hypertension and abdominal obesity. Conversely, higher education was proportional to increases sedentary life style. Our study demonstrated a significant higher prevalence of risk factors in urban population in South India. Burden of DM risk factors in the population reflects epidemiological transition which requires an immediate attention.

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### **Further Implication**

Qualitative research should be conducted to understand the problem of prevalence of risk factors for type 2 diabetes mellitus.

## **REFERENCES**

- Health & Family Welfare Government of India Planning Commission (2010)**. Report of the Working Group on Disease Burden for 12th Five Year Plan, Government of India Planning Commission 2(6).
- Mohan V, Sandeep S, Deepa R, Saha B and Varghese C (2007)**. Epidemiology of type 2 diabetes: Indian scenario. *Indian Journal of Medical Research* 125 217-30.
- Danaei G, Finucane MM, Lu Y, Singh GM, Cowan MJ, Paciorek CJ et al., (2011)**. National, regional, and global trends in fasting plasma glucose and diabetes prevalence since 1980: systematic analysis of health examination surveys and epidemiological studies with 370 country-years and 2.7 million participants. *Lancet* 378 31-40.
- Diabetes Atlas (2013)**. Online version of IDF Diabetes Atlas. Available: [www.idf.org/.../EN\\_6E\\_Atlas\\_Full\\_O.pdf](http://www.idf.org/.../EN_6E_Atlas_Full_O.pdf) 6 30-34.
- Ramachandran A and Snehalatha C (2009)**. Current scenario of diabetes in India. *Journal of Diabetes* 1(1) 8-28.
- Rama Lakshmi G and Bandyopadhyay SS (2011)**. Appraisal of risk factors for diabetes mellitus type 2 in central Indian population: a case control study. *Journal of Anthropology* 7(1) 103-110.
- Schade JP (2006)** The complete Encyclopedia of Medicine, 1st ed., United States of America, Foreign media group 74 – 78.
- Bhutani J and Bhutani S (2014)**. Worldwide burden of diabetes. *Indian Journal of Endocrinology and Metabolism* 18 868-870.
- Fauci AS, Kasper DS, Longo DL, Braunwald E, Hauser SL, Jameson JL et al., (2008)**. *Harrison's Principles of Internal Medicine*, (United States New York: McGraw Hill).
- World Health Organisation (2002)**. The World Health Report 2002. *Reducing Risks, Promoting Healthy Life*. (Geneva, Switzerland: World Health Organization). Available: [http://www.who.int/whr/2002/en/n\\_blank](http://www.who.int/whr/2002/en/n_blank). Accessed on 22.08.2014
- Murray CJ and Lopez AD (1996)**. *The Global Burden of Disease. A Comprehensive Assessment of Mortality and Disability from Disease, Injuries, and Risk Factors in 1990 and Projected to 2020*. (Cambridge, MA, U.S.A., Harvard University Press).
- Hope T (2001)**. Rationing and life-saving treatment: should identifiable patients have higher priority? *Journal of Medical Ethics* 3 179-85.
- Agrawal S and Ebrahim S (2012)**. Prevalence and risk factors for self-reported diabetes among adult men and women in India: finding from a national cross-sectional survey. *Public Health Nutrition* 15(6) 1065-77.
- Bryan GC and Samuel C (2012)**. An assessment of risk factors for type 2 diabetes among women in rural Jamaica. *West Indian Medical Journal* 61(8) 809-813.
- Marinho NB and Vasconcelos HC (2013)**. Risk for type 2 diabetes mellitus and associated factors. *Acta Paulista de Enfermagem* 26(6) 569-74.
- Gupta SK, Singh Z, Purty AJ and Vishwanathan M (2009)**. Diabetes prevalence and its risk factors in urban Pondicherry. *International Journal of Diabetes in Developing Countries* 29 166-69.
- Lu FH, Yang YC and Wu JS (2000)**. A population based study of prevalence and associated risk factors of diabetes Southern Taiwan. *Diabetic Medicine* 15(7) 564-72.
- Sanjay KG, Zile S, Anil JP and Vedapriya DR (2010)**. Diabetes prevalence and its risk factors in rural area of Tamil Nadu. *Indian Journal of Community Medicine* 35(3) 396-399.
- Fletche BRN and Gulanick M (2002)**. Risk factors for type 2 diabetes mellitus. *Journal of Cardiovascular Nursing* 16 17-23.

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**Abdul-Rahim HF, Husseini A, Giacaman R, Jervell J and Bjertness E (2001).** Diabetes mellitus in an urban Palestinian Population: Prevalenced associated factors. *East Mediterranean Health Journal* **7**(1-2) 67-68.

**Hjellset VT, Bjorge B, Eriksen HR and Hostmark AT (2011).** Risk Factors for Type 2 Diabetes Among Female Pakistani Immigrants: The Inva Diab-DEPLAN Study on Pakistani Immigrant Women Living in Oslo, Norway. *Journal of Immigrant and Minority Health* **13**(1) 101-110

**Orozco LJ, Buchleitner AM, Gimenez-Perez G, Roqu'eI Figuls M, Richter B and Mauricio D (2008).** Exercise or exercise and diet for preventing type 2 diabetes mellitus. *Cochrane Database of Systematic Reviews* **3** CD003054.

**Ramachandran A, Snehalatha C, Mary S, Mukesh B, Bhaskar AD and Vijay V (2006).** The Indian Diabetes Prevention Programme shows that lifestyle modification and met form in prevent type 2 diabetes in Asian Indian subjects with impaired glucose tolerance (IDPP-1). *Diabetologia* **49**(2) 289–297.

**Lindstrom J and Tuomilehto J (2003).** The diabetes risk score: a practical score to predict risk of type two diabetes. *Diabetes Care* **26**(3) 725-31.

**Tiwari RR, Deb PK, Debbarma A et al., (2008).** Risk factor analysis in self-reported diabetes in a rural Kerala population. *International Journal of Diabetes in Developing Countries* **28**.