

EPIDEMIOLOGICAL STUDY OF DIABETES AMONGST GERIATRIC POPULATION IN AN URBAN SLUM, NAGPUR

JaiPrakash Singh¹, AVSaoji², N B Kasturwar³, SP Pitale², AR Deoke², JG Nayse⁴

¹PG Student, ²Associate professor, ³Professor and Head of Department, ⁴Statistician/lecturer, Department of community medicine, NKP Salve Institute of Medical Sciences and Research Center, Nagpur, India

Correspondence:

Dr. JP Singh

Dept. Of Community Medicine, NKP Salve Institute of Medical Sciences and Research Center, Digdoh hill, Hingna road, Nagpur (MH)

Email: jpaliwal0001@gmail.com Mobile: 9028495628

ABSTRACT

The study was conducted to assess the prevalence and associated risk factors for diabetes in the geriatric population in urban slum areas of Nagpur. A community based cross sectional study was carried out in the field practice area of Urban health training center (UHTC), dept. Of community medicine, NKP Salve Institute of Medical Sciences and Research Center, Nagpur. A total of 400 subjects (165 males and 235 females) aged ≥ 60 years were screened for Diabetes Mellitus. Diagnosis of diabetes mellitus was based on the American Diabetes Association criteria 2004. The data analysis by using Epi Info software. Author observed that prevalence of diabetes was 17.75% and stress was the commonest risk factors 46(64.79%), followed by positive family history of diabetes (63.38%) and others. Family history of diabetes (63.38%) and hypertension 26 (36.62%) were significantly associated with diabetes ($p < 0.05$) while other risk factors were not significantly associated.

Key words: Prevalence, Diabetes, Glucose, Body mass index, associated risk factors, Nagpur

INTRODUCTION

"Today on the eve of the twenty first century, we see that the world health situation is no longer that clear cut and simple. Many developing countries have made great progress in combating infectious diseases and malnutrition, thereby improving the length and quality of life of their people. But rapid urbanization and industrialization in those same countries, together with the adoption of modern life style that adversely effect health have brought new problems in the form of chronic non-communicable diseases. In many developing countries these new problems are arriving before the old one's are resolved leading to a double burden of the disease," Nakajima H, Director General¹, WHO 1991. "Diabetes Mellitus (DM) can no longer be considered a disease of affluent nation alone, it has become a global problem, a major epidemic of the twentieth century, and one which shows

no sign of abating²". DM now affects a higher proportion of persons in many developing countries than it does in Western countries where two or three percent of the population is affected. This trend has been linked with the increasing life expectancy, rural urban shifts, moves from traditional to modern life style, change in diet and physical inactivity and obesity³. DM today affects over 50 million people in the world and about one half of them are living in the developing world.

The prevalence of diabetes mellitus (DM) increases with age. In India, 20% of the elderly population has DM⁴ In addition, over 25% of older persons have impaired glucose tolerance (IGT)⁵. The majority of older individuals with diabetes have type 2DM. At the same time, the disease and its complications cause a heavy economic burden for diabetic patients themselves, their families and society. A better

understanding about the cause of a predisposition of Indians to get T2DM is necessary for future planning of healthcare, policy and delivery in order to ensure that the burdens of disease are addressed (Hoskote and Joshi 2008).

The Prevalence of Diabetes amongst geriatric population in urban areas of India for last ten years is reported as ranging from 3.3% to 36.0%. The average Prevalence of Diabetes amongst geriatric population in urban areas of India for last ten years is 16.41% (Table-1).

Table 1: Prevalence of Diabetes amongst geriatric population in urban areas of India

Years	Authors	Place	Prevalence %
2002	H.M.Swami	Chandigarh	12.2
2002	RB Gurav	Kalwa (MH)	9.41
2004	Shashikant	Delhi	8.15
2004	Rahul prakash	Udaipur (Raj.)	3.33
2005	MK Sharma	Chandigarh	25.5
2006	GK Medhi	Dibrugarh (Assam)	17.4
2007	SPS Bhatia	Chandigarh	11.9
2007	Sonia puri	Chandigarh	27.1
2008	SH Parray	Kashmir	30.0
2008	DR Gaur	North India	11.0
2008	PR Moharana	Brahmapur (Orrisa)	36.0
2009	A Lena et al	S.India	10.3
2010	D.R.Gaur	N.India	11.0

AIMS AND OBJECTIVES

1. To study the prevalence of diabetes among geriatric population.
2. To study the associated risk factors for diabetes among geriatric population in an urban slum areas of Nagpur

Inclusion criteria: Age 60 years and above.

Exclusion Criteria: Age less than 60 years, Chronic and seriously ill person.

MATERIALS AND METHODS

The community based cross-sectional study was conducted in the field practice area of Urban health training center (UHTC) of the dept. of community medicine of NKP Salve Institute of

Medical Sciences and Research Center, Nagpur. The study population comprised of geriatric subjects of ≥ 60 years of age belonging to urban slum area of UHTC, Nagpur. The house to house visit and interview of 400 elderly ≥ 60 years of age was done. The sample was selected by random sampling technique. A prestructured, pretested Performa was used to get detailed information. The methodology comprised of interview, physical examination, clinical examination and laboratory investigations. General demographic, socio-economic and family structure information was obtained. Geriatric subjects were interviewed regarding his or her daily activity, lifestyle, socio-economic status, stress and morbidities.

Personal history regarding physical activity, diet, substance abuse (alcohol) and exercise were noted. Weight was recorded (to an accuracy of 1 kg) & the height of each subject (to an accuracy of 1 cm.) were measured. Blood pressure was measured in lying down position twice in each individual with an interval of 3-5 minutes. Elderly with a pressure ≥ 140 mmHg systolic & ≥ 90 mmHg diastolic or else who were on treatment were considered hypertensive⁶. Obesity was assessed by calculating Body Mass Index (BMI) using formula (wt in kg / ht in m²). Elderly with BMI ≥ 25 were classified as overweight. Modified Prasad's classification was applied to measure the individual's socioeconomic status⁷. Data entry and statistical analysis were performed using the Microsoft Excel and Epi Info software. Tests of significance like Pearson's Chi-square test was used to find out the results. P values < 0.05 were considered significant for the identified risk factors and outcome variables. Random blood sugar was done with glucometer by using glucose strips. Elderly having random blood sugar level ≥ 200 mg% were classified as diabetics.

Definitions and diagnostic criteria: Diabetes was diagnosed based on drug treatment for diabetes (insulin or oral hypoglycemic agents) and/or criteria laid by the ADA in 2004 i.e. fasting plasma glucose (FPG) 126 mg/dl or 2 hr post-glucose value 200 mg/dl. Impaired glucose tolerance (IGT) was diagnosed if FPG was < 126 mg/dl and 2 hr post-glucose value (140 mg/dl and < 200 mg/dl)⁸. The data was compiled and analyzed by using Epi.Info software.

RESULTS

Out of 400 study subjects, 71 (17.75%) were diabetic, and among diabetes 31 (43.66%) were males and 40 (56.34%) were females. The majority of diabetic subjects were female (56.34%), Hindu (66.20%), Married (78.87%), Literate (76.06%), Non-working occupation (56.34%), Nuclear family (54.93%), Economically dependent (57.75%), Middle class of socioeconomic status (39.44%) and Normal BMI (63.38%).

Table 2: Distribution of study subjects according to Age & Sex (n=71)

Subjects	Male	Female	Total (%)
Total subjects	165	235	400 (100)
Known Diabetics	25	30	55 (13.75)
New Diabetics	06	10	16 (4.00)
Total	31(18.78)	40(17.02)	71 (17.75)

Table 3: Distribution of diabetic subjects according to Epidemiological factors (n=71)

Epidemiological Factors	M	F	Total	%	Epidemiological Factors	M	F	Total	%
Religion					†BMI				
Hindu	23	24	47	66.20	Under weight	4	3	7	9.86
Buddhist	7	16	23	32.39	Normal weight	23	22	45	63.38
Others	1	0	01	1.41	Over weight	4	15	19	26.76
Marital status					Stress				
Married	27	29	56	78.87	Normal	12	13	25	35.21
Widower/Widow	4	11	15	21.13	Mild	5	17	22	30.99
Literacy					Moderate	13	10	23	32.39
Illiterate	01	16	17	23.94	Sever	1	0	1	1.41
Literate	30	24	54	76.06	Substance Abuse				
Occupation-					Yes	15	13	28	39.44
Working	9	22	31	43.66	No	16	27	43	60.56
Non-Working	22	18	40	56.34	Diet				
Type of family					Veg.	14	24	38	53.52
Nuclear	19	20	39	54.93	Mixed	17	16	33	46.48
Joint	11	17	28	39.44	Exercise				
Joint Extended	01	03	04	5.63	Routine	9	7	16	22.54
Economic Dependency					Occasional	10	11	21	29.58
Dependent	10	31	41	57.75	No	12	22	34	47.88
Independent	21	9	30	42.25	Physical Activity				
*SES					Sed.	13	18	31	43.66
Upper	12	5	17	23.94	Mod.	17	22	39	54.93
Upper Middle	6	3	9	12.68	Heavy	01	0	01	1.41
Middle	10	18	28	39.44					
Lower Middle	3	11	14	19.72					
Lower	0	3	3	4.23					

*SES- Socio-economic status

†BMI- Body mass index

Life style profile of diabetic subjects in our study revealed that the majority of subjects were Non substance abuser (60.56%), Vegetarian (53.52%), Lack of exercise (47.88%), Moderate physical activity (54.93%) and stressed (64.79%).

The most common risk factors found in our study for diabetes was stress (64.79%), positive family history for diabetes was 45 (63.38%), lack of exercise 34 (47.89%), Non-veg./mixed diet 33 (46.48%), sedentary habit 31 (43.66%). Other risk factors for diabetes were history of hypertension 26 (36.62%), overweight 19 (26.76%) and alcohol 7 (9.86%).

DISCUSSION

The prevalence Diabetes-2 has been increasing in India. The average prevalence of Diabetes-2 in geriatric population for last ten years is 16.41% in urban area of India. Factors which are attributable to these changes are rapid urbanization, lifestyle changes, dietary changes and increased life expectancy. Diabetes is an important cause of morbidity and mortality in geriatric population and is a risk factor for many other diseases. All the diabetic subjects had type-2 diabetes mellitus. The present study was

conducted to analyze the epidemiological factors, along with risk factors for diabetes in geriatric subjects who were suffering from type II diabetes. Out of 400 patients examined and investigated, the overall prevalence of diabetes was found to be 17.75 %. The prevalence of diabetes were 18.78% in males and 17.02% in females among the total study subjects and among the diabetic patients, 31(43.66%) were

males and 40 (56.34%) were females. This is nearly equal to earlier studies from Assam by Medhi GK et al (2006)⁹ and higher than the an urban area study by Gurav RB et al (2002)¹⁰ and Javid Ahmad et al (2011)¹¹ in which prevalence was 17.4%,9.41% and 16.66% respectively. The higher prevalence could be because of increasing stress, change in life style etc.

Table 4: Association of risk factors with diabetes

Risk factors	Diabetic (N=71)	Non-Diabetic (n=329)	Chi-square	P-Value
Sex				
Male	31	134	0.21	0.648
Female	40	195		
Hypertension	26	79	4.79	0.0285
Family history of diabetes	45	6	141.85	0.000
BMI ≥ 25	19	64	1.90	0.168
Sedentary habit	31	172	1.74	0.187
Lack of exercise	34	174	0.58	0.44
Non-veg. diet	33	186	2.38	0.122
Alcohol	7	27	0.21	0.65
Stress	46	194	0.82	0.363

*P VALUE< 0.05 significant

Most of the subjects were known diabetics who were diagnosed as diabetics 55 (13.75%) presented with one or other classic signs/symptoms which is higher to the study of Singh NP.16(4.00%) were newly diagnosed during routine check up as compared 18 (24.3%) in Puri S, Kalia M¹² study and 8% in Singh NP¹³ study. Prevalence of various risk factors for diabetes was seen in our study. Obesity (BMI≥25) was present in 19(26.76%) which is comparable to Framingham study¹⁴ (26.5%) but higher than the study of Singh N P (18%). Positive family history for diabetes was found in 45(63.38%) which is much higher than Ramachandran A¹⁵ (16.9%)and Puri S (27.0%). Sedentary life style was present in 31(43.66%) of the respondents in our study which is lower than the study of Puri S (47.3). Among the risk factors, stress 46(64.79%) was to be most commonest risk factors for diabetic subjects. Lack of exercise was found in 34(47.89%) subjects and hypertension was found in 26(36.62%) subjects.

In our study, family history of diabetes mellitus was associated with increased risk for diabetes, which is statistically significant (p<0.001) and supports the role of heritability as long has been known for diabetes. History of hypertension is

also statistically significant (p<0.05) which shows the twin epidemic, as found in other studies.

CONCLUSION

The present study revealed that the prevalence of diabetes is showing a rising trend in urban slum. The risk factors of positive family history for diabetes (p<0.001) and history of hypertension for diabetes (p<0.05) was statistically significant. Life style changes and aggressive control of risk factors are urgently needed to tame this trend.

ACKNOWLEDGEMENT

I am thankful to teaching staffs, PG Students & geriatric subjects.

REFERENCES

1. The Health of Nations is changing, Nakajima H; World Health, 1991, 3.
2. WHO & Diabetes, Hiliarg King, World Health, May-June 1991, 3.
3. Diabetes in the third world, Johnson TO, World Health May, June, 1991, 8.

4. Meneilly GS, Tessier D. Diabetes in the elderly. *Diabet Med* 1995;12:949-960.
5. Harris MI, Hadden WC, Knowler WC, et al. Prevalence of diabetes and impaired glucose tolerance and plasma glucose levels in the US population aged 20 to 74 years. *Diabetes* 1987;36:523-534
6. S E Mahmood, Anurag Srivastava, V P Shrotriya, Iram Shaifali, Payal Mishra. Prevalence and epidemiological correlates of hypertension among labour population. *National journal of community medicine* 2011;2(1):43-48
7. Agarwal AK. Social classification: The need to update in the present scenario. *Indian J Community Med* 2008; 33:50-1
8. King H, Rewers M: Global estimates for prevalence of diabetes mellitus and impaired glucose tolerance in adults. WHO Ad Hoc Diabetes Reporting Group. *Diabetes Care* 1993; 16: 157-177.
9. GK Medhi , NC Hazarika, PK Borah , J Mahanta . Health problems and disability of elderly individuals in two population groups from same geographical location. *J Assoc Physicians India*. 2006 Jul;54:539-44.
10. Gaurav RB, Samel DR, kartikeyan S. Community based study on hypertension in an urban area. *Antiseptic*, 2002; 99 (6): 216-219.
11. Javid Ahmad, Muneer Ahmad Masoodi , Mohd Ashraf , Rauf Rashid, Rafiq Ahmad , Ashfaq Ahmad and Sheikh Dawood :Prevalence of Diabetes Mellitus and Its Associated Risk Factors in Age Group of 20 Years and Above in Kashmir, India; *AJMS Al Ame en J Med Sci* (2011)4 (1) :38-44
12. S. Puri, M. Kalia, H. M. Swami, A. Singh, Abhimanyu, C. Mangat, A. Kaur & S. Kaur : Profile of diabetes mellitus in elderly of Chandigarh, India .*The Internet Journal of Endocrinology*. 2007 Volume 4 Number 1
13. Singh N P, Pugazhendhi, Das A K et al. Clinical and Laboratory Profile of Diabetes in Elderly. *J Indian Med Assoc* 1999; 97(4):124-8
14. Framingham eye study. The four major diseases and blindness. *Surv Ophthalmol* 1980;24:458- 71.
15. Ramachandran A, Snehalata C, Mary S, Mukesh B, Bhaskar A D, Vijay V. The Indian diabetes prevention programme shows that lifestyle modification and metformin prevent type 2 diabetes in Asian Indian subjects with impaired glucose tolerance (IDPP-1). *Diabetologia* 2006;49: 289- 297.