Descriptive Analysis of Known Type II Diabetes Mellitus Cases in Urban Population of Agra, Uttar Pradesh

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Abstract: *Context: In last three decades' prevalence of Diabetes Mellitus doubled worldwide and in India it is increasing at a higher rate. India is the Diabetic Capital of the World with highest number of type II diabetes patients. Risk of coronary heart disease among diabetic patients is up to four times higher and majority of diabetic cases die of cardiovascular disease[1]. There are very few Community based studies of known diabetic cases. Therefore, a descriptive analysis is required to understand the current scenario regarding early detection and proper management of Type II Diabetes Mellitus. Settings and Design: Cross-sectional, community based study in Urban population of Agra (U.P.). Methods and Material: Total 670 individuals were interviewed and screened for diabetes. Out of these 670, 52 were found known diabetic while 37 known diabetic cases volunteered for the interview. Thus findings of 89 known type II Diabetes Mellitus cases were analyzed. Result: Around 15% of known diabetic cases were not taking any kind of medications. Majority (69.7%) of known diabetics were taking oral hypoglycemic drugs. Among those who were taking irregular treatment, more than two third (72.2%) had uncontrolled blood sugar level while among those who were taking regular treatment, less than half (46.6%) had uncontrolled blood sugar level. Conclusion: Community awareness programs regarding early detection and proper diabetic care would help the patients to lead a long and healthy life by maintaining euglycemia thus delaying type II Diabetes Mellitus related complications and premature deaths.*

Keywords: Type II Diabetes Mellitus, Secondary Level of Prevention, Known Diabetic cases, Uncontrolled blood sugar level

1. Introduction

From the beginning of 21st century, diabetes is a leading killer of the world population. Diabetes does not kill by itself but it fans the flames of the other systemic diseases. Approximately 75–80% of people with diabetes die of cardiovascular disease. Among diabetic people the chances of getting coronary heart diseases is up to four times higher than normal and the prognosis is also very poor. The risk of cerebrovascular and peripheral vascular disease is also significantly higherin diabetic patients[2]. All these outcomes and complications are responsible for premature deaths which results in an estimated 12 to 14 years of life lost[3].

Opening remarks of Dr Margaret Chan, Director-General of the World Health Organization on the occasion of World Health Day celebration and the launch of the WHO Global report on diabetes in 2016 were "Worldwide, the prevalence of diabetes has doubled since 1980. WHO estimates that 422 million adults had diabetes in 2014"[4]

Diabetes is usually ignored by the individual in their routine life because it does not present with a peculiar or prompt symptom. Ignorance of some general symptoms leads to detection at the later stage which is mainly responsible for complications and poor prognosis of diseases. In a multi-country study in Asia, the average age of diabetes detection was found 43.6 years among Indians[5]. Those who were detected earlier were taking irregular treatment which further nullifies the benefits of early detection and even aggravates the condition, leading to worse consequences. In a hospital-based study, compliance was reported for medications, dietary advice and exercise was 30%, 37%, and 19% respectively. Lower socio-economic group people had shown poor compliance with medication, dietary advice, and exercise[6].

Majority of studies related to diabetes care had their collect samples collected from hospital settings that's why real ground-based information of diabetes care remains untouched. Keeping the points in mind, study was conducted to understand the current situation of secondary level prevention among Type II Diabetes Mellitus Cases in the community.

2. Subjects and Methods

A Cross-sectional, community based survey was conducted by author in Agra, Uttar Pradesh. Samples were collected from June 2012 to June 2013 among adults in the age group of 30 years and above residing in Agra City.

A statistically valid sample size of 604 was calculated to figure out the prevalence of type II Diabetes Mellitus in urban Agra. The sample size was further increased to 670 to include 10% non-response error.

Minimum sample size= 4 (PQ)/ L2
Where: P= Prevalence of 14.2% (from a previous study in Urban Chandigarh[7])
Q= 100- P and L= 20% of P

Total 670 individuals were interviewed and screened for diabetes. Out of these 670, 52 were found known diabetic and 37 known diabetic cases volunteered for interview and blood sugar estimation thus total 89 individuals were analyzed to assess secondary level of prevention. All the

observations were based on information collected from 89 subjects.

3. Results

Total 670 individuals were interviewed and screened for the study purpose. In the study 51 subjects were newly diagnosed and 89 subjects were found known diabetics. About 60% of the reported diabetics were in their 5th and 6th decade of life while 20% in 4th decade. Distribution of diabetes among Male and Female were almost equal in number and most (93.3%) of them were Hindu. Majority (66.3%) of Diabetic patients had education above graduation. Just one percent of the patients were from lower SEC (Table No.-1).

Table 1: Demographic Profile of Study Subjects

Variable		N	%
Age	30-39	6	6.7
	40-49	19	21.3
	50-59	28	31.5
	60-69	28	31.5
	≥70	8	9.0
Sex	Male	50	56.2
	Female	39	43.8
Religion	Hindu	83	93.3
	Muslims	6	6.7
Caste	General	75	84.3
	OBC	10	11.2
	SC	4	4.5
Education	Illiterate	0	0.0
	Up to Middle Class	13	14.6
	High School /Intermediate	17	19.1
	Graduate / Postgraduate	59	66.3
Socio Economic Class (SEC)*	Upper(I)	16	18.0
	Upper Middle(II)	26	29.2
	Lower Middle(III)	28	31.5
	Upper Lower(IV)	18	20.2
	Lower (V)	1	1.1
Total		89	100

*Kuppuswamy Modified Scale for SEC

Majority of patients were detected as diabetic in 4th and 5th decade of life although early detection in 3rd decade of life was also significant. Among the study subjects those living with diabetes more than 10 years was 18.6% and mean duration of individuals living with diabetes was found to be 7(CI- 5.9 - 8.1) year (Table No. - 2).

Table 2: Distribution of known diabetes cases according to age at diagnosis and duration of Diabetes Mellitus

Variable		Number	%	
Age at Diagnosis (in Years)	<30	1	1.1	Mean Age at Diagnosis- 41.5 year CI-(38.86 - 44.14)
	30-39	16	18.0	
	40-49	31	34.8	
	50-59	27	30.3	
	60-69	10	11.2	
	>70	4	4.5	
Duration of Diabetes (in Years)	<5	44	49.4	Mean Duration of Diabetes – 7 year (CI- 5.93 - 8.09)
	5-10	28	31.5	
	10-15	10	11.2	
	15-20	5	5.6	
	>20	2	2.3	
Total		89	100	

In the present study majority (41.6%) of known cases were diagnosed with Type II diabetes while they visited the doctor with complaints related to metabolic changes, whereas in around one-fourth (24.7%) of study subjects, diabetes was detected during their routine medical checkup. Considerable number (10.1%) of study subjects were diagnosed quite late when they developed complaints related to end organ damage (Table No. - 3).

Table 3: Distribution of Known Diabetics Based on Reason behind First Time Blood Sugar Testing

Reason		Number	%
	Not Remember	7	7.9
	Routine check up	22	24.7
Dr suggested	Complaints related to metabolic changes (polyurea, polyphagia, polydipsia etc.)	37	41.6
	Complained related to end organ damage (numbness and blurred vision)	9	10.1
	Complaints not related to Diabetes Mellitus	14	15.7
Total		89	100

Overall 89 known diabetics were found during the survey and out of them, 13 (14.6%) were not taking any kind of the medications and all had uncontrolled blood sugar level. Rest 76 (85%) of known diabetics were on some sort of medical therapy. A majority (69.7%) of known diabetics were taking oral hypoglycemic drugs. Other preparations for diabetic control was taken by around nine percent of patients while around seven percent were on Insulin therapy (Table No. - 4). Out of 76 participants who were on treatment, more than two-thirds (72.2%) of patients who maintained irregularity in treatment, had uncontrolled blood sugar level while more than half (53.4%) of those who were on regular treatment, had controlled blood sugar level (Table No -5).

Table 4: Distribution of Known Diabetic Subjects According to Management Adopted

Management	Number	(%)
No treatment	13	14.6
Oral hypoglycemic agent (OHA)	62	69.7
Insulin	6	6.7
Other preparation	8	9
Total	89	100

Table 5: Association between drug compliance and blood sugar level among diabetes patients

Management	Blood Sugar Level Controlled	Blood Sugar Level Uncontrolled	Total (%)	Test of significance
Regular	31(53.4)	27(46.6)	58(76.3)	χ^2=3.63 df – 1 p-value-0.05
Irregular	5(27.8)	13(72.2)	18(23.7)	
Total	36(47.4)	40(52.6)	76(100)	

4. Discussion

In the present study the mean age at diagnosis of Diabetes Mellitus was found to be 49.2 years and around 17 percent of the diabetic cases were detected in the age group of 30-39 years similarly. Ramachandran A et al conducted a chain of community based studies in Chennai also reported the mean age at diagnosis of diabetes Mellitus as 49.6 and 45.2 years respectively in the year 2000 and 20068. A substantial (17.9%) number of diabetic were diagnosed even in the age

group of 30-39 years. Early development and detection of diabetes was also reported by Misra A et al (2001) in northern India9.

Out of 89 known diabetic cases, 13 (14.6%) were not taking any kind of the medications while majority (69.7%) of known diabetics were taking Oral Hypoglycemic Agents (OHAs). Other preparations (non-allopathic) and Insulin were being taken by 8(9.0%) and 6(6.7%) patients respectively. Raheja BS et al (2001) in his tertiary level hospital based study reported 53.9% were taking oral hypoglycemic agent, 22.0% insulin and 19.8% combination of oral hypoglycemic agent and insulin5. The study being hospital based, findings are not comparable with the present study.

In the present study it was found that, more than half (52.6%) of the cases had uncontrolled blood sugar level. Raheja BS et al (2001) also reported half of the study subjects visiting hospital had uncontrolled blood sugar level5. Similarly, Nagpal J et al (2006) conducted a community based study to evaluate the quality of care in known diabetic patients at Delhi and reported 41.8% diabetics had poor glycemic control10.

Disease burden of diabetes is very high in the community. Most of the cases remain undetected due to lack of awareness regarding the disease and inaccessibility to proper health care. Even if the case gets diagnosed, a significant number of the cases don't take medication. Though some cases start treatment, they don't take regular medicines. Also the follow up consultation with a medical practitioner is ignored leading to complications and organ failure.

In present study average age at the time of diagnosis was 41.5 years and average life with diabetes was seven years. It is difficult to conclude on the basis of a cross sectional study that age at detection of diabetes is high and average age with diabetes is low but it might be due to delayed detection, inappropriate management and premature death of diabetic patients in study population. A cohort study would be suggestive for better understanding of an average healthy life span with diabetes

Early detection, correct treatment regime, proper compliance to diabetic medications, regular monitoring and changes in drug regime according to blood sugar level is still a challenge for known type II diabetic cases. Awareness in the community regarding diabetes can help in early detection and proper treatment, which would help the patient lead a long and healthy life by maintaining euglycemia thus delaying diabetic related complications and pre mature deaths.

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