



## Compliance of known diabetics regarding treatment and monitoring in rural Ludhiana

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### Abstract:

**Background:** The worldwide prevalence of diabetes mellitus has risen dramatically in the developing countries over the past two decades. It's a serious public health problem that threatens the quality of life of patients, the success of long-term maintenance therapy for diabetes depends largely on the patients' compliance with a therapeutic plan. **Material and Methods:** The study was done in rural field practice area of department of community medicine amongst known diabetic's of Ludhiana. Structured questionnaire was used to assess the practices of known diabetics. Information regarding knowledge of taking regular medications, routine check up, type of treatment, lifestyle modification dietary pattern and exercise program was collected. The data was analyzed by using statistical software SPSS version 20. **Result:** The results of this study regarding patient compliance revealed that 82.5% gave history of regular intake of medications while 13.75% were irregular in taking treatment. Regarding the adherence to blood glucose monitoring, it was seen that 80.4% of patients were on regular blood sugar checkup, while 19.65% subjects were irregular. 54.8% subjects accounted unawareness as the main reason for irregularity in glucose monitoring. **Conclusion:** Despite the increasing prevalence of diabetes, improved understanding of the disease, and a variety of new medications, glycemic control does not appear to be improving. Monitoring of blood glucose is one strategy for improving glycemic control; however, patients adherence is suboptimal and a proper education and follow-up are crucial.

**Key words:** Body mass Index; Compliance; Diabetes Mellitus; Monitoring; Regular treatment.

## Introduction

Diabetes mellitus occupies a special place among non communicable diseases as it is one of the leading killers of the present time thus posing a considerable burden to the society in terms of public health. According to WHO, India heads the world with over 32 million diabetic patients and this number is projected to increase to 79.4 million by the year 2030 [1]. Keeping in view the alarming rise in incidence and prevalence of diabetes in India, WHO declared India as “Diabetic Capital” of the world [2]. Diabetes is a lifelong disease with a variety of complications. Blood glucose monitoring is an important measure for prevention of complications. Thus it becomes the responsibility of the patient to acquire certain skills, and modify some of the behaviours to achieve a good glycemic control and thus prevent complications.

The ICMR study reported that the prevalence was 2.1 per cent in urban and 1.5 percent in rural areas [3], and a later study showed that the prevalence was 3 times higher among the urban (8.2%), compared to rural population (2.4%) [4].

India is a country with diverse social, economic, cultural and educational patterns. A large proportion of the population of India is from rural sector [5].

India, being a rural country, has unique problems regarding the treatment compliance of diabetic patients. Hence, the present study was planned in order to understand treatment-seeking behaviour, compliance patterns, and reasons for noncompliance among patients suffering from diabetes in rural Ludhiana.

## Material and Methods

The study was carried out in the field practice area of Rural Health Training Center (RHTC) located at village Pohir, Dehlon Block, District Ludhiana, Punjab, India. The field practice area is composed of fifteen villages with an approximate population of 31,000. The present study was cross-sectional which involved known diabetes mellitus (type -2) patients. The list of subjects were prepared from the family folders maintained at Rural Health Training Center. Subjects of known type-1 diabetes mellitus were excluded from the study. A total no of 388 respondents were studied. The study subjects between 20-90 years of age and of both genders were contacted in their households. A structured and pre-tested questionnaire was filled by local health workers and interns posted at centre and

supervised by faculty of the department of community medicine. Initially the questionnaire was prepared in English and then translated to local language. Information regarding knowledge of taking regular medications, routine check up, type of treatment, lifestyle modification dietary pattern and exercise program was collected. The verbal consent was obtained in the vernacular language with confidentiality and anonymity of the patient's information. No ethical issues were involved in the study as no interventions were carried out. The data was analyzed by using statistical software SPSS version 20. Statistical methods used were simple frequencies and percentages.

## Results

A total of 388 subjects with known diabetes mellitus (type 2) were interviewed. Majority of the subjects 198 (51%) were in the age group 60-90 years followed by 157 subjects (40.5%) in 41-59 years and 33 (8.5%) were in age group of 20-40 years. Most of the subjects were females 243 (62.6%) and there were 145 (37.4%) males. It was observed that there were 155 (39.9%) illiterate subjects, 209 (53.9%) subjects were matric passed and 24 (6.2%) subjects had done their graduation. Majority of the women i.e., 57.7% were engaged in household work. There were 19.8% and 19.1% subjects engaged in unskilled and skilled occupation, respectively. Only 3.4% subjects were not working. Regarding the socio-economic status, majority of the subjects 314 (80.9%) were from middle socio-economic group comprising 102 (26.3%) from low middle and 212 (54.6 %) from high middle socio-economic group. There were 72 (18.6%) and 2(0.5%) subjects in high and low socio-economic status groups, respectively (Table1).

Distribution of subjects as per BMI is presented in Table 2. Amongst the study subjects 96(24.7%) had normal BMI. Whereas 61(15.7%) were overweight and 216(55.7%) of subjects were obese.

Regarding the duration of diabetes there were 151 (38.9%) subjects who were known diabetic for less than 5 years, while 153 (39.4%) and 21.6% subjects of subjects were known diabetic for 5-10 years and for more than 10 years respectively. As far as the type of treatment is concerned majority of the subjects 366 (97.1%) were on allopathic treatment, there were 5(1.3%) subjects who were taking ayurvedic treatment, 2 (0.5%) subjects were taking homeopathic treatment and 4 (1.1%) were on desi medications. 15 (3.9%) subjects were those who

were not taking any treatment. Regarding the patient compliance it was seen that 320 (82.5%) gave history of regular intake of medications while 53 (13.75%) were irregular in taking treatment (Table 3). It was observed that 303 (78.1%) of subjects were on regular exercise. Regarding the adherence to blood glucose monitoring, it was seen that 312(80.4%) of patients were on regular blood sugar checkup, while 76 (19.6%) subjects were irregular in blood sugar monitoring. Out of 76 subjects who were irregular in monitoring, 54.8% accounted unawareness as the reason for being irregular in glucose monitoring. Another important reason was cost of checkup in 26.9% subjects. For 15.7% of the non adherent subjects, distance was an impediment.

**Table: 1 Socio-Demographic profile of study participants**

| VARIABLES                     | FREQUENCY | PERCENTAGE |
|-------------------------------|-----------|------------|
| <b>Age distribution</b>       |           |            |
| 20-40                         | 33        | 8.5        |
| 41-59                         | 157       | 40.5       |
| +60                           | 198       | 51.0       |
| <b>Sex distribution</b>       |           |            |
| Male                          | 145       | 37.4       |
| Female                        | 243       | 62.6       |
| <b>Educational status</b>     |           |            |
| Graduate                      | 24        | 6.2        |
| Matriculate                   | 209       | 53.9       |
| Illiterate                    | 155       | 39.9       |
| <b>Occupational status</b>    |           |            |
| Skilled                       | 74        | 19.1       |
| Unskilled                     | 77        | 19.8       |
| House maker                   | 224       | 57.7       |
| Not working                   | 13        | 3.4        |
| <b>Socio-economic status*</b> |           |            |
| Low                           | 2         | 0.5        |
| Low middle                    | 102       | 26.3       |
| High middle                   | 212       | 54.6       |
| High                          | 72        | 18.6       |

\*As per Modified Udai Pareek Scale

**Table 2: Body Mass Index of study participants**

| BMI       | Category    | Number | Percentage |
|-----------|-------------|--------|------------|
| <18.5     | underweight | 15     | 3.9        |
| 18.5-22.9 | normal      | 96     | 24.7       |
| 23.0-24.9 | overweight  | 61     | 15.7       |
| ≥ 25.0    | obese       | 216    | 55.7       |

**Table 3: Duration of disease and treatment compliance of study participants (N= 388)**

| Variables                 | Frequency | Percentage |
|---------------------------|-----------|------------|
| <b>Known diabetic for</b> |           |            |
| <5 years                  | 151       | 38.9       |
| 5-10 years                | 153       | 39.4       |
| >10 years                 | 84        | 21.6       |
| <b>Regular Treatment</b>  |           |            |
| Yes                       | 320       | 82.5       |
| No                        | 53        | 13.7       |
| No treatment              | 15        | 3.9        |
| <b>Type of treatment*</b> |           |            |
| Allopathy                 | 366       | 97.1       |
| Ayurvedic                 | 5         | 1.3        |
| Homeopathy                | 2         | 0.5        |
| Desi                      | 4         | 1.1        |

\*Total exceeds 'n' because of multiple responses

**Table 4: Status of Blood Glucose Monitoring of study participants**

|  | Frequency | Percentage |
|--|-----------|------------|
| <b>Regular monitoring</b>                |           |            |
| yes                                      | 312       | 80.4       |
| no                                       | 76        | 19.6       |
| <b>Reasons for irregular monitoring*</b> |           |            |
| Money                                    | 31        | 26.9       |
| Unawareness                              | 63        | 54.8       |
| Distance                                 | 18        | 15.7       |
| Others                                   | 3         | 2.6        |

\*Total exceeds 'n' because of multiple responses

## Discussion

Analysis of the present study revealed that majority of the subjects 198 (51%) were in the age group 60-90 years followed by 157 subjects (40.5%) in 41-59 years and 33 (8.5%) were in age group of 20-40 years. According to Daryaganj survey done in Delhi in 1986, it was reported that none of the diabetics were aged less than 30 years [6]. However, the National Urban Diabetes Survey done in 2001 showed that prevalence of diabetes in those aged below 30 was 5.4% [7]. The CURES investigation in Chennai in 2006 demonstrated a temporal shift in the age at diagnosis to a younger group when compared to NUDS study published just 5 years earlier [7,8]. A study from Delhi in 2004 also reported a high prevalence of insulin resistance in children which was associated with excess fat and adiposity. Hence it is increasingly becoming clear that type 2 DM has become prevalent even among younger age group.

Some of the population based studies have reported that prevalence was higher in women [7,9]. In the present study also most of the subjects were female 243(62.6%). This may be due to availability of housewives in households at time of survey while males in productive age group had gone for work. However, a study from Manipur in 2001 reported a higher prevalence in males than in females [10].

Diabetes has been generally considered a disease of the rich and affluent. The Chennai Urban Population Study was done in 2003 to assess the effect of socioeconomic status on the prevalence of type 2 diabetes and related abnormalities showed that age standardized prevalence was 12.4% in middle income group compared to 6.4% in lower income group [11]. Also the prevalence of related metabolic abnormalities like obesity and cardiovascular risk factor were also markedly higher in middle income group. In the present study also majority of the subjects 314 (80.9%) were from middle socio-economic group comprising 102 (26.3%) from low middle and 212 (54.6 %) from high middle socio-economic group. Another study from New Delhi done in 2001 showed that even the slum dwellers had high prevalence of obesity, glucose intolerance and dyslipidemia [12]. This suggest that diabetes is no longer a disease of the affluent or a rich man's disease. It is becoming a problem even among the middle income and poorer sections of the society. Studies have shown that the poor diabetic subjects are more prone to complication, as they have little access to quality health care [13]. So this presents an alarming picture as the poor would find it difficult to cope with the diabetes epidemic.

BMI has been shown to be a helpful indicator of obesity, which is a critical risk factor for diabetes. Table 2 shows that 24.7% of the subjects were normal (BMI 18.5-22.9kg/m<sup>2</sup>), 15.7% were overweight (BMI > 23 kg/m<sup>2</sup>), 55.7% were obese (BMI ≥ 25 kg/m<sup>2</sup>) while 3.9 % were underweight (BMI <18.5 kg/m<sup>2</sup>). Recent BMI studies showed that 37% of all male diabetics, and 79% of all female diabetics were obese. According to the waist to hip ratio, 79% of men with diabetes and 96% of women had central obesity [14].

Distribution of study participants based on duration of diagnosis with diabetes mellitus in the present study showed 151 (38.9%) subjects were known diabetic for less than 5 years, while 153 (39.4%) of subjects were known diabetic for 5-10 years and 21.6% subjects were known diabetic for more than 10 years. Similar studies carried out in 2011 in England and India showed the analyses of adjusted HbA1c levels revealed that longer diabetes duration and females were indicative of poorer self care [15,16].

It was observed in the present study that 82.5% of subjects were taking regular medications. As far as the system of medicine is concerned 97.1% preferred allopathic as the system of choice.

In the present study it was seen that nearly three quarters of the studied sample performed regular monitoring of their blood glucose, another study reported that only 40% of patients did so [17]. Muninarayana (2010) study on prevalence and awareness regarding diabetes mellitus in rural Tamaka, Kolar" showed monitoring of blood sugar was very poor (38.7%). Only 9.7% of the patients visited doctors on a regular basis [18].

Major reason for the non compliance with monitoring of blood glucose in present study was the unawareness or lack of knowledge. Another important reason was cost of checkup in 31 (27.0%) subjects. However, for 18 (15.7%) of subjects, the reason for irregular monitoring was long distance between household and health facility.

It is likely that results of the study represent only the tip of iceberg. In depth community based studies has to be undertaken to assess the awareness about diabetes. Community level awareness programs need to be launched to increase the awareness.

## Conclusions

This study reveals that knowledge regarding the adherence to treatment and monitoring of blood

glucose levels are very poor in rural areas. This emphasize the need for sending the right message regarding diabetes treatment and monitoring right down to the masses and also extending diabetes education activities to rural areas as well, where prevalence rate of diabetes have already begun to rise.

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