



## General Medicine

# ASSESSMENT OF KNOWLEDGE, ATTITUDE, PRACTICE CONCERNING THE INSULIN ADHERENCE AMONG THE ADULT DIABETIC OUTPATIENTS IN TERTIARY CARE CENTRE, PUDUCHERRY.

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**ABSTRACT**

**Background** India is said to be the diabetic capital of the world. 30% of all diabetics is in insulin therapy. Inadequate awareness regarding insulin will affect its acceptance & adherence. **Objectives** 1. To assess the knowledge, attitude, practice concerning insulin adherence among adult diabetic out patients. 2. To determine the impact of patient counselling about the management of diabetes on insulin adherence. **Material And Methods** The present study was cross sectional study carried out among diabetic patients more than 18 years of age attending to the outpatient department, department of general medicine. The study period was 3 months. Informed consent was obtained from all the participants included into the study. The sample size was estimated to 100. The data was collected in a semi structured questionnaire. Statistical analysis was done using descriptive statistics. **Results** 57% were in the age group 31 to 60 years. 59% were males. 69% resided in rural areas. The mean knowledge score was  $7.58 \pm 3.26$ . The mean attitude score was  $7.41 \pm 2.18$ . 76% reported to administer insulin 20 minutes before food. 54% reported to practice rotation of sites while injecting insulin. 21% got eye examined once every year. 31% reported to have checked HbA1C once every 3 months. 78% reported to have return insulin to shop in case expired. 51% reported to have injected insulin at 90 degrees and subcutaneously. 31% reported economic cause as barrier to use insulin regularly. **Conclusion** The study population was found to have moderate knowledge towards insulin. The attitude is more on the positive side. Both the above have reflected in the practice to adherence among the participants.

**KEYWORDS :** Diabetes, Knowledge, Attitude, Practice, insulin, management, Adherence.**INTRODUCTION**

Diabetes mellitus is a term used to stand for a group of metabolic disorders where the common phenotype is hyperglycaemia<sup>1</sup>. India is said to be the diabetic capital of the world as the people suffering from diabetes is on an increasing trend. With 72 million cases to be suffering from diabetes in the year 2017, the proportion was expected to double by the year 2025<sup>2</sup>. Diabetes is classified into type I, type II and gestational diabetes mellitus. Type I diabetes occurs as a result of complete or near total insulin deficiency while type II is characterised by insulin resistance, impaired insulin secretion and increased glucose production. But as the disease progresses type II diabetics will also become insulin deficient<sup>1</sup>.

Insulin is a powerful drug and is necessary for the managing the blood sugar levels. In case of people with type I diabetes, Insulin administration is the corner stone of management and a proportion of those suffering from type II diabetes will receive insulin in addition to the oral hypoglycaemic agents<sup>3</sup>. Insulin is a peptide hormone secreted by the  $\beta$  cells of the pancreatic islets of Langerhans and maintains normal blood glucose levels by facilitating cellular glucose uptake, regulating carbohydrate, lipid and protein metabolism and promoting cell division and growth through its mitogenic effects. Isolated in the year 1921 and the first human administration was done in the year 1922<sup>4</sup>. About 30% of all the diabetics irrespective of their type will be dependent on insulin either singly or in combination with oral anti-diabetic drugs (OADs)<sup>5</sup>.

Inadequate awareness regarding insulin will affect its acceptance & adherence<sup>6</sup>. Self-administration of insulin depends on the knowledge and attitude of the patient on insulin therapy<sup>7</sup>. One third of patients fail to take their insulin as prescribed, and 20% of adults intentionally skip their doses. It's imperative that all the diabetic patients who use insulin should be educated about its use<sup>8</sup>. The present study was done to assess the knowledge, attitude, practice on insulin adherence and to determine the impact of patient counselling about the management of diabetes. Though many studies had reported on the knowledge, attitude and practice on diabetes, only very few focussed on insulin alone. Only very few studies from Tamilnadu had reported the knowledge, attitude and practice.

**MATERIAL AND METHODS**

The present study was cross sectional study carried out in the department of general medicine, Sri Venkateshwara Medical College Hospital and Research centre, Puducherry. The study was carried out for a period of 3 months between September 2023 and November 2023. Ethical clearance for the study was obtained from the institutional ethics committee. Diabetes patients aged more than 18

years and who had attended the out-patient department during the study period were included into the study. Informed consent was obtained from all the participants. The sample size for the study was determined using the open epi software 3.01. Using the data from the study by Anu Mary Swaroop et al the sample size was estimated to be 100<sup>9</sup>. Convenience sampling was followed. The data for the study was collected using a validated and pre-tested structured questionnaire.

The questionnaire consisted of four parts. Part I dealt with socio demographic variables. The socio demographic variables included into the study were age, sex, place of residence, education, occupation, monthly income and employment status. The knowledge part consisted of 12 questions. The correct answer was scored one and wrong answer was scored zero. The minimum obtainable knowledge score will be zero while maximum will be 12. The attitude part consisted of 11 attitude related questions. Those with answers indicating positive attitude were scored one and those options indicating negative attitude was scored zero. For an individual participant the minimum attitude score obtainable was zero indicating the most negative attitude towards insulin adherence and the maximum obtainable score was 11 indicating the most positive attitude towards insulin adherence. The practice part consisted of 11 practice related questions. All the practice questions were close ended ones.

The data collected were entered into Microsoft excel 2019 and the master chart was created. The master chart was then loaded onto SPSS version 26 for statistical analysis. Descriptive statistics were used in analysis of the data. The qualitative variables were expressed using frequency and percentage. The knowledge and attitude scores were expressed in mean and standard deviation. Bar charts were used to represent the data pictographically.

**RESULTS**

Out of the 100 participants studied, 33% were in the age group 31 to 40 years followed by 24% in the age group 51 to 60 years. 19% were elderly. 59% were males. 69% resided in rural areas. 21% studied up to secondary school followed 19% from middle school and 15% studied up to higher secondary school. 29% were employed in an unskilled job followed by 23% were housewives. 15% of the participants were retired. 39% were either earning or getting financial aid of less than Rs 5000 per month followed by 23% with monthly income of Rupees 5,001 to 10,000. 6% were earning more than 50,000 rupees per month. 77% were married and 15% were either separated or widowed. 31% reported that one of their family members were suffering from diabetes (Table 1).

With regard to the questions assessing the knowledge among the study

participants, 94% reported correctly the characteristics of diabetes. 96% reported correctly the symptoms of diabetes. 81% had known regarding the complications of diabetes. 92% reported that insulin is important in the treatment of diabetes. 89% reported combining insulin along with OAD's is beneficial to the patient. Only 42% were aware regarding the types of insulin. 68% were aware regarding various insulin delivering devices. 61% and 68% had known the side effects of insulin therapy and the preferred sites of insulin injection, respectively. 51% reported television to be their predominant source of information followed by 35% who reported it to be books. 69% reported correctly the symptoms of low blood glucose and 35% had known that HbA1C indicates long term control of blood glucose (Table 2). The mean knowledge score among the participants was  $7.58 \pm 3.26$  (Fig 1).

With regard to the attitude questions, 72% reported insulin can be premixed in same syringe. 91% insulin to be the only cure for diabetes. 32% reported insulin can be stopped once blood glucose is controlled. 21% reported that once insulin is started diet and exercise are not needed. 47% reported diabetes can be controlled by diet alone. 7% reported insulin can be administered even when the vial is having clumps. 74% thought diabetes to be life long disease. 51% reported insulin can cause harm. 28% were of idea that insulin should not be administered at the same site. 78% thought too high or too low insulin can cause drastic alterations in blood glucose. 94% were confident that they can self-administer insulin (Table 3). The mean attitude score among the participants was  $7.41 \pm 2.18$  (Fig 1).

With regard to the practice of insulin, 76% reported that they administer insulin 20 minutes before food and 21% reported that they administer it along with food. 54% reported to practice rotation of sites while injecting insulin and 37% reported to practice it sometimes. 21% reported that they had got an eye check once every year and for 44% it was once every two years. 12% had got an eye examination done once every four years. 31% had checked their HbA1C level once every 3 months. 28% and 29% reported to have checked the HbA1C levels once every 6 months and 9 months, respectively. 35% reported to have checked their lipid profile and serum creatinine levels every year. 23% and 25% reported to have performed the tests for every 2 and 3 years, respectively. 47% reported that they store insulin in the refrigerator above freezing point, 21% reported to store it in room temperature and 25% reported to store in anywhere. 62% agreed that they check the expiry date before using insulin and 24% reported that they check it sometimes. In case if the insulin expired, 78% reported that they return it to local pharmacy and 22% reported that they throw it in the dustbin. 51% reported that they inject insulin with the needle at 90 degrees and subcutaneously. 24% reported that they inject insulin at 90 degrees and intramuscularly. 31% reported economic cause as a barrier for them to get insulin. 26% reported to have stopped the usage of insulin following the disappearance of symptoms. 21% reported to not use insulin as the blood glucose got controlled. 76% reported to keep readily available blood sugar whenever they go out. 11% reported to keep readily available source of blood sugar, sometimes (Table 4).

## DISCUSSION

Diabetes continues to be a pandemic worldwide caused by a sedentary lifestyle and food habits. Genetic predisposition along with the fore mentioned factors have led to early onset of diabetes in the Indian population<sup>7</sup>. Insulin is an important drug in the management of both type I and type II diabetes mellitus and it has been estimated that almost 3 in 10 diabetics irrespective of their type is treated with insulin<sup>35</sup>. An adequate awareness among the patients is important for them to accept and adhere to insulin<sup>6</sup>. The present cross-sectional study was conducted with the objective of knowing the knowledge, attitude and practice on insulin adherence in a tertiary care hospital. The study was carried out for a period of 3 months in the department of general medicine among the patients suffering from diabetes who had attended to the outpatient department.

The mean knowledge score among the participants was  $7.58 \pm 3.26$ . In a study by Sunny A et al the mean KAP score was 63.92% just more than 50% score which was similar to the present study<sup>10</sup>. More than ninety percentage had correctly stated the characteristics and symptoms of diabetes correctly. More than 80% were aware regarding the complications of diabetes. Similarly major proportions had thought insulin is important for treatment and combining it the OAD's is beneficial. In a study by vimalavathini R et al, only 61% and 50% had known the symptoms and complication of diabetes, respectively which were lesser than the present study<sup>11</sup>.

The awareness was much lower regarding the type of insulin. Around 60% were aware regarding the side effects and the preferred sites of insulin therapy. Similar proportion stated correctly the symptoms of low blood glucose. Only one third had known that HbA1C levels reflect the long-term glucose control. In a study by Nasir BB et al it was found that only small proportion of diabetics answered correctly to the questions regarding the complications of insulin therapy<sup>12</sup>. In contrast to the present study in study by yusef, 95% reported the side effects of insulin therapy accurately<sup>13</sup>.

The mean attitude score was  $7.41 \pm 2.18$ . Almost three forth reported insulin can be premixed in same syringe and a sixty-percentage believed insulin is the only cure for diabetes. One in three reported insulin can be stopped once blood glucose is controlled and one in five reported diet and physical activity are not needed once insulin is started. Only few (7%) reported that they will not administer insulin when the vial had clumps. Almost 50% stated insulin can harm. Almost 80% thought a high or low dose of insulin alters blood glucose level. A majority 90% believed that they can self-administer insulin.

Choudhury SD et al reported that among the study participants only 6% thought insulin to cure diabetes and only 14% in their study reported insulin can cause harm. Similar to present study Choudhary SD et al reported 11% reported that insulin can replace diet control and physical activity<sup>14</sup>. Similar to present study in a study by vimalathini R et al, 58% reported insulin is not a safe drug and 72% reported diabetes to be life long disease<sup>11</sup>. Al maskari F et al reported participants to have negative attitude when it comes to them having the disease diabetes and positive attitude when it comes to getting treated for diabetes mellitus<sup>15</sup>. Abougambou SSI et al<sup>16</sup> and Abdulrahman M et al<sup>17</sup> also reported positive attitude among diabetics with regard to the treatment and usage of insulin.

Many participants had reported practice that is more towards the guidelines prescribed by the doctors. Three forth administered insulin 20 minutes before food. Almost 50% practiced rotation of sites while injecting insulin. Almost 60% checked the expiry date on the vial regularly. Almost 70% injected insulin at 90 degrees. One third reported economic cause as a barrier for continuous usage of insulin. With regard to checking for complications, many have not done in the last one year. Only 20% had checked their eyes in least one year and only 31% had checked their HbA1C levels. Similarly, only 35% had checked lipid profile and serum creatinine levels. In a study by Gurmu et al, only 34% reported to administer insulin half an hour before meal which was lesser than the present study<sup>18</sup>.

The strength of the present study was its' objective not many studies were done with similar objective in the past. The limitations were that the practice part was self-reported one, an objective variable to measure practice would make it more accurate. The study shall be generalised cautiously.

The participants in the present study though had positive knowledge they lacked in certain domains like the complications of insulin therapy and checking for the complications of diabetes. These can be addressed through health education specific to the domains found. Most had a positive attitude. The domains where the knowledge gap was there also got reflected in practice.

## CONCLUSION

Most participants were good with regard to both knowledge and attitude towards insulin adherence. Most practices were also similar to the one advised by the practitioners. The study had identified certain domains that can be addressed through health education in order to bridge the gap.

**Table 1: Sociodemographic And Baseline Characteristics Among The Study Participants.**

| Variables            | Frequency (n=100) |    |
|----------------------|-------------------|----|
| Age group (in years) | 18-30             | 10 |
|                      | 31-40             | 14 |
|                      | 41-50             | 33 |
|                      | 51-60             | 24 |
|                      | >60               | 19 |
| Gender               | Male              | 59 |
|                      | Female            | 41 |
| Place of residence   | Urban             | 31 |

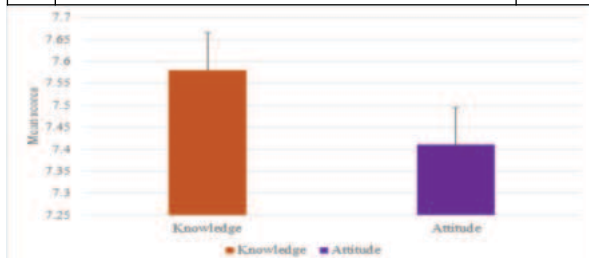
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|----------------------------|--------------------|----|
|                            | Rural              | 69 |
| Education                  | Illiterate         | 8  |
|                            | Primary            | 13 |
|                            | Middle             | 19 |
|                            | Secondary          | 21 |
|                            | Higher secondary   | 15 |
| Occupation                 | Graduate and above | 24 |
|                            | Unemployed         | 13 |
|                            | Unskilled          | 29 |
|                            | Semiskilled        | 13 |
|                            | Skilled            | 7  |
|                            | House wife         | 23 |
| Monthly income (in rupees) | Retired            | 15 |
|                            | <5000              | 39 |
|                            | 5,001-10,000       | 23 |
|                            | 10,001-25,000      | 19 |
|                            | 25,001-50,000      | 13 |
| Marital status             | >50,000            | 6  |
|                            | Married            | 77 |
|                            | Unmarried          | 8  |
| Family history of diabetes | Separated/widowed  | 15 |
|                            | Present            | 31 |
|                            | Absent             | 69 |

**Table 2: Distribution According To Correct Answer To The Knowledge-based Questions.**

| Sno | Question                                                             | N=100 |
|-----|----------------------------------------------------------------------|-------|
| K1  | Diabetes is a disease characterised by                               | 94    |
| K2  | Symptoms of diabetes                                                 | 96    |
| K3  | Complications of diabetes                                            | 81    |
| K4  | Insulin is important                                                 | 92    |
| K5  | Usage of insulin along with OAD's is beneficial in diabetes patients | 89    |
| K6  | Aware of various types of insulin                                    | 42    |
| K7  | Aware of various insulin-delivering devices                          | 68    |
| K8  | Side effects of insulin therapy                                      | 61    |
| K9  | Preferred sites of insulin injection                                 | 68    |
| K10 | Source of information about insulin                                  |       |
|     | Books                                                                | 35    |
|     | Television                                                           | 51    |
|     | Internet                                                             | 12    |
|     | Others                                                               | 2     |
| K11 | Symptoms of low blood glucose                                        | 69    |
| K12 | HbA1c is used for long-term control of blood glucose                 | 35    |

**Table 3: Distribution According To Attitude Towards Insulin Usage And Adherence Among The Participants.**

| S no | Question                                                                   | Agree (n=100) |
|------|----------------------------------------------------------------------------|---------------|
| A1   | Insulin can be pre-mixed in the same syringe                               | 72            |
| A2   | Insulin is the only cure for diabetes                                      | 65            |
| A3   | Insulin can be stopped once blood glucose is controlled                    | 32            |
| A4   | Once insulin is started diet and exercise are not needed                   | 21            |
| A5   | Diabetes can be controlled by diet alone                                   | 47            |
| A6   | Insulin can be administered even if the vial is having clumps              | 17            |
| A7   | Diabetes is a lifelong disease                                             | 74            |
| A8   | Insulin can cause harm                                                     | 51            |
| A9   | Insulin should not be administered at the same site                        | 28            |
| A10  | Too high or too low insulin can cause drastic alterations in blood glucose | 78            |
| A11  | I can self-administer insulin                                              | 94            |



**Fig 1:** Bar chart showing the mean knowledge and attitude scores

among the participants.

**Table 4: Distribution According To Practice Towards Insulin And Its Adherence Among The Participants.**

| Sno | Question                                                                  |                                                                             | N=100 |
|-----|---------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------|
| P1  | When do you inject insulin?                                               | 20 mins before food                                                         | 76    |
|     |                                                                           | With food                                                                   | 21    |
|     |                                                                           | 20 mins after food                                                          | 2     |
|     |                                                                           | Anytime                                                                     | 1     |
| P2  | Do you practice injecting insulin in the rotation of sites?               | Yes                                                                         | 54    |
|     |                                                                           | No                                                                          | 9     |
|     |                                                                           | Sometimes                                                                   | 37    |
| P3  | How often do you go for an eye check-up?                                  | Once in a year                                                              | 21    |
|     |                                                                           | Once in 2 years                                                             | 44    |
|     |                                                                           | Once in 3 years                                                             | 23    |
|     |                                                                           | Once in 4 years                                                             | 12    |
| P4  | How often do you check your blood glucose and HbA1c?                      | Once in 3 months                                                            | 31    |
|     |                                                                           | Once in 6 months                                                            | 28    |
|     |                                                                           | Once in 9 months                                                            | 29    |
|     |                                                                           | Annually                                                                    | 12    |
| P5  | How often do you check your lipid profile and serum creatinine?           | 1 year                                                                      | 35    |
|     |                                                                           | 2 years                                                                     | 23    |
|     |                                                                           | 3 years                                                                     | 25    |
|     |                                                                           | 4 years                                                                     | 17    |
| P6  | How do you store insulin?                                                 | At refrigerator above freezing point                                        | 47    |
|     |                                                                           | At room temperature                                                         | 21    |
|     |                                                                           | At refrigerator in freezing point                                           | 8     |
|     |                                                                           | Anywhere                                                                    | 24    |
| P7  | Do you check for the expiry date before using insulin?                    | Yes                                                                         | 62    |
|     |                                                                           | No                                                                          | 14    |
|     |                                                                           | Sometimes                                                                   | 24    |
| P8  | What will you do to the expired insulin?                                  | Return it to local pharmacy/Will not take                                   | 78    |
|     |                                                                           | Throw it in the dustbin                                                     | 22    |
|     |                                                                           | Will take                                                                   | 0     |
| P9  | How do you inject insulin?                                                | Retracting the injected surface with needle at 45 degrees, intramuscularly  | 13    |
|     |                                                                           | Retracting the injected surface, with needle at 90 degrees, subcutaneously  | 51    |
|     |                                                                           | Retracting the injected surface, with needle at 45 degrees, subcutaneously  | 12    |
|     |                                                                           | Retracting the injected surface, with needle at 90 degrees, intramuscularly | 24    |
| P10 | Reasons for not using insulin                                             | Economic reasons                                                            | 31    |
|     |                                                                           | Fear of side effects or hypoglycaemia                                       | 22    |
|     |                                                                           | Disappearance of symptoms                                                   | 26    |
|     |                                                                           | Blood glucose controlled                                                    | 21    |
| P11 | Do you keep readily available source of blood sugar, whenever you go out? | Yes                                                                         | 76    |
|     |                                                                           | No                                                                          | 13    |
|     |                                                                           | Sometimes                                                                   | 11    |

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