

# Knowledge and Awareness Regarding T1DM in Primary Health Care Providers

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## ABSTRACT

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**Background:** Diabetes is one of the commonest non-communicable diseases in the world. Type 1 Diabetes Mellitus (T1DM) is relatively less common but it is associated with greater morbidity and mortality. It is important to have the knowledge and awareness of T1DM especially in primary care providers (PCPs) to save the lives of children and young adults with T1DM.

**Methods:** A cross-sectional study was performed by distributing questionnaires amongst the doctors belonging to the field of General Medicine working at the primary care level with practices comprising approximately 10% of diabetic patients. Responses were recorded on a questionnaire and the data was analyzed by SPSS version 20.

**Results:** Only 62% doctors were aware about the correct pathogenesis of T1DM. Regarding the most important and fatal complication of T1DM i.e. diabetic ketoacidosis (DKA), 88.9% came up with correct answer. However when asked about the mortality related to T1DM only 22% PCPs gave the right answer. Only 40% of the PCPs could give correct answer regarding the mechanism of action of insulin. 55.6% PCPs were aware of the variation in blood glucose levels and had knowledge how to adjust them. Only 55.6% doctors were aware of causes of hypoglycemia.

**Conclusions:** Most of the PCPs had suboptimal knowledge regarding T1DM, its pathogenesis, complications and mechanism of action of insulin. This study has identified the need for further improvement in PCP's practices for treating and educating diabetics and recommended that awareness and educational programs are necessary to update the PCPs on screening, effective treatment of T1DM, and prevention of its complications.

**Keywords:** T1DM, Knowledge, Primary Health Care Providers

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## INTRODUCTION

Diabetes is one of the commonest non-communicable diseases in the world. It is classified into 3 main categories namely type 1 diabetes mellitus (T1DM), type 2 diabetes mellitus (T2DM) and gestational diabetes mellitus (GDM).<sup>1</sup>

The major portion of diabetes mellitus comprise of T2DM. However, incidence of T1DM is different in different countries.<sup>2</sup> The prevalence of T1DM also differs from region to region with 2-5 percent of the whole spectrum of diabetes.<sup>3</sup> The incidence of T1DM is highest in Finland and lowest in South America and Asian countries including Pakistan. However a study conducted in Karachi, Pakistan on the incidence of T1DM in children, it was seen that 25 children had T1DM below the age of 14 years (per 100,000 children/ year).<sup>3</sup> T1DM usually occurs in childhood and adolescence thereby posing a

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great challenge in controlling the blood glucose levels.<sup>4</sup> The pathophysiology and epigenetics of T1DM are different than T2DM and GDM.<sup>5</sup> The people suffering from T1DM are more prone to develop acute complications like diabetic ketoacidosis (DKA) as compared to other forms.<sup>6</sup> In one study it was noted that more than half of the patients were hospitalized at the time of diagnosis, including 93% of those with DKA and 41% without DKA.<sup>7</sup> It was observed in a previous study that the initial diagnosis was wrongly categorized as a respiratory system infection, peri-anal candidiasis, gastroenteritis, urinary tract infection, stomatitis or appendicitis.<sup>8</sup> One of the life-threatening complications is DKA which needs urgent hospitalization and treatment. Any delays in diagnosing and shifting the patient to a secondary or tertiary care health centers may lead to fatal consequences.<sup>9</sup> It makes it even more imperative to have the knowledge and awareness of T1DM especially in primary care providers (PCPs) because this can save the lives of children and young adults. The diagnosis of diabetes can be more challenging because it mostly occurs in children who may not present with classical symptoms, and it should be recommended that all PCPs who deal with sick children have a high index of suspicion for this eminently treatable condition.<sup>10</sup> It was observed that the knowledge was not up to the mark in PCPs regarding T1DM. Although T1DM is not as common as T2DM however the mortality in undiagnosed and untreated patients is quite high. It is observed that the diagnosis and management of patients with T1DM will be compromised unless the knowledge of PCPs is up to the mark. The present study assessed the knowledge and awareness regarding T1DM among the PCPs to plan educational sessions for them regarding management of T1DM.

## MATERIALS AND METHODS

A descriptive cross-sectional study was performed in a diabetic center of Shalamar Hospital after taking approval from Institutional Review Board (IRB). Informed consent was

taken from each participant of the study. Doctors belonging to the field of General Medicine and working at the primary health care level with practices comprising about 10% of diabetic patients were included in the study. Data was collected on a questionnaire distributed to the participants. Based on their responses the data was analyzed by SPSS version 20.

## RESULTS

**Table 1: Knowledge Regarding Pathophysiology of T1DM**

Responses about Pathophysiology of T1DM	n= 90(%)
Type 1 diabetes mellitus occurs only in adults	10 (11.1)
There is destruction of the alpha cell of the islet of Langerhans	20 (22.2)
There is enhanced hepatic glucose output	4 (4.4)
There is infiltration of the islet of Langerhans with mononuclear cells	56 (62.2)

When the knowledge regarding pathophysiology of T1DM was asked only 62% doctors gave the right answer to the question. However 38% doctors were not able to provide with correct answer. These 38% doctors make a very significant in number and all are practicing qualified doctors (Table 1).

**Table 2: Knowledge Regarding Complications of T1DM**

Responses of medical doctors about complications of T1DM	n= 90 (%)
Ketoacidosis	80 (88.9)
Hypertension	4 (4.4)
Dehydration	6 (6.7)

Regarding the most important and fatal complication of T1DM i.e. ketoacidosis, almost 90% came up with correct answer but the 10% who did not give the right answer makes a significant number of PCPs managing patients with T1DM in primary health care centers (Table 2).

**Table 3: Knowledge Regarding Age of Onset of T1DM and Rate of Mortality**

Responses regarding age of onset of T1DM	n (%)
10-15 years	40 (44.4)
20-30 years	46 (51.2)
>40 years	4 (4.4)
Responses regarding rate of mortality in type 1 diabetics	
2-10 times higher mortality in patients with T1DM	20 (22.2)
Similar life expectancy as people without diabetes	70 (77.8)

When asked about the age of onset of T1DM most of the doctors had a fair idea about it. However regarding the mortality associated with T1DM, only 22% gave the right answer, which proves that more than 78% of the doctors fail to comprehend the importance of good glycemic control to decrease the rate of mortality in patients with T1DM.

**Table 4: Knowledge Regarding the duration of Action and use of bolus insulin.**

Duration of action of rapid acting insulin:	n (%)
20 min	36 (40.0)
2 hours	50 (55.6)
3 hours	4 (4.4)
Bolus insulin is used for the control of:	
Postprandial blood glucose level	24 (26.7)
24 hours blood glucose control	4 (4.4)
Both postprandial and 24 hours	62 (68.9)

When asked about the only treatment modality in type T1DM i.e. insulin, it is interesting to note that only 40% of the doctors had an idea about the onset of action of newer available rapidly acting insulin analogues. The clarity regarding the onset of action of insulin is extremely important in preventing hypoglycemic events for which the rapid acting analogues are made for. When asked about the common terms used in literature for treating T1DM i.e. the bolus insulin

and its timing of use. The correct answer to understand the term was given by 26.7% however this percentage was raised to 68.9% considering a partially correct answer (Table 4).

**Table 5: Awareness Regarding Causes and Management of Hypoglycemia**

Responses regarding cause of hypoglycemia	n (%)
Increase activity right before or right after meal	46 (51.1)
A high fat or high protein meal	10 (11.1)
Both increased activity and high fat and protein meals	34 (37.8)
Responses regarding management of hypoglycemia	
Keep record of your blood glucose levels before and after meals and at bedtime.	50 (55.6)
Check blood glucose levels in the middle of night	26(17.7)
Eat dinner earlier in the evening	24 (26.7)

When asked about the variation in the blood glucose levels and how to address them by adjusting insulin, 55.6% gave the correct answer. Regarding the cause of hypoglycemia, correct answer was given by 51.1% doctors only.

## DISCUSSION

Fortunately, the prevalence and incidence of T1DM is low in this part of the world.<sup>3</sup> However the seriousness and severity of this particular form of diabetes is quite high. As sometimes mentioned T1DM is a life sentence due to a difficult therapeutic regimen and sometimes it is partially effective to prevent acute or chronic complications. The need to educate and equip the doctors to treat this problem cannot be over emphasized.<sup>11</sup> As in any country a very high responsibility is on the primary care providers this study was done to analyze the awareness amongst the doctors. As the result shows that knowledge amongst the PCPs regarding this particular area was not up to the mark. This inference is drawn after judging the knowledge of doctors in different areas of the disease. As T1DM is only a small part of the spectrum of

disease which a primary care provider sees therefore it is understandable that it can easily be ignored. However the PCPs who work with special interest in diabetes need to be educated in this particular subject. Our results showed that despite the increasing prevalence of diabetes, physician's knowledge about diabetes control and its complications were not enough. As evident by the results there is a very little understanding about the epigenetics which is a new emerging field in understanding of T1DM. Epigenetics is defined as heritable changes in gene expression, so this may be seen as a non-genetic factor that interacts with gene. This is in accordance with another study carried out in Karachi, Pakistan which showed that only 31.2 % of the doctors were aware of the hereditary nature of diabetes.<sup>12</sup> However, 90% of the PCPs had knowledge regarding the most common and fatal complication of T1DM i.e. DKA though still 10% were unaware of its causes. These findings warn general Practitioners (GPs) to update their knowledge about chronic diseases such as T1DM. One of the methods proposed for updating skills and professional abilities of physicians over the time are Continuing Educational Programs (CME).<sup>13</sup> It is also pertinent to note that the PCPs were not equipped in their knowledge regarding mechanism of action of insulin and how to adjust the doses of insulin to control diabetes in these patients. Similar results were seen in another study carried out in Karachi, Pakistan where only 39.6% physicians were aware of correct insulin techniques.<sup>12</sup> It is also worthwhile to mention that insulin is the only treatment currently available treatment for T1DM. Our results showed that the PCPs are not familiar with latest insulin delivery devices which leave them with limited treatment options regarding T1DM. In the present study, the majority of physicians had undesirable practice abilities. This finding was in accordance with a study in US.<sup>14</sup> In our study major weaknesses in the practice of PCPs were in the knowledge regarding the pathogenesis of T1DM, insulin treatment of hypoglycemia in patients treated

with insulin. This small study is an eye opener and warrants extensive training programs for the PCPs targeting both the pathophysiological and the clinical sides of the disease. To prevent the morbidity and mortality in our younger population, the future resource of the country, people suffering from T1DM. We have similar studies from this part of the world showing ignorance in this area of medicine in non-structured primary health care setups. Specialists in this field should work on making brochures/handouts for training of doctors and also help making documentary videos for the community. By doing that a lot of difference could be made in preventing the mortality and morbidity in T1DM.

## CONCLUSION

Our study showed that most of the PCPs had suboptimal knowledge regarding T1DM, its pathogenesis, complications and action of insulin. There is a need for further improvement in PCPs awareness and practices for treating diabetics.

## Recommendations

It is therefore recommended that continuous medical education programs such as seminars, conferences, symposia's, training courses and workshops are necessary to update the knowledge of PCPs regarding screening, treatment of T1DM, and prevention of its complications.

## Limitations

We encountered some limitations in our study; for example, the sample size was small and heterogeneous and did not represent the entire community; also, the special interests of PCPs were not assessed. We did not have any information about the physicians whether they had experiences in diabetes clinics, or they participated in workshops and diabetes training courses as a source of information. Therefore, we recommend a comprehensive study in order

to assess the level of physicians knowledge, attitude and practice about T1DM, using a questionnaire according to the level of speciality.

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### Conflicts of Interest

The authors had no conflicts of interest to declare.

### Contributors

Dr. Saira Yousaf conceived the idea and designed the study, did the literature search and drafted the initial version of the manuscript. Dr. Rozina Arshad revised the manuscript, contributed to the literature search and discussion of the article. Dr. Muhammad Waqeel contributed to collection of data and contributed to the discussion of manuscript. Dr. Maria Javaid contributed to the different aspects of manuscript. Hafiza Rabia Naeem did the statistical analysis and results interpretation. Faiza Kamal prepared the questionnaires.

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