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## What primary care physicians think about insulin initiation in type 2 diabetes: a field-based study

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**Background/aim:** A significant number of patients with type 2 diabetes mellitus require insulin and little is known about the possible physician-related factors that could cause a delay in the initiation of insulin treatment in patients with type 2 diabetes. This study aimed to evaluate those factors.

**Materials and methods:** A total of 87 family physicians working at 36 family health centers in urban Malatya participated in our study on a voluntary basis. A self-administered survey form was structured to gather the views of the primary care physicians. The survey was developed based on a review of the literature. The survey consisted of Likert scale item questions regarding knowledge about the disease of diabetes mellitus and the views of the primary care physicians regarding insulin initiation for type 2 diabetic patients.

**Results:** Almost half of the participants (42.5%, n = 37) felt incompetent in the starting dosage adjustment and 40.2% (n = 35) of the participants felt incompetent in maintaining the appropriate dosage adjustment. In terms of sex, female family physicians were found to be more uncertain about the timing of initiating insulin treatment for diabetic patients.

**Conclusion:** This study shows the necessity of continuous education activities and interventions to promote motivation in family physicians to improve care of diabetic patients in primary care.

**Key words:** Primary care, family physicians, insulin initiation

### 1. Introduction

Insulin, a miraculous agent, has been in the service of medicine for almost a century (1). Its life-saving effects were initially thought to only act on patients with type I diabetes mellitus. However, it certainly has significant beneficial effects on patients with type II, which is more commonly seen in adult populations. A significant number of patients with type 2 diabetes mellitus require insulin therapy to attain suggested glycemic targets (2).

Despite these recommendations, the number of patients receiving insulin therapy is below the desired levels. Patients with type 2 diabetes do not commonly receive insulin on time (3,4). This reluctance to initiate insulin therapy in a timely manner contributes to prolonged periods of poor glycemic control among individuals with type 2 diabetes and ultimately increases the risk for neuropathic, microvascular, and macrovascular complications (5). It is estimated that at least 50% of patients with type 2 diabetes may need insulin within 6 years of diagnosis (6).

Initiating insulin therapy in the primary care set-up has some practical and theoretical barriers. This resistance is based on a variety of factors, primarily beliefs, and perceptions regarding diabetes and its treatment and the nature and consequences of insulin therapy (7). Insulin as a drug of choice is considered as 'the last resort' by many diabetic patients. This 'stigmatization' may contribute to the underutilization of insulin and cause unnecessarily prolonged oral antidiabetic drug treatment (8).

Patients' perception of the disease may be due to the insufficient knowledge or motivation of the physician, patient-related factors, and absence of primary care guidelines (9). On the other hand, a delay in the initiation of insulin therapy could originate either from the health care system or health care professionals (7).

Primary care physicians are almost always the first encountered for the majority of diabetic patients. Patients with type II diabetes have acute or chronic comorbid health problems that compel the physician to address the

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symptoms that bring the patient to the physician. Only modest numbers of patients achieve established targets of diabetes control (10). Redefining the role of the primary care physician in the management of diabetes is necessary to decrease diabetes mellitus-related complications.

Little is known about the factors that contribute to physician reluctance to initiate insulin in patients with type 2 diabetes.

There are reports on varying proportions of diabetic patients using insulin in different countries. The global prevalence of diabetes is increasing in almost every country, including Turkey (11). However, there are no current data available on attitude and awareness of primary care physicians about the initiation of insulin treatment for the required patients.

We wanted to evaluate the possible physician-related factors causing a delay in initiation of insulin treatment in patients with type 2 diabetes.

## 2. Materials and methods

### 2.1. Study design and participants

Family medicine practices have vastly changed in the last decade in Turkey. The reshaped family medicine service model makes physicians more responsible for the management of chronic disorders. This is a cross-sectional study carried out among primary care physicians. Each physician currently serves an average population of 3500–4000.

Family medicine services are conducted by family medicine specialists and general practitioners. Family medicine specialists complete 3 years of vocational training. The family medicine specialty is a relatively new field in terms of availability of departments at universities and in residential education all over Turkey.

Therefore, the number of family medicine specialists is comparatively smaller than the number of general practitioners in family health care centers. For this reason, family medicine specialists are not included in this study.

Family physicians work in family health centers. Each family health care center has approximately 2–6 physicians in addition to 2–6 nurses, depending on the size of the population served and availability of a convenient location.

The majority of primary care healthcare services are sustained by general practitioners at family health centers. General practitioners obtain family practice eligibility certificates after completing a course accredited by the Ministry of Health.

A total of 87 family physicians working at 36 family health centers in urban Malatya participated in our study on a voluntary basis.

### 2.2. Survey form and data collection

A self-administered survey form was structured to gather the views of the primary care physicians. This trial was

conducted by using a self-structured, 5-point Likert scale questionnaire. Item development for the survey was based on a review of the literature. Responses were recorded as either participant's direct answers or as "strongly agree", "agree", "neutral", "disagree", or "strongly disagree".

The survey form also included questions about the following issues.

#### 2.2.1. Sociodemographic features

Information about age, sex, years in practice, and number of patients with diabetes seen in a day was recorded (Table 1).

#### 2.2.2. Knowledge about diabetes mellitus

Basic knowledge was assessed by asking questions regarding diabetes as follows (Table 2): Do you feel yourself competent enough to diagnose diabetes? What is the source of your current knowledge about diabetes? At which level of HgA1c should insulin treatment be initiated?

#### 2.2.3. Views of primary care physicians regarding insulin initiation for type 2 diabetic patients

Physicians responded to the following points (Table 3):

I am not confident enough about when insulin treatment should be started.

I am not confident about the initial dosage and when to start insulin for patients.

I do not think I have enough time to explain to patients about how to arrange the dosing and use of insulin.

I do not think that a meaningful difference exists between insulin as compared to oral antidiabetics as far as long-term outcomes are concerned.

I am obliged to delay insulin treatment because patients have preconceptions about insulin.

Patients are not well educated about the possible benefits of insulin.

Patients object to insulin because they think that insulin may cause weight gain and hypoglycemia.

The survey form was voluntarily circulated and collected by volunteer students during their rotation in family medicine at the İnönü University School of Medicine. Each participant filled out the questionnaire by her/himself.

### 2.3. Statistics

SPSS 17.0 for Windows was used to analyze the data. The Mann–Whitney U test was used to determine the significance of differences. For statistical purposes, 'completely agree' and 'agree' responses and 'do not agree' and 'completely disagree' responses were considered together. The significance of data with more than one variable was evaluated with the Kruskal–Wallis test.  $P < 0.05$  was considered statistically significant.

### 3. Results

A total of 87 family physicians volunteered to participate in the study. Eight physicians did not have time to complete the survey form and so were not included in the study. In terms of sex, female family physicians were found to be more uncertain about the timing of insulin initiation for diabetic patients ( $P = 0.03$ ).

The 87 participating physicians had an average age of  $38.88 \pm 8.8$  years and most (66.7%) were male. It was found that 24.1% of them had been in practice for 0–5 years and 17.2% had been in practice for more than 15 years. An average of 5 diabetic patients were seen by each physician (Table 1).

No statistically significant difference was observed between views about the level of HbA1c at which insulin should be initiated and the initiation and adjustment of maintenance doses of insulin.

The majority of physicians (85.1%) stated that they feel competent in diagnosing diabetes in terms of current guidelines, while 14.9% of them stated they would need specialists' confirmation in order to start insulin (Table 2).

Almost half of the participants (42.5%,  $n = 37$ ) felt incompetent in the starting dosage adjustment and 40.2% ( $n = 35$ ) of the participants felt incompetent in maintaining the appropriate dosage adjustment.

**Table 1.** Sociodemographic features of the participants.

Parameters	$n = 87$
Age (years)	$38.28 \pm 8.8$
Age range	24–60
Age groups	
20–29 years	17 (19.5%)
30–39 years	28 (32.2%)
40–49 years	33 (37.9%)
50 years or more	9 (10.3%)
Sex	
Male	58 (66.7%)
Female	29 (33.3%)
Duration in practice	
0–5 years	21 (24.1%)
6–10 years	14 (16.1%)
11–15 years	17 (19.5%)
16–20 years	20 (23.0%)
21 years or more	15 (17.2%)

A statistically significant difference was found between those physicians who had initiated insulin treatment for any patient and those who thought themselves competent in maintaining dosages for already started treatment ( $P = 0.048$ ).

We found a statistically significant difference between the family physicians who did not think that a meaningful difference existed between insulin as compared to oral antidiabetics as far as the long-term outcomes are concerned (46.0%,  $n = 38$ ) and those who had no time to educate patients about insulin use (47%,  $n = 41$ ) ( $P = 0.0027$ ).

In addition, 40.2% ( $n = 35$ ) of the physicians thought patients' reservations would make them hesitant about initiating insulin therapy, 34.5% ( $n = 30$ ) of the physicians thought that patients were not compliant with insulin, 43.7% ( $n = 38$ ) thought hypoglycemia as a side effect was a barrier to insulin treatment, 43.7% ( $n = 38$ ) of the participants stated some reservation in using insulin over the age of 65 due to possible hypoglycemia, and 50.6% ( $n = 44$ ) of the participants thought that if injection was not the method of administering insulin then patients would have no objections (Table 3).

### 4. Discussion

To the best of our knowledge, this is the first field-based study conducted among primary care physicians to evaluate their views in terms of insulin administration to those in need and possible physician-related reservations in starting insulin treatment in Turkey.

We found that the diagnosis of diabetes is not a challenge for primary care physicians, but a majority of them do not prescribe insulin to their patients; instead, they prefer to refer these patients to a general internist or an endocrinologist (Table 2). Numerous factors may be related to this. Our study reflects similarities to that of Peyrot et al., carried out on 4 continents, Asia, Australia, Europe, and North America, in respect to general practitioner-related factors in delaying insulin treatment as compared to specialists (3). Similarly, physicians in our study tended to refer their patients for specialist care (Department of Internal Medicine or Endocrinology). At this point it is necessary to create models that make family physicians actively involved in the decision making and management of diabetes (12). Taking into account the increasing incidence of diabetes all across the world, neither the number of specialists nor the appointments made with specialists would be sufficient to deal with diabetes in the near future. In addition, a huge number of patients would be missed or would be cared for only at the terminal stages of diabetes. Interventions in diabetic care should be modified or implemented in terms of the exact circumstances of the country involved.

**Table 2.** Responses in regards to current knowledge of diabetes mellitus.

	n	%
Do you feel competent enough to diagnose diabetes mellitus?		
Yes	74	85.1
No	13	14.9
What is the source of your current knowledge about diabetes?		
Medical school	61	70.1
Internet	16	18.4
Textbook	5	5.7
National guidelines	2	2.3
Local continuous education courses	1	1.1
Congresses	2	2.3
How do you follow up with diabetic patients?		
I schedule appointment	45	51.7
I refer them to Endocrinology or Internal Medicine	29	33.3
During the refilling procedure	13	14.9
Do you evaluate diabetic patients in terms of complications of the disease?		
Yes	51	58.6
No	5	5.7
I refer them, so they should have been evaluated	31	35.6
Have ever initiated an insulin treatment?		
Yes	21	24.1
No	66	75.9
How often do you order HbA1c tests for diabetic patients?		
10–30 days	1	1.1
30–60 days	8	9.2
60–90 days	59	67.8
I usually do not order tests	19	21.8
What is the level of HbA1c at which insulin should be initiated?		
6	1	1.1
7	10	11.5
8	12	13.8
9	4	4.6
10	3	3.4
I have no idea; I do not initiate insulin	57	65.5
Do you know the approximate number of diabetic patients on insulin in your population?		
Yes, I know	26	29.9
No, I do not know	61	70.1

**Table 3.** Views of primary care physicians regarding insulin initiation for type 2 diabetic patients.

	Completely agree I agree				No idea		I do not agree		Completely disagree	
	n	%	n	%	n	%	n	%	n	%
1. I do not feel competent enough in insulin initiation and need a specialist's confirmation.	8	9.2	21	24.1	7	8.0	45	51.7	6	6.9
2. I am not confident about the initial dosage and when to start insulin for patients.	10	11.5	37	42.5	5	5.7	30	34.5	5	5.7
3. I feel uncertain about the maintenance dose of insulin.	8	9.2	35	40.2	9	10.3	29	33.3	6	6.9
4. I do not think I have enough time to explain to patients how to arrange the dosing and use of insulin.	3	3.4	21	24.1	8	9.2	41	47.1	14	16.1
5. There are some legal restrictions in prescribing insulin to patients.	6	6.9	14	16.1	29	33.3	23	26.4	15	17.2
6. I do not think that a meaningful difference exists between insulin as compared to oral antidiabetics as far as the long-term outcomes are concerned.	0	0.0	13	14.9	4	4.6	40	46.0	30	34.5
7. I am not confident enough about when insulin treatment should be started.	2	2.3	27	31.0	6	6.9	38	43.7	14	16.1
8. I do not assume that insulin use delays the occurrence of complications.	3	3.4	24	27.6	6	6.9	28	32.2	26	29.9
9. I am obliged to delay insulin treatment because patients have preconceptions about insulin.	9	10.3	35	40.2	13	14.9	22	25.3	8	9.2
10. I think patients are not compliant with insulin treatment.	3	3.4	30	34.5	11	12.6	40	46.0	3	3.4
11. Hypoglycemia is the main factor that makes me hesitate to start insulin.	11	12.6	38	43.7	9	10.3	27	31.0	2	2.3
12. Weight gain is the major issue in considering insulin for patients.	5	5.7	19	21.8	19	21.8	39	44.8	5	5.7
13. Insulin should not be used in patients with a BMI of >35 due to the possibility of weight gain.	0	0.0	27	31.0	31	35.6	25	28.7	4	4.6
14. Use of insulin is even more risky over the age of 65 due to hypoglycemia.	5	5.7	38	43.7	14	16.1	27	31.0	3	3.4
15. I have no time to educate patients about insulin use.	7	8.0	28	32.2	7	8.0	40	46.0	5	5.7
16. Injecting insulin is the major obstacle in starting insulin because it is painful for patients.	12	13.8	44	50.6	10	11.5	18	20.7	3	3.4
17. Patients are not compliant in arranging the doses.	1	1.1	13	14.9	23	26.4	45	51.7	5	5.7
18. Patients are not well educated about the possible benefits of insulin.	10	11.5	35	40.2	11	12.6	29	33.3	2	2.3
19. Patients object to insulin because they think that insulin may cause hypoglycemia.	4	4.6	25	28.7	15	17.2	37	42.5	6	6.9
20. Patients object to insulin because they think that insulin may cause weight gain.	4	4.6	23	26.4	18	20.7	34	39.1	8	9.2
21. Insulin treatment is often perceived as complicated by many patients.	9	10.3	35	40.2	17	19.5	25	28.7	1	1.1
22. Education about insulin treatment seems complicated to many patients.	11	12.6	36	41.4	16	18.4	23	26.4	1	1.1

A significant number of physicians in our study stated that they either felt incompetent in making dosage adjustments or in maintaining the appropriate level. Physicians thought insulin and oral antidiabetic agents have different effects on regulating blood sugar levels (Table 3 shows the responses of physicians regarding insulin initiation for type 2 diabetic patients). These data are also very similar to the findings of Hayes et al. in expressing the requirement of continuous education programs for primary care physicians about the different stages of diabetes. Their study also mentioned the necessity of tools for successful insulin initiation (13).

Family medicine implementation has shifted from location-based (geographical territory) care to individual-based care. This change has inevitably increased the outpatient care burden, resulting in less time for each patient. Family physicians in our study acknowledged this fact indirectly by stating that they have no time to explain to the patient how to use insulin.

Family physicians in our study identified patients' reservations as a cause of their hesitation in starting treatment, even when it is necessary. In addition, some of the respondents stated that patients were not compliant with insulin. At this point, it becomes even more difficult to predict the actual culprit; is it really the patients' psychological resistance to insulin or the physicians' hesitancy that prevents the start of insulin on time? What is certain is that early and intensive glycemic control prevents or minimizes the development of microvascular and macrovascular complications in individuals with type 2 diabetes mellitus (5).

In most studies, education and improved interaction between patients and physicians are the catalysts for improving the existing problem (14). Underlying reasons should be examined meticulously for the insufficiency of updated knowledge and nonadherence to current guidelines by the physicians, as well as the preconceived opinions and prejudices of the patients. Physicians should become aware of multiple determinants and stages in the management of diabetes and integrate the recommendations into their practice (15). Furthermore, patient-related factors in the delay of insulin treatment are often attributed to misconceptions (16).

Some reasonable conditions exist in which insulin usage should be avoided, such as life-threatening hypoglycemia and insulin allergy (17). We suggest even more use of physiological insulin to reduce side effects of insulin preparations. Physiological insulin is required to decrease complications, in particular in the geriatric population (18).

Primary care physicians in our study had the opinion that hypoglycemia, particularly in the geriatric population, remains the major issue to be addressed. Fear of injections

also increases patient reluctance about the initiation of insulin. Consistent with this finding, Munshi et al. found that even after the recommendation of the American Geriatric Society for the elevation of targeted HgA1c levels to over 8%, hypoglycemia occurrence in this population is not precisely known and remains an area for further investigation (19).

Family physicians in this study stated that patients' weight was a major problem for initiating insulin, particularly for overweight or obese patients (20).

Developing interventions and strategies to improve care in primary practice is essential to commonly encountered disease management (21). This study indicates the necessity of initially encouraging awareness among the primary care physician community. Interventions are implemented only after recognizing the issue as a necessity. Factors like awareness, self-efficacy, and familiarity in the management of the disease could be a matter of concern in any disease and field of medicine (22).

Nationally structured competencies covering the needs of the physicians are necessary to improve good clinical practice experiences (23).

Only after an increase in awareness could a call for the development of the role of family physicians in the management of type 2 diabetes, in particular with regards to insulin initiation and follow-up, become a crucial step to address the issue (24). We know of the existence of good examples of developing interventions, achievements, and the readiness of the family physicians with regards to the management of diseases, which help physicians improve their practice outcomes (25,26). Therefore, the conclusion of this trial is not that primary care physicians are reluctant to prescribe insulin to their diabetic patients who need it, but instead that they should be encouraged in a multitude of related issues.

Although this is the first study assessing the views of primary care physicians in the field, some factors may restrict the generalization of the outcomes. First, the study was conducted in only a single city, which may not reflect the general opinion of all primary care physicians in the entire country. In addition, this study does not reflect the views of family medicine specialists. Second, the number of female physicians was relatively small, which could have an impact on the interpretation of the results, and, finally, the survey forms were filled out by the participants either at the end of a work day or in the noon interval, which may not be conducive to the provision of accurate data.

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