

## Original Article

## Determination of the Level of Knowledge of Clinical Nurses about Oral Anti-Diabetics

**Elif Unsal Avdal, PhD**

Associate Professor, Izmir Katip Celebi Univesity Faculty of Health Science Izmir, Turkey

**Berna Nilgun Ozgursoy Uran, MSc**

Lecturer, Izmir Katip Celebi Univesity Faculty of Health Science Izmir, Turkey

**Yasemin Tokem, PhD**

Associate Professor, Izmir Katip Celebi Univesity Faculty of Health Science Izmir, Turkey

**Husnu Yilmaz, MD**

Izmir Katip Celebi Univesity Faculty of Medicine, Cigli Local Hospital, International Medical Science Izmir, Turkey

**Burcu Arkan, PhD**

Assistant Professor, Uludag University, Bursa, Turkey

**Correspondence:** Husnu Yilmaz, MD, Izmir Katip Celebi Univesity Izmir, Turkey

E-mail: elifunsal2003@yahoo.com

### Abstract

**Objectives:** This study was carried out to determine the level of knowledge of clinical nurses regarding oral anti-diabetic medications.

**Methodology:** The survey was conducted in the internal medicine clinics working at a university hospital in Bursa city during the period between February and March 2013 as a descriptive and cross-sectional study and included 50 nurses. Data were evaluated and statistical procedures were performed using SPSS; specifically, the number and percent distribution were determined using the Mann-Whitney U test and Kruskal-Wallis test.

**Results:** The sampling power was 92%. The average score on the set of questions to determine the level of knowledge of the nurses was  $52 \pm 8.7$ . When the factors were evaluated according to the values assigned to the age of the nurses ( $p=0.006$ ), work times ( $p=0.002$ ), educational status ( $p=0.017$ ), and availability of diabetes education ( $p=0.005$ ), the differences were statistically significant.

**Conclusion:** The findings suggest supporting the nurses with clinical training on oral anti-diabetic medications.

**Key Words:** Type 2 DM, oral anti-diabetic medication, clinical nursing, level of knowledge

### Introduction

Diabetes mellitus (DM) is a chronic disease that lasts a lifetime; however, DM can be treated. Type 2 (T2) DM implies that the basic disorder is insulin resistance in the liver and peripheral, as well as insufficient insulin secretion by the pancreas (ADA, 2012; AACE, 2012; Kahn et al., 2004; Inzucchi, 2002). The ideal treatment in individuals with T2DM is the regulation of glucose metabolism by means of diet and exercise; however, these measures are not sufficient for three-fourths of patients. Thus, oral anti-diabetic medications are needed. (ADA,

2012; AACE, 2012; DCCT, 2010; Longo, 2010; Philippe & Raccach, 2009).

Oral anti-diabetic drugs (OADs) are used in diabetics in whom the ability of insulin secretion has not been exhausted, i.e., insulin production continues, albeit decreased. The treatment begins with OAD as mono-therapy, mostly in patients with T2DM (Philippe & Raccach, 2009; Chyan & Chuang, 2007; Mizuno et al., 2008; Inzucchi, 2002). With the scope of T2DM, OADs can be classified depending on the mechanism of action as follows: increasing insulin secretion of the pancreas (insulin *secretagogues*); improving

insulin sensitivity of the liver and periphery; and decreasing intestinal absorption of glucose (ADA, 2012; AACE, 2012; DCCT, 2010; Longo, 2010; Pratley, 2009; Chyan & Chuang, 2007; Ozcan, 2002).

Clinic nurses play important roles in the OAD medication planning process in individuals with T2DM (ADA, 2012; AACE, 2012; Kahn et al., 2004; Mizuno et al., 2008; Akalın et al., 2000; DCCT, 2010; Ozcan, 2000). The most important responsibility of the clinic nurse in the treatment of T2DM is to inform the diabetic about OADs in addition to insulin treatment (El-Deirawi & Zuraikat, 2001). Diabetics should be trained and followed by nurses with respect to adverse effects during the treatment with OADs (ADA, 2012; Turkiye Diyabet Vakfı, 2011; Azal & Corakcı, 2005; Ozcan, 2001; Univar, 2000). The nurses working with diabetics should have sufficient information regarding this matter and in the event adverse effects or inadequate treatment are noted, the patients should be evaluated by a physician (ADA, 2012).

Optimal treatment for diabetics can be achieved by training the patients thoroughly in this matter. The rate of drug use, duration of hospitalization, and rate of organ dysfunction decrease significantly in patients who had undergone the necessary training (Levetan, 2007; Beaser et al., 2001).

Since insulin treatment has been taken into consideration more efficiently within the clinical environment in Turkey, the clinic nurses have limited knowledge levels about OADs. We have not encountered any studies related to this matter in the literature search we executed.

The OADs based on the principle that clinic nurses should know all stages of diabetes treatment.

### **Aim and research questions**

This study was carried out to determine the level of knowledge of clinic nurses regarding oral anti-diabetic medications.

### **Research Questions**

1. What is the level of knowledge of clinic nurses about OADs?
2. Is there any relationship between the availability of diabetes education to clinic nurses and the level of knowledge about OADs?

## **Methodology**

### **Design**

The research was a descriptive and cross-sectional study to determine the level of knowledge of clinic nurses about OADs.

### **Participants and Sample**

The research was carried out in the internal medicine clinics at a university hospital in İzmir.

The research subjects included 55 nurses working in the clinic between February and March 2013; however, 5 nurses chose not to participate in the research. Thus, the research sample included 50 volunteer clinic nurses. The sampling sufficiency was 92%.

### **Data Collection Tools**

As a means of data collection, a questionnaire comprised of 15 questions with multiple choices was used to determine the level of knowledge of clinic nurses about OADs. A second questionnaire comprised of 4 questions was given to the nurses to determine the descriptive characteristics.

The questions in the questionnaire were developed from the knowledge of the researchers and the national diagnostic and treatment guidelines for diabetes. The evaluation was as follows: true (1); and false/no response (0). The raw score points between 0 and 15 were obtained from the clinic nurses and the points were converted into a 100-point system for easier interpretation. It is noteworthy that the knowledge of the nurses about OADs was deemed sufficient with scores between 80 and 100 on the medication evaluation form. The questionnaire was collected by the researchers by face-to-face interview.

### **Ethical considerations**

The necessary permission was obtained from the institution where the research was conducted after informed consent was obtained from the nurses.

### **Data analysis**

The data were evaluated and statistical procedures were performed using SPSS; the number and percent distribution were obtained by the Mann-Whitney U test and Kruskal-Wallis test (Aksakoglu, 2006). Neslihan Demirel, an Assistant Professor at Dokuz Eylül University, Faculty of Arts and Sciences, Department of

Statistics, provided us with support during the data evaluation process.

## Results

Review of the sociodemographic characteristics (Table 1) of the nurses participating in the survey revealed the following: the average age of the nurses was  $27.02 \pm 6.56$  years; the average duration of work experience was  $9.02 \pm 2.56$  years; the percentage of females was 100%; 80% of the nurses held bachelor's degrees; 20% of the nurses were high school graduates; and 72% of the nurses received diabetes education (Table 1).

Review of the data in Table 2 showed that the average score of OAD knowledge of the clinic nurses was 52.0; the lowest score was zero and the highest score was 100 (Table 2).

Based on the level of education, the difference between the median scores of nurses related to the knowledge of OADs was statistically significant ( $p = 0.005 < \alpha = 0.05$ ). Thus, the knowledge score of the nurses with bachelor's degrees was higher than the scores of high school graduates (Table 3). Based on the availability of diabetes education, the difference between the median scores of nurses related to the knowledge of OADs was statistically significant ( $p =$

$0.005 < \alpha = 0.05$ ). Thus, the knowledge score of the nurses with bachelor's degrees was higher than the scores of high school graduates (Table 3).

The difference between the median scores of nurses related to the knowledge of OADs was statistically significant ( $p = 0.005 < \alpha = 0.05$ ). Thus, the knowledge score of the nurses who received diabetes education was higher than the nurses who had not received diabetes education (Table 3).

Based on the length of work experience, the difference between the median scores of nurses related to the knowledge of OADs was statistically significant ( $p = 0.002 < \alpha = 0.05$ ). Thus, the knowledge score of the nurses who have been working for 1-15 years was higher than the nurses who had been working for  $> 15$  years (Table 3).

Based on age, the difference between the median scores of nurses related to the knowledge of OADs was statistically significant ( $p = 0.006 < \alpha = 0.05$ ). Thus, the knowledge score of the nurses who were  $\geq 50$  years of age was lower than the nurses who were of different ages (Table 3).

**Table 1: Socio demographic Characteristics of Clinical Nurses**

Socio demographic Characteristics		n	%	$\bar{X} \pm S$
Sex	Female	50	100	-
	Male	-	-	-
Educational Attainment	High school graduate	10	20	-
	Bachelor	40	80	-
Diabetes education availability	Yes	36	72	-
	No	14	28	-
Working time		50	-	$9.02 \pm 2.56$
Age		50	-	$27.02 \pm 6.56$

\* Working time and the age given average.

**Table 2: The average score of Oral anti-diabetic drug knowledge of the clinical nurses**

	n (%)	Min.	Max.	$\bar{X} \pm S$
<b>Average Score</b>	50 (% 100)	0	100	52.0 $\pm$ 8.7

**Table 3: The Relation between the descriptive characteristics of the nurses and oral anti- diabetic drug knowledge**

<b>Descriptive Characteristics</b>	n	$\bar{X} \pm S$	test Statistics (p value)	
<b>Educational Attainment</b>	High school graduate	10	35.3 $\pm$ 11.2	U=2.383 (p= 0.005)
	Bachelor	40	45.5 $\pm$ 10.1	
<b>Diabetes education availability</b>	Yes	36	46.2 $\pm$ 9.6	U=0 .587 (p=0.005)
	No	14	25.2 $\pm$ 10.1	
<b>working time</b>	1-15 years	38	47.0 $\pm$ 9.5	U=0.487 (p=0.002)
	Over 15 years	12	30.1 $\pm$ 8.7	
<b>age</b>	20-34	25	40.0 $\pm$ 10.2	KW= 1.969 (p=0.006)
	35-49	16	38.1 $\pm$ 9.2	
	50 and above	9	27.2 $\pm$ 10.7	

## Discussion

In the current study the average score of the knowledge of nurses about OADs was 52.0. When a comparison was made between the scores obtained by the nurses according to age, length of work experience, and diabetes education, the differences between the groups were statistically significant ( $p < \alpha = 0.05$ ).

When a diabetic cannot achieve euglycemia in spite of a balanced diet and adequate physical activity, the medication has to be started in combination with current measures (ADA, 2012; Pratley, 2009; Inzucchi, 2002; Akalin et al., 2000). Generally, monotherapy with OADs is initiated in patients with T2DM. The nurses participating in the health management of diabetics should have sufficient information about the main OADs, effects and side effects,

and cautions to be considered during the planning of efficient care and training schedules for diabetics using OADs (Mizuno et al., 2008; El-Deirawi & Zuraikat, 2001; Ozcan, 2001; Ozcan, 2002).

On the basis of a national and international literature search, no study was identified regarding to the level of knowledge of clinic nurses about OADs. A study was conducted, however, to determine the level of knowledge of nurses among health care professionals on insulin treatment (Derr, Sivanandy, Bronich-Hall, Rodriguez, 2007), which showed that 60% of the nurses had adequate knowledge regarding insulin treatment ( $p < 0.0001$ ). The study was an indicator that the clinic nurses on insulin treatment had a greater fund of knowledge about OADs than nurses not on insulin treatment.

The average knowledge score of clinic nurses on OADs was at the middle level. Thus, insulin treatment is taken into consideration more when compared to oral medication in Turkey and worldwide. Because the average knowledge score of the clinic nurses between 20 and 34 years of age was higher than the other age groups ( $p < 0.05$ ). Indeed, the adult learning theory of Knowles implied that 20% of information is forgotten with aging was verified (Knowles, 1970). Education and experience are important factors in the use and application of the information (Knowles, 1970). This assertion that a greater fund of knowledge about OADs is further supported by nurses who have been working in the clinic for 1–15 years, nurses who have bachelor's degrees, and nurses who had been given diabetes education ( $p < 0.05$ ). In Turkey the clinic nurses frequently encounter patients with T2DM who require OADs. However, it is thought that the OADs have not received consideration as much as insulin treatment, therefore the level of knowledge of clinic nurses on OADs remains inadequate. Based on this study, it is considered that the knowledge of clinic nurses on OADs shall be reviewed and serve as a guide for further studies.

### Limitations

Due to limitations on the duration of the research, the clinic nurses at other hospitals in Izmir could not be reached.

### Conclusions

In the treatment of diabetes in a clinical environment, insulin treatment protocols are taken into consideration more significantly, thus the level of knowledge of clinic nurses on OADS remains inadequate. The clinic nurses are responsible for recognizing all stages in the treatment of diabetes. According to these results, it is suggested to support nurses with clinical training involving OADs and expected improvements to be applied in the near future.

### Acknowledgments

The authors thank the nurses who supported and participated in the study.

### References

Aksakoglu, G. (2006). Research and analysis in health. Izmir: DEU Rekt Orluk Pring House, 45-54. (in Turkish).  
American Diabetes Association (ADA). Standards of medical care in diabetes. Available from

<http://www.diabetes.org/2012> (Access: 23.05.2013)  
American Association of Clinical Endocrinologists (AACE). American association of clinical endocrinologists guideline. Available from <http://www.aace.com>. (Access: 23.05.2013)  
Akalin S, Aslan M, Baskal N (2010). Diabetes Mellitus. Ed: C.Yilmaz, MT Yilmaz, S Imamoglu, Gri Tasarım, Istanbul (in Turkish).  
Azal O, Corakci A. (2005). Treatment of Type 2 diabetes mellitus with oral hypoglycemic drugs. Diabetes Forum, 1(1): 10-19.  
Beaser SB, Richardson DL, Hollerorth HJ (2001). Education in the treatment of diabetes”, Joslin's Diabetes Mellitus ed. Kahn CR, Weir GC 13th, Waverly Company, USA, Chapter 23, 404-14.  
Chyan YJ, Chuang LM. (2007). Dipeptidyl peptidase-IV inhibitors: An evolving treatment for type 2 diabetes from the incretin concept. Recent Patents on Endocrine, Metabolic and Immune Drug Discovery, 2007;1: 15-24.  
Derr RL, Sivanandy MS, Bronich-Hall L, Rodriguez A. (2007). Insulin-related knowledge among health care professionals in internal medicine, Diabetes Spectrum, 20 (3), 177-185.  
DCCT. (1993). The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. The Diabetes Control and Complications Trial Research Group. N Engl J Med . 329:977–986 (revised 2012).  
El-Deirawi KM, Zuraikat N. (2001). Registered nurses' actual and perceived knowledge of diabetes mellitus. J Nurses Staff Dev. 17:5–11.  
Inzucchi SE. (2002). Oral antihyperglycemic therapy for type 2 diabetes: Scientific review. JAMA, 287 (3): 360-372.  
Kahn CR, Weir GC, King GL, Jacobson AM, Moses AC, Smith RJ. (2004). Joslin's Diabetes Mellitus. 14th ed: Lippincott Williams & Wilkins, 585-792.  
Knowles MS. (1970). The modern practice of adult education. New York: Association Pres. (revised 2012)  
Levetan C. (2007). Oral antidiabetic agents in type 2 diabetes. Current Medical Research and Opinion, 23 (4): 945-952.  
Longo R. (2010). Understanding oral antidiabetic agents. American Journal of Nursing, 110 (2): 49-52.  
Mizuno CS, Chittiboyina AG, Kurtz TW, Pershadsingh HA, Avery MA. (2008). Type 2 diabetes and oral antihyperglycemic drugs. Curr Med Chem. 15: 61-74.  
Pratley RE. (2009). Expanding treatment options for type 2 diabetes: the old and the new. Diabetes Educ. 35 Suppl 1: 4-11.  
Philippe J, Raccach D. (2009). Treating type 2 diabetes: how safe are current therapeutic agents. Int J Clin Pract, 63 (2):321-332.

- Ozcan S. (2001). Management of patients with diabetes mellitus and nursing. In: Yenigun M, Altuntas Y, ed. Her Yonuyle Diyabetes Mellitus. Nobel Tıp Kitabevi Ltd. Sti. Istanbul, 34-45. (in Turkish)
- Ozcan S. (2002). Oral antidiabetic therapy management. In: Erdogan S, ed. Basics Diabetes Nursing. Yuce Reklam Yayım Dagıtım, Istanbul, 23-44. (in Turkish).
- Diabetes Foundation of Turkey. Treatment of diabetes. Available URL: <http://www.turkdiab.org/> 2013 (Access: 23.05.2013).
- Unuvar N. (2000). The role and importance of education in type 2 diabetes. Turkish Diabetes Yearbook, 219-226, Istanbul (in Turkish).