



Identifying Predictors of No-Show Appointments at a University Hospital in Turkey

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ABSTRACT

Aim: This study aimed to identify the number of patients not attending their outpatient appointments and the risk factors associated with no-show appointments in a university hospital.

Methods: Patients' no-show appointments were analyzed retrospectively in a university hospital in Çorum, a typical medium-sized province of Turkey, in a one-month period between January 1 and February 1, 2020. Data were obtained from the hospital information systems. Multivariate logistic regression analysis was used to determine factors affecting no-show appointments.

Results: The proportion of no-show appointments was 16.2%. Logistic regression analysis showed a significant correlation between patients' sex, age, marital status, outpatient status, and not going to their appointments ($p < 0.05$).

Conclusions: The findings of this study will help better understand and manage the problem of no-show appointments. To reduce the negative effect of no-show appointments it is important to develop appropriate interventions.

Keywords: appointment, appointment systems, outpatient appointment, no-show appointments, missed appointments.

1. Introduction

Outpatient health services play an important role in the services provided by health care institutions. For health institutions to operate efficiently and effectively, both outpatient and inpatient services should not be interrupted. Therefore, various risks that can cause uncertainty in the service process, such as random visits to outpatient clinics, variability in the duration of service, and patients who do not attend their appointments, need to be well managed (Gupta & Wang, 2012). To avoid such problems during the service process, it is important to make an appointment schedule well, understand the reasons for not attending the appointment, and take necessary and appropriate measures.

Patients who do not attend scheduled outpatient appointments are a major cause of inefficiency in the health care system. This causes a loss of time related to administrative, medical, and nursing services. This wastage of time potentially results in increased waiting times, delayed treatments, increased costs, patient dissatisfaction, and morbidity (Casey et al., 2007). The rate of patients not attending outpatient appointments varies

between 3% and 80%, depending on the patient population and specialty (Dantas et al., 2018; Rust et al., 1995).

Berg et al. found that the rate of daily no-shows in the outpatient endoscopy unit of an academic medical center was 18% (Berg et al., 2013) whereas Hamilton et al. found that the average rate of no-shows was 3.9% in five family medicine practices (Hamilton, Luthra, et al., 2002). In a three-year retrospective study, Mbada et al. found that the rate of not attending an appointment in a physiotherapy outpatient clinic was 79.2% (Mbada et al., 2013). In addition, the highest average no-show rate was observed in Africa (43%), followed by South America (27.8%), Asia (25.1%), North America (23.5%), Europe (19.3%), and Oceania (13.2%) (Dantas et al., 2018), which is considered to be caused by factors related to patients and the health system (Casey et al., 2007).

Although there are many studies in international literature on the problem of no-show appointments, there are no satisfactory studies in Turkey regarding no-show appointments and their reasons. This study aimed to determine the extent to which patients do not attend outpatient appointments in a university hospital and whether patients' no-show appointments are related



to their characteristics. Considering that patients not going to their appointments have negative consequences on the daily examination schedule, use of health resources, and efficiency of health institutions, this study is thought to guide health managers and hospital managers.

2. MATERIALS AND METHODS

2.1 Data

This study was conducted retrospectively in a university hospital in Çorum, a typical medium-sized province of Turkey, to determine the level of patients' no-show appointments in a one-month period between January 1 and February 1, 2020 and to identify the risk factors affecting patients' no-show. Because hospital management only allowed one month of data to be used, the study period was also limited to this period. Data on patients who came or did not come to their appointments during the one-month working period, sex, age, marital status, and the polyclinic where they made an appointment were obtained from the hospital information system. After quality control, data cleaning and arrangements were performed on the data received in Excel format, and the data were transferred to the SPSS program for statistical analysis.

2.2 Statistical Analysis

Data were analyzed using the SPSS program (version 23.0). Multivariate logistic regression analysis was used to

determine the factors affecting the probability of patients not attending their appointments. The most important assumption of logistic regression analysis is that the dependent variable has two categories (1 and 0), and the independent variables are continuous or categorical (Mertler & Vannatta, 2005). In this analysis, the variable indicating the status of patients attending or not attending an appointment was included as the dependent variable; the state of attending an appointment was coded as (0), and the state of not attending an appointment was coded as (1). Patient characteristics, such as sex, age, marital status, and the outpatient clinic with which they made an appointment, were used as independent variables in the logistic regression.

3. RESULTS

A total of 102,561 appointments in the database were included in the study. According to data from the hospital information system for January–February 2020, the no-show rate was 16.2%.

The descriptive characteristics of the patients are presented in Table 1. As seen in the table, the majority of the patients (63%) who made an appointment at the hospital were women, more than half were 40 years old, and over, 61.5% were married. Nearly half (49.8%) made an appointment with the internal departments, followed by surgery (34.2%), gynecology (7.8%), and pediatric and dental diseases (7.4%).

Table 1. Descriptive Characteristics of Patients

Variables	Frequency	Percentage
Gender		
Female	64566	63.0
Male	37995	37.0
Age (years)		
<20	16535	16.1
20-39	28215	27.5
40-59	32451	31.6
≥60	24873	24.3
Marital Status		
Married	63079	61.5
Single	28582	27.9
Widowed	6061	5.9
Department		
Surgical Departments	35092	34.2
Internal Departments	51059	49.8
Gynecology Department	8008	7.8
Pediatrics Department	6768	6.6
Dental Diseases Department	787	0.8

Logistic regression analysis was used to determine whether patients' no-show appointments were affected by their demographic characteristics, and a statistically significant model was found ($\chi^2_{(16)} = 825.042$, $p < 0.05$) (Table 2). Nagelkerke's R^2 values show that 15% of the variance in the dependent variable is

explained by the independent variables. The model correctly classified 84.5% of the patients.



Table 2. Analysis of Logistic Regression Describing the Factors Affecting Patients' No-show Appointments

Variables	β	Standard Error	Wald	p	Exp(B)	%95 Interval	Confidence
Gender (Male; Ref:Female)	0.048	0.019	6.230	0.013	1.049	1.010	1.090
Age (Ref:<20)			324.277	<0.001			
20-39	0.307	0.035	75.161	<0.001	1.359	1.268	1.457
40-59	-0.073	0.041	3.228	0.072	0.929	0.858	1.007
≥ 60	-0.114	0.044	6.772	0.009	0.892	0.819	0.972
Marital (Ref:Married)			97.583	<0.001			
Single	0.248	0.028	80.778	<0.001	1.282	1.214	1.353
Widowed	0.181	0.041	19.121	<0.001	1.199	1.105	1.301
Department (Ref:Surgical)			120.734	<0.001			
Internal	-0.068	0.020	11.478	0.001	0.934	0.898	0.972
Obstetrics	-0.215	0.038	31.949	<0.001	0.806	0.748	0.869
Pediatrics	0.141	0.043	10.939	0.001	1.152	1.059	1.252
Dental	0.639	0.082	60.744	<0.001	1.894	1.613	2.224
Constant	-1.515	0.023	4441.227	<0.001	0.220		

$\chi^2_{(16)}=825.042$; $p<0.001$; Nagelkerke $R^2=0.15$

Abbreviations: Ref, Reference group

As seen in Table 2, there was a statistically significant relationship between not going to an appointment and patient sex (Wald=6.230, $p=0.013$), age (Wald=324.277, $p<0.001$), marital status (Wald=97.583, $p<0.001$), and the outpatient department where they made an appointment (Wald=120.734, $p<0.001$).

Table 2 shows that male patients are more likely to not attend appointments than female patients who form the reference group. Compared to patients aged 20 years, the no-show probability for patients aged 20-39 years was 35.9% higher, but the no-show probability for patients aged 60 years and older was 10.8% lower. Regarding marital status, the no-show probabilities of single and widowed patients were 28.2% and 19.9% higher, respectively, than that of married patients. When patient no-shows were examined in terms of the outpatient clinic, compared to surgical departments, the no-show probability in the internal and obstetrics departments was 6.6% and 19.4% lower, respectively. On the other hand, the no-show probability in the pediatric and dental departments was 15.2% and 89.4% higher, respectively, than that in the surgical departments.

4. DISCUSSION

Failure to attend a scheduled outpatient appointment will result in other patients needing an appointment being unable to do so, resulting in dissatisfaction and poor health outcomes among patients (Murray, 2000; Nguyen et al., 2011; Samuels et al., 2015). Therefore, identifying the characteristics of patients who do not attend their appointments is of great importance in terms of minimizing these negative effects. Accordingly, this study aimed to determine the rate of no-show appointments in university hospitals and the factors affecting this rate.

In our study, male patients were more likely to not attend appointments than female patients. In a study conducted by Peng et al. in a hospital affiliated with the Ministry of Veterans Affairs in the USA, male patients were more likely than female patients to not attend appointments, as was the case in this study (Peng et

al., 2016). Similarly, in a study by Hamilton et al. in 13 family medicine clinics in England, men were less likely to attend appointments (Hamilton et al., 2002). Contrary to these findings, in a study conducted in a dermatology clinic, the probability of not attending an appointment was higher in female patients than in male patients (Cohen et al., 2008) Cohen et al. also investigated the status of not attending an appointment in an ear, nose and throat (ENT) outpatient clinic in Israel and reported that females were more likely not to attend appointments because family care has traditionally been the responsibility of females (Cohen et al., 2007).

The study showed that patients aged 20-39 years were more likely to miss an appointment than patients aged 20 years and below, and patients aged 60 years and over were less likely to miss an appointment. Several studies have investigated the relationship between age and no-show appointments (Cohen et al., 2008; Daggy et al., 2010; Dreiherr et al., 2008; Menendez & Ring, 2015; Miller et al., 2015). The study conducted by Daggy et al. found that the no-show probability in patients aged 70 and younger was higher than in patients aged 70 and over (Daggy et al., 2010). In a study conducted by Cohen et al. in a dermatology clinic, patients aged 55 years and younger were found to be more likely to not attend their appointments than patients aged over 55 years. Lower no-show rates among individuals older than 55 years may be caused by the need for help from a doctor owing to worse health status, more free time, or cultural differences between societies (Cohen et al., 2008). Similarly, a study conducted at a tertiary health institution revealed that younger age groups had a higher no-show probability (Miller et al., 2015). Peng et al. reported that patients in the 18-75 age group were more likely to not attend an appointment than those aged 75 years and older (Peng et al., 2016). In a study conducted by Torres et al. in the internal medicine outpatient clinic of an academic medical center in the United States, they concluded



that the no-show probability decreased with increasing age (Torres et al., 2015). Similarly, in the study conducted by Lee et al., in which all outpatient clinics of a general hospital were included to determine the factors identifying the no-show probability of patients (n=22,864), as in our study, a significant relationship was found between age and no-shows. It was estimated that patients over the age of 40 were less likely to be no-shows than patients aged 20 years and younger (Lee et al., 2005).

Our study indicated that single and widowed patients had a higher no-show probability. Similarly, in a study by Peng et al., single patients were associated with a higher probability of no-shows than married patients (Peng et al., 2016). Daggy et al. found that married patients were less likely to miss appointments than unmarried patients in their study conducted in a medical center (Daggy et al., 2010). In a study conducted in the surgical outpatient clinic of a hospital, a significant relationship was found between marital status and not showing up for an appointment; the no-show probability was higher in single or divorced patients than in married patients as the reference category (Menendez & Ring, 2015).

In our study, compared with the surgical departments, the probability of not attending to an appointment in the internal medicine and gynecology departments was lower, but it was higher in the pediatric and dental departments. This is thought to be due to patients' fear of surgical procedures. In a study conducted by Lee et al., patients who did not attend their appointments were also examined in terms of outpatient clinics, as in our study, and the evaluation was made in six categories: surgical, internal medicine, ophthalmology, ENT, therapy, and other outpatient clinics. Similar to our study, surgical outpatient clinics were chosen as the reference categories. Compared to surgical outpatient clinics, the probability of not attending an appointment was higher in ophthalmology, ENT, therapy, and other outpatient clinics; however, this probability was lower in internal outpatient clinics. This study examined failure to attend appointments based on patient characteristics. According to the findings, the mobile phone number of patients registered in the outpatient clinic had a negative and significant relationship with no-shows in all departments. Patients with an appointment duration of 21 days or more had a positive significant relationship with no-shows in all departments (only a negative non-significant relationship was found in the therapy department), and those aged 40 and over in all departments (older eye outpatient clinic patients) were found to have a negative relationship with no-shows (Lee et al., 2005).

5. CONCLUSIONS

One of the current problems with the Turkish health care system is that patients cannot access the service because they have difficulty getting an appointment from the Central Physician Appointment System (Alpay Kanitez, 2019; Kördeve et al., 2017). Although there are difficulties in accessing the service, the no-show problem determined in this study is a contradiction that must be resolved. In our study, the no-show

rate was 16.2%, and the no-show probability was higher among male patients, those aged 20-39, those who were single, and those who made an appointment in pediatric and dental outpatient departments.

Conducting studies that reveal the reasons (forgetting the appointment, lack of time and recovery from the disease) for these patient groups, who are more likely not to attend their appointments, can complement this study. If there is a high risk of forgetting an appointment among patients, measures to remind them of their appointments can be taken through interventions such as SMS. In addition, effective and persuasive training can be provided to patient groups who are more likely to not show that if they do not attend their appointments, their health status may deteriorate and cause negative consequences for other patients and the hospital. Families of patients who do not attend pediatric outpatient clinic appointments should be trained on the importance of appointments. However, patients who do not visit dental clinics can be told that bigger problems can be encountered if oral and dental care is neglected. Developing appropriate interventions is important to reduce the negative effects of missed appointments.

In conclusion, this study examined the problem of missed appointments at a university hospital over a one-month period. It would be beneficial for health managers, including the Ministry of Health and private hospitals, to conduct larger-scale and longitudinal studies to achieve results with higher external validity.

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Conflicts of Interest and Source of Funding

The authors report that they have no conflict of interest. No funding was received for this article.

Ethics Statement

The study was approved by Hacettepe University Non-Interventional Clinical Research Ethics Committee on 22 October 2019 (Ref No: GO 18/954).

Additional Info

This study was produced from researcher Nursel Tuncer's master's thesis.



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