# Evaluation of digital healthcare services and satisfaction level of outpatients at the City Training and Research Hospital in Turkey during Covid-19 pandemic

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**ABSTRACT**

*The purpose of the study was to evaluate the type and use of digital healthcare services by the healthcare professionals and determine the satisfaction level of outpatients with the services they received during their visit to hospital. The study was a cross-sectional study and was carried out in the City Training and Research Hospital located in the South of Turkey between March 13-23, 2021 when the Covid -19 Pandemic was the most intense. The hospital received a level of 6 digital certificate in 2019. In addition to socio-demographic questionnaires developed for healthcare professionals and patients, specific questionnaires were developed for the study. Total 308 respondents participated in this research. Among the existing digital healthcare services at the hospital, the majority of the healthcare professionals reported "electronic digital health care records" (66.7%), "nursing information system" (61.1%) and "patient imaging system" (50.9%). Others were mentioned by the less than half of the respondents. Patients reported satisfaction with the services they received during their visit to hospital.*

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## INTRODUCTION

Rapid developments in mobile technology (m-health) positively affect healthcare services. Especially during Covid-19 pandemic people access to mobile health technologies has increased significantly. Digital health applications help individuals to monitor his/her health status, compliance with the treatment protocols, and improve communication between individual and healthcare professionals [1]. Due to widely use of smartphones doctors can easily monitor their patients to find out if the patients are complied with their prescribed medications and the patients' vital data, body temperature and movement patterns [2].

Rapidly evolving technologies, along with demographic and economic changes, are expected to change the concept of hospitals worldwide. In general, a digital hospital means the full integration of all information systems including medical and non-medical in the hospital with a variety of technologies and the determination of standards of a safe data flow and easy access to patient data from anywhere by health care professionals by spending less professional time and energy, no-manual operation, paperless and filmless, the control of right medication and medical treatment and can be defined as a hospital system with advanced technology and a hospital operation where all operations are carried out, controlled and managed with a full automation system [3]. Digital hospital applications provides some benefits such as to facilitate access to hospitals [4], increase the efficiency of the physician using technology and the level of health information and satisfaction of the patients [5], save it from unnecessary costs due to repetitive procedures associated with the patient and hospital [6], understand the medical benefits of Picture Archiving and Communication System (PACS) used in the digital hospital system and its benefits reducing cost and increasing profits towards future [7], enable patients access to their own health information from anytime and anywhere. [8].

The level of digitalization of the hospital is measured by the Electronic Medical Record Compliance Model (EMRAM), which is developed by Health Information and Management System Society (HIMSS) [9].

In parallel to development of technology globally, the number of digital hospitals is increasing in Turkey. The Turkish Ministry of Health has developed a target to initiate and expand "digital hospital applications" in all public health institutions that was emphasized in the 2013-2017 strategic plan [10].

Hospitals are evaluated by using an EMRAM model to determine their level of digitalization. According to the level, HIMMS is giving an accreditation certificate to hospitals that are awarded for the certificate of 6 and 7 levels [11].

Patient satisfaction research is the key instrument of evaluating and improving the quality of healthcare in the hospital. The purpose of patient satisfaction studies is to better understand a patient's views on healthcare services they receive, and the factors affecting satisfaction of patients, expectations of the hospital, and issues with healthcare services and how to design healthcare services to meet expectations of patients [12]. One criticism of patient satisfaction ratings has been the inability to account for expectations about medical care, which may be influenced by prior experiences with the health-care system [13].

## MATERIALS AND METHODS

The research was carried out in the City Research & Training Hospital located in the South of Turkey between March 13-23, 2021 when the Covid 19 Pandemic was the most intense.

The purpose of the research was to better understand the type and benefits of digital healthcare services existing at the hospital and determine the level of satisfaction of outpatients with the services they received during their visit to the hospital.

In addition to the approval of the Ethics Committee of the University, we got an approval from the Turkish Ministry of Health and Adana Provincial Health Department.

In order to determine the type and benefits of digital healthcare services, a questionnaire was developed based on the qualitative research conducted previously [3]. The questionnaire with socio- demographic questions was sent to a large group of healthcare professionals via online in the hospital. However, the response rate was far below than the expected level due to patient load of healthcare professionals during Covid-19 pandemic. One hundred and eight healthcare professionals responded to the survey. In order to determine the level of outpatient satisfaction, a questionnaire with a 5 -likert scale was used. Overall patients' satisfaction results from the summation of the scores of individual questions (1 = extremely dissatisfied to 5 = extremely satisfied). The patient satisfaction questionnaire was randomly administered to outpatients via face to face by the interviewers. For the data analysis, the SPSS 21 package program was used. Validity and reliability of the patient satisfaction questionnaire were tested using factor analysis. The Kaiser-Meyer- Olkin method was used for sampling adequacy which was found to be very high (0.932), meaning the matrix was well suited for factor analysis

[14]. Seventeen satisfaction items of the survey were submitted. Factor loadings of 0.40 or greater were considered significant for defining the factors. As a result of factor analysis, two statements for scoring less than 0.40 were excluded from the satisfaction scale. For those remaining 15 factors explanatory factor analysis was applied and the scale was compiled under a single dimension, with a total variance of 61.9%. Although many techniques were used to test the validation of scale, the most common one was Cronbach's alpha [15]. Typically, Cronbach's alpha reliable coefficient gets a value between 0 and 1. If Cronbach's alpha was found to be greater than 0.90, the scale was considered very reliable [16]. The Cronbach alpha coefficient of the satisfaction survey was found to be 0.955, meaning the validity of the scale was extremely high.

## RESULTS

**1.Healthcare Professionals**

Table 1 represents socio-demographic characteristics of the respondents.

**Table 1:** Socio-demographic characteristics of healthcare professionals

| | Variable | % |
|---|---|---|
| **Gender** | Female | 71.3 |
| | Male | 28.7 |
| **Age Groups (years)** | 20-29 | 30.6 |
| | 30-39 | 29.6 |
| | 40-49 | 25.9 |
| | 50-59 | 13.9 |
| **Profession** | Nurse | 63.0 |
| | Doctor | 17.6 |
| | Administrative or technical staff | 11.1 |
| | Others | 8.3 |
| **Length of employment in this hospital (year(s))** | 4 | 29.6 |
| | 3 | 24.1 |
| | 2 | 15.7 |
| | 1 | 7.4 |
| | <1 | 23.1 |
| **Attended digital healthcare services trainings in the hospital** | Yes | 63.0 |
| | No | 37.0 |
| **Evaluation of trainings on digital healthcare applications (in terms of length and effectiveness)** | Yes | 49.1 |
| | No | 23.1 |
| | Not sure | 27.8 |
| **Use of digital healthcare applications during Covid-19 pandemic** | Often | 62.0 |
| | Rarely used | 29.6 |
| | Frequency of use has not changed | 8.3 |
| **Patient types suitable for digital healthcare services** | All patients | 83.0 |
| | Inpatients | 6.5 |
| | Outpatients | 4.6 |
| | Patients requiring home care | 0.9 |
| | Other | 4.6 |

As noticed in Table 1, the majority of the respondents were female (72%). Regarding age, all respondents were below the age of 60. In terms of specialty, the sample consisted of 63% nurse, 18% physicians, 11% management or technical staff. Nearly, 63% received trainings on digital health applications. Of those who received training programs 49% found them sufficient in terms of length and effectiveness. Sixty-two percent reported using digital health applications frequently during Covid-19 pandemic. Concerning the experience with digital healthcare applications, 65% reported using those less than 2 years. All patient profiles were considered suitable for digital healthcare services.

Table 2 illustrates existing digital healthcare services in the hospital by the time research was being conducted.

**Table 2:** Existing digital healthcare services at the hospital

| | n | % |
|---|---|---|
| Electronic Medical Records | 72 | 66.7 |
| Nurse Information System | 66 | 61.1 |
| Patient Imaging Systems | 55 | 50.9 |
| Hospital Information Management System | 51 | 47.2 |
| Tele Medicine | 36 | 33.3 |
| Clinical Decision Support Systems | 34 | 31.5 |
| Clinical Practice Guidelines | 31 | 28.7 |
| Smart Card Applications | 29 | 26.9 |
| Clinical Communication Systems | 27 | 25.0 |
| Standards and Classification System. | 22 | 20,4 |
| Hybrid Operating Room | 17 | 15.7 |
| Clinical Care Maps | 17 | 15.7 |
| Case Composition | 10 | 9.3 |
| Virtual Reality Applications | 7 | 6.5 |

As seen in Table, 2, nearly 67% chose "electronic medical records", 61% "nurse information system", 51% chose "patient imaging systems". Other services were mentioned less than 50% of the respondents. Table 3 outlines the benefits of digital healthcare services to healthcare professionals.

**Table 3:** Benefits of digital healthcare services to healthcare professionals

| | n | % |
|---|---|---|
| Accessing patient data from anywhere | 66 | 61.1 |

| | | |
|---|---|---|
| Providing easy archiving | 63 | 58.3 |
| Speed, safety and convenience in medical procedures | 62 | 57.4 |
| Accelerating coordination between units | 36 | 33.3 |
| Reducing errors in administrative processes | 35 | 32.4 |
| Prevention of repetition of radiological imaging | 35 | 32.4 |
| Immediate patient intervention opportunity | 28 | 25.9 |
| Accessing patient private information from anywhere | 27 | 25.0 |
| Easy communication opportunity with the patient | 25 | 23.1 |
| Giving orders without going to service | 22 | 20.4 |
| Others | 8 | 7.4 |

Among all the benefits of digital healthcare services, "accessing patient data from anywhere" (61%), "providing easy archiving" (58%,) "speed, safety and convenience in medical procedures" (57.4%) were mentioned by more than 50% of the respondents.

Table 4 illustrates the contribution of digital healthcare services to patient care delivery.

**Table 4.** Contribution of digital healthcare services to patient care delivery

| | n | % |
|---|---|---|
| Possibility to follow treatment regimen | 69 | 64.9 |
| Speed in accessing laboratory and radiological data | 68 | 63.0 |
| Ability to share patient information with another hospital specialist | 65 | 60.2 |
| Speed in accessing patient files | 64 | 59.3 |
| Speed in diagnosis and treatment planning | 59 | 54.6 |
| Prevention of misuse of medication | 56 | 51.9 |
| Opportunity to get to know healthcare professionals | 33 | 30.6 |
| Opportunity to get to to know the hospital and physician | 31 | 28.7 |

According to the Table 4, many digital healthcare services were selected for their contribution to patient care delivery. More than 50% chose the following services: "possibility to follow the treatment program" (65%), "speed in accessing laboratory and radiological data" (63%,), "ability to share patient information with another hospital specialist" (60.3%), "speed in accessing patient files" (59.3%), "speed in diagnosis and treatment planning" (54.6%), and "prevention of misuse medication" (52%).

Table 5 summarizes the opinions of healthcare professionals on patients' attitudes towards healthcare applications in the hospital.

**Table 5:** Views of healthcare professionals on patients' attitudes towards use of digital health applications

| (I THINK…….) | Strongly Disagree | Disagree | Neither Disagree Nor Agree | Agree | Strongly Agree | $\bar{x}$ | σ |
|---|---|---|---|---|---|---|---|
| patients use mobile health applications effectively | 4 | 19 | 38 | 37 | 10 | 3.278 | .984 |
| patients use mobile health applications more frequently during Covid-19 pandemic | 3 | 11 | 23 | 53 | 18 | 3.667 | .967 |
| patients admit to hospital less frequently during Covid-19 pandemic | 9 | 19 | 27 | 37 | 16 | 3.296 | 1.170 |
| Inpatient satisfaction has increased due to digital healthcare services | 4 | 8 | 42 | 38 | 16 | 3.500 | .962 |
| Outpatient satisfaction has increased due to digital healthcare services | 4 | 11 | 38 | 37 | 18 | 3.500 | 1.009 |
| patients benefit from digital healthcare services at our hospital | 5 | 8 | 44 | 37 | 14 | 3.435 | .969 |

$\bar{x}$:=3.446 **σ**= .825

As outlined in Table 5, three statements were evaluated at a higher rate than the others. Those were "I think patients use mobile health applications frequently during Covid- 19 pandemic" ($\bar{x}$= 3.66)", followed by "I think inpatient and outpatient satisfaction has increased in our hospital due to digital healthcare services" with a 3.5 mean score respectively.

Table 6 summarizes the contribution of digital healthcare services to the efficiency of the hospital.

**Table 6.** Contribution of digital healthcare publications to hospital efficiency

| | Strongly Disagree | Disagree | Neither Disagree Nor Agree | Agree | Strongly Agree | $\bar{x}$ | σ |
|---|---|---|---|---|---|---|---|
| Our hospital fully uses digital healthcare applications | 4 | 13 | 17 | 52 | 22 | 3.694 | 1.045 |
| Sufficient number of training programs on digital healthcare services held in our hospital | 4 | 19 | 29 | 35 | 21 | 3.463 | 1.106 |
| due to digital healthcare applications…… | | | | | | | |
| Costs have decreased | 1 | 12 | 30 | 41 | 24 | 3.694 | .971 |
| Personnel productivity has increased | 3 | 15 | 30 | 41 | 19 | 3.537 | 1.032 |
| Quality of healthcare service has increased | 5 | 8 | 27 | 46 | 19 | 3.667 | 1.082 |
| Shortage of doctors has decreased | 5 | 6 | 34 | 37 | 26 | 3.676 | 1.049 |
| Speed in diagnosis and treatment services have been accelerated | 2 | 5 | 17 | 55 | 29 | 3.963 | .885 |
| Malpractice has decreased | 5 | 5 | 33 | 44 | 21 | 3.657 | .997 |
| Employee satisfaction has increased | 6 | 9 | 28 | 47 | 18 | 3.574 | 1.043 |

$\bar{x}$:=3.661 **σ**: =839

In Table 6, the mean scores of almost all statements were above 3.5. While "speed in diagnosis and treatment services have been accelerated due to digital healthcare services" received the highest mean score ($\bar{x}$=3.96)**,** "sufficient number of trainings provided by the hospital" received the lowest mean score ($\bar{x}$=3.4).

In order to determine the association between socio-demographic characteristics and the factors contributing to hospital efficiency, the ANOVA test was used. Among the healthcare professionals participating in this research, male respondents evaluated the contribution of digital healthcare services to hospital efficiency at a higher rate than female healthcare professionals. This difference was found statistically significant ($p<0.05$). Regarding age break down, the respondents who fell into the age category of 50-59 evaluated the contribution of digital healthcare applications to hospital efficiency at a higher rate than those whose ages were between 20-29. This difference was found statistically significant ($p<0.05$). In terms of profession, physicians rated contribution of digital health applications to hospital efficiency at a higher rate than the rest. The lowest mean score was observed among the nurses. However, this difference was found statistically insignificant ($p>0.05$).

Regarding the length of employment, the respondents who worked at the hospital for a year evaluated the factors contributing to hospital efficiency at a higher rate than those who worked at the hospital for 3 years. This difference was found statistically significant ($p<0.05$). Among the healthcare professionals who received training on digital healthcare services rated the contribution of factors to hospital efficiency at a higher than those who did not receive training at all. This difference was found statistically significant ($p<0.05$).

**2. Outpatient Satisfaction**

The study was carried out at the City Training & Research Hospital located in the South of Turkey. The questionnaire was developed using a 5-likert scale to measure the level of satisfaction of outpatients with the services they received during their visit to hospital. Validity and reliability of the questionnaire were tested and found to be very high (Cronbach's alpha coefficient value 0.955).

Socio-demographic characteristics of outpatients were displayed in Table 7.

**Table 7:** Socio- demographic characteristics of outpatients

| Variable | n | % |
|---|---|---|
| **Gender** | | |
| Men | 105 | 52.5 |
| Women | 95 | 47.5 |
| **Age Breakdown (years)** | | |
| 20-29 | 54 | 27.0 |
| 30-39 | 47 | 23.5 |
| 40-49 | 31 | 15.5 |
| 50-59 | 36 | 18.0 |
| = >60 | 32 | 16.0 |
| **Education Level** | | |
| Illiterate | 7 | 3.5 |
| Literate | 20 | 10.0 |
| Primary education | 60 | 30.0 |
| High school | 39 | 19.5 |
| Undergraduate | 64 | 32.0 |
| Graduate | 10 | 5.0 |
| **Employment Status** | | |
| Public | 25 | 12.5 |
| Private | 27 | 13.5 |
| Self-employed | 33 | 16.5 |
| Student | 32 | 16.0 |
| Retired | 31 | 15.5 |
| Other | 52 | 26.0 |
| **Income (in local currency (TL))** | | |
| <1500 | 18 | 9.0 |
| 1501-2000 | 21 | 10.5 |
| 2001-3000 | 20 | 10.0 |
| 3001-4000 | 38 | 19.0 |
| 4001-5000 | 24 | 12.0 |
| >5000 | 13 | 6.5 |
| No income | 66 | 33.0 |
| **Hospitals preferred by the patient** | | |
| Public | 67 | 33.5 |
| University | 11 | 5.5 |
| City Research & Training | 97 | 48.5 |
| Private | 17 | 8.5 |
| Family health center | 8 | 4.0 |
| **Number of visits to any hospital (times)** | | |
| 2-3 | 84 | 42.0 |
| 4-5 | 57 | 27.5 |
| 6-7 | 28 | 14.0 |
| 8-9 | 6 | 3.0 |
| = >10 | 25 | 12.5 |
| **Frequency of hospital admission during Covid-19 pandemic** | | |
| Never been to hospital | 28 | 14 |
| Frequency not changed | 64 | 32 |
| Frequency decreased | 97 | 48.5 |
| Frequency increased | 11 | 5.5 |
| **Type of health insurance** | | |
| General health | 144 | 72.0 |
| Green card | 28 | 14.0 |
| Private health | 7 | 3.5 |
| No health insurance | 21 | 10.5 |
| **Number of visits to City Training & Research Hospital** | | |
| First time | 55 | 27.5 |
| Several times (1-4) | 83 | 41.5 |
| Many times (5-10) | 39 | 19.5 |
| Frequently | 23 | 11.5 |
| **TOTAL** | **200** | **100** |

According to the Table 7, 52.5% of the respondents were male, 47.5 were female; almost 84% of the respondents were under the age of 60, only 16% percent were the aged 60 and above. Regarding the level of education, about 30% of the respondents either have a high school or a bachelor's degree, while only 3.5% were illiterate. Regarding type of employment, nearly 16% of the respondents were either self-employed or students respectively and 15.5% were retired. In terms of income, about 33% claimed no income. Regarding source for health information, 42.5% patients reported using internet and 40.5% reported hospital. Concerning the type of hospital, patients mostly admit to City Training & Research hospital (48.5%) and followed by public hospitals (33.5%). With regard to number of visits to any hospital, 43.0% of the respondents claimed 2-3 times. Concerning the frequency of admitting to any hospital during Covid-19 pandemic, 48.5% reported a reduction in the number of hospital admissions, while 32% reported no change. In terms of health insurance, 72% of the patients claimed having "general health insurance" 10.5% claimed having "no insurance", 7% reported carrying a green card that is given to those who cannot afford healthcare services in Turkey. In terms of number of visits, 41.5% of the respondents reported several visits to this hospital (1-4 visits), 28% reported first visit.

Table 8 illustrates the type of health information patient searched for on the internet and the type of applications patient used for doctor appointment.

**Table 8:** Type of health information patients searched on the internet and applications used

| Type of health information searched for | n | % |
|---|---|---|
| Doctor appointment | 84 | 42.0 |
| Pharmaceuticals | 64 | 32.0 |
| Healthcare services | 55 | 27.5 |
| Diseases | 55 | 27.5 |
| Physicians | 36 | 18.0 |
| **Type of mobile health applications used** | | |
| e-pulse | 86 | 43.0 |
| Central Hospital Appointment System | 83 | 41.5 |
| Life Fits Home | 73 | 36.5 |
| Do not use | 62 | 31.0 |
| Step counter | 58 | 29.0 |
| Others | 21 | 10.5 |
| **Applications used when making an appointment at the hospital** | | |
| ALO 182 | 136 | 68.0 |
| Central Hospital Appointment System | 72 | 36.0 |
| e-pulse | 19 | 9.5 |

Nearly 42.4% of patients reported searching for physician appointment and 32% reported searching

pharmaceuticals on the internet. The types of mobile health applications used were: e-pulse (43.5%) and Central Physician Appointment System (41.5%). Sixty-eight percent of patients used ALO 182 application and 36% used Central Hospital Appointment System when making a doctor appointment.

Table 9 illustrates the type of specialty visited by the patient at the hospital.

**Table 9:** Type of specialty visited by the patient at the hospital

| Specialty | n | % |
|---|---|---|
| Ophthalmology | 53 | 26.6 |
| Internal Medicine | 40 | 21.0 |
| General Surgery | 39 | 19.6 |
| Orthopedics & Traumatology | 35 | 17.6 |
| Ear, Nose, Throat | 25 | 12.6 |
| Cardiovascular Surgery | 24 | 12.1 |
| Cardiology | 23 | 11.6 |
| Gyn/OBS | 20 | 10.1 |
| Others | 49 | 24.5 |

Regarding the type of specialty, 26.6% contacted ophthalmologist, 21% internal medicine specialist, and 19.6% general surgeon.

Table 10 illustrates the type of services patients received remotely and when they were actually being at the hospital.

**Table 10:** Services patients received remotely and at the hospital

| Services patients received remotely | n | % |
|---|---|---|
| I did not receive any support remotely | 88 | 44.0 |
| I was able to access my X-ray results | 56 | 28.0 |
| I was able to get my test results | 42 | 21.0 |
| I was able to get my e-prescription | 34 | 17.0 |
| I was able to connect with the doctor | 20 | 10.0 |
| My doctor was able to follow my treatment plan | 16 | 8.0 |
| **The services patients received in this hospital** | | |
| Biochemistry | 115 | 57.8 |
| Radiology | 67 | 33.7 |
| Pathology | 44 | 22.1 |
| Microbiology | 41 | 20.6 |
| Others | 19 | 9.5 |

Nearly 44% of the respondents reported not getting any support remotely. The rest indicated receiving many services remotely. Nearly, 58% received services from the biochemistry lab while they were at the hospital.

Table 11 shows the descriptive findings of the scale.

**Table 11:** Descriptive findings of satisfaction scale

| | $\bar{x}$ | σ |
|---|---|---|
| Examination and test results sent to your physician electronically | 4.01 | 1.095 |
| Guidance provided by the front-desk personnel | 3.99 | 1.148 |
| Convenience and comfort of the unit you are being examined | 3.97 | 1.034 |
| Examination and test results sent to a patient's smart phone | 3.95 | 1.085 |
| Ease of moving around in the hospital | 3.89 | 1.144 |
| Physician's interest and attitudes towards you | 3.86 | 1.139 |
| Quality of services of employees in patient admission | 3.84 | 1.154 |
| Efficiency of diagnosis and treatment processes | 3.83 | 1.227 |
| Getting examined by your physician on time | 3.83 | 1.106 |
| Nurses' interest and attitudes towards you | 3.83 | 1.184 |
| Duration of tellers process | 3.82 | 1.170 |
| Ease of access to the hospital | 3.82 | 1.095 |
| Attitudes and behaviors of the health personnel to wards you (laboratory, x-ray technician, etc.) | 3.82 | 1.148 |
| Attitudes of other staff towards you | 3.81 | 1.034 |
| The time allocated to you by your doctor | 3.78 | 1.085 |

**n= 200 $\bar{x}$=3.870 σ=0.872**

Overall, the outpatient satisfaction score was found to be high ($\bar{x}$=3.870). Among all the services, "results of examination and tests sent to a physician electronically" received the highest mean score ($\bar{x}$ =4.01), and closely followed by "guidance provided by front desk personnel" ($\bar{x}$ = 3.99). On the other hand, "the time allocated to you by your doctor" was rated slightly lower than other statements ($\bar{x}$ =3.78).

Table 12 outlines the patient satisfaction scale items that were scored higher than the mean ($\bar{x}$=3.5) by the majority of patients.

**Table 12:** Satisfaction scale items that were scored above average by the majority patients

| | n | % |
|---|---|---|
| Convenience and comfort of the unit you are being examined | 155 | 78 |
| Guidance provided by the front-desk personnel | 153 | 77 |
| Quality of services provided by admission staff | 148 | 74 |
| Results of examination and tests sent to your physician electronically | 147 | 74 |
| Physician's interest and attitude towards you | 144 | 72 |
| Getting examined by your doctor on time | 140 | 70 |
| Ease of moving around in the hospital | 140 | 70 |
| Results of tests and examinations sent to a patient's smartphone | 140 | 70 |

The majority of the patients reported high satisfaction with the services listed in Table 12. Seventy-eight percent patients reported high satisfaction for the convenience and comfort of the unit in which they were being examined and closely followed by guidance provided by the front personnel in the hospital.

**The difference test for outpatient satisfaction according to demographic variables**

To see the association between the demographic variables and level of patient satisfaction, the ANOVA test was applied to the study. Table 13 illustrates the relationship between the level of satisfaction and education.

**Table 13:** Association between patient satisfaction and education

| | EDUCATION | n | x̄ | σ | F value | Significance |
|---|---|---|---|---|---|---|
| Patient Satisfaction | Illiteral | 7 | 3.66 | .9034 | 2.414 | 0.038* |
| | Literate | 20 | 3,76 | 1.407 | | |
| | Primary School | 60 | 4,15 | .7222 | | |
| | High School | 39 | 3.89 | .6861 | | |
| | Bachelor's Degree | 64 | 3.70 | .8091 | | |
| | Graduate Degree | 10 | 3.48 | 1.054 | | |

*p<0.05

According to the Table 13, there was a statistically significant relationship between the patient satisfaction and the various level of education. To show the differences among the groups, the Games Howell test [17] was used and the results of the tests of homogeneity of variances were shown in Table 14.

**Table 14:** Multiple comparison of satisfaction based on education

| Satisfaction | Education | | Mean Difference | Significance |
|---|---|---|---|---|
| Patient Satisfaction | Primary School | Bachelor's Degree | 0.45576 | 0.015* |

*p<0.05

As seen in Table 14, the level of satisfaction of patients with a primary school education had a higher average of satisfaction compared to the patients with a bachelor's degree.

To see how number of visits to the hospital were associated with the patient satisfaction, the Anova test was used. The results of the test were shown in Table 15.

**Table 15:** Association between patient satisfaction and the number of hospital visits

| Satisfaction | Number of hospital visits | n | x̄ | σ | F value | Significance |
|---|---|---|---|---|---|---|
| Patient Satisfaction | First time | 55 | 4.099 | .7500 | 2.939 | 0.034* |
| | Few times (1-4) | 83 | 3.859 | .8254 | | |
| | Multiple times (5-10) | 39 | 3.565 | 1.049 | | |
| | Continuously | 23 | 3.875 | .8695 | | |

*p<0.05

The satisfaction level of the patients showed significant differences according to the number of visits made to the hospital. According to homogeneity of variance test [Levene], the variance of satisfaction scale was found to be homogeneous. In order to see the differences within groups, the Gabriel test was used [17]. The results of homogeneity of variances were shown in the Table 16.

**Table 16:** Multiple comparison of satisfaction based on number of hospital visits

| Satisfaction | Number of hospital visits | | Mean Difference | Significance |
|---|---|---|---|---|
| | First time | Multiple times (5-10) | 0.5335 | 0.019* |

*p<0.05

The patients who paid a first visit to hospital were more satisfied than those who visited hospital multiple times. This difference was statistically significant (p<0.05).

## DISCUSSION AND CONCLUSION

The research for assessing digital healthcare services in the hospital was the first study in quantitative nature in Turkey. Therefore, there was no opportunity to compare the results with other research studies. The questionnaire was developed based on qualitative and review research studies previously done by other researchers. This research indicated that digital healthcare applications were suitable for all type of patients. Our findings were in line with the findings of the qualitative research that was conducted by Bayer, Kuyrukcu and Akbas in the public hospital in Turkey [3]. Among the benefits of digital healthcare applications to health care professionals, only three benefits were stood out. Those were accessing patient data from anywhere, providing easy archiving and speed, safety, and convenience in medical procedure. Accessing patient data from anywhere was also found to be an advantage of digital healthcare services in the qualitative research conducted by Bayer, Kuyrukcu and Akbas [3].

In this study, healthcare professionals "agreed on" a decrease in overall hospital costs and misuse of medications by the patients, and an increase in personnel efficiency and quality of service as a result of digitalization of healthcare services. Similar information were also reported in the review article written by Peker, Giersbergen, Biçersoy [18].

Although level of satisfaction was considered to be a subjective evaluation of the patient or care giver, it was an important indicator of the quality of healthcare services. Therefore, measuring patient satisfaction was a fundamental need of hospitals to improve the quality of patient care and services (10). Most patients tend to give positive answers if they are asked how satisfied they were even though if they have complaints about specific aspects of the received care [19].

Among all the socio-demographic variables, the level of satisfaction of outpatients showed significant differences according to education level and the number of visits to hospital. The patients who had primary school education tended to be more satisfied than the patients who had a bachelor's degree.

Regarding number of visits, the patients who paid a first visit to this hospital tended to be more satisfied than the patients who made multiple visits to the same hospital. In other difference tests conducted within the scope of the research, the satisfaction levels of the patients did not differ significantly in other demographic variables.

Our research did not show any association between age and satisfaction; however, patient characteristics may also have an impact: for example, older patients and those with lower levels of education appear to be more satisfied [19]. Nearly, 80% of patients reported satisfaction regarding convenience and comfort of the units in which they were being examined in the hospital, while 69% patients reported satisfaction for the same attribute in the study by Tasliyan and Akyuz at Malatya public hospital [12]. Regarding attitudes and behaviors of the healthcare professionals (laboratory and x-ray technicians), 65% of patients reported satisfaction in this study, nearly 83% reported satisfaction in the study by Tasliyan and Akyuz in Malatya public hospital [12]. Regarding interests and attitudes of nurses towards patients, 69% reported high satisfaction in our research while 64% reported high satisfaction in the research study conducted at Malatya Hospital.

### Limitation of the Study

The study was limited to one hospital and had a relatively small sample size compared to other patient satisfaction studies due to the difficulty of doing research in a hospital during Covid-19 pandemic.

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### Conflict of Interest

No conflict of interests needs to be reported.

## REFERENCES


1. Lupton D. The digitally engaged patient: Self-monitoring and self-care in the digital health era. Social Theory & Health. 2013;11.3: 256-270
2. M C. The Digitalization of Healthcare, Health Management, Volume 20 - Issue 2, 2020.
3. Ak B. (2010). "Tıp Bilişiminde Mobilite Uygulamaları", (Ed.) AKGÜL, M. vd., Muğla Üniversitesi XII. Akademik Bilişim Konferansı Bildiri Kitabı, Muğla Üniversitesi Basımevi, Muğla.
4. Craig J, Patterson V. Introduction to the Practice of Telemedicine. Journal of Telemedicine and Telecare. 2005; 11(1): 3–9.
5. Patrick K, Griswold W, Raab F, Intille S. I. Health and the Mobile Phone. American Journal of Preventive Medicine. 2008; 35(2): 177-181
6. Franco M, Tursunbayeva A. Mobile Technology and Public Health Organisational System. Emergent Issues in Management. 2014;1:80-89.
7. Hurby W, Mosser H, Urban M, Ruger W. The Vienna SMZO-PACS-Project: The Totally Digital Hospital. European Journal of Radiology. 1992; 16: 66-68.
8. Coşkun M B. Türk Kamu Yönetimi Perspektifinden e-sağlık Hizmetleri ve Sağlık Politikalarındaki Yeri Üzerine Bir Araştırma. Yönetim ve Ekonomi Araştırmaları Dergisi. 2018;16(1): 289-302.
9. Yelmen A. Klinik Bilgi Sistemlerine İlişkin Lisans Sözleşmeleri Hakkında Değerlendirmeler. İnönü Üniversitesi Hukuk Fakültesi Dergisi. 2016; 7(2): 365-382.
10. Sağlık Bakanlıgı Stratejik Plan, 2013-2017 https://sgb.saglik.gov.tr/Eklenti/9843/0/saglik-bakaligi-stratejik-plan--2013-2017 pdf. pdf?_tag1=732DB6BBC0692DEE6FC458B05035CFCDB14F1F97
11. SBSGM (2018). Sağlık Bakanlığı Sağlık Bilgi Sistemleri Genel Müdürlüğü (2018), http://sbsgm.saglik.gov.tr/TR,1276/kurulusumuz.html, (14.07.2018).
12. Tasliyan M, Akyüz M. Sağlık hizmetlerinde hasta memnuniyet araştırması: Malatya Devlet Hastanesi'nde bir alan çalışması. Karamanoğlu Mehmetbey Üniversitesi Sosyal Ve Ekonomik Araştırmalar Dergisi. 2010; 2: 61-66.
13. Zhang Y, et al. Patient Satisfaction, Self-rated health status, and Health Confidence: an Assessment of the Utility of Single-item questions. American Journal of Medical Quality. 2007, 22.1: 42-49.
14. Kaiser H F, Rice J. Little jiffy, mark IV. Educational and psychological measurement. 1974, 34.1: 111-117.
15. Ural A, Kılıç İ. Bilimsel Araştırma Süreci ve SPSS ile Veri Analizi. Ankara: Detay Yayıncılık. 2011.
16. Özdamar K. Paket Programlar ile Istatistiksel Veri Analizi. Eskişehir: Kaan Kitabevi, 2011.
17. Mayers, A. (2013). Introduction to statistics and SPSS in psychology. Pearson Higher Ed.
18. Peker, S. Van Giersbergen, Y, Biçersoy, G. Sağlık Bilişimi ve Türkiye'de Hastanelerin Dijitalleşmesi, Saglık Akademisi, 2018,3 (3):81-84.
19. Schoenfelder, T., Klewer, J., Kugler J. International Journal for Quality in Health Care 2011; Volume 23, Number 5: pp. 503–509 10.1093, Advance Access Publication: 29 June 2011