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# AN EXAMINATION OF DIGITAL HEALTH APPLICATIONS IN TÜRKİYE BASED ON THE USER EXPERIENCES

## ABSTRACT
This study examined user experiences with digital health applications in Türkiye. The study is quantitative and has a descriptive, correlational and cross-sectional design. The research population included all general digital health application users in Türkiye. Data were collected from 500 volunteers who participated in an online survey via convenience sampling. Most participants found the applications to be time-saving (75.6%), life-enhancing (73.4%), and easy to use (72.6%). While 68.6% were generally satisfied with digital health applications, only 31.4% found them secure, and 26.6% believed their personal data was protected. E-Nabız is the most widely known and used (44.9%) application. Participants primarily use the applications to schedule appointments (59%). However, 55.5% reported difficulty scheduling appointments. The study found a significant correlation only between education level and satisfaction ($\chi 2(16)=33.937$, $p=0.006$). The study recommends making digital health applications more accessible and improving data security for the elderly and people with low education.

**Keywords:** User experience, Digital Health Applications, Satisfaction, Türkiye.

# TÜRKİYE'DE DİJİTAL SAĞLIK UYGULAMALARININ KULLANICI DENEYİMLERİNE GÖRE İNCELENMESİ

## ÖZET
Bu çalışmada Türkiye'deki dijital sağlık uygulamaları genel kullanıcılarının deneyimleri incelendi. Çalışma nicel olup betimsel, ilişkisel ve kesitseldir. Araştırmanın evreni Türkiye'deki tüm genel dijital sağlık uygulaması kullanıcılarıdır. Kolayda örnekleme yöntemiyle gönüllü 500 katılımcıdan veriler toplandı. Katılımcıların çoğu uygulamaları zaman kazandırıcı (%75,6), yaşamı kolaylaştırıcı (%73,4) ve kullanımı kolay (%72,6) buldu. %78,6'sı genel olarak dijital sağlık uygulamalarından memnun iken, yalnızca %31,4'ü uygulamaları güvenli bulmuş ve %26,6'sı kişisel verilerinin korunduğuna inanmıştır. E-Nabız, en çok bilinen ve kullanılan (%44,9) uygulamadır. Katılımcılar uygulamaları çoğunlukla randevu almak için kullanmaktadır (%59). Bununla birlikte, katılımcıların %55,5'i randevu bulmakta zorlandığını bildirdi. Araştırmada yalnızca eğitim düzeyi ile memnuniyet arasında anlamlı bir ilişki bulundu ($\chi 2(16)=33.937$, $p=0.006$). Çalışma, yaşlılar ve düşük eğitimli insanlar için dijital sağlık uygulamalarının daha erişilebilir hale getirilmesini ve veri güvenliğinin artırılmasını önermektedir.

## 1. INTRODUCTION

In today's information and technology age, digitalization is gaining importance and demonstrating its impact strongly in many areas, from economy to education, industry to healthcare. Digitalization is a comprehensive transformation process that involves the use of technology-driven tools, the reading and editing of data in a digital environment, and the integration of workflows into digital systems. Advances in science and technology have triggered a similar transformation in the healthcare sector; in a critical area like healthcare, digitalization has introduced significant innovations that accelerate individuals' access to healthcare services and support personal health management (Üzmez & Büyükbeşe, 2021; Akalın & Veranyurt, 2022: 138; Almalawi et al., 2023: 1). Thus, digital health technologies have become a factor that supports individuals' active participation in their healthcare management and, at the same time, the provision of effective healthcare services.

## 2. CONCEPTUAL FRAMEWORK

Digital health is defined as the utilization of digital technologies to improve healthcare services and the digitization of health information and services (Herselman, 2016; Fahy & Williams, 2021). As in many other areas, the healthcare field has undergone a significant digital transformation; thanks to innovative solutions such as mobile health applications, users can track their healthcare processes, make appointments, monitor medication use, and communicate with healthcare professionals digitally (Uysal & Ulusinan, 2020). The fact that healthcare services require high technology, skill, and cost further increases the importance of digital health solutions, as they contribute to a patient-centered approach and increase autonomy in individual health management (Kılıç, 2017: 204; Demir & Özcan, 2023; Şimşek & Karaismailoğlu, 2021: 58). Furthermore, digital health services are preferred by a wide range of users due to the convenience they offer, especially in regions with limited geographical access (Kabakoğlu, 2023: 9). With digitalization in healthcare, new applications have begun to replace traditional methods; healthcare services have shifted from being solely hospital-centered to a hospital and home-centered structure (Akar, Burmaoğlu, & Kıdak, 2023: 1). Considering that four billion people struggle to access basic healthcare, digital health applications play a significant role in reducing these access problems. By transferring health data to the digital environment, the active participation of patients in the treatment process increases and the sustainability of healthcare services is also strengthened (; Uysal & Ulusinan, 2020; Isbanner et al., 2022; Jain, 2024). In addition, the determination that approximately 20–40% of healthcare system expenditures worldwide are wasted due to inefficiency reveals the potential of digital health technologies in increasing efficiency (Darzi et al., 2023; Mbau et al., 2023). Digital platforms enable individuals to manage their own health more effectively by facilitating access and transparency of health information, improve clinical decision-making processes, and strengthen patient-physician communication (Ball & Lillis, 2001: 8; Chib & Lin, 2018; Tengilimoğlu, 2020; Sherman et al., 2020: 7).

The World Health Organization (WHO) defined the concept of e-health in 2005, emphasizing the importance of innovations that facilitate digital access in global health policies (Halpert, 2018: 7). Digital transformation efforts in healthcare in Türkiye were initiated in 2002 and increased with the Health Transformation Program in 2003 (Çavmak & Çavmak, 2017: 48; Başkavak et al., 2024: 94). By 2010, the use of information management systems in hospitals became widespread; strengthening the digital health infrastructure increased the speed, efficiency, and accessibility of healthcare services (Tezcan, 2016). The COVID-19 pandemic, on the other hand, has increased the

importance of digital health systems and expanded the range of e-health applications (Iqbal, 2022; WHO, 2020). Healthcare is one of the areas experiencing the fastest digitalization in Turkiye (Demir & Özcan, 2023: 5). In fact, applications such as E-Nabız, MHRS, Tele-tıp and Neyim Var? facilitate the user experience of making appointments, viewing laboratory results and managing treatment processes (Sağlık Bakanlığı, 2022). This study aims to examine the general user experience of digital health applications widely used in Türkiye, such as e-Nabız, MHRS, Tele-tıp, and Neyim Var? Understanding the correlation between problems in the use of digital health applications, user satisfaction, and demographic variables is crucial for developing health policy. Therefore, the primary research questions were determined as "1. What are the user experiences of digital health applications in Türkiye? 2. How satisfied are people with digital health applications?"

## 2. MATERIAL and METHODS

This research is quantitative, descriptive, correlational, and cross-sectional. The research population consists of all general digital health service users in Türkiye, and the study was planned to include a minimum of 385 individuals, according to the acceptable sample size table for specific study populations (Sekaran, 2003:294). Data were collected from 500 individuals using an online survey form and convenience sampling. Participants participated voluntarily, and completing the survey took an average of 10-15 minutes.

### 2.1. Data Collection Tools and Data Analysis

The survey used to collect data consists of two parts, an Information Form and the Digital Health Applications User Experience Survey (DHAUE). The DHAUE consists of 15 items, and its validity and reliability were performed by Gürcan (2025). As a result of the first factor analysis, one item (D7) was removed from the scale because it loaded on two different components and the difference between the factor loadings was less than 0.10. As a result of the re-factor analysis, KMO (0.823) and Bartlett's test of sphericity ($\chi 2$= 3082.230; $p < 0.001$) were performed, and a four-dimensional structure was obtained. The DHAUE sub-dimensions were named as Ease of Use and Satisfaction-ES (D1-D5); Security and Privacy-SP (D6, D8-D9); Psychological and Behavioral Effects-PB (D10-D12); and Suggestions for Improvement-SI (D13-D15). The total explanatory power of the variances in four dimensions is 69.53% and the survey reliability coefficient is 0.657, which has a high level of reliability. SPSS (Statistical Package for Social Sciences) for Windows 26.0 package program was used in the analysis of the data. It was determined that the data were normally distributed with skewness-kurtosis coefficients (±2), and it was decided to use parametric tests ($p<0.05$). Descriptive statistics, factor analysis, confirmatory factor analysis (CFA), independent samples t-test, ANOVA test, chi-square test, and Pearson correlation analysis were applied in the study. All statistical analyzes were evaluated with a 95% confidence level and a 5% margin of error. As a result of the analysis, the participants' mean general perception level of DHAUE was 4.13±0.40, which is a high level.

## 3. FINDINGS

Demographic findings of the participants are given in Table 1, and user opinions on digital health applications are given in Table 2. Furthermore, the usage rates, purpose of uses, and difficulties encountered for digital platforms currently in use in Türkiye are presented in Table 3.

Table 1. Socio-demographic characteristics of the participants (n=500)

| Variables | f | % | Variables | f | % |
|---|---|---|---|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Gender | Female | 277 | 55,4 | Monthly Income | ₺1-20.000 | 97 | 19,4 |
| | Male | 223 | 44,6 | | ₺20.001-30.000 | 64 | 12,8 |
| Marital status | Married | 287 | 57,4 | | ₺30.001-40.000 | 53 | 10,6 |
| | Single | 213 | 42,6 | | ₺40.001-50.000 | 57 | 11,4 |
| Age | 18-24 | 46 | 9,2 | | ₺50.001-6.000 | 82 | 16,4 |
| | 25-34 | 142 | 28,4 | | ₺60.001 and more | 147 | 29,4 |
| | 35-44 | 109 | 21,8 | Region | Mediterranean | 26 | 5,2 |
| | 45-54 | 123 | 24,6 | | Eastern Anatolian | 29 | 5,8 |
| | 55 and above | 80 | 16,0 | | Aegean | 48 | 9,6 |
| Educational Level | Elementary School | 13 | 2,6 | | Southeastern Anatolian | 16 | 3,2 |
| | High School | 211 | 42,2 | | Central Anatolian | 97 | 19,4 |
| | Associate Degree | 74 | 14,8 | | Blacksea | 25 | 5,0 |
| | Bachelor's Degree | 51 | 10,2 | | Marmara | 259 | 51,8 |
| | Master's Degree/Doctorate | 151 | 30,2 | Chronical illness | Yes | 126 | 25,2 |
| | | | | | No | 374 | 74,8 |

The majority of participants were female (55.4%), married (57.4%), aged between 25 and 34 (28.4%), high school graduates (42.2%), had a monthly income of ₺60,001 or more (29.4%), lived in the Marmara Region (51.8%), and had no chronical illness (74.8%) (Table 1).

Table 2. Participants' findings regarding DHAUE-related statements

| Items | Strongly Agree | | Agree | | Partially Agree | | Disagree | | Strongly Disagree | |
|---|---|---|---|---|---|---|---|---|---|---|
| | f | % | f | % | f | % | f | % | f | % |
| D1 Digital health applications make my life easier | 151 | 30,2 | 216 | 43,2 | 100 | 20 | 17 | 3,4 | 16 | 3,2 |
| D2 These applications save me time | 157 | 31,4 | 221 | 44,2 | 98 | 19,6 | 13 | 2,6 | 11 | 2,2 |
| D3 I use applications easily | 130 | 26 | 233 | 46,6 | 108 | 21,6 | 17 | 3,4 | 12 | 2,4 |
| D4 I find digital health applications more advantageous than traditional methods. | 159 | 31,8 | 224 | 44,8 | 63 | 12,6 | 37 | 7,4 | 17 | 3,4 |
| D5 I am generally satisfied with digital health services. | 115 | 23 | 228 | 45,6 | 120 | 24 | 21 | 4,2 | 16 | 3,2 |
| D6 I think my personal data is safe | 30 | 6 | 103 | 20,6 | 168 | 33,6 | 100 | 20 | 99 | 19,8 |
| D7 I avoid using some apps due to security concerns | 71 | 14,2 | 164 | 32,8 | 168 | 33,6 | 58 | 11,6 | 39 | 7,8 |
| D8 I am sufficiently informed about data privacy | 25 | 5 | 106 | 21,2 | 182 | 36,4 | 127 | 25,4 | 60 | 12 |
| D9 I think digital health applications are safe. | 25 | 5 | 132 | 26,4 | 206 | 41,2 | 92 | 18,4 | 45 | 9 |
| D10 The digital health problems I experienced affected me psychologically. | 12 | 2,4 | 37 | 7,4 | 101 | 20,2 | 230 | 46 | 120 | 24 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| D11 I considered stopping using the systems due to glitches/problems. | 14 | 2,8 | 35 | 7 | 120 | 24 | 223 | 44,6 | 108 | 21,6 |
| D12 I am having difficulty due to my lack of technological knowledge. | 14 | 2,8 | 30 | 6 | 81 | 16,2 | 168 | 33,6 | 207 | 41,4 |
| D13 Artificial intelligence-supported health consultants should be developed | 29 | 5,8 | 132 | 26,4 | 216 | 43,2 | 87 | 17,4 | 36 | 7,2 |
| D14 Applications should have guide video/audio narration features. | 128 | 25,6 | 232 | 46,4 | 105 | 21 | 29 | 5,8 | 6 | 1,2 |
| 15 Special designs should be made for disabled individuals. | 244 | 48,8 | 208 | 41,6 | 33 | 6,6 | 6 | 1,2 | 9 | 1,8 |

The majority of participants found the apps to be life-enhancing (73.4%), time-saving (75.6%), and easy to use (72.6%). While the overall satisfaction rate was 68.6%, only 31.4% found the applications secure, and 26.6% believed their personal data was protected (Table 2).

Table 3. User experience results of various digital health applications

| Awerness/Known | f | % | Purpose of use | f | % | Difficulties encountered in use | f | % |
|---|---|---|---|---|---|---|---|---|
| e-Nabız | 506 | 44,9 | Making an appointment | 285 | 59 | Inability to find an appointment | 361 | 55,5 |
| MHRS | 453 | 40,2 | Analysis/Result display | 160 | 33,1 | I had no problems | 90 | 13,8 |
| Neyim Var | 103 | 9,1 | Viewing health history | 31 | 6,4 | System freeze | 66 | 10,1 |
| Tele-tıp | 31 | 2,7 | Other | 13 | 0,5 | Interface confusion | 51 | 7,8 |
| Other | 35 | 3,1 | | | | Other | 83 | 12,8 |
| Total | 1128 | 100 | | | | Total | 651 | 100,0 |
| Usage | f | % | | | | Reasons for difficulty accessing the application | f | % |
| e-Nabız | 453 | 44,9 | | | | No information is provided | 101 | 41,1 |
| MHRS | 427 | 42,3 | | | | The application is complicated | 58 | 23,6 |
| Neyim Var | 52 | 5,2 | | | | My technological knowledge is insufficient | 32 | 13,0 |
| Tele-tıp | 20 | 2,0 | | | | Other | 55 | 22,3 |
| Other | 57 | 5,6 | | | | Total | 246 | 100,0 |
| Total | 1009 | 100 | | | | | | |

The most widely known and used application by participants was e-Nabız (44.9%), and participants used this application most frequently for making appointments (59%). However, 55.5% reported difficulty finding an appointment (Table 3). Participants cited the lack of information provided in digital applications as the most significant reason for accessibility difficulties (41.1%).

The reliability analysis of DHAUE was performed with Confirmatory Factor Analysis (CFA) and the path diagram is given in Figure 1.

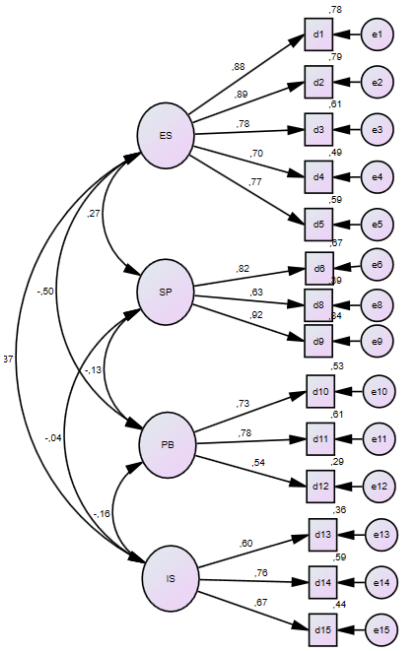


Figure 1. DHAUE's confirmatory factor analysis path diagram

According to CFA, the fit indices of the model are acceptable and at a good level (CMIN=173.952; df=71; p<0.001; CMIN/DF=2.45; GFI=0.952; AGFI=0.929; CFI=0.966; RMSEA=0.054). The factor loadings of the items range from 0.697–0.892 in the ES subscale, 0.626–0.915 in the SP subscale, 0.536–0.780 in the PB subscale, and 0.601–0.765 in the IS subscale. All are statistically significant, supporting structural validity. These results demonstrate that the survey provides a valid and reliable structure for measuring user experience with digital health applications and that the model is valid (Figure 1).

The results of the difference analyses of the participants are given in Table 4.

**Tablo 4. Analyses of Differences**

| **Variables** | **n** | **Survey/Scale and Sub-Dimensions** | | | | |
|---|---|---|---|---|---|---|
| | | ES | SP | PB | IS | DHAUE |
| **Gender** | | | | | | |
| Female | 277 | 3,95 ± 0,76 | 2,85 ± 0,90 | 2,06± 0,75 | 4,01 ± 0,74 | 4,13 ± 0,39 |
| Male | 223 | 3,88 ± 0,85 | 2,85 ± 0,96 | 2,21 ± 0,82 | 3,96± 0,75 | 4,12 ± 0,41 |
| t/F*; p; Difference | | t=0,885; p=0,377 | t=-0,007; p=0,995 | t=-2,214; p=0,027* | t=0,734; p=0,463 | t=-0,161; p=0,872 |
| **Martial Status** | | | | | | |
| Single | 213 | 3,98 ± 0,75 | 2,83 ± 0,96 | 2,00 ± 0,72 | 4,01 ± 0,74 | 4,12 ± 0,38 |
| Married | 287 | 3,88 ± 0,84 | 2,86 ± 0,91 | 2,23 ± 0,82 | 4,00 ± 0,75 | 4,13 ± 0,41 |
| t/F*; p; Difference | | t=1,455; p=0,146 | t=-0,381; p=0,704 | t=-3,385; p=0,001* | t=0,623; p=0,533 | t=-0,544; p=0,587 |
| **Age** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 18-24[1] | 46 | 4,10 ± 0,65 | 3,28 ± 0,79 | 1,91 ± 0,70 | 4,28 ± 0,53 | 4,28 ± 0,32 |
| 25-34[2] | 142 | 4,16 ± 0,69 | 2,75 ± 1,03 | 1,87 ± 0,71 | 4,08 ± 0,77 | 4,14 ± 0,39 |
| 35-44[3] | 109 | 3,86 ± 0,89 | 2,78 ± 0,89 | 2,07 ± 0,77 | 4,11 ± 0,66 | 4,10 ± 0,36 |
| 45-54[4] | 123 | 3,80 ± 0,84 | 2,85 ± 0,83 | 2,28 ± 0,78 | 3,85 ± 0,74 | 4,10 ± 0,42 |
| 55 and above[5] | 80 | 3,64 ± 0,76 | 2,87 ± 0,96 | 2,55 ± 0,78 | 3,70 ± 0,79 | 4,09 ± 0,43 |
| t/F*; p; Difference | | F=7,360; p=0,000* (Tukey:1>5; 2>3,4,5 | F=3,114; p=0,015* (Tukey:1>2,3,4) | F=12,808; p=0,000* (Tukey:5>1,2,3; 2-3<4,5) | F=7,386; p=0,000*; LSD=(1>4,5; 5<1,2,3) | F=2,356; p=0,053 |
| **Educational Status** | | | | | | |
| Primary school[1] | 13 | 3,25 ± 0,88 | 2,85 ± 0,97 | 2,64 ± 0,83 | 3,54 ± 1,08 | 3,93 ± 0,41 |
| High school[2] | 211 | 3,62 ± 0,92 | 2,90 ± 0,84 | 2,43 ± 0,92 | 3,94 ± 0,80 | 4,11 ± 0,41 |
| Vocational School | 74 | 3,73 ± 0,80 | 2,93 ± 0,88 | 2,15 ± 0,58 | 3,63 ± 0,74 | 4,04 ± 0,41 |
| Bachelor's degree[4] | 51 | 3,95 ± 0,72 | 2,83 ± 0,96 | 2,10 ± 0,76 | 4,02 ± 0,69 | 4,13 ± 0,39 |
| Master/PhD[5] | 151 | 4,14 ± 0,77 | 2,82 ± 0,95 | 1,96 ± 0,76 | 4,12 ± 0,71 | 4,18 ± 0,39 |
| t/F*; p; Difference | | F=8,888; p=0,000* (Tukey: 5<1,2,3; 2<3) | F=0,200; p=0,938 | F=6,106; p=0,000* (Tukey; 5<1,2; 2>4,5; | F=5,752; p=0,000* (Tukey:3<4,5; 1<5) | F=2,073; p=0,083 |
| **Occupation** | | | | | | |
| Unemployement[1] | 48 | 3,78 ± 0,85 | 2,65 ± 0,85 | 2,00 ± 0,73 | 4,01 ± 0,80 | 4,02 ± 0,37 |
| Retired[2] | 93 | 3,74 ± 0,75 | 2,86 ± 0,84 | 2,44 ± 0,74 | 3,74 ± 0,75 | 4,10 ± 0,38 |
| Public Servant[3] | 142 | 3,98 ± 0,78 | 2,93 ± 0,92 | 2,18 ± 0,80 | 4,02 ± 0,70 | 4,18 ± 0,39 |
| Student[4] | 56 | 4,05 ± 0,62 | 3,02 ± 0,96 | 2,00 ± 0,77 | 4,11 ± 0,63 | 4,19 ± 0,37 |
| Private Sector | 139 | 4,02 ± 0,85 | 2,79 ± 0,97 | 1,93 ± 0,76 | 4,09 ± 0,76 | 4,13 ± 0,41 |
| Own Business[6] | 22 | 3,68 ± 0,92 | 2,65 ± 1,12 | 2,32 ± 0,80 | 3,80 ± 0,86 | 4,01 ± 0,50 |
| t/F*; p; Difference | | F=2,531; p=0,028* (LSD:2<3,4,5) | F=1,373; p=0,233 | F=5,824; p=0,000* (Tukey: 2>1,4,5) | F=3,323; p=0,006* (Tukey:2<4,5) | F=1,952; p=0,084 |
| **Income Status** | | | | | | |
| 0-20.000[1] | 97 | 3,83 ± 0,80 | 2,85 ± 0,92 | 2,09 ± 0,73 | 4,00 ± 0,71 | 4,09 ± 0,38 |
| 20.001-30.000[2] | 64 | 3,82 ± 0,83 | 2,83 ± 0,95 | 2,13 ± 0,84 | 3,84 ± 0,83 | 4,08 ± 0,35 |
| 30.001-40.000[3] | 53 | 3,93 ± 0,77 | 3,02 ± 0,88 | 2,44 ± 0,88 | 3,98 ± 0,81 | 4,23 ± 0,44 |
| 40.001-50.000[4] | 57 | 3,92 ± 0,83 | 2,92 ± 0,94 | 2,18 ± 0,89 | 4,04 ± 0,82 | 4,16 ± 0,43 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 50.001-60.000[5] | 82 | 3,92 ± 0,79 | 2,91 ± 1,00 | 2,16 ± 0,79 | 3,90 ± 0,67 | 4,13 ± 0,45 |
| 60.001 and more[6] | 147 | 4,02 ± 0,80 | 2,73 ± 0,89 | 2,00 ± 0,70 | 4,07 ± 0,70 | 4,11 ± 0,35 |
| t/F*; p; Difference | | F=0,833; p=0,526 | F=1,009; p=0,412 | F=2,562; p=0,026* (LSD=3>6) | F=1,127; p=0,345 | F=1,366; p=0,236 |
| **Chronical Illness** | | | | | | |
| Yes[1] | 126 | 3,77 ± 0,79 | 2,82 ± 0,92 | 2,38 ± 0,83 | 3,81 ± 0,83 | 4,10 ± 0,40 |
| No[1] | 374 | 3,97 ± 0,80 | 2,86 ± 0,93 | 2,04 ± 0,75 | 4,05 ± 0,70 | 4,14 ± 0,39 |
| t/F*; p; Difference | | t:-2,448; p=0,015* | t=-0,409; p=0,683 | t=4,212; p=0,000* | t=-3,098; p=0,002* | t=-0,931; p=0,352 |

* t=Independent simple t test, F= One-Way Analysis of Variance (ANOVA), **p<0.05

In the difference analyses, men's perceptions of PB were higher than women's (t= –2.214, p= 0.027); married people's perceptions of PB were higher than single people's (t= –3.385, p= 0.001) (Table 4). However, DHAUE perception scores were found to be higher in women.

A significant difference was found in the overall survey and its sub-dimensions according to the age variable [ES (F= 7.360, p < 0.001), SP (F= 3.114, p = 0.015), PB (F= 12.808, p< 0.001), and IS (F= 7.386, p< 0.001)]. Participants in the 18–24 age group were found to have the highest IS and SP perceptions. The 55 and older group had the highest PB scores. However, the 55 and older group had the lowest mean scores in ES, IS, and the overall survey.

It was also found that there was a statistically significant difference according to the education level variable [(ES (F= 8.888, p < 0.001), PB (F= 6.106, p< 0.001) and IS (F= 5.752, p< 0.001)]. Participants with higher education levels had the highest perceptions of ES and IS.

Statistically significant differences were found between the groups according to the occupation variable [(ES (F= 2.531, p = 0.028), PB (F= 5.824, p< 0.001) and IS (F= 3.323, p= 0.006)]. In particular, the PB scores of the retired were found to be significantly higher than the other groups, while the IS scores of the students were found to be higher.

A significant difference was found only in the PB dimension in terms of income status (F= 2.562, p= 0.026), and it was found that the PB scores were the highest in the 30,001–40,000 TL income group.

The t-test applied to chronical illness status showed significant differences in the sub-dimensions of ES (t= –2.448, p= 0.015), PB (t= 4.212, p < 0.001) and IS (t= –3.098, p= 0.002); While individuals without chronic diseases had higher ES and IS scores, participants with chronic diseases had significantly higher PB scores. Furthermore, no statistically significant differences were found between groups based on regions. These findings reveal that overall user experience varies significantly according to certain socio-demographic variables (p>0.05).

Table 5 Correlation Analysis

| Correlation | | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| ES (1) | Pearson Correlation | 1 | | | | |
| | Sig. (2-tailed) | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| SP (2) | Pearson Correlation | ,242** | 1 | | | |
| | Sig. (2-tailed) | 0 | | | | |
| PB (3) | Pearson Correlation | -0,414 | -0,07 | 1 | | |
| | Sig. (2-tailed) | 0 | 0,111 | | | |
| IS (4) | Pearson Correlation | ,320** | -0,03 | -,150** | 1 | |
| | Sig. (2-tailed) | 0 | 0,579 | 0,001 | | |
| DHAUE (5) | Pearson Correlation | ,749** | ,640** | 0,057 | ,396** | 1 |
| | Sig. (2-tailed) | 0 | 0 | 0,201 | 0 | |

** Correlation is significant at the 0.01 level (2-tailed).

In the correlation analysis, there was a positive, significant and weak correlation between ES and SP ($r = 0.242$, $p < 0.01$); a positive, significant and moderate correlation with IS ($r= 0.320$, $p< 0.01$); and a positive, significant and very strong correlation with DHAUE ($r= 0.749$, $p< 0.01$). There is a positive, significant and strong correlation between SP and DHAUE ($r= 0.640$, $p< 0.01$). A negative, significant and moderate correlation was found between PB and ES ($r= –0.414$, $p< 0.01$); a negative, significant and weak correlation was found with IS ($r= –0.150$, $p< 0.01$). There is a significant, positive and moderate correlation between IS and DHAUE ($r = 0.396$, $p< 0.01$).

In the chi-square analyses, a significant relationship was identified only between individuals' educational status and their overall satisfaction with digital health services ($\chi2(16)=33.937$, $p=0.006$). A significant shift in the distribution of satisfaction with digital health services is observed as the level of education increases, demonstrating that education level influences how individuals perceive digital health services.

## 4. DISCUSSION

The effectiveness and use of digital health applications used in various areas of healthcare are increasing daily. Research estimates that the global digital health market will reach $505 billion by 2025 (Dijital Sağlıkta Dünya ve Türkiye Perspektifi, 2023: 4). Studies have shown that technological tools have advantages over traditional methods (Knapp et al., 2021). Implemented digital care systems have been found to increase patient and physician satisfaction (Khanh et al., 2020). In this study, users also found digital health applications useful. Eke, Uysal, & Uğurluoğlu (2019: 519) also reached similar conclusions in their research.

In this study, participants' satisfaction with digital health applications was found to be high. Several studies have obtained results parallel to this result (Hussein et al., 2022; Abril-Jimenez et al., 2023; Ruggiero et al., 2024). Mercan (2020) found that students most frequently used applications related to MHRS, medication tracking, and diet and weight loss. Akğün (2020) found that one-quarter of the participants in their study were not knowledgeable about the e-Nabız system. İlgar and Bilgili (2023) determined that the e-health literacy level of the elderly was below average, and only 30% used the e-Nabız and MHRS applications. Alacadağlı (2019) indicated that the use of e-health and m-health applications was low among patients, and that their primary purpose was to obtain laboratory results. In another study, it was determined that nearly 56% of users do not have concerns about data privacy and security when using mobile health services (Kaya and Eke, 2023:1).

In this study, although men's average perception of PB was higher than women's, women's average perception of digital application use was found to be higher in the overall survey. Lim et al. (2020) also noted that female participants were more willing to use digital health applications. Married

participants also had higher perceptions of digital applications compared to single participants. Furthermore, the average scores of participants aged 55 and over on the ES, IS, and overall survey were lower compared to other age groups. It has been reported that older adults, in particular, struggle to use digital health applications because they find them complex (Mielonen et al., 2020). Therefore, it has been suggested that providing digital health training specifically to older adults could be beneficial (Toscos et al., 2020). Furthermore, studies have suggested that older adults should be taught how to use digital tools and support their digital health literacy levels (Demir Avcı & Gözüm, 2017: Beşkardeş & Köse, 2025:134).

In this research, participants with higher education levels were found to evaluate user experiences more positively. It was determined that female participants with higher education levels were more willing to use mobile health applications (Lim et al., 2020). Alacadağlı (2019) found that the rate of use of e-health and m-health applications decreased as the level of education decreased. Retirees had significantly higher PB scores than other groups, while students had higher IS scores. This may be due to the life experiences and identification abilities of older individuals, and students' tendency to follow and use technology. A significant difference was found only in the PB dimension in terms of income (F= 2.562, p= 0.026), with the 30,001–40,000 TL income group having the highest PB scores.

Participants without chronical illness had higher ES and IS scores, while participants with chronic diseases had significantly higher PB scores. 12.4% of Turkey's population lives in rural areas. In rural areas, the prevalence of elderly people, low levels of education, social insecurity, poverty, and difficulty accessing healthcare are prominent (Demir Avcı & Gözüm, 2017: 56). Numerous studies have identified the potential benefits of digital health tools and applications, particularly for individuals with chronic diseases living in rural areas (Steinman et al., 2021; Kayserili & Tefiroğlu, 2023: 28). Furthermore, individuals with disabilities have been found to have more difficulty using digital health applications compared to those without disabilities (Petterssons et al., 2023). Despite the many advantages offered by digital health applications, it should be noted that they can also bring disadvantages such as technological inequalities in access and use of digital applications, distrust and concerns regarding the protection of information in electronic media, decreased doctor-patient communication and interaction, the possibility that treatments offered by digitalization may not be suitable for every disease, decreased patient satisfaction due to inadequate use of technology, and an increase in data security breaches (Kessler, 2019; Demir &Özcan, 2023: 8). Indeed, this study also identified participants' concerns about data security. Demir and Arslan (2017: 77-78) also reached a similar conclusion in their own research.

## 5. CONCLUSION AND RECOMMENDATIONS

Digital health applications contribute to the development of health policies by offering multifaceted advantages such as improving service quality, reducing costs, supporting the performance of healthcare professionals, reducing geographical barriers, and saving time (Povorina & Kosinova, 2020: 652; Dal Mas et al., 2023; Beşkardeş & Köse, 2025: 126; Pattanaik et al., 2024). However, for digital health applications to be used effectively, security, infrastructure, and digital literacy elements must be developed. Designing user-friendly interfaces is crucial, especially for the elderly, individuals with low levels of education, and those with low digital literacy to benefit from these systems. Furthermore, it is recommended that protective and preventative applications be supported and developed to ensure data security. It is also recommended that similar studies be conducted with a larger sample and regional differences be examined.

**REFERRENCES**


Abril-Jiménez, P., Merino-Barbancho, B., Fico, G., Martín Guirado, J. C., Vera-Muñoz, C., Mallo, I., Lombroni, I., Cabrera Umpierrez, M. F., & Arredondo Waldmeyer, M. T. (2023). Evaluating IoT-based services to support patient empowerment in digital home hospitalization services. Sensors, 23(3), 1744.

Alacadağlı, E. (2019). Bilgi Yönetimi, Dijitalleşme ve Türk Sağlık Sistemi. Turkish Studies, 14(2), 67-86. 10.7827/TurkishStudies.14918

Almalawi, A., Khan, A. I., Alsolami, F., Abushark, Y. B., & Alfakeeh, A. S. (2023). Managing security of healthcare data for a modern healthcare system. Sensors, 23(7), 3612. https://doi.org/10.3390/s23073612

Akalın, B. ve Veranyurt, Ü. (2022). Sağlık 4.0 ve sağlıkta yapay zeka. Sağlık Profesyonelleri Araştırma Dergisi, 4(1), 57-64.

Akar, T., Burmaoğlu, S., & Kıdak, L. B. (2023). 5G Teknolojisinin Sağlık Alanındaki Uygulamaları. Eurasian Journal of Health Technology Assessment, 7(1), 1-22.

Akğün, E. (2020). Sağlık Hizmetlerinde Sayısal Uçurumun E-Nabız Sistemi Ve E-Sağlık Okuryazarlığı İle Birlikte İncelenmesi. Yüksek Lisans Tezi, Necmettin Erbakan Üniversitesi Sağlık Bilimleri Enstitüsü Sağlık Yönetimi Anabilim Dalı, Konya.

Avcı, Y. D., & Gözüm, S. (2017). Kırsal alanda yaşayan yaşlılar için sağlık hizmeti sunum modelleri ve tele-sağlık. Turkish Journal of Family Medicine and Primary Care, 12(1), 56-67.

Ball, M. J., & Lillis, J. (2001). E-health: transforming the physician/patient relationship. International journal of medical informatics, 61(1), 1-10.

Başarıcı, G. (2025). Sağlikta dijital uygulamalar konusunda bireylerin karşilaştiklari sorunlar ve memnuniyet durumlarinin belirlenmesi. Ahmet Yesevi Üniversitesi Sağlik Kurumlari İşletmeciliği Tezsiz Yüksek Lisans Dönem Projesi.

Başkavak, G., Şahinol, M., & Kılıçtepe, Ş. (2024). Interplay of global technological dynamics and local realities: digital healthcare transformation in Turkey. Trakya Üniversitesi Sosyal Bilimler Dergisi, 26(1), 91-118.

Beşkardeş, B. N., & Köse, A. (2025). Sağlık Hizmetine Dijitalleşmenin Etkisinin Değerlendirilmesi. Yeni Yüzyıl Journal of Medical Sciences, 6(4), 125-137.

Chib, A., & Lin, S. H. (2018). Theoretical advancements in mHealth: a systematic review of mobile apps. Journal of health communication, 23(10-11), 909-955.

Çavmak, Ş., & Çavmak, D. (2017). Türkiye'de Sağlik Hizmetlerinin Tarihsel Gelişimi Ve Sağlikta Dönüşüm Programi. Sağlık Yönetimi Dergisi, 1(1), 48-57.

Dal Mas, F., Massaro, M., Rippa, P., & Secundo, G. (2023). The challenges of digital transformation in healthcare: An interdisciplinary literature review, framework, and future research agenda. Technovation, 123, 102716.

Darzi, M. A., Islam, S. B., Khursheed, S. O., & Bhat, S. A. (2023). Service quality in the healthcare sector: a systematic review and meta-analysis. LBS Journal of Management & Research, 21(1), 13-29. DOI 10.1108/LBSJMR-06-2022-0025.

Demir, H., & Arslan, E. T. (2017). Mobil sağlık uygulamalarının hastanelerde kullanılabilirliği: hastane yöneticileri üzerine bir araştırma. Karamanoğlu Mehmetbey Üniversitesi Sosyal ve Ekonomik Araştırmalar Dergisi, 19(33), 71-83.

Demir, T. ve Özcan, A. (2023). 2014-2023 Yılları Arasında Türkiye'de Sağlıkta Dijitalleşmeyle İlgili Yaymlanmış Araştırmaların Sistematik Derlemesi. Avrasya Bilimler Akademisi Sosyal Bilimler Dergisi. 51,1-25.

Dijital Sağlıkta Dünya ve Türkiye Perspektifi. (2023). https://www.ey.com/content/dam/ey-unified-site/ey-com/tr-tr/industries/life-sciences/documents/dijital-saglikta-dunya-ve-turkiye-perspektifi-raporu.pdf

Eysenbach, G. (2001). What Is EHealth [Editorial]. Journal of Medical Internet Research 3, 2.

Eke, E., Uysal, M., & Uğurluoğlu, D. (2019). E-Sağlık Uygulamalarının Farkındalığına Yönelik Bir Araştırma. Journal of Mehmet Akif Ersoy University Economics and Administrative Sciences Faculty, 6(2), 510-522.

Fahy, N. ve Williams, G. A. (2021). Use of digital health tools in Europe. World Health Organization, https://apps.who.int/iris/handle/10665/345091 adresinden 05.12.2025 tarihinde ulaşılmıştır.

Halpert, A. (2018). Irritable bowel syndrome: patient-provider interaction and patient education. Journal of clinical medicine, 7(1), 3.

Herselman, M., Botha, A., Toivanen, H., Myllyoja, J., Fogwill, T., and Alberts, R. (2016, May). "A digital health innovation ecosystem for South Africa". IST-Africa Week Conference, İEEE, Durban, South Africa

Hussein, E. S. E., Al-Shenqiti, A. M. & El-Sayed Ramadan, R. M. (2022). Applications of medical digital technologies for noncommunicable diseases for follow-up during the COVID-19 pandemic. International Journal of Environmental Research and Public Health, 19(19), 12682.

Iqbal, M. (2022). App download data. Business of apps. https://www.businessofapps.com/data/app-statistics/

İlgar, Y., & Bilgili, N. (2023). Yaşlı bireylerde e-sağlık okuryazarlık düzeyi ve dijital sağlık hizmetlerinin kullanımı. Euroasia Journal of Social Sciences & Humanities, 10(32), 126-135.

Isbanner S, et al. The adoption of artificial intelligence in health care and social services in australia: findings from a methodologically innovative national survey of values and attitudes (the AVA-AI Study). J Med Internet Res 2022;24(8):e37611

Jain, M., Shakdwipee, P., & Bhatia, T. K. (2024). Digitalization and healthcare quality. Educational Administration: Theory and Practice, 30(5), 6240-6243. https://doi.org/10.53555/kuey.v30i5.3923

Kabakoğlu, S. (2023). Muskuloskeletal fizyoterapide dijital sağlık teknolojilerini kullanma isteği: Fizyoterapistler ile anket çalışması Yüksek Lisans Tezi. Dokuz Eylül Üniversitesi Sağlık Bilimleri Enstitüsü. İzmir.

Kaya, E. & Eke, E. (2023). Bireylerin Mobil Sağlık Uygulaması Kullanım Durumu ve E-Sağlık Okuryazarlığı İlişkisi. İşletme Bilimi Dergisi, 11(1), 1-15.hcare employees. Health Informatics Journal, 26 (1), 461–473

Kayserili A. & Tefiroğlu, Ç. E. (2023). Dijital Sağlık Hizmetlerinin Hastane İdarecileri Tarafından Değerlendirilmesi. Abant Sağlık Bilimleri ve Teknolojileri Dergisi, 3(2), 26-38.

Kessler, S. R., Pindek, S., Kleinman, G., Andel, S. A., & Spector, P. E. (2020). Information security climate and the assessment of information security risk among healthcare employees. Health informatics journal, 26(1), 461-473.

Khanh, T. Q., Hao, P. N., Roitman, E., Raz, I., Marganitt, B., & Cahn, A. (2020). Digital diabetes care system observations from a pilot evaluation study in Vietnam. International Journal of Environmental Research and Public Health, 17(3), 937.

Kılıç, T. (2017). E-Sağlık, iyi uygulama örneği; Hollanda. Gümüşhane Üniversitesi Sağlık Bilimleri Dergisi, 6(3), 203-217.

Knapp, P. W., Keller, R.A., Mabee, K.A., Pillai, R. & Frisc, N.B., (2021). Quantifying patient engagement in total joint arthroplasty using digital application-based technology. The Journal of Arthroplasty, 36(9), 3108-3117.

Lim, D., Norman, R., & Robinson, S. (2020). Consumer preference to utilise a mobile health app: A stated preference experiment. PLoS ONE, 15(2), e0229546. https://doi.org/10.1371/journal.pone.0229546

Mbau, R., Musiega, A., Nyawira, L., Tsofa, B., Mulwa, A., Molyneux, S., ... & Barasa, E. (2023). Analysing the efficiency of health systems: a systematic review of the literature. Applied Health Economics and Health Policy, 21(2), 205-224. https://doi.org/10.1007/s40258-022-00785-2

Mercan, Y., Dizlek, K., Süsim, G., Gürez, D. & Akman, Y. (2020). Sağlık Amaçlı İnternet Kullanımı ve Mobil Sağlık Uygulamaları Üzerine Bir Araştırma. Kırklareli Üniversitesi Sosyal Bilimler Meslek Yüksekokulu Dergisi, 1(1), 66-76.

Mielonen, J., Kinnunen, U.-M., Saranto, K., Kemppi, A. &Kuusisto, H. (2020). The effect of chronic diseases on the use of health technology and digital services in the elderly population in Finland. Studies in Health Technology and Informatics, 275, 147-151.

Pattanaik, P. K., Gupta, S., Pani, A. K., Himanshu, U., & Pappas, I. O. (2024). Impact of inter and intra organizational factors in healthcare digitalization: a conditional mediation analysis. Information Systems Frontiers, 1-28. https://doi.org/10.1007/s10796-024-10522-w

Pettersson, L., Johansson, S., Demmelmaier, I. & Gustavsson, C. (2023). Disability digital divide: survey of accessibility of eHealth services as perceived by people with and without impairment. BMC Public Health, 23(1), 181.

Povorina, A. V., & Kosinova, N. N. (2020, December). Digitalization of healthcare: Domestic and foreign experience, development trends. In 2nd International Scientific and Practical Conference on Digital Economy (ISCDE 2020) (pp. 651-657). Atlantis Press.

Ruggiero, C., Macchione, I. G., Gemo, V., Properzi, C., Perini, F., Bianco, A., Ercolani, M. C., Mencacci, M., Manzi, P., Pasqualucci, A., De Filippis, G., Baroni, M. & Mecocci, P. (2024). Effectiveness and satisfaction with telemedicine in geriatric patients at high risk of fragility fractures. Telemedicine and e-Health, 30(7), 2040–2049

Sağlık Bakanlığı. (2022). Türkiye Sağlık İstatistikleri Yıllığı 2022. T.C. Sağlık Bakanlığı, Sağlık Bilgi Sistemleri Genel Müdürlüğü.

Sekaran, U. (2003:294) Business Research Methods: A Skill-Building Approach, 4. Baskı, John Wiley&Sons.

Sherman L.D., Patterson, M. S., Tomar, A. ve Wigfall L. T. (2020). Use of digital health information for health information seeking among men living with chronic disease: data from the health information national trends survey. American Journal of Men's Health, 14(1), 1557988320901377.

Steinman, L., Heang, H., van Pelt, M., Ide, N., Cui, H., Rao, M., LoGerfo, J. & Fitzpatrick, A. (2020). Facilitators and barriers to chronic disease self-management and mobile health interventions for people living with diabetes and hypertension in Cambodia: Qualitative study. JMIR MHealth and UHealth, 8(4), e13536.

Şimşek, P., & Karaismailoğlu, D. (2020). Sağlık Hizmetlerinde Dijital Teknolojilerin Kullanımı ve Hasta Güvenliği. Uluslararası İnovatif Hemşirelik Kongresi–1. İnovatif Hemşirelik Öğrencileri Sempozyumu.

Tengilimoğlu, D. (2020). Sağlık İşletmelerinde Yönetim (8. baskı). Nobel Yayıncılık.

Tezcan, C. (2016). Sağlığa Yenilikçi Bir Bakış Açısı: Mobil Sağlık. TUSİAD, 1-116.

Toscos, T., Coupe, A., Wagner, S., Ahmed, R., Roebuck, A., Flanagan, M., Drouin, M. & Mirro, M. (2020). Engaging patients in atrial fibrillation management via digital health technology: The impact of tailored messaging. Journal of Innovations in Cardiac Rhythm Management, 11(8), 4209-4217.

World Health Organization [WHO], 2020 World Health Organization (WHO, Digital health strategy 2020–2025. https://www.who.int/publications/i/item/9789240020924

Uysal, B. ve Ulusinan, E. (2020). Güncel dijital sağlık uygulamalarının incelenmesi. Selçuk Sağlık Dergisi, (1), 46-60.

Üzmez, S. S. ve Büyükbeşe, T. (2021). Dijitalleşme sürecinde bilgi yönetiminin işletmelerin teknoloji uyumuna etkileri. Bilgi Ekonomisi ve Yönetimi Dergisi, 16(2), 117-127