

Melek ÇAKIR¹
Orcid: 0000-0001-7756-7337
Bilgen ÖZLÜK²
Orcid: 0000-0002-2560-4199

¹Ankara Atatürk Sanatorium Training and Research Hospital/ Palliative Care Service /Ankara /TÜRKİYE,

²Necmettin Erbakan University / Faculty of Nursing / Department of Nursing Management / Konya / TÜRKİYE,

Corresponding Author (Sorumlu Yazar):
Melek ÇAKIR

cakir.melek2396@gmail.com

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The Relationship Between Techno-Stress Levels and Attitudes Toward Change Among Nurses And Physicians in Hospital Undergoing Digital Transformation

Dijital Hastaneye Geçiş Sürecinde Olan Bir Hastanede Çalışan Hemşire Ve Hekimlerin Tekno-Stres Düzeyleri Ve Değişime Karşı Tutumları Arasındaki İlişki

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ABSTRACT

Objective: The aim of this study is to examine the relationship between techno-stress levels and attitudes towards change of nurses and physicians working in a hospital undergoing digital transformation.

Methods: A descriptive and correlational study design was used. The study population consisted of 166 nurses and physicians working in a public hospital in Ankara, Türkiye. The sample size was determined as 117 participants using the known-the-universe sample calculation formula. A total of 120 participants, 79 nurses and 41 physicians, were recruited using the convenience sampling method. Data were collected using a socio-demographic form, the Attitudes Toward Change Scale, and the Workplace Techno-Stress Scale. Analyses included descriptive statistics, t-tests, Mann-Whitney U, Kruskal-Wallis, Pearson correlation, and linear regression.

Results: The attitude score of nurses towards change was found to be 2.73 ± 0.61 and that of physicians was found to be 2.91 ± 0.72 . Techno-stress scores were 3.36 ± 0.63 for nurses and 3.19 ± 0.61 for physicians. Pearson correlation showed a strong negative relationship between attitude toward change and techno-stress among nurses ($r = -0.579$, $p < 0.001$), and a significant negative correlation among physicians ($r = -0.523$, $p < 0.001$). Regression analysis revealed that attitudes toward change explained 33.5% of techno-stress in nurses and 27.3% in physicians. Techno-stress levels among physicians differed significantly by age, while change attitudes among nurses varied by institutional experience ($p < 0.05$).

Conclusion: Nurses and physicians with positive attitudes toward digital change experienced lower techno-stress. Nurses showed more negative attitudes and higher stress. These findings highlight the importance of scientific change management. It is recommended to increase system training and promote nurse participation in decision-making, considering their greater sensitivity to techno-stress.

ÖZ

Amaç: Bu çalışmanın amacı, dijital dönüşüm geçiren bir hastanede çalışan hemşire ve hekimlerin tekno-stres düzeyleri ile değişime yönelik tutumları arasındaki ilişkiyi incelemektir.

Yöntem: Tanımlayıcı ve ilişkisel bir çalışma deseni kullanılmıştır. Araştırmanın evrenini Ankara/Türkiye'deki bir kamu hastanesinde çalışan 166 hemşire ve hekim oluşturmaktadır. Evreni bilenen örneklem hesaplama formülü kullanılarak örneklem büyüklüğü 117 katılımcı olarak belirlenmiştir. Kolayda örneklem yöntemiyle toplam 79 hemşire 41 hekim olmak üzere 120 kişi araştırmanın örneklemini oluşturdu. Veriler sosyo-demografik form, Değişime Yönelik Tutum Ölçeği ve İşyeri Tekno-Stres Ölçeği kullanılarak toplanmıştır. Analizler, tanımlayıcı istatistikler, t-testi, Mann-Whitney U, Kruskal-Wallis, Pearson korelasyonu ve doğrusal regresyon içermektedir.

Bulgular: Hemşirelerin değişime karşı tutum puanı $2,73 \pm 0,61$, hekimlerin ise $2,91 \pm 0,72$ olarak bulunmuştur. Hemşireler için tekno-stres puanları $3,36 \pm 0,63$ ve hekimler için $3,19 \pm 0,61$ olarak bulundu. Pearson korelasyonu, hemşireler arasında değişime yönelik tutum ile tekno-stres arasında güçlü bir negatif ilişki ($r = -0,579$, $p < 0,001$) ve hekimler arasında anlamlı bir negatif ilişki ($r = -0,523$, $p < 0,001$) olduğunu gösterdi. Regresyon analizi, değişime yönelik tutumların hemşirelerde tekno-stresin %33,5'ini ve hekimlerde %27,3'ünü açıkladığını ortaya koydu. Hekimler arasında tekno-stres düzeyleri yaşa göre anlamlı farklılık gösterirken, hemşireler arasında değişime yönelik tutumlar kurumsal deneyime göre farklılık gösterdi ($p < 0,05$).

Sonuç: Dijital değişime karşı olumlu tutumlara sahip hemşireler ve hekimler daha düşük tekno-stres yaşadı. Hemşireler daha olumsuz tutumlar ve daha yüksek stres gösterdi. Bu bulgular, bilimsel değişim yönetiminin önemini vurgulamaktadır. Teknolojik strese karşı daha duyarlı oldukları göz önüne alındığında, sistem eğitimlerinin artırılması ve hemşirelerin karar alma süreçlerine katılımının sağlanması önerilmektedir.

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INTRODUCTION

Globalization and technology, which shape the information age, have made digital transformation mandatory in the health sector's application models and the institutions where health services are provided (Alkan Demir and Torun, 2022). In its "Global Strategy on Digital Health 2020-2025" published in 2021, the World Health Organization (WHO) emphasized the integration of digital health applications as an essential step to increase quality and efficiency in the provision of health services (WHO, 2021). The 2013-2017 strategic plan of the Ministry of Health in Türkiye also included the goal of initiating and developing the "digital hospital" process (Sağlık Bilgi Sistemleri Genel Müdürlüğü (SBSGM), 2018). The Ministry emphasizes initiating digital transformation to store and protect individuals' health data, ensure an effective treatment and care process, and provide sustainable and quality healthcare services. (Ministry of Health, 2014).

Digital hospitals are important locations where changing and developing technology impacts the provision of healthcare services. Hospitals where technology benefits patients and employees through online platforms created for health needs are considered digital hospitals (Kim, Roh, Kim, Park and Choi, 2020).

Digital hospitals base their operations on clinical information systems (CIS) and diagnostic and treatment systems (DTS). CIS are web-based systems that store and record patients' clinical data, such as smart cards, e-prescriptions, e-referral services, and e-appointments. DTS is information-based equipment used in diagnosis and treatment, such as Image Storage and Communication Systems, Radio Frequency Identification (RFID), robotic surgery, pharmacy and medical consumables management systems, laboratory information systems, electronic document management systems (Bal, 2010; SBSGM, 2018).

In digital hospitals, manual and paper-based processes are eliminated with the mentioned technologies, enabling faster and more systematic delivery of healthcare services (Keasberry, Scott, Sullivan, Staib and Ashby, 2017). Thanks to paperless management, the complete and accurate storage of information and documents reduces the rate of medical and administrative errors, and the time allocated to treatment and care increases due to the decreased time spent by healthcare professionals on administrative tasks (Hamidi, Mahendran and Denecke, 2019). However, mechanical and human factors such as failure of hardware and systems, disruptions in training procedures, deficiencies in security policies, employees being not familiar with changing technology, and lack of knowledge can lead to various disadvantages (Koca, Gülhan and Yılmaz, 2017; Özlük and Çakır, 2024).

The system's potential disadvantages may also cause problems for healthcare professionals. Technological stress (techno-stress), which affects the perception and attitude towards the digital transformation process, is one of them (Yener, 2018). Techno-stress is a modern adaptation problem associated with information technologies and caused by an inability to cope (Dragano and Lunau, 2020). Time pressure due to the desire to do things in a shorter time, employees' lack of knowledge in adapting to technology, and not using appropriate hardware and software are among the factors that lead to adaptation problems (Özel and Aba, 2023). Attitudinal, behavioral, and physical issues such as nervousness, anxiety, low performance, low motivation, decrease in organizational commitment, increase in medical errors and turnover intentions, head and back pain, insomnia, and depression can be seen in health professionals experiencing techno-stress (Akgün, 2019; Weinert, Maier, Laumer and Weitzel, 2020; Yener, (2018). This situation affects the success of digital hospital applications, so successful change management is required to ensure adaptation (Basulo-Ribeiro, Freitas, Rocha-Gonçalves, and Teixeira, 2025). The role of managers in change management comes to the fore, and it is recommended to include nurses and physicians in the process, especially when planning hospitals' digital transformation (Pomare, Churruca, Long, Ellis and Braithwaite, 2019). In this context, determining the attitudes towards change and techno-stress levels of nurses and physicians who provide extensive service at the system level with patients and examining the relationship between these variables is essential in establishing policies for hospitals in the transformation process.

METHODS

Research Design

This study is a descriptive and correlational research.

Population and Sample

The hospital where the study was conducted is a 200-bed public hospital in Ankara, one of Türkiye's leading healthcare institutions in the field of physical therapy and rehabilitation, undergoing a digital transformation. The institution has 27 different clinics and outpatient clinics providing both internal and surgical medical services. However, due to the nature of the services it provides, it is a specialized hospital with a limited number of healthcare professionals and no emergency room or intensive care unit. It is the only hospital in Ankara with digital hospital status. The research population consisted of all nurses and physicians (N=166) working at the hospital.

The sample of the study using the sample calculation formula for the known universe to calculate the number of people to be sampled if the average of the event is to be examined, was determined to be 117 participants. To account for potential attrition, the target number of participants was increased by 10% to 129. The study sample was a convenience sampling method, with a total of 120 participants: 79 nurses and 41 physicians (Sümbüloğlu & Sümbüloğlu, 2014). The sample represents a significant portion of the target population (n=166). Nurses and physicians who had worked at the institution for six months or more and agreed to participate voluntarily were included. This emphasis on voluntary participation protects the ethical integrity of the study.

Data Collection

Data were collected by the first author of the study between November and December 2022. They were informed of the study's purpose and content, and their written informed consent was obtained before proceeding with data collection. Participants completed surveys individually, and the first author collected the completed surveys. Surveys were completed individually within approximately 10 minutes before or after participants' shifts.

Data Collection Tools

Data collection tools were the Descriptive Information Form, The Attitude Against Change Scale (AACS), and Techno-Stress at Work Scale (TAWS).

Descriptive information form: The researchers created this form, which includes descriptive information about the participants, by reviewing the literature (Çoban, 2019; Saray and Ünsal, 2020). In this form, there are seven questions, including descriptive information such as age, gender, working time in the profession, working time in the hospital, and educational status of nurses and physicians.

The attitude against change scale (AACS): The scale developed by Seren (2005) in Turkish, a reliable and valid instrument, consists of 29 items and four sub-dimensions. The five-point Likert-type scale measures organizational policy in change (12 items), consequences of change (8 items), resistance to change (5 items), and management style in change (4 items) sub-dimensions. Items 13, 21, 22, 23, and 24 in the scale contain negative statements, and the total raw score that can be obtained from the scale varies between 29 and 145. The total raw scores to be obtained from the sub-dimensions are 12-60 for "organizational policy," 8-40 for "consequences of change," 5-25 for "resistance to change," and 4-20 for "management style in change." The increase in the score obtained from the scales indicates that the individual's attitude towards change is more positive (Seren, 2005). Seren (2005) found the Cronbach Alpha value for the total scale to be .92 in his study. In this study, the Cronbach Alpha value for the total scale was .91.

Techno-stress at work scale (TAWS): The researchers used a 14-question scale developed by Tarafdar, Tu and Ragu-Nathan (2007) and adapted into Turkish by Türen, Erdem and Kalkın (2015) to measure the techno-stress levels of nurses and physicians. This scale is a 5-point Likert scale, scored from Strongly Disagree=1 to Strongly Agree=5, with no reverse-coded questions. It comprises three sub-dimensions: 'techno-overload,' 'techno-uncertainty,' and 'techno-complexity.' The total and sub-dimensions of the scale are evaluated on a scale of 1-5 points, with scores approaching five indicating a high level of techno-stress and one indicating a low level of techno-stress. The Cronbach Alpha reliability coefficient was determined to be .84 for the overall scale, while in this study, it was .81 for the total scale.

Data Analysis

The data were analyzed using the SPSS 21 package program, and the findings were evaluated at a 95% confidence interval and a 5% significance level. Descriptive data were evaluated using numbers, percentages, mean values, and standard deviations. The data conformity to normal distribution was determined by skewness and kurtosis values. Independent samples t-test, Kruskal Wallis Test, and Mann-Whitney U Test were used to compare the descriptive characteristics of the participants and the mean total and subscale scores. The relationships between the scales were analyzed using Pearson Correlation Analysis. Linear regression analysis was used to analyze the independent variables affecting techno-stress.

Ethical Considerations

Permission to conduct the study was obtained from the ethics committee (Date: 06.07.2022, Decision Number: 24). Scale usage permissions were obtained from the authors via e-mail. Written institutional permission was obtained from the institution where the study is conducted. Nurses and physicians were informed about the purpose of the study, and that participation was voluntary. The researchers obtained written consent from the participants.

RESULTS

Of the nurses who participated in the study, 79.7% were female, and 51.9% were 31 years of age or older. When looking at the length of professional experience, 45.6% of the nurses had between 6 months and 5 years, 12.7% had between 6 and 10 years, and 41.8% had 11 or more years of experience.

Furthermore, in terms of the length of time they had worked in their current institution, 63.3% of the nurses had between 6 months and 5 years, 26.6% had between 6 and 10 years, and 10.1% had 11 or more years. When the distribution of nurses by unit was examined, it was determined that 44.3% worked in surgical units, 51.9% in internal medicine, and 3.8% in administrative units. Regarding whether they had received digital hospital training, it was determined that 73.4% of the nurses had not received this training.

Among physicians, 65.9% are male, and 65.9% are 31 years of age or older. In terms of professional experience, 48.8% of physicians have been working for 6 months to 5 years, 19.5% for 6–10 years, and 31.7% for 11 years or more. In terms of time spent in the institution, 56.1% of physicians have been working for 6 months to 5 years, 24.2% for 6–10 years, and 19.5% for 11 years or more. In terms of their respective units, 19.5% work in surgical units, 58.5% in internal medicine, and 22% in administrative units. 70.7% of physicians reported not having received digital hospital training (Table 1).

Table 1. Demographic Data of the Participants (n:120)

Variable	Nurse n (%)	Physician n (%)
Sex		
Female	63 (79.7)	14 (34.1)
Male	16 (20.3)	27 (65.9)
Age		
30 or younger	38 (48.1)	14 (34.1)
31 or older	41 (51.9)	27 (65.9)
Years in the profession		
6-months to 5-years	36 (45.6)	20 (48.8)
6-to-10 years	10 (12.7)	8 (19.5)
11 years or more	33 (41.8)	13 (31.7)
Years in the hospital		
6-months to 5-years	50 (63.3)	23 (56.1)
6-to-10 years	21 (26.6)	10 (24.2)
11 years or more	8 (10.1)	8 (19.5)
Unit		
Surgical unit	35 (44.3)	8 (19.5)
Internal medicine unit	41 (51.9)	24 (58.5)
*Administrative unit	3 (3.8)	9 (22.0)
Digital Hospital Training Status		
Yes	21 (26.6)	12 (29.3)
No	58 (73.4)	29 (70.7)

* Clinic chief physicians, clinic manager nurses,

According to the research findings, the total average score of nurses on the AACS was determined to be 2.73 ± 0.61 . In the AACS sub-dimensions, the average score for “Organizational Policy” was 2.62 ± 0.82 , for “Results of Change” 3.04 ± 0.79 , for “Resistance to Change” 3.01 ± 0.73 , and for “Management Style in Change” 2.10 ± 0.77 .

The total TAWS score average for nurses is 3.36 ± 0.63 . In the TAWS sub-dimensions, the average for “Techno-Workload” was 3.97 ± 0.88 , the average for “Techno-Uncertainty” was 2.90 ± 0.91 , and the average for “Techno-Complexity” was 3.23 ± 0.90 (Table 2).

Table 2. Mean Total Scores, Internal Consistency and Normality of AACS and TAWS

Scales and Subdimensions	Nurse		Physician	
	M±SD	Min-Max	M±SD	Min-Max
Institutional policy	2.62±0.82	1.25-4.25	2.82±0.96	1.00-5.00
Results of change	3.04±0.79	1.25-4.25	3.10±0.81	1.63-4.75
Resistance to change	3.01±0.73	1.00-4.60	3.33±0.77	1.80-4.80
Management style in change	2.10±0.77	1.00-4.25	2.23±0.90	1.00-5.00

AACS Total	2.73±0.61	1.31-4.07	2.91±0.72	1.55-4.72
Techno-overload	3.97±0.88	1.00-5.00	3.74±0.96	1.00-5.00
Techno-uncertainty	2.90±0.91	1.00-5.00	2.72±0.89	1.00-5.00
Techno-complexity	3.23±0.90	1.00-5.00	3.13±0.80	1.60-4.60
TAWS Total	3.36±0.63	1.62-4.77	3.19±0.61	1.62-4.62

M: Mean; SD: Standard deviation; Min: Minimum; Max: Maximum; AACS: The Attitude Against Change Scale; TAWS: Techno-stress at Work Scale.

The AACS total score average for physicians was calculated as 2.91±0.72. According to the sub-dimensions, the average for “Organizational Policy” is 2.82±0.96, the average for “Results of Change” is 3.10±0.81, the average for “Resistance to Change” is 3.33±0.77, and the average for “Management Style in Change” is 2.23±0.90. The total TAWS score average for physicians is 3.19±0.61, with an average of 3.74±0.96 for the “Techno-Workload” sub-dimension, 2.72±0.89 for “Technological Uncertainty,” and 3.13±0.80 for “Technological Complexity” (Table 2).

In the study, the total AACS and TAWS scores of nurses and physicians were examined according to gender, age, digital hospital training, length of service in the profession and hospital, and unit of assignment. In the comparison by age, a significant difference was found in the TAWS scores of physicians according to age ($p=0.041$); in this context, the technological stress level of physicians aged 31 and over was found to be higher than that of physicians aged 30 and under. In terms of length of service at the hospital, a significant difference was found in AACS scores among nurses ($p=0.033$); nurses with 11 years or more of service had significantly higher AACS scores than those with 5 years or less of service (Table 3).

Table 3. AACS And TAWS Mean Total Score Comparison for Nurses and Physicians

Descriptive Features	Nurse		Physician	
	AACS Total (M±SD)	TAWS Total (M±SD)	AACS Total (M±SD)	TAWS Total (M±SD)
Sex				
Female	2.70±0.62	3.35±0.62	2.67±0.50	3.17±0.50
Male	2.88±0.58	3.37±0.70	3.03±0.79	3.21±0.66
t	-1.050	-0.062	-1.538	-0.199
p	0.297	0.950	0.132	0.843
Age				
30 or younger	2.70±0.54	3.32±0.63	2.95±0.56	2.92±0.31
31 or older	2.76±0.68	3.39±0.64	2.89±0.80	3.33±0.68
t	-0.462	-0.526	0.250	-2.610
p	0.645	0.601	0.804	0.041
Digital Hospital Training Status				
Yes	2.86±0.78	3.46±0.66	3.16±0.84	3.40±0.59
No	2.69±0.54	3.32±0.63	2.80±0.66	3.11±0.60
t	0.947	0.870	1.470	1.414
p	0.352	0.387	0.149	0.165
Years in the profession				
6-months to 5-years	2.7±10.55	3.32±0.63	2.83±0.63	3.30±0.63
6-to-10 years	2.81±0.48	3.36±0.67	2.79±0.76	3.54±0.70
11 years or more	2.74±0.72	3.39±0.64	3.09±0.85	3.24±0.36
KW	0.861	0.134	0.581	2.048
p	0.650	0.935	0.748	0.359
Years in the hospital				
6-months to 5-years ¹	2.83±0.63	3.30±0.63	2.79±0.59	3.08±0.38
6-to-10 years ²	2.79±0.76	3.54±0.70	2.89±0.99	3.49±0.83
11 years or more ³	3.09±0.85	3.24±0.36	3.26±0.67	3.16±0.77
KW	6.847	2.297	1.778	4.778
p	0.033	0.317	0.411	0.092
Difference	3>1,2			

Unit				
Surgical unit	2.77±0.59	3.25±0.62	3.15±0.45	3.19±0.48
Internal medicine unit	2.69±0.65	3.44±0.66	2.76±0.70	3.14±0.63
Administrative unit	2.83±0.42	3.48±0.36	3.07±0.93	3.35±0.66
KW	0.129	1.878	1.933	1.255
p	0.938	0.391	0.380	0.534

M: Mean; SD: Standard deviation; KW: Kruskal Wallis test; t: independent samples t test; AACS: The Attitude Against Change Scale; TAWS: Techno-stress at Work Scale.

Pearson Correlation analysis was performed to determine the relationship between nurses' total AACS scores and TAWS total and subscale scores. A strong and significant negative relationship was found between the total AACS score and the total TAWS score in the nurse group ($r=-0.579$, $p<0.001$). Among the AACS subdimensions, "Institutional Policy" ($r=-0.487$, $p<0.001$), "Results of Change" ($r=-0.303$, $p<0.001$), "Resistance to Change" ($r=-0.517$, $p<0.001$), and "Management Style in Change" ($r=-0.559$, $p<0.001$) of the AACS subdimensions were also found to have negative and significant relationships with the TAWS score. Similarly, in the physician group, a significant and negative relationship was observed between the AACS total score and TAWS ($r=-0.523$, $p<0.001$). At the sub-dimension level, significant negative correlations were found between "Institutional Policy" ($r=-0.571$, $p<0.001$) and "Management Style in Change" ($r=-0.383$, $p<0.05$) and TAWS, while "Results of Change" ($r=-0.187$, $p>0.05$) was found to be unrelated. Additionally, a statistically significant but weak negative relationship was observed between the "Resistance to Change" dimension and TAWS ($r=-0.461$, $p<0.01$) (Table 4).

Table 4. The Relationship Between TAWS Total Score and AACS Total and Subscale Scores

Variables	Nurse		Physician	
		The TAWS		The TAWS
The AACS	r	-0.579***		-0.523***
Institutional policy	r	-0.487***		-0.571***
Results of change	r	-0.303***		-0.187
Resistance to change	r	-0.517***		-0.461**
Management style in change	r	-0.559***		-0.383*

$p>0.05$, * $p<0.05$, ** $p<0.005$, *** $p<0.001$, AACS: Attitude Against Change Scale; TAWS: Techno-stress at Work Scale.

In order to examine the predictive effect of attitudes toward change (AACS) on levels of technological stress (TAWS) in the workplace, a simple linear regression analysis was performed, evaluating nurses and physicians separately. In Model A for the nurse group, AACS scores explained 33.5% of TAWS scores ($R^2=0.335$). In Model B for the physician group, AACS scores explained 27.3% of TAWS scores ($R^2=0.273$). (Table 5).

Table 5. Linear regression analysis of the effect of nurses' and physicians' resistance to change on technological stress

Model	R	R ²	Standard Error	F	p
A	0.579	0.335	0.096	38.808	0.001
B	0.523	0.273	0.115	14.671	0.001

Model A: Nurse, Predictor (Constant): Attitude Against Change Scale, Dependent Variable: Techno-stress at Work Scale.

Model B: Physician, Predictor (Constant): Attitude Against Change Scale, Dependent Variable: Techno-stress at Work Scale.

$p<0.001$

DISCUSSION

The study found that nurses and physicians' attitudes toward change were below average, meaning they had a negative attitude. This is thought to be due to the hospital where the study was conducted being in the digital transformation process, and the participants' inability to adapt to the process and experiencing techno-stress. It is particularly noteworthy that the majority of nurses and physicians stated that they had not received any training on the digital hospital process. For employees to have positive attitudes during the digital transformation process, training on the subject should be provided and included in the planning phase. This failure to do so may be one of the determinants of this outcome. The results of the studies conducted by Alotaibi, Wilson and Traynor, (2025); Araújo, Santos and Alencar, (2023) underscore this conclusion.

The findings of the current study are consistent with the results of studies conducted by Keshevarz et al. (2025) and Çelik Öztörün (2018), which also appear in the literature, indicating that healthcare professionals have developed negative attitudes toward change. However, studies found that healthcare professionals exhibited a highly positive attitude toward change (Çoban, 2019; Korkmazer, Aslan and Ekingen, 2020; Mabaso, Mokonyama and Mitonga-Monga, 2025; Özkalay, 2017; Üstün and Naldöken, 2020). These conflicting results may be related to various institutional structures, process-specific training, levels of digitalization, and participant involvement in the process.

A comparative examination of nurses' and physicians' attitudes toward change (AACS) revealed that physicians had higher AACS total mean scores than nurses, and accordingly, physicians exhibited more positive attitudes toward change. Negash et al. (2024) conducted a study within the scope of "Perspectives on the Use and Acceptance of Artificial Intelligence in Medical Care (PEAK)," finding that physicians exhibited positive attitudes toward artificial intelligence and technological systems is consistent with the findings of our study. The study suggests that physicians' more positive attitudes toward change may be due to their increased status, role, and decision-making authority, along with their increased professional autonomy through digital systems and their participation in decisions within the institution. A study in the literature found that physicians positively perceived the improvements provided by digitalization in the treatment process, and that their professional roles and active positions in decision-making processes played a role in their positive attitudes toward digital change (Seidi et al., 2025). On the other hand, the lower attitudes of nurses toward change compared to physicians may be due to nurses' lack of a voice in the digitalization process and, therefore, their perception of change as a threat, their perception of digital systems as an increased responsibility in workflow procedures and their perceived workload (Kräft, Wirth, Harth, and Mache, 2024; Sakrak and Doğan, 2025). A healthcare institution undergoing change must establish balance by identifying the structural and organizational factors of different professional groups when formulating its corporate policies.

The study found that nurses and physicians experienced techno-stress in the workplace due to technological change above a moderate level. This result suggests that nurses and physicians are under a certain stress burden due to the technological demands of the digital transformation process. Similarly, Keshavarz et al. (2025), Würtenberger et al. (2025), Çoban (2019), Mahdian et al. (2017), and Özer et al. (2022) determined that techno-stress levels in healthcare professionals were moderate. On the other hand, Kopuz and Aydın (2020) concluded that techno-stress levels in healthcare professionals were below average. Technological changes experienced to provide quality and safe healthcare services create new tasks for healthcare professionals, and this creates role ambiguities (Lucena et al., 2021). This suggests an increase in techno-stress levels in healthcare professionals. High levels of techno-stress reduce job satisfaction and job dissatisfaction, leading to an increase in the intention to leave (Gaube et al., 2021; Califf et al., 2020). Nurses and physicians should be included in the institution's technological change process, the process should be clearly established, and workload should be distributed evenly.

A comparative examination of nurses' and physicians' techno-stress levels (TAWS) revealed that nurses experienced higher levels of stress related to the technological change process compared to physicians. This finding is thought to be due to nurses' more intensive interaction with digital systems during their work hours, particularly their increased workload with electronic records and automated systems used in medication ordering and control, dose monitoring, and treatment administration. A study conducted by Kraft et al. (2024) on nurses found that techno-invasion-related stressors led to emotional exhaustion and work-life conflict. In this context, nurses' high techno-stress levels appear to be influenced not only by individual skills but also by organizational factors such as lack of organizational support and inadequate system training. In support of this finding, a study conducted by Sakrak and Doğan (2025) with nurses found that establishing institutional policies for the adoption of technological information systems led to a decrease in techno-stress levels.

The study found no significant difference between nurses and physicians in terms of their AACS and TAWS total scores, gender, digital hospital training, length of service in the profession and hospital, or the unit they worked in. Similarly, a study conducted with nurses by Sakrak and Doğan (2025) found that factors such as age, gender, or professional experience were not effective in the adoption of current digital systems. A study conducted in Switzerland by Golz et al. (2021) found that gender and length of experience had no significant effect on technostress levels. Furthermore, studies by Bulut and Yıldız (2018), Üstün and Naldöken (2020), Korkmazer et al. (2020), and Çoban

(2019) found no statistically significant difference between the attitudes of male and female participants toward change.

In a study comparing physicians aged 31 and older, statistically significantly higher levels of techno-stress were found compared to their colleagues aged 30 and younger. Wekenborg et al. (2024) investigated age-related differences in physicians' perceptions of digital transformation and found that younger physicians experienced less stress from digital transformation. In this context, as physicians age, they may experience difficulties adapting to digital systems, increasing difficulties in meeting technological expectations, complex perceptions of digital tool use, and fear of making mistakes, all of which may threaten their professional independence and clinical decision-making responsibilities, leading to increased stress levels.

The data in these sources reinforces the findings of our study and demonstrates that age is an important factor to consider, particularly among physicians, when adapting to digital transformation. In this study, nurses' attitudes toward change were statistically determined to be more positive in those who had worked for 11 years or more than those who had worked for less time, based on their length of service. This finding differs from the results of Özkalay's (2017) study. Özkalay reported that nurses' length of service did not have a statistically significant effect on their attitudes toward change. In the current study, the fact that nurses who had worked for a long time experienced numerous changes, such as shift changes, system and process changes within the institution, relocation, and constantly updated protocols and procedures, suggests that this result stems from the fact that nurses who have worked for a long time have experienced numerous changes, such as shift changes, system and process changes within the institution, relocation, and constantly updated protocols and procedures. Furthermore, employees who cannot cope with these changes can experience change fatigue due to stress and burnout (Lv et al., 2025). Çiftçi Kırac and Uyar (2023) found in their research with healthcare professionals that change fatigue was higher in those who had worked for 1-5 years compared to those who had worked for 11 years or more. At this point, when managers provide information about the change process and the reasons for change and when the participation and autonomy of employees are supported, employees can exhibit a more positive approach to change.

This study identified significant and negative relationships between technology-related stress levels and attitudes toward change in nurses and physicians. It was determined that, in particular, technology-related stress levels decreased significantly as nurses' positive attitudes toward change increased. While a similar relationship was observed in physicians, this relationship was found to be weaker than in nurses. This finding may be attributed to the fact that nurses are directly responsible for technology-based practices such as maintaining electronic health records, ordering and monitoring medication, and patient transfers during the treatment and care process. Technical problems that may occur during these stages can negatively impact nurses' work routines, while the mental burden of constantly interacting with digital systems, the pressure of speed, and the fear of making mistakes can lead to psychological stress and burnout. Therefore, the fact that nurses face more technology-related challenges during these processes can be considered a significant reason for their high techno-stress levels. This finding is consistent with Shan, Shang, Yan and Ye's (2023) observational study, which found that workflow interruptions during electronic health record tasks increased nurses' mental workload and decreased their task performance. Digital systems need to be optimized for nurses' healthcare service delivery, and both technical and psychological support mechanisms need to be strengthened in managing the process.

Analyses conducted in terms of subdimensions revealed a statistically significant and negative relationship between the variables "Institutional Policy," "Consequences of Change," "Resistance to Change," and "Management Style in Change" and technology-related stress levels in the nurse group. A particularly high correlation was found in the "Management Style in Change" dimension. In this context, the ability of organizational managers to effectively master and evaluate the process during the digital transformation process has a decisive impact on employees' technology-related stress levels. Similarly, in the literature, a study by Kraft et al. (2024) indicates that managerial support is crucial for employees' perceptions of change during the digital transformation process. Otherwise, it can reduce employee motivation and negatively impact organizational commitment and job performance (Çiftçi Kırac & Uyar, 2023). Qiao, Li and Hong (2024) reported that digital leadership facilitates employee adaptation to change by guiding digital transformation, thus playing a critical role in job performance and organizational commitment. Managers working in healthcare institutions need to develop strategies that will facilitate nurses' adaptation to this process by approaching change management in a scientifically based manner.

Analyses conducted across sub-dimensions in the physician group revealed a significant negative correlation between "Corporate Policy" and "Management Style in Change" and techno-stress levels, while no correlation was found between "Consequences of Change." This may be due to physicians' higher levels of professional autonomy and greater decision-making power over institutional change processes, creating a perception of control over the

outcomes of the change process. This perception can directly influence the cognitive and emotional approaches to change, potentially reducing technology-related stress levels (Çiftçi Kırac & Uyar, 2023).

In this study, regression analysis revealed that nurses' and physicians' attitudes toward change significantly predicted their technology-related stress levels. The findings indicated that nurses' attitudes toward change were more predictive of technology stress than physicians'. Accordingly, it can be argued that as nurses and physicians approach change more positively, their technology-related stress levels decrease. The stronger relationship found for nurses may be due to their intense involvement with digital systems, their frequent encounters with the complexity and disruptions of technological systems within their busy work schedules, lack of sufficient training support, and their limited participation in strategic and managerial decision-making mechanisms during the change process. A study by Keshevarz et al. (2025) identified system uncertainty and workload as the leading triggers for increased techno-stress levels in healthcare professionals.

An observational study conducted in Germany found a significant positive relationship between techno-overload and techno-complexity in nurses and their burnout and stress levels (Kraft et al., 2024). In addition to establishing the technological infrastructure for the digital transformation process, the psychosocial needs of nurses and physicians must be considered. Ensuring nurses' active participation in this process, organizing planned training, and ensuring they have a voice in decision-making roles is particularly important.

Limitations

This study was conducted in a small, private hospital in Ankara province, which is the only institution undergoing a digital hospital transition. Furthermore, it lacks a dedicated emergency room or intensive care unit and employs a limited number of healthcare professionals. Because this institution is one of the few examples undergoing digital transformation, the findings reflect the specific circumstances of this institution. Multicenter studies in different provinces are recommended for more comprehensive results.

CONCLUSION

The study found that nurses and physicians with more positive attitudes toward change had significantly lower techno-stress levels. While nurses' attitudes toward change were more positive than physicians, they also had higher techno-stress levels. Regression analysis revealed that attitudes toward change were a significant predictor of techno-stress levels; this relationship was stronger for nurses than physicians.

Nurses and physicians are observed to struggle to adapt to the digital transformation process and experience technological stress due to inadequate training and administrative support during this process. To foster a more positive attitude toward change among nurses and physicians and lower techno-stress levels, it is important to increase training to enhance digital competencies, actively involve employees in the change process, and strengthen administrative support. When determining professional roles and responsibilities in this process, it is crucial for policymakers to take steps to ensure a balance between work and digital system load, particularly for nurses. Future studies are recommended to include digital hospitals in different cities and conduct more comprehensive research with a larger sample size. It is recommended to conduct mixed-method studies in which the emotional and behavioral attitudes of employees towards the digital transformation process are examined in detail.

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Concept - MÇ, BÖ; Design- MÇ, BÖ; Supervision- MÇ, BÖ; Resources- MÇ, BÖ; Materials- ; Data Collection and/or Maintenance- MÇ; Analysis and/or Interpretation- MÇ, BÖ; Literature Review- MÇ, BÖ; Writing- MÇ, BÖ; Critical Review - MÇ, BÖ

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