RESEARCH ARTICLE

Muhammed Fatih Ertas [1]
Merve Ebrar Ulug [2]

[1] University of Health Sciences, Faculty of Health Sciences, İstanbul, Türkiye.
[2] Samsun University, Faculty of Humanities and Social Sciences, Samsun, Türkiye

Corresponding Author:
Muhammed Fatih Ertas
mail: fatih.ertas@sbu.edu.tr

Received: 09.01.2025
Acceptance: 15.05.2025
DOI: 10.18521/ktd.1616541

Konuralp Medical Journal
e-ISSN1309–3878
konuralptipdergi@duzce.edu.tr
konuralptipdergisi@gmail.com
www.konuralptipdergi.duzce.edu.tr

Organizational Change in Health Institutions: Artificial Intelligence Anxiety of Internal and Surgical Branch Physicians

ABSTRACT

Objective: The integration of artificial intelligence applications into the health sector creates some concerns about the uncertainties in the process as well as facilitating factors in service delivery. This study investigates the interaction and changes with professional qualifications by examining AI anxiety, readiness for AI, and openness to organizational change among physicians in internal and surgical specialties.

Method: The study data were collected between September 1, 2024 and November 15, 2024 from 15 health institutions with the status of training and research hospitals on the Anatolian and European sides of Istanbul by online survey method. Valid measurement tools for data collection: Artificial Intelligence Anxiety Scale, Medical Artificial Intelligence Readiness Scale, and Organizational Openness to Change Scale were used. The distribution of variables was analyzed by Shapiro Wilk test. Differences between groups that did not show normal distribution were analyzed using Mann Whitney U and Kruskal Wallis H tests. Bonferroni correction was applied for multiple test corrections in intragroup comparisons.

Results: AI anxiety was generally moderate, with no difference between specialties. Regular follow-up of medical literature was positively correlated with decreased AI anxiety and increased readiness levels. Openness to organizational change was found to be high in both specialties.

Conclusions: AI anxiety and AI readiness are influenced by gender and following medical literature. Following academic literature and training programs are critical for building confidence in AI applications. Physicians' openness to organizational change is a facilitating factor for the best implementation of AI in clinical settings through hands-on training and scientific studies.

Keywords: Artificial Intelligence in Medicine, Education, Physician Readiness, Technological Adaptation, Organizational Change Management.

Sağlık Kurumlarında Örgütsel Değişim: Dahili ve Cerrahi Branş Hekimlerinin Yapay Zeka Kaygısı

ÖZET

Amaç: Yapay zeka uygulamalarının sağlık sektörüne entegrasyonu hizmet sunumunda kolaylaştırıcı unsurların yanı sıra süreçteki belirsizlikler de birtakım endişeler yaratmaktadır. Bu çalışma dahili ve cerrahi uzmanlık alanlarındaki doktorlar arasında yapay zeka kaygısını, yapay zekaya hazır olma ve örgütsel değişime açıklık durumlarının incelenerek mesleki nitelikleri ile olan etkileşimi ve değişimi araştırmaktadır.

Yöntem: Çalışma verileri 1 Eylül 2024 - 15 Kasım 2024 tarihleri arasında online anket yöntemiyle İstanbul'da Anadolu ve Avrupa yakasında bulunan 15 eğitim araştırma hastanesi statüsünde olan sağlık kurumundan toplanmıştır. Veri toplamada geçerli ölçme araçları olan: Yapay Zeka Kaygı Ölçeği, Tıbbi Yapay Zeka Hazırlık Bulunuşluk Ölçeği ve Örgütsel Değişime Açıklık ölçeği kullanılmıştır. Değişkenlerin dağılımı Shapiro Wilk testi ile incelenmiştir. Normal dağılım göstermeyen gruplar arasındaki farklar Mann Whitney U ve Kruskal Wallis H testleri ile analiz edilmiştir. Grup içi karşılaştırmalarda çoklu test düzeltmesi için Bonferroni düzeltmesi uygulanmıştır.

Bulgular: Yapay zeka kaygısı genel olarak orta düzeydeyken uzmanlık alanları arasında bir farklılık tespit edilmemiştir. Tıbbi literatürün düzenli takibi, yapay zeka kaygısının azalması ve hazır olma seviyelerinin artması ile pozitif korelasyon göstermiştir. Her iki uzmanlık alanında örgütsel değişime açıklığın yüksek olduğu belirlenmiştir.

Sonuç: Yapay zeka kaygısı ve yapay zekaya hazır bulunuşluk cinsiyet ve tıbbi literatürü takip etme faktörlerinden etkilenmektedir. Akademik literatürü takip etme ve eğitim programları yapay zeka uygulamalarına olan güveni oluşturmak için kritik öneme sahiptir. Hekimlerin örgütsel değişime açık olması; uygulamalı olarak yapılacak eğitimlerin ve bilimsel çalışmaların yapay zekanın klinik ortamlarda en iyi şekilde uygulanmasında kolaylaştırıcı bir etkendir.

Anahtar Kelimeler: Tıpta Yapay Zeka, Eğitim, Hekimin Hazır Bulunuşluğu, Teknolojik Adaptasyon, Organizasyonel Değişim Yönetimi.

INTRODUCTION

In today's world, where technological innovations and changes are advancing rapidly, an important development that has come to the fore frequently in various sectors in recent years is artificial intelligence (AI) and its sub-branch, machine learning. Artificial intelligence is applied in almost every sector in order to produce solutions to complex problems (1). The main goal of machine learning is to design algorithms that improve with experience and can continuously learn from new data and insights and find answers to various questions (2). Machine learning seeks various combinations by extracting rules from data and considering a large number of variables to reliably predict outcomes with the algorithms it creates (3). These characteristics make machine learning, and therefore artificial intelligence, a very interesting technology.

The healthcare industry is dynamic, generating large amounts of data at a rapid pace and at the same time making decisions that take into account a large number of variables. In recent years, the use of artificial intelligence in healthcare has been increasing and provides many advantages (4). In medicine, artificial intelligence is widely used in the creation of clinical decision support systems. It enables the development of decision support systems that can increase learning capacity and transform the future of healthcare (2). Furthermore, AI has been effectively applied in many fields such as disease diagnosis, prognosis, treatment optimization, outcome prediction, drug development and public health (2,4–9).

Artificial intelligence applications are becoming widespread in internal and surgical fields of medicine. The largest application of AI algorithms is in radiology, but there are also examples of applications in other fields such as dermatology, ophthalmology, psychiatry, cardiology, oncology, neuroscience, pathology, and epigenetics (1–4). The integration of AI into medicine has brought awe-inspiring changes but has also raised significant concerns among physicians (5,6). However, concerns such as the low acceptability of AI as a digital health intervention among medical professionals, lack of user convenience and engagement, ethical and privacy issues, unreliability of the technology, professional liability threaten to prevent the realization of promising benefits. Understanding the factors underlying the acceptability of AI will be vital for medical institutions to identify gaps and areas for improvement in their AI implementation strategies (5,7,8). Research has highlighted that these concerns vary across specialties, with different levels of exposure and reliance on AI technologies. For example, internal medicine physicians, who rely heavily on AI tools in their diagnostic and decision-making processes, frequently express concerns about the technology's potential to overshadow their expertise and autonomy. The study by Mansoor et al. (9) highlights concerns among internal medicine practitioners about the increasing role of AI in diagnostic accuracy and its implications for clinical judgment. Similarly, Simone et al. (10) reveal that surgeons view AI as “a double-edged sword”, recognizing its potential in trauma and emergency settings, while expressing uneasiness about ethical issues and the associated with its adoption (11). In addition to these concerns, Johnson-Mann et al. (12) highlight how AI-driven systems in surgical procedures raise questions about accountability for errors, further increasing hesitancy among practitioners in high-risk areas. These findings suggest that variation in AI readiness and anxiety is driven by specialty-specific interactions with AI technologies, underscoring the need for targeted training and support strategies. In fact, it suggests that variation in AI readiness and anxiety is driven by specialty-specific interactions with AI technologies, underscoring the need for targeted training and support strategies.

To investigate these dynamics, the study examined physicians' perceptions of AI using validated instruments, namely the Artificial Intelligence Anxiety Scale (AIAS), the Openness Toward Organizational Change Scale (OTOCS) and the Medical Artificial Intelligence Readiness Scale (MAIRS). Through a comparison between internal and surgical branch physicians, it was targeted to examine physicians' reactions to AI. It is aimed to determine whether organizational openness to change and having knowledge about AI affect AI anxiety in physicians and whether the field of specialization has an effect on AI anxiety.

MATERIAL AND METHODS

This study was designed as a cross-sectional study. The sample was determined by identifying the hospitals with the status of “training and research hospital” on the Anatolian and European sides of Istanbul. Of the 44 hospitals, 22 were selected by simple random draw method. The managers working in these hospitals were contacted and requested to support the study through online communication tools. Of the managers who accepted our interview request, 15 agreed to support the study. Data were collected through an online survey between September 1, 2024 and November 15, 2024 and 403 physicians participated in the survey. Physicians working in Istanbul and having a specialty in one of the medical branches were included in the study. Questions regarding inclusion criteria were added to the survey questions and these criteria were checked. . Approval for the study was obtained from the Health Sciences University Hamidiye Scientific Research Ethics Committee (28.08.2024-31181)

and voluntary informed consent was obtained from the participating physicians.

The OTOCS (max: 30) used in this study has a structure consisting of a single dimension and a total of 6 items (13). The AIAS (max: 147) consists of four sub-dimensions (Learning, Job Replacement, Sociotechnical Blindness and AI Configuration) and contains 21 items in total (14,15). The MAIRS (max: 110) consists of four dimensions (Cognition, Ability, Vision, and Ethics) and has a total of 22 items (16). The scales were applied to assess physicians' concerns about AI, their level of readiness and their openness to organizational change.

The internal consistency of the MAIRS developed to measure the readiness levels of medical students in the field of medical AI was evaluated with Cronbach's alpha coefficient and found to be α=0.87, which indicates that the scale is highly reliable (16). Construct validity was tested with confirmatory factor analysis (CFA), and CFA results showed that the four-factor model of the scale was compatible with the data (χ^2/df = 3.81, RMSEA = 0.094, SRMR = 0.057, CFI = 0.938, NNFI (TLI) = 0.928), so it can be said that the scale exhibits a valid structure.

The AIAS was developed to determine the level of anxiety towards AI technologies and the internal consistency of the scale was evaluated with Cronbach's alpha coefficient and found to be α=0.96, this high coefficient indicates that the scale has a strong internal consistency (14). Construct validity was examined by exploratory factor analysis (EFA) and CFA, and CFA findings revealed that the four-factor structure of the scale was confirmed. Goodness of fit indices were found to be acceptable (χ^2 / df = 2.57, TLI = 0.93, CFI = 0.94, RMSEA = 0.084, SRMR = 0.069).

The internal consistency of OTOCS, which was developed to assess the level of openness to organizational change, was evaluated with Cronbach's alpha coefficient and it was determined as α=0.845 for the industrial sector, α=0.857 for the education sector and α=0.921 for the health sector (13). These high coefficients indicate that the scale is a reliable measurement tool. In terms of validity, content validity was ensured in line with expert opinions. Construct validity was tested with EFA and CFA methods and CFA findings showed that the one-factor structure of the scale was confirmed. Within the scope of criterion dependent validity, significant correlations were found between leader support and openness to organizational change, and these findings reveal that the scale exhibits a valid structure.

Statistical Analysis: Statistical analyses were performed using SPSS 25.0 software (IBM Corp., 2017; IBM SPSS Statistics for Windows, version 25.0, Armonk, NY, USA). Descriptive statistics are presented as mean±standard deviation or median (min-max) values according to the normal distribution of the data. The distribution of variables was analyzed by Shapiro Wilk test. Differences between groups that did not show normal distribution were analyzed with Mann Whitney U and Kruskal Wallis H tests. Bonferroni correction was applied for multiple test correction in intragroup comparisons. Reliability analyses of the scales were evaluated with Cronbach's α coefficient and the confidence level was determined as 95%.

RESULTS

Among the physicians participating in the study, 60.3% were female. When the distribution of specialty areas was examined, it was aimed to have a balanced distribution in accordance with the purpose of the study and as a result, 49.4% of the physicians were specialized in surgery and 50.6% in internal medicine. The rate of having an academic title among the physicians participating in the study was 81.4% and 31.3% of the physicians were in the university staff and 98% of the physicians stated that they followed the medical literature, although the frequency of follow-up varied (Table 1).

Table 1. Participants' demographic characteristics and Scale Scores

	Frequency (n)	Percentage (%)
Gender		
Male	160	39.7
Woman	243	60.3
In which field are you specialized		
Surgical medical sciences	199	49.4
Internal medical sciences	204	50.6
Academic title ownership		
There is	328	81.4
No	75	18.6
Cadre status		
University staff	126	31.3
I am not on the university staff	277	68.7
How often do you follow medical literature or new studies in the field?		
2-3 days a month	202	50.1
2-3 days a week	193	47.9
I don't have time to follow	8	2
	Average	**Standard Deviation**
Age	48.49	8.89
How many years in the profession	17.15	8.28
AIAS	64.32	34.26
Learning	24.63	12.93
Job Replacement	18.31	10
Sociotechnical Blindness	12.29	6.81
AI configuration	9.09	5.15
MAIRS	99.2	12.64
Cognition	35.36	4.85
Ability	36.42	4.81
Vision	13.6	2.06
Ethics	13.83	1.68
OTOCS	27.61	2.64

The reliability analysis results of the scales used in the study are presented in Table 2. Moreover, it was determined that the scales and sub-dimensions were not normally distributed in the results of the Shapiro Wilk test and the tests used are given in Table 2.

Table 2. Scale results and comparison between groups

		Gender			Branch			Academic Title Ownership			*Frequency of following medical literature or new studies in the field*			
Scales and Dimensions	**Cronbach a**	**Male**	**Woman**	**p**	**Surgery**	**Internal**	**p**	**Yes**	**No**	**p**	**2-3 times a month**	**2-3 times a week**	**To follow I don't have time**	**p**
AIAS	0.993	50(21-147)	52(21-147)	**0.01**†	51(21-147)	51.5(21-147)	0.769†	51(21-147)	50(21-147)	0.400†	51(21-147)	52(21-147)	72(42-144)	0.087†
Learning	0.984	19.5(8-56)	20(8-56)	**0.001**†	20(8-56)	20(8-56)	0.381†	20(8-56)	20(8-56)	0.199†	20(8-56)	20(8-56)	26.5(14-55)	0.439†
Job Replacement	0.981	14(6-42)	15(6-42)	**0.021**†	14(6-42)	14(6-42)	0.401†	14(6-42)	14(6-42)	0.419†	14(6-42)	14(6-42)	23(12-42)	0.08†
Sociotechnical Blindness	0.976	9(4-28)	10(4-28)	**0.033**†	9(4-28)	10(4-28)	0.43†	9(4-28)	10(4-28)	0.733†	$9(4\text{-}28)_{a}$	$10(4\text{-}28)_{a.b}$	$14.5(8\text{-}28)_{b}$	**0.032**†
AI configuration	0.973	7(3-21)	7(3-21)	**0.007**†	7(3-21)	7(3-21)	0.977†	7(3-21)	7(3-21)	0.198†	7(3-21)	7(3-21)	11.5(3-21)	0.063†
MAIRS	0.97	102(36-110)	104(42-110)	**0.004**†	104(43-110)	103(36-110)	0.19†	104(36-110)	100(44-110)	**0.002**†	104(43-110)	103(36-110)	63.5(44-109)	**<0.05**†
Cognition	0.916	36.5(11-40)	37(16-40)	**0.008**†	37(15-40)	37(11-40)	0.404†	37(11-40)	36(16-40)	**0.023**†	37(15-40)	37(11-40)	24(16-39)	**0.019**†
Ability	0.936	38(10-40)	38(15-40)	**0.001**†	38(16-40)	38(10-40)	0.137†	38(10-40)	37(15-40)	**<0.01**†	$38(15\text{-}40)_{a}$	$38(10\text{-}40)_{b}$	$24(16\text{-}40)_{a.b}$	**0.004**†
Vision	0.874	14(4-15)	14(5-15)	**<0.001**†	14(6-15)	14(4-15)	0.307†	14(4-15)	14(5-15)	**0.004**†	14(6-15)	14(4-15)	8.5(6-15)	0.102†
Ethics	0.806	14(6-15)	14(6-15)	0.147†	14(6-15)	14(6-15)	0.583†	14(6-15)	14(6-15)	**0.016**†	$14(6\text{-}15)_{a.b.c}$	$14(6\text{-}15)_{b}$	$9(6\text{-}15)_{c}$	**0.003**†
OTOCS	0.825	28(10-30)	28(18-30)	**0.014**†	28(17-30)	28(10-30)	0.916†	28(10-30)	28(17-30)	0.278†	28(10-30)	28(17-30)	26(19-30)	**0.029**†

†: Mann-Whitney U test. ŧ: Kruskall Wallis H test, $^{a\text{-}c}$: Represents group memberships in Post Hoc test results.

The Cronbach's Alpha (α) value of the AIAS scale was found to be 0.993, which indicates that the scale is highly reliable. When the sub-dimensions of the scale are examined; the α value of the Learning dimension is 0.984, the Job replacement dimension is 0.981, the Sociotechnical Blindness dimension is 0.976 and the AI Configuration dimension is 0.973.

The overall reliability coefficient of the MAIRS was calculated as 0.97. Considering its sub-dimensions; the α value of the Cognition dimension is 0.916, the Ability dimension is 0.936, the Vision dimension is 0.874, and the Ethics dimension is 0.806 825. The reliability coefficient of the third scale, OTOCS, was found to be 0.82. The Cronbach's Alpha values presented in Table 2 show that the scales and sub-dimensions used are highly reliable.

As a result of the analysis, it was determined that the AIAS of female participants were significantly higher than male participants in the and its sub-dimensions ($p<0.05$). On the other hand, no significant difference was found between the scale scores of physicians in surgical and internal units ($p>0.05$), which indicates that anxiety levels are similar between branches.

The scores of the participants with academic titles were found to be higher than those without an academic title in the MAIRS and its sub-dimensions. This indicates that being involved in scientific activities may increase readiness for AI. As a matter of fact, the frequency of following the medical literature or new studies in the field also led to significant differences in the results of the MAIRS ($p<0.05$). It was found that the MAIR scale scores of those who followed the literature were significantly higher than those who did not follow the literature. On the other hand, for the OTOCS, there is a statistically significant difference between the groups according to the frequency of following the literature, but no difference was found between the groups ($p>0,05$). In this context, it shows that regular literature follow-up and frequency of access to information are effective in having a positive attitude towards artificial intelligence and in the level of openness to organizational change.

As a result, the findings of the analyses show that the frequency of following medical literature, academic title and gender variables are effective on AI anxiety and AI readiness levels. On the other hand, it was concluded that the frequency of following medical literature is effective on openness to organizational change.

DISCUSSION

In this study, in order to evaluate physicians' attitudes towards artificial intelligence, it was aimed to determine their openness to organizational change, their level of readiness for medical artificial intelligence and their concerns about artificial intelligence, as well as to reveal the factors affecting these attitudes. Moreover, determining whether there are differences between branches is also among the aims of the study.

When the studies in the literature are examined, differences in the adoption of AI applications between internal and surgical branches have been addressed as an important research topic in the literature. Various findings have been found that internal branch physicians adopt the potential of AI to support diagnosis and treatment processes faster than surgical branches (9,17,18). It is emphasized that although AI is a promising tool in the fields of robotics and imaging, surgeons are inevitably cautious due to technical complexities and occupational safety concerns (9,10,18,19). Similarly, Wahl et al. (17) point out that data-driven approaches increase the effectiveness of AI in internal branches, while user trust and lack of technical infrastructure limit integration in surgical branches. These findings reveal that AI applications have different dynamics between branches and that these differences should be addressed through educational and technological approaches. As researchers, our expectation was that internal medicine physicians would encounter artificial intelligence applications more frequently than surgical physicians. However, the findings show that this difference did not have a significant effect on anxiety levels. On the other hand, internal branch physicians perform less complex interventional procedures compared to surgical branch physicians and it is known that AI has a greater potential in terms of interfering with their clinical autonomy. However, the data obtained showed that there was no significant difference between the branches in terms of anxiety level. It is understood that the main difference is due to the differences in the decision-making and implementation processes of the branches (9,10,17–19).

In the scale evaluations made without any distinction of branch, it was determined that physicians do not have a serious concern about AI. In addition, they were found to be open to organizational change, which shows that physicians are not afraid of the innovations that artificial intelligence will bring and have a high potential to adapt to these changes.

The scores of the participants with academic titles on the scale and its sub-dimensions of the MAIRS were found to be significantly higher than those of the participants without academic titles. This finding indicates that physicians who are actively involved in academic activities follow new developments more closely and develop a conscious attitude towards these developments. Similarly, the increased frequency of following the medical literature facilitates physicians to be prepared for artificial intelligence.

Following the literature increases physicians' understanding and foresight in this field by

providing a broad framework of knowledge on artificial intelligence. On the other hand, it is stated that inadequate AI education may cause anxiety. Addressing this anxiety with targeted training programs is an important factor in increasing physicians' confidence in AI applications (10). Hopson et al. (20), who conducted a pilot study on AI literacy, emphasize the positive results of studies conducted in collaboration with medical students, computer scientists, AI experts. It is stated that the multidisciplinary approach will open a door to enable optimal utilization of the potential areas of medicine (personalized medicine, quality of patient care, accurate diagnosis, etc.) and AI (20).

As the integration of artificial intelligence into clinical processes is experienced by clinicians, uncertainties about these technologies are expected to decrease (20). Although the applications of artificial intelligence in clinical systems are still very new, adapting these technologies according to the feedback and criticism of physicians is critical to increase the benefits to be obtained. Similarly, Pedro et al. (18) emphasize the role of interdisciplinary collaboration in increasing clinicians' AI skills (21).

Yin et al. (11), who found that institutional AI readiness nurtures behavior that supports innovation, also brings up institutional openness to change. Experiencing a critical change and transformation such as AI in organizations will of course bring some difficulties in managing it. At the employee level, there are factors that affect the acceptance, management or resistance to this change (22). As a result of this study, it was found that organizational openness to change was higher in physicians who regularly follow the medical literature. In this context, the important role of access to information and information sharing in reducing resistance to change is emphasized. On the other hand, it is inevitable to equip physicians with the necessary skills and emphasize the need for special training programs to overcome the lack of knowledge about AI tools, to build trust and to use them effectively (9,10,23).

Limitations

Although the findings of this study provide important implications, there are some limitations. First, the study was conducted with only 403 physicians working in Istanbul and the results may not be generalizable to physicians in different geographical regions or different health systems. Secondly, a cross-sectional design was used and AI anxiety, readiness and organizational change should be examined with causality analyses along with other possible variables.

CONCLUSION

According to the findings of the study, there is no statistically significant difference between internal and surgical branch physicians in terms of AI anxiety. Similarly, there is no significant difference between the branches in terms of the level of OTOC and the level of MAIRS. On the other hand, it was concluded that regular follow-up of academic articles had a significant positive effect on physicians' level of MAIR.

As a result of the study, it was determined that academic articles following and having information affects the openness to organizational change and reduces the concerns arising from uncertainties. In this context, first of all, the balance of technology and human reasoning should be ensured in the researches to be conducted together with the training programs. Fields of application should be established and the functioning should be explained to physicians with concrete examples. Of course, there are uncertainties and areas that need to be resolved. Ethics, legal framework and security are some of them. These topics are seen as important elements of AI that should be the subject of further studies.

The data obtained shows that physicians are interested in AI. However, it is difficult to predict how the results will evolve when a larger sample is reached. Nevertheless, in order to be prepared for this transition period, health systems should gradually implement similar studies and continuously monitor their feedback. The most important emphasis here should be on the feedback to be received from healthcare personnel who use AI and are in a decision-making position.

This research opens many potential avenues for studies on AI anxiety and readiness. In future research, it is recommended to conduct similar studies on physicians in different health systems and in different countries. Such studies may reveal how cultural and systemic differences affect physicians' attitudes towards AI. In addition, it may be important to examine the differences in anxiety and readiness towards artificial intelligence according to professional experience levels (e.g., between senior physicians and beginners). Similarly, the attitudes of physicians in different specialties towards artificial intelligence can be evaluated in more detail.

REFERENCES

1. Waymel Q, Badr S, Demondion X, Cotten A, Jacques T. Impact of the rise of artificial intelligence in radiology: What do radiologists think? Diagn Interv Imaging. 2019;100(6):327–36.
2. Ahmed Z, Bhinder KK, Tariq A, Tahir MJ, Mehmood Q, Tabassum MS, et al. Knowledge, attitude, and practice of artificial intelligence among doctors and medical students in Pakistan: A cross-sectional online survey. Annals of Medicine and Surgery. 2022;76:1-7.
3. Deo RC. Machine learning in medicine. Circulation. 2015;132(20):1920–30.

4. Bhattacharya S, Pradhan BK, Bashar AM, Tripathi S, Semwal J, Marzo RR. Artificial intelligence enable healthcare: A hype, hope or harm. Journal of Family Medicine and Primary Care. 2019;8(11):3461-64.
5. Irfan F. Artificial intelligence: Help or hindrance for family physicians? Pak J Med Sci. 2021;37(1):288-91.
6. Guo J, Li B. The Application of Medical Artificial Intelligence Technology in Rural Areas of Developing Countries. Health Equity. 2018;2(1) 174–81.
7. Hua D, Petrina N, Young N, Cho JG, Poon SK. Understanding the factors influencing acceptability of AI in medical imaging domains among healthcare professionals: A scoping review. Artificial Intelligence in Medicine. 2024;147:102698.
8. Wubineh BZ, Deriba FG, Woldeyohannis MM. Exploring the opportunities and challenges of implementing artificial intelligence in healthcare: A systematic literature review. Urologic Oncology: Seminars and Original Investigations. 2024;42(3):48–56.
9. Mansoor MA, Ibrahim AF, Kidd N. The Impact of Artificial Intelligence on Internal Medicine Physicians: A Survey of Procedural and Non-procedural Specialties. Cureus. 2024;16(9):e69121.
10. De Simone B, Abu-Zidan FM, Gumbs AA, Chouillard E, Di Saverio S, Sartelli M, et al. Knowledge, attitude, and practice of artificial intelligence in emergency and trauma surgery, the ARIES project: an international web-based survey. World Journal of Emergency Surgery. 2022;17(10):1-8.
11. Yin M, Jiang S, Niu X. Can AI really help? The double-edged sword effect of AI assistant on employees' innovation behavior. Comput Human Behav. 2024;150:107987.
12. Johnson-Mann CN, Loftus TJ, Bihorac A. Equity and Artificial Intelligence in Surgical Care. JAMA Surgery. American Medical Association; 2021;156(6):509–10.
13. Çalışkan A. Örgütsel Değişime Açıklık: Bir Ölçek Geliştirme Çalışması. Aksaray Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi. 2022;14(2):191–202.
14. Terzi R. An adaptatıon of artificial intelligence anxiety scale into Turkish: Reliability and validity study research article an adaptatıon of artificial intelligence anxiety scale ınto Turkish: Reliability and validity study. International Online Journal of Education and Teaching. 2020;7(4):1501-15.
15. Wang YY, Wang YS. Development and validation of an artificial intelligence anxiety scale: An initial application in predicting motivated learning behavior. Interactive Learning Environments. 2019;30(4):619–34.
16. Karaca O, Çalışkan SA, Demir K. Medical artificial intelligence readiness scale for medical students (MAIRS-MS) – development, validity and reliability study. BMC Med Educ. 2021;21(112):1-9.
17. Wahl B, Cossy-Gantner A, Germann S, Schwalbe NR, Wahl B. Artificial intelligence (AI) and global health: How can AI contribute to health in resource-poor settings? BMJ Glob Health. 2018;3:e000798.
18. Pedro AR, Dias MB, Laranjo L, Cunha AS, Cordeiro J V. Artificial intelligence in medicine: A comprehensive survey of medical doctor's perspectives in Portugal. PLoS One. 2023;18(9):e0290613.
19. Recht MP, Dewey M, Dreyer K, Langlotz C, Niessen W, Prainsack B, et al. Integrating artificial intelligence into the clinical practice of radiology: challenges and recommendations. Eur Radiol. 2020;30(6):3576–84.
20. Hopson S, Mildon C, Hassard K, Urie PM, Della Corte D. Equipping Future Physicians with Artificial Intelligence Competencies through Student Associations. International Medical Education. 2024;3(4):388–94.
21. Triantafyllopoulos L, Feretzakis G, Tzelves L, Sakagianni A, Verykios VS, Kalles D. Evaluating the interactions of Medical Doctors with chatbots based on large language models: Insights from a nationwide study in the Greek healthcare sector using ChatGPT. Comput Human Behav. 2024;161:108404.
22. Eroğlu S.G, Alga E. Üniversite Çalışanlarının Örgütsel Değişime Açıklıkları ile Örgütsel Ataletleri Arasındaki ilişki Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi. 2019; 23 (3):1251-1271.
23. Başer A, Altuntaş SB, Kolcu G, Özceylan G. Artificial Intelligence Anxiety of Family Physicians in Turkey. Progress in Nutrition. 2021;23(2):c2021275.