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Araştırma Makalesi/ Research Article

THE RELATIONSHIP BETWEEN ARTIFICIAL INTELLIGENCE CONCERNS AND PERCEIVED SPIRITUAL CARE IN INTERNAL MEDICINE NURSES

DAHİLİYE HEMŞİRELERİNİN YAPAY ZEKÂ KAYGILARI VE MANEVİ BAKIM ALGILARI ARASINDAKİ İLİŞKİ

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Abstract

Aim: This study aimed to determine the relationship between artificial intelligence concerns and perceived spiritual care in internal medicine nurses.

Methods: This descriptive correlational study was conducted between October 13, 2021 and March 12, 2022. The sample of the study consisted of 477 internal medicine nurses. The data were collected using a 'Nurse Information Form', 'Artificial Intelligence Anxiety Scale' and 'Spirituality and Spiritual Care Rating Scale'. Data were analyzed by independent-samples t test, One-Way ANOVA, Bonferroni test, Pearson's correlation test and linear regression analysis.

Results: The majority of the nurses were 26-32 age group (33.3%), female (63.1%), married (54.9%), had bachelor's degree (58.7%) and professional experience of 6-10 years (35.6%). Their Artificial Intelligence Anxiety Scale and Spirituality and Spiritual Care Rating Scale total mean scores were 95.35±4.02 and 63.50±3.14, respectively. A highly significant negative correlation was found between their AIAS and Spirituality and Spiritual Care Rating Scale total mean scores ($r = -0.785$, $p = 0.041$). Their artificial intelligence concerns negatively affected their perceived spiritual care ($F = 36.140$, $p<0.05$, $R = .840$).

Conclusion: Internal medicine nurses had moderate Artificial Intelligence Anxiety Scale mean score and high Spirituality and Spiritual Care Rating Scale mean score. As their Artificial Intelligence Anxiety Scale mean score increased, their Spirituality and Spiritual Care Rating Scale mean score decreased.

Keywords: Internal Medicine, Nurse, Artificial Intelligence, Spiritual Care Perception.

Özet

Amaç: Bu araştırmanın amacı, dahiliye hemşirelerinin yapay zekâ konusundaki kaygıları ve manevi bakım algıları arasındaki ilişkinin belirlenmesidir.

Yöntem: Bu araştırma, tanımlayıcı ve ilişkisel olarak yapıldı. Örneklemi 13.10.2021-12.03.2022 tarihleri arasında 477 dâhiliye hemşiresi oluşturdu. Veriler, 'Hemşire Bilgi Formu, "Yapay Zekâ Kaygı Ölçeği" ve "Maneviyat ve Manevi Bakım Algılama Ölçeği" kullanılarak toplandı. Veriler, Independent-Samples t testi, One-Way ANOVA testi, Bonferroni testi, Pearson Korelasyon testi ve Linear Regresyon ile analiz edildi.

Bulgular: Hemşirelerin büyük çoğunluğu 26-32 yaş grubunda (%33.3), kadın (%63.1), evli (%54.9), üniversite mezunu (%58.7) ve 6-10 yıldır çalışmaktadır (%35.6). Hemşirelerin Yapay Zekâ Kaygı Ölçeği toplam puan ortalamasının 95.35±4.02, Maneviyat ve Manevi Bakım Algılama Ölçeği puan ortalamasının ise 63.50±3.14 olduğu bulundu. Hemşirelerin Yapay Zekâ Kaygı Ölçeği toplam puanı ile Maneviyat ve Manevi Bakım Algılama Ölçeği toplam puanı arasında negatif yönde yüksek derecede anlamlı bir ilişki olduğu saptandı ($r = -0.785$, $p = 0.041$). Hemşirelerin yapay zekâ kaygılarının manevi bakım algısı üzerinde etkili olduğu belirlendi ($F = 36.140$, $p<0,05$, $R = .840$).

Sonuç: Dahiliye hemşirelerinin Yapay Zekâ Kaygı Ölçek puan ortalamalarının orta düzeyde, Maneviyat ve Manevi Bakım Algılama Ölçek puan ortalamasının ise yüksek düzeyde olduğu bulundu. Hemşirelerin Yapay Zekâ Kaygısı Ölçeği puan ortalaması arttıkça Maneviyat ve Manevi Bakım Algılama Ölçeği puan ortalamasının azaldığı belirlendi.

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INTRODUCTION

Artificial Intelligence (AI) is an abstract concept and has become an intriguing subject today. The term of artificial intelligence dates back to the 1950s and can be briefly defined as "the science of machines that can think like humans" (1, 2). In its broader definition, AI is considered a science that contributes to the development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages (1, 3).

Artificial intelligence is rapidly affecting the field of health, as it affects many fields today (2). AI takes place in many areas in health. AI technologies are used in several health-related fields such as early diagnosis, accurate diagnosis, clinical decision making, and maintenance of health (4, 5). In China, radiologists are using artificial intelligence technologies to improve medical diagnosis and identify suspicious lesions and nodules in lung cancer patients while reading brain tomography scans and x-rays (2, 3). An AI platform is used in the USA to analyze oncology treatments and to observe if artificial intelligence can design drugs with fewer side effects (3, 4). In addition, robot nurses have provided care to patients in isolation during the COVID-19 pandemic, thus eliminating the possibility of virus transmission between nurses and patients (5). Case studies report that AI, with its ability to process information, can largely eliminate the problem of misdiagnosis and medical errors in health, and can be used to reduce the rate of medical malpractice and increase healthcare productivity (6, 7).

Nurses constitute the majority of healthcare workers and play an active role in the provision of health services (8, 9). Nursing profession has to change and develop in order to meet healthcare needs of people in today's new world (8). Internal medicine nurses, who serve a wide range of patients, need to adopt innovative approaches and AI-supported technologies while providing health services in many different areas such as health promotion, education, counseling and research (7, 9). Several reasons such as increased nursing workload and shortage of nurses will increase the use of AI supported care robots in nursing, whereby these robots will support nurses' delivery of care services (4, 8, 10).

Nurses are worried that AI may have negative effects besides its positive contributions to patient treatment and care. Programming a robot by AI to imitate human movements and make clinical decisions may pose risks for the nursing profession (11, 12), including patient privacy, ethical issues, and discussions about the ability of providing spiritual care (5, 11).

A holistic care approach, considering people' physical, spiritual, economic, cultural, emotional and spiritual aspects, constitutes the essence of nursing in today's health care services (14, 15). Spiritual and psychosocial needs are intangible and complexes compared to physical needs, and are also difficult to measure. Therefore, physical needs, which can be measured more easily, are handled first in the health care of individuals, whereas spiritual needs can be overlooked (13,16). Spirituality affects one's health, illness, well-being and quality of life (8, 9).

Artificial intelligence robots can meet physical needs of patients during treatment and care processes. Therefore, one of the primary responsibilities of nurses is to meet spiritual care needs of patients and their relatives and will not be performed through artificial intelligence robots. In its history, nursing has never been perceived as a profession to provide only physical care (12, 13). Considering the need for emotions such as compassion and empathy for patients, AI robots will be lacking at this point (17, 18). There is no study on the relationship between AI concerns and perceived spiritual care in internal medicine nurses. Considering the power of spiritual care in patient recovery, this is a significant study as it evaluates the relationship between AI and

spiritual care and examines the perceptions of internal medicine nurses regarding the use of AI in health and spiritual care.

This study aimed to determine the relationship between artificial intelligence concerns and perceived spiritual care in internal medicine nurses.

METHODS

Study Type

This is a correlational descriptive study.

Population and Sample

The population of the study consisted of all nurses (N:603) in the internal medicine clinics of one state hospital and one university hospital in Malatya, Turkey and the sample included those who worked in internal medicine clinics (internal medicine, cardiology, neurology, internal medicine intensive care, chest and dialysis) and agreed to participate in the study. No sampling method was used to reach the entire population. The sample consisted of a total of 477 internal medicine nurses who were not on leave between October 13, 2021 and March 12, 2022 and agreed to participate in the study. The participation rate was 79.0%.

Data Collection Tools

The data were collected using a nurse information form (5, 6, 8, 10, 12), the Artificial Intelligence Anxiety Scale (AIAS) and the Spirituality and Spiritual Care Rating Scale (SSCRS). A preliminary application was made with five nurses to finalize the questionnaire. The data were collected using face-to-face interview technique, following the mask, hygiene and social distance rules. Nurses first were informed about the purpose of the study and the questionnaire, and their written and verbal consents were obtained. The questionnaire lasted around 10-15 minutes to fill in.

Nurse Information Form

The form consists of a total of 10 questions, including five about the characteristics of nurses (age, gender, marital status, education level, work experience), three about their knowledge of artificial intelligence (status of having knowledge about artificial intelligence, status of having information about the use of artificial intelligence in health, status of using an application with artificial intelligence), and two about spiritual care (status of knowing about spiritual care and getting training about spiritual care) (5, 6, 8, 10, 12).

Artificial Intelligence Anxiety Scale (AIAS)

The scale was developed by Wang & Wang (2019) and adapted into Turkish by Akkaya et al. (2021). This is a 7-point Likert-type scale that asks each participant to reflect their current experiences. It has four subscales: learning, job replacement, sociotechnical blindness, and artificial intelligence configuration. The lowest and highest scale scores are 21 and 147, respectively. A higher score indicates higher artificial intelligence anxiety (19). The Cronbach's alpha coefficient of the scale was found to be 0.93 (20). In this study, the Cronbach' alpha coefficient of the scale was determined as 0.92.

Spirituality and Spiritual Care Rating Scale (SSCRS)

The scale was developed by Mcshreey Draper and Kendric (2002) (21). This is a five-point Likert-type scale, scoring from 1 to 5 and consisting of 17 items. Four items (3, 4, 13, 16) are scored in reverse. The lowest and highest scale scores are 17 and 85, respectively. A higher score indicates positive perception towards spirituality and spiritual care. The Cronbach' alpha coefficient of the scale was found to be 0.64 (21). Ergül and Temel (2007), who adapted this scale into Turkish, found the Cronbach's alpha coefficient of the scale as 0.76 (22). In this study, the Cronbach' alpha coefficient of the scale was determined as 0.78.

Data Evaluation

The data were analyzed using the SPSS 24.0 (Statistical Package for the Social Sciences) and evaluated using descriptive

statistics. The Kolmogrow-Smirnow test was used to check the data for normal distribution. The Cronbach's alpha value was found using reliability analysis. Independent-samples t-test was used to compare two independent groups for normally distributed variables. One-Way ANOVA test was used to compare more than two independent groups. Bonferroni test, one of the post-hoc analysis methods, was used to determine which group caused the difference in more than two groups. Pearson's correlation test was used for correlation analysis. Linear regression analysis was used to examine the predictors of perceived spiritual care. A p-value less than 0.05 was considered statistically significant.

Ethical considerations

For conducting the study, a written permission was obtained from the author, who conducted the Turkish validity and reliability study of the scale, via e-mail. In addition, a written permission was obtained from the institutions where the study was conducted; verbal and written consents from nurses who agreed to participate in the study; and an approval from the Inönü University Non-Interventional Ethics Committee (Decision Number: 2021-29/10). The study complied with research and publication ethics.

Limitations

This study cannot be generalized to all internal medicine nurses in Turkey and is limited to those who work in the hospitals where the study was conducted and agreed to participate in the study.

RESULTS

The majority of the nurses were between 26-32 years old (33.3%), female (63.1%), married (54.9%) and had bachelor's degree (58.7%) and working experience of 6-10 years (35.6%). The vast majority of them did not know about artificial intelligence (58.5%), did not have knowledge about the use of artificial intelligence in health (66.2%), did not use an application with artificial intelligence (76.7%), knew about spiritual care (83.4%), and did not receive training for spiritual care (65.6%) (Table 1). There was a statistically significant difference between the nurses' AIAS mean scores according to their knowledge about artificial intelligence and the use of artificial intelligence in health, where the difference was due to the those without such knowledge ($p<0.05$). In addition, there was a statistically significant difference between the nurses' SSCRS mean scores in terms of gender, marital status, working experience, status of having knowledge about the use of artificial intelligence in health, status of knowing about spiritual care, and status of getting education about spiritual care ($p<0.05$). The difference between them was caused by female nurses, married nurses, nurses with working experience of 16 years or more, those who did not know about the use of artificial intelligence in health, those who knew spiritual care, and those who received training about spiritual care ($p<0.05$) (Table 1).

The nurses' mean scores were 95.35±4.02 for AIAS, 39.17±4.00 for learning, 27.00±3.46 for job replacement, 16.92±4.18 for sociotechnical blindness, and 13.48±4.35 for artificial intelligence configuration. Their SSCRS mean score was found to be 63.50±3.14 (Table 2).

There was a highly significant negative correlation between the nurses' AIAS and SSCRS total mean scores ($r=-0.785$, $p= 0.041$). There was no significant relationship between their SSCRS total mean score and AIAS subscales mean scores ($p>0.05$) (Table 3).

The nurses' artificial intelligence concerns affected their perceived spiritual care, where $R^2=0.71$ ($F= 36.140$, $p<0.05$, $R = .840$). It was determined that 70.5% of the total variance in the nurses' SSCRS total score was explained by their AIAS total score, and the result was statistically significant ($B=-0.188$, $SE=0.010$, $\beta=-0.455$ $t=-9.125$, $p<0.001$) (Table 4).

Table 1. Comparison of AIAS and SSCRS total scores according to nurses' descriptive characteristics (n=477)

Descriptive Characteristics	***n***	**%**	**AIAS**	**SSCRS**
Age Groups				
18-25	94	19.7	95.17±4.00	63.50±3.14
26-32	159	33.3	95.02±4.73	62.94±3.57
33-40	135	28.3	95.65±4.08	63.05±3.10
41 and up	89	18.7	95.19±4.16	63.56±3.26
Test value *p*			F:1.940 0.142	F:1.085 0.417
Gender				
Female	301	63.1	94.97±4.90	67.22±3.00
Male	176	36.9	95.10±4.28	59.90±3.12
Test value *p*			t:0.065 p:0.811	t:0.026 p:**0.023***
Education level				
High school	103	21.6	95.18±4.65	63.18±3.95
University	280	58.7	95.35±4.02	63.16±3.82
Postgraduate	94	19.7	94.73±3.84	63.70±3.00
Test value *p*			F:1.660 0.959	F:2.191 0.501
Marital status				
Married	262	54.9	95.00±3.75	64.02±2.54
Single	215	45.1	95.20±4.13	62.90±3.10
Test value *p*			t:0.501 p:1.612	t:0.368 p:0.914
Years of work in the profession				
0-5 years	112	23.5	94.60±4.65	58.08±3.69
6-10 years	170	35.6	94.13±4.02	62.45±3.23
11-15 years	115	24.1	96.07±4.79	61.50±3.00
16 years and up	80	16.8	96.00±3.20	65.32±3.04
Test value *p*			F:2.016 0.077	F:1.700 **0.015***
Gaining knowledge about the concept of artificial intelligence				
Yes	198	41.5	91.55±4.20	62.83±2.06
No	279	58.5	99.16±4.10	63.79±3.17
Test value *p*			t:1.720 p:**0.030***	t:0.490 p:0.062
To have knowledge about the use of artificial intelligence in health				
Yes	161	33.8	90.87±4.16	63.57±3.46
No	316	66.2	100.38±4.83	63.66±3.23
Test value *p*			t:1.920 p:**0.017***	t:1.013 p:0.105
Using an application that uses artificial intelligence				
Yes	111	23.3	95.91±3.97	63.57±3.46
No	366	76.7	96.22±4.10	63.66±3.23
Test value *p*			t:1.598 p:0.300	t:1.013 p:0.105
Knowing Spiritual Care				
Yes	398	83.4	95.34±4.06	68.05±3.01
No	79	16.6	95.00±4.32	58.14±3.00
Test value *p*			t:1.654 p:0.086	t:0.905 p:**0.040***
Getting Education for Spiritual Care				
Yes	164	34.4	94.04±4.14	69.49±3.63
No	313	65.6	96.20±4.30	57.66±3.88
Test value *p*			t:1.068 p:0.070	t:0.256 p:**0.021***

**p*< 0.05 AIAS: Artificial Intelligence Anxiety Scale, SSCRS: Spirituality and Spiritual Care Rating Scale

Table 2. AIAS and SSCRS mean scores (n=477)

Scales	Mean	Min-Max
AIAS Total	95.35±4.02	21-147
AIAS -Learning	39.17±4.00	8-56
AIAS -Job Replacement	27.00±3.46	6-42
AIAS -Sociotechnical Blindness	16.92±4.18	4-28
AIAS -Artificial Intelligence Configuration	13.48±4.35	3-21
SSCRS Total	63.50±3.14	17-85

AIAS: Artificial Intelligence Anxiety Scale, SSCRS: Spirituality and Spiritual Care Rating Scale, Min: Minimum, Max: Maximum.

Table 3. Correlation between nurses' AIAS total and sub-dimension scores and SSCRS (n=477)

Scales		SSCRS
AIAS Total	**r**	-0.785
	p	0.041*
AIAS -Learning	**r**	0.006
	p	0.982
AIAS -Job Replacement	**r**	0.224
	p	0.763
AIAS -Sociotechnical Blindness	**r**	0.195
	p	0.060
AIAS -Artificial Intelligence Configuration	**r**	0.012
	p	0.259

Pearson correlation analysis *p < 0.05; AIAS: Artificial Intelligence Anxiety Scale, SSCRS Spirituality and Spiritual Care Rating Scale

Table 4. Linear Regression Analysis of the effect of AIAS on SSCRS (n=477)

Variable	B	S.E.	β	t	*p*
Constant	62.78	.25		3.00	.00
AIAS	- 0.221	.15	- 0.018	2.19	.03

F = 36.140, p< .05; R = .840, R^2 = .705; AIAS: Artificial Intelligence Anxiety Scale

DISCUSSION

Artificial intelligence makes it easier for nurses to support clinical decision-making in complex care practices or to conduct remote tasks that require one-to-one interaction with patients, such as documentation processes (4, 8). However, the idea that artificial intelligence robots will replace nurses in the future will cause the problems of meeting physical and spiritual care needs of patients together (17, 18). Based on this idea, the results of our study were discussed in the light of the literature.

Internal medicine nurses had moderate anxiety about the use of AI in the field of health. This may be because they do not have sufficient knowledge about AI applications and have not encountered such a technology yet. Although health professionals generally agree on the benefits of using AI in the field of health, most healthcare professionals do not fully understand the principles of AI and are concerned about the possible consequences of its widespread use in clinical practices (23, 24). They concern about privacy and inability of AI robots to meet patients' spiritual care needs (23, 25).

Our study found a significant difference between the nurses' AIAS mean scores according to their knowledge about artificial intelligence and its usage in health. Those who did not have knowledge about AI and its usage in health had higher AIAS. Studies have reported that knowing about AI and its use reduces anxiety about AI (4, 25). Experts using AI technology should explain this technology to nurses to relieve their anxiety and confusion on this issue. In addition, nurses should make an individual effort to reach accurate and reliable information about AI (26, 27).

As the lowest and highest scores on SSCRS are 17 and 85, the nurses' perceived spiritual support was found to be high in this study. The nurses' perceived spiritual support mean score was found as 52.48±6.51 by Timmins and Caldeira (28), 44.151±10.83 by Veloza-Gómez et al., and 47.70±9.95 by Riahi et al., suggesting that they had high perceived spiritual care (29, 30). Perceived spiritual support is important for patients to recover from their illness or to accept their illness. Employees with high perceived spirituality will provide spiritual support to patients and contribute to their treatment processes through a more hopeful perspective (31, 32). These will also have positive effects on the job satisfaction of health service providers and the effectiveness and efficiency of health institutions.

The present study determined significantly higher perceived spiritual care in female nurses. As female nurses constitute the majority of nursing profession and are more sensitive in approaching patients emotionally, this may have played an active role in the emergence of this difference. Compared to male nurses, female nurses have more emotional sensitivities and better ability to share their feelings with patients, have higher sense of compassion, and are more sensitive to the needs of others (47). Female nurses also have high spiritual care sensitivity (48, 49). Our study found higher perceived spirituality and spiritual care in nurses who had a working experience of 16 years or above, suggesting that a longer professional experience in clinics affects nurses' perceived spiritual care positively.

Studies reported that nurses who did not know about spirituality and spiritual care had lower SSCRS mean scores (8, 9), and that nurses who received training on spiritual care practice spiritual care more frequently (13, 14). According to the results of our study, the nurses who did not know about spiritual care and those who did not receive training on this subject was found to have lower SSCRS mean scores. These results show that training for both nursing students and nurses about spirituality and spiritual care increases their knowledge, perception and practices about the subject (15, 16). Considering the results of our study and those in the literature; the most important reason for the unmet spiritual care needs of patients is the nurses' lack of knowledge about spirituality and spiritual care (16, 22)

There was an elevated level of negative correlation between the AIAS and the SSCRS, and the nurses' AIAS significantly affected their perceived spiritual care scores. Those with high AI anxiety had lower perceived spiritual care. These results suggest that nurses consider the use of AI in health insufficient in terms of meeting spiritual care needs of patients. Studies have emphasized that the majority of nurses agree that AI robots will not be able to meet moral and emotional needs of patients because they will not have feelings such as love and compassion (12, 34). Nurses believe that meeting spiritual care needs of patients, one of the important duties of nurses, cannot be fulfilled by AI health robots.

CONCLUSION

Internal medicine nurses obtained moderate AIAS mean score and high SSCRS mean score. As their AIAS mean score increased, their SSCRS mean score decreased. Therefore, it is important to increase the awareness of nurses on AI technologies through trainings, examine their attitudes towards artificial intelligence, and create harmonization strategies between nurses and AI applications. It is necessary to develop holistic and

transparent AI systems that can solve spiritual care problems, eliminate related risks in health and have spiritual care sensitivity. In addition, further comprehensive and qualitative studies should be conducted to understand nurses' concerns about AI.

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Conflict of Interest Statement

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