

Palliative Care in the Age of Artificial Intelligence: Evaluation of Healthcare Workers' Awareness and Attitudes

Yapay Zeka Çağında Palyatif Bakım: Sağlık Çalışanlarının Farkındalık Düzeyi ve Tutumlarının Değerlendirilmesi

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Abstract

Objective: Palliative care plays a critical role in improving quality of life for patients with life-limiting illnesses; however, misconceptions, educational gaps, and emerging technological challenges continue to affect its clinical implementation. This study aimed to evaluate healthcare professionals' awareness and attitudes toward palliative care and to explore their perceptions of artificial intelligence (AI) applications in palliative care practice.

Method: This descriptive cross-sectional study was conducted between September 1 and 30, 2025, among healthcare professionals working in tertiary care hospitals. A structured questionnaire, developed through literature review and expert consultation, was administered to physicians, nurses, and allied health professionals. The questionnaire included items on palliative care awareness and attitudes, as well as perceptions of AI applications. Content validity was confirmed ($\alpha=0.88$), and internal consistency was satisfactory (Cronbach's $\alpha=0.82-0.86$). Data were analyzed using descriptive statistics.

Results: A total of 337 participants were included in the analysis (response rate: 96.3%). Most participants demonstrated high awareness of palliative care principles, with 91.6% correctly identifying quality of life improvement as its primary goal. The majority rejected misconceptions that palliative care is limited to terminal stages (73.8%) or oncology patients (88.1%). Despite this, 49.6% reported insufficient training in opioid use, and 19.8% felt inadequately prepared for difficult patient-family conversations.

Öz

Amaç: Palyatif bakım, yaşamı tehdit eden hastalıklarda yaşam kalitesini artırmada temel bir rol oynamaktadır; ancak yanlış inanışlar, eğitim eksiklikleri ve gelişen teknolojilere ilişkin belirsizlikler klinik uygulamayı etkilemektedir. Bu çalışmanın amacı, sağlık profesyonellerinin palyatif bakıma yönelik farkındalık ve tutumlarını değerlendirmek ve palyatif bakımda yapay zeka (YZ) uygulamalarına ilişkin algılarını incelemektir.

Yöntem: Bu tanımlayıcı kesitsel çalışma, 1-30 Eylül 2025 tarihleri arasında üçüncü basamak sağlık kuruluşlarında çalışan sağlık profesyonelleri ile yürütülmüştür. Literatür taraması ve uzman görüşleri doğrultusunda geliştirilen yapılandırılmış bir anket; hekimlere, hemşirelere ve yardımcı sağlık personeline uygulanmıştır. Anket palyatif bakım farkındalık ve tutumları ile YZ algılarını içermektedir. İçerik geçerliği sağlanmış ($\alpha=0,88$) ve iç tutarlılık katsayıları kabul edilebilir düzeyde bulunmuştur (Cronbach $\alpha=0,82-0,86$). Veriler tanımlayıcı istatistiklerle analiz edilmiştir.

Bulgular: Toplam 337 katılımcı çalışmaya dahil edilmiştir (yanıt oranı: %96,3). Katılımcıların büyük çoğunluğu palyatif bakımın temel amacını doğru şekilde tanımlamış (%91,6) ve palyatif bakımın yalnızca terminal dönem (%73,8) veya onkoloji hastalarıyla (%88,1) sınırlı olduğu yönündeki yanlış inanışları reddetmiştir. Buna karşın, katılımcıların %49,6'sı opioid kullanımı konusunda ek eğitime ihtiyaç duyduğunu, %19,8'i ise hasta-aile görüşmelerinde kendini yetersiz hissettiğini belirtmiştir. YZ'ye yönelik tutumlar heterojen olup, %37,7'si YZ kullanımını desteklerken gizlilik (%86,7) ve empati

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Abstract

Attitudes toward AI showed a heterogeneous distribution: 37.7% supported broader AI implementation, while 45.7% remained undecided. Concerns regarding patient confidentiality (86.7%) and loss of empathy (54.0%) were prominent, although most participants expressed willingness to receive training on AI applications.

Conclusion: Healthcare professionals demonstrated generally positive awareness of palliative care; however, important gaps persist in clinical competencies such as opioid management and communication skills. AI offers potential benefits for palliative care delivery, but ethical concerns highlight the need for cautious, human-centered integration supported by structured education and governance frameworks.

Keywords: AI-assisted healthcare, healthcare professionals, palliative care awareness

Öz

kaybı (%54,0) önemli kaygılar olarak öne çıkmıştır. Buna rağmen katılımcıların çoğu YZ eğitimi almaya isteklidir.

Sonuç: Sağlık profesyonellerinin palyatif bakıma yönelik farkındalığı genel olarak olumlu olmakla birlikte, klinik becerilerde önemli eksiklikler bulunmaktadır. YZ, palyatif bakımda potansiyel katkılar sunsa da etik ve insani boyutlar gözetilerek, yapılandırılmış eğitim ve düzenleyici çerçevelerle desteklenen bir entegrasyon gerekmektedir.

Anahtar kelimeler: Palyatif bakım farkındalığı, sağlık profesyonelleri, YZ-destekli sağlık

Introduction

Palliative care is a holistic and multidisciplinary care model that aims to improve the quality of life of individuals living with life-limiting illnesses by addressing physical, psychological, social, and spiritual needs. The World Health Organization emphasizes that palliative care should not be restricted to terminal stages but should be integrated early in the disease trajectory (1). Nevertheless, the integration of palliative care into routine clinical practice remains heterogeneous worldwide, with persistent variations in healthcare workers' awareness, misconceptions regarding eligibility criteria, and uncertainty about the appropriate timing of referral (2-4).

Although recent literature suggests an overall improvement in conceptual knowledge of palliative care, this knowledge is not consistently translated into clinical practice. A meta-analysis including more than 30 international studies demonstrated that misconceptions such as "palliative care begins only when curative treatment ends" remain prevalent, particularly among non-specialist clinicians (4). These findings indicate that increasing awareness alone is insufficient unless it is supported by structured educational programs and implementable care models.

At the same time, the growing demand for palliative care services — driven by population aging, increasing cancer prevalence, and the rising burden of chronic diseases — has further underscored the need for adequately trained healthcare professionals (5). However, several barriers continue to limit effective palliative care delivery, including hesitancy toward opioid use, moral distress during end-of-life decision-making, communication challenges with patients and families, and insufficient

interdisciplinary collaboration (6,7). The palliative care knowledge scale, developed and validated by Kozlov et al. (6), has demonstrated that education significantly improves knowledge; yet notable gaps persist in translating this knowledge into routine clinical practice. Therefore, systematically assessing healthcare workers' perceptions and attitudes toward palliative care is essential for identifying educational needs and informing service planning.

In parallel with these traditional challenges, healthcare systems are undergoing a rapid digital transformation in which artificial intelligence (AI) is increasingly being introduced as a supportive tool for clinical decision-making. In the context of palliative care, AI-based applications have shown potential in prognostication, early identification of symptom trajectories, patient monitoring, risk stratification for clinical deterioration, and decision support systems (8,9). In oncology settings, AI-assisted mortality prediction models have been reported to estimate 6-12-month survival with accuracies ranging from 75% to 92% (10). Additionally, emerging studies have explored the use of natural language processing-based systems to support empathic communication and detect early pain signals through physiological pattern recognition (11).

Despite these promising developments, the adoption of AI in palliative care remains limited. Ethical concerns—including patient privacy, algorithmic transparency, accountability in clinical decision-making, and the potential erosion of human empathy—represent major barriers to implementation in this sensitive, human-centered field (12-14). Importantly, previous research has demonstrated

that healthcare professionals' acceptance and readiness are key determinants of successful technology integration, highlighting the need to understand their perceptions toward AI applications.

Against this background, a combined examination of healthcare workers' knowledge and attitudes toward palliative care, together with their perceptions of AI-based applications, is both timely and necessary. However, the existing literature addressing this dual perspective remains scarce, particularly in healthcare systems where AI integration is still emerging and palliative care education varies considerably. Therefore, the present study aims to evaluate healthcare workers' awareness of and attitudes toward palliative care and to explore their perceptions of AI applications in this field. If both traditional and technological dimensions are addressed, the findings may inform targeted training programs, guide resource allocation, and support the development of ethical, human-centered AI integration policies to strengthen future palliative care delivery.

Materials and Methods

Study Design and Setting

This study was designed as a descriptive cross-sectional survey and was primarily aimed at providing an exploratory assessment of healthcare workers' awareness and attitudes rather than testing predefined hypotheses. Data were collected from healthcare professionals working in tertiary care hospitals between September 1 and September 30, 2025. Ethical approval was obtained from the İstanbul Medipol University Ethics Committee (decision no: 1137, date: 23.09.2025). Participation was voluntary, and written informed consent was obtained from all participants. This study was primarily designed as an exploratory assessment to map awareness and attitudes rather than to test predefined hypotheses.

Participants

The study population comprised physicians (specialists, residents, associate professors, and professors), nurses, and allied health professionals. Inclusion criteria were: (i) age ≥ 18 years, (ii) current employment in the hospital, and (iii) voluntary participation. Exclusion criteria included refusal to participate and incomplete survey responses.

Questionnaire Development and Validation

The questionnaire was developed through an extensive literature review and consultation with three palliative care specialists and one academic with expertise in AI.

Content validity was assessed using expert ratings, yielding a content validity index of 0.88.

A pilot study was conducted with 30 healthcare professionals to assess clarity, relevance, and completion time. Based on pilot feedback, minor wording adjustments were made. Pilot data were excluded from the final analysis.

Internal consistency reliability was evaluated using Cronbach's alpha coefficients:

- Palliative care awareness/attitude section: $\alpha=0.82$
- AI perception section: $\alpha=0.86$.

Data Collection Tool

The questionnaire consisted of two main sections.

Palliative care awareness and attitudes (21 items):

- Profession and years of professional experience
- Referral practices to palliative care services
- Likert-scale items (1= strongly disagree, 5= strongly agree) assessing scope and objectives of palliative care, holistic approach, family involvement, opioid use, communication skills, training needs, psychosocial support, and ethical considerations
- Open-ended items for additional comments.

AI in palliative care (15 items):

For the purpose of this study, AI applications were defined as clinical decision-support tools, prognostic models, symptom-monitoring systems, and communication-support technologies potentially applicable in palliative care settings.

- Awareness of AI applications in symptom management, prognosis prediction, and patient communication
- Perceived benefits, risks, and ethical concerns related to AI use
- Likert-scale items evaluating attitudes toward AI-based patient monitoring, clinical decision-support systems, empathetic communication support, and family support
- Training needs and willingness to receive education on AI.

Variables such as medical specialty and duration of direct experience in palliative care were not included to limit questionnaire length and reduce response burden, given the exploratory nature of the study.

Sample Size

The required sample size was calculated using a prevalence-based approach with a 95% confidence level and a 5% margin of error. Given the descriptive and exploratory design of the study, a minimum sample size of 350 participants was determined. After exclusion of incomplete questionnaires, 337 valid responses were analyzed, yielding a response rate of 96.3%.

Statistical Analysis

Data analysis was performed using IBM SPSS Statistics for Windows, Version XX (IBM Corp., Armonk, NY, USA). Descriptive statistics were presented as frequencies and percentages for categorical variables and as mean \pm standard deviation for continuous variables.

Consistent with the exploratory and descriptive design, no hypothesis-driven comparisons or multivariable inferential analyses (e.g., chi-square tests or logistic regression) were planned. Therefore, the analysis focused exclusively on descriptive statistics to summarize overall response patterns and trends.

Results

A total of 350 healthcare professionals were approached, and after excluding incomplete responses, 337 participants were included in the final analysis, yielding a response rate of 96.3%. The study population consisted of physicians (specialists, residents, and academic faculty), nurses, and allied health professionals. The distribution of professional experience was as follows: 0-1 years (15.0%), 2-4 years (23.3%), 5-10 years (33.4%), and ≥ 11 years (28.3%) (Figure 1). Both early-career and experienced healthcare workers were represented in the study sample.

Overall awareness of palliative care was high (Table 1). Forty-one percent of participants reported referring at least one patient to palliative care services within the past three years. A majority of participants disagreed with the statement that palliative care is intended only for terminal patients (73.8%), while 10.9% agreed with this statement and 15.3% were neutral. Similarly, 88.1% of respondents disagreed that palliative care is limited to oncology patients, 6.4% agreed, and 5.5% were neutral.

Most participants correctly identified improvement in quality of life as the primary goal of palliative care (91.6%) and more than 85% agreed that psychosocial support is an essential component of palliative care. Regarding perceived competencies, 49.6% of participants reported

a need for additional training in opioid use, while 50.4% indicated that they felt sufficiently trained. With respect to communication skills, 19.8% reported feeling inadequately prepared for difficult patient-family conversations, 56.8% reported feeling adequately prepared, and 23.4% reported feeling neutral (Table 1).

Attitudes toward AI in palliative care showed a heterogeneous distribution of responses (Table 2). While 37.7% of participants supported broader implementation of AI applications in palliative care, 45.7% remained undecided and 16.6% opposed broader implementation. Opinions regarding the role of AI in supporting ethical decision-making were divided: 27.0% agreed, 28.5% disagreed, and 44.5% reported neutral responses.

Concerns related to patient confidentiality were prominent, with 86.7% of participants indicating that AI poses at least a moderate risk to data privacy, while 2.1% perceived no such risk. Perceptions of AI's ability to replicate empathy were mixed: 19.5% evaluated this capacity positively, 20.2% evaluated this capacity negatively, and 54.0% reported uncertainty. Despite these concerns, the majority of participants expressed willingness to receive training related to AI applications in palliative care (Table 2).

Discussion

This study evaluated healthcare professionals' awareness and attitudes toward palliative care and explored their perceptions of integrating AI into clinical practice. By addressing both traditional palliative care knowledge and emerging technological perspectives, the findings provide contemporary insights into the evolving landscape of palliative medicine.

Awareness levels regarding the fundamental goals of palliative care were generally encouraging. Most participants rejected the misconceptions that palliative care is limited to terminal patients (73.8%) or to oncology settings (88.1%); most recognized quality-of-life enhancement as its central aim (91.6%). These observations indicate progress compared with earlier reports in which palliative care was frequently perceived as synonymous with end-of-life care (2,3). However, the persistence of misconceptions in the literature (4) and variability across healthcare systems suggest that continuous education and institutional standardization remain necessary.

Despite favorable overall awareness, this study revealed marked gaps in essential competencies. Nearly half of respondents (49.6%) reported insufficient opioid

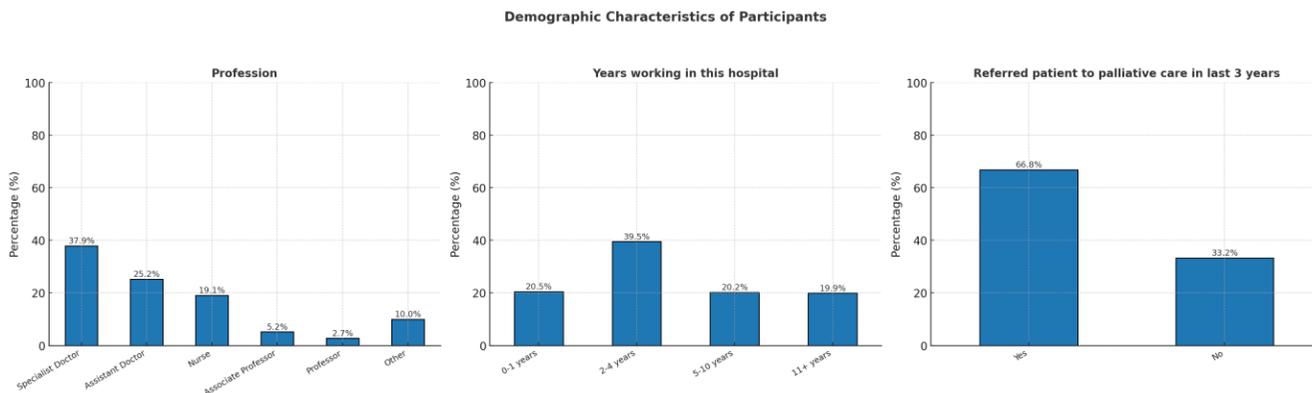


Figure 1. Demographic characteristics of participants

Table 1. Awareness and attitudes toward palliative care among healthcare professionals (n=337)

Statement	Agree n (%)	Neutral n (%)	Disagree n (%)
Palliative care aims to improve quality of life	309 (91.6)	-	-
Palliative care is only for terminal patients	37 (10.9)	52 (15.3)	248 (73.8)
Palliative care is limited to oncology patients	22 (6.4)	19 (5.5)	296 (88.1)
Psychosocial support is an essential component of palliative care	≥287 (≥85.0)	-	-
I feel sufficiently trained in opioid use for palliative care	170 (50.4)	-	167 (49.6)
I feel adequately prepared for difficult patient-family conversations	191 (56.8)	79 (23.4)	67 (19.8)
I have referred at least one patient to palliative care in the last three years	138 (41.0)	-	-

Table 2. Attitudes toward AI in palliative care (n=337)

Statement	Agree n (%)	Neutral n (%)	Disagree n (%)
AI should be more widely implemented in palliative care	127 (37.7)	154 (45.7)	56 (16.6)
AI can support ethical decision-making in palliative care	91 (27.0)	150 (44.5)	96 (28.5)
AI poses a risk to patient confidentiality	292 (86.7)	38 (11.2)	7 (2.1)
AI can adequately replicate empathy in patient care	66 (19.5)	182 (54.0)	68 (20.2)
Willingness to receive training on AI applications in palliative care	Majority	-	-

AI: Artificial intelligence

knowledge, and 19.8% reported feeling inadequately prepared for difficult conversations with patients and families. Previous research similarly highlights deficiencies in pain management and communication as recurrent barriers to high-quality palliative care (5,6). These findings reinforce the need for comprehensive, multidisciplinary training programs that combine theoretical knowledge with structured clinical experience (10).

Perceptions toward AI demonstrated cautious optimism. While 37.7% supported broader integration of AI, only 27.0% believed it could assist with ethically complex decision-making; major concerns were identified regarding data privacy (86.7%) and loss of empathy (54.0%). This aligns with emerging evidence indicating that AI shows promise

in symptom monitoring, prognostic modeling, and clinical decision support; however, adoption remains hindered by concerns regarding transparency, accountability, and explainability (7-9,11). Notably, the strong willingness of participants to receive AI training highlights an opportunity for capacity-building, particularly given the early stage of AI integration in palliative care practice. Educational initiatives should therefore address not only technical competencies but also ethical boundaries, data security, and the preservation of human-centered care (12,13).

Study Limitations

This study has several limitations. As the data were obtained through self-reported responses, the possibility of response

bias and social desirability bias cannot be excluded. Additionally, perceptions regarding artificial intelligence were assessed based on conceptual understanding rather than direct clinical experience, as AI-based applications are not yet widely implemented in routine palliative care practice. Finally, the absence of subgroup analyses according to specialty or duration of palliative care experience may have limited a more detailed exploration of variations in attitudes.

Conclusion

Collectively, these findings suggest that improving palliative care in the digital era requires a dual strategy: addressing existing deficits in opioid-related knowledge and communication skills, and promoting the ethical, transparent, and human-centered integration of AI, supported by structured training and regulatory oversight.

Ethics

Ethics Committee Approval: Ethical approval was obtained from the İstanbul Medipol University Ethics Committee (decision no: 1137, date: 23.09.2025).

Informed Consent: Written informed consent was obtained from all participants.

Footnotes

Authorship Contributions

Surgical and Medical Practices: C.G., S.K.S., Concept: C.G., S.K.S., Design: C.G., S.K.S., Data Collection or Processing: C.G., S.K.S., Analysis or Interpretation: C.G., S.K.S., Literature Search: C.G., S.K.S., Writing: C.G., S.K.S.

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