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Role of Artificial Intelligence in Spirituality Among Palliative Care Patients: An Integrative Review

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ABSTRACT

The integration of Artificial Intelligence (AI) in palliative care nursing has reshaped healthcare delivery, particularly in addressing the holistic needs of patients; aiming to enhance patients' physical, mental, social, and spiritual well-being. This integrative review examines AI's role in addressing spiritual needs and its effectiveness in improving spiritual care outcomes. A systematic search was conducted in Google Scholar, BASE, CORE, Science Gov, RefSeek, and PubMed using keywords, covering studies from July 2023 to December 2024. Screening based on inclusion and exclusion criteria resulted in twelve (12) studies. PRISMA guidelines and CASP criteria were applied. Findings suggest that AI supports symptom detection, decision-making, and treatment optimization in palliative care. However, concerns about data privacy, trust, and the loss of human connection persist. While AI can enhance nursing practice by reducing workload and providing real-time insights, it should serve as a complement rather than a replacement for patient-centered care. Thus, ethical frameworks and proper training are essential for the responsible integration of AI in end-of-life care. Further research is needed to evaluate AI's impact on spiritual care while ensuring compassionate, ethical, and patient-centered implementation.

Keywords: *Artificial Intelligence, Palliative Care, Spirituality, Nursing, Machine Learning, Patient Autonomy*

INTRODUCTION

The integration of Artificial Intelligence (AI) and spirituality is advancing, with applications extending even to spiritual support within healthcare settings. This shift has opened new avenues for AI to support patients in palliative care, where spiritual guidance can enhance mental, social, and physical well-being, promoting peace and fulfilment. In palliative nursing, spiritual care is especially impactful, often shaping patients' end-of-life experiences and decisions. However, few studies explore AI's role in addressing existential and spiritual needs among palliative care patients. Indicators of spiritual needs, like feelings of isolation, unresolved relationships, or a search for meaning, highlight opportunities for AI technology to support caregivers in identifying, and addressing these needs. While smart sensory technology can assist in detecting stress or other symptoms, it should be used cautiously to avoid

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overshadowing the deeper, more personal dimensions of spirituality (Ott et al., 2023). Research has also started to examine the ethical implications of AI in end-of-life care. Considerations like quality of life, caregiver dedication, and respect for patients' spiritual concerns are critical when employing AI to aid decision-making (De Panfilis, Peruselli, Tanzi & Botrugno, 2023). Although AI may help ease emotional burdens, its potential impact on empathy, trust, and the human bond within healthcare must be carefully evaluated (Balasubramanian et al., 2023). Ethical issues—such as balancing empathy with privacy and cultural sensitivity—are essential to responsibly integrating AI into the deeply personal realm of spiritual care. This study aims to identify and synthesize current literature on the role of AI in addressing spiritual care in nursing. Specifically, it will critically review research on how AI can be integrated into nursing care to support palliative patients' spiritual needs, an area with a limited body of evidence. Additionally, the study will assess the effectiveness of the current AI interventions in enhancing spiritual care outcomes for both patients and nurses. Through this integrative analysis, the research will highlight gaps in the existing literature and provide recommendations for future studies. Ultimately, this study seeks to contribute to nursing practice by offering a foundational understanding for both practitioners and researchers. It will provide valuable insights into the current state of research on AI in palliative care nursing and address the role AI can play in supporting patients' spiritual well-being, while also considering the ethical implications of integrating AI into spiritual care in healthcare settings, post Pandemic.

PICOT Question

PICO or PICOT question is a framework used to formulate a focused and well-structured clinical question that serves as a guide in nursing research. The researchers established this framework to search for evidence that will help answer the inquiry:

What is the spiritual satisfaction (O) of palliative care patients and providers (P) with the role of the utilization of artificial intelligence (I) post-pandemic (T)?

Conceptual Framework

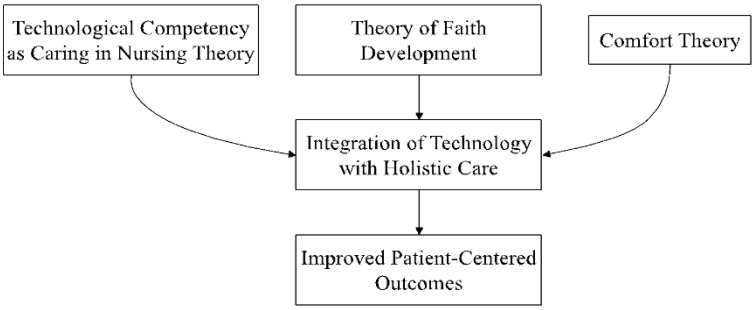

Figure 1. *Conceptual Framework of the three theories utilized in the study*

The researchers utilize Rozzano Locsin's Technological Competency as Caring in Nursing Theory, James Fowler's Theory of Faith Development, and Katharine Kolcaba's Comfort Theory to provide a robust foundation for integrating artificial intelligence (AI) into the quality of spiritual care in palliative care nursing. Locsin's theory emphasizes the use of technology to enhance nursing care while maintaining a human-centered approach. It highlights how technology can support patient satisfaction by addressing choices, mental health, and spiritual needs. While technology is effective in managing physical health, the personal touch and emotional sensitivity of nurses remain essential in addressing patients' spiritual well-being. By leveraging technology, nurses can more accurately assess, diagnose, and treat patients, enabling

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deeper engagement informed by timely and precise data. However, Locsin's theory reminds us that caring for the spirit is as vital as treating the body, underscoring the holistic nature of nursing care. Fowler's Theory of Faith Development complements this by providing a framework for understanding patients' spiritual journeys. This theory can guide the integration of AI into spiritual care by aligning its application with the stages of faith development. Such alignment enables healthcare providers to develop personalized and empathetic spiritual care strategies that evolve alongside the patient's needs. Fowler's theory also encourages reflection on the ethical implications of AI, including its limitations and impact on patient trust. This ensures that the adoption of AI in spiritual care is mindful, ethical, and trust-centered. Kolcaba's theory of comfort emphasizes three types of comfort, relief, ease, and transcendence which can be applied through physical, emotional and spiritual dimension. In the context of palliative care, this theory aligns with the goal of addressing spiritual needs by promoting a state of transcendence, where a patient will be able to find peace during illness or even end-of-life challenges. AI can help support this when it is applied thoughtfully, in ways such as helping understand patient's discomfort by using data analytics, and with helping nurses create tailored interventions to enhance patient care and comfort. Together, Locsin's, Fowler's, and Kolcaba's theories illustrate the complementary relationship between technology and spiritual care in nursing. Locsin's focus on technological competency enhances patient care without replacing the human element, while Fowler's developmental approach spiritual care supports deeper, personalized understanding of patients' faith journeys, and Kolcaba's emphasis on comfort by ensuring interventions that address a patient's relief, ease and transcendence whether physical, emotional, or spiritual. For nurses to provide holistic care, they must balance technological skills with an awareness of patients' spiritual needs, which are influenced by their stage of faith development. Understanding both the technical and spiritual dimensions of care enables nurses to address the full spectrum of patient well-being. Healthcare professionals can use AI to better understand and treat patients while remaining aligned with core nursing principles. However, ethical integration requires awareness of AI's limitations and a commitment to using it responsibly. These three theories together offer a roadmap for healthcare professionals to confidently integrate AI in ways that uphold ethical standards and enhance care delivery.

Variable Discussion

This study identifies three key research variables: the role of artificial intelligence (AI) as the independent variable, quality of spiritual life; the dependent variable, and palliative care patients as the mediating variable. The integration of AI in palliative care aims to enhance both physical health outcomes and spiritual well-being for patients facing terminal illnesses. AI has the potential to provide personalized care that respects and addresses patients' spiritual needs, a critical aspect of holistic palliative care. AI developments during the pandemic have benefited healthcare. Social distancing has created the need for some degree of contact-free patient experience and because of that, different companies have launched contactless check-in options powered by AI for patients who need in-person visits. There are a fast-growing number of patients turning to fully virtual options and companies are responding with enhancements in telehealth. For instance, more healthcare organizations are utilizing chatbots to answer basic questions for patients, including scheduling appointments and triaging visits. ("There Was an Increase in AI During the Pandemic. Soon We Won't Be Able to Imagine Life Without It," 2024).

Spirituality during COVID-19 Pandemic. The COVID-19 pandemic brought about a noticeable increase in spirituality as individuals turned to faith to cope with its challenges. Spiritual practices became a vital source of stability and hope, particularly among Filipino Catholics, who relied on their beliefs to navigate uncertainties and maintain optimism for post-pandemic recovery. The Catholic Church played a significant role by facilitating online and virtual Eucharistic celebrations, which allowed the faithful to continue their spiritual practices despite restrictions on physical gatherings. This shift to digital platforms not only maintained but also strengthened spiritual engagement during the pandemic (Rosales, 2021). Research focusing on COVID-19 patients in Pakistan highlighted that many individuals turned to

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spirituality as a primary coping mechanism during their recovery. Participants expressed that their faith provided them comfort and a sense of purpose amidst the challenges posed by the virus. This qualitative study revealed that patients often avoided hospitalization in favor of prayer and spiritual practices, reflecting a significant increase in religiosity during their illness (Safdar et al., 2023). A broader review encompassing literature from 1978 to 2019 indicated that spirituality plays a crucial role in fostering mental relaxation during crises like the COVID-19 pandemic. The review emphasized that religious practices and spiritual beliefs could serve as effective tools for emotional support, helping individuals cope with stress and uncertainty (Fardin, 2020). The findings advocate for integrating spiritual care into healthcare practices, especially for patients affected by COVID-19.

Neglected spiritual needs. The spiritual needs of COVID-19 patients have often been overlooked due to various challenges faced by healthcare providers, including high workloads and emotional fatigue. This neglect can significantly impact patients' psychological well-being and their ability to cope with end-of-life issues (Bahramnezhad & Asgari, 2020). The literature suggests that enhancing awareness and training in spiritual care among healthcare professionals is crucial for improving the quality of care provided to these vulnerable patients.

Proclamation of post COVID-19 pandemic. The date July 21, 2023 marks the end of the pandemic in the Philippines. This is according to the Proclamation No. 297 spearheaded the lifting of the State of Public Health Emergency throughout the Philippines due to COVID-19 as signed by the President of the Philippines. Furthermore, the WHO Director-General, Tedros Adhanom Ghebreyesus, also concurred with the advice offered by the said committee regarding the on-going COVID-19 pandemic and determined that COVID-19 is now an established and on-going health issue, which no longer constitutes a public health emergency of international concern and advised the transition to long-term management of the COVID-19 pandemic ("Presidential Communications Office," 2023). Post-pandemic spirituality in the U.S. reflects increased polarization. Those deeply committed to their faith maintained their practices; found solace during the crisis, while others, particularly those with weaker ties to religious institutions, disengaged further. Spirituality appears to have become more individualized, with many opting for cultural or identity-based religious connections over traditional worship practices. This shift suggests a diminished collective role of religion in society, accompanied by more personalized expressions of faith and spirituality (Gray, 2023).

Spirituality of Palliative Care patients. End-of-life or Palliative Care patients may suffer spiritual sorrow, which can entail profound introspection —— own inner deep questioning and a loss of life's meaning and purpose (Quinn & Connolly, 2023). Another study advocates for the integration of hope and spirituality in palliative care practices during the pandemic. It argues that fostering hope can help patients find purpose even amidst suffering, which is vital for enhancing their overall well-being (Laranjeira et al., 2022).

Artificial Intelligence in Palliative Care. Research supports the positive impact of AI on palliative care. Gupta N. & Gupta A. (2024) found that AI enhances palliative care by improving communication between patients and healthcare providers, allowing for more personalized support. AI tools reduce healthcare professionals' workloads, enabling them to focus on direct patient interaction essential for addressing spiritual needs. For instance, Utaria-Munive (2024) reported a 23% improvement in communication and coordination through electronic palliative care systems with AI integration, leading to better symptom management and quality of life. Similarly, two studies observed that AI-based decision-support tools increased consultation rates for palliative care by 1.44 times, ensuring timely and effective spiritual interventions (Wilson et al., 2023; Xie & Butcher, 2023).

Ethical considerations also play a critical role. Sawicki (2021) emphasized that while AI supports decision-making, it cannot replace the human touch essential for compassionate care. Abuzaid, Elshami, and Fadden (2022) found that only 8% of nurses received formal AI training, highlighting gaps in readiness within the nursing workforce. Furthermore, Lora and Foran (2024) revealed that nurses view AI capabilities,

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such as predictive analytics and automation, positively for improving workflow efficiency and patient outcomes. However, ethical concerns, including data privacy and the potential deskilling of healthcare professionals, remain significant barriers. While the integration of AI into palliative care offers transformative potential, it also raises ethical challenges and practical concerns. The lack of readiness among healthcare providers to use AI effectively could undermine its benefits (Abuzaid et al., 2022). Ethical issues such as data privacy and the risk of deskilling human expertise must be carefully addressed to prevent harm (Lora & Foran, 2024). AI should serve as a tool to enhance spiritual care rather than replace the compassionate, human-centered approach that is vital in end-of-life care. To balance technological advancement with human dignity, collaboration among technologists, healthcare professionals, ethicists, and patients is essential. While AI offers an opportunity to improve spiritual quality of life, its implementation must be guided by ethical considerations, comprehensive training for healthcare providers, and policies that safeguard patient trust.

Research Paradigm

The method of gathering research material that will be combined and utilized jointly in the integrative review is depicted in the diagram shown in Figure 2. The first step in the research process is the identification stage. The researchers will identify research questions, which are then transformed into a study title. Once problem or question is identified, the researchers will use databases and search engines to find and compile relevant literature and studies. During this phase, a wide range of possible sources are gathered for evaluation. A screening phase is used to apply eligibility criteria to the gathered studies in order to exclude those that do not fulfil certain standards, following identification and collection using search engines and databases. The relevant studies and literature go to a subsequent assessment phase to verify that they attain all requirements for review inclusion. Studies that met the requirements are chosen for further evaluation after completing the eligibility phase. The data from the chosen literature and research will then be combined to create the study variables: the role of artificial intelligence, how it is or can be used in the study's context; the quality of spiritual life, evaluating its influence or factors pertaining to spiritual life; and palliative care patients, analyzing the implications for those undergoing palliative care.

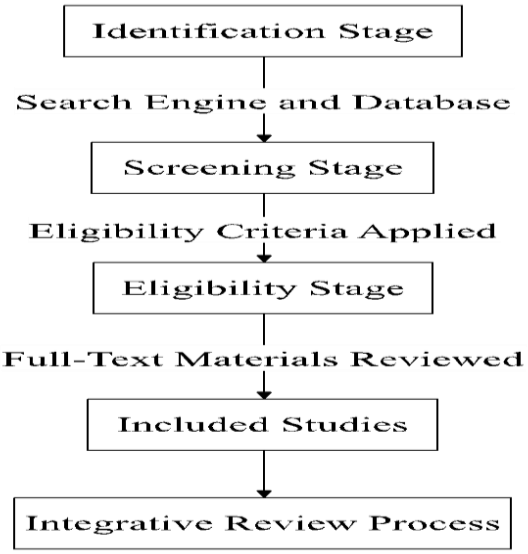

Figure 2. *Integrative Review Process.*

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METHODS

This study is an integrative review of the literature and study gathered with the use of search engines and databases with keywords, access and extracts the data of each study, and analyzes data to synthesize the result with the determining of nursing implications. The outline of the review will display studies and their authors to conduct a quality assessment after the data inclusion and exclusion to further review each study. The titles, abstracts, and full-text publications were checked and evaluated. Furthermore, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were followed.

Research Design

The study will be aligned in the following steps to conduct this integrative review: (1) identify the clinical topic of interest, (2) develop a PICOT question, (3) search strategy or inclusion and exclusion criteria, (4) conduct quality assessment of the material, (5) extract and analyze data, (6) synthesize the results, and (7) determine nursing implications.

Search Strategy and Data Sources

The review began through different libraries across Marikina and some major or university libraries around Metro Manila. In addition, the study utilized online searching of web-based resources using various search engines: Google Scholar, Bielefeld Academic Search Engine (BASE), CORE, Science.gov, and RefSeek. One database was also utilized, which was PubMed. The researchers also looked for the references of selected papers to determine any study that had not yet shown up in the searches. The following are some of the keywords that were used for inclusion and exclusion criteria: Artificial intelligence, palliative care, hospice care, spirituality, palliative care and spiritual life, artificial intelligence and spiritual life, artificial intelligence, and palliative care. The Boolean operators ("AND","OR", and "NOT") were utilized to join words. Moreover, Medical Subject Headings (MeSH) headings/ keywords in titles or abstracts: artificial intelligence/ AI/ machine learning/ ML/ neural network/ NN, palliative care/medicine were employed to index the literature in life sciences. Due to the fast-growing technological development and advancement of artificial intelligence in various countries, a date limit was fixed, therefore, only the articles published in July 2023 to December 2024 were considered to attain the post-COVID-19 pandemic literature on palliative care nursing.

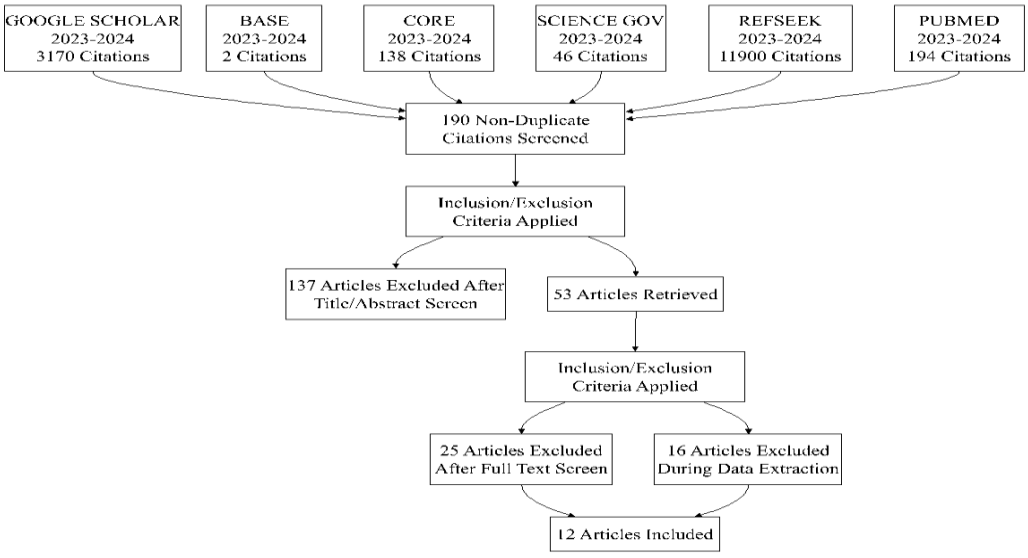

Figure 3. *Search Strategy and Selection of Paper*

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In the context of reviewing the published literature, the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) approach was used (Tedja et al., 2024). Filters were utilized to retrieve only those peer-reviewed, primary research studies in the English language. The date range was set from July 2023 to December 2024.

Study Selection and Data Extraction

The researchers followed the application of inclusion and exclusion criteria to screen the studies based on their titles and abstracts. The full-text papers were collected and evaluated to confirm that they were eligible for inclusion in the data extraction table. Data were collected from all publications that satisfied the review's eligibility and inclusion criteria. First author, date of publication, country, research design, important outputs of studies, roles of Artificial Intelligence in palliative care, and its impact to spiritual life were retrieved and evaluated.

Quality Assessment

This study conducted a quality assessment, following the Critical Appraisal Skills Program (CASP) criteria to assess the quality of each research included (Long, 2020). The CASP tools were created to critically evaluate the published materials. These are the criteria that the researchers assessed for inclusion and exclusion of data: aims, method, design, recruitment, data collection, relationship, ethics, data analysis, findings, and value. All papers that met the inclusion and exclusion criteria were included in the table provided below.

Table 1. *Quality Assessment by CASP Guidelines*

Study Authors	Q1 Aims	Q2 Method	Q3 Design	Q4 Recruitment	Q5 Data Collection	Q6 Relationship	Q7 Ethics	Q8 Data Analysis	Q9 Findings	Q10 Value
Balasubramanian et al.	Y	Y	Y	N	N	N	Y	N	Y	4
Bork-Zalewska	Y	Y	Y	N	Y	N	Y	Y	Y	4
Cascella et al.	Y	Y	Y	N	N	N	Y	N	Y	4
O'connor et al.	Y	Y	Y	N	Y	N	Y	N	Y	5
Oh et al.	Y	Y	Y	N	Y	N	N	Y	Y	4
Shetrit	Y	Y	Y	N	N	N	Y	N	Y	4
Shimada & Tsuneto	Y	Y	Y	Y	Y	N	Y	Y	Y	5
Srivastava	Y	Y	Y	N	Y	N	Y	Y	Y	4
Utaria-munive	Y	Y	Y	N	N	N	Y	N	Y	4
Vitale et al.	Y	Y	Y	N	Y	N	N	Y	Y	4
Wicki et al.	Y	Y	Y	Y	Y	N	Y	Y	Y	5
Xie & Butcher	Y	Y	Y	N	N	N	Y	N	Y	4

The table consists of 10 columns with their respective Q's. The following Q's are used with guide questions to properly assess the published material. (Q1) Aims of the study have clear objectives and whether it aligns with the study's design; was there a clear statement of the aims of the study? (Q2) The

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method used is suitable and appropriately applied for answering the research questions; is the methodology used applicable for answering the research questions? (Q3) The research design is appropriate to the study and is connected with the aims of the research; was the research design appropriate to address the aims of the study? (Q4) Recruitment of participants meets the needed population for the research question. Consider the study's validity, the possibility of bias during recruitment, and the methods used to recruit participants; was the recruitment strategy appropriate to the aims of the study? (Q5) Collection of data is appropriate with reliable tools used to gather relevant data; was the data collected in a way that addressed the research issue? (Q6) The relationship between researcher and participants are considered to avoid potential bias and influence during formulation of the research questions and data collection; has the relationship between the researchers and participants been adequately considered? (Q7) The study's ethical considerations were conducted based on ethical principles. These include assessing informed consent, ensuring participant privacy, and treating participants ethically throughout the research process; are ethical issues being taken into consideration? (Q8) The data went through the right process and the analysis is relevant and rigorous; was the data analysis sufficiently rigorous? (Q9) The study findings are clearly presented and well-supported by the data; is there a clear statement of the study? (Q10) The research holds significant value through its contribution to the field and its applicability, particularly in terms of the relevance, impact, and usefulness of the study's findings to practice, policy, and further research; how valuable is the research? It will be rated from 1 to 5, with 5 being the highest. The table was answered with yes (Y) and no/unclear (N) to further evaluate the study and whether the data are appropriate to the research aims. In this way, the papers were assessed for their validity, results, and clinical relevance.

RESULTS

The results of the study will be discussed critically in this chapter from its article/ sample characteristics, discussions, conclusion, and recommendations. The discussion will cover the integrative review of 12 identified filtered studies from the various search engines accordingly.

Article/ Sample Characteristics

The considerable search for publications has been filtered to 53 results, with 12 of them successfully meeting the integrative review's inclusion and exclusion criteria (see Table 2). The search technique was exemplified using the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) flow diagram (see Figure 3). The Level of Evidence VI applies to all the articles examined. There was one (01) study conducted in Poland, three (03) in the United States of America, one (01) in the United Kingdom, one (01) in India, one (01) in Israel, one (01) in Japan, one (01) in Switzerland, one (01) in Columbia, one (01) in Italy, and one (01) in Canada.

Table 2. *Included Articles Characteristics*

Primary Author (Year) Country of Publication	Design	Sample, Sample Size, and Setting	Method	Level of Evidence (LOE)
Balasubramanian et al. (2023); United States of America	Descriptive	No Sample, sample size, and setting	Ethical review	LOE VI
Bork-Zalewska (2024); Poland	Descriptive	PubMed and Scopus published between 2019 and 2024	Quasi-Systematic Review	LOE VI

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Cascella et al. (2024); United States of America	Descriptive	No Sample, sample size, and setting	Narrative review	LOE VI
O'connor et al. (2024); United Kingdom	Descriptive	CINAHL, MEDLINE, PsycINFO, and PubMed	Systematic review	LOE VI
Oh et al. (2024); United States of America	Conceptual	Does not involve a sample, sample size, or setting	Hypothetical case analysis	LOE VI
Shetrit (2024); Israel	Descriptive, exploratory	Does not involve a sample, sample size, or setting	Case study	LOE VI
Shimada & Tsuneto (2023); Japan	Experimental	213 cancer patient records were used as a sample from August 2015 to August 2016	Retrospective clinical survey	LOE VI
Srivastava R. & Srivastava S. (2023); India	Exploratory	Does not involve a sample, sample size, or setting	Case study	LOE VI
Utaria-Munive (2024); Colombia	Descriptive	Does not involve a sample, sample size, or setting	Literature review	LOE VI
Vitale et al. (2024); Italy	Exploratory	Does not involve a sample, sample size, or setting	Literature review	LOE VI
Wicki et al. (2024); Switzerland	Cross-sectional	29 palliative care patients participated in the palliative care unit.	Questionnaire, Survey	LOE VI
Xie & Butcher (2023); Canada	Descriptive, Evaluative	Does not involve a sample, sample size, or setting.	Horizon scan	LOE VI

Table 3. *Data Analysis*

Study	Objective	Platform/ Intervention	Outcome
Balasubramanian et al. (2023); United States of America	Examine the ethical dimensions of deploying artificial intelligence (AI) in decision-making processes related to end-of-life care within the healthcare setting.	To ultimately contribute to the enhancement of end-of-life care practices, addressing autonomy, beneficence, justice, transparency, accountability, cultural sensitivity, and emotional impact, that offer a framework for responsible AI integration which aligns with ethical principles in healthcare, can provide a comprehensive examination of the ethical dimensions surrounding AI-assisted decision-making in end-of-life care.	The integration of artificial intelligence (AI) in end-of-life care decision-making presents ethical challenges that must be carefully addressed. Patient autonomy should remain a priority, ensuring AI systems are transparent and explainable to foster trust. AI should compromise, and not replace human judgement to be able to maintain a balance between technology and healthcare providers' expertise.

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Bork-Zalewska (2024); Poland	Aims to summarize the literature on applying AI techniques, focusing on Machine Learning (ML) in palliative care, and to analyze the performance rates and usability.	Within machine learning, subsets of AI, there are two main approaches: supervised and unsupervised learning, primarily differing in the type of training data used. Supervised learning employs examples containing both the input and the expected output, whereas unsupervised learning operates only on the input data. Machine Learning was utilized for variety of reasons including the following: machine learning for mortality prediction, for identification of palliative status phases, machine learning for demands, invisible symptoms, and delirium prediction, machine learning as a communicative and informative tool, and machine learning in clinical	Machine Learning (ML) in Palliative Care is used to forecast mortality. Recent literature suggests its applications like predicting demands and various symptoms of patients with advanced disease. Moreover, AI has found application as a source of information in the field of palliative care for patients to enhance their level of awareness and knowledge, although the quality of generated data should be thoroughly evaluated and frequently improved. The role of AI in communication with people should continue to be developed further. Available ML- based tools are being validated for their use in clinical practice, achieving satisfactory results; nonetheless, there is still room for developing models to improve their usability and user experience. Meanwhile, the added value of ML and particularly its capability to generalize across data from various institutions continues to be challenging to evaluate.
Cascella et al. (2024); United States of America	Review ethical dilemmas in palliative care in ICUs, AI applications in pain therapy, and the opioid epidemic	The implementation of artificial intelligence can impact patient autonomy that raise question about informed consent. It is crucial that the patient also their families have the comprehensive knowledge and understanding of the implications of artificial intervention. Artificial Intelligence technology should always function as a complementary tool rather a replacement for a physician.	The use of artificial intelligence to ethical problems in palliative care is applicable since these challenges touch wide range of topics such as legal changes, medical advancement and access discrepancies. In order to provide a compassionate, patient centered care that respects autonomy and dignity of people dealing with serious illness and end of life decisions, it is important that these issues be addressed.
O'connor et al. (2024); United Kingdom	To identify and synthesize evidence on artificial intelligence in cancer nursing. Examine the involvement of cancer nurses in AI research. Understand the	AI has been used in numerous ways in cancer nursing. Seventeen studies applied AI techniques to address clinical issues related to direct patient care including breast, colorectal, liver, and ovarian cancers, among others. They reported improvements in the accuracy of predicting health outcomes and some cases identified variables that improved outcome prediction. The	The review showed AI is being utilized in cancer nursing. However, designing and utilizing AI-based digital tools with cancer nurses needs more rigorous research to determine if sophisticated algorithms can improve clinical and professional practice, patient care, and the delivery of cancer services. This is to ensure it evaluates the

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	limitations and risks of AI in cancer nursing.	review revealed that nurses actively participated in the study in developing and testing AI algorithms in oncology, where several limitations related to AI in cancer nursing were reported, such as the quality of the health datasets used which might reduce the accuracy of the algorithms and predictive models.	real-world impact of AI tools on oncology nursing practice is also needed, along with examining the limitations and risks of these advanced computational techniques.
Oh et al. (2024); United States of America	The study aims to critically assess whether AI technologies can ethically support the person-centered goals of palliative care and to identify gaps in responsible AI usage within the field.	The study uses these tools to examine the integration of AI technologies into palliative care practices, particularly in supporting healthcare providers in decision-making processes, patient monitoring, and personalized care planning. The findings are to enhance symptom management into Artificial Intelligence to improve the overall patients' quality of life.	The study concludes that Artificial Intelligence has the potential benefit to enhance palliative care. It emphasizes the importance of addressing ethical challenges.
Shetrit (2024); Israel	To explore AI's potential to improve palliative care and assist in the implementation of the Dying Patient Act.	Examine how AI can enhance palliative care and support the utilization of the Dying Patient Act.	Healthcare professionals must continue to implement AI based technologies that can provide added and significant value in shaping patient's last days according to the wishes and values while preserving important personal values, dignity, and privacy.
Shimada & Tsuneto (2023); Japan	To create a machine-learning based model to predict symptoms difficult to assess by general observation from patient characteristics.	Using machine learning, specifically decision tree analysis, to predict nonvisible symptoms in cancer palliative care. The model used patient background data and visible symptoms as input variables to predict nonvisible symptoms.	The machine learning model results from the patient background data used and the visible and nonvisible symptoms for the following are shown respectively. Prediction accuracy (88.0%/55.5%), sensitivity (84.9%/3.3%), and specificity (96.7%/24.1%). With this, the applications used on the results may assess symptoms to the same extent as healthcare professionals.
Srivastava R. & Srivastava S. (2023); India	The article reviews the developments in artificial intelligence (AI) technologies and their current and prospective applications in end-	The GPT-3 playground with the right prompts produced remarkable, often surprising texts and responses that imitated human interaction. However, glitches such as redundancy were noticed along with strongly held	AI-assisted communication in palliative care could be used to train professionals in the palliative care field using it as a simulation in training. It could also be used as a therapeutic intervention for the purpose of engagement and

	of-life communications. It uses Open AI's generative pre-trained transformer 3 (GPT-3) as a case study to understand the possibilities of AI-aided communication in Palliative Care.	opinions in certain questions related to faith, death, and life after death.	philosophical dialogue after certain modifications. However, it would have its own limitations such as it cannot replace a human agent just yet.
Utaria-Munive (2024); Colombia	To examine the current applications of AI in palliative care, assess its potential benefits, analyze the associated ethical challenges, and explore prospects in this rapidly evolving field.	AI-based systems, including machine learning algorithms and decision-support tools, enhance pain management, optimize clinical decision-making, and personalize patient care.	AI improves palliative care by increasing diagnostic accuracy, enhancing treatment personalization, reducing healthcare professionals' workload, and automating documentation, but ethical concerns such as data privacy, dependency on technology, and access equity must be addressed.
Vitale et al. (2024); Italy	Aimed to highlight the available evidence on the intersection of art, creativity, and the nurse–patient relationship in oncology nursing through Generative Artificial Intelligence (GAI) analysis from two specialized nursing databases.	The insights from the GAI interpretation underscored the significance of empathy, creativity, and artistry in nurturing meaningful nurse–patient connections. It acknowledged the spiritual dimension while emphasizing authentic presence and empathic communication.	The study concludes the importance of spirituality sensitivity, empathy, and professional growth in nursing care. Suggests that incorporating technology with human-centered care, including creativity and artistry, can enhance the patient experience and outcomes in oncology nursing. While AI tools like Natural Language Processing (NLP) and large language models help to analyze emotions and language, human insight remains critical in understanding the needs of the patient and how to improve communication.
Wicki et al. (2024); Switzerland	To evaluate the attitudes and perceptions of palliative care patients regarding a broad range of digital health technologies used in their routine monitoring and treatment and	The majority of patients showed interest in digital health technologies (69%) and a favourable attitude toward them (75.9%). The vast majority (93.1%) think that these tools will become more important in the future. For health management, many would use wearables (69%) or cellphones (79.3%) more regularly. Wearables, smartphones, and virtual reality were the most widely accepted technologies.	The Palliative Care patient group was very receptive to new technology, which encouraged their use throughout the end of life.

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	identify barriers to use.	Unfamiliarity, worries about data security, mistakes in data interpretation, and the loss of human interaction due to AI were among the obstacles.	
Xie & Butcher (2023); Canada	To evaluate AI-based decision-support tools (nudges) designed to help clinicians identify patients at high risk of short-term mortality and prompt end-of-life care planning conversations.	The study evaluates an AI-based nudge system integrated into EHRs, which uses machine-learning algorithms to predict short-term mortality and prompt clinicians to initiate serious illness conversations (SICs) with high-risk patients.	AI-based nudges increased palliative care consults and hospice referrals, with a two-fold and 13-fold rise respectively for high-risk patients. Despite high specificity (>0.95), the tools had low sensitivity (<0.3) and faced clinician concerns about accuracy and ethical implications. Limited external validation raised questions about their generalizability to Canadian healthcare.

DISCUSSION

Recent reviews on explorations on Artificial Intelligence (AI), as applied in palliative care, have been primarily directed towards technicalities and the algorithms (O'connor et al., 2024) needed to facilitate its model performances on health care settings with its increasing acceptance of digital health technologies in palliative care patients (Oh et al.; Utaria-Munive; Wicki et al., 2024). A model has been created to predict non-visible symptoms (which include spiritual concerns) from visible symptoms and the fundamental patient characteristics using machine learning in palliative care nursing surpassing the skills of general healthcare professionals (Shimada & Tsuneto, 2023). There were integrative reviews that emphasize AI as a predictive tool that can be integrated in clinical practice ensuring terminally ill clients will have meaningful dialogue and end -of -life planning while expressing their preferences and values (Shetrit, 2024). Furthermore, Generative Artificial Intelligence (GAI) analyses have provided critical exploration into spiritual sensitivity, empathic communication, and on-going professional growth as applied in palliative care nursing that helps patients cope up with mental health crises, including the possibility of dying (Vitale et al., 2024). With the emergence of various AI models, machine learning – driven identification of patient phases (stable, unstable, deteriorating, and terminal) is established, which enhances the clinical decision process (Sandham et al., 2022). The limited use of AI – based technologies from the wide array of AI models and tools have been identified despite its promising results that may improve the quality of palliative care and optimization of health resources (Bork-Zalewska, 2024). As Artificial Intelligence revolutionizes palliative care nursing, challenges of these AI – based technologies for end – of – life decision making are also in dire need for careful consideration and evaluation. Balasubramanian et al., (2023) identifies lack of data quality and bias, lack of transparency and interpretability in AI algorithms privacy concerns, legal and ethical issues, cultural sensitivity, emotional and psychological impact, resistance from healthcare professionals, overreliance on technology (Utaria-Munive, 2024), unintended consequences and algorithm bias, patient trust and perception and integration into clinical workforce pose a significant challenge as well. Furthermore, there have been studies in palliative care suggestive of AI – assisted communication in training professionals for simulation training, which can be used as therapeutic intervention for engagement and philosophical dialogue but notwithstanding the human agent yet (Srivastava, R, & Srivastava S., 2023). AI has been critically used in cases such as of morality – predicting machine learning algorithms which have been used for palliative care referrals, providing natural language processing systems detecting psychological distress, and AI chatbots addressing unmet information needs

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in palliative care (Oh et al., 2024), screening non- visible symptoms such as spiritual issues (Shimada & Tsuneto, 2023), and strengthening regulatory policies globally (Shetrit, 2024). More so, AI has been identified to predict patient's mortality as emphasized by Bork-Zalewska (2024), which aligns the relevance of AI – based technologies providing added value in reinforcing the patient's remaining days catering their wishes while upholding their personal values, dignity, and privacy (Shetrit, 2024). There were still studies that suggested more practical research on real-life scenarios investigating health care providers' and patient's acceptance to these AI – based behavioural interventions. This was in line with the study of Oh et al. (2024) that continuous initiatives to integrate Artificial Intelligence into palliative care practice and research needed more clarity as ethical moral principles and dimensions of beneficence, nonmaleficence, autonomy, justice, and explicability may impact patient's overall wellbeing, supporting seriously ill individuals and their families (Balasubramanian et al., 2023; Cascella, 2024). More advanced analytics in the form of Artificial Intelligence techniques are being amalgamated into these digital tools to better support patient care and the delivery of healthcare services (O'connor et al., 2024).

CONCLUSION

A dearth of studies has been identified on impact of AI – driven interventions on patient's spiritual domain as applied in the context of palliative care nursing. AI application is geared towards fundamentally improving regulatory compliance and policies that strengthens accurate predictions, prognoses, and treatment optimization Given the numerous opportunities of AI – driven interventions, there are still areas in the field of palliative care nursing that remains unclear in the context of integrating AI to ethically support the spiritual dimension, quality of life, and alleviation of suffering of terminally ill patients and their families in such health care setting.. Ethical, societal, and legal challenges must be carefully and critically addressed.

Recommendation

Further studies and rigorous research shall be conducted to examine ethical dimensions addressing the spiritual life of palliative care patients using the ethical Artificial Intelligence (AI) applications. Hence, empirical studies may be undertaken to evaluate such integration in clinical practice settings given the limitations of the AI – driven machine learning model as applied in the context of palliative care. The direction of future AI – based technologies in forecasting life expectancy and adjusting personal care to the spiritual needs and wishes of the patient may be explored considerably, which may uncover promising breakthroughs in the patient's spiritual domain as they reach their final moments of life's existence. In the context of spiritual care, AI can complement the human-centered approach in addressing the spiritual needs of palliative patients, but it should not replace it. Furthermore, this study serves as a foundational data, particularly those investigating the role of AI in the spirituality of palliative patients. However, the researchers encountered challenges due to the limited availability of studies, both online and in physical libraries, especially in the Philippines. To address this, future researchers are encouraged to expand their literature review by accessing international peer-reviewed studies via credible search engines, databases, and academic repositories. Securing funding from academic institutions to access subscription-based empirical studies could also be beneficial. Additionally, considering the increased reliance on spirituality observed during the pandemic (Safdar et al., 2023), conducting qualitative research on the perspectives of Filipino registered nurses or hospice patients in the Philippines regarding AI's role in spirituality would be valuable. Such research could explore how AI can support spiritual practices and address the spiritual needs of patients in a way that aligns with their faith and cultural background, particularly in the post-pandemic context where digital platforms for spiritual engagement have become more prevalent (Rosales, 2021). By addressing these gaps, future researchers can enhance the understanding of AI's potential in providing

spiritual care within palliative settings among researchers and Filipino registered nurses, improving the holistic well-being of patients.

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