MJN

Oncology Nurses' Knowledge, Attitudes, and Factors in Cancer Pain – A Systematic Review

Krishna Prasanth Baalann[1], Danti Joseph[2], Ashni Bhandari[3], Pallavi Kulkarni[4]*, Gaurav Agarwal[5], Shilpi Agarwal[6]

[1]Department of Community Medicine, Sree Balaji Medical College and Hospital, Chennai, Tamil Nadu 600044, India; Bharath Institute of Higher Education and Research, Chromepet, Chennai- 600 073, Tamil Nadu, India

[2]Department of Physiology, Sree Balaji Medical College and Hospital, Chennai, Tamil Nadu 600044, India

[3]Epidemiologist and Biostatistician, Sree Balaji Medical College and Hospital, Chennai, Tamil Nadu 600044, India

[4]Department of Pharmacology, KLE's Jagadguru Gangadhar Mahaswamigalu Moorsavirmath Medical College, Hubballi. KLE Academy of Higher Education and Research, Belagavi - 590010, Karnataka, India

[5]Department of Pharmacy, Panipat Institute of Engineering and Technology, Panipat, Haryana 132102, India

[6]Panipat Institute of Engineering and Technology, Panipat, Haryana 132102, India

*Corresponding Author's Email:pallavik3085@gmail.com

ABSTRACT

Background: This systematic study thoroughly examines the detailed knowledge, attitudes, and complex aspects influencing oncology nurses' cancer pain treatment. This study aims to investigate the challenges and potential avenues confronted by oncology nurses specializing in cancer pain treatment; a thorough exploration of diverse scholarly resources was undertaken. **Methods:** The inquiry encompassed an exhaustive literature review from prominent databases, including Web of Science, SCI, Scopus, Science Direct, and ProQuest. Employing an ethical and systematic methodology, a comprehensive examination was conducted into a broad spectrum of studies encompassing the understanding, attitudes, and variables related to addressing pain in cancer patients among oncology nurses. **Results:** The evaluation focused on improving oncology nurses' knowledge and attitudes towards cancer pain management. Nurses' knowledge levels were assessed, revealing a wide range from 5.13% to 84%. Doctors demonstrated superior knowledge and attitudes compared to nurses. Nurses showed a mean score of 20.08 out of 39 (51.5%) in pain management, while doctors scored 24.3 out of 39 (62.3%). The study emphasizes the need for tailored educational interventions to address knowledge gaps and improve cancer pain management practices among nurses. **Conclusion:** This systematic analysis underscores the need for accurate cancer pain treatments, highlighting gaps in oncology nurses' knowledge and the need for tailored educational programs.

Keywords: Assessment Tools; Attitudes; Clinical Recommendations; Competency Evaluations; Cultural Influences; Knowledge; Oncology; Pain Management; Systematic Review

INTRODUCTION

Effective pain management for cancer patients is a critical aspect of oncology nursing care. It requires a thorough awareness of the information, attitudes, and many other elements that influence clinical practices. This systematic analysis delves into the intricate landscape of oncology nurses' involvement in managing cancer pain. The study explores the challenges and benefits of this specific field by delving into various literature sources. The final objective is to provide specific therapeutic suggestions and improve the skills and expertise of oncology nurses. Pain, acknowledged as the fifth vital indicator in cancer patients, is a substantial, resource-

intensive, and distressing experience that underlies cancer pathology. This factor shapes its impact on the overall well-being of individuals coping with cancer (Keene *et al*., 2023). Managing cancer pain remains a formidable challenge in cancer therapy for individuals (Al Qadire *et al*., 2023). Effective cancer pain management is a pivotal facet of patient care that holds significance across all types and stages of cancer (Modderkolk *et al*., 2023). Considering the vital role of nurses as integral members of the healthcare team, their knowledge, attitudes, and skills are indispensable for adeptly handling cancer pain (Gudhoor, Ganachari & Salimath, 2023).

Considering the significant impact these symptoms have on the quality of life of cancer patients, it is essential to delve into the complexities of Cancer Pain Management (CPM) and the crucial role that nurses play in this area. A comprehensive examination is necessary to grasp the intricate interplay between psychological, biological, and societal factors contributing to the onset and progression of cancer pain (Xie *et al*., 2023). This investigation is especially crucial in the context of improving medical procedures that prolong the lives of patients in the late stages of cancer, which adds complexity to the range of pain they feel (McCabe *et al*., 2023). When it comes to managing cancer pain, it becomes clear that nurses play a crucial role due to their direct engagement in patient care (Uzunkaya Oztoprak & Terzioglu, 2024). Their duty comprises the technical parts of pain evaluation, drug delivery, and the intricate skill of empathetic communication and patient education (Phothikul & Seven, 2023). As primary healthcare professionals, nurses act as caretakers for pain management, guaranteeing that treatment approaches are tailored to each patient's distinct requirements and choices (Jimenez *et al*., 2023). This systematic study aims to clarify the complexities of the information base, attitudes, and variables that influence oncology nurses' important role in CPM. The subsequent sections outline the methodology, present significant results, engage in a detailed debate, and draw conclusions that enhance our understanding of cancer pain treatment, offering crucial insights for both research and clinical practice. In the following parts, the chosen study techniques that have been published will present the findings and finish with their valuable insights relevant to the study and clinical applications in the treatment of cancer pain. The Edmonton Classification System for Cancer Pain (ECS-CP) is a tool developed to identify complex pain syndromes in cancer patients (Sánchez Ortega, 2024).

METHODOLOGY

Eligibility Criteria

The selected studies encompass diverse methodologies, including cross-sectional analysis, descriptive questionnaire surveys, nationwide surveys, and quantitative investigations (Yee *et al.*, 2023). Each study endeavors to evaluate the knowledge and attitudes of oncology nurses regarding managing cancer pain (Shih *et al.*, 2023). Across all investigations, the inclusion criteria consistently focused on registered nurses actively engaged in oncology units, ensuring a targeted assessment of individuals directly involved in delivering care to cancer patients (Rassouli *et al*., 2015). The participants' age bracket spans from 21 to 65 years, reflecting the broad age spectrum observed among professionals in the oncology nursing field, representing the wide variety of ages seen in oncology nursing (Liu *et al*., 2023). The inclusion requirements included the desire to participate, a minimum required work experience (varying from three to six months), and possession of applicable credentials, such as nursing practice certifications issued by a competent body (Maskor *et al*.,2021). The search tactics used in these investigations are distinguished by a systematic strategy, which includes formulating study inquiries, identifying relevant keywords, using electronic databases, and implementing a systematic screening procedure (Dreismann *et al.*, 2023).

The meticulous adherence to methodological standards highlights the dedication to promoting inclusiveness and thoroughly examining the available material. The gender distribution of participants in the study exhibited variability, with stated percentages ranging from mostly female to a combination of male and female individuals. This acknowledgment recognizes and encompasses the variety of genders in the field of cancer nursing, which in turn enhances the understanding of study results by considering subtler and more detailed factors. The qualifying criteria combined lead to a rich and varied dataset, enabling a comprehensive examination of oncology nurses' knowledge and perspectives regarding managing cancer pain. This method guarantees the inclusion of diverse viewpoints from various geographical locations and demographic groups, strengthening the results' reliability and relevance. The methodological approach employed for this systematic review strictly adheres to the principles outlined in the Cochrane Handbook for Systematic Reviews, and the documentation aligns with the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-

Analyses tool (Liu, 2023). The outcome data were retrieved from the information supplied in the individual studies, and each study included in the analysis had a minimum sample size of 20 patients. The studied population consisted of nurses in inpatient units specializing in cancer (Altarawneh *et al.*, 2023). The current study focused on thoroughly examining the areas of knowledge, attitudes, relevant variables, and suggestions for improvement among inpatient nurses working in cancer settings.

Search Strategy

The search strategy employed in this extensive examination followed a systematic approach to identify pertinent literature and evaluate the perspectives and viewpoints of oncology nurses regarding cancer pain management. A comprehensive exploration was conducted on electronic databases, including PubMed, CINAHL, Cochrane Library, Proquest, and Scopus. The search terms were thoughtfully constructed, encompassing a combination of keywords and medical subject headings (MeSH) directly related to the study (Ma *et al.*, 2023). The keywords incorporated in the investigation were "management of cancer pain," "nurses specializing in oncology," "knowledge," "attitudes," "assessment of pain," and "healthcare professionals." The emphasis was placed on publications in the English language, covering the timeframe from 2000 to 2018 for contemporary relevance. The inclusion criteria prioritized studies examining oncology nurses across diverse global locations, including Turkey, Iran, Ethiopia, China, Norway, Korea, Jordan, Nigeria, and Saudi Arabia. The search methodology also targeted studies utilizing various approaches, such as cross-sectional studies, surveys, and questionnaire-based surveys. The exhaustive search methodology aimed to capture a diverse range of studies, presenting varied perspectives on the knowledge and attitudes of oncology nurses in different cultural and professional settings. The process of selecting relevant publications involved meticulous screening, data extraction, and analysis to ensure crucial findings for the subsequent sections of this comprehensive assessment. To ensure a comprehensive overview of relevant studies PROSPERO database was referred for information on ongoing or recently completed systematic reviews, particularly on the medical subject (Buchanan *et al.*, 2020).

Study Selection and Data Extraction

Following the designated study procedure and entry requirements, two persons thoroughly examined titles and abstracts, eliminated duplicate studies, and carefully evaluated the full texts to extract the necessary information. Collaborative decision-making resolved differences among the studies in selecting the final included papers, ensuring agreement in the best interest of the review's objective. When there was a shortage of necessary information, the authors of the relevant papers were directly approached. During the data extraction process, a variety of factors were considered, including the primary author, the nation of origin, the participation rate, the publication year, the sample size, the ultimate sample size, the target demographic, participant age, participant gender, the sampling strategy, and the data collection methodologies. The evaluation included many elements about the potential for bias and the measures used to evaluate outcomes. These elements included the study's goals, the tools and methods used, the metrics used to assess knowledge and attitudes, variables relevant to the study, impediments encountered throughout the study, and suggestions for enhancing future studies. The rigorous methodology used for data extraction guarantees the reliability and thoroughness of the material obtained from the study featured.

Evaluation of Quality

This evaluation tool is comprised of ten specific criteria that appraise the study quality by focusing on two primary aspects: external validity, which encompasses the evaluation of factors like the sampling frame, target population, sampling methodology, and minimal nonresponse bias, and internal validity, which entails the scrutiny of the data collection method, study instrument, case definition, and mode of data collection. This evaluation tool provides a structured and thorough approach to assessing the quality of a study, considering both external and internal validity as critical components in ensuring the reliability and credibility of research findings.

Outcomes

Selection of Studies

A thorough analysis of the existing academic literature was conducted, in which a collection of 852 papers was originally located via careful database searches. After removing unnecessary entries, a carefully selected

group of 685 papers received a thorough examination based on their titles and abstracts. Following that, an assessment for qualification was carried out on 85 papers by thoroughly examining all their texts. Seventy-five full-text articles were excluded for various reasons, such as not being relevant to the target population (35), being literature or narrative reviews (15), being letters to the editor (8), not having complete textual content (4), being in a language other than English (6) and lacking methodological rigor and quality (7). As a result, a carefully chosen to set of 10 studies was identified as the body of evidence for the subsequent systematic review (Fig. 1).
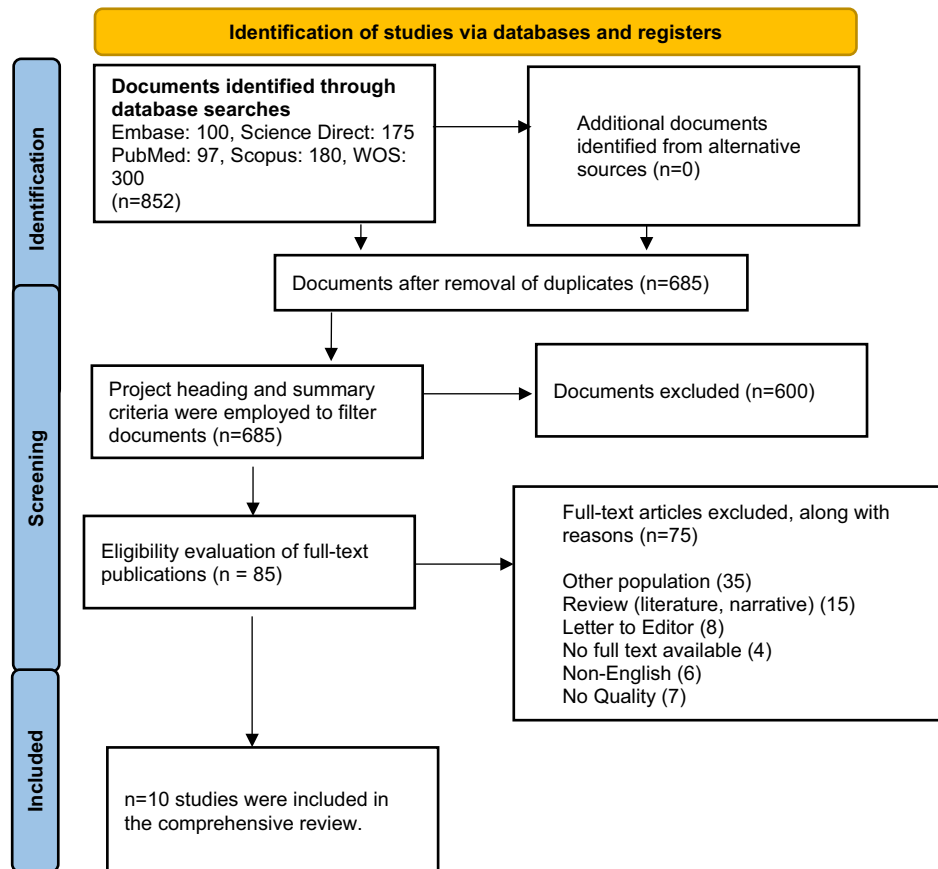
Identification of studies via databases and registers

Identification

Documents identified through database searches
Embase: 100, Science Direct: 175
PubMed: 97, Scopus: 180, WOS: 300
(n=852)

Additional documents identified from alternative sources (n=0)

Documents after removal of duplicates (n=685)

Screening

Project heading and summary criteria were employed to filter documents (n=685)

Documents excluded (n=600)

Eligibility evaluation of full-text publications (n = 85)

Full-text articles excluded, along with reasons (n=75)

Other population (35)
Review (literature, narrative) (15)
Letter to Editor (8)
No full text available (4)
Non-English (6)
No Quality (7)

Included

n=10 studies were included in the comprehensive review.

Figure 1: The Procedure for Choosing Studies for a Systematic Review is Shown in the PRISMA Flow Diagram

Characteristics of the Study

Table 1 provides a thorough summary of 10 separate studies examining the understanding, attitudes, and variables that impact the treatment of cancer pain among nurses in oncology departments. The design, precise objectives, study locations, targeted age groups, eligibility requirements, and noteworthy characteristics of the applied search approach distinguish each study. The study by Yildirim, Cicek and Uyar (2008) and colleagues employed a cross-sectional approach to assess the insights and perceptions of Turkish oncology nurses in three hospitals. The participants in the study were between the ages of 21 and 50. The study by Bernardi *et al.*, (2007) was a descriptive survey at four cancer hospitals in Korea. The study focused on registered nurses who had a minimum of six months of practical experience in oncology, aged 21 to 59. Moreover, employing a range of study methodologies, such as cross-sectional, exploratory, and web-based surveys, the subsequent studies have investigated the understanding and perspectives of oncology nurses in different international contexts, encompassing Iran, Ethiopia, China, Norway, Korea, Jordan, Nigeria, and Saudi Arabia. The studies included various ages, genders, and criteria for selecting participants. This reflects a comprehensive collection of study efforts focused on managing cancer pain in the specialist field of oncology nursing (Table 1).

Table 1: Summary of Included Studies Assessing Oncology Nurses' Understanding, Perspectives, and Influencing Factors in Cancer Pain Management

Study	Study Design	Study Aim	Study Setting	Age Range	Eligibility Criteria	Search Strategy	Sex	Mean Age
Yildirim, Cicek & Uyar (2008), Turkey	Cross sectional	Examine Turkish oncology nurses' knowledge and viewpoints on the treatment of cancer pain.	Oncology departments in three distinct hospitals in Turkey.	Between 21 and 50 years	A registered nurse working in an oncology unit and willing to participate in the study.	A comprehensive literature review in PubMed, CINAHL, and Scopus to identify relevant studies and validated instruments. Ethical considerations, statistical analysis methods, and demographic questionnaire development were explored to ensure a robust exploration approach.	Not mentioned	31.5 ± 6.5 years
Bernardi et al., (2007), Korea	Descriptive survey	The study aimed to assess Korean oncology nurses' attitudes and knowledge about cancer pain treatment and to find variables that predict these nurses' expertise in Korea.	Four different oncology centres in Korea	Between 21 and 59 years	A registered nurse working in an oncology unit and having at least six months of work experience in oncology.	The search steps include defining the study question, identifying relevant keywords, searching for sources, evaluating sources, and synthesizing the information.	91.2% female and 8.8% male	31.9 ± 7.3 years
Shahriary et al., (2015), Iran	Descriptive, exploratory cross-sectional survey study design	Examine the understanding and perspectives of oncology nurses concerning managing cancer pain.	Iran	25 to 48 years	Employees in the oncology departments who agreed to take part in the study	The search utilized terms such as "oncology nurses", "cancer pain management", "knowledge", "attitudes", "survey" in databases like PubMed and Google Scholar, focusing on articles	All female	33.5 years

					published in English within the last 10 years.		
Admass et al., (2020), Ethiopia	Cross-sectional study	Assess oncology nurses' knowledge and viewpoints about treating pain associated with cancer.	Cancer hospital in Ethiopia	25 to 48 years	Nurses specializing in oncology employed within the hospital's three oncology units.	This search strategy includes the main keywords related to the review of literature in PubMed, CINAHL, and Scopus	All female	33.5 years
Yu et al., (2021), China	Descriptive cross-sectional	Examine Chinese oncology nurses' attitudes and understanding about managing cancer pain.	Three training sessions on managing cancer symptoms were held in China to find volunteers to investigate Chinese oncology nurses' viewpoints and comprehension of cancer pain management.	Beyond the age of 18.	Those certified in nursing practice work in cancer nursing and are willing to complete the survey.	Search involves identifying, developing, selecting, conducting, screening, extracting, and analyzing data using a questionnaire.	464 were female (91.88%) and 41 were male (8.12%)	31.37 ± 5.33 years
Utne, Smastuen & Nyblin (2019), Norway	Web-based survey	Evaluate Norwegian nurses' knowledge of pain and their attitudes toward cancer care.	Oncology facility in Norway	Limited participation of male nurses (Age not mentioned)	To be eligible for participation in this study. must hold a background in cancer nursing, preferably with advanced training or a master's degree	The search strategy includes pain management, cancer care, nurses, knowledge, attitudes, pharmacology, patient expression of pain, and pain management courses using a review of literature in PubMed, CINAHL, and Scopus	(98.4%) were women, while only a small percentage (1.6%) were men	Significant associations were found between NKAS total score and pain management course ($p = 0.01$) and workplace ($p = 0.04$).
Darawad et al., (2019), Jordan	Cross-sectional	Evaluate and contrast the understanding, perspectives, and perceived obstacles among physicians and nurses in managing cancer pain.	Oncology units in participating hospitals in Jordan	Age ranges between 24 and 59 years	The study included physicians and nurses who worked in four oncology units in Jordan and had experience in managing cancer pain. The participants	The study employed an extensive search strategy to locate pertinent articles from electronic databases such as PubMed, CINAHL, and Cochrane Library. The search used keywords and	The gender breakdown of the participants is provided. Among the physicians, 61 (45.2%) were women and 74 (54.8%) were men. There were 28 (38.9%) female and	The mean age of participating physicians was 30.5 years (SD = 7.2), and the mean age of participating nurses was 28.1 years (SD = 4.09).

					were required to be able to read and write in Arabic or English to complete the questionnaire.	MeSH terms related to cancer pain management, healthcare professionals, and attitudes.	44 (61.1%) male nurses.	
Elumelu et al., (2014), Nigeria	Questionnaire-based survey	Determine the level of nurses' knowledge about cancer pain management in a Nigerian tertiary healthcare facility.	Nigerian tertiary medical institution	The age range of the respondents was 31-60 years old.	Nurses working in the specified Nigerian tertiary health institution who met the criteria for selection.	The study used a survey that respondents completed themselves with three primary sections: management of cancer-related pain, demographic information, and pain appraisal.	97% of the respondents were female, and 3% were male	The ages of the respondents ranged from 31-60 years, with the modal age range being 31-40 years
Alqahtani & Jones (2015), Saudi Arabia	Quantitative study	Evaluate the understanding and perspectives of oncology nurses in Saudi Arabian hospitals concerning pain management.	Saudi Arabian hospitals	The age range of the registered nurses included in the sample was 21-60 years old.	The study included licensed Saudi nurses, aged 21 to 60, with at least three months' training in five large hospitals.	The search involved electronic databases, including PubMed, CINAHL, and Scopus, using keywords such as "oncology nurses," "pain management," and "Saudi Arabia.	There were 284 female participants (88.8%) and 36 male participants (11.2%). Furthermore, women made up the majority of the sample.	The participants ranged in age from 24 to 65, with an average age of 34.2 years.

Nurses' Understanding and Disposition Towards CPM

Significant variations emerge when examining nurses' perspectives on cancer pain management across diverse cultural and professional contexts. In the investigation led by Yildirim (Yildirim, Cicek & Uyar, 2008), focusing on Turkish oncology nurses, the mean score for correctly answering pain-related questions was deemed inadequate, registering at 35.41%. Despite this, nurses expressed positive attitudes toward pain management, albeit with lingering misconceptions. Factors such as age, nursing education level, and years of experience were identified as influencing comprehension of pain management. According to Bernardi et al., (2007), Korean oncology nurses had a moderate level of knowledge, with an average of 21.4 correctly answering pain-related questions (SD = 5.5). The study highlighted that prior educational background and the extent of emphasis on pain management in undergraduate nursing curricula played crucial roles in acquiring and applying pain management knowledge. Admass et al., (2020) found that oncology nurses' knowledge and attitude towards cancer pain treatment were inadequate, with only 31.44% demonstrating a satisfactory level of understanding. Significant correlations were noted between nurses' educational attainment and knowledge and attitude. The study by Yu et al., (2021) indicated an insufficient understanding of cancer pain treatment. Higher education levels are positively correlated with knowledge, despite reporting favourable attitudes. Additionally, the study revealed that more years of experience in cancer nursing were associated with a higher level of understanding. The investigation by Elumelu et al., (2014) disclosed that nurses at Nigerian tertiary health institutions demonstrated insufficient overall knowledge, with only 18% having undergone formal training in cancer pain management. Contributing factors included a lack of structured education, unfamiliarity with opioid administration practices, and an inadequate grasp of pain evaluation and treatment methods. These findings

underscore the need for targeted educational interventions and training programs to enhance nurses' knowledge and attitudes regarding cancer pain management. It is crucial to acknowledge the contextual elements influencing these aspects across diverse healthcare settings (Table 2).

Table 2: Diverse Perspectives from Various Studies Regarding Nurses' Attitudes and Understanding of the Management of Cancer Pain

Study Ref	Overall Knowledge	Level of Knowledge	Level of Attitude	Related Factors of Knowledge
Yildirim, Cicek & Uyar (2008), Turkey	The mean score for correctly answered pain-related questions indicated overall knowledge was inadequate.	The mean accuracy rate for correct responses was 35.41%, ranging from 5.13% to 56.41%. The average count of accurately answered questions was 13.81 ± 5.02	Nurses had positive attitudes towards pain management, but some had misconceptions.	Demographic and professional characteristics related to pain management knowledge included age, nursing education, and years of experience.
Bernardi *et al.,* (2007), Korea	The study found that Korea oncology nurses did not understand cancer pain management, highlighting the need for educational programs to address knowledge gaps and improve patient care.	In the range of 6 to 35, the mean number of accurately answered questions related to pain awareness stood at 21.4 (with a standard deviation of 5.5). 55% of questions across the scale were responded to accurately, with a standard deviation of 25.9.	Comparison of correct answer rates for different types of questions.	Factors influencing the acquisition and application of pain management knowledge by Korean oncology nurses include prior pain management education and the degree to which pain is covered in undergraduate nursing programs at Korean universities.
Shahriary *et al.,* (2015), Iran	Overall, the knowledge of the nurses needs to be improved.	The nurses' knowledge level needed improvement, with only 13.8% of nurses having received training in pain management.	Higher scores indicate more positive attitudes. Attitude scores can vary from 25 to 100.	Level of education and pain management training were related factors that influenced the knowledge of the nurses.
Admass *et al.,* (2020), Ethiopia	Ethiopian oncology nurses' collective understanding and approach to addressing cancer pain were insufficient.	In Ethiopia, approximately 31.44% of nurses specializing in oncology demonstrated a positive understanding and attitude toward managing pain associated with cancer.	Only a small fraction, 7.2%, of oncology nurses in Ethiopia held a positive view of managing cancer pain.	Out of all the factors considered, the only notable correlation was found between knowledge, attitude, and the level of education.
Yu *et al.,* (2021), China	The overall comprehension of cancer pain treatment among oncology nurses in China was limited.	Having achieved an average score of 12.23 out of 20, Chinese oncology nurses demonstrated a moderate level of comprehension regarding cancer pain treatment.	The study revealed a mean score of 3.56 out of 5, suggesting that Chinese oncology nurses demonstrated positive attitudes regarding cancer pain management.	Education level was positively associated with knowledge. The more years of oncology nursing experience, the better the knowledge.
Utne, Smastuen & Nyblin	Nurses have good pain knowledge, but there is still room for improvement.	The mean NKAS total score for the total sample was 31 points (75%), with a	The study discovered that nurses specializing in cancer care in Norway obtained an average total score of 75% on the NKAS,	Variables like familiarity with cancer patients in the workplace, nursing experience, and completion

(2019), Norway		variation between 21 and 40 (51–97%)	indicating a noticeably higher understanding and favourable views about pain treatment.	of a pain management course were associated with the total knowledge score.
Darawad *et al.,* (2019), Jordan	Both doctors and nurses demonstrated reasonable understanding and positive attitudes regarding managing cancer pain. This study also revealed that physicians possessed adequate knowledge and positive attitudes concerning cancer pain management, registering a mean score of 62.3%.	According to the study, physicians exhibited a superior understanding and attitude score (mean score of 24.3 out of 39, SD = 5.2) compared to nurses (mean score of 20.08 out of 39, SD=4.8).	Not Reported	For physicians, factors such as working in a pain team, educational level, and specialty were significantly associated with differences in knowledge.
Elumelu *et al.,* (2014), Nigeria	The investigation unveiled that the overall comprehension of cancer pain management among nurses in tertiary healthcare institutions in Nigeria was identified as inadequate.	The study revealed a deficit in comprehensive comprehension of managing pain associated with cancer among nurses, with only 18% undergoing formal training. Although 84% could accurately define pain, merely 2% were able to present a proficient overview of cancer pain management.	The study found that only 20% of the nurses knew that a rating scale was recommended for evaluating patient pain. While 84% gave a correct definition of pain, only 2% could provide a detailed account of cancer pain management. Additionally, a lack of awareness regarding the significance of opioids was noted among 80.7% of the participants. In pain management, 63.02% had a limited idea or were not sure about other treatment options for cancer pain.	The study revealed an inadequate knowledge of cancer pain management among nurses, with only 18% having received formal training. While 84% could accurately define pain, merely 2% were able to offer a comprehensive understanding of cancer pain management. These factors included the lack of formal training in pain management, unfamiliarity with opioid administration logistics and insufficient knowledge on pain assessment and treatment modalities.
Alqahtani & Jones (2015), Saudi Arabia	The investigation showed that, on average, the mean scores indicated that the nurses exhibited a relatively constrained overall grasp of managing pain. With a mean score of 45.1% (95% CI = 43.9%, 46.2%). This indicates a substantial need for a more comprehensive understanding of pain management among oncology nurses in the KSA.	The mean KASRP score was 45.1%, indicating a relatively low level of knowledge among the nurses.	The investigation uncovered that the nurses exhibited a relatively restricted comprehension of pain control, as evidenced by the average KASRP scores, which suggested a mean score of 45.1% (95% CI = 43.9%, 46.2%). This suggests a notable need for improvement in understanding pain management among oncology nurses in the KSA.	The average KASRP scores significantly varied depending on the nurses' country of origin, enrolment in pain-related courses, and involvement in study activities.

Factors and Obstacles Associated with the Understanding of CPM:

The study thoroughly reviews the complex topic of cancer pain management, highlighting different clinical recommendations, therapies, and challenges that significantly affect oncologist nurses' expertise base. The first two studies argued for the implementation of ongoing education, essential principles, and cross-disciplinary cooperation. These ideals align with the main objective of promoting a vibrant and knowledgeable healthcare staff. The highlighted limitations, such as the absence of standardized tools and cultural obstacles, emphasize the need to develop cultural competency and implement globally applicable tools. This finding emphasizes the necessity for enhancing pain assessment and treatment practices, indicating a commitment to ongoing self-evaluation and quality improvement. The study conducted by Shahriary *et al.*, (2015) from Iran offers a score range that represents positive attitudes, highlighting the importance of having a positive mentality in the quest for knowledge. In a study conducted in Ethiopia, Admass *et al.*, (2020) highlight the association between education levels and knowledge among Ethiopian oncology nurses. This challenges existing beliefs and emphasizes the importance of education in changing attitudes. The survey reveals that a mere 7.2% of nurses demonstrated satisfactory knowledge and attitudes, highlighting the pressing need for focused interventions to address the existing knowledge deficit. Yu *et al.*,'s (2021) study underscores the significance of precision and competence in pain treatment procedures, particularly in terms of accuracy levels. This study establishes a standard for the desirable degree of expertise in this field. The study conducted by Utne, Smastuen and Nyblin (2019) from Norway proposes a complete method that supports the implementation of required education, frequent evaluation, and interdisciplinary teamwork. This approach aligns with the principles of holistic care and ongoing professional growth. The study conducted by Darawad *et al.*, (2019) in Jordan distinguishes between doctors and nurses, revealing possible deficiencies in knowledge and highlighting the need for fair and extensive education across many healthcare fields. The Nigeria study by Elumelu *et al.*, (2014) and her colleagues demonstrates a dedication to comprehending and tackling obstacles unique to the Nigerian setting. The study emphasizes the importance of treatments designed to suit the local environment. The study conducted by Alqahtani and Jones (2015) in Saudi Arabia identifies several obstacles to acquiring information and emphasizes the need for creative and study-supported educational approaches. These studies highlight the need for ongoing education, collaborating across different fields, understanding other cultures, and maintaining a positive attitude while dealing with the complex issues of managing cancer pain. The authors support the adoption of individualized treatments that take regional variations into account and stress the importance of gaining knowledge in shaping the viewpoints and understanding of cancer nurses (Table 3).

Enhancing the Knowledge and Attitude of Nurses Regarding CPM: Clinical Recommendations

The third list is a compilation of medical recommendations to improve nurses' attitudes and understanding of cancer-related pain management. This compilation of clinical recommendations aims to enhance nurses' understanding and perspectives regarding CPM. The recommended solutions embody the values the healthcare community holds, emphasizing the significance of ongoing education, multidisciplinary cooperation, and the incorporation of technological breakthroughs. The first set of suggestions, which includes Turkey, Korea, Iran, Ethiopia, and China, emphasizes the need for continuous education and training, well-defined guidelines, multidisciplinary cooperation, and the effective use of technology. Interventions that align with this include customized strategies, peer assistance, mentor guidance, and simulation learning. The limitations identified include the absence of standardized pain assessment instruments, cultural and language obstacles, and attitudinal impediments. The "Attitude" reports, which demonstrate a mean precision in responses at 35.41% and positively correlate with the duration of oncologist nursing experience, highlight concerns about the nursing staff's limited understanding and perspectives on cancer pain management. The second set of suggestions in the study conducted in Norway, Korea, Jordan, Nigeria, and Saudi Arabia emphasizes the need for ongoing education and training programs, multidisciplinary teamwork, and adherence to clinical standards. Interventions include several methods, such as seminars, online courses, simulation training, and the use of technology. Barriers include organizational concerns, individual beliefs, linguistic obstacles, and cultural difficulties. A distinct "attitude" in the Korean setting suggests oncology nurses reasonably understand pain (68.5%). Still, they need to enhance their skills in pain evaluation and treatment.

The study conducted by Yu *et al.*, (2021) in China highlights educational and quality enhancement efforts in

pain treatment, specifically targeting the issue of inadequate pain management training. The "Attitude" component incorporates a scoring mechanism (26% scoring) that assigns higher scores to indicate more favourable attitudes. It promotes consistent training in cancer pain treatment, revising the curriculum, adhering to national criteria, and engaging in conferences and workshops. Notwithstanding these suggestions, the "attitude" demonstrates a general lack of knowledge and a negative attitude among Ethiopian oncology nurses. The education degree is considerable, but no notable difference depends on prior training or work experience. The stated number indicates that a mere 7.2% of oncology nurses exhibited commendable knowledge and attitude, serving as a distinct quantitative outcome. The sixth set of suggestions consists of continuing education programs that specifically emphasize the fundamental concepts of pain management. Interventions include continuing educational initiatives and using the KASRP for assessment. Obstacles include insufficient knowledge and training, limited resource access, and misunderstandings. The "Attitude" survey reveals that the average precision of oncology nurses in managing cancer pain is 63.5%, below the acceptable accuracy level. The study by Utne, Smastuen, and Nyblin (2019) proposes the implementation of compulsory education, specialized training, curriculum integration, frequent evaluation, cooperation across different disciplines, and ongoing improvement. Interventions include instructional initiatives, simulation training, discussions involving many disciplines, consistent feedback, and following pain management recommendations. Barriers include limited education, unfavourable attitudes, limited time availability, communication difficulties, and insufficient resources, with the omission of the specific barrier of "attitude." The topic encompasses pain evaluation, drug and non-drug approaches to pain relief, and individuals' perspectives on pain control. However, there is no documented information on the precise impediments, and the "attitude" in question is poorly defined.

According to Darawad *et al.*, (2019), including evidence-based recommendations, providing ongoing education, and using pain assessment instruments to enhance understanding are recommended. Both nurses and physicians demonstrated sufficient understanding and perspectives regarding the management of cancer-induced pain. Physicians had much superior knowledge and more favourable views than nurses, achieving 62.3% and 51.5%, respectively. The Nigeria study by Elumelu *et al.*, (2014) suggests strategies such as ongoing education, multidisciplinary training, mentoring, resource accessibility, and skills evaluations. Interventions include a range of techniques, including the use of medications, non-medication approaches, collaboration among different healthcare disciplines, patient education, and palliative care. The hurdles have not been documented, and the "attitude" assessment mostly focuses on evaluating the levels of knowledge at a Nigerian tertiary health institution. The study in Saudi Arabia by Alqahtani and Jones (2015) suggests using modern educational interventions to enhance nurses' attitudes and understanding of pain treatment. Interventions in Saudi Arabian hospitals consist of formulating and executing plans supported by evidence. Obstacles include inadequate general knowledge and limited engagement in studies or appropriate courses. Nevertheless, the "attitude" is not well defined. These recommendations demonstrate the dedication to ongoing education, teamwork, and patient-focused treatment in oncology nursing. They also recognize and tackle healthcare providers' difficulties managing cancer pain (Table 3).

Table 3: Clinical Recommendations, Interventions, Barriers of Knowledge, and Overlap Attitude in Studies on Cancer Pain Management among Nurses

Study	Clinical Recommendations to Improve Knowledge	Interventions	Attitude	Barriers of Knowledge
Yildirim, Cicek & Uyar (2008), Turkey	Improve Turkish oncology nurses' pain management with targeted interventions.	Tailored interventions, peer support and mentoring, simulation, and other experiential learning approaches	Oncology nurses: 35.41% accurate response rate, positive correlation with pain knowledge.	Standardized pain assessment lacking: cultural, linguistic considerations needed; attitudinal barriers exist.
Bernardi *et al.* (2007), Korea	Recommend educational programs, nurse educator role enhancement for better oncology nursing.	Diverse interventions: workshops, courses, simulation, tech, pharmacological, non-pharmacological options.	Korean oncology nurses exhibit 68.5% moderate pain knowledge, require improvement.	Factors influencing organizational, personal, language, and cultural dynamics.

Shahriary et al. (2015), Iran	Enhance nursing pain education, integrate interventions, and update guidelines.	Enhancement and educational efforts in pain management quality advancement	The percentage of participants in the pain management survey was 28.5%.	Lack of pain management training
Admass et al. (2020), Ethiopia	Ethiopian oncology nurses: Improve cancer pain management via training, curriculum integration.	Essential national guidelines: Consistent training, curriculum revision for cancer pain.	Only 7.2% of oncology nurses viewed cancer pain positively.	Ethiopian oncology nurses' limited understanding of cancer pain management.
Yu et al. (2021), China	Improve pain management with structured education and comprehensive training programs.	Evaluate continuing education programs with KASRP for effectiveness.	Oncology nurses' attitude toward cancer pain management is 63.5%.	Limited education, resources, and misconceptions hinder cancer pain management.
Utne, Smastuen & Nyblin (2019) Norway	Enhance knowledge with education, training, and collaboration in oncology nursing.	Education, simulations, team meetings, feedback, and pain guidelines implemented.	Not Reported	Barriers to cancer pain knowledge include education gaps and resource shortages.
Darawad et al. (2019), Jordan	Improve cancer pain management through education, tools, teams, materials, and studies.	Integrate guidelines, offer education, implement pain evaluation for cancer care.	Healthcare providers understand cancer pain management; physicians more (62.3%) than nurses (51.5%).	Recognized gaps, poor pain assessment, opioid scarcity hinder CPM. Time, colleague support also cited."
Elumelu et al. (2014), Nigeria	Nigerian nurses: integrate pain control, offer formal training, raise awareness.	Interventions for cancer pain: pharmacological, non-pharmacological, multidisciplinary, education, palliative care.	Not Reported	Nurses' understanding of cancer pain control in Nigeria's health institution.
Alqahtani & Jones (2015), Saudi Arabia	In the following, suggestions for enhancing pain management among oncology nurses	Improve evidence-based pain management in Saudi hospitals.	Not Reported	Only 26% of oncology nurses understood pain management adequately.

DISCUSSION

Many important factors that contribute to the Understanding, Attitudes, and Actions (KAP) conversation are identified by selected studies. The identified gaps in knowledge levels, as evidenced by various study endeavours, underscore a substantial deficiency in the fundamental understanding of managing cancer pain within the oncology nursing community (Bouya *et al.*, 2019). Addressing this knowledge gap becomes paramount in evaluating their ability to deliver effective pain treatment. Despite generally positive attitudes among oncology nurses toward pain management, the presence of recurrent misunderstandings emphasizes the necessity for targeted interventions. Examining selected studies highlights key elements of attitudes, recognizing their generally favourable orientation while also pinpointing areas requiring corrective actions. Investigating the effects of demographic and professional parameters, such as nursing education level, age, and years of experience, offers valuable insights into the factors influencing the proficiency levels among oncology nurses in managing pain in cancer patients (El-Rahman, Al kaladeh & Muhbes, 2013). the study utilized by Yildirim, Cicek & Uyar (2008) the minimum mean score for accurately answered pain-related questions to indicate overall knowledge, revealing an average correct response rate of 35.41%. The average number of accurately answered questions was documented as 13.81±5.02 out of 39, highlighting the challenges and lack of understanding among surveyed Turkish oncology nurses regarding cancer pain treatment. Conversely, Darawad

et al., (2019) study disclosed the highest average score with doctors demonstrating greater knowledge and attitudes, achieving an average score of 24.3 out of 39 (62.3%). In contrast, nurses obtained a slightly lower average score of 20.08 out of 39 (51.5%). The score disparity underscores differences in comprehension and perspectives on managing cancer pain between doctors and nurses. The study delved into nurses' favourable stance on managing cancer pain, revealing a minimum average score of 7.2% and a maximum average of 68.5%. The results underscore notable variations in nurses' perspectives across different study studies, emphasizing the necessity for targeted interventions and training initiatives to enhance their understanding and approach to cancer-related pain relief. The discussion focused on the strategies for establishing a work environment that promotes support, including the implementation of specific educational initiatives. Structured educational programs specifically designed to target and fill the identified gaps in knowledge while promoting a culture of ongoing learning are of utmost importance for successfully treating cancer pain (Kan *et al*.,2020). In the realm of cancer pain management, persistent training initiatives are indispensable for sustaining and augmenting the proficiency of oncology nurses in this specialized domain. The findings of the chosen study emphasized the significance of customizing treatments to unique healthcare settings, taking into account the cultural and contextual variables (Viale & Schwartz, 2004). Comprehending and dealing with these discrepancies enhance the efficacy of suggested tactics. The ideas and guidelines function as a roadmap for enhancing the overall expertise of oncology nurses in this specific field (Evans *et al*., 2020). The paper presents a thorough framework for comprehending the difficulties and possibilities in cancer nursing practices associated with CPM. The presence of deficiencies in knowledge levels among oncology nurses is consistently seen across many studies.

The average results indicate a need for more expertise and emphasize the immediate need for focused interventions. Although there is a general acceptance of favourable attitudes towards pain treatment, the presence of persisting misunderstandings poses a significant obstacle that must be addressed by targeted remedial actions. The analysis of demographic and professional aspects, as outlined in the findings, confirms their substantial impact on levels of knowledge, underscoring the need for customized educational approaches. The debate emphasized the significance of educational initiatives. Implementing customized programs that consider demographic and professional criteria is a feasible option to overcome the knowledge gaps among oncology nurses (Dias dos Passos & Palucci Marziale, 2020). Ongoing educational interventions are necessary for maintaining and improving competency, and continuous training efforts support this requirement. The ever-changing nature of managing pain in cancer patients is well-suited for well-organized programs that can adapt to changing best practices. The disparities in knowledge levels across diverse cultural settings underscore the need for treatments tailored to individual situations to maximize results. Artificial intelligence assists nurses in managing cancer pain by providing evidence-based analysis, proposing individualized treatment and therapy strategies, and optimizing the monitoring process. It improves evaluations, maximizes interventions, and aids in decision-making. While AI is beneficial, it enhances nurses' knowledge and improves treatment. However, it only partially replaces nurses' crucial function in patient-centric pain management (Table 4).

Table 4: Overall Summary of Key Points, Challenges, and Recommendations on Various Factors of KAP Discussed in the Selected Studies

Sl. No	Various Factors of KAP in All Selected Studies	Key Points	Challenges and Gaps Identified in the Results	Recommendations and Strategies for Improvement
1	Inadequacies in Knowledge Levels	All selected studies identified gaps in understanding pain management among oncology nurses.	All selected studies revealed mean scores indicating insufficient knowledge.	All selected studies proposed to develop targeted educational interventions to address identified knowledge gaps.
2	Positive Attitudes and Persistent Misconceptions	Prevalence of positive attitudes towards pain management across studies.	Positive attitudes are prevalent among oncology nurses.	Need to Incorporate specific modules in educational programs to address persistent misconceptions.

3	Influence of Demographic and Occupational Factors	Exploration of factors including age, nursing education, and years of experience.	Age, nursing education, and years of experience significantly influence knowledge levels.	Need to tailor educational interventions based on demographic factors, considering the diverse needs of different age groups and experience levels.
4	Educational Interventions	Implementation of targeted educational programs discussed in the results section.	Implementing targeted educational programs is discussed, emphasizing the need for structured interventions.	A curriculum that integrates real-world scenarios, case studies, and practical experiences is needed to enhance the effectiveness of educational programs.
5	Continuous Training Initiatives	Imperative of continuous training for sustaining and augmenting proficiency.	Continuous training is imperative for sustaining and enhancing proficiency.	Encourage participation in conferences, workshops, and web-based learning programs to remain updated on the latest advancements in the field.
6	Cultural and Contextual Considerations	Acknowledgment of cultural and contextual variations was in the results.	Cultural and contextual variations impact knowledge levels among oncology nurses.	Need to Collaborate with local healthcare institutions to customize educational programs according to the specific needs and practices of the region.

CONCLUSION

This systematic analysis underscores the critical importance of treatments that prioritize precision. Oncology nurses play a pivotal role in managing cancer pain, yet research consistently indicates a lack of sufficient information and persistent misunderstandings in this particular area. The study thoroughly comprehends the problems and possibilities necessary for oncology nursing practices to treat cancer pain. Although nurses generally have good views towards pain treatment, there are clear gaps in knowledge across different demographic and professional groups. This highlights the immediate need for focused educational programs that address various needs and settings. Implementing programs that consider cultural sensitivity and the ability to adapt to developing best practices can lead to practical solutions. These initiatives seek to effectively tackle knowledge gaps and misunderstandings. Therefore, by providing oncology nurses with the necessary expertise and knowledge, we can establish a comprehensive framework that improves the management of cancer-related pain and improves the overall well-being of patients.

Conflict of Interest

The authors declare that they have no competing interests.

ACKNOWLEDGEMENT

REFERENCES

Admass, B. A., Endalew, N. S., Tawuye, H. Y., & Mersha, A. T. (2020). Knowledge and attitude of Ethiopian oncology nurses about cancer pain management: national survey. *Cancer Management and Research*, 9045-9055. https://doi.org/10.2147/CMAR.S261172

Al Qadire, M., Ballad, C. A. C., Aljezawi, M. E., Al Omari, O., Alaloul, F., Musa, A., ... & Khalaf, A. (2023). Nurses' knowledge of chemotherapy-induced neutropenia and its management: a cross-sectional survey.

Journal of Cancer Research and Clinical Oncology, 149(7), 2893-2901. https://doi.org/10.1007/s00432-022-04140-9

Alqahtani, M., & Jones, L. K. (2015). Quantitative study of oncology nurses' knowledge and attitudes towards pain management in Saudi Arabian hospitals. *European Journal of Oncology Nursing, 19*(1), 44-49. https://doi.org/10.1016/j.ejon.2014.07.013

Altarawneh, W. M., Masa'deh, R., Hamaideh, S. H., Saleh, A. M., & Alhalaiqa, F. (2023). Nurses' knowledge, attitudes and practices towards palliative care provided to patients diagnosed with cancer. *Plos One, 18*(10), e0289317. https://doi.org/10.1371/journal.pone.0289317

Bernardi, M., Catania, G., Lambert, A., Tridello, G., & Luzzani, M. (2007). Knowledge and attitudes about cancer pain management: a national survey of Italian oncology nurses. *European Journal of Oncology Nursing, 11*(3), 272-279. https://doi.org/10.1016/j.ejon.2006.09.003

Bouya, S., Balouchi, A., Maleknejad, A., Koochakzai, M., AlKhasawneh, E., & Abdollahimohammad, A. (2019). Cancer pain management among oncology nurses: knowledge, attitude, related factors, and clinical recommendations: a systematic review. *Journal of Cancer Education, 34*, 839-846. https://doi.org/10.1007/s13187-018-1433-6

Buchanan, C., Howitt, M. L., Wilson, R., Booth, R. G., Risling, T., & Bamford, M. (2020). Predicted influences of artificial intelligence on the domains of nursing: scoping review. *JMIR Nursing, 3*(1), e23939. https://doi.org/10.2196/23939

Darawad, M., Alnajar, M. K., Abdalrahim, M. S., & El-Aqoul, A. M. (2019). Cancer pain management at oncology units: comparing knowledge, attitudes and perceived barriers between physicians and nurses. *Journal of Cancer Education, 34*, 366-374. https://doi.org/10.1007/s13187-017-1314-4

Dias dos Passos, E. A., & Palucci Marziale, M. H. (2020). Knowledge And Attitudes of Nursing Professionals at A Hospital in The Brazilian State of São Paulo Regarding Standard Precautions. *Cogitare Enfermagem, 25*. https://doi.org/10.1590/s0080-62342009000200009

Dreismann, L., Schoknecht, K., Vogel, A., & Zimmermann, T. (2023). Should I call psycho-oncology? Training nurses on psycho-oncological screening reduces uncertainties. *Journal of Cancer Research and Clinical Oncology, 149*(12), 10585-10592. https://doi.org/10.1007/s00432-023-04936-3

El-Rahman, M. A., Al Kalaldeh, M. T., & Muhbes, F. J. (2013). Knowledge and attitude towards pain management. A comparison between oncology and non-oncology nurses in Jordan. *International Journal of Advanced Nursing Studies, 2*(2), 95. https://doi.org/10.14419/ijans.v2i2.1006

Elumelu, T. N., Adenipekun, A. A., Eriba, L. O., & Akinlade, B. I. (2014). Knowledge of cancer pain management among nurses in a Nigerian tertiary health institution. *Journal of Nursing Education and Practice, 4*(4), 74. https://doi.org/10.5430/jnep.v4n4p74

Evans, A., Vingelen, M. B., Yu, C., Baird, J., Murray, P., & Bryant, P. (2020). Nausea in numbers: electronic medical record nausea and vomiting assessment for children with cancer. *Journal of Pediatric Oncology Nursing, 37*(3), 195-203. https://doi.org/10.1177/1043454219900467

Gudhoor, M., Ganachari, M. S., K, J., & Salimath, G. S. (2023). Onco-pharmacist led evaluation of knowledge, attitude & practice (KAP) of safe handling cytotoxic drugs among health care professional's (HCP's) in tertiary care hospital: A hospital based interventional Study. *Journal of Oncology Pharmacy Practice, 29*(2), 263-269. https://doi.org/10.1177/10781552211066957

Kan, E., Mustafa, S., Chong, W. W., Premakumar, C. M., & Mohamed Shah, N. (2020). Relationship between

adherence to opioid analgesics and pain beliefs among patients with cancer pain at tertiary care hospitals in Malaysia. *Patient Preference and Adherence*, 1411-1419. https://doi.org/10.2147/PPA.S255289

Keene, M. R., Heslop, I. M., Sabesan, S. S., & Glass, B. D. (2023). Knowledge, attitudes, and practices of Australian oncology health professionals on complementary medicines. *Journal of Pharmacy Practice and Research, 53*(1), 10-17. https://doi.org/10.1002/jppr.1838

Liu, J. (2023). Barriers for Nurses Providing Cancer Pain Management: A Qualitative Systematic Review. *Number 3/May 2023, 50*(3), 348-360. https://doi.org/10.1188/23.onf.348-360

Ma, Y., Xie, T., Zhang, J., & Yang, H. (2023). The prevalence, related factors and interventions of oncology nurses' burnout in different continents: A systematic review and meta-analysis. *Journal of Clinical Nursing, 32*(19-20), 7050-7061. https://doi.org/10.1111/jocn.16838

Maskor, N. A., Muhamad, M., Krauss, S. E., & Mahmood, N. H. N. (2021). Relationship between personal values, work experience and nursing competencies among cancer care nurses in malaysia. *Asian Pacific Journal of Cancer Prevention: APJCP, 22*(1), 287. https://doi.org/10.31557/APJCP.2021.22.1.287

McCabe, C., Feeney, A., Basa, M., Eustace-Cook, J., & McCann, M. (2023). Nurses knowledge, attitudes and education needs towards acute pain management in hospital settings: A meta-analysis. *Journal of Clinical Nursing, 32*(15-16), 4325-4336. https://doi.org/10.1111/jocn.16612

Modderkolk, L., van Meurs, J., de Klein, V., Engels, Y., & Wichmann, A. B. (2023). Effectiveness of meaning-centered coaching on the job of oncology nurses on spiritual care competences: a participatory action research approach. *Cancer Nursing,* 10-1097. https://doi.org/10.1097/ncc.0000000000001255

Phothikul, J., & Seven, M. (2023). Knowledge, Perception, and Skills, and Practices of Oncology Nurses in Cancer Survivorship Care: a Scoping Review. *Journal of Cancer Education, 38*(4), 1119-1133. https://doi.org/10.1007/s13187-023-02311-x

Rassouli, M., Zamanzadeh, V., Ghahramanian, A., Abbaszadeh, A., Alavi-Majd, H., & Nikanfar, A. (2015). Experiences of patients with cancer and their nurses on the conditions of spiritual care and spiritual interventions in oncology units. *Iranian Journal of Nursing and Midwifery Research, 20*(1), 25-33. https://journals.lww.com/jnmr/fulltext/2015/20010/Experiences_of_patients_with_cancer_and_their.5.aspx. Accessed on 27th December, 2023.

Shahriary, S., Shiryazdi, S. M., Shiryazdi, S. A., Arjomandi, A., Haghighi, F., Vakili, F. M., & Mostafaie, N. (2015). Oncology nurses knowledge and attitudes regarding cancer pain management. *Asian Pacific Journal of Cancer Prevention, 16*(17), 7501-7506. https://doi.org/10.7314/apjcp.2015.16.17.7501

Shih, Y. A., Wang, C., Zhao, J., Ali, A., Huang, X., Wang, Y., ... & Lu, Q. (2023, June). Psychometric Properties of the Knowledge, Attitude, and Practice Behavior of Oncology Nurses on Advance Care Planning Instrument. In *Seminars in Oncology Nursing* (Vol. 39, No. 3, p. 151378). WB Saunders. https://doi.org/10.1016/j.soncn.2022.151378

Utne, I., Småstuen, M. C., & Nyblin, U. (2019). Pain knowledge and attitudes among nurses in cancer care in Norway. *Journal of Cancer Education, 34*, 677-684. https://doi.org/10.1007/s13187-018-1355-3

Uzunkaya Oztoprak, P., & Terzioglu, F. (2024). Attitudes of oncology nurses towards care of dying patients and the principles of dying with dignity and their views on good death. *OMEGA-Journal of Death and Dying, 88*(3), 961-976. https://doi.org/10.1177/00302228211057743

Viale, P. H., & Schwartz, R. N. (2004). Survey of Oncology Nurses' Attitudes and Treatment Practices for Ambulatory Settings. *Clinical Journal of Oncology Nursing, 8*(5), 455-461. https://doi.org/10.1188/04.CJON.455-461

Xie, J., Zhou, Y., Luo, X., Cheng, Q., Luo, Y., Kang, Y., ... & Cheng, A. S. (2023). Knowledge, attitude, and practice of sexual healthcare and its influencing factors among oncology nurses: a multicenter study. *Sexual Medicine, 11*(2), qfad001. https://doi.org/10.1093/sexmed/qfad001

Yee, R., Chay, P. L., Khor, M. M. Y., Lim, Y. S. L., Lee, N. K. L., Kam, W. F., ... & Chan, M. Y. (2023). A survey of pediatric oncology nurses' oral health knowledge, attitudes, practices, and perceived barriers in a Singapore Tertiary Children's Hospital. *BDJ Open, 9*(1), 3. https://doi.org/10.1038/s41405-023-00130-2

Yildirim, Y. K., Cicek, F., & Uyar, M. (2008). Knowledge and attitudes of Turkish oncology nurses about cancer pain management. *Pain Management Nursing, 9*(1), 17-25. https://doi.org/10.1016/j.pmn.2007.09.002

Yu, W., Li, D., Lu, Y., Yang, H., & Ma, X. (2021). Knowledge and attitudes of Chinese oncology nurses regarding cancer pain management—a cross-sectional study. *Journal of Cancer Education, 36*, 1115-1123. https://doi.org/10.1007/s13187-020-01743-z