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The Need for Early Integration of Oncology and Palliative Care into Iranian Undergraduate Medical Education: A Critical Integrative Review

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Abstract

Background*:* The rising cancer burden and increasingly complex patient needs highlight the importance of strengthening oncology and palliative care education. This review examined the need for and identified context-sensitive strategies to support early, longitudinal, and competency-based integration of these fields into Iranian undergraduate medical education.

Materials and Methods*:* An integrative review followed Whittemore and Knafl's five-stage framework and the Population–Concept–Context model. PubMed/MEDLINE, Scopus, Web of Science, ERIC, CIVILICA, SID, and Google Scholar were searched from inception through March 2026, alongside grey literature, guidelines, policy documents, and curricula. Persian- and English-language studies on undergraduate oncology or palliative care education, curriculum evaluation, educational needs, or competency development were eligible. Two reviewers independently screened and extracted data. Quality and risk of bias were assessed using MMAT 2018 and AGREE II, followed by thematic synthesis.

Results: The synthesis identified three major findings. First, Iranian undergraduate medical education remains predominantly biomedical and fragmented, with limited longitudinal integration of palliative care and insufficient structured training in communication, ethical decision-making, symptom management, and interprofessional collaboration. Second, these gaps may contribute to opioid hesitancy, inadequate pain and symptom management, difficulty communicating bad news, uncertainty in end-of-life decision-making, limited teamwork, and emotional distress among learners. Third, the evidence supports a longitudinal spiral curriculum introducing cancer biology, pain, suffering, and the human dimensions of illness during the basic sciences, followed by the development of progressively complex clinical competencies through simulation, role-play, bedside teaching, OSCEs, Mini-CEX, DOPS, and portfolio-based assessment.

Conclusion: Iranian undergraduate medical education should replace isolated lectures with longitudinal, spiral, competency-based, and interprofessional training supported by national competencies, faculty development, performance-based assessment, context-sensitive implementation, and strengthened palliative care infrastructure.

Key Words: Curriculum integration, Iran, Palliative care, Oncology, Undergraduate medical education.

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1- INTRODUCTION

Cancer is one of the most significant public health challenges and a leading cause of disease burden and mortality globally and nationally (1). According to reports from the International Agency for Research on Cancer (IARC/WHO), the global cancer burden is on an upward trajectory, and in developing countries, including Iran, it is increasing at a steeper rate due to demographic changes, population aging, and lifestyle changes (1, 2). Although advances in oncology in recent years have improved survival among cancer patients, the nature of the disease, physical complications, psychological distress, chronic pain, and the complexity of antitumor treatments necessitate that the therapeutic approach not be limited solely to biological targeting of the tumor; rather, improving quality of life (QoL) must be prioritized from the time of diagnosis (3, 4).

Palliative care, as defined by the World Health Organization (WHO) and the American Society of Clinical Oncology (ASCO), is a comprehensive, multidisciplinary, patient-centered approach aimed at preventing and relieving suffering and improving the quality of life of patients with life-threatening illnesses and their families (4, 5). Robust clinical evidence and landmark randomized controlled trials, including the seminal study by Temel et al., have demonstrated that the early integration of palliative care alongside active, standard oncology treatment—not limiting it to end-of-life care—is associated with better symptom and pain control, reduced anxiety and depression, avoidance of unnecessary aggressive interventions at the end of life, and even improved overall survival (3, 5).

Despite this clear evidence and World Health Assembly Resolution WHA67.19, which calls for the integration of palliative care education into medical training (6), undergraduate medical education curricula in many countries, particularly in Iran, continue to exhibit structural gaps (7, 8). General practitioners, who serve at the forefront of Iran's health system, including comprehensive health centers, emergency departments, and referral systems, play a vital role in screening, referral, initial symptom management, post-treatment follow-up, rational prescribing of analgesics, and psychosocial support for cancer patients (8, 9). However, analysis of the Iranian general medical curriculum reveals that oncology and palliative care training is predominantly fragmented, subspecialty-oriented, focused on a biomedical perspective, and inpatient-centered, with dedicated content on the early integration of palliative care, professional communication skills such as breaking bad news, comprehensive cancer pain management, and home-based care falling significantly short of international standards (7, 10).

Moreover, multiple studies assessing the attitudes and knowledge of Iranian medical students and physicians indicate prevalent misconceptions, including fear of opioid dependence, the erroneous belief that palliative care equates to "abandoning active treatment," and insufficient self-efficacy in managing complex cancer symptoms (8, 10, 11). Consequently, revising the general medical curriculum and integrating palliative oncology concepts in an early, longitudinal, and structured manner have become undeniable necessities within Iran's higher health education system (7, 12).

1-1. Objectives

The overall aim of this review article is to articulate the need for and analyze strategies for the early integration of oncology and palliative care education into the undergraduate medical curriculum in Iran, in alignment with international evidence and guidelines. To this end, the present study focuses on two key areas:

- **Assessing the current status:** Analyzing clinical evidence and global experiences and identifying curricular and educational gaps within Iran's undergraduate medical education system.
- **Proposing an integration framework:** Outlining structured, context-adapted strategies for the longitudinal, competency-based integration of palliative oncology concepts across various stages of undergraduate medical training.

2- MATERIALS AND METHODS

2-1. Study Design and Conceptual Framework

This study was conducted using an integrative review methodology based on the five-stage methodological framework proposed by Whittemore and Knafl (13). Due to its methodological flexibility, this design enables the collection, critical appraisal, and synthesis of data derived from a diverse range of empirical, quasi-experimental, qualitative, and mixed-methods studies, as well as policy documents and curricular materials, making it one of the most comprehensive approaches for reviewing health sciences education policies. To ensure transparency, accuracy, and reproducibility, the identification, screening, and reporting stages were structured according to the international PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guideline (14).

2-2. Eligibility Criteria and PCC Framework

To define the conceptual boundaries and align the inclusion and exclusion criteria with Joanna Briggs Institute (JBI) standards, the research question was formulated using the three-component PCC (Population, Concept, Context) framework (15):

- **Population:** Students enrolled in the undergraduate medical program across various stages of training (basic sciences, introductory clinical/pathophysiology courses, clinical clerkship, and internship) and general practitioners delivering primary healthcare.
- **Concept:** Education in oncology fundamentals and palliative care; core competencies related to pain management and cancer symptom control; communication skills with seriously ill patients; breaking bad news; and longitudinal curriculum integration.
- **Context:** The undergraduate medical education system in Iran, curricula approved by the Council for General Medical Education under the Ministry of Health and Medical Education, and comparative analyses with international reference models.

Accordingly, all original research articles (quantitative, qualitative, and mixed-methods) and policy or educational reports published in Persian or English up to March 2026 that addressed curriculum evaluation, educational needs assessment, measurement of learners' knowledge, attitudes, or performance, or strategies for integrating palliative care were included. Conversely, studies focusing exclusively on specialty or subspecialty residency programs; research examining only pharmacological or clinical effectiveness without an educational dimension; non-peer-reviewed conference abstracts; letters to the editor without data; and duplicate articles were excluded from the analysis.

2-3. Search Strategy and Data Sources

A systematic search was designed using standardized Medical Subject Headings (MeSH) terms and free-text keywords in titles, abstracts, and keywords. The international databases searched included PubMed/MEDLINE, Scopus, Web of

Science, Embase, ERIC, and Google Scholar (the first 100 records were screened for maximum coverage). National databases, including CIVILICA, and SID (Scientific Information Database), were searched without initial time restrictions through July 2025. Additionally, grey literature was identified through documents from the Iranian Ministry of Health portal, the World Health Organization (WHO), and recommendations from the European Association for Palliative Care (EAPC).

The sample search strategy implemented in PubMed/MEDLINE was as follows:

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(("Palliative Care"[Mesh] OR "Palliative Medicine"[tiab] OR "Hospice Care"[Mesh]
OR "End-of-Life Care"[tiab] OR "Terminal Care"[Mesh] OR "Supportive Care"[tiab])
AND
("Medical Oncology"[Mesh] OR "Neoplasms"[Mesh] OR "Cancer"[tiab] OR "Oncolog*"[tiab])
AND
("Education, Medical, Undergraduate"[Mesh] OR "Curriculum"[Mesh]
OR "Undergraduate Medical Education"[tiab] OR "Medical Student*"[tiab]
OR "General Practice"[Mesh] OR "General Practitioner*"[tiab] OR "Curriculum Integration"[tiab])
AND
("Iran"[Mesh] OR "Iran*"[tiab] OR "Developing Countries"[Mesh]))
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2-4. Study Selection and Data Extraction

To minimize human error and selection bias, the screening and selection processes were conducted independently by two researchers. Initially, all retrieved records were imported into EndNote 20 reference management software, and duplicates were removed. Subsequently, titles and abstracts were evaluated against the inclusion criteria, followed by a detailed full-text review of potentially eligible studies. Inter-rater agreement was calculated using Cohen's kappa statistic, yielding a value greater than 0.84, which indicated excellent agreement between the reviewers (16). Discrepancies were resolved through discussion, and when consensus could not be reached, the opinion of a third reviewer, a medical education specialist, served as the final decision. Extracted data were recorded in standardized forms, including author names, publication year, objectives, study design, sample size and characteristics, educational level, assessment tools, and primary outcomes.

2-5. Critical Appraisal and Quality Assessment

To assess the methodological quality and risk of bias of the included studies, a systematic and critical appraisal was conducted, accounting for the diversity of study designs. This process employed internationally recognized and standardized tools to minimize subjective judgments and maintain methodological transparency.

Empirical, observational, qualitative, and mixed-methods studies were appraised using the MMAT (Mixed Methods Appraisal Tool, 2018 version) (17). The tool evaluates key methodological criteria, including the clarity of the research question, appropriateness of the study design, quality of sampling and data collection, measurement of outcomes, consideration of confounding factors where applicable, and appropriateness of data analysis and interpretation. Each criterion was classified as "Yes," "No," or "Can't tell." In accordance with the MMAT developers' recommendations, no overall numerical score was calculated. However, for the purposes of descriptive classification in this review, studies meeting fewer than three criteria (less than 60%) were considered to have low methodological quality or a high risk of bias and were excluded from the final synthesis (7, 8).

Policy documents, clinical guidelines, and approved curricula were appraised using the AGREE II (Appraisal of Guidelines for

Research and Evaluation II) instrument (18). This instrument evaluates six domains: (1) Scope and Purpose, (2) Stakeholder Involvement, (3) Rigour of Development, (4) Clarity of Presentation, (5) Applicability, and (6) Editorial Independence. Each item is scored on a 7-point scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). Domain scores were converted to percentages using the standard AGREE II formula. Following the developers' recommendations, the six domain scores were reported separately, and aggregation into a single overall score was avoided (6, 10). Documents scoring below 50% in key domains, particularly Rigour of Development and Editorial Independence, or demonstrating clear methodological weaknesses were considered low quality and excluded from the final synthesis.

2-6. Data Analysis and Synthesis

Data synthesis followed the four analytical stages of the Whittemore and Knafl framework: data reduction, data display using comparative matrices, data comparison, and conclusion drawing and verification (13). Thematic synthesis was employed to develop and articulate common concepts regarding existing educational challenges in Iran, learner attitudes, and the structural requirements for the longitudinal integration of oncology and palliative care competencies across the three stages of undergraduate medical education: basic and introductory courses, clinical clerkship, and internship (19).

2-7. Ethical Considerations

Throughout all stages of this research, international standards for ethical conduct in review studies and relevant guidelines from the Committee on Publication Ethics (COPE) were followed (20). This included a commitment to research originality, scientific integrity in quotations and citations, avoidance of data manipulation, distortion, or selective reporting, and transparent reporting of the search strategy to ensure reproducibility. Because this study was based on secondary data and previously published literature and involved no direct intervention with human participants or animals, informed consent was not required. Nevertheless, the confidentiality of information contained in institutional documents and the impartial analysis of data related to university educational programs were maintained.

3- RESULTS

Synthesis of evidence from policy documents, approved curricula, and domestic and international empirical studies elucidated the current status of oncology and palliative care education in Iran's undergraduate medical program. The methodological quality of the included evidence was variable. Empirical studies were appraised using the MMAT 2018, whereas policy documents, clinical guidelines, and approved curricula were assessed using the AGREE II instrument. The principal limitations identified in the empirical studies concerned sampling procedures, outcome measurement, consideration of potential confounding factors, and the reporting of data analyses.

The policy documents, guidelines, and curricula also demonstrated variable performance across the AGREE II domains, particularly with respect to the rigour of development, stakeholder involvement, applicability, and editorial independence. Studies and documents judged to have low methodological quality or a high risk of bias were excluded from the final synthesis in accordance with the predefined assessment procedures. Collectively, these findings informed a roadmap for reform across three main domains.

3-1. Comparative Analysis of Iran's Curriculum with Contemporary International Standards

The included evidence suggests that, in contemporary international models, palliative care and oncology are increasingly taught in an integrated manner from the time of diagnosis. In contrast, Iran's undergraduate medical curriculum faces several structural challenges:

- **Fragmented and biomedical education:** Oncology content primarily focuses on tumor pathophysiology and specialized treatments, whereas concepts related to the alleviation of suffering, symptom relief, and end-of-life care have no organized position in curricula approved by the Supreme Council for Medical Sciences Planning (7, 21).
- **Neglect of structured training in sensitive skills:** Education on professional behaviors in critical clinical situations, such as breaking bad news and alleviating psychological distress, has largely been relegated to the hidden curriculum, leaving learners with limited opportunities for structured practice in clinical environments (22, 23).
- **Assessment based on theoretical knowledge:** Student evaluation is largely confined to end-of-term written examinations, while communication skills, empathy, and ethical decision-making in clinical settings are assessed less frequently (24, 25).

A comparative analysis of the curriculum structure against international reference models is summarized in **Table 1**.

Table-1: Comparative Analysis of Iran's Undergraduate Medical Curriculum Structure and International Reference Models.

Comparison axis	International reference models (EAPC/ASCO/WHO)	Structural status in Iran's curriculum	Potential implications for graduates' clinical competence	References
Curriculum architecture	Longitudinal spiral integration across all academic stages	Fragmented and limited to scattered topics in internal medicine and pediatrics	Limited understanding of the continuum of care from diagnosis to end of life	(12, 21, 26)
Dominant care perspective	Holistic care with a focus on quality of life	Predominant focus on biomedical aspects and tumor control	Limited attention to psychological suffering and distressing symptoms	(4, 9, 27)
Communication skills	Workshop-based training with simulation and clinical feedback	Predominantly theoretical lectures without sufficient practical exercises	Difficulty conducting challenging conversations and potential reliance on prognostic concealment	(22, 23, 28)
Pharmacological pain management	Training in standard protocols and opioid dose calculation	Predominantly theoretical pharmacology instruction in	Potentially inadequate pain management associated with	(5, 10, 29)

Comparison axis	International reference models (EAPC/ASCO/WHO)	Structural status in Iran's curriculum	Potential implications for graduates' clinical competence	References
		classroom settings	reluctance to prescribe opioids	
End-of-life decision-making	Clarification of the boundaries of non-beneficial treatment and preservation of patient dignity	Absence of coherent content on end-of-life care	Possible continuation of non-beneficial aggressive interventions during the final days of life	(6, 11, 30)
Assessment methodology	Workplace-based assessment, including Mini-CEX, and OSCEs	Predominantly multiple-choice written examinations at course completion	Limited assessment of behavioral competencies, attitudes, and empathy	(24, 25, 31)

Note: EAPC: European Association for Palliative Care; ASCO: American Society of Clinical Oncology; WHO: World Health Organization; Mini-CEX: Mini-Clinical Evaluation Exercise; OSCE: Objective Structured Clinical Examination.

3-2. Thematic Analysis of Clinical Challenges and Their Implications for the Health System

Thematic synthesis of the included evidence suggests that educational gaps during undergraduate medical training may contribute to five clinical competency-related challenges with potential implications for healthcare delivery:

- **Disproportionate fear of opioid prescribing ("opioidphobia"):** Limited practical training in dose titration and adverse-effect management may contribute to fear among general practitioners regarding addiction or respiratory depression and may be associated with the prescription of inadequate analgesic doses (10, 29).
- **Challenges in breaking bad news:** Limited familiarity with structured protocols such as SPIKES may contribute to rushed disclosure or the delegation of information to family members, potentially exacerbating patients' psychological distress (23, 28).
- **Continuation of potentially non-beneficial aggressive interventions:** Limited training in distinguishing supportive care from disease-directed treatment may contribute to unnecessary aggressive interventions and intensive care admissions during advanced stages of illness (11, 30).
- **Interprofessional disconnection:** Limited opportunities to work with nurses, psychologists, and social workers during training may restrict general practitioners' ability to deliver comprehensive, multidimensional care (8, 32).
- **Healthcare provider burnout:** Insufficient attention to self-care strategies and grief management may contribute to defensive reactions and emotional burnout among learners and healthcare providers (22, 33).

Thematic analysis of these competency-related challenges and their potential consequences is presented in **Table 2**.

Table-2: Thematic Analysis of Neglected Competencies, Clinical Behaviors, and Potential Systemic Consequences.

Competency domain	Root cause in the curriculum	Observed clinical behavior	Potential impact on patients and the health system	References
Cancer pain control	Limited practical training in dose calculation and medication adjustment	Prescription of potentially inadequate doses and reluctance to prescribe strong opioids	Uncontrolled patient suffering and potentially avoidable emergency department visits	(10, 29, 34)
Crisis communication	Absence of practical training within standardized clinical scenarios	Incomplete disclosure of prognosis or possible concealment of information from patients	Potential increase in patient anxiety and weakening of the therapeutic relationship	(23, 28, 35)
End-of-life care	Lack of education on the boundaries of aggressive interventions in terminal conditions	Possible continuation of non-beneficial cardiopulmonary resuscitation and intensive care admissions	Potentially increased suffering during the final days of life and increased healthcare costs	(11, 30, 33)
Interprofessional collaboration	Limited attention to interprofessional education during training	Difficulty establishing effective interactions with other team members	Patient confusion and limited attention to non-medical needs	(8, 32, 36)
Clinical resilience	Absence of structured coping strategies related to death and psychological decompression	Possible avoidance of emotional engagement and increased psychological distancing	Potential occupational burnout among physicians and reduced quality of healthcare delivery	(22, 33, 37)

Note: ICU: Intensive care unit. Disproportionate fear of opioid prescribing ("opioidphobia") refers to excessive concern about prescribing opioid medications because of fears related to addiction, respiratory depression, or other adverse effects (10, 34). Potentially non-beneficial interventions refer to interventions that are unlikely to achieve meaningful clinical benefit or improve the patient's quality of life in the context of advanced, life-threatening illness (11, 30, 33).

3-3. Strategic Framework for Longitudinal, Competency-Based Integration into Iran's Medical Education System

The synthesis of the available evidence suggests that merely adding optional courses may be insufficient. Instead, the curriculum requires redesign based on a longitudinal spiral curriculum model across four academic stages:

- **Basic sciences (Years 1–2):** Understanding cellular mechanisms of cancer, physiological pain pathways, and the psychological and human dimensions of illness.
- **Pathophysiology (Year 3):** Developing knowledge of applied pain pharmacology, the rationale for clinical assessment, and the fundamentals of interviewing and responding to patients' emotions.
- **Clinical clerkship (Years 4–5):** Developing clinical skills in the management of common symptoms, including nausea, dyspnea, and delirium; practicing protocols for

breaking bad news; and participating in clinical rounds.

- **Internship (Years 6–7):** Developing independent decision-making skills, practical medication adjustment at the bedside, participation in home-care teams, and the provision of dignified end-of-life care.

The implementation matrix for this framework, together with the proposed learning and assessment methods, is outlined in **Table 3**.

Table-3: Strategic Curriculum Redesign Matrix for the Longitudinal Integration of Oncology and Palliative Care Competencies.

Educational stage	Competency layer and learning objectives	Integrated educational content	Educational methodology	Clinical assessment mechanism	References
1. Basic sciences (Years 1–2)	Understanding tumor biology, pain physiology, and a human-centered approach	Biological mechanisms of cancer; neural pain-transmission pathways; concepts of suffering and narrative medicine	PBL; analysis of textual and video scenarios; narrative medicine	Reasoning-based written examinations; evaluation of reflective reports	(12, 21, 31)
2. Pathophysiology (Year 3)	Developing familiarity with diagnostic approaches, pain management, and the rationale for clinical communication	WHO analgesic ladder and drug pharmacokinetics; fundamentals of interviewing and communicating with seriously ill patients; oncological emergencies in clinical settings	TBL; interactive simulation workshops; role-play exercises	Key-feature examinations; preliminary structured station examinations	(26, 27, 34)
3. Clinical clerkship (Years 4–5)	Developing skills in symptom management, breaking bad news, and clinical ethics	Implementation of the SPIKES protocol for breaking bad news; management of dyspnea, nausea, and severe fatigue; decision-making in potentially non-beneficial treatment situations	Bedside teaching; interaction with SPs; joint rounds involving major departments and palliative care teams	OSCE; DOPS	(22, 23, 28)
4. Internship (Years 6–7)	Developing skills in independent patient management, prescription writing, and end-of-life care	Titration and adjustment of palliative medication doses; management of dying patients during the final days of life;	Rotations in oncology departments and pain clinics; participation in home-visit teams; regular	Mini-CEX; outcome-based competency logbooks; clinical experience portfolio	(24, 26, 30)

Educational stage	Competency layer and learning objectives	Integrated educational content	Educational methodology	Clinical assessment mechanism	References
		delivery of palliative care in primary and home-care settings	experience-review and clinical stress-management sessions		

Note: PBL: Problem-based learning; TBL: Team-based learning; SPIKES: Setting, Perception, Invitation, Knowledge, Emotions/Empathy, and Strategy/Summary; SP: Standardized patient; OSCE: Objective Structured Clinical Examination; DOPS: Direct Observation of Procedural Skills; Mini-CEX: Mini-Clinical Evaluation Exercise; WHO: World Health Organization; EAPC: European Association for Palliative Care.

4- DISCUSSION

4-1. Interpretation of the Main Findings

This integrative review aimed to clarify the need for early integration of oncology and palliative care education into Iran's undergraduate medical curriculum. The synthesis of evidence indicated that the main problem is not merely the absence of a stand-alone course; rather, it is the lack of a continuous, longitudinal, and assessable educational pathway through which theoretical knowledge, clinical skills, professional communication, ethical decision-making, interprofessional collaboration, and the ability to support patients and families can be progressively developed (38–40).

Current education in Iran remains largely focused on diagnosis, pathophysiology, and cancer-specific treatments, whereas competencies related to symptom control, pain management, prognostic communication, shared decision-making, end-of-life care, and interprofessional collaboration are often addressed in a fragmented manner or depend on individual clinical experiences (7, 8, 21, 37). Evidence from undergraduate palliative care education also suggests that the content and delivery of palliative care training may be uneven across medical curricula, with some important competencies insufficiently addressed (40). Consequently, students may possess theoretical knowledge of cancer and its treatment but remain insufficiently prepared to assess and manage pain, respond to the concerns of patients and families, deliver bad news, or recognize the need for referral when caring for patients with advanced cancer (24, 25, 38, 40).

These findings are consistent with the global transformation of cancer care. Palliative care should not be restricted to the final days of life; rather, it should be introduced early in the course of advanced disease and provided concurrently with oncology treatment (3, 4, 9, 41, 42). The study by Temel et al. demonstrated that the early integration of palliative care in patients with metastatic lung cancer was associated with improved quality of life and mood (3). Similarly, the American Society of Clinical Oncology guideline emphasizes the integration of specialist palliative care with standard oncology care for patients with advanced cancer (4). Evidence concerning the coordinated, timely, and targeted delivery of oncology and palliative care, as well as alignment with patients' goals of care, further supports this change in clinical approach (41, 42).

4-2. Curricular Gaps and the Role of General Practitioners

The principal difference between international reference models and the Iranian context concerns curriculum architecture rather than simply the presence or absence of specific course titles. In reference curricula, palliative care education is structured longitudinally, spirally, and according to defined competencies. Concepts are introduced at earlier stages and subsequently practiced and assessed in increasingly complex clinical situations (12, 26, 39). Murphy et al. showed that mapping a curriculum against established learning objectives can identify educational gaps and inconsistencies between curriculum content and assessment methods (39).

The increasing cancer burden in Iran further strengthens the rationale for curriculum reform (1, 2). General practitioners may be among the first healthcare professionals to discuss symptoms, pain, psychological concerns, and referral pathways with patients and families. In areas with limited access to specialist services, they may also play an important role in identifying palliative care needs and providing initial symptom management (7, 37). The World Health Organization emphasizes the integration of palliative care into primary care (5). However, the objective of undergraduate education is not to enable general practitioners to manage every complex palliative care case independently. Rather, graduates should be able to identify palliative care needs, conduct an initial assessment, provide safe first-line interventions, and refer patients to specialist services when necessary (5, 9, 41).

Domestic studies have shown that educational programs in some disciplines are not fully aligned with palliative care standards. Important unmet needs include academic education, workforce development, public awareness, and the empowerment of patients and families (7, 8, 37). Therefore, curriculum reform should be embedded within a broader strategy for developing palliative care services, strengthening referral systems, and improving access to care rather than being limited to changes in educational content alone (8, 37).

4-3. Educational Gaps and Clinical Consequences

Educational gaps may manifest clinically as inadequate pain control, difficulty communicating bad news, uncertainty in end-of-life decision-making, weak interprofessional collaboration, and emotional distress among learners. Nevertheless, these outcomes cannot be attributed solely to inadequate education. Medication access, service organization, shortages of specialist teams, family attitudes, legal support, and institutional culture also contribute to these challenges (8, 10, 11, 37).

Cancer pain management in Iran is affected by professional, patient-related, and organizational barriers (10). WHO guidance emphasizes regular pain assessment, appropriate treatment selection, medication titration, and monitoring for adverse effects (34). However, theoretical instruction alone is insufficient to develop these competencies. Fear of prescribing opioids, concerns about dependence, and limited familiarity with dose adjustment may contribute to inadequate prescribing or delayed treatment initiation. Education should therefore include clinical case scenarios, dose calculation and adjustment, recognition of adverse effects, and criteria for referral (10, 33, 34).

Regarding the communication of bad news, the SPIKES protocol provides a useful framework for structuring the conversation (23). However, the ability to communicate with an anxious patient or an angry family requires repeated practice and structured feedback. The Cochrane

review by Gilligan et al. indicated that communication-skills interventions can improve medical students' communication performance, although heterogeneity in intervention design and outcome measures limits direct comparisons across studies (43). In Iran, the prominent role of the family in decision-making may sometimes be accompanied by requests to conceal the diagnosis or prognosis from patients. Physicians therefore need to balance respect for the family, patient confidentiality, and the patient's right to receive information (11, 23, 28).

4-4. End-of-Life Care and the Hidden Curriculum

The absence of structured education regarding prognosis, goals of care, shared decision-making, and treatment limitation may contribute to the continuation of aggressive interventions with limited benefit during the final days of life (11, 42, 44, 45). Education in this area should not be limited to a single theoretical session on medical ethics. Students should be able to interpret prognostic information realistically, elicit patients' goals and preferences, discuss the appropriateness of proposed interventions, and seek specialist support in complex cases (12, 26, 44, 45).

The hidden curriculum also plays a critical role in shaping students' attitudes and behaviors. Ratanawongsa et al. reported that students' experiences with dying patients were strongly influenced by the clinical environment and the behavior of healthcare professionals (22). If students observe that patients' pain is minimized or discussions about prognosis are postponed, they may internalize these behaviors as practical models of clinical medicine (22, 38). Repeated exposure to death and suffering may also generate psychological distress. Reflective sessions, structured debriefing, mentoring, and learner well-being support should therefore be incorporated into the formal curriculum (25, 33, 38).

4-5. Longitudinal Integration and Interprofessional Education

A longitudinal and spiral integration framework provides a direct response to the identified curricular gaps. A spiral curriculum enables concepts to be revisited at different stages of training with progressively increasing complexity (26, 36, 39, 40). During the basic sciences, the focus may be on cancer biology, pain physiology, and the concept of suffering. During pathophysiology, the emphasis may shift to the relationship between disease mechanisms and pain assessment and management. During the clinical clerkship, students may focus on symptom management and communication skills, whereas during the internship, they may further develop competencies in clinical assessment, safe intervention, decision-making, and timely referral (21, 26, 36, 40).

The review by Boland et al. showed that palliative care education interventions commonly improve knowledge and, in some cases, learners' attitudes or confidence; however, the available evidence remains insufficient to identify a single superior teaching method or to establish a definitive effect on clinical performance (38). Similarly, faculty perspectives on undergraduate palliative care education suggest that the content and delivery of training may vary across curricula and that several core competencies require more systematic attention (40). Accordingly, the proposed curriculum should combine active learning methods, including case-based learning, role-play, standardized patients, bedside teaching, and structured feedback, with performance-based assessment (33, 38–40).

Methods such as the Objective Structured Clinical Examination (OSCE), Mini-Clinical Evaluation Exercise (Mini-CEX), Direct Observation of Procedural Skills (DOPS), and portfolio assessment can

provide opportunities to evaluate clinical, communication, and professional competencies that may not be adequately captured by written examinations alone (25, 29, 33, 38–40). However, their implementation should be guided by clearly defined learning outcomes and competency-based assessment criteria.

Interprofessional education is another essential component of this framework. Irajpour et al. emphasized the need to develop an interprofessional palliative care curriculum for patients with cancer in Iran (32). In addition, the review by Chua et al. indicated that interprofessional education can strengthen empathy and empathic care behaviors among learners (46). Joint ward rounds, case conferences, team-based educational activities, and simulation-based team scenarios may provide practical starting points for developing these competencies (27, 32, 46).

4-6. Implementation Considerations and Policy Implications

Implementation of the proposed reforms should reflect the actual capacity of Iranian universities and the healthcare system. Not all universities have access to specialist palliative care teams, hospice services, pain clinics, or organized home-care programs. Directly replicating programs from countries with extensive palliative care infrastructure may therefore be impractical. A more realistic strategy would involve the gradual use of existing educational opportunities in internal medicine, oncology, family medicine, emergency medicine, intensive care, and pain clinics (8, 37).

At the national level, minimum competencies related to supportive oncology and palliative care should be defined for undergraduate medical graduates (47, 48). At the university level, implementation methods may be adapted to local resources; however, expected outcomes and graduate competencies should remain standardized. Faculty development is also essential. Without faculty members who are competent in symptom management, difficult conversations, feedback provision, and reflective facilitation, the formal curriculum is unlikely to be fully implemented in clinical settings (12, 21, 49).

Implementation also requires coordination among the Ministry of Health and Medical Education, medical schools, academic departments, teaching hospitals, and primary healthcare providers. Defining shared national competencies, developing standardized assessment tools, and creating educational opportunities appropriate to the capacity of each university may help prevent superficial or symbolic implementation. In this model, expected graduate competencies should be nationally standardized, whereas the educational pathways used to achieve them may remain adaptable to local circumstances (47–49).

4-7. Limitations of the Study

This review has several methodological and contextual limitations that should be considered when interpreting its findings. First, the study used an integrative review design. Although this approach enables the synthesis of evidence from different study designs and supports conceptual interpretation, heterogeneity across the included studies limits definitive conclusions regarding causal relationships (13, 50). Accordingly, the findings should be interpreted as a synthesis and interpretation of the available evidence and as a basis for educational reform, rather than as a definitive estimate of the effectiveness of any particular educational intervention.

Second, although data were extracted from a broad range of documents and curricula, limited access to some domestic documents and variation in curriculum

implementation across medical universities may mean that not all local experiences were fully represented (7, 37). Third, the study focused primarily on documents and educational structures and did not include extensive field-based investigation of the experiences of students, faculty members, and general practitioners. Future qualitative and multicenter studies could provide more detailed information about the gap between the formal curriculum and its implementation in educational environments (10, 11, 38).

In addition, heterogeneity in assessment instruments, differences in competency definitions, and the limited number of longitudinal studies made direct comparison of findings difficult. Finally, not all challenges in palliative care can be attributed to curricular deficiencies. Medication access, service organization, legal support, workforce capacity, referral structures, and cultural attitudes also play important roles (7, 8, 10, 37).

4-8. Recommendations

Based on the findings of this study, two main directions are proposed for future research and educational policy. At the research level, multicenter qualitative and survey studies focusing on the lived experiences of students, faculty members, and general practitioners when caring for patients with cancer could more accurately identify the gap between formal education and clinical reality (10, 21, 38). In addition, longitudinal intervention studies are needed to evaluate the effects of spiral curricula, simulation, interprofessional education, and performance-based assessment on knowledge, self-efficacy, clinical performance, and communication quality.

At the policy level, a national roadmap should be developed for the longitudinal and competency-based integration of oncology and palliative care across all stages of undergraduate medical education. This roadmap should address not only curriculum content but also the reform of assessment methods, the transition from predominantly written examinations to performance-based assessment, interprofessional education, continuing faculty development, and stronger links between universities and healthcare services (12, 33, 37, 45, 47–49).

5- CONCLUSION

This review examined the need for and strategies to integrate oncology and palliative care education into Iran's undergraduate medical curriculum. Although the current curriculum addresses diagnosis, pathophysiology, and cancer-specific treatments, important gaps remain in the systematic development and assessment of competencies related to pain and symptom management, communication with patients and families, prognostic discussions, shared decision-making, end-of-life care, timely referral, and interprofessional collaboration. These gaps may widen the distance between theoretical knowledge and clinical performance and may limit general practitioners' ability to address the complex and culturally sensitive needs of patients with cancer.

Isolated teaching sessions or a single elective course are unlikely to be sufficient. Oncology and palliative care should instead be integrated through a longitudinal, spiral, competency-based, and interprofessional curriculum. Foundational concepts should be introduced during the basic sciences and progressively developed through pathophysiology, clinical clerkship, and internship using practical training, simulation, structured feedback, and performance-based assessment.

The proposed framework emphasizes context-sensitive educational objectives and the realistic use of existing university and healthcare resources. Graduates should

be able to identify palliative care needs, assess and initially manage pain and common symptoms, communicate in a patient-centered and culturally sensitive manner, discuss patients' goals and preferences, refer complex cases appropriately, and contribute effectively to interprofessional teams.

Successful implementation requires nationally defined minimum competencies, faculty development, improved teaching and assessment methods, strengthened interprofessional education, and alignment between medical education policies and palliative care services. Early and longitudinal integration should therefore be considered a component of structural reform in undergraduate medical education in Iran.

6- AUTHORS' CONTRIBUTIONS

Study conception or design: AH; Data analyzing and draft manuscript preparation: AH, and ZR; Critical revision of the paper: AH; Supervision of the research: AH and ZR; Final approval of the version to be published: AH, and ZR.

7- CONFLICT OF INTEREST: None.

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