Revolutionizing Palliative Care Education: The Power of Simulation-Based Learning for Medical-Surgical Nursing Students

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Abstract

Background: The aim of palliative care is to improve the quality of life among seriously ill and dying patients and their families. Nursing students report emotional distress and feelings of inadequacy to the complexity of palliative care. Simulation-based education serves as a link between classroom learning and clinical practice. **This study aimed to** determine the effect of simulation-based education on medical-surgical nursing students' knowledge and practices regarding palliative care for patients with cancer. **Method**: A quasi-experimental research design was used (pre- and post-test-one group) to achieve the aim of this study. **Setting**: The study was conducted in clinical medical-surgical laboratory skills, Faculty of Nursing affiliated to Sohag University. **Subjects**: The study was carried out on 700 nursing students first semester 1st academic year as a convenient sample in 2024. **Tools of data collection:** Two tools utilized for data collection (1) Self-administered questionnaire including two parts, part one; to assess medical-surgical nursing student's personal data and part two; to assess medical-surgical nursing student's knowledge regarding palliative care for patients with cancer (2) An observational checklist to assess medical-surgical nursing student's practice during implementation of palliative care for patients with cancer. **Results**: There was a highly statistically significant difference between the studied medical-surgical nursing student's knowledge and practice. The vast majority of the studied medical-surgical nursing students had a satisfactory level of knowledge and most of them had adequate level of practice after implementing simulation-based education**. There was a highly significant difference correlation between medical-surgical nursing student's knowledge and practice after simulation-based education than pre- education. **Conclusion**: The present study concluded that simulation-based education was a feasible strategy and had a positive effect on improving medical-surgical nursing student's knowledge and practices regarding palliative care for patients with cancer. **Recommendations**: The study recommended that simulation-based education should be integrated as an effective method in medical-surgical nursing student's training regarding palliative care for patients with cancer**. Replication of the study with a larger sample of students from different universities may have a more generalized effect.

Keywords: Knowledge and practices, Medical-surgical nursing student, Palliative care for patients with cancer, Simulation-based education.

Introduction

Currently, cancer is one of the leading causes of illness and death worldwide. Cancer patients are a vulnerable group with low tolerance, and chemotherapy regimens used to treat the disease are quite complicated. Compared to patients with modest symptoms, those with high levels of symptoms—whether from cancer or the side effects of chemotherapy—need more consistent and extended caring time. As a result, caregivers of cancer patients with severe symptoms are more likely to experience social, psychological, physical, and economical repercussions. If the caregivers themselves are poor, have few resources, or are ill, the pressure on them grows even more (**Milazzo et al., 2020**).

The World Health Organization (WHO) suggests palliative care for patients nearing the end of their lives in order to improve their quality of life by controlling their symptoms and providing them and their family with existential, social, and emotional support. One of the most vulnerable times in life is death, and it has been demonstrated that the palliative approach improves quality of life more than standard practice. Only about 14% of people worldwide receive palliative care when necessary, according to the Who is global atlas (**Worldwide

Palliative Care Alliance & WHO, 2024). According to the paper, education is a crucial component in expanding access to palliative care. Frontline healthcare providers include nurses and nursing students. During nursing school, many young students experience mortality for the first time. There are reports of emotional discomfort and feelings of inadequacy, the intricacy of the required, and the complexity of the necessary competence in palliative care makes such competence challenging to learn and perform (**Zhou et al., 2021).**

Palliative care is a multidisciplinary approach that offers therapeutic treatments and support to patients with severe chronic illnesses and high-morbidity, incurable ailments in order to control their symptoms and enhance their quality of life. Palliative care addresses the medical, psychological, spiritual, and social requirements resulting from serious illness in addition to the main goal of symptomatic alleviation. This helps patients maintain their dignity, respect their autonomy, and cultivate hope (**Kars et al., 2019).**

Palliative care encompasses a wide range of services, such as education, communication, and support, for patients and their families. Palliative care services' teaching component gives patients and caregivers the knowledge they need according on their circumstances and expectations. Palliative care incorporates training activities to offer caregivers the skills they need to fulfill their auxiliary care responsibilities in order to guarantee continuity of care after discharge (**WHO, 2023)**

Nursing students must study physical problems, symptom management, communication, psychosocial factors, and life closure techniques as part of the palliative care curriculum. It is crucial to have strong interpersonal communication skills in order to work well in an interdisciplinary team. Furthermore, medical professionals need to regulate their personal responses to death and dying (**Gamondi et al., 2023).**

By using suitable teaching methods and straightforward strategies, nursing educators help students understand both theoretical and practical clinical skills. They also assist students in integrating theory and practice at all levels. Student nurses should preferably develop practical skills primarily in the clinical setting. However, nursing students' learning activities are limited by their competition with allied health and medical students for learning opportunities, which results in less than ideal experiences for subject integration and mastery (**Swenty & Eggleston, 2021**). It is more crucial to include simulation in the nursing curriculum as a substitute for clinical placements and to replace clinical hours since the growing number of student nurses limits their learning opportunities (**Bradshaw & Lowenstein, 2024**).

Although a number of studies have suggested a novel teaching strategy that uses simulation to teach nursing students the fundamentals of palliative care, there is currently relatively little research on this topic (Smith et al., 2018). Nursing students who have taken part in palliative care case simulations report better communication skills, courage, self-confidence, and good attitudes toward palliative care, as well as higher understanding of palliative care principles (**Valen et al., 2019). Stroup (2024)** highlights that students do not benefit from the possible increases in critical thinking and confidence that take place alone in the laboratory. A framework for examining whether learning transfers from one circumstance to another can be found in the simulation's learning outcomes and whether the students apply what they have learned in the past. According to this theory, in order to promote learning transfer from one situation to another. This framework suggests that to foster transfer of learning, the learner needs to detect a potential relationship with previous learning, elect to pursue this relationship and identify a fruitful connection between previous learning and the current situation. The role of motivational and dispositional factors must also be included (**Kelly, 2024).**

Learning objectives, fidelity, problem-solving, and support in a secure learning environment are characteristics of simulation. Developing knowledge, skills, and competence is the aim, and a transformative learning process is a key component. When a confused predicament changes harmful frames of reference or mental patterns, transformative learning takes place. Critical thought on the circumstance can lead to a modification of meaning perspectives, which impacts the individual's capacity to modify their future behavior and mentality. According to their prior experiences in the field of palliative care, students who take part in palliative care simulations bring both positive and negative frames of reference to the situation (**Yun et al., 2023).**

A technique known as simulation-based training attempts to replicate a lived situation by building a realistic model of it. This provides the chance to see how acquired knowledge is used in practical situations. Simulation-based training is the best way to learn, gain experience, and change behaviors and skills. Additionally, it enhances decision-making, problem-solving, and critical thinking abilities. Research has shown that healthcare workers' knowledge and habits regarding hand hygiene were enhanced by simulation-based training (**Jallad & Işık, 2022).**

An important part of palliative care is provided by nurses. Through a variety of tasks, they offer emotional support to cancer patients and their families in addition to the standard nursing responsibilities of monitoring, documenting, and managing symptoms. When providing palliative care, nurses must first build trusting relationships with patients and their families, encourage hope for the patient, manage pain and symptoms with medication and nonpharmacological methods like breathing exercises, meditation, and skin care, preserve dignity and self-esteem by offering spiritual care, avoid feelings of loneliness, use gentle touch while providing care, and inform family members about home care services. **[Kirkpatrick and others, 2020].**

Nursing recommendations for palliative care for cancer patients include assessing pain, creating a pain-management plan, assessing the efficacy of treatments, managing physical symptoms like nausea and vomiting, constipation, dyspnea, and mucositis with both pharmaceutical and non-pharmacological means, and offering appropriate psychological and spiritual support (WHO, 2023)

Significance of the study

Recent research has shown that integrating palliative care early in the course of treatment for patients with incurable cancers is a practical and effective way to enhance mood and quality of life while also potentially increasing survival. One tenable explanation for this survival gain is that early palliative care improves the control of treatment-related side effects and problems, enabling patients to undergo more chemotherapy treatments. On the other hand, in addressing symptoms and supporting treatment choices (**American Cancer Society, 2020**).

While simulation can be a valuable teaching tool, it cannot take the place of in-person patient interaction [**Swenty and Eggleston, 2021]. In** recent years, there has been a dearth of research on evaluation simulation as an educational approach, and even fewer studies have examined the relationship between faculty and student opinions of simulation-based learning (**Kelly, 2021**). According to the literature, nursing schools hardly ever offer palliative care education, despite the fact that it is acknowledged as being important for increasing health professionals' knowledge and competence in this area (**Kim et al, 2020**). Palliative care nursing experience has become more and more in demand, and nursing schools need to prepare their students to meet this demand. According to **Ferrell et al. (2019)**, nurses are an essential part of the palliative care team and must deliver high-quality care. Therefore, they should have current palliative care training. Thus, the purpose of this research was to ascertain how simulation-based learning affected the knowledge and practices of medical-surgical nursing students with regard to palliative care for cancer patients.

Aim of the study

This study aimed to determine the effect of simulation-based education on medical-surgical nursing students' knowledge and practices regarding palliative care for patients with cancer.

Research Hypotheses

Simulation-based education is expected to have a positive effect on improving medical-surgical nursing student's knowledge and practices regarding palliative care for patients with cancer.

Subject and methods

Research design

A quasi-experimental research design was used (pre- and post-test-one group) to achieve the aim of this study.

Settings

The study was conducted in clinical medical-surgical laboratory skills, Faculty of Nursing affiliated to Sohag University.

Subjects

It was carried out on 700 nursing students in the first semester as a convenient sample in the academic year 2023-2024.

Tools of data collection:

Two tools utilized for data collection:

Tool (1): Self-administered questionnaire. The researcher reviewed the relevant literature befor e creating it in Arabic (**American Cancer Society, 2020; Barasa et al. 2021; Zhou et al. 2021),** which was divided into two sections:

Part 1: Evaluation of Medical-Surgical Nursing Students' Personal Information (age, sex, education, years of experience, and prior simulation-based education)

Part 2: Medical-Surgical Nursing Students' Knowledge Assessment: This instrument evaluates medical-surgical nursing students' understanding of palliative care for cancer patients. The study sample completed it, which was created by researchers in plain Arabic based on current and pertinent literature from (**Magee, 2019; Harding and Kwong, 2020; Perry, 2021).** It had sixty-two questions divided into four sections: **Section 1:** Questions pertaining to the general concept of palliative care, such as definitions and dimensions of palliative care (four multiple-choice questions).

Section 2: Questions about how to manage common physical symptoms in cancer patients, such as nurses' knowledge of how to manage pain (6 multiple-choice questions), medical-surgical nursing students' knowledge of how to manage dyspnea (3 multiple-choice questions), medical-surgical nursing students' knowledge of how to manage fatigue (3 multiple-choice questions), medical-surgical nursing students' knowledge of how to manage anorexia and oral mucositis (5 multiple-choice questions), and medical-surgical nursing students' knowledge of how to manage nausea and vomiting (9).

Section 3: Six multiple-choice questions assessing medical-surgical nursing students' understanding of managing psychological symptoms such as anxiety and depression.

Section 4: The purpose of this section to evaluate medical-surgical nursing students' understanding
of spiritual, social, and familial support for cancer patients through 24 true/false questions.

The   medical-surgical

nursing students' knowledge assessment had 62 questions in the form of 38 multiple-choice (MCQ) questions and 24 true/false questions. The questions were categorized as follows: Each question was given a score of "1" for a correct response and a score of "0" for an incorrect response. A total of sixty percent of the possible score (48 out of 62 degrees) indicates a satisfactory level of knowledge. A total knowledge level below 60 percent of the maximum score (less than 47 degrees) is considered unsatisfactory.

Tool (2) A nursing students' observational checklist:

It was used to evaluate how well medical-surgical nursing students practiced providing palliative care to cancer patients. This English-language tool was developed by the researchers after being adopted from **Elshamy (2020) and Sadhu et al. (2019)**.

The next three sections of this instrument addressed the practice of palliative care for cancer patients:

The first section covers nursing care for typical physical ailments, such as:

I: Nurses' evaluation and treatment of acute and chronic pain (15 items).

II. Nursing care of abnormal breathing and dyspnea (27 items).

III. Nursing fatigue management (16 items).

IV: Nursing care for nutritional imbalance (24 items).

V-Management of oral mucous membrane impairment by nurses (17 items).

VI: Nursing care for inadequate fluid intake: diarrhea, vomiting (15 items).

VII: Blood transfusion nursing management (45 items).

Nursing management of typical psychological symptoms, such as dread, inadequate denial, ineffective coping, and grief, is covered in the second section (19 items).

Section 3: Nursing care for spiritual symptoms in cancer patients (15 items).

System of scoring:

Each correctly completed step received one score, whereas each incomplete or unfinished step received zero. The observational checklist used by nursing students has a total score of 193 marks.

The following categories were created from the medical-surgical nursing students' overall score:

60% of the total practice level is satisfactory, which is equivalent to [146 out of 193 degrees].

Less than 60% of practice is insufficient, which is equivalent to less than 146 degrees.

Content validity and reliability:

The face and content validity of the data collection tools in this study were tested and evaluated by five experts in medical-surgical nursing and oncology to determine their relevance, clarity, and completeness. Experts were asked to indicate whether they agreed or disagreed with the tools' face and content validity in order to meet the trustworthiness criteria. The medical-surgical nursing students' knowledge and practices had a validity score of 0.922 and 0.912, respectively, but the overall internal consistency of the employed tool was high.

Ethical considerations:

Ethical approval was obtained from the Research Ethics Committee of the Faculty of Nursing - Sohag University (No. 120-9-2023). The researcher was clarified the objective and aimed of the program to the medical-surgical nursing student's included in the study, Anonymity and confidentiality of the data was being assured and maintained, medical-surgical nursing student's was being informed that they are allowed to participate or not in the study and that they have the right to withdraw from the study at any time.

Pilot study:

To clarify and test the tools' applicability and reliability, a pilot study was conducted for 70% of the sample, or 70 medical-surgical nursing students.

Based on the results of the pilot study, no changes were made to the tools. The pilot study's medical-surgical nursing participants were incorporated into the primary investigation.

Field of work

Permission from Faculty of Nursing, Sohag University was obtained in order to take their approval for conducting the study. The actual field work was carried out over a period of six months (from the beginning of April 2023 to the end September 2023). The study was conducted through the following four phases:

I-Assessment Phase:

- The researcher interviewed the students. At the beginning of the interview, the researchers greeted each student, introduced themselves, and explained the aim and nature of the study.
- Every medical-surgical nursing student was interviewed pre-conduct simulation-based education to collect the personal data utilizing tool (I) part (1).
- Initial assessment of medical-surgical nursing students' knowledge and practices, regarding palliative care for patients with cancer was carried out prior to educational sessions through utilizing tool (I) part (2) and tool II.

II. Planning phase:

The objectives, priorities, and predictable outcomes were articulated depending on the findings of the previous phase, to meet the medical-surgical nursing students' practical needs, knowledge deficits and practices regarding palliative care for patients with cancer. Four sessions (2 theoretical and 3 practical) were planned by the researchers for the medical-surgical nursing students studied.

The educational program:

A **simulation-based** education was designed and revised. It included theoretical and practical sessions regarding palliative care for patients with cancer.

The general objective of simulation-based educational sessions:

At the end of the sessions, the medical-surgical nursing students were expected to acquire knowledge that improved their practices regarding palliative care for patients with cancer.

Specific objectives of the simulation-based educational sessions:

At the end of the sessions, the medical-surgical nursing students were expected to recognize:

- • - Definition of palliative care.
- • - Principles of palliative care.
- • - Pain and symptoms management
- • - Psychological care of cancer patients
- • - Spiritual care of cancer patients

III. Implementation phase:

- The implementation of simulation-based education was aimed to determine the effect of simulation-based education on medical-surgical nursing students' knowledge and practices regarding palliative care for patients with cancer through sessions; two theoretical and three practical sessions.

- All participants were given a 10min education via PowerPoint presentation designed to improve their palliative care for patients with cancer knowledge and practices. The presentation was followed by a 5min demonstration of how to perform palliative care for patients with cancer.

- At the beginning of each session, the researchers started by taking feedback about the previous session and at the end of each session the researchers gave a summary.

- The medical-surgical nursing students studied were classified into subgroups, with varying numbers.
-The theoretical portion of the simulation-based learning process about palliative care for cancer patients was taught to all students first. An hour was spent on the theoretical portion in the first-year medical-surgical nursing department classroom, while the practical portion was carried out in the department's affiliated laboratory. The practical portion of the lesson began with establishing the goal of simulation-based learning, creating the material that explained the rationale for the sessions, and using a mannequin simulator. For 20 days, two sessions per day, or roughly two to three days per week, were used for demonstration and re-demonstration of clinical laboratory skills for each group. The duration of each session varied based on the medical-surgical nursing students' comprehension and responses, lasting between 45 and 50 minutes. In accordance with the scenario, students were split up into groups (the group included 25 medical-surgical nursing students) to enable their simulation-based learning on the manikin. Every medical-surgical nursing student spends roughly fifteen to twenty minutes. Every medical-surgical nursing student was permitted to use the faculty clinical laboratory skills palliative care mannequin simulator while being watched over by researchers. Until the student of medical-surgical nursing had mastered these abilities, this was done repeatedly.

Following a review of related literature and an assessment of the actual needs of the medical-surgical nursing students under study, a simplified booklet covering all topics related to knowledge and practice regarding palliative care for cancer patients was distributed to the students in Arabic. -A variety of teaching techniques, including lectures, brainstorming sessions, small group discussions, pictures, demonstrations, and re-demonstrations, using the required tools and the simulation manikin available in the faculty clinical lab to implement simulation-based learning. A variety of instructional resources were used, including PowerPoint, figures, flipcharts, handouts, and animated films.

IV-Evaluation phase:

Medical-surgical nursing students' knowledge and practices regarding palliative care for patients with cancer were reassessed immediately post the implementation of the simulated-based education (post-test) using the previously mentioned tools to evaluate the effect of simulated-based education.

Statistical analysis:

Data collected from the studied sample was revised, coded and entered using PC. Computerized data entry and statistical analysis were fulfilled using the statistical package for social sciences (SPSS) version 20. Data were presented using descriptive statistics in the form of frequencies and percentages. Chi-square test(X2) was used for comparisons between qualitative variables and correlation sufficiency was used to test correlation between variables. Statistically significant was considered at p-value <0.05.

Results:

Table (1): shows that 80% of the studied medical-surgical nursing students aged ≤ 19 years with mean ±SD 19.2 ± 1.1, 70% were female students, and 75% lived in rural areas. Also, it was observed that no one of them (0%) attend previous simulation-based education regarding palliative care for patients with cancer.

Table (2) illustrates that there was a highly

statistically significant difference between medical-surgical nursing students' knowledge scores regarding palliative care for patients with cancer pre and post- simulation-based education implementation at (P<0.001).

Figure (1): illustrates that 85% of the studied medical-surgical nursing students had unsatisfactory knowledge about palliative care for patients with cancer pre- simulation-based education implementation decreased to 4.0% post- simulation-based education implementation with statistically significant differences P - < 0.0001.

- **Table (3)** shows that there was a highly statistically significant difference between medical-surgical nursing students' practice scores regarding palliative care for patients with cancer pre- and post- simulation-based education **implementation** at (P<0.001).

- **Figure (2):** illustrates that 94% of the studied medical-surgical nursing students had inadequate practices about palliative care for patients with cancer pre- simulation-based education implementation decreased to 13.0% post- simulation-based education implementation with statistically significant differences P - < 0.001.

- **Table (4)** reveals that there was a highly significant statistical correlation between medical-surgical nursing students' total knowledge score and their age, gender, and previous training simulation-based education.

Table 5 reveals that there was a highly significant statistical correlation between medical-surgical nursing students' total practice score and their age, gender, and previous simulation-based education.

Table (6) shows a correlation between the medical-surgical nursing students' knowledge and practice scores before and after the simulation-based education was implemented. The knowledge and practice scores showed statistically significant differences (p <0.05).

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Table (1): medical-surgical **nursing students distribution according to demographic data (n = 700)**

Items	No.	%
Age		
≤19	560	80.0
≥19	140	20.0
Mean ± SD	19.2 ± 1.1	
Gender		
Male	210	30.0
Female	490	70.0
Residence		
Rural	525	75.0
Urban	175	25.0
ious attendance simulation-based education regarding palliative care for patients with cancer		
Yes	0	0.0
No	700	100.0

Table (2): Differences in knowledge scores regarding palliative care for patients with cancer among the studied medical-surgical nursing Students pre and post- simulation-based education **implementation (N = 700)**

Medical-surgical nursing Students' knowledge regarding palliative care	Study Group (n= 700)				X2	P-value
	Pre		Post			
	No	%	No	%		
Definition of palliative care and its principles	154	22.0	658	94.0	F=78.43 P<0.001	
Pain and symptoms' management	126	18.0	644	92.0		
Psychological issues	133	19.0	630	90.0		
Spiritual issues	105	15.0	616	88.0		

X^2 56.44 (P- value < 0.001)

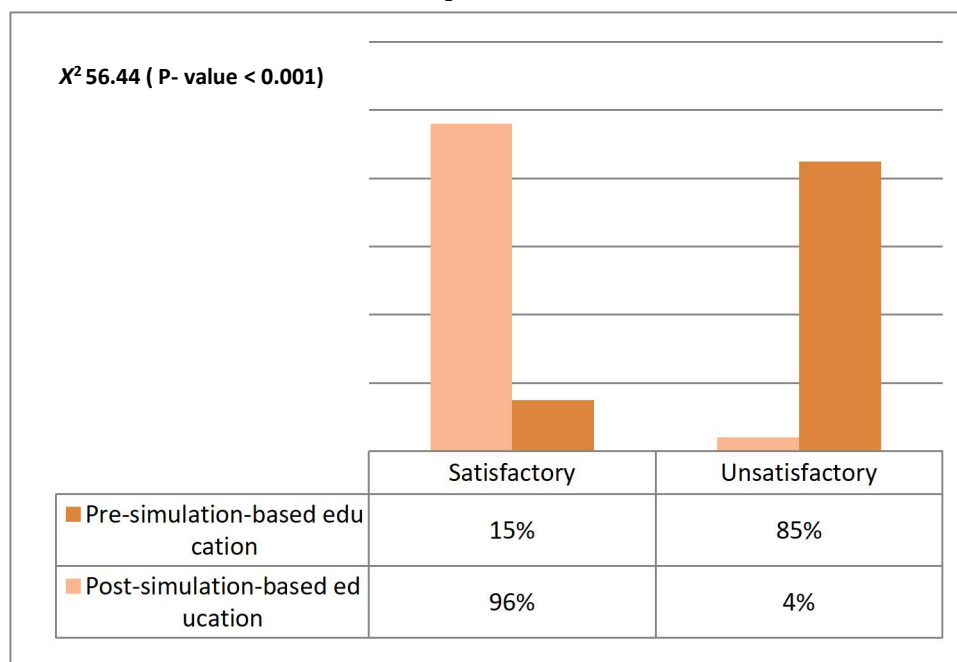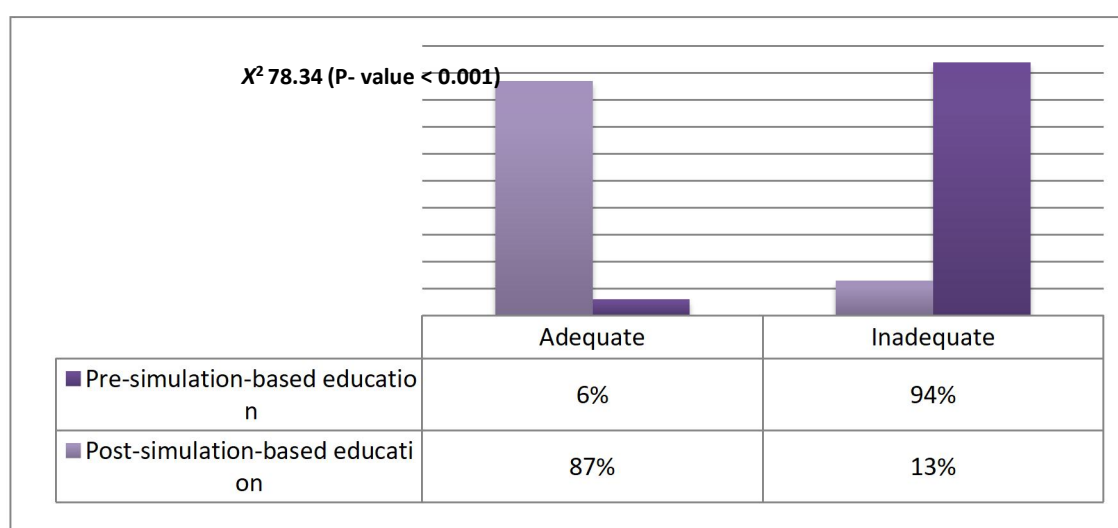|	Satisfactory	Unsatisfactory
Pre-simulation-based education	15%	85%
Post-simulation-based education	96%	4%

Figure (1): Total knowledge levels among the studied medical-surgical nursing students regarding palliative care for patients with cancer pre and post- simulation-based education (n=700).

Table (3): Differences in practice scores regarding palliative care for patients with cancer **among the studied medical-surgical nursing students pre and post-** simulation-based education **implementation (N = 700)**

ical-surgical nursing Students' practi rding palliative care	Study Group (n= 400)				X2	P-value
	Pre		Post			
	No	%	No	%		
The physical aspect of care						
assessment and management	140	20.0	686	98.0		
ng care for nausea and vomiting	112	16.0	658	94.0		
ng care for oral mucositis	91	13.0	672	96.0		
ng care for dyspnea	84	12	602	86		
nd: Total The psychological aspect of care	70	10	609	87	F=76.54 P<0.001	
: Total The social and cultural aspect of care	105	15	553	79		
h: Total The spiritual aspect of care	126	18	567	81		

X² 78.34 (P- value < 0.001)

	Adequate	Inadequate
■ Pre-simulation-based education	6%	94%
■ Post-simulation-based education	87%	13%

Figure (2): Total practice levels among the studied medical-surgical nursing students regarding palliative care for patients with cancer pre and post- simulation-based education (n=700).

Table (4): Correlation between personal data of the medical-surgical **nursing students and their total knowledge scores n=50**

ables	R	X2	P value
with knowledge	0.34		0. 01*
er with knowledge		6.33	0.01*
ous training course with knowledge	0.31		0.01*

Table (5): Correlation between personal data of the medical-surgical **nursing students and their total practice (n= 50)**

ables	R	X²	P value
with practice	0.24		0.00*
er with practice		8.12	0.01*
ous training course with practice	0.45		0.00*

Table (6): Correlation Co-efficient between medical-surgical nursing student's **total knowledge scores and practice scores pre andpost-** simulation-based education **implementation**

elation	Practice scores	
	R	P
vledge score		
simulation-based education	0.159	0.348
simulation-based education	0.368	0.046*

- Correlation is significant at the 0.05 level **

Discussion:

The fundamental principles of palliative care include easing suffering and ensuring comfort to preserve a patient's quality of life for as long as they are alive. Nursing professionals play a crucial role in providing palliative care because their duties involve creating care plans and offering support to patients and their families. When it comes to addressing the physical, psychological, social, and spiritual aspects of care, nurses are the most valuable members of the palliative care team (**Menekli et al., 2021; Eleke et al., 2020**). Thus, the research was conducted to determine the effect of simulation-based education on medical-surgical nursing students' knowledge and practices regarding palliative care for patients with cancer.

Upon analyzing the demographics of the medical-surgical nursing students under study, it was found that less than three quarters of them were female and that the majority of them were under the age of 19, with a mean ± SD 19.2 ± 1.1 years. The fact that the nursing profession in Egypt was previously exclusively for women but is now open to both sexes may be the cause of this finding. **Eleke et al., (2020)** concur with this finding. Most of the subjects in the study, "Knowledge of palliative care among studied medical-surgical nursing students in Southeast Nigeria: A needs assessment for continuing education Chinemerem," were female. The findings showed that none of them had previously attended simulation-based education about palliative care for cancer patients. According to the researchers, it validated the necessity for the medical-surgical nursing students under study to learn about palliative care for cancer patients through simulation-based instruction in order to enhance their skills and understanding. They should all attend training sessions in order to enhance their performance.

In the present study, the knowledge scores of medical-surgical nursing students about palliative care for cancer patients before and after simulation-based implementation were found to differ in a highly statistically significant way. It demonstrated the beneficial impact of using simulation-based learning to meet the needs of the subjects, according to the researchers. These findings align with research showing nursing students feel inadequate in this field (**Hall-Lord et al. 2020; Henoch and colleagues. 2020; Zhou et al. (2021)**), which suggested that self-reporting bias might have also contributed to the results. Before performing, some students find it difficult to give high ratings of their knowledge, abilities, and competence, particularly in a field that is unfamiliar and difficult for them, like palliative care. As advised by Daley **and Campbell (2019)**, the participants in this study simulated the same case twice, with a reflective debriefing session following each simulation. The students may have been more motivated if they had been able to discuss, learn from, and try again after the experience. According to reports, the simulation's impact on learning outcomes is consistent with earlier studies (**Smith et al. 2018; Svellingen et al., 2021; Stroup (2024).**

In the same way, **Venkatasalu et al., (2021)** Palliative care case simulations helped nursing students better understand death and dying during their placement. Additionally, **Smith et al., (2018)** In this study, conditions may not have been ideal for identifying palliative care needs and connecting the situation to previous learning because notes that nursing students have limited opportunities to learn palliative care in a clinical setting. Another reason might be that participants were only occasionally invited by staff to participate in events involving patients who require palliative care. Unit nurses were hesitant to engage students in palliative care, which reduced exposure and learning opportunities, according to **Carmack and Kemery (2018).** Adding more simulation "boosters" might have helped keep the emphasis on the learning objectives for palliative care (**Shariff et al. (2020)**. According to the current study's findings, the majority of medical-surgical nursing students had inadequate knowledge about palliative care for cancer patients before simulation-based education was implemented. This percentage dropped to just 4% after the implementation of simulation-based education, with statistically significant differences. According to the researchers, it demonstrated how well simulation-based learning was implemented, which satisfied the study's objective.

This conclusion was confirmed by a study conducted by **Paknejadi et al., (2020)**, who discovered that the majority of respondents were aware of what palliative care was and concurred that it is provided when a patient's condition is steadily declining. The findings were consistent with those of **Mohamed et al., (2019)**.

The majority of study participants had inadequate knowledge in the preprogram phase, but most in the postprogram phase and most in the follow-up phase had adequate knowledge. This result concurred with **Hassan et al.'s findings. (2019)** and noted that most nurses in the study had inadequate knowledge scores about all aspects of palliative care. This outcome concurred with the **Morsy et al., (2024)** result found that nurses' median level of palliative care nursing knowledge was lower examined the factors linked to nurses' self-efficacy in applying palliative care in intensive care units. This might be because palliative care training has not been provided to these medical-surgical nursing students.

The current study's findings regarding the knowledge level of medical-surgical nursing students regarding palliative care in general showed that the majority of them had unsatisfactory scores on the subjects. This might be as a result of the medical-

surgical nursing students under study not having received palliative care training or being unfamiliar with the term "palliative care.". Our findings support those of these studies; **Farmani et al. (2019)**, as well as **Kassa et al. (2024)**, they all stated that the majority of nurses in the study had a low overall score for palliative care knowledge. The first question about nurses' knowledge of palliative care for cancer patients is addressed by this result.

The current study's findings showed a highly statistically significant difference between the practice scores of medical-surgical nursing students before and after the use of simulation-based education in relation to palliative care for cancer patients. According to the researchers, it validated the efficacy of the use of simulation-based education, which is explained by the fact that it gives medical-surgical nursing students adequate knowledge and is linked to best practices. These findings were consistent with a study conducted by **Barasa et al. (2021),** which examined medical surgical nursing at Zagazig University's Department of Medical Surgical Nursing, Faculty of Nursing, and found that nurses' practice level increased during the post-program phase. Following program implementation, the majority of the nurses under study demonstrated a satisfactory level of practice in managing gastrointestinal symptoms, itching, and breathing difficulties. Furthermore, with a highly statistically significant difference, over three-quarters of the nurses in the study had a satisfactory level of practice managing fatigue after the program. This could be because learning, practice, and interaction with environments are the means by which one develops the ability to act and behave with complete understanding.

Interestingly, though, the students stated that during their hospital placement, they somewhat practiced the learning outcomes from simulating palliative care in palliative care scenarios. This is an intriguing discovery because nursing students find it difficult to acquire and apply the knowledge, abilities, and competence needed in the palliative care field (**Hall-Lord et al. 2020; Henoch et al., 2020; Jeppesen et al., 2020. , 2020),** and education is cited as a crucial component in expanding access to palliative care for patients who are terminally ill. The findings of the study lend credence to the claim that it is crucial to let students act out various palliative care situations in order to guarantee that they are trained in palliative care prior to graduation. Additionally, through intentional follow-up, educators and clinical staff must assist students in creating mental bridges that will foster the development of competence in palliative care in the clinical setting. According to this study, it is not an easy process for students to apply and transfer learning outcomes during placement.

Due to the emotional impact of frequent exposure to suffering and death, palliative care patients are particularly vulnerable, and providing palliative care can be stressful. Personal development is frequently regarded as a crucial protective factor, and palliative care requires personal resources to handle stressful situations. Although some participants desired more practical content, such as symptom management, our findings show that postgraduate nursing students felt more confident and experienced personal growth and development after engaging in simulation learning. In order to feel ready for meetings with patients and their families during palliative care, postgraduate nursing students should receive pertinent training and education. Potential obstacles to palliative care may include nurses' lack of education, training, skills, and capacities (**Chen et al. 2022**).

The small number of studies that were included in our review could be attributed to a number of factors. Given that postgraduate education in palliative care nursing is not available in many nations, nurses may be able to take shorter courses and receive palliative care training at work that incorporates simulation learning. A potential lack of faculty experience may also make it difficult to provide palliative care education. In addition to being a relatively new specialty, palliative medicine education has been slow to adopt simulation learning. Lack of funding may be one factor contributing to the delayed adoption of simulation learning in the palliative field, given that it can be a costly and time-consuming teaching strategy (**Dwyer et al. 2022**). In undergraduate and graduate education, there is an emphasis on the necessary skills for nurses are working in palliative care, including communication, observation, assessment, symptom management teamwork, and simulation learning. Other active learning techniques are also advised. **Gillan et al., (2024)** discovered that the use of simulation learning to teach EOL skills to undergraduate nursing students dates back to 2009. Since palliative care is frequently regarded as a less urgent specialty than, say, anaesthetics, simulation learning may be seen as less applicable in this field. Because palliative care is frequently seen as a less urgent specialty than, say, anaesthetics, simulation learning may be seen as less applicable in this field. High-tech learning and teaching simulations, such as resuscitation, have grown significantly. One way to characterize palliative care is as "high touch" (**Allen et al. 2021).**

The current study's findings demonstrated that, prior to the adoption of simulation-based education, the majority of medical-surgical nursing students lacked adequate practices regarding palliative care for cancer patients. These practices declined after the adoption of simulation-based education, with statistically significant differences. A lack of knowledge could be the cause of this. Additionally, the enhancement pertaining to the introduction of simulation-based education. These results were in line with those of **Abu Sharour's (2019)** study, which discovered that over two-thirds of the sample under study had inadequate palliative care practices. This result was consistent with that of **Bibi et al. (2020)**, who found that most nurses in

the study had inadequate palliative care practices for gastrointestinal symptoms. These practices were not standardized because the participants lacked proper nursing procedures.

This outcome is consistent with that of **Farmani et al. (2019) and Sorifa and Mosph (2019)**, who found that approximately 75% of the participants in the study had high overall scores for palliative care practices. Our results were consistent with those of **Wang-Qin & Hong-Lin (2018) and Pasaol (2019)**, who discovered that over three-quarters of the participants had inappropriate palliative care practices. This outcome aligned with the findings of **Mohamed et al. (2019**) explained that the preprogram practice level of the nurses under study was inadequate. **Saylor et al., (2022)** provided support for the current finding found that nurses' knowledge and abilities in palliative care significantly improved following a palliative care simulation education. In particular, the pre-post education intervention in this study showed a highly statistically significant difference in the knowledge of morphine as a standard to use when comparing the analgesic effect of other opioids. **Morsy et al., (2024)** provided support for the current finding, who investigated the variables linked to nurses' self-efficacy in providing palliative care in intensive care units, found that most of the nurses in the study had a completely satisfactory degree of practice following the program.

According to the current study, medical-surgical nursing students' age, gender, and prior simulation-based training were statistically correlated with their total knowledge score and practices. Older adults with more life experience are more knowledgeable and skilled than younger individuals with less training. pertaining to a comparison of the medical-surgical nursing students' practice scores and knowledge prior to and following the implementation of simulation-based learning. There were statistically significant differences between the knowledge and practice scores, according to the current study. This result supports the findings of **Sorifa and Mosph (2019),** who found a strong positive correlation between the nurses' knowledge and practice, with knowledge growing as practice increases. This outcome is consistent with **Abu Sharour's (2019**) finding that the level of performance and the studied nurses' level of knowledge were statistically significantly positively correlated.
However, this result contradicts the findings of **Ibrahim et al. (2019),** who found no statistically significant relationship between the nurses' total level of practice and their total level of knowledge. But this result contradicts that of **Morsy et al. (2024)** as well as **Hassan et al. (2019),** who discovered no statistically significant correlation between the total practice scores and the total knowledge scores of nurses.

Conclusion:

Based on the results of the present study, it was concluded that simulation-based education was a feasible strategy and had a positive effect on improving medical-surgical nursing student's knowledge and practices regarding palliative care for patients with cancer.

Recommendations:

Based on the current study findings, it can be recommended that:
- Simulation-based education should be integrated as an effective method in medical-surgical nursing student's training regarding palliative care for patients with cancer**.**
- Integrating palliative care education within nursing curricula is a priority, although the best method to accomplish this is yet to be established.
- Replication of the study with a larger sample of students from different universities may have a more generalized effect.

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