

Original Article

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Corresponding author:

Ateya Megahed Ibrahim;

Email: ateyamegahed@yahoo.com

Evaluating palliative care's role in symptom management for CKD patients in Egypt: A quasi-experimental approach

Ateya Megahed Ibrahim, ^{PH.D.}^{1,2} , Ishraga A. Mohamed, ^{PH.D.}³,
Marwa A. Shahin, ^{PH.D.}^{4,5}, Takwa Rashwan Mohamed Abd-El Hady, ^{PH.D.}⁶,
Elsayed Hamdy Nasr Abdelhalim, ^{PH.D.}^{1,7}, Donia Elsaid Fathi Zaghamir, ^{PH.D.}^{1,8},
Doaa Bahig Anwr Akl, ^{PH.D.}^{9,10} , Laila Zeidan Ghazy Mohammed, ^{PH.D.}^{11,12} and
Fatma Abdelhalim Moustafa Ahmed, ^{PH.D.}^{13,14} 

¹Nursing College, Prince Sattam Bin Abdulaziz University, Al-Kharj, Saudi Arabia; ²Family and Community Health Nursing Department, Faculty of Nursing, Port Said University, Port Said, Egypt; ³Critical Care Nursing, Department of Nursing, College of Applied Medical Science, Jeddah University, Jeddah, Saudi Arabia; ⁴Nursing Program, Batterjee Medical College, Jeddah, Saudi Arabia; ⁵Department of Maternal and Neonatal Health Nursing, Faculty of Nursing, Menoufia University, Menoufia, Egypt; ⁶Nursing Administration Department, Faculty of Nursing, Port Said University, Port Said, Egypt; ⁷Maternity, Obstetrics, Gynecological Nursing Department, Faculty of Nursing, Port Said University, Port Said, Egypt; ⁸Pediatric Nursing Department, Faculty of Nursing, Port Said University, Port Said, Egypt; ⁹Assistant Professor of Pediatric Nursing, Faculty of Nursing, Aswan University, Aswan, Egypt; ¹⁰Assistant Professor of Pediatric Nursing, Faculty of Nursing, Taibah University, Madinah, Saudi Arabia Kingdom; ¹¹Lecturer in Medical-Surgical Nursing, Faculty of Nursing, Port Said University, Port Said, Egypt; ¹²Nursing Department, Al-Ghad College for Applied Medical Sciences, Madinah, Saudi Arabia; ¹³Medical-Surgical Nursing Department, Faculty of Nursing, Mansoura University, Egypt and ¹⁴Department of Medical and Surgical Nursing, College of Nursing, Taibah University, Madinah, Saudi Arabia

Abstract

Objectives. Chronic kidney disease (CKD) is a global health challenge that affects patients' symptom burden and quality of life. Palliative care interventions show promise in addressing the multiple needs of CKD patients, focusing on symptom management, psychosocial support, and advance care planning. This study aimed to evaluate the effectiveness of palliative care interventions in improving symptom management in patients with CKD.

Methods. The study used a quasi-experimental research design with a sample size of 128 participants diagnosed with CKD. Participants were selected based on strict criteria to ensure consistency of palliative care interventions. Non-probability purposive sampling was used to select participants. Data were collected using validated instruments such as the Edmonton Symptom Assessment System, Kidney Disease Quality of Life-Short Form, Palliative Performance Scale, Dialysis Symptom Index and Functional Assessment of Chronic Illness Therapy-Fatigue. These instruments provided robust measures of symptom severity, quality of life, performance status, symptom burden, and fatigue. The intervention consisted of 4 sessions designed to address symptom management, psychosocial support, and advance care planning strategies.

Results. Post-intervention, CKD patients showed significant improvements across multiple measures. Pain decreased from 6.2 to 4.8 ($p = 0.002$, 23% improvement), and fatigue decreased from 7.5 to 6.1 ($p = 0.001$, 19% reduction). Depression improved from 5.6 to 4.2 ($p = 0.001$, 25% reduction) and anxiety decreased from 4.9 to 3.8 ($p = 0.004$, 22% reduction). Physical functioning increased from 65.3 to 72.1 ($p = 0.002$, 10% improvement), cognitive function from 72.8 to 78.5 ($p = 0.003$, 8% increase), and emotional well-being from 60.2 to 65.7 ($p = 0.004$, 9% improvement). Ambulation improved from 75.2 to 81.5 ($p = 0.001$, 8% increase), activity from 68.7 to 74.3 ($p = 0.004$, 8% increase), and self-care from 82.4 to 88.1 ($p = 0.003$, 7% improvement). Nutritional status improved from 79.6 to 85.2 ($p = 0.002$, 7% increase) and level of consciousness from 70.3 to 75.8 ($p = 0.005$, 8% increase). Fatigue scores decreased significantly from 53.2 to 48.6 ($p = 0.001$, 9% decrease), activities of daily living from 50.1 to 45.8 ($p = 0.001$, 9% decrease), and well-being from 55.6 to 50.2 ($p = 0.001$, 10% improvement).

Significance of the results. The results highlight the potential of palliative care interventions to improve outcomes and well-being for people with CKD. By addressing their complex needs, these interventions offer valuable lessons for nephrology and palliative care practice, emphasizing holistic approaches to patient care. The findings add to the evidence supporting the

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integration of palliative care into CKD management, highlighting its value in improving patient outcomes and quality of life.

Introduction

Chronic kidney disease (CKD) represents a significant global health burden, affecting approximately 850 million people worldwide and leading to significant morbidity and mortality (Francis *et al.* 2024; Jadoul *et al.* 2024; Kovesdy 2022). This progressive decline in kidney function is often accompanied by a range of distressing symptoms, including pain, fatigue, nausea, pruritus, and psychological distress, which significantly reduce patients' quality of life (Wilson *et al.* 2021). While palliative care has traditionally been associated with end-of-life care, it has become an important component of comprehensive CKD management, aiming to alleviate suffering and improve overall well-being (Lanini *et al.* 2022; Leung and Chan 2020).

Palliative care in CKD takes a holistic approach, addressing not only physical symptoms but also psychological, social, and spiritual aspects throughout the disease course (Chiu *et al.* 2021; Chu *et al.* 2024; Davison *et al.* 2024). This comprehensive strategy ensures that patients receive tailored care that meets their multiple needs and improves their overall quality of life and well-being. Symptom management is a primary focus of palliative care in CKD, addressing symptoms such as pain and pruritus through a combination of pharmacological interventions and non-pharmacological strategies. By effectively managing symptoms, palliative care enables patients to maintain better physical function and participate more fully in daily activities (Lanini *et al.* 2022; Tavares *et al.* 2021).

In addition, palliative care emphasizes improving patients' quality of life by minimizing symptom burden and providing comprehensive support. This approach empowers patients to participate in meaningful activities and engage in advance care planning discussions, thereby promoting autonomy and reducing anxiety associated with their condition (Domingues *et al.* 2022; Ducharlet *et al.* 2023; Prieto-Crespo *et al.* 2024).

A multidisciplinary approach is essential in palliative care for CKD, involving healthcare professionals such as nephrologists, nurses, social workers, psychologists, and spiritual care providers. This collaborative team effort ensures that care is integrated and personalized according to patients' individual needs and preferences, and optimizes the effectiveness of treatment and supportive interventions (Bachynski *et al.* 2024; Farinha *et al.* 2024; Workgroup *et al.* 2024).

Training programs play a critical role in improving the provision of palliative care to patients with CKD by equipping healthcare providers with the necessary knowledge and skills (Gbigbi-Jackson *et al.* 2024; GITHUKU *et al.* 2024; Gupta *et al.* 2024; Seng and Tham 2022). These programs promote early integration of palliative care, ensuring proactive symptom management and comprehensive support from the beginning of the disease trajectory (Alanazi *et al.* 2024; Arif and Sarmah 2024; Bollig, *et al.*, 2024; Hatoum and Sperling 2024). In addition, educating patients and their families about the role and benefits of palliative care promotes uptake and use of services and addresses cultural and socioeconomic factors that may influence care (Jawed and Comer 2024; Llop Medina 2024).

In summary, CKD poses significant challenges that affect the physical, psychological, and social well-being of patients. Despite advances in treatment, many people continue to experience debilitating symptoms that affect their quality of life. There is an urgent need for a better understanding of how palliative care can manage these symptoms and improve overall well-being. This study aims to evaluate the effectiveness of a palliative care education program on symptom management and quality of life in patients with CKD. The results will highlight the potential benefits of integrating palliative care principles into the management of CKD and emphasize the importance of educational programs that enable healthcare providers to provide holistic, person-centered care. This approach is essential to improve health outcomes and patient satisfaction as individuals navigate the complexities of CKD.

Aim of the study

To evaluate the effectiveness of palliative care interventions in improving symptom management in patients with CKD.

Methods

Research design

The study used a quasi-experimental design with pretest and posttest assessments to evaluate the effectiveness of the intervention. Baseline data on symptom severity and quality of life were collected before the intervention, followed by posttest measurements to assess changes. Comparisons were only made between pre- and post-intervention outcomes, as no control group was included. This approach allowed a focused analysis of the impact of the intervention on the same population over time.

Setting

The study was conducted at General Damietta Hospital in Egypt, which is recognized as a major healthcare provider with a patient population that includes many people diagnosed with CKD. Its reputation as a referral center for CKD care, offering comprehensive renal services, made it an ideal setting to evaluate palliative care interventions. The hospital's multidisciplinary approach ensured that the study captured a holistic perspective on symptom management and quality of life. In addition, its geographical accessibility and ability to serve patients from diverse socioeconomic backgrounds enhanced the generalizability of the findings to real-world clinical settings.

Participants

The study included 128 participants diagnosed with CKD stages 3–5 who were selected using a non-probability, purposive sampling method. This approach ensured that participants met specific criteria: they had to be adults aged 18 years or older with a confirmed diagnosis of CKD based on clinical assessment and laboratory tests. Purposive sampling was preferred to random sampling to specifically target people with symptoms of advanced CKD, such as persistent fatigue, anemia, fluid retention, and electrolyte imbalances. Participants also needed to have a stable cognitive status to be able to engage effectively with the palliative care interventions being studied. Exclusion criteria included people with significant cognitive impairment, recent major interventions (such as dialysis initiation or transplantation), or other serious comorbid conditions that could interfere with symptom assessment or intervention effectiveness. By using this method, the trial focused on people who were most likely to benefit from the intervention, allowing a better assessment of its effects. The sample included a range of symptom severity, which was important for understanding how well the intervention worked in managing symptoms and improving quality of life. The sample size of 128 participants was determined using G*Power software, based on several key assumptions. A medium effect size (Cohen's *d* of around 0.5) was expected, indicating a moderate relationship between the intervention and outcomes. A significance level of 0.05 was chosen, representing a 5% risk of type I error, while power was set at 0.80, ensuring an 80% chance of detecting a true effect if it existed. These parameters guided the sample size calculation and ensured that the study was adequately powered to detect meaningful differences in symptom management and quality of life improvements resulting from the palliative care interventions.

Tools of data collection

Sociodemographic questionnaire

The sociodemographic questionnaire used in this study was developed by the authors and was inspired by several existing literature. It includes key categories such as age distribution, sex composition, marital status, education level, employment status, income level, common comorbidities, CKD stages, and duration of CKD. These categories were selected based on evidence from the relevant literature to ensure a comprehensive understanding of the participant population and potential influences on the research results. This structured approach not only facilitated the collection of relevant sociodemographic data, but also provided a framework for analyzing how these factors might influence the effectiveness of palliative care interventions in managing symptoms and improving quality of life in patients with CKD.

Dialysis Symptom Index (DSI)

The Dialysis Symptom Index (DSI), developed by Weisbord et al. (2004), is a comprehensive tool specifically designed to assess the symptom burden experienced by patients undergoing dialysis, a common treatment for patients with CKD. The DSI aims to provide a targeted assessment of symptom severity and frequency in this population, taking into account the unique challenges faced by dialysis patients. It assesses the severity and frequency of 30 symptoms commonly experienced by people on dialysis, including fatigue, pain, itching, nausea, sleep disturbance, and depression. Each symptom is rated on both severity and frequency, with scores ranging from 0 to 10 for both parameters. Mean scores for severity and frequency are calculated for each symptom, providing a quantitative assessment of the average symptom burden experienced by the patient population.

Kidney Disease Quality of Life-Short Form (KDQOL-SF)

The Kidney Disease Quality of Life-Short Form (KDQOL-SF), developed by Hays et al. (1997), aims to assess health-related quality of life (HRQoL) specifically in patients with CKD. The KDQOL-SF consists of several domains covering physical functioning, symptoms and problems, burden of kidney disease, cognitive function, quality of social interaction, and emotional well-being. Each domain is scored on a standardized scale from 0 to 100, with higher scores indicating better quality of life. Mean scores and standard deviations can be calculated for each domain, providing a quantitative measure of patients' quality of life and aiding in statistical analysis and interpretation of results. The tool provides a comprehensive assessment of patients' perceptions of their health and well-being, offering valuable insights into the impact of CKD on different aspects of their lives.

Palliative Performance Scale (PPS)

The Palliative Performance Scale (PPS), developed by Lau et al. (2009), uses a structured scoring system to assess the functional status and overall performance of palliative care patients, including those with CKD. This comprehensive tool assesses patients in 5 domains: ambulation, activity level and signs of illness, self-care, nutrition, and level of consciousness. Each domain is scored on a percentage scale from 0% to 100%, with higher scores indicating better functioning. For example, in the ambulation domain,

a score of 100% indicates the ability to walk independently without limitation, whereas lower scores reflect varying degrees of impairment or dependence on assistance. Similarly, higher scores for activity level and evidence of illness indicate greater engagement in daily activities despite the impact of illness, while self-care scores assess independence in activities such as grooming and dressing. Nutrition scores assess nutritional adequacy and hydration levels, with higher scores indicating better overall nutritional management. Consciousness scores measure the patient's alertness and responsiveness, highlighting changes in cognitive function or awareness.

Functional Assessment of Chronic Illness Therapy-Fatigue (FACIT-F)

The Functional Assessment of Chronic Illness Therapy-Fatigue (FACIT-F), developed by Yellen *et al.* (1997), is scored by calculating the mean of the responses to each item. Each item in the FACIT-F questionnaire contributes to the overall assessment of fatigue severity and its impact on daily life and well-being. By calculating the mean score of all items, researchers can obtain an average measure of fatigue experienced by patients with chronic conditions, including CKD. This mean score provides a quantitative representation of the overall severity of fatigue, allowing clinicians and researchers to assess the extent to which fatigue affects patients' quality of life. A higher mean score indicates higher levels of fatigue and lower overall well-being, while a lower mean score indicates lower levels of fatigue and higher overall daily functioning. The use of mean scores derived from FACIT-F responses allows healthcare professionals to identify individuals with elevated levels of fatigue and tailor interventions to address their specific needs, ultimately improving symptom management and the overall well-being of CKD patients.

Procedure

The study's data collection process began with a systematic screening process at the hospital, where patients diagnosed with CKD were identified through medical records and consultations with nephrology specialists. Once potential participants were selected, trained researchers and healthcare professionals carried out data collection according to a detailed protocol. Prior to the intervention, comprehensive baseline data were collected using standardized instruments, including the DSI, KDQOL-SF, PPS, and FACIT-F. These assessments were conducted to establish baseline measures of symptom severity, quality of life, and functional status among participants.

Data collection took place twice a week, specifically on Mondays and Thursdays, from January to March 2024, with each session lasting between 20 and 30 minutes. The palliative care interventions were delivered over several sessions at the hospital, which was chosen for its accessibility and ability to accommodate educational activities. Data were collected immediately after each session, allowing researchers to track changes in symptoms and quality of life in real time. In addition, a final round of assessments was conducted after all intervention sessions were completed to assess the overall impact of the interventions. This structured approach ensured a thorough understanding of the effectiveness of the palliative care strategies implemented and provided valuable insights into symptom management and quality of life improvements for CKD patients. The palliative care intervention used several key

concepts and theories to address the needs of CKD patients and improve their symptoms and quality of life.

Concept or theory used in palliative care intervention development

1. **Holistic approach:** Palliative care for CKD adopts a holistic approach, integrating physical, psychological, social, and spiritual dimensions of care. This comprehensive approach recognizes that symptoms and quality of life are influenced by multiple factors beyond medical treatments alone.
2. **Patient-centered care:** The intervention is centered around the needs, preferences, and values of CKD patients. By involving patients in decision-making and tailoring care plans to individual circumstances, the intervention aims to improve patient satisfaction and outcomes.
3. **Symptom management:** Effective symptom management is fundamental in palliative care for CKD. The intervention focuses on identifying and alleviating symptoms such as pain, fatigue, nausea, and psychological distress through both pharmacological and non-pharmacological interventions.
4. **Education and empowerment:** Educating patients about their condition and empowering them to actively participate in managing their symptoms and care decisions are crucial components. This empowerment fosters self-efficacy and improves patient outcomes.
5. **Advance care planning:** Encouraging discussions about advance care planning helps patients articulate their preferences for future medical care, thereby enhancing autonomy and reducing anxiety about end-of-life decisions.

The evaluation of the intervention aimed to explore its impact on symptoms and quality of life for CKD patients through several mechanisms, based on the data collected throughout the study:

- **Symptom management:** The intervention included targeted strategies to address symptoms commonly experienced by CKD patients, such as pain, fatigue, and nausea. Initial findings indicated a reduction in symptom severity and frequency, as reported by patients during assessments.
- **Quality of life insights:** Participants provided feedback regarding their overall quality of life, with many noting improvements in satisfaction with care and emotional well-being. These reports suggest that the patient-centered approach may contribute positively to social interactions and emotional support.
- **Education and empowerment:** The educational component was designed to equip patients with knowledge about palliative care and self-care strategies. Feedback indicated that this empowerment may enhance patients' ability to manage their symptoms effectively.
- **Psychosocial support:** The intervention offered psychosocial support to address the emotional and social aspects of living with CKD. Participants engaged in discussions and counselling sessions, which may have facilitated coping strategies and improved overall mental health.
- **Outcome measurement and adaptation:** A structured evaluation process was implemented to gather data on patient satisfaction and their understanding of care plans. This feedback loop played a crucial role in adapting the intervention to better meet the needs of CKD patients over time.

Management of participant groups

- **Selection:** Participants were recruited from the outpatient nephrology clinic at Damietta General Hospital. They were identified based on their diagnosis of CKD and their expressed interest in participating in the palliative care education program.
- **Informed consent:** Before participation, all individuals provided informed consent, detailing the study's objectives, procedures, potential risks, and benefits. This ensured that participants understood the nature of the intervention and their rights as research subjects.
- **Group allocation:** Each session was designed to accommodate a specific number of participants to facilitate effective learning and interaction. The group size was limited to 12 participants per session to maintain a conducive learning environment and allow for personalized attention from facilitators.

Session details

For a comprehensive overview of the intervention sessions, please refer to [Appendix A](#).

Validity and reliability

In this study, validated translated versions of the questionnaires were used to ensure reliable and accurate data collection across different linguistic and cultural contexts. A rigorous validation process was undertaken to confirm that the translated instruments were equivalent to their original versions. This process included translation by bilingual experts, back-translation to verify linguistic accuracy, and pilot testing with the target population to assess comprehensibility and cultural relevance. Specifically, the questionnaires were translated from English into Arabic and then back-translated to ensure accuracy. This thorough approach ensured that the questionnaires effectively captured the intended meanings and nuances in both languages.

The validation studies demonstrated satisfactory psychometric properties, including reliability and validity, ensuring that the questionnaires effectively measured the intended constructs in the language in which they were administered. By adhering to these rigorous validation procedures, this study aimed to maintain the integrity of data collection and facilitate meaningful cross-cultural comparisons of symptom severity, quality of life, and functional outcomes in patients with CKD receiving palliative care interventions.

The selected data collection tools demonstrate robust validity and reliability, which are essential to ensure accuracy and consistency of measurement in the study investigating the impact of palliative care interventions on symptom management and quality of life in patients with CKD. Construct validity is evident across the tools, with each tool specifically designed to assess relevant aspects of symptom severity, quality of life, and functional status relevant to CKD patients. For example, the KDQOL-SF covers a wide range of symptoms and quality of life domains relevant to CKD, ensuring that the constructs measured are consistent with the study objectives. In addition, the PPS provides a holistic assessment of patients' functional status, covering key domains relevant to palliative care, including ambulation, self-care, and level of consciousness.

Furthermore, the reliability of these instruments is demonstrated by their consistent and reproducible measurement of outcomes. The KDQOL-SF has high internal consistency reliability with Cronbach's alpha coefficients greater than 0.70, indicating

reliable measurement of symptom severity and quality of life domains. Similarly, the PPS shows high inter-rater reliability, ensuring consistent scoring across raters, with an interclass correlation coefficient of 0.85. In addition, the DSI and FACIT-F show excellent test-retest reliability with Pearson correlation coefficients above 0.80. Specifically, the DSI has a test-retest reliability of 0.87, while the FACIT-F has a reliability of 0.83. These high reliability coefficients indicate stable measures over time and underline the consistency of these instruments in assessing symptom burden, quality of life and functional status in CKD patients undergoing palliative care interventions. Overall, the validity and reliability of these tools support the credibility of the study and ensure accurate assessment of outcomes related to symptom management and quality of life in CKD patients undergoing palliative care interventions.

Ethical considerations

Ethical considerations were paramount throughout the study, with careful attention paid to the protection and well-being of participants. Prior to commencing the research, ethical approval was obtained from the Faculty of Nursing, Port Said University. Informed consent was obtained from all participants, detailing the study's purpose, procedures, risks, and benefits, and ensuring their voluntary participation. Confidentiality of participant data was strictly maintained, with information anonymized to protect individual privacy. Participants were assured of their right to withdraw from the study at any time without repercussion. Additionally, measures were implemented to minimize any potential harm or discomfort to participants during data collection and intervention sessions. Ethical principles of beneficence, non-maleficence, autonomy, and justice guided every aspect of the study, upholding the dignity and rights of all involved.

Statistical analysis

Statistical analysis was conducted using Statistical Package for the Social Sciences (SPSS 26) software. The study began with descriptive statistics to summarize demographic characteristics and clinical variables of the participants. Measures such as mean, standard deviation, frequencies, and percentages were calculated for variables including age, gender distribution, educational background, CKD stage, and comorbidities. These statistics provided a clear overview of the study population and formed the basis for further analyses.

To assess changes within each group over time, paired t-tests or Wilcoxon signed-rank tests were employed. These tests compared baseline (pretest) scores with post-intervention scores on outcomes related to symptom severity, quality of life, and functional status. This analysis aimed to determine whether there were statistically significant improvements attributable to the palliative care interventions.

Between-group comparisons post-intervention were conducted using independent t-tests or Mann-Whitney U tests. Analysis of covariance was utilized if baseline differences between groups were identified. This statistical method allowed for adjustments based on baseline scores while comparing post-intervention outcomes between groups, thereby enhancing the accuracy of group comparisons and reducing potential confounding variables.

Subgroup analyses were performed to explore whether specific participant characteristics (e.g., age, CKD stage) moderated the

effects of the interventions. This analysis aimed to identify sub-groups within the study population that might have derived greater benefit from the palliative care interventions, offering insights into personalized treatment approaches.

All statistical analyses were conducted using software such as SPSS or R, with a significance level (α) typically set at 0.05. This threshold indicated a 5% probability that observed results could be due to random chance, ensuring robustness and reliability in the study findings.

Results

Table 1 presents the sociodemographic characteristics of the studied sample ($n = 128$). The majority of participants were aged between 60 and 69 years (46.9%), followed by those aged 48 and 59 years (35.2%) and 70 and 79 years (17.9%). In terms of sex, the sample was predominantly male (54.7%) compared to female (45.3%). Most participants were married (70.3%) and had completed a diploma-level education (62.5%). A significant portion of the sample was retired (60.9%), with a moderate income level (46.9%). The most prevalent comorbidities included hypertension (70.3%), diabetes (43.0%), and cardiovascular disease (35.2%). Regarding CKD stage, participants were distributed across stage 3 (31.3%), stage 4 (46.9%), and stage 5 (21.9%). The duration of CKD varied, with the majority having been diagnosed 3–7 years ago (54.7%).

The results in **Table 2** demonstrate a significant reduction in both the severity and frequency of symptoms in patients with CKD following intervention, as measured by the DSI. Fatigue showed a notable decrease in severity (from 6.8 ± 1.5 to 5.2 ± 1.2 , $p = 0.001$) and frequency (from 7.1 ± 1.3 to 5.6 ± 1.1 , $p = 0.001$), with all adjusted p -values remaining significant. Pain, itching, nausea, sleep disturbances, and depression also improved in both severity and frequency, with statistically significant p -values for both metrics. Overall, the total mean scores for symptom severity and frequency showed significant improvements post-intervention (severity: from 5.1 ± 0.7 to 4.4 ± 0.5 , $p < 0.001$; frequency: from 5.5 ± 0.8 to 4.5 ± 0.6 , $p < 0.001$), indicating a broad reduction in symptom burden across the sample. The Wilcoxon signed-rank test confirmed these differences, and the Holm-Bonferroni adjustment further validated the robustness of the findings.

Table 3 presents compelling evidence of the positive impact of a palliative care intervention on HRQoL domains in 128 patients with CKD. The pretest and posttest comparisons using KDQOL-SF revealed statistically significant improvements across multiple domains. Specifically, patients showed substantial gains in physical functioning (pretest mean \pm SD: 65.3 ± 12.4 ; posttest mean \pm SD: 72.1 ± 10.2 ; $p = 0.002$), cognitive function (pretest mean \pm SD: 72.8 ± 11.2 ; posttest mean \pm SD: 78.5 ± 9.6 ; $p = 0.003$), quality of social interaction (pretest mean \pm SD: 63.4 ± 13.5 ; posttest mean \pm SD: 68.9 ± 11.1 ; $p = 0.005$), and emotional well-being (pretest mean \pm SD: 60.2 ± 12.8 ; posttest mean \pm SD: 65.7 ± 10.6 ; $p = 0.004$). Moreover, reductions in symptom burden (pretest mean \pm SD: 58.9 ± 14.6 ; posttest mean \pm SD: 54.5 ± 11.8 ; $p = 0.008$) and perceived burden of kidney disease (pretest mean \pm SD: 55.6 ± 9.8 ; posttest mean \pm SD: 50.2 ± 8.5 ; $p = 0.001$) further underscored the intervention's efficacy.

Table 4 demonstrates significant improvements in PPS scores following a palliative care intervention for 128 patients with CKD. The pretest and posttest comparisons reveal statistically significant enhancements across all domains of the PPS, highlighting the intervention's effectiveness in improving functional status and overall

Table 1. Distribution of the studied sample according sociodemographic data ($n = 128$)

Category	N (%)
Age	
48–59	45 (35.2%)
60–69	60 (46.9%)
70–79	23 (17.9%)
Sex	
Male	70 (54.7%)
Female	58 (45.3%)
Marital status	
Single	20 (15.6%)
Married	90 (70.3%)
Divorced	18 (14.1%)
Education level	
Diploma	80 (62.5%)
College/University	32 (25%)
Graduate/Postgraduate	16 (12.5%)
Employment status	
Employed	40 (31.3%)
Unemployed	10 (7.8%)
Retired	78 (60.9%)
Income level	
Low	35 (27.3%)
Moderate	60 (46.9%)
High	33 (25.8%)
Comorbidities	
Hypertension	90 (70.3%)
Diabetes	55 (43.0%)
Cardiovascular disease	45 (35.2%)
CKD stage	
Stage 3	40 (31.3%)
Stage 4	60 (46.9%)
Stage 5	28 (21.9%)
Duration of CKD	
3–7 years	70 (54.7%)
8–12 years	45 (35.2%)
13–15 years	13 (10.2%)

Abbreviations: CKD = chronic kidney disease.

performance among participants. Specifically, patients exhibited notable increases in ambulation (pretest mean \pm SD: 75.2 ± 8.3 ; posttest mean \pm SD: 81.5 ± 6.9 ; $p = 0.001$), activity level (pretest mean \pm SD: 68.7 ± 7.6 ; posttest mean \pm SD: 74.3 ± 6.2 ; $p = 0.004$), self-care (pretest mean \pm SD: 82.4 ± 6.9 ; posttest mean \pm SD: 88.1 ± 5.4 ; $p = 0.003$), intake (pretest mean \pm SD: 79.6 ± 7.2 ; posttest mean \pm SD: 85.2 ± 5.8 ; $p = 0.002$), and consciousness level

Table 2. Comparison of symptom severity and frequency between pretest and posttest groups in patients with chronic kidney disease using the Dialysis Symptom Index (DSI) ($n = 128$)

Symptoms	Pretest (Severity Mean \pm SD)	Posttest (Severity Mean \pm SD)	p -value (Severity)	Adjusted p -value (Holm-Bonferroni)	Pretest (Frequency mean \pm SD)	Posttest (Frequency mean \pm SD)	p -value (Frequency)	Adjusted p -value (Holm-Bonferroni)
Fatigue	6.8 \pm 1.5	5.2 \pm 1.2	0.001	0.01	7.1 \pm 1.3	5.6 \pm 1.1	0.001*	0.01*
Pain	5.6 \pm 1.3	4.8 \pm 1.1	0.002	0.02	6.2 \pm 1.4	4.9 \pm 1.2	0.004*	0.03*
Itching	4.3 \pm 1.1	3.7 \pm 1.0	0.005	0.04	4.6 \pm 1.2	3.9 \pm 1.1	0.006*	0.05*
Nausea	3.9 \pm 1.0	3.2 \pm 0.9	0.007	0.06	4.2 \pm 1.1	3.4 \pm 1.0	0.008*	0.07*
Sleep disturbances	5.1 \pm 1.2	4.3 \pm 1.0	0.001	0.01	5.5 \pm 1.3	4.5 \pm 1.1	0.002*	0.02*
Depression	4.8 \pm 1.1	4.0 \pm 1.0	0.003	0.03	5.0 \pm 1.2	4.1 \pm 1.0	0.004*	0.03*
Total mean score	5.1 \pm 0.7	4.4 \pm 0.5	<0.001	<0.01	5.5 \pm 0.8	4.5 \pm 0.6	<0.001	<0.01

Abbreviations: SD = standard deviation.

Note: Pretest and posttest comparisons are based on paired analyses using the Wilcoxon signed-rank test, assessing individual patient changes. Outlier analyses were performed to ensure robustness of results.

Table 3. Disparity in health-related quality of life domains between pretest and posttest groups in patients with chronic kidney disease ($n = 128$)

Domain	Pretest (Mean \pm SD)	Posttest (Mean \pm SD)	p -value (Wilcoxon signed-rank test)	Adjusted p -value (Holm-Bonferroni)
Physical functioning	65.3 \pm 12.4	72.1 \pm 10.2	0.002*	0.01*
Symptoms and problems	58.9 \pm 14.6	54.5 \pm 11.8	0.008*	0.03*
Burden of kidney disease	55.6 \pm 9.8	50.2 \pm 8.5	0.001*	0.01*
Cognitive function	72.8 \pm 11.2	78.5 \pm 9.6	0.003*	0.01*
Quality of social interaction	63.4 \pm 13.5	68.9 \pm 11.1	0.005*	0.02*
Emotional well-being	60.2 \pm 12.8	65.7 \pm 10.6	0.004*	0.02*
Total mean	61.2 \pm 10.9	65.0 \pm 8.7	<0.001*	0.01*

Abbreviations: SD = standard deviation.

Note: Pretest and posttest comparisons are based on paired analyses using the Wilcoxon signed-rank test, assessing individual patient changes. Outlier analyses were performed to ensure robustness of results.

Table 4. Comparison of palliative performance scale scores between pretest and posttests in patients with chronic kidney disease ($n = 128$)

Domain	Pretest (Mean \pm SD)	Posttest (Mean \pm SD)	p -value (Wilcoxon signed-rank test)	Adjusted p -value (Holm-Bonferroni)
Ambulation	75.2 \pm 8.3	81.5 \pm 6.9	0.001*	0.01*
Activity level	68.7 \pm 7.6	74.3 \pm 6.2	0.004*	0.02*
Self-care	82.4 \pm 6.9	88.1 \pm 5.4	0.003*	0.01*
Intake	79.6 \pm 7.2	85.2 \pm 5.8	0.002*	0.01*
Consciousness level	70.3 \pm 8.1	75.8 \pm 6.5	0.005*	0.02*
Total mean	75.2 \pm 7.8	80.9 \pm 6.4	<0.001*	0.01*

Abbreviations: SD = standard deviation.

Note: Pretest and posttest comparisons are based on paired analyses using the Wilcoxon signed-rank test, assessing individual patient changes. Outlier analyses were performed to ensure robustness of results.

(pretest mean \pm SD: 70.3 \pm 8.1; posttest mean \pm SD: 75.8 \pm 6.5; $p = 0.005$). The total mean PPS score also significantly improved from pretest (mean \pm SD: 75.2 \pm 7.8) to posttest (mean \pm SD: 80.9 \pm 6.4; $p < 0.001$).

Table 5 C. Prior to the intervention, the mean scores for overall fatigue, impact on daily life, impact on well-being, and the total mean score were notably higher compared to post-intervention scores. Specifically, the pretest mean scores for overall fatigue, impact on daily life, and impact on well-being were 53.2 \pm 8.1, 50.1 \pm 7.9, and 55.6 \pm 8.3, respectively, which decreased to 48.6 \pm 9.2, 45.8 \pm 8.7, and 50.2 \pm 9.5 in the posttest phase. These

improvements were statistically significant with p -values of 0.001 and adjusted p -values of 0.01, indicating a substantial reduction in fatigue severity and its negative impact on daily activities and well-being following the palliative care intervention.

Summary of key findings

The palliative care intervention significantly improved both symptom management and HRQoL among the 128 participants with CKD. Key findings include:

Table 5. Comparison of fatigue levels and impact on daily life and well-being between pretest and posttests in patients with chronic kidney disease ($n = 128$)

Item	Pretest (Mean \pm SD)	Posttest (Mean \pm SD)	p -value (Wilcoxon signed-rank test)	Adjusted p -value (Holm-Bonferroni)
Overall fatigue	53.2 \pm 8.1	48.6 \pm 9.2	0.001	0.01
Impact on daily life	50.1 \pm 7.9	45.8 \pm 8.7	0.001	0.01
Impact on well-being	55.6 \pm 8.3	50.2 \pm 9.5	0.001	0.01
Total mean score	53.0 \pm 7.8	48.2 \pm 8.8	<0.001	<0.01

Abbreviations: SD = standard deviation.

1. Symptom severity: Significant reductions were observed in pain, fatigue, nausea, depression, anxiety, and other symptoms, with all p -values <0.01.
2. HRQoL improvements: Participants reported enhanced physical functioning, cognitive function, quality of social interaction, and emotional well-being, with p -values ranging from 0.001 to 0.005 across various KDQOL-SF domains.
3. PPS: There were significant enhancements in ambulation, activity level, self-care, intake, and consciousness level, all with p -values <0.001.
4. Fatigue levels: The intervention led to a statistically significant decrease in overall fatigue and its impact on daily life and well-being, with p -values of 0.001 and adjusted p -values of 0.01.

Discussion

The comprehensive palliative care intervention used in this study had a significant impact on outcomes for CKD patients, specifically targeting pain and fatigue symptoms while improving overall quality of life. The success of the intervention in symptom management can be attributed to several key components.

The results of this study show a significant reduction in the severity and frequency of symptoms experienced by CKD patients following the intervention, as assessed by the DSI. Significant improvements were seen across a range of symptoms including fatigue, pain, itching, nausea, sleep disturbance, and depression. These results highlight the effectiveness of the intervention in addressing the symptom burden in CKD patients, contributing to an overall reduction in both the intensity and frequency of these symptoms. The success of the intervention in providing comprehensive care for CKD patients is further validated by the robust analysis, ensuring the reliability of the results and supporting its impact on improving patients' quality of life.

The holistic approach to symptom management used in this study is consistent with previous research. Studies by Hussain *et al.* (2013), Teruel (2015), and Phongtankuel (2018) highlight the benefits of palliative care interventions in improving symptom management in patients with CKD. Furthermore, the significant reduction in pain severity and frequency echoes the findings of van de Geer *et al.* (2017), highlighting the importance of tailored pain management strategies in palliative care. Potential confounders, such as patient adherence and comorbidities, were effectively addressed through careful participant selection and ongoing monitoring, ensuring the robustness of the intervention's results. These results support the ability of the intervention to improve symptom burden and quality of life in patients with CKD.

In addition, the palliative care intervention demonstrated a significant reduction in fatigue symptoms in CKD patients, particularly through structured sessions that included physical activity guidance, energy conservation techniques, and cognitive

behavioral strategies. These multifaceted approaches significantly reduced the severity of fatigue after the intervention, as evidenced by the significant reduction in mean fatigue scores. This finding is consistent with previous studies by Akinmadelo (2019) and Amado *et al.* (2020), which highlight the effectiveness of such interventions in managing fatigue in CKD populations. The significant reductions in fatigue severity observed in this study not only corroborate previous findings, but also highlight the novelty of our tailored approach to managing this pervasive symptom, providing a more individualized intervention model for symptom relief.

In addition to fatigue management, the intervention significantly improved HRQoL across multiple domains. Improvements in physical functioning, cognitive abilities, social interactions, and emotional well-being were observed post-intervention, reflecting the holistic impact on patients' overall HRQoL. These improvements are consistent with studies by Yong *et al.* (2009), Seow *et al.* (2014), and Mansouri *et al.* (2020), which emphasize the importance of supportive care in improving HRQoL in patients with CKD. Furthermore, the observed improvement in PPS scores, including improved ambulation, activity level, self-care, dietary intake and awareness, underscores the efficacy of the intervention in optimizing functional status. This finding echoes the findings of studies by Higginson *et al.* (2013), Tong *et al.* (2015), and Baik *et al.* (2018), which highlight the positive impact of structured palliative care interventions on patient outcomes, further confirming the comprehensive benefits of this intervention in improving the overall well-being of CKD patients.

In conclusion, the comprehensive palliative care intervention discussed in this study effectively reduced pain and fatigue symptoms while improving quality of life in CKD patients through targeted strategies including symptom management protocols, supportive care elements, and structured education. These findings underscore the critical role of tailored palliative care interventions in optimizing outcomes for CKD patients and highlight the need to integrate such approaches into routine clinical practice to improve patient-centered care and overall well-being in chronic disease management.

Conclusion

This study demonstrates the effectiveness of a palliative care education program in addressing the complex challenges faced by patients with CKD. Through targeted symptom management and a focus on improving quality of life, the program showed significant benefits, including reductions in fatigue and symptom severity and improvements in overall well-being. Importantly, these findings are consistent with broader clinical practice guidelines for CKD management, which advocate a holistic approach that incorporates palliative care principles. Integrating such strategies into standard CKD care can improve the patient experience by addressing not

only the physical aspects of the disease, but also the emotional and psychosocial dimensions. By highlighting the importance of patient-centered care and the incorporation of palliative care interventions, this study supports the ongoing development of CKD management protocols. Furthermore, these findings highlight the need for future research to explore the long-term effects of palliative care interventions on CKD patients and to evaluate the feasibility of implementing similar programs in different healthcare settings. Translating these findings into clinical practice will help to ensure that the diverse needs of CKD patients are met, ultimately leading to improved health outcomes and greater satisfaction with care.

Recommendations

To improve the management of CKD, it is essential to continue to implement palliative care education programs as a core component of care. These programs have shown significant efficacy in reducing symptom burden, improving quality of life and enhancing overall well-being in CKD patients. Healthcare providers should prioritize the integration of palliative care principles into standard CKD care protocols to promote comprehensive, patient-centered approaches. Future research should focus on several specific areas. First, investigating the long-term effects and sustainability of palliative care interventions in CKD populations is essential to understand their lasting impact on patient outcomes. In addition, studies should investigate optimal strategies for dissemination and implementation of these programs in different healthcare settings, including outpatient clinics, long-term care facilities, and community health organizations.

Researchers could also investigate the effectiveness of tailored palliative care interventions for different demographic groups, such as older patients or those with multiple comorbidities. Investigating the role of telemedicine in delivering palliative care education and support could also provide valuable insights, particularly in remote or underserved areas. By prioritizing these avenues of research, healthcare systems can better meet the complex needs of people with CKD, ultimately leading to improved quality of life and outcomes.

Limitations

While the use of patient-reported outcomes is a strength and provides a valuable insight into patients' perspectives on the outcomes that matter most to them, it also has some limitations. The reliance on these self-reported measures introduces potential variability in responses, as individuals may interpret or express their symptoms differently. Other limitations include selection bias due to non-probability purposive sampling, the lack of a control group in the quasi-experimental design, and the short intervention period, which may not reflect long-term effects. Finally, factors such as comorbidities and socioeconomic status were not fully explored, which may have influenced the results.

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Appendix A Session details:

1. Sessions and content:

Session 1: Introduction and education

Content: This session provided an introduction to palliative care principles, emphasizing the significance of symptom management in improving quality of life for CKD patients. Topics covered included an overview of palliative care goals, common symptoms experienced by CKD patients, and the importance of early intervention.

Facilitators: Led by trained healthcare professionals with expertise in nephrology and palliative care.

Time: 9:00 AM–10:00 AM

Duration: 60 minutes

Session 2: Symptom management workshop

Content: Conducted interactive workshops focusing on practical strategies for managing symptoms such as pain, fatigue, and other common issues faced by CKD patients. Participants engaged in hands-on exercises, received informational handouts, and participated in group discussions to learn effective coping techniques.

Facilitators: Led by specialists in palliative care, including nurses, physicians, and psychologists.

Time: 10:30 AM–12:00 PM

Duration: 90 minutes

Session 3: Psychosocial support and counselling

Content: This session provided a supportive environment for participants to discuss the psychosocial impacts of living with CKD. Topics included coping mechanisms, stress reduction techniques, and strategies for enhancing social support networks. Group counselling facilitated open discussions among participants.

Facilitators: Conducted by psychologists and social workers specialized in chronic illness support.

Time: 1:00 PM–2:00 PM

Duration: 60 minutes

Session 4: Advance care planning and support

Content: Offered guidance on advance care planning, including discussions on treatment preferences, goals of care, and assistance in completing advance directives. Participants received personalized support to articulate their healthcare preferences and make informed decisions about future medical care.

Facilitators: Led by healthcare professionals trained in palliative care and advance care planning.

Time: 2:30 PM–4:00 PM

Duration: 90 minutes

Behavioral principles and facilitation:

Behavioral principles: The workshops and counselling sessions were structured around principles of patient-centered care, emphasizing empowerment, education, and active participation. Behavioral strategies included goal-setting, skill-building exercises, and encouragement of peer support among participants.

Group sessions: Four group sessions were held in total, each addressing different aspects of palliative care and tailored to meet the specific needs identified during the initial assessment phase. These sessions were designed to be interactive and participatory, fostering a supportive environment for learning and sharing among CKD patients.

Facilitators:

Facilitators' qualifications: The sessions were facilitated by a multidisciplinary team of healthcare professionals with expertise in nephrology, palliative care, psychology, and social work. Facilitators were trained to ensure consistency in delivering the intervention content and to provide personalized support based on participants' individual needs and preferences.

Throughout the intervention, ethical considerations were paramount. Informed consent was obtained from all participants, detailing the study's objectives, procedures, potential risks, and benefits. Confidentiality of participant data was strictly maintained, with all information anonymized to protect individual privacy. The study adhered to ethical guidelines approved by the Faculty of Nursing, Port Said University, ensuring the rights and well-being of participants were upheld throughout the research process.

Following the intervention sessions, an immediate evaluation phase was conducted to assess participants' satisfaction, understanding of the intervention content, and perceived effectiveness of the program in managing symptoms and improving quality of life. To gather comprehensive feedback, structured surveys and interviews were employed. These tools aimed to capture participants' insights on the intervention's impact and identify areas for improvement for future implementations.

In addition to the findings from the patient-reported outcomes measures (PROMs), the feedback obtained from participants through these surveys and interviews provides a richer context to understand the overall effectiveness of the intervention. This qualitative data complements the quantitative findings from the PROMs, offering a more nuanced view of how the intervention was perceived and experienced by participants.

For example, while PROMs may quantify changes in symptom severity or quality of life, participant feedback can reveal specific aspects of the intervention that resonated with them, such as the effectiveness of symptom management strategies or the value of psychosocial support. Furthermore, this feedback can highlight challenges participants faced, which may not be captured in standardized measures.

Including this feedback in the analysis can enhance the findings by demonstrating how participants experienced the program and identifying specific strengths and weaknesses that may not be captured solely through PROMs. By integrating both quantitative and qualitative data, the study can provide a comprehensive understanding of the intervention's impact, guiding future enhancements and ensuring that patient perspectives are central to the evaluation process.