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Original Article

Impact of Palliative Care Integration on Patient Satisfaction and Symptom Burden in the Oncology Units of Nishtar Hospital, Multan

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ABSTRACT

Background: Palliative care integration is increasingly recommended for patients with advanced cancer, yet implementation remains limited in low- and middle-income settings, including Pakistan. Objective: To evaluate whether nurse-led integrated palliative care was associated with reduced symptom burden and improved patient satisfaction among oncology patients at Nishtar Hospital, Multan. Methods: A quasi-experimental non-equivalent control group study was conducted among 120 adults with stage III or IV solid malignancies, including 60 patients receiving nurse-led integrated palliative care plus standard oncology care and 60 patients receiving standard oncology care alone. The intervention included structured symptom assessment, patient and family education, psychosocial support, care coordination, and repeated follow-up over five months. Symptom burden was measured using the Edmonton Symptom Assessment System, and patient satisfaction was measured using the Patient Satisfaction Questionnaire Short Form at baseline, one month, three months, and five months. Longitudinal outcomes were analyzed using adjusted linear mixed-effects models with missing outcome data handled through multiple imputation. Results: ESAS scores decreased from 52.4 ± 11.8 to 28.6 ± 9.4 in the intervention group and from 51.9 ± 12.1 to 45.3 ± 10.8 in the control group, with a month-5 between-group difference of -16.7 points. PSQ-18 scores increased from 58.3 ± 10.2 to 85.6 ± 8.7 in the intervention group and from 59.1 ± 9.8 to 65.4 ± 10.1 in the control group, with a month-5 between-group difference of 20.2 points. Conclusion: Nurse-led palliative care integration was associated with lower symptom burden and higher patient satisfaction among advanced oncology patients, supporting further multicenter evaluation of this model in resource-constrained settings. Keywords: Palliative care; Oncology; Symptom burden; Patient satisfaction; Nurse-led care; Pakistan; Low- and middle-income country.

INTRODUCTION

Cancer remains a major global public health challenge, with continuing increases in incidence, mortality, treatment complexity, and demand for supportive oncology services. Global estimates indicate that the cancer burden is rising most rapidly in low- and middle-income countries, where delayed diagnosis, limited oncology infrastructure, constrained access to essential medicines, and insufficient supportive-care systems intensify avoidable suffering among patients with advanced disease (1,2). Pakistan reflects many of these challenges, with a growing number of newly diagnosed cancer cases each year and substantial regional disparities in access to oncology, pain management, psychosocial support, and end-of-life care (3). In this context, advanced cancer is frequently accompanied by high

symptom burden, impaired functional status, psychological distress, financial strain, and dissatisfaction with fragmented healthcare delivery, making integrated palliative care a clinically and ethically important component of comprehensive cancer management.

Palliative care is defined as an approach that improves the quality of life of patients and families facing life-threatening illness through early identification, assessment, prevention, and relief of physical, psychosocial, and spiritual suffering (4). In oncology, palliative care is no longer considered limited to terminal care; rather, it is increasingly recommended alongside disease-directed treatment, particularly for patients with advanced malignancy and substantial symptom burden. Evidence from randomized and pragmatic oncology studies has shown that early palliative care can improve quality of life, reduce symptom distress, improve mood, strengthen communication, and enhance patient-centered decision-making when integrated with standard oncology care (5,6). Systematic reviews have further supported the beneficial role of ambulatory and tertiary palliative care interventions for common cancer-related symptoms, including pain, fatigue, nausea, depression, anxiety, dyspnea, and global distress, although effect sizes vary according to intervention model, baseline symptom severity, healthcare setting, and available multidisciplinary resources (7,8).

Nurse-led palliative care models are particularly relevant for resource-constrained settings because they may expand access to structured symptom assessment, patient education, psychosocial support, family counseling, and care coordination without requiring immediate dependence on a large specialist physician workforce. Recent evidence suggests that nurse-led palliative care interventions can improve symptom control and quality-of-life outcomes among cancer patients when delivered through structured assessment, repeated follow-up, and protocol-guided supportive care (9). Such models are especially important in settings where oncology services are overburdened, patients present with advanced-stage disease, and routine consultations are often focused primarily on chemotherapy, radiotherapy, or disease surveillance rather than systematic symptom management.

Patient satisfaction is also a key patient-reported indicator of healthcare quality in oncology because it reflects communication, interpersonal care, perceived technical competence, accessibility, time spent with providers, and alignment between patient needs and delivered care. Studies from oncology and palliative-care settings have shown that dissatisfaction is common when pain and other distressing symptoms are inadequately assessed or undertreated, and that integration of palliative care can improve patients' experience of care, particularly among those with higher baseline symptom severity (10,11). This is clinically important because satisfaction is not merely a service-quality outcome; it may influence adherence, trust in clinicians, disclosure of symptoms, continuity of care, and engagement with shared decision-making during advanced illness.

Despite this growing evidence base, palliative care remains underdeveloped in many low- and middle-income countries, including Pakistan. International reviews have highlighted the limited representation of South Asian settings in palliative-care research, creating uncertainty about the transferability of findings from high-income health systems to hospitals with different staffing patterns, cultural norms, medication access, referral pathways, and patient-family decision-making structures (12). In Pakistan, palliative care services are limited, unevenly distributed, and often concentrated in major urban centers, while many patients with cancer continue to receive oncology treatment without structured symptom assessment, psychosocial support, or formal advance-care planning (13,14). Barriers include limited trained workforce, inconsistent opioid availability, low public and professional awareness, misconceptions that palliative care is only end-of-life care, and absence of standardized referral pathways within oncology units.

Nishtar Hospital, Multan, is a major tertiary-care center serving a large population across South Punjab, including patients from urban, peri-urban, and rural communities with diverse socioeconomic backgrounds. The hospital manages a substantial burden of advanced cancer, and regional investment in cancer-care infrastructure reflects increasing recognition of the need to improve oncology services in

this population (15,16). However, supportive oncology and palliative-care integration have remained limited, and symptom management has traditionally depended on routine oncology consultations and ad hoc clinician-led decisions rather than a structured nurse-led model. This creates an important implementation and evidence gap: whether an integrated palliative-care program delivered by trained oncology nurses, alongside standard oncology care, can reduce symptom burden and improve patient satisfaction in a real-world Pakistani tertiary-care setting.

Using a PICO framework, the present study focused on adult patients with stage III or IV solid malignancies receiving oncology care at Nishtar Hospital, Multan; evaluated a nurse-led integrated palliative-care program added to standard oncology care; compared outcomes with standard oncology care alone; and measured longitudinal changes in symptom burden and patient satisfaction over five months. The study was designed to answer the following research question: among adult oncology patients with advanced solid tumors and clinically relevant baseline symptom burden, is nurse-led palliative care integration, compared with standard oncology care alone, associated with greater reduction in symptom burden and higher patient satisfaction over a five-month follow-up period?

MATERIALS AND METHODS

This quasi-experimental study with a non-equivalent control group design was conducted in the Department of Medical Oncology at Nishtar Hospital, Multan, Pakistan, from January 2025 to March 2026. The active recruitment and follow-up phases were conducted within this period, while the remaining time was used for completion of follow-up documentation, data verification, cleaning, analysis, and manuscript preparation. A quasi-experimental design was selected because the intervention was introduced as a structured service-integration model within routine oncology care, and individual randomization was not feasible without risk of contamination between patients managed in the same oncology environment. The study compared standard oncology care alone with standard oncology care plus nurse-led integrated palliative care, using repeated patient-reported outcome assessments over five months.

The study population consisted of adult patients receiving active oncology care for advanced solid malignancy at Nishtar Hospital. Eligible participants were aged 18 years or older, had a histologically confirmed stage III or IV solid tumor, were receiving oncology treatment or follow-up within the department, had an expected survival of at least six months according to the treating oncologist's clinical assessment, had a baseline Edmonton Symptom Assessment System total score of at least 15, and were able to provide informed consent. Patients were excluded if they had hematological malignancies, cognitive impairment that prevented valid participation, an acute psychiatric disorder requiring immediate specialist management, or concurrent enrollment in another interventional study likely to influence symptom or satisfaction outcomes.

Participants were recruited through convenience sampling from oncology inpatient and outpatient services. To reduce contamination between groups, recruitment was sequential rather than concurrent. Patients in the control group were recruited during the first recruitment phase from January to March 2025, before implementation of the palliative-care integration program. Patients in the intervention group were recruited during the subsequent phase from April to June 2025, after the nurse-led palliative-care model had been introduced. This allocation approach was not randomization; therefore, baseline comparability was assessed statistically, and potential confounding was addressed during analysis through covariate adjustment. Written informed consent was obtained from all participants in Urdu after explanation of the study purpose, procedures, follow-up requirements, voluntary participation, confidentiality safeguards, and right to withdraw without any effect on ongoing oncology care.

The sample size was calculated using G*Power version 3.1.9.7, based on a two-group comparison informed by previously reported intervention effects for symptom-burden reduction in nurse-led palliative care among cancer patients (9). Assuming a medium-to-large effect size of Cohen's d = 0.65,

two-sided alpha of 0.05, statistical power of 80%, and allowance for approximately 20% attrition during longitudinal follow-up, the required sample size was 120 participants, with 60 patients in the intervention group and 60 patients in the control group. This sample size was considered appropriate for detecting clinically relevant between-group differences in the primary outcome while allowing for expected loss to follow-up in an advanced oncology population.

Participants in the control group received standard oncology care as routinely provided at Nishtar Hospital. Standard care included medical oncology consultation, disease-directed treatment such as chemotherapy, targeted therapy, radiotherapy, or combined treatment where indicated, routine nursing care, vital sign monitoring, medication administration, and symptom management initiated by the treating oncology team according to clinical need. Standard care did not include a formal structured palliative-care assessment, scheduled palliative-care follow-up, systematic psychosocial assessment, formal family-caregiver support sessions, or structured advance-care planning.

Participants in the intervention group received standard oncology care plus a nurse-led integrated palliative-care program adapted from the ENABLE model and contextualized for the local oncology-care environment (17). The intervention began with an initial palliative-care assessment during the first week after enrollment. This assessment included structured symptom evaluation using the Edmonton Symptom Assessment System, review of functional status, medication review, psychosocial assessment, family-support assessment, financial and access-related concerns, culturally sensitive spiritual assessment, and development of an individualized supportive-care plan. The initial session was followed by weekly face-to-face visits during the first month and biweekly visits during months two to five. Each visit lasted approximately 30 to 45 minutes and focused on symptom reassessment, supportive counseling, patient and family education, medication adherence, recognition of warning symptoms, coping strategies, caregiver support, and coordination with the oncology team.

The nurse-led intervention included protocol-guided symptom management, patient and family education, psychosocial support, advance-care planning adapted to the Pakistani cultural and family context, family-caregiver support, and care coordination. Symptom management focused on pain, fatigue, nausea, dyspnea, constipation, appetite disturbance, drowsiness, anxiety, depression, and overall well-being. Medication-related recommendations and escalation decisions were coordinated with the treating oncology team to maintain clinical governance and patient safety. Psychosocial support included brief supportive counseling, relaxation techniques, emotional support, and referral to available clinical services where required. Advance-care planning discussions addressed treatment preferences, goals of care, family involvement, surrogate decision-making, and patient values in a culturally sensitive manner. Between scheduled visits, telephonic follow-up was available for urgent symptom concerns, and issues requiring medical review were referred back to the oncology team.

Two registered nurses with at least five years of oncology experience delivered the intervention after completing an 80-hour training program in palliative-care principles and practice. The training covered foundational palliative care, symptom assessment, communication skills, ethical considerations, pain and symptom-management principles, non-pharmacological supportive strategies, culturally sensitive communication about serious illness, family dynamics, spiritual care, documentation, and supervised clinical practice. Competency was assessed before independent delivery of the intervention, and refresher sessions were conducted during the intervention period. Intervention delivery was documented using structured visit records to support fidelity, reproducibility, and consistency across participants.

The primary outcome was symptom burden measured using the Edmonton Symptom Assessment System. The ESAS assesses nine common symptoms—pain, fatigue, nausea, depression, anxiety, drowsiness, appetite, well-being, and dyspnea—on 0 to 10 numerical rating scales, where higher scores indicate greater symptom severity. The ESAS Total Distress Score was calculated as the sum of the nine symptom scores, with a possible range from 0 to 90. ESAS was selected because it is brief, clinically

interpretable, widely used in oncology and palliative care, and suitable for repeated symptom monitoring in advanced cancer populations (18). The Urdu-translated version was used for participant assessment.

The secondary outcome was patient satisfaction measured using the Patient Satisfaction Questionnaire Short Form. The PSQ-18 includes 18 items covering general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with doctor, and accessibility or convenience. Each item is scored on a five-point Likert scale, and the total summary score ranges from 18 to 90, with higher scores indicating greater satisfaction. The Urdu version was used for data collection, and the total score was analyzed as the principal satisfaction outcome (19).

Sociodemographic and clinical variables were collected at baseline to characterize the study population and assess potential confounding. These variables included age, sex, education level, monthly family income, distance from hospital, cancer type, cancer stage, treatment modality, comorbidity burden measured by the Charlson Comorbidity Index, and Eastern Cooperative Oncology Group performance status. The main exposure variable was group allocation, defined as standard oncology care alone for the control group and standard oncology care plus nurse-led integrated palliative care for the intervention group. The primary endpoint was change in ESAS Total Distress Score across baseline, one month, three months, and five months. The secondary endpoint was change in PSQ-18 total score across the same assessment points.

Outcome assessments were conducted at four time points: baseline within 72 hours of enrollment and before initiation of the intervention for participants in the intervention group, one month after enrollment, three months after enrollment, and five months after enrollment. Trained research assistants conducted assessments in a private area of the oncology outpatient department. Research assistants were kept separate from intervention delivery to reduce measurement bias. Participants who were unable to attend in person at follow-up completed outcome assessments by telephone when feasible. Each assessment required approximately 25 to 30 minutes. Data were recorded on structured forms using unique study identification numbers, checked for completeness after each assessment, and entered into a secured dataset for analysis.

Several measures were used to reduce bias and improve internal validity. Sequential recruitment was used to minimize contamination between control and intervention participants; however, because this approach may introduce temporal confounding, baseline characteristics were compared between groups and adjusted analyses were planned for clinically relevant covariates. Outcome assessors were not involved in delivering the intervention. Standardized instruments were used at all assessment points, and the timing of follow-up assessments was predefined. Potential confounding by age, cancer stage, baseline functional status, and baseline outcome severity was addressed through multivariable longitudinal modeling. Subgroup analyses were treated as exploratory and interpreted cautiously because the study was not primarily powered for subgroup effects.

Data were analyzed using SPSS version 26.0. Continuous variables were summarized as mean and standard deviation when approximately normally distributed, while categorical variables were summarized as frequencies and percentages. Baseline between-group comparisons were performed using independent-samples t-tests for continuous variables and chi-square tests for categorical variables, with these comparisons used to describe baseline comparability rather than to infer equivalence. Missing data patterns were examined, and Little's MCAR test was used to assess whether missingness was consistent with a missing-completely-at-random mechanism. Multiple imputation with five imputations was used for missing outcome data, and imputed analyses were interpreted alongside the longitudinal model.

Longitudinal changes in ESAS and PSQ-18 scores were analyzed using linear mixed-effects models with restricted maximum likelihood estimation. The models included fixed effects for time, group, and the time-by-group interaction, with random intercepts to account for within-participant correlation across

repeated measurements. Models were adjusted for age, cancer stage, and ECOG performance status, and baseline outcome values were considered in interpretation of change over time. Between-group differences at each follow-up point were reported with 95% confidence intervals and p-values. Bonferroni correction was applied for multiple pairwise comparisons. Cohen's d was calculated to estimate the magnitude of between-group differences at each time point. Exploratory subgroup analyses examined whether intervention effects differed by cancer type, baseline symptom severity, and age group. Statistical significance was set at $p < 0.05$.

The study was approved by the Institutional Review Board of Nishtar Medical University, Multan, under Protocol No. NMU/IRB/2024/178. All participants provided written informed consent before enrollment. Participation was voluntary, and withdrawal from the study did not affect access to oncology treatment. Confidentiality was maintained through coded study identifiers, restricted access to study data, and secure storage of research forms and electronic files. Control-group participants were offered access to the palliative-care intervention after completion of the study follow-up as an ethical bridging measure. Adverse events or urgent clinical concerns identified during study assessments were communicated to the treating oncology team for appropriate management.

RESULTS

Of 180 patients assessed for eligibility, 120 patients met the inclusion criteria, provided informed consent, and were included in the study, with 60 participants allocated to the standard oncology care group and 60 participants allocated to the nurse-led integrated palliative-care group. By the five-month assessment, 11 participants had withdrawn or were lost to follow-up, including 5 participants in the intervention group and 6 participants in the control group. The observed follow-up population at five months was therefore 109 participants. The primary longitudinal analyses were conducted using the full analytic sample of 120 participants, with missing outcome data handled through multiple imputation as specified in the statistical analysis plan.

Table 1. Participant Flow and Follow-Up Status

Participant Status	Intervention Group	Control Group	Total
Enrolled	60	60	120
Completed five-month follow-up	55	54	109
Withdrawn or lost to follow-up	5	6	11
Attrition, %	8.3	10.0	9.2

The overall attrition rate was 9.2%, with comparable loss to follow-up between the intervention and control groups. Five-month observed follow-up was available for 55 participants in the intervention group and 54 participants in the control group. Because attrition was modest and balanced between groups, the longitudinal analyses retained the originally enrolled sample using the prespecified missing-data approach.

The intervention and control groups were comparable at baseline across demographic, socioeconomic, clinical, and patient-reported outcome variables. Mean age was similar between the intervention and control groups, at 56.3 ± 12.4 years and 57.1 ± 13.2 years, respectively. Stage IV disease was present in 63.3% of intervention participants and 58.3% of control participants, while ECOG performance status 2–3 was present in 53.3% and 46.7%, respectively. Baseline symptom burden was high in both groups, with mean ESAS total scores of 52.4 ± 11.8 in the intervention group and 51.9 ± 12.1 in the control group. Baseline patient satisfaction was also similar, with mean PSQ-18 scores of 58.3 ± 10.2 and 59.1 ± 9.8, respectively. No statistically significant baseline differences were observed across the assessed variables.

Symptom burden decreased progressively in the intervention group across the five-month follow-up period, while the control group showed comparatively smaller reductions. At baseline, ESAS total scores were similar between groups, with a mean difference of 0.5 points. By month 1, the intervention group had a lower mean ESAS score than the control group, with a between-group difference of -7.1 points.

This difference widened to -12.7 points at month 3 and -16.7 points at month 5. The effect size increased over time, from 0.64 at month 1 to 1.62 at month 5, indicating a progressively larger separation in symptom burden trajectories between groups. The five-month between-group difference exceeded commonly used thresholds for clinically meaningful change in ESAS total distress scores.

Table 2. Baseline Demographic and Clinical Characteristics

Characteristic	Intervention Group (n=60)	Control Group (n=60)	Test Statistic	p-value
Age, years	56.3 ± 12.4	57.1 ± 13.2	-0.34	0.73
Male sex	34 (56.7)	32 (53.3)	0.14	0.71
Female sex	26 (43.3)	28 (46.7)	0.14	0.71
No formal education	25 (41.7)	28 (46.7)	1.23	0.54
Primary or middle education	22 (36.7)	18 (30.0)	1.23	0.54
Secondary education or higher	13 (21.7)	14 (23.3)	1.23	0.54
Monthly income <20,000 PKR	31 (51.7)	35 (58.3)	2.34	0.31
Monthly income 20,000–50,000 PKR	20 (33.3)	18 (30.0)	2.34	0.31
Monthly income >50,000 PKR	9 (15.0)	7 (11.7)	2.34	0.31
Breast cancer	24 (40.0)	21 (35.0)	2.67	0.61
Lung cancer	12 (20.0)	10 (16.7)	2.67	0.61
Oral cavity cancer	10 (16.7)	13 (21.7)	2.67	0.61
Colorectal cancer	8 (13.3)	9 (15.0)	2.67	0.61
Other cancer type	6 (10.0)	7 (11.7)	2.67	0.61
Stage III disease	22 (36.7)	25 (41.7)	0.34	0.56
Stage IV disease	38 (63.3)	35 (58.3)	0.34	0.56
Chemotherapy only	35 (58.3)	38 (63.3)	1.08	0.58
Radiotherapy only	8 (13.3)	5 (8.3)	1.08	0.58
Chemotherapy and radiotherapy	17 (28.3)	17 (28.3)	1.08	0.58
ECOG 0–1	28 (46.7)	32 (53.3)	0.54	0.46
ECOG 2–3	32 (53.3)	28 (46.7)	0.54	0.46
Charlson Comorbidity Index	1.8 ± 1.2	1.6 ± 1.1	0.95	0.34
ESAS total score	52.4 ± 11.8	51.9 ± 12.1	0.23	0.82
PSQ-18 total score	58.3 ± 10.2	59.1 ± 9.8	-0.44	0.66

Values are presented as mean ± SD or n (%). ECOG, Eastern Cooperative Oncology Group; ESAS, Edmonton Symptom Assessment System; PKR, Pakistani Rupees; PSQ-18, Patient Satisfaction Questionnaire Short Form; SD, standard deviation. Test statistics are t values for continuous variables and χ^2 values for categorical variables.

Table 3. Longitudinal Changes in ESAS Total Distress Scores

Time Point	Intervention Group (n=60)	Control Group (n=60)	Mean Difference	95% CI	Cohen's d	p-value
Baseline	52.4 ± 11.8	51.9 ± 12.1	0.5	-3.8 to 4.8	0.04	0.82
Month 1	42.7 ± 10.6	49.8 ± 11.5	-7.1	-11.0 to -3.2	0.64	<0.001
Month 3	34.5 ± 9.8	47.2 ± 10.9	-12.7	-16.4 to -9.0	1.21	<0.001
Month 5	28.6 ± 9.4	45.3 ± 10.8	-16.7	-20.3 to -13.1	1.62	<0.001

Values are presented as mean ± SD unless otherwise indicated. ESAS, Edmonton Symptom Assessment System; CI, confidence interval; SD, standard deviation. Longitudinal analysis used a linear mixed-effects model adjusted for age, cancer stage, and ECOG performance status, with Bonferroni correction for pairwise comparisons. Follow-up estimates are reported for the intention-to-treat analytic sample with missing outcome data handled using multiple imputation.

Table 4. Longitudinal Changes in PSQ-18 Patient Satisfaction Scores

Time Point	Intervention Group (n=60)	Control Group (n=60)	Mean Difference	95% CI	Cohen's d	p-value
Baseline	58.3 ± 10.2	59.1 ± 9.8	-0.8	-4.3 to 2.7	0.08	0.65
Month 1	68.9 ± 9.5	61.2 ± 10.1	7.7	4.2 to 11.2	0.78	<0.001
Month 3	78.4 ± 9.1	63.8 ± 9.8	14.6	11.1 to 18.1	1.53	<0.001
Month 5	85.6 ± 8.7	65.4 ± 10.1	20.2	16.8 to 23.6	2.11	<0.001

Values are presented as mean ± SD unless otherwise indicated. PSQ-18, Patient Satisfaction Questionnaire Short Form; CI, confidence interval; SD, standard deviation. Longitudinal analysis used a linear mixed-effects model adjusted for age, cancer stage, and ECOG performance status, with Bonferroni correction for pairwise comparisons. Follow-up estimates are reported for the intention-to-treat analytic sample with missing outcome data handled using multiple imputation.

Patient satisfaction improved substantially in the intervention group compared with the control group. Baseline PSQ-18 scores were similar between groups, with a mean difference of -0.8 points. By month 1, the intervention group had a 7.7-point higher mean satisfaction score than the control group. The between-group difference increased to 14.6 points at month 3 and 20.2 points at month 5. The corresponding Cohen's d values increased from 0.78 at month 1 to 2.11 at month 5, indicating a large and progressively widening difference in patient satisfaction over time.

At month 5, the intervention group reported higher satisfaction scores across most PSQ-18 domains. The largest between-group differences were observed for technical quality, communication, and general satisfaction, with mean differences of 3.9, 3.5, and 3.4 points, respectively. Interpersonal manner, time spent with doctor, and accessibility or convenience also showed higher scores in the intervention group. The financial aspects domain showed a smaller between-group difference of 0.6 points, with a confidence interval crossing zero, indicating that the intervention was not associated with a clear improvement in perceived financial aspects of care.

Table 5. PSQ-18 Domain Scores at Month 5

Domain	Intervention Group (n=60)	Control Group (n=60)	Mean Difference	95% CI	p-value
General satisfaction	13.2 ± 1.6	9.8 ± 2.1	3.4	2.7 to 4.1	<0.001
Technical quality	17.4 ± 2.1	13.5 ± 2.4	3.9	3.1 to 4.7	<0.001
Interpersonal manner	8.9 ± 1.1	6.8 ± 1.6	2.1	1.6 to 2.6	<0.001
Communication	13.6 ± 1.4	10.1 ± 2.0	3.5	2.9 to 4.1	<0.001
Financial aspects	6.8 ± 1.8	6.2 ± 1.9	0.6	-0.1 to 1.3	0.09
Time spent with doctor	8.4 ± 1.3	6.9 ± 1.7	1.5	1.0 to 2.0	<0.001
Accessibility and convenience	7.5 ± 1.6	6.5 ± 1.8	1.0	0.4 to 1.6	0.002

Values are presented as mean ± SD unless otherwise indicated. PSQ-18, Patient Satisfaction Questionnaire Short Form; CI, confidence interval; SD, standard deviation.

Table 6. Subgroup Analysis of Change in ESAS Total Distress Score from Baseline to Month 5

Subgroup	Intervention Group Change	Control Group Change	Mean Difference	95% CI	Interaction p-value
Breast cancer	-25.6 ± 10.2	-6.8 ± 8.9	-18.8	-24.2 to -13.4	0.18
Lung cancer	-22.4 ± 11.4	-5.2 ± 9.4	-17.2	-26.3 to -8.1	0.18
Oral cavity cancer	-23.8 ± 10.8	-7.4 ± 10.1	-16.4	-25.4 to -7.4	0.18
Baseline ESAS ≥50	-28.4 ± 9.6	-5.9 ± 8.2	-22.5	-26.9 to -18.1	0.02
Baseline ESAS <50	-18.2 ± 8.9	-7.8 ± 7.6	-10.4	-15.2 to -5.6	0.02
Age <60 years	-25.1 ± 10.5	-6.4 ± 9.1	-18.7	-23.5 to -13.9	0.31
Age ≥60 years	-22.9 ± 10.2	-7.1 ± 8.8	-15.8	-21.1 to -10.5	0.31

Values are presented as mean ± SD unless otherwise indicated. ESAS, Edmonton Symptom Assessment System; CI, confidence interval; SD, standard deviation. Subgroup analyses were exploratory.

Exploratory subgroup analyses showed that reductions in ESAS total distress scores were greater in the intervention group than in the control group across cancer-type and age categories. The interaction by cancer type was not statistically significant, suggesting no clear evidence that the intervention effect differed across the reported tumor groups. Baseline symptom severity modified the intervention effect, with patients who had baseline ESAS scores of 50 or higher showing a larger between-group change than those with baseline ESAS scores below 50. The between-group difference was -22.5 points among participants with higher baseline symptom burden compared with -10.4 points among those with lower baseline symptom burden. Age did not modify the observed intervention effect.

Table 7. Intervention Exposure and Adherence

Measure	Intervention Group
Mean number of palliative-care visits	14.2 ± 2.8
Visit duration, minutes	38.5 ± 9.4
Participants attending ≥80% of scheduled visits	49 (81.7)
ESAS change among adherent participants	-27.4
ESAS change among less-adherent participants	-18.6
p-value	0.003

Values are presented as mean ± SD or n (%) unless otherwise indicated. ESAS, Edmonton Symptom Assessment System; SD, standard deviation.

Participants in the intervention group received a mean of 14.2 ± 2.8 palliative-care visits over five months, with a mean visit duration of 38.5 ± 9.4 minutes. Adherence to at least 80% of scheduled visits was observed in 49 participants, corresponding to 81.7% of the intervention group. Greater reduction in ESAS total distress score was observed among adherent participants than among less-adherent participants, with mean changes of -27.4 and -18.6 points, respectively.

Overall, nurse-led integrated palliative care was associated with greater improvement in symptom burden and patient satisfaction over five months compared with standard oncology care alone. The difference between groups increased progressively over time for both ESAS and PSQ-18 outcomes. The

largest clinical separation was observed at month 5, when the intervention group had a 16.7-point lower ESAS score and a 20.2-point higher PSQ-18 score than the control group. The intervention effect was most pronounced among patients with higher baseline symptom burden, while satisfaction improvements were broad across most domains except financial aspects of care.

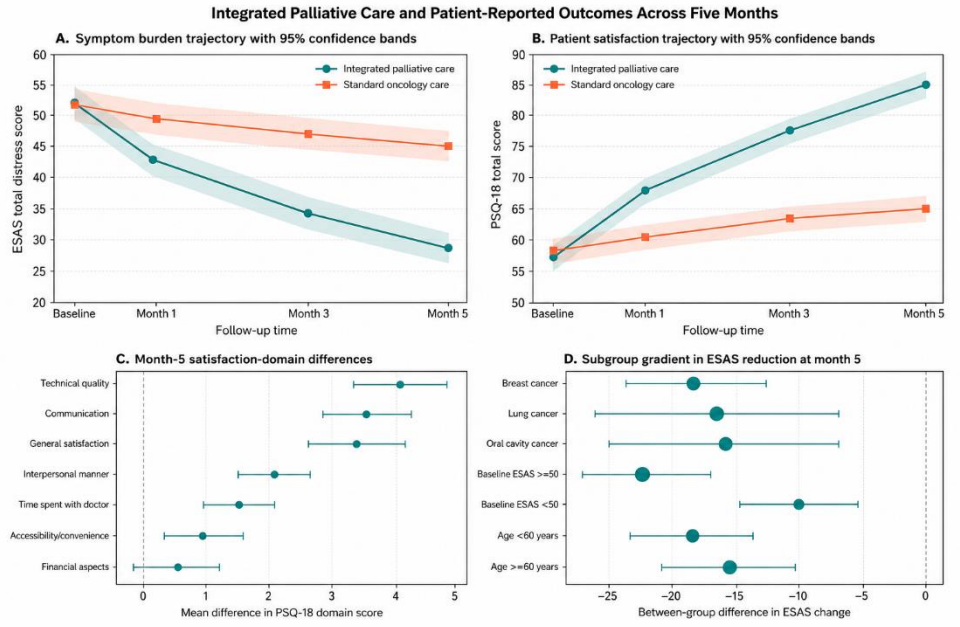

Figure 1 Integrated Palliative Care and Patient-Reported Outcomes Across Five Months

The panelled figure shows progressive divergence between the integrated palliative-care and standard oncology-care groups across symptom burden and patient satisfaction outcomes. ESAS total distress scores declined from 52.4 to 28.6 in the intervention group compared with 51.9 to 45.3 in the control group, producing a month-5 between-group difference of -16.7 points. PSQ-18 satisfaction scores increased from 58.3 to 85.6 in the intervention group compared with 59.1 to 65.4 in the control group, corresponding to a month-5 between-group difference of 20.2 points. Satisfaction-domain differences were greatest for technical quality, communication, and general satisfaction, while financial aspects showed the smallest difference and a confidence interval crossing zero. Subgroup patterns showed the largest ESAS reduction among patients with baseline ESAS scores ≥50, with a between-group change difference of -22.5 points, suggesting that patients with higher baseline symptom burden derived the greatest observed benefit from nurse-led palliative-care integration.

DISCUSSION

This quasi-experimental study found that nurse-led integrated palliative care, delivered alongside standard oncology care, was associated with greater reduction in symptom burden and greater improvement in patient satisfaction among adults with advanced solid malignancies receiving care at Nishtar Hospital, Multan. Over five months, ESAS total distress scores decreased from 52.4 ± 11.8 to 28.6 ± 9.4 in the intervention group, whereas the control group showed a smaller reduction from 51.9 ± 12.1 to 45.3 ± 10.8. The between-group difference widened progressively from -7.1 points at month 1 to -16.7 points at month 5, with the largest separation observed at the final follow-up. Patient satisfaction followed a parallel but inverse pattern, with PSQ-18 scores increasing from 58.3 ± 10.2 to 85.6 ± 8.7 in the intervention group compared with 59.1 ± 9.8 to 65.4 ± 10.1 in the control group. These findings suggest that structured palliative-care integration may address clinically relevant gaps in symptom monitoring, supportive communication, continuity of care, and patient-centered service delivery in oncology units where routine care is primarily disease-directed.

The magnitude and direction of these findings are consistent with international evidence supporting early or concurrent palliative care for patients with advanced cancer. Previous oncology trials and systematic reviews have shown that palliative care can improve quality of life, reduce distressing symptoms, support mood and coping, and strengthen communication between patients, families, and clinicians (5–8). The present study extends this evidence into a tertiary-care oncology setting in South Punjab, where advanced-stage presentation, limited supportive-care resources, financial vulnerability, and high patient volume create a substantially different implementation environment from most high-income settings. The large reduction in ESAS total distress score in the intervention group may partly reflect the high baseline symptom burden of the enrolled population, since patients with more severe symptoms have greater potential to benefit from structured assessment, repeated follow-up, and coordinated symptom-management support. This interpretation is supported by the exploratory subgroup analysis, in which participants with baseline ESAS scores of 50 or higher had a larger between-group improvement than those with lower baseline symptom burden.

The observed improvement in patient satisfaction is clinically important because satisfaction reflects not only general approval of services but also perceived communication, interpersonal care, technical quality, access, time spent with providers, and confidence in clinical support. In the present study, the largest month-5 satisfaction-domain differences were observed for technical quality, communication, and general satisfaction, suggesting that the intervention may have improved patients' experience through more systematic review of symptoms, clearer explanation of care plans, and greater continuity with trained oncology nurses. These components are central to palliative care and may be especially valuable in busy oncology units where routine consultations are often constrained by treatment workload. However, the financial aspects domain showed only a small difference, with a confidence interval crossing zero. This finding is plausible because a palliative-care communication and symptom-management intervention can improve care experience but cannot, by itself, resolve the broader structural problem of out-of-pocket cancer-care costs, transport expenses, medicine affordability, and household income disruption in low-resource settings.

The intervention was delivered by trained oncology nurses, which has practical relevance for health systems where specialist palliative-care physicians are limited. Nurse-led models may offer a feasible pathway for expanding supportive oncology services through task-sharing, structured protocols, patient and family education, psychosocial screening, medication adherence support, and timely escalation to physicians when required. The mean exposure of 14.2 ± 2.8 visits over five months indicates that the intervention was delivered with sustained contact rather than as a single consultation. The adherence analysis further suggested a dose-response pattern, as participants attending at least 80% of scheduled visits had a greater ESAS reduction than those with lower adherence. Although this finding should be interpreted cautiously because adherence may also reflect functional status, family support, access to transport, or motivation, it supports the importance of continuity and repeated assessment in palliative-care integration.

The results have implications for oncology service planning in Pakistan and comparable low- and middle-income settings. First, routine ESAS-based screening could help identify patients with high symptom burden who may benefit most from structured palliative-care referral. Second, oncology units may consider integrating trained palliative-care nurses into standard care pathways, particularly for patients with advanced-stage disease, high symptom scores, or repeated unscheduled visits due to uncontrolled symptoms. Third, hospital administrators should recognize that physical cancer-care infrastructure alone is insufficient without parallel investment in supportive-care services, staff training, opioid and essential medicine availability, documentation systems, and referral pathways. Fourth, undergraduate and continuing education for nurses and physicians should include core palliative-care competencies, including symptom assessment, pain management principles, communication skills, family counseling, culturally sensitive care planning, and psychosocial support.

Several limitations should be considered when interpreting the findings. The study used a quasi-experimental non-equivalent control group design with sequential recruitment rather than individual randomization; therefore, unmeasured temporal confounding, selection bias, changes in clinical practice over time, staffing differences, or case-mix variation cannot be fully excluded. Although baseline characteristics were similar and adjusted longitudinal models were used, statistical adjustment cannot replace random allocation. The single-center setting limits generalizability to other Pakistani hospitals, especially smaller district hospitals, private oncology centers, or rural care environments with different staffing, infrastructure, and patient access barriers. The five-month follow-up period was sufficient to detect short-term patient-reported outcome changes but did not assess survival, place of death, end-of-life care quality, caregiver burden, bereavement outcomes, or longer-term sustainability of the intervention. Hematological malignancies were excluded, so the findings should not be generalized to those populations without further study. Patient satisfaction outcomes may also be vulnerable to response bias because participants were aware of receiving additional supportive care.

The study also has important strengths. It evaluated a clinically relevant, patient-centered intervention in a real-world oncology setting serving a large and underserved regional population. The use of repeated ESAS and PSQ-18 assessments allowed longitudinal evaluation of symptom burden and satisfaction rather than relying on single time-point measurement. The intervention was described as a structured, nurse-led model with repeated follow-up, patient-family education, psychosocial support, care coordination, and escalation to the oncology team. Attrition was modest and balanced between groups, and missing outcome data were addressed using the prespecified analytic approach. The findings therefore provide useful preliminary evidence to support further testing of palliative-care integration in Pakistani oncology services, while also identifying the need for more rigorous multicenter trials.

Future research should confirm these findings through multicenter randomized or cluster-randomized controlled trials across diverse Pakistani oncology settings. Such studies should include longer follow-up, formal intervention-fidelity assessment, cost-effectiveness analysis, caregiver-reported outcomes, opioid-access measures, and qualitative evaluation of patient, family, nurse, and physician experiences. Additional work should also examine whether ESAS thresholds can be used pragmatically to prioritize limited palliative-care resources and whether nurse-led models can be adapted for district hospitals, community-based cancer support, and telephonic or hybrid follow-up pathways. Until such evidence is available, the present findings should be interpreted as supportive but not definitive evidence that nurse-led integrated palliative care is associated with improved patient-reported outcomes among advanced oncology patients in this setting.

CONCLUSION

Nurse-led integration of palliative care into oncology services at Nishtar Hospital, Multan, was associated with greater reduction in symptom burden and higher patient satisfaction over five months compared with standard oncology care alone among adults with advanced solid malignancies. The observed benefits were most pronounced among patients with higher baseline symptom burden, while satisfaction improvements were evident across most domains except financial aspects of care. Although the quasi-experimental design limits causal inference, the findings support the feasibility and potential clinical value of structured palliative-care integration in a resource-constrained tertiary oncology setting. Larger multicenter controlled studies with longer follow-up, cost-effectiveness evaluation, and caregiver-centered outcomes are needed before broad policy implementation.

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