

Nurse-led cancer palliative care compared to oncologist-led cancer palliative care: A retrospective analysis of Chinese patients suffering from cancer and receiving chemotherapy

Mengtian Xu^{B,E,F}, Li Zhu^{C,E,F}, Jingjuan Yang^{A,D–F}

Department of Infectious Diseases, First Affiliated Hospital of Soochow University, Suzhou, China

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Address for correspondence

Jingjuan Yang
E-mail: jingjuan.y1ang@gmail.com

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Abstract

Background. Cancer palliative care is recommended by guidelines for patients with early stage of cancer. Unlike the Western countries, in mainland China, cancer patients receive specialist-led cancer palliative care. Nurse-led cancer palliative care (NUC) is not well established yet.

Objectives. To compare the clinical outcome measures, quality of life and symptom distress in patients suffering from cancer who received NUC with the same results in patient who received consulting oncologist-led cancer palliative care (ONC).

Materials and methods. The study was a chart review of a database of patients suffering from cancer. Data regarding clinical outcome measures, quality of life and symptom distress of patients suffering from cancer who were receiving chemotherapy and NUC (NUC cohort, n = 185) or ONC (ONC cohort, n = 170) were collected and analyzed. One oncologist or 1 nurse was involved in treating 1 patient during the patient's hospital visit. Each visit took 30 min. The Chinese version of the Symptom Distress Scale was used for the evaluation of the degree of symptom distress. The simplified Chinese version of the European Organization for Research and Treatment Quality of Life Questionnaire (the EORTC QLQ-C30) v. 3.0 was used for evaluation of the quality of life.

Results. Female patients preferred NUC ($p < 0.0001$). The pain intensity (4.13 ± 1.71 compared to 3.35 ± 1.01 , $p < 0.0001$), dyspnea (3.89 ± 1.48 compared to 2.82 ± 0.97 , $p < 0.0001$), constipation (3.56 ± 1.78 compared to 3.06 ± 1.89 , $p = 0.0107$), and degree of symptom distress (38.09 ± 7.26 compared to 35.05 ± 7.92 , $p = 0.0002$) were reported higher among patients from the ONC cohort than among those from the NUC cohort. Patients from the NUC cohort reported a better quality of life than those from the ONC cohort (70.41 ± 13.62 compared to 45.63 ± 7.94 , $p < 0.0001$).

Conclusions. The NUC results in better clinical outcome measures and higher quality of life than ONC for patients receiving chemotherapy.

Key words: cancer, cancer palliative care, nurse, oncologist, quality of life

Background

Cancer is a widespread disease responsible for mortality and death.¹ At the time of diagnosis, most patients are in an advanced stage of cancer (IIIb or IV) and very few are in an early stage.² Patients diagnosed at an advanced stage have a poor prognosis, lower survival rate and a higher symptom burden than those diagnosed at an early stage.^{1,3} Chemotherapy has adverse effects on the health of patients.¹ Advances in technology and radiotherapy and/or chemotherapy make the conditions of patients during the treatment period complex.^{4,5} Nurses are members of the oncology multidisciplinary team and contribute to the well-being of patients before and after the cancer treatment.⁶

Outcomes after chemotherapies are required to be predicted before further chemotherapy treatment cycles for the success of the previous intervention(s) and to avoid emergency condition(s). Guidelines recommend cancer palliative care for patients with an early stage of the disease.⁷ The clinics operated with nurse-led cancer palliative care (NUC) model have better clinical outcomes than those operated with clinician-led cancer palliative care (ONC).⁸ Unlike the Western countries, in mainland China, cancer patients receive ONC. Therefore, the NUC is not well established yet. Pilot studies performed in the 947 Hospital of PLA, Kashgar Shule, China, the Hong Kong Polytechnic University, Hong Kong, and Queen Elizabeth Hospital, Hong Kong,^{1,5} meta-analyses^{9,10} and randomized trials on adult patients with acute lymphoblastic leukemia¹¹ reported that NUC results in better clinical outcomes than non-nurse-led cancer palliative care in patients with cancer. However, ONC is the preferred supportive adjuvant care modality among cancer patients.¹² There are only a few studies available to compare the effectiveness of NUC and ONC or non-nurse-led cancer palliative care in Chinese cancer patients.

Objectives

The objectives of this non-randomized, non-treatment and retrospective study were to compare the clinical outcome measures (pain, dyspnea and constipation), quality of life, symptom distress, and survival of Chinese patients suffering from cancer and receiving chemotherapy who received NUC to those of patients who received ONC.

Materials and methods

Ethics approval and consent to participate

The study was a chart review of a database of patients suffering from cancer. Therefore, informed consent from patients, registration into the Chinese trial

registry or approval from the human ethics committee of the First Affiliated Hospital of Soochow University, Suzhou, China, were not required. The study adheres to the law of China and the 2008 Declaration of Helsinki.

Study population

From March 27, 2018, to April 18, 2020, a total of 355 patients suffering from cancer have been receiving chemotherapy at the Department of Oncology of the First Affiliated Hospital of Soochow University (Suzhou, China) and the referring hospitals, and were under NUC or ONC. Patients with missing data were excluded. Data regarding cancer and chemotherapy-related symptoms and quality of life of 355 patients were collected from the institutional records. The flow diagram of the retrospective analysis is presented in Fig. 1.

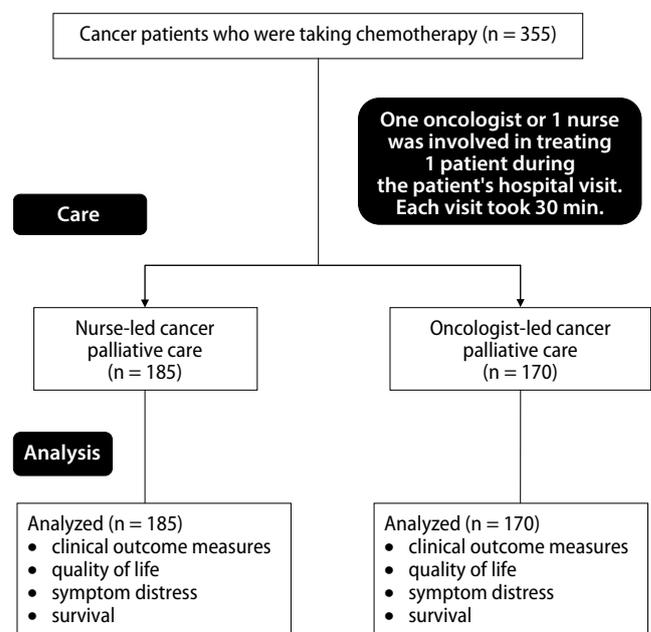


Fig. 1. Flow diagram of retrospective analysis

Cohorts

A total of 185 patients were subjected to NUC regarding physical check-ups, education, treatment adherence control, and counseling at the time of hospital visits because consulting oncologists were unavailable. These patients were included in the NUC cohort. A total of 170 patients were subjected to ONC regarding the same features at the time of hospital visits because their cases were difficult to manage due to history or comorbidities (e.g., respiratory or gastrointestinal disease) that were observed by a physician. These patients were included in the ONC cohort. One oncologist or 1 nurse was involved in treating one patient during the patient's hospital visit. Each visit took 30 min.

Clinical outcome measures

Physical measures

Pain was evaluated on a scale of 0–10, on which 0 indicates no pain and 10 indicates the worst possible pain. Dyspnea was evaluated on a scale of 0–10, where 0 indicates no dyspnea and 10 indicates the worst possible dyspnea. Constipation was evaluated on a scale of 0–10, where 0 indicates no constipation and 10 indicates the worst possible constipation.

Quality of life

The quality of life of patients was assessed by a trained instructor (3 years of experience) of First Affiliated Hospital of Soochow University, using the simplified Chinese version of the European Organization for Research and Treatment Quality of Life Questionnaire (the EORTC QLQ-C30) v. 3.0. It includes 32 items divided into 4 domains (physical, psychological, social, and adverse effects) and 9 facets. Each item is evaluated based on a 5-point Likert scale. The score ranges from 32 to 160. The higher the score, the better the quality of life.¹³

Symptom distress

The Chinese version of the Symptom Distress Scale was used for the evaluation of the degree of symptom distress of patients. A total of 24 common symptoms were included in the evaluation of the degree of symptom distress. Each item is scored based on a 5-point Likert scale. The score ranges from 0 to 120. The higher the score, the higher the degree of symptom distress.¹⁴

Progression free-survival

During treatment or follow-up, if patients were not subjected to extra chemotherapy and/or radiotherapy besides routine chemotherapy and/or radiotherapy (at the oncologist's discretion), it was considered progression-free survival. Patients visit the hospitals frequently during the course of treatment and clinical outcome measures were evaluated during such visits.

Statistical analyses

InStat v. 3.01 software (GraphPad Software, San Diego, USA) was used to perform statistical analyses. All eligible patients were included in the analysis. Continuous data are demonstrated as mean \pm standard deviation (SD) and constant data are demonstrated as frequency (percentages). The Fisher's exact test was used for constant data. Distribution of continuous data was checked visually whether they were distributed normally or not normally through frequency distribution. The continuous data were distributed

Table 1. The Brown–Forsythe test for the homogeneity of variance of continuous data

Parameter	p-value
Demographical conditions	
Age [years]	0.4521
Body mass index [kg/m ²]	0.6232
Outcome measures	
Pain	0.1336
Dyspnea	0.5543
Constipation	0.0108
EORTC QLQ-C30	0.0005
Symptom distress	0.0003

EORTC QLQ-C30 – the simplified Chinese version of the European Organization for Research and Treatment Quality of Life Questionnaire. A value of $p < 0.05$ was considered as showing not equal population variance.

normally. The homogeneity of variance of continuous data was checked using the Brown–Forsythe test (Table 1). If the population variance was not equal, unpaired t-test with Welch's correction was used for continuous data, and if the population variance was equal, unpaired t-test was used for continuous data. All results were considered significant if the p-value was lower than 0.05.

Results

Demographical and clinical conditions

Female patients preferred NUC ($p < 0.0001$). There is a distinct and significant difference in the types of cancer between the groups – for example, most prostate cancer patients received ONC ($p < 0.0001$). The other demographical and clinical conditions of patients before the start of chemotherapy presented no statistically significant differences between both cohorts ($p > 0.05$, Table 2).

Outcome measures

The pain intensity in patients who received ONC was higher than in those who had received NUC (4.13 ± 1.71 (minimum: 2, maximum: 8) compared to 3.35 ± 1.01 (minimum: 2, maximum: 8), $p < 0.0001$, degrees of freedom (df): 353, t-value: 5.271; t-test). Dyspnea was reported higher among patients who received ONC than in those who received NUC (3.89 ± 1.48 (minimum: 1, maximum: 8) compared to 2.82 ± 0.97 (minimum: 1, maximum: 8), $p < 0.0001$, df: 353, t-value: 8.189; t-test). Constipation was reported higher among patients who received ONC than in those who received NUC (3.56 ± 1.78 (minimum: 1, maximum: 9) compared to 3.06 ± 1.89 (minimum: 1, maximum: 8), $p = 0.0107$, df: 352, Welch's approximate t-value: 2.568; t-test with Welch's correction). Patients who received NUC had better quality of life than those who received ONC

Table 2. Demographical and clinical conditions of patients before the start of chemotherapy

Variables		Cohorts		Comparisons		
		NUC	ONC	p-value	df	t-value
Type of cancer palliative care		nurse-led	oncologist-led			
Number of patients		185	170	–	–	–
Gender	male	77 (42)	129 (76)	<0.0001 (Fisher's exact test)	N/A	N/A
	female	108 (58)*	41 (24)			
Age [years]	minimum	32	33	0.3392 (t-test)	353	0.9571
	maximum	67	67			
	mean \pm SD	39.51 \pm 7.14	40.45 \pm 11.09			
Body mass index [kg/m ²]	–	24.12 \pm 2.02	23.89 \pm 1.88	0.2687 (t-test)	353	1.108
ECOG Performance Status	1	139 (75)	129 (76)	0.902 (Fisher's exact test)	N/A	N/A
	2	46 (25)	41 (24)			
Morbidities	diabetes	21 (11)	21 (12)	0.869 (Fisher's exact test)	N/A	N/A
	hypertension	11 (6)	10 (6)	0.999 (Fisher's exact test)	N/A	N/A
	atherosclerosis	10 (5)	17 (10)	0.113 (Fisher's exact test)	N/A	N/A
	dyslipidemia	10 (5)	12 (7)	0.661 (Fisher's exact test)	N/A	N/A
Type of cancer	breast cancer	58 (31)*	5 (3)	<0.0001 (Fisher's exact test)	N/A	N/A
	prostate cancer	4 (2)	61 (36)	<0.0001 (Fisher's exact test)	N/A	N/A
	colorectal cancer	15 (8)	21 (12)	0.292 (Fisher's exact test)	N/A	N/A
	thyroid cancer	29 (16)*	3 (2)	<0.0001 (Fisher's exact test)	N/A	N/A
	oral cancer	47 (25)	51 (30)	0.344 (Fisher's exact test)	N/A	N/A
	lung cancer	3 (2)	5 (3)	0.487 (Fisher's exact test)	N/A	N/A
	liver cancer	9 (5)	13 (8)	0.379 (Fisher's exact test)	N/A	N/A
	cervical cancer	14 (8)*	2 (1)	0.004 (Fisher's exact test)	N/A	N/A
	brain cancer	1 (1)	2 (1)	0.610 (Fisher's exact test)	N/A	N/A
skin cancer	5 (3)	7 (4)	0.562 (Fisher's exact test)	N/A	N/A	

Continuous data are demonstrated as mean \pm standard deviation (SD) and constant data are demonstrated as frequency (percentages). Unpaired t-test was used for continuous data and Fisher's exact test was used for constant data. All results were considered significant if the p-value was less than 0.05.

* significantly higher value than that of the ONC cohort. NUC – nurse-led cancer palliative care; ONC – oncologist-led cancer palliative care; df – degrees of freedom; N/A – not applicable; ECOG – Eastern Cooperative Oncology Group.

(70.41 \pm 13.62 (minimum: 32, maximum: 90) compared to 45.63 \pm 7.94 (minimum: 33, maximum: 70), $p < 0.0001$, df: 300, Welch's approximate t-value: 21.145; t-test with Welch's correction). Patients who received ONC had a higher degree of symptom distress than those who received NUC (38.09 \pm 7.26 (minimum: 17, maximum: 50) compared to 35.05 \pm 7.92 (minimum: 15, maximum: 50), $p = 0.0002$, df: 352, Welch's approximate t-value: 3.806; t-test with Welch correction).

Survival

Eighteen months after the start of treatment, 11 (6%) patients from the NUC cohort and 10 (6%) patients from the ONC cohort have died ($p = 0.999$). A total of 174 (94%) patients from the NUC cohort and 160 (94%) patients from the ONC cohort survived 18 months from the start of treatment, irrespective of disease conditions. There was no statistically significant difference in overall survival 18 months from the start of treatment ($p = 0.999$). After

this period, 65 (35%) patients from the NUC cohort and 45 (26%) patients from the ONC cohort achieved progression-free survival. There was no statistically significant difference in progression-free survival 18 months after the start of treatment ($p = 0.086$). During the treatment and follow-up period, 1 (1%) patient from the NUC cohort and 2 (1%) patients from the ONC cohort developed distal metastasis ($p = 0.609$).

Discussion

The current study found that pain intensity, dyspnea, constipation, and symptom distress were lower, and the quality of life was higher among patients who received NUC than those who received ONC. The results of clinical outcome measures in the current study were consistent with those of a pilot study,¹ a randomized, parallel study,⁸ a meta-analysis,⁹ and some randomized trials^{11,15–17} but were not consistent with those of other

Table 3. Results of similar studies after follow-up care

Variable		Author, year							
		Zhang et al., 2020 ¹	Cheng et al., 2018 ⁹	Lin et al., 2016 ¹¹	Kim et al., 2018 ¹⁵	Beaver et al., 2017 ¹⁶	Malmström et al., 2016 ¹⁷	Kimman et al., 2011 ¹⁸	Verschuur et al., 2009 ¹⁹
Country		China	China	China	South Korea	UK	Sweden	the Netherlands	the Netherlands
Number of patients involved	nurse-led cancer palliative care	110	554	36	30	129	26	149	54
	consultant-led cancer palliative care	110	556	37	30	130	23	150	55
Pain (VAS)	nurse-led cancer palliative care	NV	NV	31%	20.6 ±19.4	21.5 ±29.8	25.6 ±26.8	NV	12%
	consultant-led cancer palliative care	NV	NV	19%	33.3 ±26.6	20.1 ±30.1	16.7 ±15.9	NV	14%
	p-value	>0.05	0.624	0.172	0.039*	0.56	0.303	N/A	0.24
Dyspnea	nurse-led cancer palliative care	NV	NV	5.0 ±3.2	20.0 ±22.5	17.5 ±28.5	35.9 ±29.7	NV	NV
	consultant-led cancer palliative care	NV	NV	5.6 ±2.9	25.6 ±28.6	13.2 ±23.7	18.8 ±16.9	NV	NV
	p-value	>0.05	0.509	0.404	0.403	0.5	0.041*	N/A	N/A
Constipation	nurse-led cancer palliative care	NV	NV	8.1 ±2.0	25.6 ±32.4	10.4 ±20.9	25.5 ±28.8	NV	NV
	consultant-led cancer palliative care	NV	NV	11.1 ±3.9	33.3 ±35.0	15.9 ±25.2	18.8 ±28.1	NV	NV
	p-value	>0.05	0.001*	0.001*	0.380	0.035*	0.288	N/A	N/A
Quality of life (EORTC QLQ-C30)	nurse-led cancer palliative care	NV	NV	79.6 ±21.0	64.4 ±15.6	71.6 ±19.8	47.8 ±14.4	78.9 ±15.8	74
	consultant-led cancer palliative care	NV	NV	63.2 ±18.1	51.4 ±22.4	73.2 ±21.5	40.2 ±15.4	77.2 ±16.6	69
	p-value	<0.05*	>0.05	0.009*	0.011*	0.31	<0.001*	0.42	0.13
Symptom distress (Symptom Distress Scale)	nurse-led cancer palliative care	NV	NV	NV	NV	NV	65.4 ±27.8	NV	NV
	consultant-led cancer palliative care	NV	NV	NV	NV	NV	64.9 ±21.8	NV	NV
	p-value	N/A	0.255	N/A	N/A	N/A	0.698	N/A	0.4
Metastasis	nurse-led cancer palliative care	NV	NV	NV	NV	4%	25%	2%	20%
	consultant-led cancer palliative care	NV	NV	NV	NV	4%	22%	2%	29%
	p-value	N/A	N/A	N/A	N/A	0.098	0.691	0.997	0.5
Death	nurse-led cancer palliative care	NV	NV	NV	NV	1%	NV	NV	13%
	consultant-led cancer palliative care	NV	NV	NV	NV	1%	NV	NV	13%
	p-value	N/A	N/A	N/A	N/A	0.096	N/A	N/A	0.998

NV – not available; N/A – not applicable; * significant difference. Dyspnea and constipation were evaluated on a scale of 0–10, where 0 indicates no event and 10 indicates the worst possible condition.

randomized trials.^{18,19} Heterogeneity of patient cohorts and short follow-up of the current study were responsible for results contradictory with those of randomized trials.^{18,19} The NUC results in better clinical outcome measures and quality of life than ONC.

Eighteen months after the start of treatment, there were statistically significant differences in the occurrence of death, progression-free survival, overall survival, and

occurrence of metastases between both cohorts. The survival rates of the current study were consistent with those of randomized trials.^{18,19} The cancer palliative care given by nurses or oncologists has no effects on chemotherapy outcomes. However, it can affect the quality of life, symptoms and mental strength of the patients.

Results of the different published studies are reported in Table 3.

All patients were offered either NUC or ONC. However, female patients preferred NUC. Female patients mostly suffered from breast, thyroid and/or cervical cancer. The NUC provides great effects in some areas of oncology, for example, in breast cancer treatment. Yet, there is usually a great imbalance of sexes in NUC and ONC cohorts that strongly influences the quality of life results.

Limitations

There are several limitations of the study that have to be reported. It is a retrospective study which lacks randomized trial and had a short (18-month) follow-up. There was a heterogeneity of patients among cohorts, which may create a bias in the analysis. There was also an imbalance in the types of cancer between groups – a lot of breast cancer patients in the NUC cohort and a lot of prostate cancer patients in the ONC cohort; these differences are statistically significant. Men and women patients suffered from different types of cancer and this imbalance influenced the study results.

Conclusions

The NUC results in better clinical outcome measures and higher quality of life than ONC in Chinese patients suffering from cancer, but this issue needs to be further examined using more sophisticated analytical methods. However, NUC did not change death, progression-free survival, overall survival, and metastasis rates. Female patients, especially those with breast cancer, preferred NUC. The present study provides evidence of the competence of nurses, and more studies like this will lead to the improvement of nurses' autonomy and professionalism.

ORCID iDs

Mengtian Xu  <https://orcid.org/0000-0002-0147-9960>

Li Zhu  <https://orcid.org/0000-0001-8220-7280>

Jingjuan Yang  <https://orcid.org/0000-0002-2941-2506>

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