### RESEARCH



# Self-reported knowledge and difficulties towards palliative care among healthcare professionals in rural China: a cross-sectional study

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#### Abstract

**Background** Palliative care (PC) in rural China remains underdeveloped, with limited specialized services and significant challenges for healthcare professionals. This study aimed to examine the difficulties in providing PC and their factors from the perspective of healthcare professionals in rural Henan province, China, where specific PC services are currently unavailable.

**Methods** A cross-sectional study was conducted between June and July 2024, using a convenience sample of 255 healthcare professionals from four secondary/tertiary hospitals participated. Data were collected on participants' demographic characteristics, information on recently deceased cancer patients they had cared for, and PC-related information. PC knowledge and PC difficulties were assessed using the Palliative Care Knowledge Questionnaire-Chinese version (PCKQ-PCN) and the Palliative Care Difficulties Scale (PCDS). Linear regression analysis identified factors associated with PC difficulties.

**Results** Among the 255 participants (Mean[age]:  $34.82 \pm 7.04$ ), 71.8% were females, 57.3% were physicians, and the average work experience was 10.20 years. Regarding PC experience, 48.2% had participated in 1–2 training sessions annually over the past two years, and 32.2% reported a poor understanding of PC. The total PCKQ-PCN mean score was 13.28 ± 2.62, with 25.2% of participants classified as having poor knowledge. The PCDS mean score was 42.58 ± 13.59. Linear regression analysis showed that participating in at least one PC training session every six months ( $\beta$ =-10.66; *p*=0.032), having experience caring for seriously ill people at home ( $\beta$ =

-6.31; p = 0.024), greater knowledge of symptom management ( $\beta = -3.72$ ; p = 0.012), and higher levels of basic knowledge ( $\beta = -5.12$ ; p = 0.007) were negatively associated with PC difficulties. Conversely, limited understanding of PC ( $\beta = 12.95$ ; p = 0.021), greater knowledge of spiritual care and death education ( $\beta = 4.95$ ; p = 0.034), and having new rural cooperative medical insurance ( $\beta = 6.36$ ; p = 0.023;  $\beta = 3.21$ ; p = 0.042) were positively associated with PC difficulties.

**Conclusions** This study highlights critical gaps in rural China's PC services, including inadequate training, limited focus on spiritual needs and death education, and disparities in insurance coverage. Targeted training programs

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in healthcare professionals and policy reforms are urgently needed to improve PC quality and accessibility in rural areas.

Keywords Palliative care difficulties, Palliative care knowledge, Spiritual care, Healthcare professionals, Rural China

#### Background

Cancer is the second leading cause of death worldwide [1, 2], with 19.98 million new cancer cases and 9.74 million deaths reported in the *Global Cancer Statistics* 2022. China accounts for 24.2% of global cancer cases and 26.4% of deaths [3], with rural areas facing particularly high mortality rates on certain cancers due to poor dietary habits, inadequate sanitation, socioeconomic inequalities, and limited healthcare access [4, 5]. These challenges, coupled with the aging population, create significant economic and psychological burdens for patients and their families [6, 7].

Palliative care (PC), which prioritize symptom management and preserving the dignity of terminal patients and their caregivers, can greatly improve quality of life [8, 9]. However, only 3% of individuals receive it in China, with most services concentrated in urban areas. This highlights an urgent need to expand PC in rural China [4, 10].

#### Implementing palliative care in rural China

The *Multidimensional Supportive Care Needs Model* [11] underscores a holistic nature of PC, encompassing symptom management, psychological support, social support, spiritual care, and informational needs. Effective PC requires collaboration among doctors, nurses, caregivers, and social workers, supported by rehabilitation therapists, dietitians, pharmacists, and physical therapists. However, significant challenges impede the effective implementation of PC in China [10, 12], such as cultural taboos surrounding death [13, 14], family-dominated decision-making, [15, 16], and limited communication between patients and healthcare professionals [17, 18] often hinder PC delivery, especially in rural China.

Spiritual care is another critical gap, often misunderstood as solely faith-based [17, 19]. Studies show spiritual support reduces depressive symptoms and improve quality of life [20]. Breast cancer patients require spiritual care needs in terms of "hope and peace" and "relationship with transcendence" [21]. Yet the limited resources and training restrict its availability in China [14, 20, 21].

China's medical insurance system includes the urban employee basic medical insurance and the urban–rural resident basic medical insurance [22]. China achieved near-universal insurance coverage through three public insurance programs, including the voluntary new cooperative medical scheme, introduced in 2003 to benefit rural residence [23]. Despite the expansion of coverage in recent years, many rural patients still face significant financial burden, particularly due to reimbursement disparities between inpatient and outpatient services across different hospitals and regions [24, 25]. In addition, they incur substantial indirect costs, such as caregiving and transportation expenses [26]. These challenges, compounded by limited information and resources, result in inconsistent access to healthcare services.

Meanwhile, rural PC services are further hindered by workforce shortages and a lack of standardized training [15, 27]. Healthcare professionals often face excessive workloads, strained doctor-patient relationships, and insufficient PC training [15, 27–29]. Although formal PC curricula are available, comprehensive workplace-based PC training for healthcare professionals remains limited across regions [30, 31]. Additionally, most training programs are concentrated in major urban cities (e.g., Beijing, Shanghai, and Guangzhou) [28, 31, 32]. This leaves rural regions underserved, with PC services primarily addressing symptoms management rather than emotional or spiritual care [14, 27, 29, 33].

To optimize the four-in-one holistic care model (安宁 疗护"四全"照顾理念), it is essential to integrates medical, social, and spiritual dimensions to address the diverse needs of patients and their families in China [11, 14, 34]. Strengthening PC delivery, especially in underserved rural areas, requires targeted public health policies, expanded training opportunities, and systemic reforms.

#### Study aims

This study aimed to examine the PC difficulties and their factors from the perspective of healthcare professionals, using a culturally sensitive instrument. Given the absence of specific PC services in hospitals/clinics in many rural areas, the findings will fill a critical gap and provide baseline data to inform the development of PC training programs in these regions.

#### Methods

#### Study design and sample

This cross-sectional study was conducted from June to July 2024 in four hospitals in Xinxiang, Henan province. Among these, one tertiary grade-A hospital had implemented limited PC services across six oncology wards, with 48 beds designated for such care. In contrast, the other three hospitals—two tertiary hospitals and one secondary hospital—had yet to initiate any PC practices.

The inclusion criteria for the participants included: i) being a formal staff member working in a hospital, ii) being a healthcare professional in the perspective hospitals more than 3 months, and iii) had experience about caring for patients with terminal-stage cancer for the past 6 months. The exclusion criteria were as follows: being training/visiting/travel nurses or medical providers.

We calculated the sample size according to the formula for the cross-sectional study:  $n = [(Z_{\delta/2})^{2^*}\delta^2])/E^2$  [35]. We used the standard deviation (SD) of the total score for the Palliative Care Difficulties Scale (PCDS) [36] in the pilot study was 45.25; therefore, the sample size was expanded to 250 participants. The effective sample size of the present study met these requirements.

#### **Data collection**

In July 2024, two designated staff members from these given hospitals help to recruit participants for the study. Staff members invited the potential participants via the WeChat mobile application. Participants could access the online anonymous survey via QR code. The study aims were introduced on the first page of the online questionnaire on Wenjuanxing. Each participant was asked to evaluate one of the deceased patients they had recently cared for. The duration for each participant to complete the questionnaire ranged from 8 to 15 min. Three measures were adopted to ensure the quality of the data collection: 1) limiting each ID to fill out the questionnaire only once; 2) setting confusion options; and 3) having two researchers double-check the answers manually after the data were downloaded from the website.

Participants in this study provided written informed consent, and study procedures were approved by the Internal Review Board (IRB) at the College of Social Affairs of Henan Normal University (CSA2024001; Clinical trial number: not applicable). We followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline to ensure comprehensive and transparent reporting of our study.

#### Measures

A self-reported questionnaire was employed to collect comprehensive data about both the participants and the patients they cared for. The questionnaire was structured into three parts.

1) Participants' demographic characteristics: This section collected information on participants' age, sex, education level, marital status, department, working duration, ward type, and their self-perception of PC knowledge.

2) General characteristics of the deceased cancer patients: Participants were asked to provide general information about one recently deceased patient they had cared for. This section included patient's age, sex, health insurance status, types of cancer, caregiver, treatment, and duration of hospitalization. This section was developed based on the previous literature [33, 37, 38]. The survey items and instruments were reviewed and refined based on feedback from an experience oncologist and a nurse in oncology care and hospice care, each with over a decade of expertise in their respective field.

3) Palliative care knowledge: healthcare professionals' PC knowledge was measured using the Palliative Care Knowledge Questionnaire-Chinese version (PCKQ-PCN), developed by Luo et al. [39]. The PCKQ-PCN includes four subscales: psychological care (3), spiritual care and death education (3), symptom management (7), and basic knowledge (5). These subscales comprehensively evaluate PC knowledge in the context of China's specific healthcare environment. Example items include: "Palliative care implements the 'four-in-one care' model of 'whole person, whole family, whole process, and whole team' (安宁 疗护实施 "全人、全家、全程、全队"的 "四全照 顾"模式)" and "Whether hospice and palliative care are synonymous and mean the same thing (安宁疗护 和缓和医疗是同义词, 代表相同的含义)". The original response options were: agree/yes, disagree/no, and I don't know. Only correct responses received 1 point, yielding a total score ranging from 0 to 18, with higher sum scores indicating greater PC knowledge. The standard score was calculated as follows: Standard score = (Total average score/Total score)\*100. Scores were categorized as: poor (<60); passing (60-80); and good (>80) [40]. The Cronbach's  $\alpha$  for the total scale the total scale was 0.845, while the subscales showed reliability ranging from 0.743 to 0.819. 4) Palliative care practices and difficulties: The common challenges encountered in daily PC practice were assessed using the PCDS [36]. This 15-item scale comprises five subscales: communication in multidisciplinary teams (3), communication with patient and family (3), expert support (3), alleviating symptoms (3), and community coordination (3). An example item is, "When a patient expresses anxiety, it is difficult to respond". Responses were rated on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The sum scores were yielded from 18 items, with higher scores including greater levels of PC difficulties. This scale is translated and validated for use in the Chinese populations [41, 42]. The Cronbach's  $\alpha$  for the total scale the total scale was 0.957, while the Cronbach's  $\alpha$  for the subscales ranged from 0.814 to 0.922.

#### Data analysis

Data were analyzed using STATA18.0. Descriptive statistics, including frequencies, means, and percentages, were calculated to summarize healthcare professionals' demographics, general information about deceased cancer patients, and scores for all subscales of PC knowledge and PC difficulties among healthcare professionals. Next, linear regression models were employed to examine the relationships between PC difficulties and variables, such as healthcare professionals' demographics, general information of the deceased cancer patients, and PC knowledge. Potential factors included in the models were selected based on previous evidence [33, 38, 43] and insights from an expert group comprising three doctors and one nurse specialized in oncology and palliative care within the surveyed hospitals. A *p*-value of < 0.05was applied to represent the statistical significance of the results.

#### Results

#### Sample characteristics

A total of 366 healthcare professionals accessed the questionnaire, of which 255 completed surveys were validated for the final analysis, yielding a response rate of 69.7%. The mean age of participants was 34.82 years (standard deviation [SD]: 7.04; age range: 23–62). Over 71.8% were females (n=183), 62.8% held a bachelor's degree, and 82.0% were married (See in Table 1). In terms of job role, 48.6% worked in oncology departments, and 57.3% were physicians and 42.7% were nurses, with an average of 10.20 years of professional experience (SD: 7.27). Regarding PC experience, 48.2% had participated in 2–4 training sessions in the past two years, 66.3% had cared for a seriously ill person at home, and 81.6% had experienced the loss of a significant other within the past year. Notably, 32.2% reported a poor understanding of PC.

#### Levels of PC knowledge and practices

The overall mean scores for healthcare professionals' knowledge of PC were 13.28 (SD: 2.62, Table 2), with 2.76 for psychological care (SD: 0.54), 2.57 for spiritual care and death education (SD: 0.81), 5.47 for symptom management (SD: 1.39), and 2.48 for basic knowledge (SD: 1.15). Meanwhile, the standard score of PC knowledge was 73.78 (SD: 14.57) with 25.2% of participants classified as having poor knowledge. Three items have lower correct response rates: "Palliative care teams are comprised of only doctors and nurses" (59.1%); "Palliative care is a synonymous term for hospice care"

(44.0%); "Regardless of the intensity of pain, all patients should start taking medication from the first step" (45.2%).

In terms of PC practices and difficulties (Table 2), the total PCDS mean score was 42.58 (SD: 13.59) with subscales including 8.99 for communication in multidisciplinary teams (SD: 2.76), 8.18 for communication with patient and family (SD: 3.12), 8.32 for expert support (SD: 3.21), 8.07 for alleviating symptoms (SD: 3.22), and 9.03 for community coordination (SD: 3.19).

#### The demographics of the decreased patients

The quality of dying and death is summarized in Table 3. Over two-thirds of cancer patients were males (69.8%), with the majority aged between 60-79 years (65.9%). Nearly 47.8% had been hospitalized for 15 to 30 days before death or discharge to home. Lung cancer was the most common diagnosis (57.6%), and 66.7% of patients had undergone curative treatments only, while 33.3% received some levels of PC in the past month. Children served as the primary caregivers for 56.5% of patients. In terms of health insurance coverage, 38.4% of patients were enrolled in urban resident medical insurance, 47.9% were covered by the new cooperative medical insurance, 8.2% had both urban resident medical insurance and new cooperative medical insurance, and 5.5% reported other forms of coverage (e.g., selfpaid, medical aid, don't know).

#### PC difficulties and their factors

After adjusting for some confounders (ward, palliative nurses, sex, education, age, marital status, patients' hospitalization, and treatment type), multivariable linear regression predicting PC difficulties ( $R^2 = 0.38$ , Table 4) revealed a statistically significant association between healthcare professionals' knowledge of PC and the difficulties they encountered. Symptom management ( $\beta = -3.72$ ; p = 0.012) and basic information  $(\beta = -5.12; p = 0.007)$  were negatively associated with PC difficulties while spiritual care and death education ( $\beta = 4.95$ ; p = 0.034) was positively associated with PC difficulties. Meanwhile, having at least one training every six months ( $\beta = -10.66$ ; p = 0.032), and having experience of caring for seriously ill people at home  $(\beta = -6.31; p = 0.024)$  were negatively associated with PC difficulties. Conversely, having limited knowledge of PC ( $\beta = 12.95$ ; p = 0.021), having rural cooperative medical insurance only ( $\beta = 6.36$ ; p = 0.023), and rural cooperative medical insurance and other insurance ( $\beta = 3.21$ ; p = 0.042) were positively associated with greater PC difficulties.

#### **Table 1** Descriptive characteristics of health professionals in rural areas (n = 255)

Variables	N (%)
Sex	
Male	72 (28.2)
Female	183 (71.8)
Education	
< College/bachelor's degree	24 (9.4)
Bachelor's degree	160 (62.8)
Masters agree or above	71 (27.8)
Age (mean, SD)	34.82 (7.04, 23–62)
Marital status	
Married	209 (82.0)
Single	44 (17.2)
Divorced/Separated	2 (0.8)
Ward	
Oncology	124 (48.6)
Radiotherapy	44 (17.3)
Geriatrics	23 (9.0)
Other (e.g., hematology, rehabilitation, intensive care unit)	64 (25.1)
Occupation	
Nurse (e.g., nurse, head nurse, chief nurse)	109 (42.7)
Physician (e.g., resident, Attending, chief)	146 (57.3)
Clinical year (mean, SD, range)	10.20 (7.27, 6 months-40 years)
Had palliative care trainings, past 2 years	
Never	113 (44.3)
1–2 trainings, per year	123 (48.2)
At least 1 training, per 6 months	19 (7.5)
Had ever taken care of seriously ill people at home	
Yes	86 (33.7)
No	169 (66.3)
Had experience the loss of a significant other in the past year	
Yes	47 (18.4)
No	208 (81.6)
Levels of knowledge of palliative care	
Not understand at all/less understand	82 (32.2)
Somewhat understand	134 (52.5)
More Understand/ understand very well	39 (15.3)

#### Discussion

This study highlights significant gaps in PC services for cancer patients in rural China, particularly the absence of specialized PC programs. The findings reveal that healthcare professionals often have limited training and knowledge, with care predominantly centered on symptom management rather than addressing holistic needs, such as emotional and spiritual support [20, 21]. Additionally, patients faced significant challenges due to insufficient insurance coverage for PC services. These results underscore the urgent need for targeted interventions,

including PC training programs and policy reforms, to enhance care quality and accessibility in rural regions.

Although the reported PC knowledge scores in our study are relevantly higher compared to findings from previous study [44, 45], 25.2% of participants were still classified as having poor knowledge. Scores of basic PC knowledge was particularly poor, with two items showing notably low correct rates. Moreover, 44.31% of participants reported receiving no formal PC training in the past two years, with pronounced training gaps observed in geriatrics wards (47.8%) compared to oncology wards

 Table 2
 Palliative care knowledge and attitudes

Scales	Mean (SD; range)
Palliative Care Difficulties <sup>a</sup>	42.58 (13.59; 15–75)
Communication in multidisciplinary teams (3)	8.99 (2.76; 3–15)
Communication with patient and family (3)	8.18 (3.12; 3–15)
Expert support (3)	8.32 (3.21; 3–15)
Alleviating symptoms (3)	8.07 (3.22; 3–15)
Community coordination (3)	9.03 (3.19; 3–15)
Palliative Care Knowledge $^{ m b}$	13.28 (2.62; 0–18)
Standard score	73.78 (14.56)
Psychological care	2.76 (0.54; 0–3)
Spiritual care and death education	2.57 (0.81; 0–3)
Symptom management	5.47 (1.39; 0–7)
Basic knowledge	2.48 (1.15; 0–5)

SD standard deviation

<sup>a</sup> Palliative care difficulties were assessed using the Palliative Care Difficulty Scale (Nakazawa et al., 2010), a 15-item, 5-point Likert scale comprising five subscales. Total sum scores were used for analysis

<sup>b</sup> Palliative care knowledge was assessed using the Palliative Care Knowledge Questionnaire-Chinese version (PCKQ-PCN; Luo et al., 2019). The scale is consisted of 18 items. Responses were recoded (1 for correct answer, 0 for incorrect). Mean and standard scores were used for analysis

(30.5%). No significant differences were found in the overall PC knowledge scores by participants' perceived level of PC knowledge, except for the subscale on spiritual care and death education. Participants who perceived higher PC knowledge scored marginally higher on this subscale compared to those with lower perceived knowledge (Mean: 2.95 vs. 2.41; p = 0.053). These results align with prior research that emphasize persistent deficits in PC education within China's medical schools and healthcare system. Notably, education historically focused more on pain and symptom management while neglecting critical aspects such as spiritual care and death education [21, 31, 46]. Nonetheless, there is a degree of openness to PC education in our study, with 61.2% of participants in our study expressing interest in expanding their knowledge and 17.65% reporting extensive experience with terminally ill patients in the past year. However, barriers such as the shortage of trained professionals, limited access to hospice centers, insufficient funding, and taskoriented nursing practices persist, undermining efforts to implement high-quality PC [15].

The PC difficulties reported in our study also align with findings from previous research [41]. Specifically, the subscales of community coordination and communication within multidisciplinary teams demonstrated higher scores, reflecting significant challenges in delivering comprehensive PC. These findings are consistent with evidence from recent studies, which underscore the persistent barriers faced by healthcare professionals [47, 48]. Furthermore, in our study, basic knowledge and symptom management were negatively associated with PC difficulties, aligning with findings from studies conducted in Min et al. [33] and Guan et al. [49], which similarly identified the critical role of foundational knowledge and skills in mitigating challenges in PC delivery.

Notably, our study underscores the significant impact of spiritual care on PC challenges, Participants with higher levels of spiritual care knowledge in PC tended to report greater levels of PC difficulties, which was contrary to our expectations. This paradox may be attributed to an insufficient professional and social environment to support open communication about death in China. Several interconnected factors may contribute to this issue: (a) Cultural norms around death education in China is relevantly underdeveloped [31, 50]. (b) Patient readiness: Not all patients are psychologically prepared to discuss spirituality or mortality, particularly when they are shielded from the full extent of their condition [51]. (c) Family-driven decisions: Families often play a central role in medical decision-making and may avoid conversations they perceive as distressing or harmful to the patient [15, 51, 52]. (d) Trust and communication barriers: Establishing trust with patients and their families is critical for meaningful spiritual care. However, inadequate training in communication skills can hinder healthcare providers' ability to build the rapport needed for such sensitive discussions. Even healthcare professionals with greater awareness and preparedness to address spiritual care and death anxiety may struggle to implement these skills effectively due to these systemic and cultural barriers.

Additionally, type of health insurance is observed to be a significant factor influencing the challenges of providing PC in our study, with 56.1% of participants enrolled in the new rural cooperative medical system (NRCMS). Although this system has expanded coverage in recent years, it has failed to reduce out-of-pocket health expenses, which continue to impose a severe financial burden on rural patients [24, 25]. For instance, Wang, Xu, Ma et al. found that individuals with NRCMS are at greater risk of experiencing catastrophic health expenditures and medical impoverishment [53]. Healthcare providers also face restrictions due to rigid insurance policies, which limit their ability to deliver comprehensive PC services that address not only physical symptoms but also emotional, social, and spiritual needs [25]. These financial and insurance barriers underscore the need to reevaluate and reform insurance frameworks in rural areas. Understanding the relationship between health insurance coverage and PC access is crucial for identifying gaps and creating policies that ensure accessible care for rural patients, regardless of their socio-economic status.

#### **Table 3** Demographic and clinical characteristics of the deceased patients (N = 255)

Variables	N (%)
Sex	
Male	178 (69.8)
Female	77 (30.2)
Age	
<60	61 (23.9)
60-79	168 (65.9)
80 or above	26 (10.2)
Marital status	
Unmarried	2 (0.8)
Married	230 (90.2)
Divorced/Separated/Widowed	23 (9.0)
Duration of hospitalization (days)	
≤ 7 days	47 (18.4)
8-14	51 (20.0)
15–30	122 (47.8)
31 and above	35 (13.8)
Religious belief	
No	220 (86.3)
Yes (e.g., Christianity, Buddhism)	4 (1.6)
Don't know	31 (12.2)
Had a caregiver	
No	4 (1.6)
Formal/paid caregiver	7 (2.7)
Spouse	100 (39.2)
Child(ren)	144 (56.5)
Caner types	
Lung cancer	147 (57.6)
Stomach cancer	30 (11.8)
Breast cancer	15 (5.9)
Other (e.g., kidney, esophageal, liver, metastatic)	63 (24.7)
Insurance types	
Urban resident medical insurance only	91 (35.7)
Urban resident medical insurance + other insurance	7 (2.7)
New cooperative medical insurance only	117 (45.9)
New cooperative medical insurance + other insurance	5 (2.0)
Urban resident medical insurance + New cooperative medical insurance	21 (8.2)
Other (e.g., self-paid; don't know)	14 (5.5)
Treatment, in the past month	
Curative treatments (e.g., surgery, chemotherapy. radiation, targeted)	170 (66.7)
Palliative care only	47 (18.4)
Palliative care + curative treatment(s)	38 (14.9)

#### Limitations

Despite the strength of the current study in exploring the healthcare professionals' knowledge in relation to PC practices in Henan province, China, there are several limitations to consider. First, the use of a descriptive study design with convenient sampling, along with data collection from a limit number of settings, may restrict the generalizability of the findings to other regions in China or the broader contexts. Additionally, the absence of specialized PC units in the surveyed institutions further limits the scope of the results. Furthermore, while the findings are valid, other factors (e.g., compassion **Table 4** Linear regression of predicting palliative care difficulties and their correlates in a sample of health professionals in Xinxiang, China (n = 255)

Variables	Palliative Care Difficulties		
Health professionals' information	β	95%Cl	p
Occupation			
Nurse	12.92	4.72, 20.09	0.021
Physician	Ref		
Palliative care training, past 2 years			
Never	Ref		
1–2 trainings, per year	0.79	-2.31, 3.14	0.658
At least 1 training, per 6 months	-10.66	-18.50, -2.43	0.032
Had ever taken care of seriously ill people at home			
Yes	-6.31	-10.72, -1.96	0.024
No	Ref		
Levels of knowledge of palliative care			
Not understood at all /less understood	12.95	3.54, 22.35	0.021
Somewhat understood	6.74	2.41, 12.59	0.068
Understand very well/more Understand	Ref		
Clinical year	0.55	-0.18, 1.28	0.139
Palliative care knowledge			
Psychological care	-2.02	-5.14, 3.09	0.621
Spiritual care and death education	4.95	1.72, 8.19	0.034
Symptom management	-3.72	-5.19, -1.29	0.012
Basic knowledge	-5.12	-10.34, -0.26	0.007
Patients' information			
Insurance types			
Urban resident medical insurance only	Ref		
Urban resident medical insurance + other insurance	1.42	-2.80, 5.18	0.484
New rural cooperative medical insurance only	6.36	1.41, 12.59	0.023
New rural cooperative medical insurance + other insurance	3.21	0.38, 6.09	0.042
Urban resident medical insurance + new rural cooperative medical insurance	2.13	-10.98, 14.32	0.322
Other (e.g., self-paid; don't know)	-10.43	-22.32, 4.13	0.432
Had a caregiver			
No	Ref		
Formal/paid social carer	-8.01	-10.57, 7.84	0.732
Spouse	-14.38	-24.61, 9.51	0.145
Child(ren)	-9.31	-21.72, 3.09	0.340
Caner types			
Lung cancer	3.21	-2.70, 8.86	0.484
Stomach cancer	3.86	-7.55, 13.42	0.679
Breast cancer	5.75	-6.53, 17.34	0.409
Other (e.g., kidney)	Ref		

Ref reference, Cl confidence interval

Model adjusted for ward, palliative nurses, sex, education, age, marital status, patients' hospitalization, and treatment type

fatigue, societal reluctance to discuss end-of-life issues with families, communicational barriers) may influence nurses' knowledge, attitudes, and willingness to provide end-of-life care. An example is that burnout among nurses often linked to the poor delivery end of life care and self-care deficit [55]. Future longitudinal studies should address these limitations by incorporating healthcare professionals from diverse settings and regions (provinces) across China. This broader scope would enable a more robust exploration of the relationships among different factors influencing PC practices. Additionally, employing culturally sensitive, validated instruments would provide a deeper and more nuanced understanding of PC within the context of China.

Another important limitation is the exclusion of family caregivers, who play a key role as informants regarding patients' quality of dying and death. While including them was not feasible in this study, their perspectives could provide valuable insights. Previous research has identified various factors—such as patient age, education level, location of death, emotional support, ward type, and caregiver characteristics—that influence the quality of dying and death [38, 54]. However, this study observed only a limited number of factors related to the quality of death. Future research with larger sample sizes should assess the quality of dying and death among patients in Henan province and investigate additional influencing factors.

#### **Clinical and policy implications**

This study underscores the urgent need for the systematic integration of PC into both basic and continuing medical education. Incorporating evidence-based PC practices into educational curricula, particularly for professionals working in cancer care and tertiary hospitals, is essential. This approach will equip healthcare providers with the tools necessary to deliver optimal cancer care, conduct comprehensive health evaluations, and ultimately improve patient outcomes and the quality of care.

Addressing the unique challenges of PC in rural China requires the development of culturally sensitive training programs for healthcare professionals. Family-dominated decision-making is a common practice in China [15, 16], highlighting the pivotal role of families and caregivers in medical decisions. PC training should prioritize a family-centered approach, focusing on facilitating family meetings, delivering holistic care (addressing the needs of individuals, families, care processes, and teams), and promoting shared decision-making.

An essential component of this training is spiritual care, which enables healthcare professionals to understand and address the spiritual needs of patients nearing the end of life. Such training enhances knowledge and skills in end-of-life care and fosters the ability to provide compassionate, patient-centered support. Furthermore, these programs should incorporate death education, coping strategies, and resilience training, particularly for nurses, to cultivate a more empathetic and effective approach to care. Recognizing the cultural significance of death and dying in Chinese society, these training initiatives should include modules tailored to address local spiritual and cultural contexts. Such efforts can reshape attitudes toward PC, foster greater acceptance, and ultimately improve the quality of care for patients and their families.

From a policy perspective, existing PC frameworks in China are primarily focused on structural standards, human resources, and service environments, leaving cultural factors insufficiently addressed. Policymakers and nurse managers should integrate cultural considerations into these frameworks to enhance PC effectiveness. Strengthening pilot programs in rural areas is critical to improving the quality of death for cancer patients and addressing regional disparities in care access. Expanding such initiatives will help provide equitable PC services to underserved populations.

Additionally, improving rural medical insurance policies is vital. Policymakers should prioritize expanding insurance coverage and improving reimbursement for PC services to alleviate the financial burden on cancer patients in rural areas. These measures will ensure comprehensive care is accessible to all, regardless of financial constraints, ultimately promoting equity and better health outcomes.

#### Conclusions

This study revealed that healthcare professionals in the four hospitals in Xinxiang have limited knowledge of PC, particularly in the domain of spiritual care, which was found to exacerbate challenges in providing effective PC. Furthermore, different types of insurance coverage significantly impacted access to PC services. These findings underscore critical gaps in PC provision in rural China and emphasize the urgent need for a systematic and culturally sensitive approach to training healthcare professionals. Incorporating evidence-based PC practices into medical education, with a focus on culturally tailored training in spiritual care and death education, is essential for improving care quality. Expanding insurance coverage and strengthening policy frameworks are vital steps to address financial and systemic barriers, ensuring equitable and holistic care for cancer patients in rural areas. These initiatives will not only improve the quality of life for cancer patients but also help reduce regional disparities in PC access.

#### Acknowledgements

We extend our heartfelt gratitude to all the participants for generously sharing their time and experiences, which made this study possible. We would also like to express our sincere thanks to the dedicated doctors and nurses in our expert group for their invaluable contributions and support.

#### Authors' contributions

JN, MF and CS contributed to the data collection. MF, CS, and HX carried out the initial analysis and drafted the manuscript. All authors contributed to the interpretations of the findings.

#### Funding

This study was funded by: 1. Guangzhou Concord Medical Humanities Research and Education Fund (#23000–3050070). 2. Henan Philosophy and Social Science Project "Research on the Construction of an Inclusive Palliative Care System in Rural Central Plains of China" (#2024BSH011).

#### Data availability

Data are available from the corresponding author upon reasonable request.

#### Declarations

#### Ethics approval and consent to participate

This study was approved by the Internal Review Board (IRB) at the College of Social Affairs of Henan Normal University (CSA2024001; Clinical trial number: not applicable).

#### **Consent for publication**

Not applicable.

#### **Competing interests**

The authors declare no competing interests.

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## Received: 3 December 2024 Accepted: 3 February 2025 Published online: 08 February 2025

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