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A WeChat-Based Platform Designed for Regional Home-Based Palliative Care in Advanced Cancer: Development and Formative Usability Study

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Abstract

Background: Home-based palliative care for people with advanced cancer requires accessible information, support for family caregivers, and continuity between specialist, community, and home services. Digital platforms may extend these resources, but their intended functions and the evidence from early user testing need to be reported separately.

Objective: This study aimed to develop a theory-informed WeChat-based platform intended to support regional home-based palliative care and to evaluate selected patient-facing functions in a formative usability study.

Methods: The HuYun Home-Based Palliative Care Platform was developed through multidisciplinary collaboration, clinical content preparation, iterative implementation, and internal expert review. Self-efficacy theory informed its educational and support functions. The design included patient, family caregiver, public, and health care provider interfaces. Ten patients with stage III or IV cancer were purposively recruited before discharge from a tertiary hospital in Shanghai, China. Following a brief introduction, they completed 5 tasks involving pain assessment, article reading, video viewing, feedback submission, and symptom search. Task completion, completion times, and System Usability Scale (SUS) scores were summarized descriptively.

Results: All 10 patients completed all 5 tasks (10/10, 100% per task; 50/50 task attempts). Mean task times were 61.92 (SD 11.80) seconds for pain assessment and feedback, 279.13 (SD 81.68) seconds for article reading, 117.00 (SD 47.55) seconds for video viewing, 11.05 (SD 7.36) seconds for feedback submission, and 25.40 (SD 19.97) seconds for symptom search. The mean SUS score was 61.25 (SD 9.88; range 42.50-75.00). Development outputs included 4 role-specific interfaces and a proposed hospital-community-home model; formal testing covered selected patient-facing functions.

Conclusions: Selected patient-facing functions of the platform were operable by 10 patients in a supervised setting, while perceived usability identified priorities for refinement. Further evaluation should include family caregivers and health care providers, independent use at home, and complete consultation, referral, and service-delivery pathways before regional service feasibility or clinical effectiveness can be established.

Keywords: palliative care; home care services; advanced cancer; caregivers; mobile health; self-efficacy; usability testing

Introduction

Palliative care aims to improve quality of life for people with life-threatening illness and their families by addressing physical, psychological, social, and other sources of distress [1]. The American Society of Clinical Oncology recommends integrating palliative care with oncology for patients with advanced cancer, including alongside active cancer treatment [2]. Evidence supports benefits for patient-centered outcomes, although effects vary across outcomes and interventions [3]. Home is a commonly preferred place of care and death, but preferences differ between individuals and can change over time [4]. Home-based services therefore need to provide a responsive option within a wider care system [5]. Research in China has also described hospital-to-home transitions near death and variation in end-of-life service use [6].

Receiving care at home places substantial day-to-day responsibilities on patients and family caregivers. They may need to recognize symptoms, apply practical care techniques, locate reliable information, and decide when to contact professionals. Patients and caregivers have identified difficulties maintaining continuity during the transition from hospital to palliative care at home [7]. A regional approach can connect specialist advice, community follow-up, and family care, with escalation when needs exceed local capacity [8,9]. Educational and psychosocial support should accompany these arrangements because caregivers need both practical capability and confidence to provide care [10,11].

Digital health can support symptom reporting, educational access, and communication outside scheduled visits. Reviews of palliative care technologies describe potential improvements in access and support alongside heterogeneous evidence and implementation challenges [12-14]. More recent randomized studies have evaluated a WeChat educational app for caregivers of homebound patients with incurable cancer [15] and an app-facilitated symptom-monitoring intervention with nurse follow-up for community-dwelling patients with advanced cancer [16]. These studies demonstrate the importance of specifying the users, clinical support, and outcomes of each intervention. They also leave a need for context-specific development reports that explain the relationship between interface functions, local care organization, and early usability findings.

Self-efficacy theory offers a rationale for organizing support for patients and family caregivers. Self-efficacy concerns confidence in performing a particular activity and is informed by mastery experiences, vicarious experiences, verbal persuasion, and physiological and affective states [17]. This framework has informed self-management support and research involving cancer caregivers [11,18]. In HuYun, it guided resources for learning, practicing care, and seeking advice. The

regional model complemented this framework by specifying intended relationships between specialist, community, and home services. Changes in self-efficacy and regional coordination were outside the outcomes of the present usability study.

This study aimed to develop the HuYun Home-Based Palliative Care Platform, a WeChat-based system with resources for patients, family caregivers, the public, and health care providers, and to conduct a formative evaluation of selected functions with patients with advanced cancer. The development objective concerned a regional home-care design; the evaluation focused on task performance and perceived usability in the patient sample.

Methods

Study Design and Setting

The study comprised platform development followed by a single-center descriptive formative usability evaluation. Development involved iterative implementation and internal expert review. The evaluation combined observed completion of predefined tasks with a standardized usability questionnaire. We used the concepts of effectiveness, efficiency, and satisfaction described in International Organization for Standardization (ISO) 9241-11:2018 to organize the assessment [19]. Testing took place face-to-face with patients approaching discharge from the Third Affiliated Hospital of Naval Medical University in Shanghai, China. The evaluation focused on selected interactions rather than comparisons of interventions or care models.

Theoretical and Clinical Development Basis

Self-efficacy theory guided the organization of educational and support content [17]. Structured symptom assessment and practical caregiving guidance were intended to create opportunities for practice and mastery. Demonstrations and case-based materials were intended to support vicarious learning. Professional communication and feedback were intended to provide verbal persuasion. Resources on grief coping, psychological adjustment, and humanistic care were intended to address physiological and affective states. These links represent the design rationale; self-efficacy was not measured as an outcome.

Clinical content was prepared using the team's existing home-care intervention materials and caregiver-support domains informed by prior local research [20]. The local caregiver study described heterogeneity in caregiving competence and its associated factors; it was used as contextual evidence for support needs. Palliative care team members prepared educational text and videos covering symptom management, practical care, communication, and emotional support, and clinicians reviewed their suitability. The present development process involved

internal clinical review and iterative refinement rather than a new instrument-validation or formal consensus study.

Development Team and Iterative Process

The development team included a principal investigator, a deputy director from the information department, 3 senior palliative care nurses, a nursing graduate student, and an information technology engineer. The principal investigator supervised the project, reviewed the architecture, and monitored progress. The nurses, each with approximately 20 years of relevant clinical experience, reviewed clinical and educational content. The graduate student drafted the platform plan and conducted the usability evaluation. The engineer implemented, tested, revised, and maintained the system.

Development proceeded through clinical content preparation and functional specification, prototype implementation, internal review, and interface revision. Researchers and the engineer translated the content and intended service functions into 4 user interfaces. The initial architecture was completed in August 2025. Over the following weeks, 4 senior clinical nursing experts and information technology staff reviewed interface organization, functional completeness, and system behavior in different network environments. Their feedback informed revisions before patient testing. The resulting functions and observed interface changes are described in the Results section.

Participants and Recruitment

Patients were purposively recruited before hospital discharge. Eligibility criteria were age 18 years or older; stage III or IV cancer according to the eighth edition of the tumor, node, metastasis (TNM) staging system; an estimated survival of less than 6 months; awareness of the illness; and ability to use a smartphone independently. Patients with severe comorbid physical illness, life-threatening clinical instability, or participation in another study were excluded. The protocol specified discontinuation of testing following sudden clinical deterioration or withdrawal. The analyzed dataset contained 10 patients who completed the evaluation; screening and nonparticipation counts were not available for this report. The prognostic criterion defined this study cohort and was not intended as a general eligibility threshold for palliative care.

The 10-patient purposive sample supported an initial examination of selected interactions and descriptive questionnaire responses. It was not intended to provide representative estimates for the wider target population. The range of usability problems identified depends on participant characteristics and sample size, and a small sample may miss important problems [21]. Family

caregivers, members of the public, and health care providers were intended platform users but were not separately recruited for this evaluation.

Task-Based Usability Evaluation

After a brief introduction to the platform, each patient was asked to complete 5 predefined tasks representing symptom assessment, access to educational content, feedback, and navigation. Consultation, appointment booking, community referral, specialist escalation, and service fulfillment were outside the task set. The tasks were:

1. Open the platform, locate the pain assessment scale, submit an assessment, and obtain feedback.
2. Open and read a designated symptom-management article.
3. Open and watch a designated caregiving-technique video.
4. Submit feedback in the evaluation section after reading or viewing the content.
5. Search for information about a specified symptom using the search function.

Task effectiveness was described as recorded completion of each task. Time on task was measured from task initiation to recorded successful completion using a stopwatch displaying hundredths of a second. This display resolution was not treated as a measure of timing accuracy. Article-reading and video-viewing times included engagement with the content and therefore combined navigation with content use. Completion results were reported without separate error counts or assistance levels. Detailed task-order allocation, assistance rules, and independent adjudication of success were not available for reporting, which limits interpretation of unassisted performance.

Perceived Usability and Data Collection

Patients completed a Chinese-language SUS questionnaire after the tasks [22]. The SUS comprises 10 items rated on a 5-point response scale. For odd-numbered items, 1 is subtracted from the original response; for even-numbered items, the response is subtracted from 5. The resulting item contributions range from 0 to 4 and are summed and multiplied by 2.5 to yield a total score from 0 to 100, with higher scores indicating better perceived usability. The analytic dataset contained these already-adjusted contributions, and no additional reverse scoring was applied. The SUS is an overall perceived-usability measure; its score is not a percentage, and individual items were summarized only to describe exploratory response patterns [22,23]. This small formative study did not undertake a psychometric validation of the Chinese questionnaire.

The researcher recorded task times during face-to-face sessions. Paper-based SUS questionnaires were administered and collected on site. Patients could ask the researcher to clarify questionnaire items. Forms were checked for missing responses, and omissions were clarified and completed on site. The assessment therefore reflects a supervised introduction to the platform rather than prolonged independent use at home.

Data Analysis

Two researchers entered task and questionnaire data independently. Descriptive analyses were performed using SPSS version 31. The task-time and SUS summaries presented here were recalculated from the participant-level records. Categorical characteristics and task completion were summarized as counts and percentages. Task times and individual SUS totals were summarized using means, sample SDs calculated with the n-1 denominator, and observed ranges. All 50 task-time values and all 100 adjusted SUS item contributions were present in the analyzed records. Each participant's SUS total was calculated before the sample mean and SD were derived. Adjusted item contributions were summarized separately on their 0-4 scale. No hypothesis tests, between-group comparisons, or causal effect estimates were performed.

Ethical Considerations

The study was conducted in accordance with the Declaration of Helsinki and was approved by the Ethics Committee of the Third Affiliated Hospital of Naval Medical University (approval no. EHBHKY2025-K008-P001). Written informed consent to participate was obtained from all participants before the usability evaluation. Participation was voluntary, and participants were informed that they could withdraw from the study at any time.

Results

Platform Development Outputs

Theory-Informed Content and Internal Refinement

Development resulted in the HuYun Home-Based Palliative Care Platform, comprising 4 user interfaces and educational, assessment, communication, and service-request functions. HuYun is the local platform brand name. Figure 1 summarizes how the 4 sources of self-efficacy information informed the intended educational and support functions. The mapping describes the design rationale rather than a tested causal pathway.

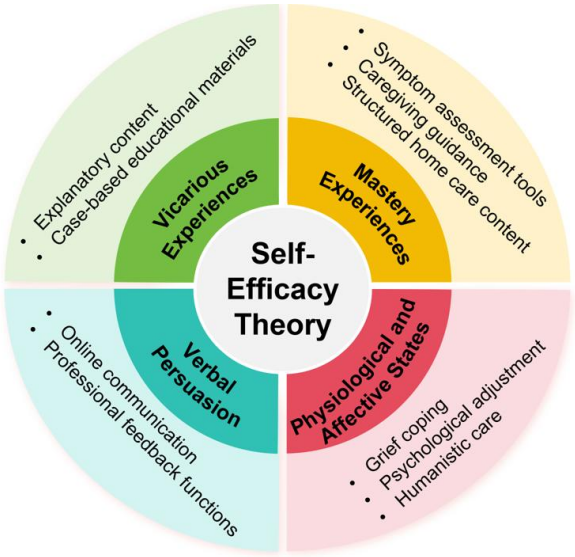


Figure 1. Self-efficacy theory as a design framework for the HuYun Home-Based Palliative Care Platform. The colored sectors represent mastery experiences, vicarious experiences, verbal persuasion, and physiological and affective states, with associated educational and support functions. Self-efficacy outcomes were not measured in this study.

Internal review identified an unclear hierarchy in the learning-materials section. The team reorganized materials into smaller knowledge units and added illustrations, figures, and process diagrams. The revised prototype was then used for patient testing. Reviewers reported no crashes or notable response delays during internal review; these observations were not accompanied by quantitative latency or load-testing measurements.

Four User Interfaces and Core Functions

Figure 2 summarizes the functional scope of the 4 user interfaces: patient, family caregiver, public, and health care provider. Each interface organizes resources and functions around the needs of its intended users. The formal patient evaluation covered the selected assessment, education, feedback, and search interactions described below.

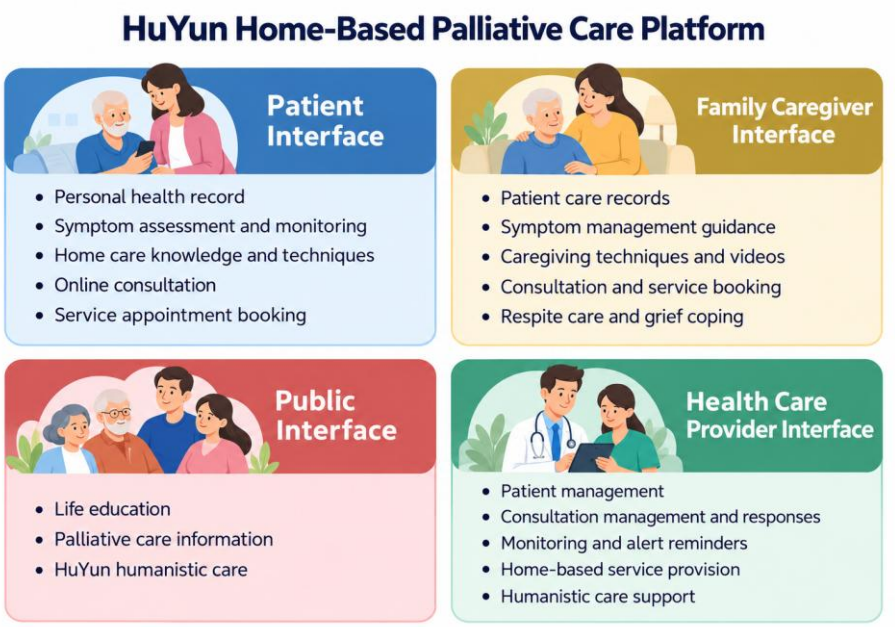


Figure 2. Functional overview of the HuYun Home-Based Palliative Care Platform. The blue, yellow, red, and green panels present the patient, family caregiver, public, and health care provider interfaces, respectively. The panels summarize role-specific content and intended service functions rather than a tested cross-institutional data-exchange workflow.

The patient interface was designed to include personal health records, symptom assessment and monitoring, home-care knowledge and techniques, online consultation, and service appointment booking. The family caregiver interface was designed to provide patient care records, symptom-management guidance, caregiving techniques and videos, consultation and booking functions, and resources on respite care and grief coping.

The public interface provides life education, introductory palliative care information, and humanistic care content for users outside patient-specific care interactions. The provider interface was designed to organize patient management, consultation management and responses, monitoring and alert reminders, support for home-based service provision, and humanistic support.

The patient, family caregiver, and public interfaces were embedded in the Zhangshang Jiayi WeChat mini-program, which served as the mobile entry point for educational resources and service requests. The provider interface was accessible through computer and WeChat environments. These access arrangements describe the platform channels; interoperability with institutional electronic health records was not evaluated.

The symptom-management module contained 15 symptom-related entries, including pain, dyspnea, and cough with sputum. Each entry included assessment, home-care strategies, and evaluation of care effects. The caregiving-techniques module combined text and video on comfort care, specialty care, and communication. Users could submit feedback after reading articles or

viewing videos. Consultation interfaces allowed professional selection, problem classification, structured questionnaires, image upload, and inquiry submission. Appointment interfaces allowed requests for home-based or inpatient services by specifying service type, time, items, and contact details. The usability study tested assessment, educational-content access, feedback submission, and symptom search; the clinical response and fulfillment of consultation and appointment requests require separate evaluation.

Proposed Regional Care Model

Figure 3 presents the proposed regional care model. Hospital specialists were assigned guidance and complex-case referral roles; community health centers and nursing homes were assigned routine care and referral-initiation roles; and patients and families were assigned home-care and symptom-reporting roles. The platform was positioned as a channel for information and coordination. Within the proposed model, community providers would support follow-up and home visits and seek specialist input when patient needs exceeded community capacity.

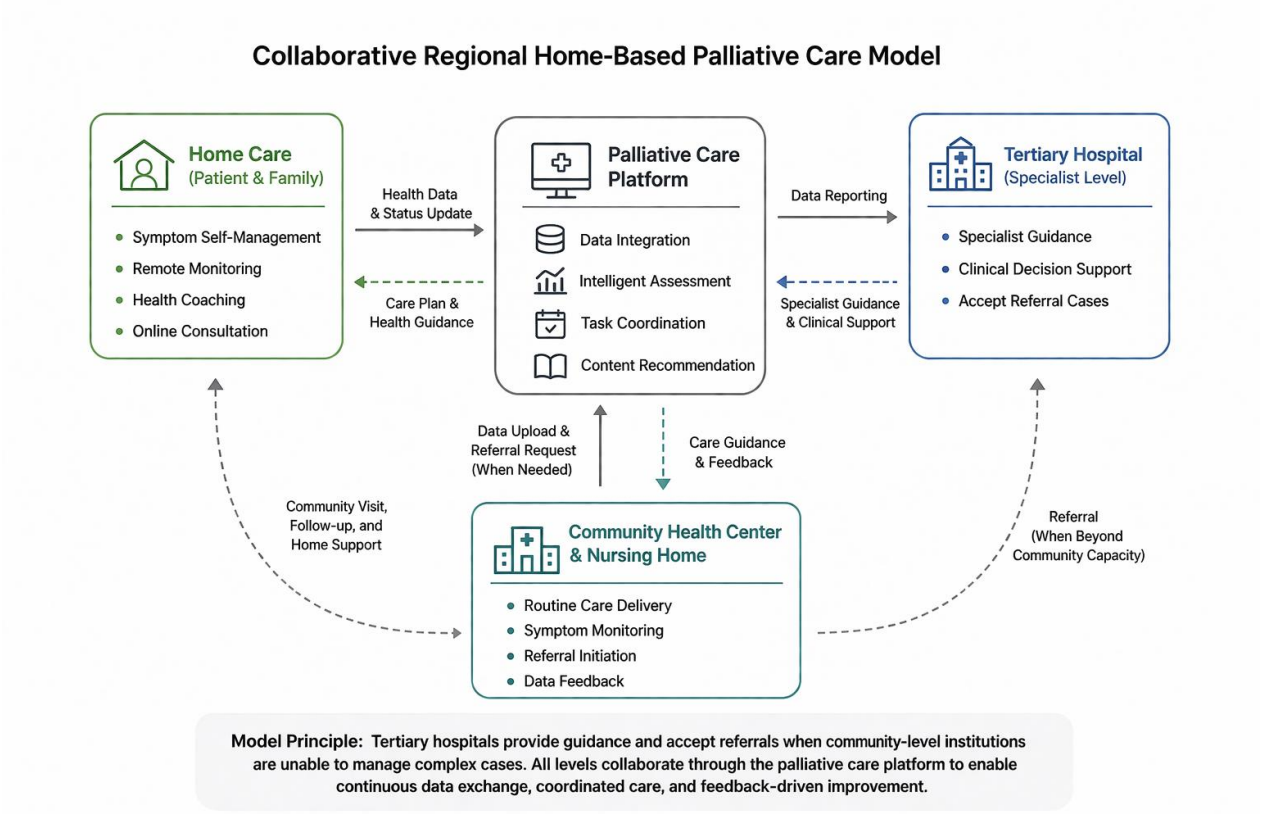


Figure 3. Proposed hospital-community-home model for regional palliative care. Solid gray arrows indicate intended information-reporting or upload pathways. Colored dashed arrows indicate proposed guidance and feedback. Curved gray dashed arrows indicate community home support and referral escalation. Labels such as intelligent assessment, task coordination, clinical decision support, and content recommendation represent design concepts whose implementation and performance were not established in this study.

The regional orientation comprised intended responsibilities across care levels, role-specific stakeholder access, and the grouping of information resources with consultation and service

requests. The study did not collect outcomes for cross-institutional data exchange, automated assessment, dispatch, referral completion, or delivery of booked services. Accordingly, Figure 3 presents a proposed organizational model and should not be interpreted as empirical validation of a regional network or intelligent system.

Patient Characteristics

The usability sample comprised 10 patients with advanced cancer. The mean age was 54.9 (SD 13.9) years, with a range of 29-72 years. Eight patients (80%) had stage IV disease and 2 (20%) had stage III disease. Seven (70%) lived in urban areas and 3 (30%) in rural areas. Educational attainment ranged from primary school to college. Table 1 summarizes the recorded characteristics. No separate caregiver, public, or provider usability cohort was included.

Table 1. Characteristics of patients in the formative usability study (N=10).

Characteristic	Value
Age, years	
Mean (SD)	54.9 (13.9)
Range	29-72
Education, n (%)	
Primary school	1 (10)
Middle school	4 (40)
High school	3 (30)
College	2 (20)
Occupation, n (%)	
Worker	2 (20)
Professional or technical	2 (20)
Farmer	2 (20)
Unemployed	4 (40)
Residence, n (%)	
Urban	7 (70)
Rural	3 (30)
Cancer stage, n (%)	
III	2 (20)
IV	8 (80)

Values are n (%) unless otherwise indicated. SD: standard deviation.

Task Completion and Completion Times

All 10 patients were recorded as completing each of the 5 tasks (10/10, 100% per task), yielding 50 completed task attempts. Table 2 summarizes completion and timing results. These results

describe performance under the supervised study conditions; error-free or unassisted use was not quantified.

Table 2. Completion rates and completion times for the 5 predefined patient usability tasks (N=10).

Task	Completed, n/N (%)	Completion time, mean (SD), seconds	Time range, seconds
1. Pain assessment and feedback	10/10 (100)	61.92 (11.80)	35.20-76.24
2. Symptom management article	10/10 (100)	279.13 (81.68)	137.88-390.19
3. Caregiving technique video	10/10 (100)	117.00 (47.55)	75.17-231.40
4. Feedback submission	10/10 (100)	11.05 (7.36)	3.02-23.54
5. Symptom search	10/10 (100)	25.40 (19.97)	5.10-71.03

SD: standard deviation. Sample SDs were calculated across the 10 participants separately for each task. Article-reading and video-viewing times include engagement with the content.

Mean completion times were 61.92 (SD 11.80) seconds for pain assessment and feedback, 279.13 (SD 81.68) seconds for article reading, 117.00 (SD 47.55) seconds for video viewing, 11.05 (SD 7.36) seconds for feedback submission, and 25.40 (SD 19.97) seconds for symptom search. Observed ranges were 35.20-76.24, 137.88-390.19, 75.17-231.40, 3.02-23.54, and 5.10-71.03 seconds, respectively. Article and video tasks included content use. Without material-length benchmarks or comprehension measures, their longer durations cannot be attributed specifically to navigation difficulty or information processing.

Perceived Usability

All 10 participants completed the SUS. The mean total score was 61.25 (SD 9.88; range 42.50-75.00). Adjusted item contributions are summarized in Table 3. The highest mean contribution was observed for confidence in using the platform (item 9: mean 3.60, SD 0.84). The lowest contributions were observed for the need for technical support (item 4: mean 0.90, SD 1.20), inconsistency within the platform (item 6: mean 1.00, SD 1.05), and the need to learn before use (item 10: mean 1.30, SD 1.57). These item-level summaries are exploratory and are not separate validated subscales.

Table 3. Adjusted SUS item contributions among the 10 participants.

Item	Item content	Original wording	Adjusted contribution, mean (SD)
1	Intention to use the platform frequently	Positive	3.50 (0.97)
2	Unnecessary complexity	Negative	2.10 (0.99)
3	Ease of use	Positive	2.70 (0.95)
4	Need for technical support	Negative	0.90 (1.20)
5	Integration of platform functions	Positive	3.50 (0.97)
6	Inconsistency within the platform	Negative	1.00 (1.05)
7	Expectation that most users could learn quickly	Positive	3.30 (1.06)
8	Cumbersome use	Negative	2.60 (1.07)
9	Confidence in using the platform	Positive	3.60 (0.84)
10	Need to learn a lot before using the platform	Negative	1.30 (1.57)

SUS: System Usability Scale; SD: standard deviation. Values are adjusted item contributions, mean (SD), for 10 participants. Contributions range from 0 to 4 after standard recoding; higher values indicate more favorable responses for all items. Item content is abbreviated. Item-level summaries are descriptive and do not represent separate validated subscales.

Discussion

Principal Findings

This study describes the development of a WeChat-based platform intended to support regional home-based palliative care and a formative evaluation of selected interactions with 10 patients with advanced cancer. Development outputs included 4 role-specific interfaces, symptom and caregiving resources, consultation and appointment interfaces, and a proposed hospital-community-home model. All tested tasks were completed, while the mean SUS score of 61.25 (SD 9.88) and the variation in individual scores identified priorities for refinement. The findings support the operability of selected functions in a supervised setting. Evaluation of independent home use and regional service delivery is the next step.

Task completion and perceived usability provide complementary information. A patient may complete a task while still finding an interface demanding, unfamiliar, or difficult to navigate. Assistance and error levels were not quantified in this evaluation, limiting the interpretation of 100% completion. The mean SUS score of 61.25 was below the commonly cited cross-system reference average of 68 [23]. This is a descriptive comparison with a contextual benchmark, not evidence of a statistically significant difference or a clinical pass-fail classification. The total score and exploratory item responses should guide further observation and iterative testing.

Regional Design and Comparison With Prior Work

Prior digital palliative care interventions provide relevant comparators. TapCloud combined remote symptom monitoring with videoconferencing in a rural palliative care population [24]. Harding and colleagues developed a mobile application to support communication between family or community caregivers and palliative care teams in resource-limited settings [25]. These studies established communication, monitoring, and caregiver involvement as relevant design priorities and provide context for the functions included in HuYun.

Recent randomized trials provide a more direct comparison with home-based cancer care. Yu and colleagues evaluated a WeChat educational app used by family caregivers and reported improved patient health-related quality of life at 2 months [15]. Chan and colleagues evaluated SUPPORT+, combining symptom reporting, self-management guidance, and nurse-led follow-up, over 18 weeks in a multicenter trial [16]. These interventions included defined clinical support and longitudinal outcomes. Their findings support further investigation of digital care pathways but cannot be transferred to HuYun on the basis of interface similarity or short supervised task testing.

HuYun combines a WeChat access channel, educational and practical care resources, caregiver respite and grief content, a public information interface, and consultation and service-request functions within a proposed regional model. Its potential contribution lies in the organization of these functions for the local care setting. The present study provides development detail and initial patient task data; its shorter observation period and narrower evaluation scope preclude direct comparison with clinical trials or sustained-service studies.

Regional coordination requires explicit responsibilities beyond interface design. The proposed model distinguishes specialist guidance and escalation from routine community care and family care, consistent with generalist-specialist links and continuity across settings [7-9]. Future operational evaluation should determine who receives requests, how urgency is assessed, who follows up, and whether referrals and services are completed. These process outcomes will be needed to evaluate the proposed regional model.

Self-Efficacy and Family Caregiver Support

The self-efficacy framework explains the inclusion of practical learning and interpersonal support alongside symptom information. Guided assessment and caregiving activities may create opportunities for mastery, demonstrations may support vicarious learning, professional feedback may reinforce confidence, and emotional-support resources may address distress that affects perceived capability [11,17,18]. These proposed mechanisms could support participation in home

care and appropriate help-seeking. Their effects require direct measurement; access to information or videos alone does not establish improved self-efficacy.

The caregiver interface is clinically relevant because relatives often undertake practical and emotional care at home, and caregiver support is an established intervention priority [10,11,15]. Patient task performance cannot establish caregiver usability or whether respite and grief resources meet caregivers' needs. Separate testing should examine patient monitoring, practical care, consultation, booking, and caregivers' own support needs. Subsequent studies could assess preparedness, task-specific self-efficacy, burden, and actual use alongside perceived usability. Public-facing content also requires independent assessment of comprehension and accessibility.

Implications for Refinement and Evaluation

Internal review led to smaller learning units and clearer visual organization. Exploratory SUS responses suggest examining the need for technical assistance, consistency of operations, and the learning required before use. These priorities should be investigated through observed task walkthroughs and interviews rather than treated as established item-level diagnoses [22,23]. Future testing should record navigation paths, errors, help requests, and comprehension. Reading and viewing times should be interpreted against the length and purpose of each material, because longer engagement may reflect either learning or difficulty.

WeChat provides a common access channel, but smartphone familiarity does not remove all usability barriers. Requiring independent smartphone use may have excluded patients with greater access needs. Home testing should include participants with different levels of digital literacy, physical ability, caregiver support, and network access. Provider perspectives are also necessary because telehealth adoption depends on workflow, workload, trust, and organizational support [26]. Future service evaluation should specify permissions, clinical responsibility, response expectations, privacy safeguards, and escalation routes for urgent needs.

A staged evaluation could extend the present findings. Further formative testing with each intended user group should use realistic tasks and qualitative explanations of problems. A subsequent prospective multisite feasibility study could track consultation responses, referrals, service completion, sustained home use, and implementation barriers. Once these pathways are sufficiently established, a comparative study could evaluate symptoms, caregiver preparedness, continuity, service use, and outcomes aligned with the platform's intended role. Self-efficacy measures could then test the proposed theory-informed mechanisms.

Limitations

The study included 10 purposively selected patients from one tertiary hospital, limiting transferability and the precision of descriptive summaries. Patients unable to use smartphones independently were excluded, so the findings may not apply to users with greater support needs. Testing took place before discharge, after introductory training and with a researcher present. It therefore did not reproduce unsupervised home use during changes in symptoms, fatigue, or competing care demands. There was no longitudinal follow-up to establish sustained engagement.

Only selected patient-facing functions were evaluated. Caregiver, public, and provider interfaces and the consultation, booking, referral, and service-fulfillment pathways require separate testing. Detailed reporting of errors, assistance, success adjudication, task order, and the exact Chinese SUS translation remains incomplete, limiting reproducibility and interpretation. Clarification of questionnaire items by the researcher may also have influenced responses. Content-oriented task times were not accompanied by material-length or comprehension benchmarks, limiting conclusions about efficiency.

Internal technical observations were not supported by instrumented load or response-time testing. Clinical outcomes, caregiver outcomes, self-efficacy, care continuity, and cross-institutional interoperability were not measured. The proposed regional pathways and intelligent-assessment labels in Figure 3 extend beyond the functions empirically examined in this evaluation. These limits should guide the interpretation and design of subsequent studies.

Conclusions

The HuYun Home-Based Palliative Care Platform was developed with 4 interfaces and functions intended to support patients, family caregivers, the public, and health care providers within a regional home-care model. A formative evaluation with 10 patients documented completion of 5 selected tasks and a mean SUS score of 61.25 (SD 9.88), identifying priorities for refinement. Further testing with caregivers and providers, independent home use, and complete regional service pathways is required to evaluate sustained usability, service feasibility, and clinical effectiveness.

Declarations

Ethics approval and consent to participate

The study was conducted in accordance with the Declaration of Helsinki and was approved by the Ethics Committee of the Third Affiliated Hospital of Naval Medical University (approval no. EHBHKY2025-K008-P001). Written informed consent to participate was obtained from all

participants before the usability evaluation. Participation was voluntary, and participants were informed that they could withdraw from the study at any time.

Consent for publication

Not applicable. This manuscript does not contain any identifiable individual participant data, images, or videos.

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During manuscript preparation, ChatGPT (OpenAI) was used to assist with language editing, manuscript organization, literature-search support, and verification of descriptive calculations. The authors retain responsibility for the accuracy, originality, and final content of the manuscript.

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Conflicts of Interest

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

Data Availability

The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy.

Authors' Contributions

Conceptualization, Li Li; methodology, Li Dai and Ting Liu; investigation, Yingping Shen; data curation, Ruimin Zhu; formal analysis, Li Dai and Minjia Lin; validation, Tingting Wang; resources, Shengli Chen and Minjia Lin; visualization, Li Dai; writing—original draft, Li Dai and Ting Liu; writing—review and editing, Yingping Shen, and Li Li; project administration, Li Li; supervision, Li Li; funding acquisition, Li Li. Li Dai and Ting Liu contributed equally to this work and share first authorship. All authors have read and approved the final manuscript and agree to be accountable for all aspects of the work.

Abbreviations

ISO: International Organization for Standardization

SUS: System Usability Scale

TNM: tumor, node, metastasis

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