support in cancer care' and 'problems related to death care' are specific to the psychological support provided in cancer treatment. Furthermore, psychologists involved in cancer treatment feel that, because it is difficult to establish a framework for psychological interviews, there are major difficulties in establishing a psychological support method that flexibly responds to individual situations. In reality, there is very little training for psychologists specific to cancer treatment, and this field is rarely studied in graduate school (19). Recently, however, patients and family members have been using the Internet and books to acquire fairly detailed knowledge about their disease and treatment. The mental state of cancer patients changes as a result of physical condition, therapeutic course and treatment side effects. For these reasons, psychologists involved in cancer treatment must acquire knowledge about cancer treatment that they can then apply when providing psychological support (1). Furthermore, by acquiring psychiatric knowledge, the psychologist can begin to provide specialized psychological support. If psychologists are not able to flexibly provide patients and family members with psychological support while taking into consideration their physical state, the extent to which they have been informed about their illness, the state of their therapy, their personal character, their family composition, etc., it will be difficult to improve the cancer specialization field within psychology (20). According to Payne and Haynes (5), psychologists in palliative care are applied scientists, who are trained to work with individuals, couples and families, and provide a consultative service to healthcare staff, as well as bring a unique perspective to the assessment and treatment of patients. In the UK, all psychologists complete both academic and professional training, drawing on the knowledge of a wide range of psychological theories to explain and understand the cognitive, emotional and behavioral aspects of responses to illness-related issues. Some theories include specific psychological intervention, such as adjuvant psychological therapy for cancer patients (21). Psychologists with Ph.D. degrees in the USA experience intern training (6). In Japan, however, psychologists are trained in a university graduate school through poor educational curriculums in cancer care, etc., and are thus not fully prepared. In this regard, we think that concrete training through case studies in aspects of psychological support specifically tailored to cancer treatment would provide the foundation of educational programs for psychologists in cancer treatment in Japan. In other words, psychologists in Japan should acquire appropriate skills to provide psychological intervention suitable for cancer patient, as well as to offer accurate assessment of the mental state of cancer patients. To this end, the construction of an educational program geared toward improving psychologists' level of experience on a case-by-case basis will be necessary (e.g. clinical experience in medical treatment or in cancer treatment).

The last category, 'Stress faced by psychologists', includes the following four subcategories: 'psychologist's isolation and anxiety' for not having people to consult with at the workplace or receiving insufficient support from other medical professionals; 'psychologist's internal conflicts' (e.g. psychologists cannot be involved in the care of many patients, or are unable to meet the demands of other medical professionals); 'psychologist burnout and helplessness' (e.g. the powerless feeling of psychologists unrecognized by other professionals) and 'psychologist self-improvement' (e.g. the desire to explore case studies in the cancer field, desire for an increase in the number of study and training groups or for a place to share information among psychologists). The 'psychologist's isolation and anxiety' and 'psychologist burnout and helplessness' subcategories are connected to the 'lack of clarity about the role psychologists are expected to play' and 'lack of clarity regarding the psychologist's specialization' mentioned above. We think that these issues emerge because psychologists' area of specialization in medical treatment is often unclear, leading to a lack of understanding from other medical professionals. Rieger et al. (22) suggested that a cohesive team approach entailing mutual respect and support between other medical professionals would mitigate the difficulties experienced by psychologists. In Japan, some psychologists feel isolation and anxiety, and do not have other psychologists to consult with at workplace; therefore, it is essential that other medical professionals communicate actively and try to understand the specialization of psychologists, or try to support them. On the other hand, professional networking among psychologists in cancer care is less mature than in other medical fields with highly advanced technology (11), and 40% of psychologists in cancer care do not have seniors and associates in the field to consult with. Finally, we found that psychologists feel a need to engage in self-improvement activities, as reflected in the desire to receive more opportunities for learning and training, supervision and/or peer review on the regular basis. Although recognized standards for education and training in clinical health psychology exist for those new to the field, the needs of psychologists already in the field who wish to develop more expertise in selected areas of practice have not been sufficiently addressed in the USA (17,23). In Japan, however, recognized standards do not exist even for those at the entry level of practice. Belar et al. (17) proposed that psychologists in heath psychology including cancer care should self-assess their readiness to provide psychological professional services before working in health psychology (17). Along these lines, the National Cancer Institute and American Cancer Society websites provide information for self-assessing the readiness to deliver services to women with breast cancer. While a realistic option for a basic education program in Japan may involve creating an environment in which psychologists can study via E-learning based on their individual needs, the development of sorely needed systematic, sequential and comprehensive education programs is also essential.

There are some limitations to this study worth noting. First, we identified categories that represent troubles and hardships experienced by psychologist working in cancer care, but did not go further to examine what psychologists find challenging, or to what extent. In the future, we plan to perform quantitative analysis of the degree of challenges faced by psychologists based on the results of this study. Secondly, although we describe the employment status of psychologists and their participation in a palliative care team, no investigation was performed in the present study to address these points. Thus, the future study should focus on these points, as well as other factors such as psychologist personality, experience and mental state.

Acknowledgements

We are grateful to the participating psychologists and to all medical staff who contributed to the study.

Funding

This study was supported in part by a Grant-in-Aid for Cancer Research from the Ministry of Health and Welfare, Japan.

Conflict of interest statement

None declared.

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American Journal of Hospice
& Palliative Medicine®
30(3) 264-267
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DOI: 10.1177/1049909112448923
ajhpm.sagepub.com
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Usefulness of Palliative Prognostic Index for Patient With Advanced Cancer in Home Care Setting

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Abstract

Aims: This study aimed to clarify the accuracy of the Palliative Prognostic Index (PPI) for advanced cancer patients in home care settings. **Method:** The study included 65 advanced cancer patients who received home visiting services between April 2007 and June 2009, and who died at home or in the hospital. Using the medical records from initial home visits, we retrospectively calculated PPI scores along with sensitivity and specificity. **Results**: For 3- and 6-week survival, prognostic prediction demonstrated respective sensitivities of 55% and 63%, and specificities of 79% and 77%. **Conclusion**: The sensitivity of the PPI for advanced cancer patients in home care settings was lower than reported for those in palliative care units. Development of prognostic tools suitable for home care settings is needed.

Keywords

patient with advanced cancer, home care setting, prognostic prediction, palliative prognostic index, retrospective study, palliative care, home visiting service

Introduction

Prognostic prediction is necessary for patients with advanced cancer, especially those in the home care setting, in order to determine the treatment goals, the content and location of provided care, and indications for hospital referral.[1] An appropriate prognostic prediction tool is therefore essential not only for patients and their families but also for the health care professionals who support their decision making.[2] Previous studies have examined several prognostic prediction tools for patients with cancer, for example, the Palliative Prognostic Index (PPI),[3] Palliative Performance Scale (PPS),[3] Cancer Prognostic Scale,[3] Palliative Prognostic Scale,[4] Japan Palliative Oncology Study–Prognostic Index,[5] and Prognosis in Palliative Care Study model,[6] and each was properly validated. These tools are intended for use in assessing inpatient and ambulatory patients, and the appropriateness of their application to patients with advanced cancer in the home care setting is uncertain. Only Stone et al prospectively studied the usefulness of the PPI in 194 patients with cancer, in a variety of settings: 73.7% of patients were hospitalized, 25.8% were in the home care setting, and 0.5% were in hospice.[7]

The PPI was defined based on performance status assessment using the PPS, oral intake, and the presence or absence of dyspnea, edema, and delirium (Table 1). The PPI does not require blood tests or radiological evaluation and would therefore be very useful for patients with cancer in the home care setting as compared to other validated prognostic prediction tools. Each PPI component is assigned an individual score, and these are added to derive the overall score. The final PPI score classifies patients into 1 of 3 groups: those with survival predicted to be shorter than 3 weeks (PPI ≥6), shorter than 6 weeks (PPI ≥4), or more than 6 weeks (PPI <4).

The PPI was developed and successfully validated for patients with cancer in palliative care units by Morita et al, in Japan,[8] but the usefulness of the PPI for patients with advanced cancer in the home care setting has not been established. The aims of this study were thus to clarify the sensitivity and specificity of the PPI for this particular population.

Methods

Our study population included all patients with advanced cancer who received home visiting services regularly from Yamato

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Table 1. Palliative Prognostic Index.[a]

	Score
Palliative Performance Scale	
10%–20%	4
30%–50%	2.5
60%	0
Oral intake	
Severely reduced	2.5
Moderately reduced	1
Normal	0
Edema	
Present	1
Absent	0
Dyspnea at rest	
Present	3.5
Absent	0
Delirium	
Present	4
Absent	0

[a] Overall Palliative Prognostic Index (PPI) score was calculated by adding each component score.

Clinic between April 2007 and June 2009 and who died at home or in the hospital. Yamato Clinic provides ambulatory care and home-visiting services for community residents with 3 doctors specialized in family medicine and palliative care. We assessed the components of the PPI during the first home visit, as is our usual practice. In June 2010, one researcher (J.H.) then used medical records from patients' first home visits to determine actual survival time as well as each component of the PPI: PPS score, oral intake, and the presence or absence of dyspnea, edema, and delirium. The PPI score was calculated for each patient, along with overall sensitivity and specificity. Survival predictions were defined as mentioned above: less than 3 weeks for PPI ≥6 and less than 6 weeks for PPI ≥4. This study was conducted in conformity with the Declaration of Helsinki and was carried out with special regard for the protection of individual data.

Results

Sixty-five patients (41 males) were included in this study. Table 2 shows patient background information in detail. The mean patient age was 73.5 years, with 25 patients (38.4%) in their 70s and 14 patients (21.5%) in their 80s. The primary cancer site was the stomach/esophagus in 12 (18.4%) patients, the lung in 11 (16.9%) patients, and the colon/rectum/anus in 11 (16.9%) patients. The mean survival time after the first home visit was 55 days. Survival time was shorter than 3 weeks in 22 patients (33.8%) and shorter than 6 weeks in 35 patients (53.8%; Table 2).

Twenty-one (32.3%) patients had PPI scores ≥6, while 29 (44.6%) had PPI scores ≥4 (Table 3). The distribution of performance status and clinical symptoms is indicated in Table 4. Twelve patients with PPI scores ≥6 survived for less than 3 weeks, while 22 patients with PPI scores ≥4 survived for less than 6 weeks (Tables 5 and 6). Three-week survival was predicted with a sensitivity of 55% (95% confidence interval [CI]: 33-75), a specificity of 79% (95% CI: 66-91), a positive predictive value of 57%, and a negative predictive value of 77%. Six-week survival was predicted with a sensitivity of 63% (95% CI: 46-78), a specificity of 77% (95% CI: 61-91), a positive predictive value of 77%, and a negative predictive value of 64% (Table 7).

Table 2. Patient Background Information (n = 65).

	n (%)
Gender	
Male	41 (63.0)
Female	24 (37.0)
Mean age (years)[a]	73.5 (35–96)
Mean survival duration (days)[a]	55.0 (1–344)
Age distribution	
35–49	2 (3.1)
50–59	7 (10.8)
60–69	11 (16.9)
70–79	25 (38.4)
80–89	14 (21.5)
90 and above	6 (9.2)
Primary cancer site	
Stomach/esophagus	12 (18.4)
Lung	11 (16.9)
Colon/rectum/anus	11 (16.9)
Pancreas	7 (10.8)
Prostate	4 (6.2)
Kidney/bladder	4 (6.2)
Liver	3 (4.6)
Breast	3 (4.6)
Biliary system	3 (4.6)
Unknown	3 (4.6)
Others	4 (6.2)
Survival duration	
0≤ week<1	11 (16.9)
1≤ week<2	8 (12.3)
2≤ week <3	3 (4.6)
3≤ week <4	7 (10.8)
4≤ week <5	2 (3.0)
5≤ week <6	4 (6.2)
6≤ week <7	7 (10.8)
7≤ week <8	0 (0.0)
8≤ week <9	3 (4.6)
9≤ week	20 (30.7)

[a] Mean (range).

Table 3. Distribution of PPI Scores (n = 65).

Score	n (%)
0	3 (4.6)
1≤ PPI ≤2	4 (6.2)
PPI = 2.5	6 (9.2)
3.5 ≤ PPI < 4	23 (35.4)
4 ≤ PPI < 6	8 (12.3)
6 ≤ PPI ≤ 8	13 (20.0)
8.5 ≤ PPI ≤ 10	3 (4.6)
10.5 ≤ PPI ≤ 12	5 (7.7)
PPI ≥ 12.5	0 (0.0)

Table 4. Patient Performance Status and Symptoms (n = 65).

	n (%)
Palliative Performance Scale	
10%–20%	6 (9.2)
30%–50%	51 (78.5)
60%	8 (12.3)
Oral intake	
Severely reduced	11 (16.9)
Moderately reduced	36 (60)
Normal	15 (23.1)
Edema	
Present	22 (33.8)
Absent	43 (66.2)
Dyspnea at rest	
Present	14 (21.5)
Absent	51 (78.5)
Delirium	
Present	6 (9.2)
Absent	59 (90.8)

Table 5. PPI Score and 3-Week Survival.

	<3-Week survival	≥3-Week survival	Total
PPI ≥ 6	12[a]	9	21
PPI < 6	10	34	44
Total	22	43	65

Abbreviation: PPI, Palliative Prognostic Index.
[a] Number of patients surviving <3 weeks with PPI scores >6.

Table 6. PPI Score and 6-Week Survival.

	<6-Week survival	≥6-Week survival	Total
PPI ≥ 4	22[a]	7	29
PPI < 4	13	23	36
Total	35	30	65

Abbreviation: PPI, Palliative Prognostic Index.
[a] Number of patients surviving <6 weeks with PPI scores >4.

Discussion

The most important finding of this study was that the sensitivity of the PPI for patients with advanced cancer in the home care setting was lower than for patients with advanced cancer in palliative care units as previously reported.[8] To the best of our knowledge, this study is the first to clarify the usefulness of the PPI for patients with advanced cancer in the home care setting. It demonstrated the sensitivity and specificity of the PPI as a prognostic prediction tool for 3- and 6-week survival. Our findings suggest limitations of the PPI in this population and setting.

One possible reason for the discrepancy in PPI sensitivity between patients with advanced cancer in palliative care units and those in the home care setting is the differential prevalence of delirium, which is the most heavily weighted score in the PPI scoring system. In our study, the prevalence of delirium in the home care setting was 9.2%, whereas Morita et al[8] reported a prevalence of 23% in the hospice setting. This discrepancy suggests 2 possibilities: (1) The prevalence of delirium in the hospice setting may in fact be higher than that in the home care setting[9,10] or (2) we might have underestimated the prevalence of delirium because we diagnosed it only by retrospective chart review.

Table 7. Accuracy of the PPI for Advanced Patients With Cancer in the Home Care Setting.

	<3 Weeks (%)	<6 Weeks (%)
Sensitivity	54.5	62.8
Specificity	79.0	76.6
Positive predictive value	57.1	75.8
Negative predictive value	77.2	63.8

Abbreviation: PPI, Palliative Prognostic Index.

In addition to the results above, we found the specificity of PPI for patients with advanced cancer in the home care setting to be nearly 80% in our study for both 3- and 6-week survival. These results suggest that the PPI might not be useful as a screening tool for poor prognosis in the home care setting because of its low sensitivity but might be useful with PPI scores <4, predicting survival longer than 6 weeks, and with PPI scores <6, predicting survival longer than 3 weeks.

This study has several limitations. First, it was carried out in one institution and the study population was small, restricting the generalizability of our results. Second, one researcher (J.H.) was aware of each patient's prognosis before performing the medical chart review, making it impossible to confirm the absence of bias during data collection. However, because the PPI score is defined based on objective indicators, this limitation most likely had only a relatively small effect on the study outcome. Third, since this study was carried out retrospectively, we cannot be certain that patients' symptoms and signs were recorded correctly at the first home visit.

In conclusion, this study showed that the PPI had a lower sensitivity for patients with advanced cancer in the home care setting than for those in palliative care units. Further research is needed to develop more accurate prognostic prediction tools for use in the home care setting.

Acknowledgment

The authors would like to thank Tatsuya Morita.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

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JJCO Japanese Journal of Clinical Oncology

Jpn J Clin Oncol 2014;44(2)172–179
doi:10.1093/jjco/hyt183
Advance Access Publication 4 December 2013

One-year Follow-up of an Educational Intervention for Palliative Care Consultation Teams

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Received May 26, 2013; accepted November 4, 2013

Objective: This study explored how an educational intervention affects interdisciplinary palliative care consultation teams.
Methods: A pre-post questionnaire survey conducted before the intervention, as well as immediately, 3, 6 and 12 months later. The outcome measurements were behavior (four domains—17 items) and confidence (one domain—6 items).
Results: Of the 252 workshop participants (63 teams), 248 submitted a pre-intervention response, 240 responded immediately after, 198 after 3 months, 197 after 6 months and 184 after 12 months. The behavior domain score significantly increased from pre- to 12 months post-intervention, as follows: 'regional partnership and consultation availability from medical personnel in region', from 15.0 to 17.8 ($P < 0.001$, effect size = 0.59); 'direct practice or care by member', from 12.8 to 13.4 ($P < 0.001$, effect size = 0.26); 'provision of information to patient and family', from 11.4 to 12.5 ($P < 0.001$, effect size = 0.42). The confidence score for palliative care consultation teams activities significantly increased from 18.5 pre-intervention to 20.2 at 12 months later ($P < 0.001$, effect size = 0.37). By the analysis according to the profession of the team member, the score changes for physicians and psychiatrists were larger than that for nurses and pharmacists.
Conclusions: Participant behavior and confidence scores significantly increased after the educational intervention for the interdisciplinary team. In particular, physicians and psychiatrists showed the largest change. Future studies are needed to confirm the findings.

Key words: palliative care – interdisciplinary team – educational intervention – evaluation – questionnaire – Japan

INTRODUCTION

Palliative care consultation teams (PCTs) were established from the early 1990s in Western countries. The concept of PCTs has widened further in the 20 years hence, with the aim of maximizing symptom palliation, and these teams are playing important roles in the UK, USA, Canada and Australia (1–4). The effectiveness of PCTs has been investigated by systematic review (5), randomized controlled trials (6,7), historical control studies (8–11), audit surveys of symptom severity (12,13), descriptive studies of PCT recommendations (14–16), satisfaction surveys of relevant medical staff (17,18), an examination of changes in patient insight (19) and cost-effectiveness analysis (20).

In Japan, hospital-based PCTs are playing an increasingly important role, with several hospitals routinely reporting PCT activities and effectiveness (21,22). The National Cancer Program strongly supports the dissemination of palliative care (23). Since National Medical Insurance started to cover inpatient palliative care units for terminal cancer patients in 1990, such units have dominated palliative care service. However, more than 90% of cancer deaths occur in hospitals (24), and the adequacy of cancer patient care in these settings has been questioned (25–27). In response to the needs of cancer patients, the National Medical Insurance scheme began to cover palliative care consultation services in 2002. In addition, Designated Cancer Hospitals were required to establish PCTs from 2006. Consequently, the number of PCTs established in Japan rapidly increased following the change in government policy, and the number of Designated Cancer Hospitals reached 351 in 2008 (28). The government released the following statements for establishing a PCT (29): (i) a PCT should include a palliative care physician, psychiatrist, nurse and pharmacist and provide palliative care for cancer patients; (ii) palliative care can be provided at outpatients; (iii) the PCT holds care meetings to discuss patient symptom management at least once a week; (iv) sufficient information is provided to cancer patients; (5) the attending physician and the PCT provide patients with information and education regarding palliative care before discharge, collaborating with their home care doctor and (6) a palliative care network with other hospitals and home care agencies in the same region is established. However, the statement lacked enough detail for the PCT to entirely understand their required roles and activities in palliative care. In a previous study, 30% of Designated Cancer Hospitals in Japan reported that PCT consultation services were unavailable for more than 50% of the business hours on weekdays (30). The issue now is to improve quality and effectiveness of PCT activities.

To improve the activities of PCTs, we implemented educational workshops for an interdisciplinary team with the National Cancer Center for PCTs within Japanese Designated Cancer Hospitals. The effectiveness of interdisciplinary education has been investigated in the USA (31–33). These studies showed that an interdisciplinary educational intervention improves role understanding and strengthens participants' confidence and comfort. To develop a useful educational program, this study evaluated the effectiveness of an educational intervention delivered to a palliative care team, measuring self-perceived changes in behavior, and learner's confidence.

METHODS

DESIGN

This study design was a one-group pre- and post-survey with 1-year follow-up.

PARTICIPANTS AND PROCEDURES

The subjects of the surveys were participants of a PCT workshop that we implemented four times from December 2008 to August 2009. The PCTs voluntarily enrolled in this workshop across the country in response to announcements by prefectural government and on the National Cancer Center homepage. The subjects received the questionnaire and were informed of the survey protocol. Consenting participants replied to the survey anonymously.

The study comprised five surveys (pre-intervention, as well as immediately, 3, 6 and 12 months after the interventions) to examine the time course of measured changes appearing after the educational intervention. The surveys were conducted from December 2008 to September 2010 using the outcome measurements that we developed. We distributed the pre-intervention questionnaire at the workshop, and the other questionnaires were mailed to all participants. Reminders were sent to subjects that had not responded within 1 month.

INTERVENTION

Table 1 outlines the PCT educational program, which aimed to improve the quality of PCT activities. The program was developed based on literature review and expert opinions (five palliative care specialized physicians, five psycho-oncologists, four board-certified pharmacist in Palliative Pharmacy, two certified nurse specialists in Cancer Nursing and four certified nurse specialists in Palliative Care). The educational intervention was run for the interdisciplinary team over 2 days. In this program, we made four members into the unit of the team, with the precondition that four PCT members with different professions participated (palliative care physician, psychiatrist, nurse and pharmacist) to promote the team building and to enhance a cooperative relationship. For the group work, 'experts', as defined above, were placed in each group as facilitator.

QUESTIONNAIRE

We developed novel instruments to quantify the behavior and confidence of workshop participants regarding PCT activities because no such measurement was available.

First, we generated items based on literature reviews and focus group interviews with 12 past workshop participants (three physicians, three psychiatrists, three pharmacists, three nurses). Second, to examine content validity, we adopted a modified Delphi method one-phase measure conducted by 10 PCT 'experts' (four palliative care specialized physicians, one psycho-oncologist, three certified nurse specialists in Palliative Care, one board-certified pharmacist in Palliative Pharmacy and one psychotherapist) (34). More importantly, these PCT 'experts' were not involved in developing the educational program. Third, we did a development phase test of the preliminary items using past workshop participants 179 (response rate 70%). The authors then discussed the items based on the development test results and reduced the number. Finally, we

Table 1. PCT workshop programme

Session	Programme/outline	Method	Time (min)
Day 1			
1	Key note speech Orientation	Lecture	15
2	Palliative care overview Review principles of palliative care and roles of PCT	Lecture	45
3	Ice braking Introduction of someone else in a group	Group work	15
4	Clarifying issues related to consultation activities Identify problems and issues that PCTs have in group work by the KJ method (brain storming)	Group work	75
5	The group work according to the specialty Recognize each specialized role and discuss ways to play the role	Group work	120
Day 2			
6	The review of consultations See the trigger video about difficult situations on which to provide consultation for palliative care and discuss how to rectify these situations and presentation through role play	Group work and role play	120
7	A method to provide palliative care in community How to encourage regional collaboration	Lecture	75
8	The goal setting of the team Based on PCT's problems and issues and make some concrete action plan	Group work	120

PCT, palliative care consultation team.

conducted a validation test of two measurements using past workshop participants 182 (response rate 97%). The reliability and validity of our two measurements were confirmed.

Behavior regarding change in PCT activities

The measurement to quantify participant behavior with respect to PCT activities comprised four domains: discussion of therapeutic measures used by the PCT and recommendation to clients; regional partnerships and consultations available with local medical personnel regarding palliative care; direct practice or care by PCT member; provision of palliative care information in a popular way to patients and their families, with 17 items (Cronbach's alpha coefficients 0.78–0.88, intraclass correlation coefficients 0.73–0.81, goodness of fit index = 0.87, adjusted goodness of fit index = 0.83). This measurement was evaluated by agreement with statements on a Likert-type scale from 1 (never) to 5 (always). A higher score indicated a higher level of behavior.

Confidence about PCT activities

To quantify confidence in PCT activities, our measure comprised six items for the four domains of the behavior measure and the overall team activities (Cronbach's alpha coefficients 0.75, intraclass correlation coefficients 0.86). This measurement was evaluated by agreement with statements on a Likert-type scale from 1 (not confident at all) to 5 (very confident). A higher score indicated a higher level of confidence.

Activity style of PCT member

To evaluate activity style after the educational intervention, we asked the respondents about their working style as a PCT member and the number of patients consulted as PCT member in the past year.

Statistical Analyses

Descriptive statistics were calculated regarding participant characteristics. The time change in behaviors and confidence were analyzed using a generalized estimating equation method, and we calculated the effect size of changes from pre-intervention to 12 months after. The relationships between behaviors and confidence before and after the intervention was estimated by dividing the change in behavior into three groups (behavior total score mean difference between before educational intervention and 1 year later; activities ± 0 = lowest–0, activities+ = 0–4 (median), activities++ = 4–highest), and comparing the confidence score mean difference between before educational intervention and 1 year later: of each group.

Statistical analysis was performed using SAS ver. 9.1. The significance level was set at <0.05 (two-tailed).

The Institutional Review Board of the National Cancer Center approved the ethical and scientific validity of this study.

RESULTS

Of the 252 study participants (across 63 teams), 248 submitted a pre-intervention response, 240 responded immediately after the educational intervention, 198 after 3 months, 197 after 6 months and 184 after 12 months. Table 2 summarized the characteristics of the respondents, of which 54% had <2 years experience in the PCT. There were nine physicians who make palliative care a speciality (18.3%), whereas 32 nurses received the Certified Nurse and Certified Nurse Specialist education about palliative care (65.3%). There were no significant differences between these characteristics at pre–post and follow-up.

Activity Style of PCT Member

The changes over time in the PCT member's activity style are outlined in Table 3. PCT duties as a percentage of the

Table 2. The characteristics of participants ($n = 248$)

	n (%)
Sex	
Male	130 (52)
Female	117 (47)
Age	
20s	12 (5)
30s	105 (42)
40s	92 (37)
50s	34 (14)
≥60	3 (1)
Professions	
Physician	63 (25)
Psychiatrist	60 (24)
Nurse	62 (25)
Pharmacist	63 (25)
Clinical experience/year	
1–4	10 (4)
5–9	47 (19)
10–19	108 (44)
20–29	69 (28)
≥30	10 (4)
Experience of activities in PCT/year	
0	6 (2)
<2	128(52)
2–4	72 (29)
4–6	28 (11)
6–8	9 (4)
>8	1 (0)
Training attendances in past year about palliative care per total time	
0	54 (22)
1–4	106 (43)
5–9	38 (15)
≥10	47 (19)

Table 3. The changes over time of PCT member's activity style

	Percent				
	Pre- intervention ($n = 248$)	After 3 months ($n = 198$)	After 6 months ($n = 197$)	After 12 months ($n = 184$)	P-value[a]
Working style as PCT member					
Full time	22	23	26	28	0.113
Part time	79	77	74	71	
PCT duties/total duties (%)					
0	2	1	2	2	0.003
1–25	50	55	51	44	
26–50	18	16	14	16	
51–75	9	8	8	9	
76–100	19	21	24	27	
The consulted number of patients as PCT member in past 1 year/case					
0	4	1	1	1	0.002
1–9	12	13	10	9	
10–49	40	35	35	34	
50–99	21	21	21	21	
≥100	22	30	31	34	

[a] Generalized estimating equation method.

participant's total duties significantly increased ($P = 0.003$), while 51% or more of the PCT duties ratio varied from 28% at pre-test to 36% after 12 months. The number of patients consulted by the PCT member as a percentage of their total patient consults in the past year also significantly increased ($P = 0.002$), with reports of 100 or more ranging from 22% at pre-test to 34% after 12 months.

BEHAVIOR ABOUT PCT ACTIVITIES

Table 4 shows the changes over time in behavior regarding the PCT activities. The domain score of regional partnership and consultation availability from medical personnel in the region significantly increased from 15.0 at before to 17.8 at after 12 months across all professions ($P < 0.001$, effect size = 0.59), while the domain score of direct practice or care by palliative consultation team changed from 12.8 at before to 13.4 at after 12 months across all professions ($P < 0.001$, effect size = 0.3), and the domain score of provision of information in a recognizable way to patient and family about palliative care changed from 11.4 at before to 12.5 at 12 months across all professions ($P < 0.001$, effect size = 0.4). The changes in domain score were larger for physicians and psychiatrists than for nurses and pharmacists.

CONFIDENCE ABOUT PCT ACTIVITIES

Table 5 lists the changes over time of confidence in PCT activities. The total score significantly increased from 18.5 at before to 20.2 at after 12 months across all professions ($P < 0.001$, effect size = 0.4). By the type of profession, the changes in the total score of physicians and psychiatrists were larger than those of nurses and pharmacists. In addition, the change in confidence score was bigger when the change of the behavior was also bigger (Fig. 1).

DISCUSSION

Herein, we report a pre–post survey study to evaluate the effects of an educational intervention on behavior and confidence