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 in-patient 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; (v) the attending physician and the PCT provide patients with information and education regarding palliative care before discharge, collaborating with their home care doctor and (vi) 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 prefectoral 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
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, intra-class 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, intra-class 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 $+0$–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
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 \((P < 0.001, \text{effect size} = 0.59)\), 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 \((P < 0.001, \text{effect size} = 0.3)\), 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 \((P < 0.001, \text{effect size} = 0.4)\). 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 \((P < 0.001, \text{effect size} = 0.4)\). 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...
Table 4. The changes over time in behaviour regarding PCT activities

<table>
<thead>
<tr>
<th>Domain</th>
<th>Domain score mean a (± SD)</th>
<th>Pre-intervention (n = 248)</th>
<th>After 3 months (n = 198)</th>
<th>After 6 months (n = 197)</th>
<th>After 12 months (n = 184)</th>
<th>Effect size b</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussion about therapeutic measures in PCT and recommendation to clients (range 6–30)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>24.5 (± 3.7)</td>
<td>24.7 (± 3.9)</td>
<td>25.4 (± 3.5)</td>
<td>25.4 (± 3.7)</td>
<td></td>
<td>0.23</td>
<td>0.026</td>
</tr>
<tr>
<td>Physicians</td>
<td>25.2 (± 3.5)</td>
<td>25.4 (± 3.9)</td>
<td>25.8 (± 3.3)</td>
<td>26.1 (± 2.8)</td>
<td></td>
<td>0.28</td>
<td>0.263</td>
</tr>
<tr>
<td>Psychiatrists</td>
<td>24.4 (± 4.3)</td>
<td>25.0 (± 3.5)</td>
<td>25.7 (± 3.8)</td>
<td>25.9 (± 3.2)</td>
<td></td>
<td>0.39</td>
<td>0.280</td>
</tr>
<tr>
<td>Nurses</td>
<td>24.1 (± 3.7)</td>
<td>24.1 (± 3.5)</td>
<td>24.7 (± 3.6)</td>
<td>24.3 (± 4.1)</td>
<td></td>
<td>0.07</td>
<td>0.553</td>
</tr>
<tr>
<td>Pharmacists</td>
<td>24.5 (± 3.4)</td>
<td>24.3 (± 4.5)</td>
<td>25.6 (± 3.1)</td>
<td>25.3 (± 4.5)</td>
<td></td>
<td>0.20</td>
<td>0.320</td>
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<td>Regional partnership and consultation availability from medical personnel in region about palliative care (range 5–25)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>15.0 (± 5.2)</td>
<td>16.0 (± 4.8)</td>
<td>16.9 (± 4.3)</td>
<td>17.8 (± 4.0)</td>
<td></td>
<td>0.59</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Physicians</td>
<td>15.5 (± 5.4)</td>
<td>15.6 (± 5.5)</td>
<td>16.8 (± 4.9)</td>
<td>18.0 (± 3.8)</td>
<td></td>
<td>0.53</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Psychiatrists</td>
<td>14.4 (± 4.9)</td>
<td>16.1 (± 4.8)</td>
<td>17.2 (± 4.0)</td>
<td>19.2 (± 3.7)</td>
<td></td>
<td>1.13</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Nurses</td>
<td>14.4 (± 5.5)</td>
<td>16.0 (± 4.6)</td>
<td>16.1 (± 4.5)</td>
<td>16.0 (± 4.2)</td>
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<td>0.32</td>
<td>0.046</td>
</tr>
<tr>
<td>Pharmacists</td>
<td>15.9 (± 4.8)</td>
<td>16.3 (± 4.4)</td>
<td>17.8 (± 3.7)</td>
<td>18.4 (± 3.6)</td>
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<td>0.59</td>
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<td>Direct practice or care by PCT member (range 3–15)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>12.8 (± 2.7)</td>
<td>12.8 (± 2.8)</td>
<td>13.2 (± 2.4)</td>
<td>13.4 (± 2.4)</td>
<td></td>
<td>0.26</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Physicians</td>
<td>12.4 (± 3.1)</td>
<td>12.7 (± 2.8)</td>
<td>13.2 (± 2.5)</td>
<td>13.4 (± 2.4)</td>
<td></td>
<td>0.37</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Psychiatrists</td>
<td>12.7 (± 2.8)</td>
<td>13.0 (± 2.8)</td>
<td>13.2 (± 2.3)</td>
<td>13.4 (± 2.3)</td>
<td></td>
<td>0.24</td>
<td>0.441</td>
</tr>
<tr>
<td>Nurses</td>
<td>13.1 (± 2.6)</td>
<td>13.0 (± 3.1)</td>
<td>13.1 (± 2.8)</td>
<td>13.6 (± 2.3)</td>
<td></td>
<td>0.21</td>
<td>0.887</td>
</tr>
<tr>
<td>Pharmacists</td>
<td>12.8 (± 2.3)</td>
<td>12.5 (± 2.5)</td>
<td>13.3 (± 1.9)</td>
<td>13.3 (± 2.7)</td>
<td></td>
<td>0.20</td>
<td>0.009</td>
</tr>
<tr>
<td>Provision of information in a recognizable way to patient and family about palliative care (range 3–15)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>11.4 (± 3.2)</td>
<td>11.8 (± 3.0)</td>
<td>12.4 (± 2.5)</td>
<td>12.5 (± 2.5)</td>
<td></td>
<td>0.42</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Physicians</td>
<td>11.5 (± 3.1)</td>
<td>11.8 (± 3.1)</td>
<td>12.2 (± 2.4)</td>
<td>12.9 (± 2.1)</td>
<td></td>
<td>0.54</td>
<td>0.020</td>
</tr>
<tr>
<td>Psychiatrists</td>
<td>10.6 (± 3.3)</td>
<td>11.7 (± 3.3)</td>
<td>12.7 (± 2.3)</td>
<td>13.0 (± 2.2)</td>
<td></td>
<td>0.90</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Nurses</td>
<td>11.3 (± 3.5)</td>
<td>11.8 (± 3.1)</td>
<td>12.1 (± 2.8)</td>
<td>12.0 (± 2.9)</td>
<td></td>
<td>0.20</td>
<td>0.536</td>
</tr>
<tr>
<td>Pharmacists</td>
<td>11.9 (± 2.6)</td>
<td>12.0 (± 2.6)</td>
<td>12.6 (± 2.4)</td>
<td>12.3 (± 2.7)</td>
<td></td>
<td>0.14</td>
<td>0.281</td>
</tr>
</tbody>
</table>

SD, standard deviation.

a Each domain score was calculated as the total score of each item from ‘never’ (1) to ‘always’ (5).

b Change from pre-intervention to 12 months later.

c Generalized estimating equation method.

regarding PCT activities over time. The major findings were that participant’s behavior and confidence scores both significantly increased after the educational intervention, and particularly among physicians and psychiatrists. Second, the PCT duties ratio to total duties and the consulted number of patients as PCT member in the past year increased over time.

**Activity Style of PCT Member**

A previous study associated the presence of a full-time physician with the number of referrals to a PCT (30). However, the findings of this study suggested that the activity of the team increased independently of working style of the PCT members (full time vs. part time). There is a limit to the number of members who can be secured for full-time duties with any given PCT. Therefore, an educational program that improves the quality of consultation services the PCT can provide regardless of time and resource limits is clearly necessary.

**Behavior Regarding PCT Activities**

The all-domain score regarding PCT activities in this study also significantly increased after the educational intervention, and this increase was more pronounced among physicians and psychiatrists compared with nurses. This finding could reflect that many nurses in this study already had an advanced education in palliative care gained through their nursing certification specialty, whereas physicians and psychiatrists have insufficient access to education about palliative medicine in Japan.
This educational intervention was designed to provide interdisciplinary learning for an interdisciplinary team, and this approach has distinct advantages. First, the team members can together explore similarities and differences in roles, skills, knowledge and ideologies. Second, they can begin to recognize the complementary skills and resources of different professions. They are also placed in a position whereby they can learn to acknowledge parity of esteem for their contributions to the care of patients and their carers. Finally, interdisciplinary education also provides scope for greater open communication by all members within a group (35). These advantages might have influenced the reported effects.

In addition, experts acted as facilitators in this educational intervention. Such an approach can enhance both individual and group learning, through more flexible learning opportunities during the workshop and increased relevance to the participant’s different learning needs overall. The close tutoring of participants by facilitators was viewed as a particular strength of this educational intervention.

**CONFIDENCE REGARDING PCT ACTIVITIES**

After the educational intervention, confidence scores increased significantly. A similar increase in confidence after interdisciplinary training was also identified by previous research (32). The participants recognized that increased cooperation within the PCT during the workshop might have influenced this observed increase in confidence, in that PCT members were better equipped to work together to solve clinical problems and support each other following the educational workshop. Relationships among the team members and PCT communication in general were also enhanced through the group work, which could also have increased the participants’ confidence in team activities.

This study has several limitations. First, we measured self-reported outcomes. It is hard to judge the effects of educational intervention using only the participants’ evaluation. To evaluate the effects of educational intervention correctly, we should independently examine both consultation user outcomes and patient outcomes including the change of clinical symptoms and quality of life, as well as the relationship between improvement in participants’ self-reported score and these outcomes. It will be necessary to conduct these surveys in the future. Moreover, the quality of palliative care as a real outcome of the educational intervention should be evaluated against patient or bereaved family outcomes (36–38). Second, this study could have a potential selection bias of participants that might limit the generalizability of the findings in other populations. On the pre-intervention survey, about half of PCTs played an active role only in a quarter of the work hours. Thus, many PCTs were unfamiliar with how to consult in their hospitals. The natural process of team building or the effects of on-the-job experience for 1 year might have influenced the change in self-reported outcomes. To exclude these factors, it may be valid to conduct...
a control trial. However, we believe that this is an unlikely possibility and conclude instead that the changes were due to not only the team-building outcome, but also the significant changes in other outcomes.

CONCLUSION

The educational intervention would be improved by enhancing the participant’s behavior and confidence regarding PCT activities. In particular, physicians and psychiatrists showed the largest change. It will be necessary to confirm the findings in future and to determine an objective outcome measure.

Funding

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Conflict of interest statement

None declared.

References

APPENDIX

Measurement items of behavior about PCT activities

Discussion about therapeutic measures in PCT and recommendation to clients
- We discuss the division of each role with PCT members
- We discuss the issues and the policy of PCT with PCT members
- When the opinion is divided among PCT members, we discuss until get it
- When PCT members do the assessment and the recommendation, we confirm needs and intentions of clients
- When PCT members do the recommendations, we aim for what primary team can practice
- When we recommend the methods to relieve a symptom, we present some choices

Regional partnership and consultation availability from medical personnel in the region about palliative care
- We exchange information about patients on telephone or conference with clinic, home-visit nursing station or hospice in region
- We hold a conference with healthcare workers in region to become ‘the relations to be able to see of the face’
- We hold a workshop or a seminar about palliative care more than once a year for healthcare workers in the region
- We provide consultation for healthcare workers in region
- Consultation is available during night-time and holiday by on call or surrogation

Direct practice or care by palliative consultation team member
- Somebody of PCT members goes the direct rounds on inpatients more than once a week
- Somebody of PCT members can do the direct care on inpatients during business hours on weekdays
- When consultation is complicated, somebody of PCT members goes the direct care on the patient every day

Provision of information in a recognizable way to patient and family about palliative care
- A pamphlet about palliative care is put in an obvious place for outpatients
- We inform the patients and the family clearly about accessing the PCT
- We inform the patients and the family clearly about the PCT activities by pamphlet, poster and online