

# Knowledge and Self-Efficacy Assessment of Residents and Fellows Following Palliative Care Unit Rotation: A Pilot Study

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Sven Niklas Burmann<sup>1</sup>, Martin Neukirchen, MD<sup>2</sup>,  
Christoph Ostgathe, MD<sup>3</sup>, Mingo Beckmann, PhD<sup>4</sup>,  
Jacqueline Schwartz, MD<sup>2</sup>, Karin Scheer<sup>5</sup>, Stephanie Klco-Brosius<sup>6</sup>,  
Joerg Hense, MD<sup>1</sup>, Martin Teufel, MD<sup>4</sup>, and Mitra Tewes, MD<sup>1</sup> 

## Abstract

**Background:** In Germany, some units of specialized palliative care (SPC) offer a 6- to 12-month rotation for resident physicians (RPs) and fellows from different specialties. **Objective:** This pilot study aimed to evaluate feasibility of assessing palliative care knowledge (PCK) and palliative care self-efficacy (PCSE) using a paper-based questionnaire. **Methods:** Palliative care knowledge and PCSE were assessed by introducing a score, followed by a descriptive analysis (determination of frequency, mean, median, and range) using nonparametric tests ( $\chi^2$  test, Mann–Whitney *U* test). **Results:** We assessed 17 RPs following SPC rotation and 16 board-certified specialists (BCSs) who had no experience in SPC from 3 German comprehensive cancer centers. Resident physicians were predominantly enrolled in residency programs of hematology and oncology ( $n = 6$ ), anesthesiology ( $n = 6$ ), and psychosomatic medicine ( $n = 3$ ). Resident physicians rotated between year 1 and 8 of residency. Fifteen RPs (88%) had elected this rotation and 72% preferred 12-month duration. The total PCK score of RPs was 27 (RPs) and 24 (BCSs;  $P = .002$ ). Mean PCSE scores were 46 (RPs) and 39 (BCSs;  $P = .016$ ). Of 71% of RPs, only 27% of BCSs knew how support of hospice service was initiated ( $P = .004$ ). Participants rated the items as comprehensible ( $n = 24$ ; 73%), relevant ( $n = 25$ ; 76%) and the questionnaire as adequately long ( $n = 23$ ; 70%). **Conclusion:** An improved PCK and PCSE were observed in physicians who rotated through an SPC unit; this resulted in an increased tangibility of local palliative care and hospice services. The questionnaire was comprehensible, relevant in terms of content, and adequate in length for a prospective multicenter survey.

## Keywords

palliative care, hospice service, rotation programs, knowledge, resident physicians, fellowship

## Introduction

Palliative care is important in the treatment of chronic diseases and is increasingly in demand.<sup>1,2</sup> Medical specialists play a crucial role in therapeutic procedures as well as integration of specialized palliative care (SPC). A palliative care team in Germany consists of physicians and nurses who specialize in the field of palliative care. Other professionals such as social workers, spiritual counselors, or psychologists may also belong to this specialized team; close cooperation with hospice care is essential.<sup>3</sup> Although an SPC team aims at relieving the primary caregiver, this support occurs late or is nonexistent.<sup>4</sup> This could be a direct result of inadequate education and awareness of the availability and organization of local SPC and hospice services.<sup>5</sup> In Germany, general palliative medicine is a cross-sectional discipline. Routine pain management and the fundamentals of treating palliative care patients are mandatory educational elements that are queried during board examinations of oncology, anesthesiology, primary care, or

<sup>1</sup> Department of Medical Oncology, West German Cancer Center, University Hospital Essen, Essen, Germany

<sup>2</sup> Department of Palliative Medicine, Medical Faculty, Heinrich-Heine-University, Duesseldorf University Hospital, Moorenstrasse, Duesseldorf, Germany

<sup>3</sup> Department of Palliative Medicine, University Hospital Erlangen, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Erlangen, Germany

<sup>4</sup> Department of Psychosomatic Medicine and Psychotherapy, University of Duisburg-Essen, LVR-Klinikum Essen, Essen, Germany

<sup>5</sup> Hospice Care, University Hospital Essen, University of Duisburg-Essen, Essen, Germany

<sup>6</sup> West German Cancer Center, DAGGIST Consortium, University Hospital Essen, Essen, Germany

## Corresponding Author:

Mitra Tewes, MD, Department of Medical Oncology, West German Cancer Center, University Hospital Essen, Essen 45122, Germany.  
Email: mitra.tewes@uk-essen.de

radiotherapy. Although not yet implemented as a mandatory requirement in Germany, appropriate educational programs that address palliative care during residencies and fellowships that include adequate evaluation are in growing demand but have not yet been implemented in Germany.<sup>6,7</sup> International studies demonstrated a benefit of a 4-week curriculum.<sup>8,9</sup> However, all residents in an investigation of Rossfeld et al require more education in SPC.<sup>8</sup> Comprehensive cancer centers (CCCs) in Germany offer residents and fellows elective, 6- to 12-month rotations in an SPC unit. German CCCs are defined as a network of qualified and jointly certified, multi- and interdisciplinary, trans-sectoral, and, if necessary, multisite institutions that encompass—when feasible—the entire trajectory of cancer patient care.<sup>10</sup> Rotations occurred between the second and the sixth post-graduate year.<sup>7</sup> However, an evaluation of possible benefits resulting from these rotations had not yet been initiated.

In this pilot study, we investigated the feasibility of a questionnaire-based survey at 3 German CCCs. We examined the effects on resident physicians (RPs) and fellows who rotated in an SPC unit regarding palliative care knowledge (PCK), palliative care self-efficacy (PCSE), and self-assessment of competencies in hospice and palliative care. The group of RPs and fellows after rotation was compared to a group of board-certified specialists (BCSs) who had no prior experience in SPC.

## Methods

### *Development and Questionnaire*

We searched for an instrument to investigate the effect that SPC unit rotation had on attitude and competence of residents. For the development of the psychometric test procedure, we defined relevant topics and appropriate questionnaires during 3 interdisciplinary meetings of experts. The team of experts consisted of 1 German CCC palliative care unit director and 2 senior physicians, 2 SPC board-certified physicians, 3 hospice service members, and 1 CCC coordinator.

Most relevant topics were derived from the Palliative Kompetenz test (PKT) for physicians. The PKT evaluates palliative knowledge and self-efficacy after a 78-hour curriculum in palliative medicine.<sup>11</sup> This standardized and validated instrument in German language is based on the “Bonn Palliative Knowledge Test” (BPW), which was developed from the Palliative care Emphasis program on symptom management and Assessment for Continuous medical Education (PEACE) questionnaire.<sup>12,13</sup>

The first domain of the final instrument contained 16 items of physicians’ characteristics and general conditions of the rotation program.

Palliative care knowledge was evaluated using 33 items in a 5-point Likert-type scale (“strongly agree”, “agree”, “disagree”, and “strongly disagree” or “I don’t know”). In our analysis, the answers “strongly agree” and “agree” as well as “disagree” and “strongly disagree” were summarized. Mean of the correctly answered questions within the different specialties was calculated.

The expectation of PCSE was investigated using 18 items in a 4-point Likert-type scale (“strongly agree,” “agree,” “disagree,” and “strongly disagree”). The self-efficacy section includes domains in palliative care skills, methods and communication competence as well as empathy and 1 question regarding spirituality. The answers were then weighted as “strongly agree” with 3 points to “strongly disagree” with 0 points. Based on 18 items, a maximum PCSE score of 54 was achieved.

In addition to these 2 validated questionnaires, other items that included questions addressing death and dying, ethics, mindfulness, and knowledge about hospice and palliative services were needed. The additional self-assessment of competencies in hospice and palliative care was assessed using 20 items in a 5-Point Likert-Scale.<sup>14</sup>

To assess the attitude of physicians, additional 5 questions were posed that addressed therapies offered at the end of patients’ life, living wills, hospice support, and the religious affiliation of the physicians. A statement specific to each topic could also be evaluated by the participants based on a 5-point Likert-type scale (strongly agree = 1, agree = 2, neither agree nor disagree = 3, disagree = 4, and strongly disagree = 5).

Finally, the participants used a 5-point Likert-type scale to assess the questionnaire in terms of relevance, comprehensibility, and length.

As part of the process, each individual item was evaluated by a team of experts regarding comprehensibility and relevance. Seven of the 15 palliative medicine board-certified senior physicians from German CCCs evaluated the questionnaire. Subsequently, an analysis of the test quality criteria and an outlier analysis were performed. Analysis of reliability yielded a Cronbach’s  $\alpha$  of 0.88 and is evaluated as good. Further secondary quality criteria such as reasonability and test economy with an average processing time of 15 minutes were considered.

### *Design and Objectives*

Between November 2017 and May 2018, the survey was conducted at 3 German CCCs, which offer SPC unit rotation. Resident physicians were invited to participate via e-mail followed by personal request. The questionnaires were returned via fax or post. In order to fulfill matched-pair design requirements, board-certified specialists (BCSs) in the same area of medical specialty who had no prior experience in SPC were asked to complete the same questionnaire. As all board examinations and similar structures at German CCC contain similar mandatory educational content such as general pain management and treatment of palliative care patients, a comparable level of education can be assumed. Board certification should have been completed no more than 5 years prior to this rotation. Specialists who had already worked in a palliative care unit were excluded from participation.

Primarily, we analyzed the feasibility of using a questionnaire to analyze PCK and self-efficacy expectation following an SPC rotation. Secondly, the difference in PCK, self-efficacy expectations, and knowledge regarding local hospice and palliative teams between RPs and BCSs was evaluated.

**Table 1.** Characteristics of Physicians Who Rotated in Palliative Care Units (Resident Physicians [RPs]) and Board-Certified Specialists (BCSs) With No Experience in Specialized Palliative Care.

	Total, N = 33	RPs, n = 17	BCSs, n = 16	P value
Gender, n (%)				
Female	17 (52%)	7 (41%)	10 (63%)	.221 <sup>a</sup>
Male	16 (49%)	10 (59%)	6 (38%)	
Age, years				
Mean (SD)	39 (6.1)	36 (4.5)	42 (6.2)	.003 <sup>b</sup>
Range	30–53	30–48	33–53	
Religion, n (%)				
Christian	23 (70%)	12 (71%)	11 (69%)	.631 <sup>a</sup>
Others	1 (3%)	1 (6%)	-	
Non	8 (24%)	4 (24%)	4 (25%)	
No answer	1	-	1	
Specialty <sup>a</sup>				
Oncology	12 (36%)	6 (35%) <sup>c</sup>	6 (38%)	1.000 <sup>a</sup>
Anesthesiology	11 (33%)	6 (35%) <sup>c</sup>	5 (31%)	
Psychosomatic medicine	6 (18%)	3 (18%)	3 (19%)	
General practitioner	2 (6%)	1 (6%) <sup>c</sup>	1 (7%)	
Radiotherapy	2 (6%)	1 (6%)	1 (7%)	
Board certification				
Yes	22 (67%)	6 (35%) <sup>c</sup>	16 (100%)	.002 <sup>a</sup>
No	11 (33%)	11 (65%)		
Rotation duration, months				
Mean (SD)		9 (3.4)		
Median		12		
Range		2–12		
Time between end of rotation and survey, months				
Median		11		
Range		0–55		
I intend to work as a palliative care physician				
Yes	16	11	5 <sup>d</sup>	.49 <sup>a</sup>
No	15	5	10	

<sup>a</sup>Chi-squared.<sup>b</sup>Mann-Whitney *U* test.<sup>c</sup>RPs were board certified in anesthesia (4), oncology (1), and general practice/family medicine (1).<sup>d</sup>Four BCSs in oncology, 1 BCS in radiotherapy.

## Statistical Analysis

Percentage, frequencies, median, mean values, and standard deviations were calculated for descriptive analysis by SPSS (Version 24). Age, interval of survey to rotation, duration of rotation, medical specialty, board certification, preferred rotation, and medical specialty after rotation were applied as variables in the analysis.

Dependent on the sample size and measurement level, group differences were determined using nonparametric tests ( $\chi^2$  test and Mann-Whitney *U* tests). For analysis of bivariate analyses comparing dependent and independent variables, Pearson and Spearman correlation tests were performed. We considered  $P < .05$  to indicate statistical significance.

## Results

Between November 2017 and May 2018, 17 of 20 RPs participated in the survey (response rate: 85%). For the planned paired analysis, 36 BCSs—from corresponding medical specialties—having no prior SPC experience were asked to

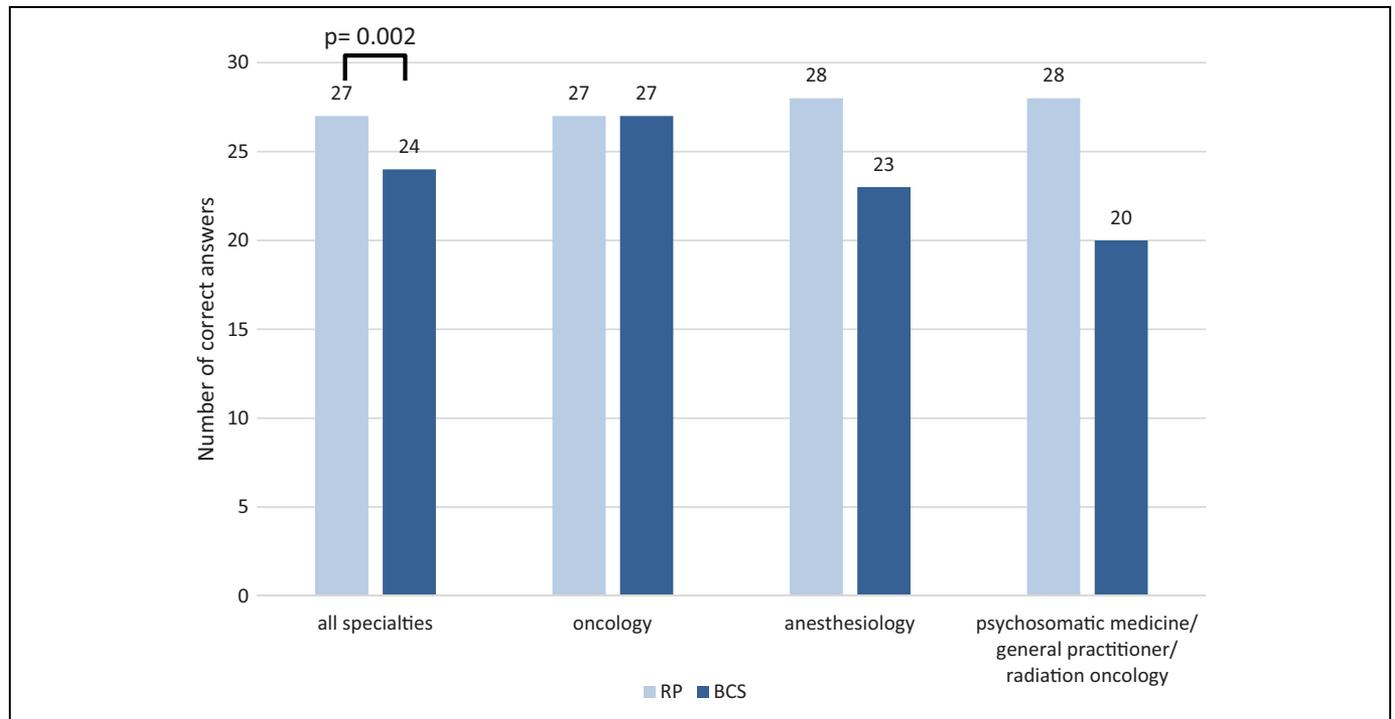
complete the same questionnaire. We received questionnaires from 16 BCSs (response rate: 44%).

## Characteristics of Participants

Demographic data from RPs and BCSs are summarized in Table 1. Resident physicians were predominantly residents of oncology ( $n = 6$ , 35%) and anesthesiology ( $n = 6$ , 35%). Resident physicians rotated between the first and eighth postgraduate year with a focus on the second and third year ( $n = 3$ , respectively). At the time of rotation, 6 physicians were board certified and 4 of them aspired to work in SPC. In total, 11 (65%) of the 17 RPs aspire to work as a palliative care physician. Five of 16 BCSs claimed to be working as a palliative care physician. The questionnaire did not differentiate between practicing SPC physicians or palliative care in addition to another specialty.

## Conditions of Rotation

Most of the participants completed a 12-month rotation ( $n = 9$ ). Six RPs completed a 6-month rotation, and 1 RP completed 10



**Figure 1.** Number of correct answers in palliative care knowledge from physicians who rotated in a palliative care unit (resident physicians [RPs]) and board-certified specialists (BCSs) who had no experience in palliative care.

months and another completed 2 months in an SPC unit. Specialized palliative care rotation was independently requested by 15 RPs, and a large majority (n = 12, 72%) preferred a 12-month rotation. From the 12-month RPs, 10 (59%) preferred a continuous rotation without interruption (6 + 6 months). None of RPs preferred a 3-month rotation. Four of the 6 RPs who participated in a 6-month rotation would have preferred a 12-month rotation. All RPs with board certification at the time of rotation indicated 12 months as their preferred rotation duration.

Resident physicians stated that their expectations of rotation were met “very well” (n = 10), “well” (n = 4), and “on average” (n = 1). Two participants did not respond to this question.

### Palliative Care Knowledge

Resident physicians answered a higher number of items correctly (mean 27.47) than the BCSs (mean 24.14; Mann-Whitney U test:  $U = 53\ 000$ ,  $P = .004$ ). The analysis could demonstrate a strong effect with Cohen’s effect size of  $r = .50$ . This emerging trend seems to be reflected particularly within the medical specialty subgroup of anesthesiology and psychosomatic medicine. Palliative care knowledge among oncologists was consistent in both the groups (Figure 1). Three psychosomatic medicine BCSs answered only 53% of the questions correctly, whereas 3 medical colleagues in the same field who had rotation experience answered 88% of the questions correctly.

**Table 2.** Palliative Care Knowledge Comparing Resident Physicians (RPs) Who Rotated and 16 Board-Certified Specialists (BCSs) Who Had Not Rotated.

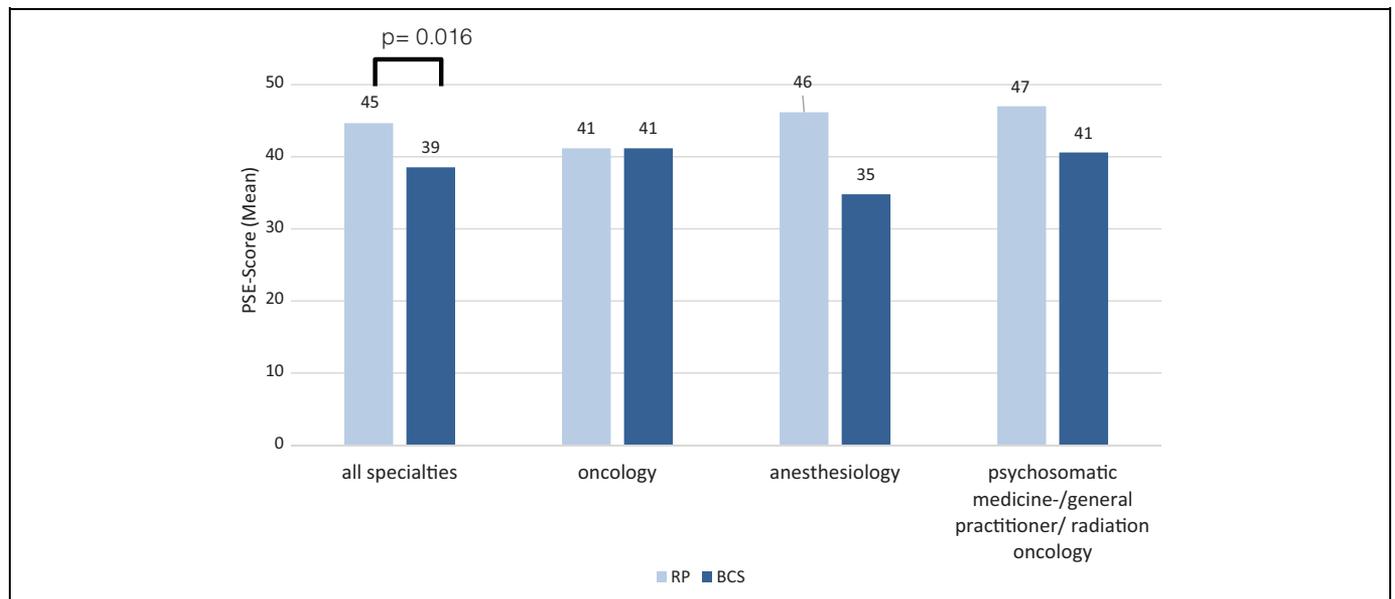
Domains (Number of Items)	RP, Mean (SD)	BCS, Mean (SD)	P value
Pain (11)	9.35 (0.862)	6.94 (2.38)	.001
Psycho-oncology (6)	4.59 (1.176)	4.44 (0.984)	.510
Hospice (5)	4.41 (0.795)	4.13 (0.806)	.326
Communication (4)	3.94 (0.243)	3.94 (0.25)	.986
Dyspnea (3)	2.82 (0.529)	2.13 (1.088)	.058
Gastrointestinal symptoms (2)	1.59 (0.507)	1.44 (0.629)	.581
Philosophy (2)	1.94 (0.243)	1.81 (0.403)	.533

A group comparison between 12-month rotation (mean: 27.67; n = 9) and 6-month rotation (mean: 28.33; n = 6) showed no significant difference in the number of correctly answered questions (Mann-Whitney U test:  $U = 19\ 500$ ;  $P = .358$ ).

Regarding the knowledge of pain management, RPs showed an improved competence with 9 of 11 correct answers compared to 7 of 11 correct answers in the BCS group (Mann-Whitney U test:  $U = 47\ 500$ ;  $P = .001$ ; Table 2).

### Palliative Care Self-Efficacy

Figure 2 shows the results concerning physicians’ PCSE. The analysis showed a difference between RPs (mean 45) and BCSs



**Figure 2.** Palliative care self-efficacy score (PCSE) of physicians who rotated in a palliative care unit (resident physicians [RPs]) and board-certified specialists (BCSs) who had no experience in palliative care.

**Table 3.** Questionnaire Assessment.

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
Items were comprehensible	–	–	7 (21%)	18 (55%)	6 (18%)
Items are relevant to my daily palliative care skills	1 (3%)	1 (3%)	3 (9%)	14 (42%)	11 (36%)
Questionnaire was too long	11 (33%)	12 (36%)	5 (15%)	2 (6%)	1 (3%)

(mean 39;  $U = 60\,000$ ;  $P = 0.016$ ) with a medium effect size (Cohens  $r = 0.45$ ). Furthermore, there was a difference in the 2 subgroups of anesthesiology (mean RPs: 46, BCSs: 35), whereas the analysis of the 2 subgroups of oncology detected no difference (mean RPs: 41, BCSs: 41).

Most RPs ( $n = 15$ ) “strongly agreed” that they were able to draw experiences from SPC rotation. Two PR, who “agreed” with that item, had a 12-month rotation and mentioned that the expectations of SPC rotation were met “well” and “very well.”

There was no correlation between PCK and PCSE in this sample (Pearson correlation  $r = 0.292$ ). Furthermore, no correlation was detected between rotation duration and PCK (Pearson correlation  $r = .121$ ) as well as expectation of PCSE (Pearson correlation  $r = .098$ ).

### Self-Assessment of Competencies in Hospice and Palliative Care

We detected differences in self-assessment between the RP and the BCS group. Resident physicians were significantly more informed regarding the involvement of local hospice services (Mann-Whitney  $U$  test  $U = 60\,000$ ;  $P = .004$ ;  $r = .50$ ) and knowledge of hospice and palliative network infrastructures (Mann-Whitney  $U$  test  $U = 65\,500$ ;  $P = .007$ ). No differences were detected in the self-perception as well as mindfulness

(mean RPs: 2.35; mean BCSs: 2.19; Mann-Whitney  $U$  test:  $U = 125\,500$ ;  $P = .69$ ). In addition to the increased awareness of locally available SPC and hospice services, differences in knowledge regarding German law of hospice and palliative care (2015)<sup>15</sup> were detected (Mean RPs 2.76, BCSs 3.56, Mann-Whitney  $U$  test  $U = 85\,000$ ;  $P = .058$ ); these results were not statistically significant.

All items about RPs and BCSs attitudes showed no differences between the 2 groups. The support that hospice services offer to the relatives of patients is rated as useful by the RPs as well as the BCSs. There was also a general agreement on the validity of living wills.

### Assessment of the Questionnaire

The assessment is summarized in Table 3. All participants assessed the questionnaire in terms of relevance, comprehensibility, and length in a 5-point Likert-type scale. Regarding comprehensibility, 18 (55%) “agreed” and 6 (18%) “strongly agreed”; 2 (6%) participants did not answer the question. Twenty-seven physicians evaluated the palliative care relevance of the questionnaire. Fourteen (42%) physicians “agreed” and 11 physicians (33%) “strongly agreed” that the questionnaire had palliative care relevance. Regarding questionnaire length, only 3 (9%) physicians “agreed/strongly

agreed,” while 11 (33%) physicians “strongly disagreed” and 12 (36%) physicians “disagreed” that the questionnaire was too long.

## Discussion

In several publications, a mandatory rotation in an SPC unit is seen as essential to improve the early integration of palliative care and the education of physicians.<sup>5,16,17</sup> As part of residencies of different medical specialties and palliative medicine, many departments of SPC in Germany offer a 6- to 12-month rotation.<sup>7</sup> Previous studies showed that even as little as a 2- or 4-week rotation in a hospice or SPC ward improves palliative care skills and knowledge.<sup>18,19</sup> Furthermore, a 4-week rotation has a significant influence on the self-perception of physicians in their ability to provide end-of-life care.<sup>9</sup> In an effort to improve palliative care education, a mandatory rotation during oncological residency has recently been recommended.<sup>20,21</sup> However, physicians deemed a 1- to 4-week rotation as inadequate.<sup>22</sup> In a short report, Duong and Zulian published a retrospective investigation on the impact that a postgraduate 4-month rotation had on 33 junior residents. The residents reported an improvement in knowledge and satisfaction after rotation.<sup>22</sup> Currently, no publication exists of a multicenter study that assesses the 6- to 12-month rotation offered at German CCCs. This retrospective paired analysis was performed in order to investigate the feasibility of a questionnaire-based survey and differences between RPs and BCSs who had no prior SPC experience. We evaluated the effect that rotation had on physicians regarding PCK, self-efficacy, and self-assessment of competencies in hospice and palliative care.

In contrast to other studies and the BCS group, our RPs showed a high response rate when contacted personally (85%).<sup>21,22</sup> This high response rate and the positive assessment of the questionnaire regarding comprehensibility, relevance and length indicate the feasibility of a nationwide survey using this tool. The low response rate of BCSs (44%) may have been related to the specific questions of palliative care, which may not be in the field of interest of BCSs who had no SPC experiences.

The high percentage of elected rotation (76%) in combination with the satisfactory fulfillment of expectations (82%) confirms the positive effect of a 6- to 12-month SPC rotation from an RP’s perspective. In addition to improved palliative care skills and competence, rotation also increases self-efficacy. This seems to be dependent on the extent of medical education. All physicians, who desired a 6-month rotation, were residents. In Germany, residencies in internal medicine require rotations through many other medical specialties. Among other things, a 6-month rotation in an intensive care unit is required.<sup>23</sup> Not to exceed the duration of a 72-month residency (36 months of internal medicine and 36 months of hematology–oncology), a 6-month rotation similar to the 6-month rotation of intensive care unit seems appropriate. Our study detected no differences in PCK between 6- and 12-month rotations among RPs. Although the number of participants in

this analysis is low, it could be assumed that a 6-month rotation is sufficient to convey basic knowledge in palliative care for board-certified oncologists, radio-oncologists, anesthesiologists, and general practitioners. A further analysis concerning the comparison of 6- and 12-month rotations is needed. A mandatory SPC rotation is not yet firmly anchored in the regulations of all specialty board certification; however, there is an increasing demand for this requirement—not only within an internal medicine residency—and a 6-month rotation in a palliative care unit as part of all specialized residencies should be discussed.<sup>1,8,9,24</sup>

The analysis of our study clearly revealed a positive effect of a 6- to 12-month rotation. Physicians who rotated in SPC units showed a higher palliative knowledge compared to BCSs who had no SPC experience. It must be assumed that a board-certified physician in Germany has acquired knowledge of palliative care during specialty training and examination. Although the BCS group is board certified and has more experience in clinical practice than the RPs, the rotation group appeared to have better PCK and an improved self-efficacy in palliative care. Knowledge regarding communication skills seems to be similar in both groups, although the BCS group was older and had more experience in clinical practice. Our results are consistent with previously published studies, which were carried out after palliative medical curricula with or without integrated SPC rotation. They all detected an increase in knowledge in the pre-post comparison.<sup>12,18,19,25</sup> However, this increased knowledge seems to be compensated in the group of BCSs in oncology. It should be noted that RPs and BCSs from oncology of this study were working together in the same department; an exchange of knowledge, attitude and skills could have taken place during this time. In addition, 5 out of 6 oncology BCSs who had no SPC experience stated that they had interest in working as palliative medicine physicians; this may indicate a general interest in the field of palliative medicine. The differences were more pronounced between RPs and BCSs whose medical specialty included a low number of patients with life-threatening illness, such as anesthesiology or psychosomatic medicine. An overall increased interest in the field of SPC in both groups seems to be a confounder of our study. However, the number of cases of these subgroups was too small for a statistical analysis. A multicenter study with a larger number of participants is needed.

The total self-efficacy score increased within the RP group. Specifically, RPs documented more often that they remained in contact with patients, even if patients expressed a desire for euthanasia. Furthermore, RPs were better informed regarding services offered by regional hospice and SPC. In addition to the improvement of communicative competence, the attitude toward end-of-life care from RPs was different from BCSs. Resident physicians felt confident in recognizing the complex needs of a dying person and in responding appropriately. Again, our study detected no difference in the subgroup of oncologists, whereas BCSs in anesthesiology and psychosomatic medicine had a significantly lower self-efficacy score. In particular, hematology/oncology fellows rated the quality of

palliative care education as inferior to the training of oncology. Buss et al concluded that oncology fellows may benefit from more emphasis on pain management, psychosocial care, and communication skills.<sup>21</sup> Our analysis may hint that more clinically experienced board-certified oncologists have the same knowledge in pain management, psychosocial care, and communication skills. Once more, it must be mentioned that the oncologists in the RP group included younger physicians who were in an earlier stage of medical education. Our novel analysis shows that rotation in an SPC unit not only improves PCK and self-efficacy but also increases the tangibility of integrating the local hospice and palliative care services. In particular, RPs were able to recognize more clearly the implications that require the initiation of hospice service and palliative care. This is one obvious advantage of an SPC rotation, as many oncologists or other specialists are unfamiliar with the relationship between these organizations.<sup>6</sup> An SPC unit rotation could also have a positive influence on the early integration of hospice and palliative care, which is known to have a positive effect on patient care.<sup>26</sup>

## Limitations

Our findings should be interpreted in light of several limitations; most prominent is the small number of physicians with varying medical specialties. The analysis of subgroups can only provide indications without statistical significances. Furthermore, this study included only 3 CCCs. This does not reflect the entirety of the university hospitals in Germany. Additionally, the overall increased interest in palliative care medicine of both groups may be a relevant confounder. A pre–post analysis may be more useful. Furthermore, the surveyed physicians were unsupervised and free to choose the time and place to answer questions.

## Conclusion

Although this pilot study has limitations, it clearly shows that RPs benefit from a rotation in an SPC unit. We observed an increase in PCK, self-efficacy in the ability to provide palliative care, and the tangibility of integrating hospice services into palliative care strategies. Assuming a good response rate and a thorough assessment from participating RPs, a nationwide evaluation of the benefits of palliative care unit rotation seems feasible; its execution could help shape an effective rotation that could supplement current medical specialty training that ultimately results in improved patient care.

## Authors' Note

The local ethical review committee of the Medical Faculty of the University of Duisburg-Essen approved the data analysis (17-7842-BO). Informed consent was obtained from all participants who were included in the study.

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## ORCID iD

Mitra Tewes  <https://orcid.org/0000-0001-8868-8329>

## Supplemental Material

Supplemental material for this article is available online.

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