Effect of a Palliative Care Nurse Champion Program on Nursing Care of Dying Patients in the Hospital: A Controlled before and after Study

Witkamp FE[1,2,3*], Van Der Heide A[3], Van Der Rijt CCD[2] and Van Zuylen L[2]

[1]Faculty of Nursing and Research Centre Innovations in Care, University of Applied Sciences, Rotterdam, The Netherlands

[2]Department of Medical Oncology, Erasmus MC Cancer Institute, Rotterdam, The Netherlands

[3]Department of Public Health, Erasmus MC, University Medical Center Rotterdam, The Netherlands

***Corresponding author:** F.E. Witkamp, Faculty of Nursing and Research Centre Innovations in Care, University of Applied Sciences, Rotterdam, The Netherlands, Tel: +31 6 17766839; E-mail: f.e.witkamp@hr.nl

Citation: Witkamp FE, Van Der Heide A, Van Der Rijt CCD, Van Zuylen L (2017) Effect of a Palliative Care Nurse Champion Program on Nursing Care of Dying Patients in the Hospital: A Controlled before and After Study. J Nurs Health Stud Vol.2: No.3: 20.

Abstract

Objective: Hospitals increasingly appoint nurse champions to improve quality of care. This study investigated the effect of palliative care nurse champions on nursing end-of-life care.

Methods: Imbedded in a controlled before-after study (June 2009-July 2012) on care for the dying patient in the hospital, nurses completed questionnaires on end-of-life care within two weeks after the patient's death. Halfway the study, seven out of 18 participating wards appointed two palliative care nurse champions. Characteristics of end-of-life care were compared for patients who died before and after the introduction of the nurse champion program and with outcomes in 11 control wards.

Results: In the intervention wards, data were collected on 81 patients in the pre-intervention period and on 93 patients in the post-intervention period; in control wards these numbers were 114 and 121, respectively (response 54%). After the introduction of the nurse champion program, nurses in the intervention wards more frequently discussed imminent death with patients (35% pre-intervention vs 50% post-intervention, p=0.05), were more frequently aware of psychological symptoms (57% vs 71%, p=0.04), and performed less futile interventions during the final hours (on average 0.8 vs 0.4 out of 4 interventions, p<0.01). These differences were not found in the control wards. No effect was found on nurses' awareness of patients' imminent death. Nurses' median score for quality of dying was lower in the post-intervention period (7.5 vs 7.0 on a 0-10 scale; p=0.02).

Conclusion: Nurse Champions had a beneficial effect on end-of-life nursing care in hospital. We found increased communication and more awareness of patients' palliative care needs. Increased awareness seems to have made nurses more critical about the quality of dying.

Keywords: Terminal care (MESH); Nurses (MESH); Hospitals (MESH); Quality of dying; Palliative; Champion; Link nurse

Introduction

In most Western countries over 50% of deaths occur in hospital [1,2]. Most of these are non-sudden deaths and due to chronic diseases, such as cancer, COPD and chronic heart failure. The percentage of deaths by chronic diseases worldwide was 68% in 2012 and is expected to increase [3]. At the end of life, a transition in goals of care is often needed, from prolonging life towards optimizing quality of life and, when death is approaching, optimizing quality of dying [4]. Quality of life, quality of dying and quality of care at the end of life are overlapping constructs but can be distinguished [5,6]. Quality of life involves physical, psycho-social and spiritual wellbeing, and quality of dying additionally includes the domains of life closure and death preparation, characteristics of health care and circumstances of death [5]. Quality of care at the end of life concerns the extent to which these domains are affected by health care. According to Steward et al. the quality of end-of-life care includes structures and processes of health care, such as organization, physical environment, communication, and decision making, which should be adapted to individual patient factors, such as diagnosis, psychological characteristics and religious background [7].

Providing high-quality end-of-life care in the hospital is challenging, because hospital care is typically focused on prolonging life and modifying disease. Several studies have described the unmet needs of patients dying in the hospital, such as poor symptom control and insufficient communication [8-12]. Gaps in hospital end-of-life care that have been identified include barriers in processes and structures of end-of-life care, a lack of physicians' and nurses' awareness of approaching death and deficiencies in their palliative and terminal care knowledge, skills and attitudes [8-13]. Interventions to improve end-of-life care need to comprise multiple strategies to address these shortcomings [7,14-16]. Furthermore, such interventions have to be disseminated

throughout all hospital wards where patient may die. Many of these wards however lack specific palliative care expertise [16,17]. This is similar to other specific areas, such as infection control and wound and tissue care. Several hospitals have implemented networks of 'nurse champions' or 'link nurses' to improve these fields of care. The empowerment of nurses towards leadership in a field of care may contribute to the quality of care [14,17-19]. Being intermediates between experts and ward nurses, nurse champions are expected to improve the results of education. They are more dedicated to a certain field of care than other nurses and have more insight in the culture and processes on their wards than the experts. Furthermore, it is easier to adapt an educational program to the educational needs of nurse champions than of all nurses on all the wards [20]. Although evaluation of the effects of such nurse champions on the quality of care is scarce, the results are promising [19,21-26]. Based on this concept we previously studied the impact of a palliative care nurse champions program on the quality of dying in the hospital, as experienced by bereaved relatives [27,28]. We hypothesized that similar to nurse champions in other fields, palliative care nurse champions may contribute to better quality of palliative care by improving the recognition of palliative care needs, the communication with patients and relatives, and the care delivered to both [14,29-32]. However, in our study bereaved relatives of patients who died in the hospital did not evaluate the quality of dying better after the introduction of a palliative care nurse champions program on hospital wards, when compared to before [27].

Such intervention to improve health care is targeted at professionals and can only affect patient outcomes when the professionals adapt their behavior accordingly. In case of improving palliative care by a palliative care nurse network program, nurse champions firstly require sufficient clinical experience, knowledge of palliative care, teaching capacities, and authority towards managers and colleagues to be a resource and role model for colleagues [24,31]. Some UK studies confirmed that palliative care nurse champions themselves experienced increased knowledge on palliative care, and felt more confident when collaborating with physicians and experts [29-32]. Subsequently, this should affect the caring behavior of nurses. To a better understanding of the impact of a nurse champions program, the objective of this study is to examine whether the implementation of a palliative care nurse champions program affects nursing behavior in end-of-life care in the hospital.

Materials and Methods

This study is part of a larger study on understanding and improving Palliative and Terminal Care in the Hospital (PalTeC-H); the protocol for this study is described elsewhere [28].

Study design

The effect of palliative care nurse champions (hereafter referred to as: nurse champions) was investigated in a 1300-bed Dutch university hospital using a controlled before-after design. Between June 2009 and July 2012, we included

patients who died in one of 18 non-intensive care wards after an in-hospital stay of at least 6 h. Seven of these 18 wards were as assigned to be intervention wards, i.e. all wards that regularly admit cancer patients or patients with other chronic and life-threatening diseases (i.e. medical oncology and geriatrics, internal medicine, ear/nose/throat surgery, gastro-intestinal surgery, gynecology and urology, lung diseases and cardiology). At each intervention ward two nurses were appointed halfway the study to become a nurse champion. Nurse champions were selected by the ward manager and selection was mostly entered by nurses' own interest. At least one of the selected champions per ward had previously shown some leadership capacities. Although lack of evidence on the time needed to effectively disseminate expertise and knowledge into clinical practice [14,17,18,26,33], we planned a transition phase of five months, as a run-up period to generate gradual changes in the nurse champions' behavior [22,34-36].

The intervention

From October 2010 on the nurse champions participated in a palliative care network that was coordinated by a senior nurse consultant who was a member of the hospital multidisciplinary expert team on pain and palliative care (hereafter referred to as: expert team). Every month an educational network meeting was organized in which at least one nurse champion per ward was expected to participate. Further, all nurse champions participated in annual tailored two-day education programs. Nurse champions were trained to identify gaps in the knowledge on and quality of palliative care in their ward, to raise ward staff's awareness of palliative care needs, and to initiate implementation of end-of-life care protocols, e.g. on management of pain/delirium and on palliative sedation. The coordinator organized the meetings and education programs, and supported nurse champions individually in developing their plans and performing activities.

Participants

For all consecutive patients who died on participating wards during both study periods, nurses who had been involved in patient care were asked to participate. In addition, the nurse champions themselves participated. We assessed their knowledge on palliative care before starting the intervention and after 1,5 years.

Ethical considerations

This study was approved by the Medical Ethical Research Committee of the Erasmus MC. According to Dutch regulations, informed consent of patients was not required because only observational data were collected after the patients' death.

Measurement and data collection

Hospital end-of-life care was defined as care provided during the last three days of life. The quality of dying was defined as multidimensional, including physical, psychological, spiritual and social experiences, life closure and death

preparation, characteristics of health care and circumstances of death [5]. We developed a questionnaire to evaluate the multiple dimensions of quality of dying and of hospital end-of-life care, including the patient's physical and psychological symptoms, social problems and acceptance of death, nurses' awareness of impending death, and nursing care during the last days. The questionnaire was tested among staff nurses and subsequently piloted in the first 30 cases. We then added two global numerical scores (0-10), asking "How do you rate the patient's quality of life during the last 3 days of life?" (QOL3), and "How do you rate the patient's quality of dying?" (QOD), with zero indicating "very poor" and 10 indicating "almost perfect". Data of patients included in the pilot study were also used for the current analysis. Within 2 weeks after a patient's death a nurse who was closely involved in the care for this patient was asked by a team coordinator to complete the questionnaire and, subsequently, to send it anonymously to the primary investigator (FEW). End-of-life care and the quality of dying in the intervention wards were compared between the pre-intervention period, from June 2009 to October 2010, and the post-intervention period from March 2011 to July 2012 (16 months each). Results were compared to end-of-life care in the same periods in 11 control wards in which the intervention was not applied, to control for changes that are not due to the intervention, such as changes in hospital policy. These control wards were expected to have a similar number of deaths as the intervention wards.

Nurse champions' knowledge was assessed using the validated Rotterdam MOVE2PC questionnaire [37], including 20 knowledge statements on nursing care and symptom management in end-of-life care.

Endpoints

For the evaluation of quality of end-of-life care and quality of dying, the endpoints were nurses' awareness of imminent death and of the psychosocial condition of the patient, and characteristics of nursing care, such as the assessment of vital functions and caring activities during the last days of the patient's life, and nurses' scores on QOL3 and QOD.

For the evaluation of the knowledge of nurse champions on palliative care the number of knowledge statements in the MOVE2PC that were correctly answered was assessed.

Data analysis

For this analysis we analyzed the data of the subgroup of patients who were admitted to hospital at least 24 h prior to death, because we wanted to exclude the assessment of patient's condition in the acute phase at hospital admission. To detect selection bias we compared the characteristics of patients for whom nurses did and did not make a report. We compared outcomes pre- and post-intervention in the intervention wards, and in the same periods in the control wards, using t-tests, Mann-Whitney U-tests and Pearson's Chi-square tests. SPSS, version 20, was used for the analyses. For the comparison of nurse champions' knowledge between the pre- and post-intervention period we only included nurse

champions who had participated at least six months in the network at the second measurement point. We compared the outcomes of the knowledge statements using the Wilcoxon Signed Rank test for paired samples.

Results

Process characteristics of the intervention

Initially, 14 nurses participated in the network of palliative care nurse champions. Five nurse champions prematurely left the network and were replaced by colleagues. During the study period, nurse champions received four days of tailored education and could participate in 18 network meetings; they participated (on average) in 8.2 meetings. During the study period at all intervention wards nurse champions performed activities to disseminate their newly derived knowledge and skills, such as bed-side teaching, educational meetings, introduction of guidelines on palliative care (e.g. on pain, delirium, sedation), and being a role-model for their colleagues in providing nursing care and in participating in the multidisciplinary team.

Characteristics of nurses, patients and nursing care

During the study period 818 patients died: 396 (48%) in the pre-intervention and 422 (52%) in the post-intervention period. Nurses completed a questionnaire on 447 patients (response rates in the intervention and control wards were 54% and 55%, respectively). Of these patients 409 had stayed at least 24 h in the hospital (**Table 1**).

Nurses on all wards completed questionnaires. In 46% of the questionnaires, nurses reported to be aged ≤ 30 years whereas in 17% they were aged ≥ 50 years. In 59%, nurses reported to have ≥ 5 years of experience and in 31% that they had cared for ≥ 6 dying patients during previous year. The patient's nurses reported on were on average aged 66 years, 59% were male, and they had died after a mean in-hospital stay of 16 days. Patients for whom no questionnaire had been completed were older (69 years; p=0.01), and had had a shorter final hospital stay (mean 13 days, p=0.03).

Response rates per ward differed (Chi2 89.7, p=0.00); in three wards the response rate was ≤ 40% (i.e. thorax surgery (25%), gastro-intestinal surgery (30%), and neurosurgery (37%)), and in four wards it was ≥ 70% (i.e. palliative oncology (72%), vascular surgery and transplantation (80%), hematology (82%), and ear, nose and throat surgery (94%)). Most nurses had cared for the patient during at least two shifts (68%), and 78% had had at least two contacts with the patient's relative(s).

In the post-intervention period, more nurses from the intervention wards reported on barriers in communication with the patient, e.g. because of coma, hearing loss or speaking problems, compared to the pre-intervention period (11% pre-vs 24% post; p=0.05). No other differences were found between the pre-intervention and the post-intervention

period, neither in the intervention, nor in the control wards (**Table 1**).

Table 1 Characteristics of the patients and nursing care.

	Intervention wards[a] N=174			Control wards[b] N=235		
	Pre-Intervention	**Post-Intervention**	**P-value difference pre-post[c]**	**Pre-Intervention**	**Post-Intervention**	**P-value difference pre-post[c]**
	n=81 (%)	**n=93 (%)**		**n=114 (%)**	**n=121 (%)**	
Patients						
Age in years: mean (SD)	66 (14)	67 (13)	0.86[d]	65 (15)	67 (15)	0.21[d]
Gender						
Male	50 (62)	60 (65)	0.7	66 (58)	66 (55)	0.61
Female	31 (38)	33 (35)		48 (42)	55 (45)	
Length of hospitalisation in days; mean (SD)	20 (29)	16 (31)	0.42[d]	16 (17)	17 (26)	0.71[d]
Ward						
Surgical	25 (31)	19 (20)	0.11	22 (19)	33 (28)	0.15
Non-surgical	56 (69)	74 (80)		92 (81)	86 (72)	
Diagnosis						
cancer	46 (57)	57 (60)	0.65	53 (46)	58 (48)	0.83
non-cancer	35 (43)	37 (40)		61 (54)	63 (52)	
Nursing care						
Number of shifts cared for patient (%)						
≤1	21 (26)	30 (33)		39 (34)	40 (33)	
02-Mar	33 (41)	41 (44)	0.36	48 (42)	49 (41)	0.8
≥ 4	26 (32)	20 (22)		27 (24)	32 (26)	
Contact with relatives (%)						
No	5 (6)	8 (9)		6 (5)	11 (9)	
Yes, once	6 (7)	13 (14)	0.27	18 (16)	24 (20)	0.33
Yes, ≥ 2 times	70 (86)	71 (76)		90 (79)	86 (71)	
Barriers in communication[e]						
Yes	9 (11)	22 (24)	0.05	16 (14)	19 (16)	0.94
No	72 (89)	71 (76)		98 (86)	102 (84)	
Barriers in culture[f]						
Yes	5 (6)	10 (11)	0.22	7 (6)	8 (7)	0.97
No	76 (94)	83 (89)		106 (94)	112 (93)	

[a]Intervention wards: Cardiology; Ear Nose & Throat surgery; Gastro-intestinal surgery; Gynaecology and urology; Internal medicine – infectious diseases and endocrinology; Lung diseases; Medical oncology and geriatrics

[b]Control wards: Haematology; Internal medicine- gastro intestinal diseases; Internal medicine-renal diseases; Neurology; Neurosurgery; Liver and kidney transplant and vascular surgery; Orthopaedics; Plastic surgery and dermatology; Trauma surgery; Thorax surgery; Palliative oncology

[c]Pearson's Chi[2] tests	
[d]Independent sample t-test	
[e]barriers due to e.g, insomnolence, different language, speaking disorders	
[f]barriers due to different culture and background, values and beliefs	

Nurses' awareness of imminent death

Table 2 Awareness of and communication about imminent death.

Variables	Intervention wards			Control wards		
	Pre-intervention	Post-intervention	P-value difference pre-post[a]	Pre-Intervention	Post-Intervention	P-value difference pre-post[a]
	n=81 (%)	n=93 (%)		n=114 (%)	n=121 (%)	
Nurse had been aware of imminent death						
Yes/More or less	74 (91)	78 (86)	0.25	93 (82)	93 (79)	0.6
No	7 (9)	13 (14)		21 (18)	25 (21)	
Moment of awareness: in hours prior to death						
<6	13 (16)	11 (12)	0.7	15 (13)	25 (21)	0.29
Jun-24	22 (27)	28 (30)		31 (27)	31 (26)	
>24	41 (51)	43 (46)		50 (44)	46 (38)	
Nurse(s) had talked with patient about imminent death						
Yes	28 (35)	46 (50)	0.05	37 (33)	32 (26)	0.31
No or don't know	53 (65)	47 (50)		77 (67)	89 (74)	
Patient was informed about their imminent death by the physician						
Yes, explicitly	20 (25)	32 (36)	0.33	30 (26)	31 (26)	0.59
Yes, implicitly	14 (18)	11 (12)		11 (10)	14 (12)	
No	20 (25)	25 (28)		52 (46)	45 (39)	
Don't know	25 (32)	21 (24)		19 (17)	26 (22)	
[a]Pearson's Chi-square test						

In the intervention wards, nurses had been aware of patients' imminent death in the majority of cases, (91% and 86% pre-intervention and post-intervention, respectively); similar results were found for the control wards (**Table 2**), albeit at a slightly lower level.

Communication about imminent death

In the intervention wards, nurses had discussed imminent death with 35% of all patient's pre- intervention (**Table 2**) compared with 50% post-intervention (p=0.05). In the pre-intervention period, 32% of the nurses did not know whether the patient had been informed about their imminent death by the physician; 25% reported that patients had been informed explicitly and 18% implicitly. These percentages were slightly different in the post-intervention period, i.e. 24% of nurses did

not know whether the patient had been informed, and in 36% and 12% they reported that patients had been informed explicitly or implicitly respectively, but these differences were not statistically significant. No differences in communication were found in the control wards.

Insight in patients' psychosocial condition

For eight psychological symptoms (e.g. anxiety, tenseness, sadness, depressed mood) nurses were asked if they knew whether or not these symptoms had been a burden for the patient. In intervention wards, nurses had this insight for 4 symptoms in the pre-intervention period and for 4.5 symptoms in the post-intervention period (**Table 3**).

This insight increased significantly for 'feelings of anxiety' and 'tenseness' (p=0.04 and 0.03, respectively). In the pre-intervention period, 70% of nurses had insight in whether patients had been aware of their imminent death and 88% in whether they had been at peace with the imminent death.

In these specific cases nurses thought that about 50% of the patients had been aware and that almost 60% had been at peace with their imminent death. These percentages were similar in the post-intervention period.

In the control wards, nurses were less frequently aware of patients' psychosocial condition and no differences were found between both periods.

Table 3 Nurses' insight in patients' psychosocial condition.

Variables	Intervention wards			Control wards		
Nurse knew whether the patient:	Pre-intervention	Post-intervention	P-value difference pre-post[a]	Pre-intervention	Post-intervention	P-value difference pre-post[a]
	n=81 (%)	n=93 (%)		n=114 (%)	n=121(%)	
Suffered from anxiety	42 (57)	61 (71)	0.04	60 (57)	68 (61)	0.54
Suffered from loneliness	40 (55)	50 (58)	0.4	53 (50)	54 (48)	0.85
Suffered from dependency	43 (58)	53 (62)	0.35	55 (51)	52 (47)	0.5
Suffered from tenseness	36 (49)	57 (66)	0.03	47 (44)	49 (44)	0.93
Suffered from worrying	45 (61)	54 (63)	0.46	44 (41)	43 (39)	0.72
Suffered from sadness	41 (56)	51 (59)	0.41	41 (38)	48 (43)	0.49
Suffered from feelings of powerlessness	41 (55)	50 (58)	0.46	47 (44)	42 (38)	0.39
Suffered from feelings of depression	38 (52)	45 (52)	0.55	37 (35)	41 (37)	0.72
Was aware of imminent death	71 (88)	81 (87)	0.91	90 (79)	99 (82)	0.58
Was in peace with imminent death	57 (70)	62 (68)	0.6	60 (53)	70 (58)	0.42
Had practical or social problems during last days of life	49 (61)	57 (61)	0.91	71 (62)	73 (60)	0.76
[a]Pearson's Chi-square test						

Nursing interventions and diagnostic measurements in the last 24 h before death

In the intervention wards, in the pre-intervention period the nurses provided on average 5.3 of 18 nursing interventions during the last 24 hours of life, such as hygiene care, tube feeding, use of intravenous fluids, and assessment of blood pressure and temperature; this number was similar in the post-intervention period (**Table 4**).

In-depth analysis showed no differences in the pre- and post-intervention periods in diagnostic measurements (range 0-4), in providing tube feeding and intravenous fluids (range 0-4), and in basic care interventions (range 0-5). Other interventions, i.e. repositioning, wound care, bandaging, and suction of secretion, were applied less often in the post-intervention period (p<0.01). No differences were found in the control wards. An association was found between the moment of nurses' awareness of imminent death, and diagnostic measurements, tube feeding and the use of intravenous fluids: these interventions were applied less often when nurses had foreseen imminent death ≥ 24 h prior to death compared with cases in which nurses' awareness was raised ≤ 24 h in advance (p<0.00).

Global score of quality of life during last 3 days of life and quality of dying

In the intervention wards, the median score for QOL3 was 5.0 during pre- and post-intervention assessment (mid-80% range (10th-90th percentile) 2-8 in the pre-, and 2-7 in the post-intervention period, respectively (p=0.59)) (**Table 5**). The median score for QOD was 7.5 (mid-80% range 5-9) in the pre-intervention period and 7.0 (mid-80% range 3-9) in the post-intervention period (p=0.03). In control wards the median for QOL 3 was 5.0 during pre-intervention and 4.0 during post-

intervention assessment (p=0.84); the median for QOD was 7 for both periods (p=0.58).

Nurse champions' knowledge

Before starting the network 12 out of 14 nurse champions completed the questionnaire. Their median knowledge score on a 0-20 scale was 10 (IQR 9.25 – 13). After 1,5-year 10 nurse champions completed the questionnaire of whom two had participated less than six months. Their median score was 14 (IQR 11.25–16.75) (p<0.01).

Table 4 Nursing interventions and diagnostic measurements in the last 24 hours of life.

	Intervention wards			Control wards		
	Pre-Intervention	Post-Intervention	P-value Difference pre-post[a]	Pre-intervention	Post- intervention	P-value difference pre-post[a]
	n=81	n=93		n=114	n=121	
Diagnostic measurements[b] (0-4) Mean (SD)	1.5 (1.6)	1.4 (1.5)	0.81	1.5 (1.6)	1.5 (1.6)	0.86
Artificial nutrition and hydration and blood transfusion[c] (0-4) Mean (SD)	0.7 (0.8)	0.6 (0.7)	0.70	0.8 (0.9)	0.9 (0.8)	0.68
Basic care interventions[d] (0-5) Mean (SD)	2.2 (1.2)	2.3 (1.1)	0.37	2.6 (0.9)	2.5 (0.9)	0.51
Other interventions[e] (0-4) Mean (SD)	0.8 (0.9)	0.4 (0.6)	0.00	0.9 (0.9)	0.7 (0.9)	0.11
Total number of interventions (0- 18) Mean (SD)	5.3 (3.2)	5.0 (2.6)	0.47	6.1 (3.0)	5.8 (3.1)	0.49
[a]Independent samples t-test						
[b]= measurement of blood pressure, temperature, oxygen saturation and blood glucose						
[c]= providing tube feeding, intravenous hydration, intravenous nutrition and blood transfusion						
[d]= hygiene (washing or showering), oral care, urinary catheter care, pain assessment						
[e]= repositioning, wound care, bandaging, suction of secretion						

Table 5 Global quality of last three days of life (QOL3) and quality of dying (QOD).

Variables	Intervention wards			Control wards		
	Pre- intervention	Post-intervention	P-value difference pre-post[a]	Pre- intervention	Post-intervention	P-value difference pre-post[a]
	n=53[b]	n=88[b]		n=91[b]	n=118[b]	
Quality of life during last 3 days: median (mid-80%)	5.0 (2.0-8.0)	5.0 (2.0-7.0)	0.59	5.0 (2.0-7.0)	4.0 (1.0-7.0)	0.84
Quality of dying: median (mid-80%)	7.5 (5.0-9.0)	7.0 (3.0-9.0)	0.02	7.0 (2.6-8.0)	7.0 (3.0-9.0)	0.58
[a]Independent samples Mann-Whitney U-test						
[b]These items were added to the questionnaire after the pilot study so that numbers are not equal to the total groups						

Discussion

In this controlled before and after study, nurses working on wards where palliative care nurse champions were appointed, were more aware of psychological symptom burden in dying patients and more frequently discussed the end of life with patients. Furthermore, non-essential nursing interventions were more frequently discontinued in the last 24 h. In the

post-intervention period, nurses were more often - though not statistically - aware of whether or not the physician had informed the patient about imminent death, which suggests a change towards a more end-of-life care minded attitude. Nurse champions have been found to facilitate successful quality improvement initiatives in various settings [19].

However, the evaluation of an intervention that consists of the implementation of a network of nurse champions is complex [34,38]. Many factors may contribute to the effect of the intervention. The dissemination of knowledge regarding palliative care to colleagues on the ward is uncertain; it remains unclear which healthcare professionals are 'affected' by the intervention, e.g. received education, or experienced that the nurse champions gained more expertise [38]. Individual characteristics and competences of the nurse champions, and contextual characteristics of the workplace, influence successful implementation [39]. Nurse champions' knowledge on palliative care and symptom management did improve during our study. At the start, their knowledge was similar to the knowledge of a randomly selected sample of general nurses in the same hospital [37]. One and a half year later their knowledge had increased to a level that was similar to the advanced knowledge level of palliative care nurses [37]. Nevertheless, implementation of an intervention with a nurses' network faces operational difficulties. The continuation of the network asks for a lot of effort. We noticed the importance of management support, collaboration with the expert team, qualified coordination and coaching of the nurse champions, as well as the intrinsic motivation of nurse champions to continue their work. Problems related to attending meetings during work time, a rapid turnover of nurse champions, and the nomination of junior nurses to the position of nurse champions [24,39]. Therefore, our finding that, despite these complicating factors, the appointment of nurse champions resulted in beneficial changes in clinical practice, can be considered as promising.

The introduction of nurse champions contributed to increased attention for communication about the end of life. In the Netherlands, disclosure of a poor prognosis by a physician has to precede nursing communication about imminent death. In the pre-intervention period, nurses reported that in about one third of the cases it was unknown to them whether the physician had informed the patient and only 25% reported that the physician had explicitly informed patients about the imminence of death. In the post-intervention period nurses tended to more frequently know whether the patient had been informed and whether this information had been given explicitly. Although we did not assess the frequency and quality of physician communication, the increased insight into this communication, as well as the higher frequency of reported patient-related barriers in communication might be the result of improved attention for communication-issues. This coincided with more communication about patients´ imminent death by the nurses, which might have resulted in the increased awareness of whether patients were burdened by psychological symptoms (such as tenseness and anxiety). Shortcomings and barriers have been reported in communication at the end of life

between patients and healthcare professionals, and among the staff [40,41-43]. Nurses consider communication at the end of life, although difficult, to be part of their responsibility; education has been found to contribute to increased confidence in interdisciplinary communication and communication with dying patients [29-31,37,41,44-46]. In our study, increased attention in the intervention wards to palliative care and to physician end-of-life communication might also have contributed to the improved end-of-life communication by nurses.

We also studied nursing interventions and diagnostic measurements during the last 24 h. The implementation of nurse champions had some effect on interventions previously described as 'non-essential care' in the final hours, such as repositioning and bandaging [47]. However, the same applies to diagnostic measurements in the dying phase, for which we found no effect of nurse champions [47]. We found that continuation of diagnostic measurements, and providing tube feeding and intravenous fluids, was associated with relatively late awareness of impending death; this emphasizes the importance of earlier recognition of the approach of death.

Our findings suggest that there was increased attention to appropriate end-of-life care in the intervention wards after the implementation of nurse's champions. The decreased median score for quality of dying in the intervention wards can be explained by increased awareness of the shortcomings in care. We believe this is an important finding for further improvements. Awareness of shortcomings and a sense of urgency are prerequisites for successful changes in care [48].

The effects we found were relatively small and no improvements were found in nurses' awareness of impending death, nor in the awareness of social or existential problems. Our findings might have been affected by the high turnover rate of nurse champions and by the 5-month run-up period which might have been too short for nurse champions to prepare for their new roles before we started the post-intervention assessment. A main element of the intervention is knowledge transfer; this is a complex process that implies that nurse champions first have to improve their own knowledge and then have to learn how to disseminate knowledge and skills among their colleagues in the multidisciplinary team [17-19]. It is suggested that nurse champions can only have an effect when they have knowledge of palliative care, teaching capacities, and authority towards managers, nurse colleagues and physicians [24,31]. Therefore, the training and individual coaching of nurse champions continued until the end of the study, and their competences and confidence have grown incrementally. Therefore, the impact of nurse champions might be larger on the long term and finally yield improvements in the quality of care as experienced by the end-users, i.e. patients and their close relatives.

This study has some limitations. First, we investigated the effect of nurse champions in only one hospital. Second, we only studied the effect on care during the last days of the patient's life; the intervention was aimed at improving palliative care during the entire course of terminal illness.

Third, intervention wards were not randomly chosen, but assigned based on categories of patients likely to need palliative and terminal care in the end-stage of their disease. These wards (e.g. oncology) might have been more motivated to take measures to improve end-of-life care. Cluster randomization would have been a stronger study design; however, obliging wards and nurse champions to make a commitment for almost two years seemed inefficient and likely to yield a significant risk of preliminary discontinuation.

Conclusion

In this study, palliative care nurse champions appeared to have a beneficial effect on the care of dying patients in the hospital. In the post-intervention period nurses more frequently discussed imminent death with the patients, were more often aware of a patient's psychological condition, and more often discontinued non-essential interventions. Furthermore, nurse's insight into physician's end-of-life communication tended to improve, being a prerequisite for their own communication. Increased awareness made nurses more critical about the quality of dying in the hospital. Taking into account the ongoing development of nurse champions, these results are promising.

Disclosures and Acknowlegments

References

1. Cohen J, Houttekier D, Onwuteaka-Philipsen B, Miccinesi G, Addington-Hall J, et al. (2010) Which patients with cancer die at home? A study of six European countries using death certificate data. J Clin Oncol 28: 2267-2273.

2. Houttekier D, Cohen J, Surkyn J, Deliens L (2011) Study of recent and future trends in place of death in Belgium using death certificate data: a shift from hospitals to care homes. BMC Public Health 11: 228.

3. World Health Organization (2014) Global status report on noncommunicable diseases. Geneva, Switzerland.

4. Hui D, Nooruddin Z, Didwaniya N, Dev R, De La Cruz M, et al. (2013) Concepts and definitions for "actively dying," "end of life," "terminally Ill," "terminal care," and "transition of care": A systematic review. J Pain Symptom Manage 47: 77-89.

5. Hales S, Zimmermann C, Rodin G (2008) The quality of dying and death. Arch Intern Med 168: 912-918.

6. Steinhauser KE, Clipp EC, Tulsky JA (2002) Evolution in measuring the quality of dying. J Palliat Med 5: 407-414.

7. Stewart AL, Teno J, Patrick DL, Lynn J (1999) The concept of quality of life of dying persons in the context of health care. J Pain Symptom Manage 17: 93-108.

8. Lynn J, Teno JM, Phillips RS, Wu AW, Desbiens N, et al. (1997) Perceptions by family members of the dying experience of older and seriously ill patients. SUPPORT Investigators. Study to understand prognoses and preferences for outcomes and risks of treatments. Ann Intern Med 126: 97-106.

9. Teno JM, Clarridge BR, Casey V, Welch LC, Wetle T, et al. (2004) Family perspectives on end-of-life care at the last place of care. JAMA 291: 88-93.

10. Klinkenberg M, Willems DL, Van Der Wal G, Deeg DJ (2004) Symptom burden in the last week of life. J Pain Symptom Manage 27: 5-13.

11. Curtis JR, Treece PD, Nielsen EL, Downey L, Shannon SE, et al. (2008) Integrating palliative and critical care: evaluation of a quality-improvement intervention. Am J Respir Crit Care Med 178: 269-275.

12. Walling AM, Asch SM, Lorenz KA, Roth CP, Barry T, et al. (2010) The quality of care provided to hospitalized patients at the end of life. Arch Intern Med 170: 1057-1063.

13. Witkamp FE, Van Zuylen L, Borsboom G, Van Der Rijt CCD, Van Der Heide A (2015) Dying in the hospital: What happens and what matters, according to bereaved relatives. J Pain Symptom Manage 49: 203-213.

14. Grol R, Grimshaw J (2003) From best evidence to best practice: Effective implementation of change in patients' care. Lancet 362: 1225-1230.

15. Wallerstedt B, Andershed B (2007) Caring for dying patients outside special palliative care settings: Experiences from a nursing perspective. Scand J Caring Sci 21: 32-40.

16. Al-Qurainy R, Collis E, Feuer D (2009) Dying in an acute hospital setting: The challenges and solutions. Int J Clin Pract 63: 508-515.

17. Aita M, Richer MC, Heon M (2007) Illuminating the processes of knowledge transfer in nursing. Worldviews Evid Based Nurs 4: 146-155.

18. Rycroft-Malone J (2007) Theory and knowledge translation: Setting some coordinates. Nurs Res 56: 78-85.

19. Woo K, Milworm G, Dowding D (2017) Characteristics of quality improvement champions in nursing homes: A systematic review with implications for evidence-based practice. Worldviews Evid Based Nurs.

20. Greenhalgh T, Russell J (2006) Promoting the skills of knowledge translation in an online master of science course in primary health care. J Contin Educ Health Prof 26: 100-108.

21. Ching TY, Seto WH (1990) Evaluating the efficacy of the infection control liaison nurse in the hospital. J Adv Nurs 15: 1128-1131.

22. Collins M, Robinson D (1996) Bridging the research-practice gap: The role of the link nurse. Nurs Stand 10: 44-46.

23. Ross KA (1982) A program for infection surveillance utilizing an infection control liaison nurse. Am J Infect Control 10: 24-28.

24. Dawson SJ (2003) The role of the infection control link nurse. J Hosp Infect 54: 251-257.

25. Cooper T (2001) Educational theory into practice: Development of an infection control link nurse programme. Nurse Educ Pract 1: 35-41.

26. Cooper T (2004) Delivering an infection control link nurse programme: Improving practice. Br J Infect Control 5: 24-27.

27. Witkamp FE, Van Zuylen L, Van Der Rijt CC, Van Der Heide A (2016) Effect of palliative care nurse champions on the quality of dying in the hospital according to bereaved relatives: A controlled before-and-after study. Palliat Med 30: 180-188.

28. Witkamp FE, Zuylen L, Maas PJ, Dijk H, Rijt CC (2013) Improving the quality of palliative and terminal care in the hospital by a network of palliative care nurse champions: the study protocol of the PalTeC-H project. BMC Health Serv Res 13: 115.

29. Bawn R, Matthews T (2002) Improving palliative care. Nurs Times 98: 34-35.

30. Jack BA, Gambles M, Saltmarsh P, Murphy D, Hutchison T, et al. (2004) Enhancing hospital nurses' knowledge of palliative care: A network nurse programme. Int J Palliat Nurs 10: 502-506.

31. Cotterell P, Lynch C, Peters D (2007) Bridging the gap: Can a link nurse initiative influence palliative care in an acute hospital? Int J Palliat Nurs 13: 102-108.

32. Byron S, Moriarty D, O'Hara A (2007) Macmillan nurse facilitators: Establishing a palliative resource nurse network in primary care. Int J Palliat Nurs 13: 438-444.

33. Thurston J, Waterworth S (2012) 'Making sense': Nurses' experiences of changing practice in caring for dying patients in New Zealand. Int J Palliat Nurs 18: 500-507.

34. Costantini M, Beccaro M (2009) Health services research on end-of-life care. Curr Opin Support Palliat Care 3: 190-194.

35. Campbell M, Fitzpatrick R, Haines A, Kinmonth AL, Sandercock P, et al. (2000) Framework for design and evaluation of complex interventions to improve health. BMJ 321: 694-696.

36. Boet S, Sharma S, Goldman J, Reeves S (2012) Review article: Medical education research: An overview of methods. Can J Anaesth 59: 159-170.

37. Witkamp FE, Van Zuylen L, Van Der Rijt CC, Van Der Heide A (2013) Validation of the Rotterdam MOVE2PC questionnaire for assessment of nurses' knowledge and opinions on palliative care. Res Nurs Health 36: 512-523.

38. Medical Research Council (2000) A framework for development and evaluation of RTC'S for complex interventions to improve health.

39. http://www.rcn.org.uk/__data/assets/pdf_file/0006/481515/004310.pdf

40. Lokker ME, Van Zuylen L, Veerbeek L, Van Der Rijt CC, Van Der Heide A (2012) Awareness of dying: It needs words. Support Care Cancer 20: 1227-1233.

41. Almack K, Cox K, Moghaddam N, Pollock K, Seymour J (2012) After you: Conversations between patients and healthcare professionals in planning for end of life care. BMC Palliat Care 11: 11-15.

42. Mayland CR, Williams EM, Addington-Hall J, Cox TF, Ellershaw JE (2013) Does the 'liverpool care pathway' facilitate an improvement in quality of care for dying cancer patients? Br J Cancer 108: 1942-1948.

43. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/212451/review_academic_literature_on_end_of_life.pdf

44. Adriaansen M, Van Achterberg T, Borm G (2008) The usefulness of the staff-patient interaction response scale for palliative care nursing for measuring the empathetic capacity of nursing students. J Prof Nurs 24: 315-323.

45. Johnston B, Smith LN (2006) Nurses' and patients' perceptions of expert palliative nursing care. J Adv Nurs 54: 700-709.

46. Frommelt KH (1991) The effects of death education on nurses' attitudes toward caring for terminally ill persons and their families. Am J Hosp Palliat Care 8: 37-43.

47. Ellershaw J, Ward C (2003) Care of the dying patient: The last hours or days of life. BMJ 326: 30-34.

48. http://89.248.0.102/upload/Topplederprogrammet/Internsider/Kull9/Litteratur/2.1%20Leading%20Change%20-%20Why%20Transformation%20Efforts%20Fail%20by%20JP%20Kotter.pdf