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## Multicomponent Palliative Care Interventions in Advanced Chronic Diseases: A Systematic Review

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### Abstract

**Background**—Many patients live with serious chronic or terminal illnesses. Multicomponent palliative care interventions have been increasingly utilized in patient care; however, it is unclear what is being implemented and who is delivering these interventions.

**Objectives**—To (1) describe the delivery of multicomponent palliative care interventions, (2) characterize the disciplines delivering care, (3) identify the components being implemented, and (4) analyze whether the number of disciplines or components being implemented are associated with positive outcomes.

**Design**—Systematic review.

**Study Selection**—English-language articles analyzing multicomponent palliative care interventions.

**Outcomes Measured**—Delivery of palliative interventions by discipline, components of palliative care implemented, and number of positive outcomes (eg, pain, quality of life).

**Results**—Our search strategy yielded 71 articles, which detailed 64 unique multicomponent palliative care interventions. Nurses (n = 64, 88%) were most often involved in delivering care, followed by physicians (n = 43, 67%), social workers (n = 33, 52%), and chaplains (n = 19, 30%). The most common palliative care components patients received were symptom management (n = 56, 88%), psychological support/counseling (n = 52, 81%), and disease education (n = 48, 75%). Statistical analysis did not uncover an association between number of disciplines or components and positive outcomes.

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### Declaration of Conflicting Interests

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

**Conclusions**—While there has been growth in multicomponent palliative care interventions over the past 3 decades, important aspects require additional study such as better inclusion of key groups (eg, chronic obstructive pulmonary disease, end-stage renal disease, minorities, older adults); incorporating core components of palliative care (eg, interdisciplinary team, integrating caregivers, providing spiritual support); and developing ways to evaluate the effectiveness of interventions that can be readily replicated and disseminated.

### Keywords

palliative care; interventions; COPD; CHF; cancer; ESRD; review

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### Introduction

In 2012, over 117 million Americans were living with a serious chronic or terminal illness.<sup>1</sup> Most patients with serious illness experience significant symptom burden, which contributes to the poor quality of life and poor patient outcomes.<sup>2-4</sup> This recognition along with the realization that affected patients often have significant unmet spiritual and/or existential needs, lack coordinated care, and have family members with significant caregiver burden has led to the steady growth of palliative care over the past 3 decades. As defined by the World Health Organization, palliative care is a type of care “that improves the quality of life of patients and their families facing the problems associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual.”<sup>5</sup>

One essential aspect of palliative care is its aim to address multiple factors that contribute to patients’ quality of life. Organizations such as the National Consensus Project and National Hospice and Palliative Care Organization have outlined domains of care (eg, ethical, cultural, physical), which serve as a guide to providing quality palliative care.<sup>6</sup> Although guidelines exist, it is unclear whether these components of care are being incorporated into practice. And while palliative care continues to grow and establish itself as an integral part of patient care, our knowledge regarding the types of patients being targeted for palliative interventions, types of providers delivering palliative care, and specific components of care being implemented remains understudied.

Past systematic reviews have focused on evaluating the efficacy of palliative care interventions. In one review, palliative care at the end of life was found to improve symptom management and advanced care planning as well as reduce caregiver burden.<sup>7</sup> A review of palliative care interventions targeting patients with cancer found evidence that they help to reduce symptom burden, anxiety level, and hospital admissions.<sup>8</sup> Finally, another study reviewed the impact of specialized palliative care teams and found inconclusive evidence to support palliative care for selected outcomes (eg, quality of life, economic cost).<sup>9</sup> To our knowledge, no systematic review has examined the characteristics of palliative care interventions and specific components of care being offered to patients. Ascertaining the individual components of these interventions and the types of providers delivering them is

critical in understanding the challenges and gaps that need to be addressed to advance the field.

In this study, we sought to identify multicomponent palliative care interventions implemented for patients with cancer, congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD), and end-stage renal disease (ESRD). These 4 conditions encompass a majority of patients living with either a chronic disease or a terminal illness.<sup>10</sup> We specifically sought to (1) describe and summarize the delivery of palliative care interventions based on disease type and setting, (2) characterize the types of interdisciplinary teams delivering them, and (3) identify the components of each palliative intervention being implemented. As a secondary objective, we sought to determine whether the number of disciplines involved in delivering an intervention or the number of palliative care components delivered was associated with a higher likelihood of achieving a positive outcome. We hypothesized that the likelihood of a positive result would be associated with the number of components being implemented and the number of disciplines delivering care.

## Methods

This systematic review followed a Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols (PRISMA-P) 2015 checklist that was applicable to systematic reviews.<sup>11</sup> Certain parts of the PRISMA checklist (eg, protocol and registration, synthesis of results) were not applicable to our study, given that our purpose was not to conduct a formal meta-analysis.

### Search Strategy

The PubMed, OVID, MEDLINE, CINAHL, and Abstracts in Social Gerontology databases were searched for articles published between January 1, 1980, and December 1, 2015. Key search terms included *palliative care and intervention plus congestive heart failure or chf or end stage heart failure or chronic obstructive lung disease or chronic obstructive pulmonary disease or copd or cancer or end stage kidney disease or end stage renal disease or esrd or chronic kidney disease or chronic kidney failure.*

### Inclusion/Exclusion Criteria

English-language articles reporting on the implementation of a multicomponent palliative care intervention targeting individuals aged 18 years and older with cancer, COPD, ESRD, and/or CHF were eligible for this review. These 4 diseases were selected a priori, given that they are common chronic diseases among adults living in the United States.<sup>10</sup> Given that palliative care seeks to address multiple aspects of a patient's care, we selected for review interventions that were judged to be multicomponent in nature. We defined a priori a multicomponent intervention as a care model that included 2 or more of the following domains: (1) symptom management, (2) psychological support/counseling, (3) spiritual/existential support, (4) advanced care planning, (5) education of illness or disease, (6) care coordination, or (7) bereavement services. Any palliative care intervention that did not specify employing at least 2 of these components was excluded (eg, an intervention only targeting pain relief in patients with cancer).

Furthermore, our objective was to focus on palliative care interventions that were not implemented solely at the end of life. Therefore, we excluded studies that enrolled patients with a prognosis of 6 months or less or were receiving hospice care. Studies targeting more than 1 disease group (eg, CHF and COPD) were included as long as the groups were composed of patients with some combination of the 4 target conditions. Studies evaluating palliative care interventions for patients with other primary illnesses (eg, HIV, dementia, Parkinson disease) were excluded. Articles that described an intervention but did not report outcome data were also excluded.

### Study Selection and Data Abstraction

All abstracts from the initial search were reviewed by 2 investigators (R.D.A., L.M., V.P. or M.C.R.), for possible inclusion in the study. Any uncertainty regarding whether an abstract should be included was brought to the entire group and resolved by discussion. The articles judged to be appropriate after initial screening subsequently underwent a full-text review and were excluded if they did not meet the study's eligibility criteria. The reference lists of all retained articles were also reviewed to identify additional potentially eligible articles. For the final set of articles reviewed, data were abstracted independently by 2 reviewers and compared. Disagreements were resolved through discussion. Data from articles that detailed the same intervention were incorporated into 1 unit of analysis rather than separating them.

Articles were independently abstracted based on the following categories: disease cohort, year of publication, study location and setting, study design, patient demographic data, disciplines delivering the intervention, palliative care components being delivered, whether interventions targeted caregivers, whether explicit communication was described between the palliative care provider and the primary physician/team through face-to-face or written contact and measured outcomes. Outcomes selected for abstraction were based upon a review of a random subset of studies ( $n = 5$ ) in our sample and included signs/symptoms (ie, pain, nausea/vomiting, shortness of breath, fatigue, appetite, anxiety, depression), quality of life, satisfaction with care, advanced care planning, emergency room visits, hospitalizations, and cost of care. These outcomes were categorized in 1 of 3 ways: not evaluated, null improvement in the outcome measured, or a statistically significant improvement in the outcome ( $P < .05$ ).

Study quality was assessed independently by 2 reviewers (T.M.D.C., S.M.) using the Downs and Black quality assessment tool.<sup>12</sup> Any discrepancies were resolved by discussion and if necessary, a review by a third person (V.P.). The tool assesses the overall study quality in 5 areas: reporting, external validity, internal validity—control of bias, internal validity—confounding, and power. It is a 27-item checklist where total scores range from 0 to 32, with 32 being the highest quality.

### Statistical Models and Analysis

Descriptive statistics were used to detail study interventions. Each of the 13 measured outcomes (eg, pain, nausea) was examined in a series of generalized mixed models with binomial error assumption and logit link function (the outcomes are 0/1, null, or positive result). Studies were included as levels of a random classification factor.

The first models examined each outcome as a function of the number of disciplines involved in a study and as the number of domains. The second set of models examined the specific domains, with fixed classification factors included for the involvement of a physician (no, yes), a nurse, a social worker, a chaplain, a physical/occupational therapist, and a psychologist. A limited examination of interactions between these factors was carried out, but the sparsity of the data (not all disciplines involved in all studies) precluded a thorough examination. It also limited the ability to look at some of the less-frequently involved disciplines even as main effects. The third set of models was analogous to the second set but examined each component of care as a classification factor (symptoms management, spiritual, etc). The same limitations apply to domain as described for discipline. A final basic model included a repeated-measures factor for multiple outcomes (eg, pain vs nausea) for the purposes of comparing the relation of more than 1 outcome to number of components and number of disciplines (eg, whether there are greater effects for pain than for fatigue).

In a series of additional models, in each of the above model types, additional variables were included as a fixed classification factor (separate models for each factor). These additional variables included disease type (cancer, CHF, COPD), year of publication (2010 and before vs 2011 and after), study type (randomized controlled trial vs observational), and country (United States versus other).

## Results

### Study Selection

Our search strategy yielded a total of 1519 citations. After applying our eligibility criteria, 71 articles were retained for analysis, which detailed 64 unique multicomponent palliative care interventions. A flow diagram of the article selection process is shown in Figure 1.

### Description of Multicomponent Palliative Care Interventions

Table 1 summarizes the 64 interventions. There was an increase in number of interventions studied over the study period (1980–2015), with 2 interventions prior to the year 2000, 22 between 2001 and 2010, and 40 between 2011 and 2015. A majority (n = 45, 70%) targeted patients with cancer followed by CHF (13%), mixed disease (11%), COPD (3%), and ESRD (3%). Most interventions studied were conducted either in the United States (n = 37, 58%) or in Europe (23%), and in the 43 studies that reported participant mean age, the calculated mean age of participants in this subgroup of studies was 65.4 years (range: 51–81).

Most studies were designed as RCTs (n = 30, 47%) or observational studies (44%). These interventions were conducted in various settings, including outpatient (n = 21, 33%), inpatient (17%), home (16%), and mixed (34%) venues. Of the 64 interventions, 24 (38%) incorporated caregivers and/or families and 24 (38%) explicitly reported communication between the palliative care provider and the primary physician/team.

### Delivery of Palliative Care by Discipline

As a group, nurses were most often involved in delivering the various interventions (n = 64, 88%) followed by physicians (67%), social workers (52%), chaplains (30%), physical/

occupational therapists (27%), and psychologists (22%). The total number of disciplines involved varied widely, with 14 (22%) interventions being delivered by 1 discipline, 15 (23%) by 2, 10 (16%) by 3, 6 (9%) by 4, 12 (19%) by 5, and 4 (6%) by all 6 disciplines. Three (5%) studies did not incorporate any of the 6 disciplines since the interventions were educational in nature.

### Components of Palliative Care Being Delivered

Table 2 details the specific components delivered as part of each intervention. The most common component was symptom management ( $n = 56$ , 88%) followed by psychological support/counseling (81%), education (75%), care coordination (50%), advanced care planning (45%), spiritual/existential support (33%), and bereavement services (9%). The total number of components delivered as part of each intervention varied considerably, with 5 (8%) interventions employing 2 components, 30 (47%) employing 3, 11 (17%) employing 4, 11 (17%) employing 5, 4 (6%) employing 6, and 3 (5%) interventions incorporating all 7 components of palliative care.

### Relation of Outcomes to Disciplines and Components

Few statistically significant relationships were found between disciplines and outcomes or between components and outcomes. The outcome for which there is such a relation—for disciplines but not for components—is quality of life based on the analysis of the starred references.\* Some of the measurement tools used to assess quality of life in these studies included: Medical Outcomes Study 36 Short Form; European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30); Spitzer Quality of Life Uniscale; and the Functional Assessment of Cancer Therapy-General (FACT-G) scale. The regression of quality of life on number of disciplines is significant ( $P = .05$ ), adjusting for number of components. Further examination shows that this result is owing solely to the involvement of a physician (the proportion of successful studies is 0.31 when no physician, 0.65 when there is one) and or a physical/occupational therapist (the proportion of successful studies is 0.40 when no physical/occupational therapist, 0.82 when there is one).

### Quality Rating of Studies

The mean Down and Black score for all 71 studies was 18.3 (standard deviation score  $\pm 3.5$ ), with a range from 11 to 23. Interrater agreement was calculated to be 89%. Overall, a majority of studies (81%) scored highest in the reporting section and lowest in the power section (35%). Several studies failed to document adverse events and did not blind participants or researchers to the interventions.

### Discussion

Our review evaluated multicomponent palliative care interventions targeting patients with cancer, CHF, COPD, or ESRD, spanning the past 3 decades. We found that a substantial majority of studies focused on patients with cancer; that nurses and physicians deliver many of the interventions; and that symptom management, disease education, and psychosocial

\*References 17,25,26,30,33,39,44,47,49,50,53,55,56,58,59,61,65,69,70



support were the main components being implemented. To the best of our knowledge, this is the first study to analyze palliative care interventions by disciplines and components of care.

While past reviews sought to analyze palliative care interventions with respect to their potential efficacy, our study sheds new light on how these multicomponent interventions are actually being delivered and implemented and have important implications for future research efforts. Our results confirm that certain groups of patients with significant palliative care needs (eg, those with COPD and ESRD) were rarely studied. Only 4 studies solely targeted patients with either COPD or ESRD, even though these 2 groups are known to experience significant symptom burden.<sup>84,85</sup> In addition, as our population continues to age, older adults are living longer with multiple chronic illnesses and have significant palliative care needs.<sup>86</sup> Yet, the mean age of participants in our review was 65.4 years, which in the geriatric literature would be characterized as the “young-old.”<sup>87</sup> “Middle-old” (ie, 75–84 years) and “old-old” (ie, 85 years and older) adult populations were less-frequently studied, which may be due to the high number of interventions targeting younger patients with cancer. Another factor which may contribute to this finding is that we excluded palliative care interventions focused on patients at the end of life, skewing a selection of interventions targeting a younger cohort. Finally, few studies explicitly enrolled minorities and, in those that did, none of them assessed for differences in treatment outcome as a function of race/ethnicity status. In the United States, minorities tend to have poorer access and lower satisfaction with medical care so it is crucial that future studies enroll minorities and do formal evaluations to see whether treatment differences occur as a function of race/ethnicity.<sup>88–90</sup> Subgroup analysis of these understudied groups could also be a focus of future analyses. Although palliative care has made significant inroads over the past 3 decades, a better understanding of the barriers to developing and studying multicomponent palliative care interventions in these and other understudied patient populations is urgently needed.

It is also important to highlight that a significant number of the interventions reviewed did not deliver what most would consider essential aspects of palliative care. We found that more than a quarter (27%) had only 1 discipline delivering care, indicating a lack of interdisciplinary involvement. Furthermore, only a third incorporated a spiritual component and only 38% delivered an intervention that specifically targeted caregivers/family members. Challenges in the field that may contribute to these findings include limited funding, lack of a trained workforce to deliver care, and the difficulty in incorporating multiple disciplines and/or components into practice.<sup>91,92</sup> With only 5% of interventions incorporating all 7 components of palliative care, offering “comprehensive” palliative services to patients appears to be a challenge we are yet to address fully. Future research should address reasons behind these shortcomings, and also seek to understand whether these types of components, which were infrequently delivered, lead to improved patient and family/caregiver outcomes.

We hypothesized that more disciplines or more components of care would be associated with greater efficacy. However, our analysis did not support our hypothesis besides an association between number of disciplines and quality of life. While this outcome was coherent across several models, with 13 outcomes being examined and only 1 of them being significant, there might be a concern about a chance finding. A few reasons may help explain the overall finding of these null results. For one, while 2 interventions may

incorporate the same discipline or component, the delivery of the interventions was rarely uniform, which makes it difficult to distinguish whether the actual implementation of the intervention or the component/discipline contributed to the lack of effectiveness. In addition, given the lack of data, the intensity and duration of the intervention were not taken into account in this analysis, which could have played a significant factor in positive outcomes.

We found substantial variability regarding the components of palliative care that were delivered and the disciplines delivering them. This level of variability represents a challenge when attempting to analyze results and when trying to draw broader conclusions. The heterogeneity of how interventions are implemented, studies are designed, and outcomes are measured in the field of palliative care are challenges that have been expressed by previous researchers in the field.<sup>7,9</sup> Tackling heterogeneity through statistical means (ie, calculating  $I^2$ ) will be important to implement in future reviews; however, it is also important to account for clinical and methodological heterogeneity for which there are no current established guidelines in place. Future reviews will need to be more rigorous in selecting appropriate palliative interventions that are comparable in terms of clinical and methodological study design in order to reduce heterogeneity and draw more conclusive results.

A challenge in palliative medicine research is to identify the components necessary for an intervention to achieve effective results. Our findings highlight the need for concerted efforts to deconstruct carefully what components are necessary and sufficient to achieve effective interventions to advance the field. This is critical to gain better insight into the specific, indivisible components of a palliative care intervention that allow it to succeed and be replicated. This is a major challenge because palliative care itself encompasses care that is integrated and multidimensional. This multidimensional piece needs to be better understood in order to create reproducible and efficient interventions that positively impact patients and caregivers/families. One step toward accomplishing this is to choose appropriate outcome measures that are standardized and validated for the specific intervention at hand.<sup>93</sup> Outcome measures should encompass a wide range of components including the structure and process of care, psychological and psychiatric elements of care, spiritual, religious, and existential components of care, cultural aspects of care, and caregiver outcomes. Existing instruments need to be reviewed and appropriate for use across diverse clinical settings and patient populations. As these measures are clarified, and then hopefully adopted, the field will be able to advance with a much needed incorporation of standard measures and can build on meaningful components of care that can be universally integrated in future work.

Furthermore, there needs to be a concerted effort to conduct higher-quality palliative care studies. Challenges around designing high-quality palliative care interventions have been acknowledged in the past.<sup>94,95</sup> While there are obstacles unique to the field of palliative care, given the targeted patient population and the interventions being delivered, conducting multicentered trials, calculating power to recruit the appropriate number of study participants, and using standardized measurement tools are just some key areas that need to be implemented for results to be clinically useful.

Our study has several limitations. While we believe our search strategy was comprehensive, there may have been articles that were missed. We also excluded articles not written in



English. In addition, we excluded interventions that only targeted patients at the end of life so this review may not accurately reflect palliative care interventions published during the study period. Finally, given the heterogeneity in the quality of studies and in how interventions were implemented, drawing firm conclusions regarding efficacy is a challenge. Therefore, future reviews focused on including more homogeneous interventions may result in more robust findings.

In conclusion, this systematic review provides readers with an analysis of multicomponent palliative care interventions targeting patients with cancer, CHF, COPD, and/or ESRD over the past 3 decades. It is promising to see the proliferation of palliative care interventions during this period. However, notable deficits were identified, including the paucity of studies targeting those with COPD or ESRD, minorities, and older adults (85 and above) since these groups have significant palliative care needs. In addition, sizeable numbers of studies in our review did not include key components of palliative care (eg, interdisciplinary team, incorporating caregivers, providing spiritual support). Finally, understanding how best to evaluate the effectiveness of multicomponent interventions that can be replicated and readily disseminated constitutes the key future research needs in the field of palliative medicine.

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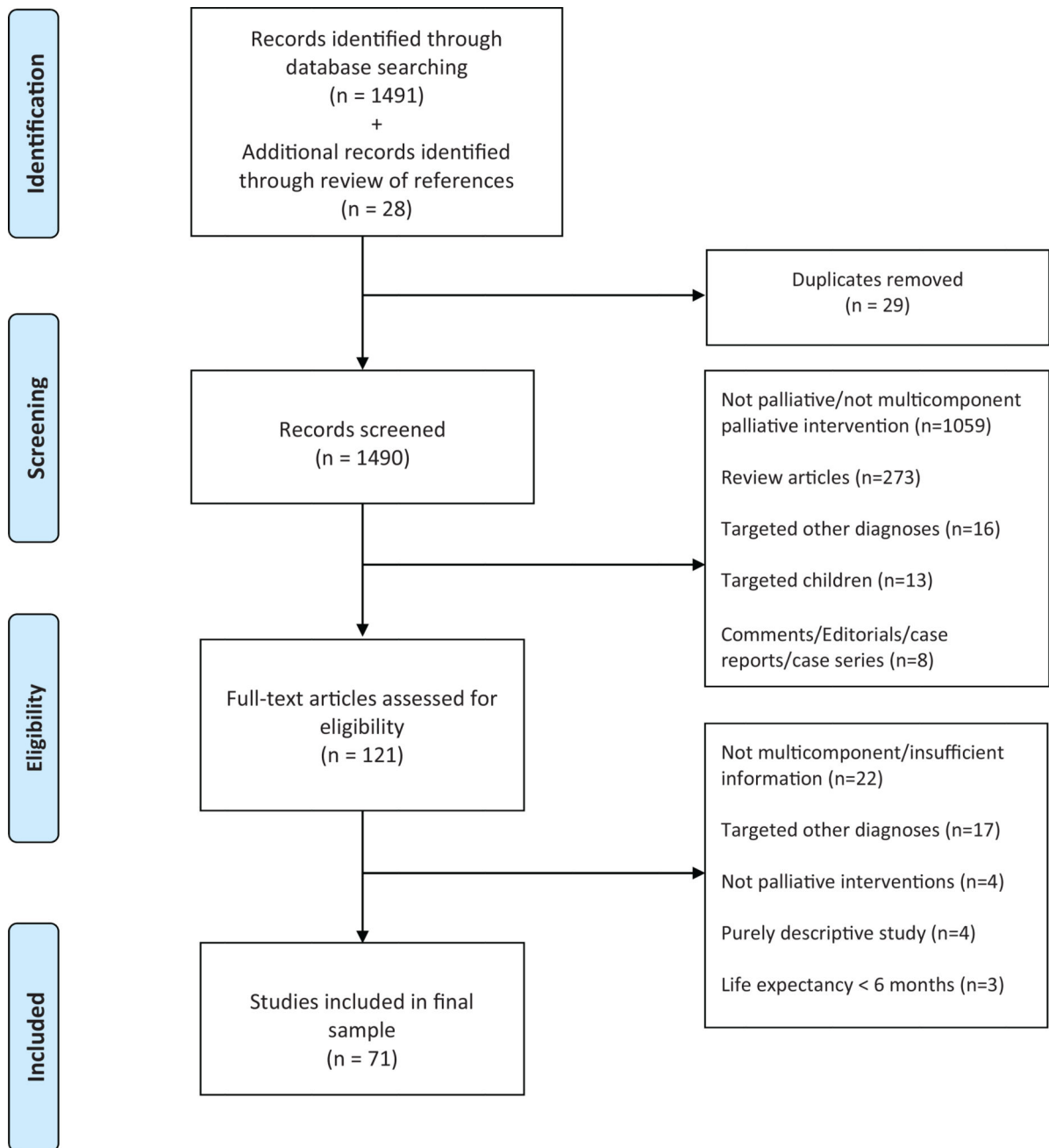
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**Figure 1.**  
Flow diagram of article selection.

**Table 1**

## Description of Multicomponent Palliative Care Studies.

	Total (%)	Cancer Studies	Noncancer Studies
Disease(s) targeted			
Cancer	45 (70)		
Congestive heart failure (CHF)	8 (13)		
COPD	2 (3)		
ESRD	2 (3)		
Mixed (cancer, CHF, COPD, and/or ESRD)	7 (11)		
Year of publication			
2011–2015	40 (63)	27	13
2001–2010	22 (34)	16	6
2000 or earlier	2 (3)	2	0
Study design			
Randomized controlled trial	30 (47)	20	10
Observational	28 (44)	20	8
Mixed methods	6 (9)	5	1
Study location			
United States	37 (58)	27	10
Europe	15 (23)	10	5
Other	8 (13)	6	2
Canada	4 (6)	2	2
Number of participants			
Median	150.5		
Mean	306	234	479
Range	14–6218	14–882	17–6218
Age <sup>a</sup>			
Mean (range)	65.4 (51–81)	63.2	71.4
Study setting			
Mixed	22 (34)	15	7
Outpatient	21 (33)	18	3
Inpatient	11 (17)	9	2
Home	10 (16)	3	7
Number of interventions that targeted caregivers			
	24 (38)	14	10
Communication between palliative provider(s) and primary physician/team			
Not reported	40 (62)	31	9
Reported	24 (38)	14	10
Studies providing race/ethnicity data			
	31 (48)		

Abbreviations: CHF, congestive heart failure; COPD, chronic obstructive pulmonary disease; ESRD, end-stage renal disease.

<sup>a</sup>Of the 64 interventions, 43 reported mean age.

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Table 2

## Components of Palliative Care Intervention.

Study and Year	Symptoms	Spiritual	Education	Bereavement	Care Coordination	Psychosocial	Goals of Care	Total
Cancer								
McCorkle, <sup>13</sup> 1989	✓			✓	✓	✓	✓	5
Ellershaw, <sup>14</sup> 1995	✓		✓		✓			3
Jordhoy, <sup>15,16</sup> 2000, 2001	✓	✓	✓		✓	✓		5
Given, <sup>17</sup> 2002	✓		✓		✓	✓		4
Comer, <sup>18</sup> 2003	✓		✓		✓	✓		4
Jack, <sup>19</sup> 2003	✓		✓			✓		3
Ahner-Elmqvist, <sup>20</sup> 2004	✓	✓				✓		3
Elsayem, <sup>21</sup> 2004	✓	✓				✓	✓	4
Meyers, <sup>22</sup> 2004	✓				✓	✓	✓	4
Strasser, <sup>23</sup> 2004	✓	✓	✓			✓	✓	5
Northouse, <sup>24</sup> 2005	✓		✓			✓		3
Strongren, <sup>25</sup> 2005	✓					✓	✓	2
Rummans, <sup>26</sup> 2006		✓	✓			✓		3
Northouse, <sup>27</sup> and 2007	✓		✓			✓		3
Borneman, <sup>28</sup> 2008	✓		✓			✓		3
Seow, <sup>29</sup> 2008	✓	✓	✓		✓	✓	✓	6
Bakitas, <sup>30</sup> 2009, Maloney, <sup>31</sup> 2012	✓		✓		✓	✓	✓	5
Follwell, <sup>32</sup> 2009	✓		✓		✓	✓		4
Temel, <sup>33,34</sup> 2010, 2011, Greer, <sup>35</sup> 2011, Pirl, <sup>36</sup> 2012	✓		✓			✓	✓	3
Meyers, <sup>37</sup> 2011	✓		✓			✓		3
Colombet, <sup>38</sup> 2012	✓				✓	✓	✓	4
Dyar, <sup>39</sup> 2012			✓			✓	✓	3
Serfaty, <sup>40</sup> 2012		✓	✓			✓		3
Tuca-Rodriguez, <sup>41</sup> 2012	✓				✓	✓		3
Wallen, <sup>42</sup> 2012	✓	✓				✓		3

Study and Year	Symptoms	Spiritual	Education	Bereavement	Care Coordination	Psychosocial	Goals of Care	Total
Yennurajalingam, <sup>43</sup> 2012	✓		✓			✓	✓	4
Chasen, <sup>44</sup> 2013	✓					✓		2
Daly, <sup>45</sup> 2013	✓	✓	✓		✓	✓	✓	6
Kao, <sup>46</sup> 2013	✓		✓			✓		3
Koczywas, <sup>47</sup> 2013	✓	✓	✓		✓	✓		5
Morita, <sup>48</sup> 2013	✓		✓		✓			3
Nakau, <sup>49</sup> 2013		✓	✓			✓		3
Northouse, <sup>50</sup> 2013	✓		✓			✓		3
Young, <sup>51</sup> 2013			✓		✓			3
Zhang, <sup>52</sup> 2013	✓		✓			✓		3
Ozcelik, <sup>53</sup> 2014	✓		✓			✓		3
Paris, <sup>54</sup> 2014	✓				✓		✓	3
Sun, <sup>55</sup> 2014	✓	✓	✓		✓	✓		5
Zimmermann, <sup>56</sup> 2014	✓	✓			✓	✓		5
Bakitas, <sup>57</sup> 2015	✓		✓		✓		✓	4
Clark, <sup>58</sup> 2015		✓	✓			✓	✓	4
Ferrell, <sup>59</sup> 2015	✓	✓	✓		✓			5
McCorkle, <sup>60</sup> 2015	✓		✓		✓		✓	4
Rabow, <sup>61</sup> 2015	✓	✓	✓	✓	✓	✓	✓	7
Rocque, <sup>62</sup> 2015	✓		✓		✓	✓	✓	5
Congestive heart failure								
Pattenden, <sup>63</sup> 2012	✓		✓			✓		3
Schwarz, <sup>64</sup> 2012	✓		✓				✓	3
Branstrom, <sup>65</sup> 2014	✓		✓			✓		3
Bekelman, <sup>66</sup> 2014	✓			✓		✓		3
Bekelman, <sup>67</sup> 2015	✓		✓			✓		3
Liljeroos, <sup>68</sup> 2015			✓			✓		2
Sahlen, <sup>69</sup> 2015	✓		✓	✓	✓	✓	✓	6
Sidebottom, <sup>70</sup> 2015	✓						✓	2

Study and Year	Symptoms	Spiritual	Education	Bereavement	Care Coordination	Psychosocial	Goals of Care	Total
Chronic obstructive pulmonary disease								
Horton, <sup>71</sup> 2013	✓		✓		✓			3
Buckingham, <sup>72</sup> 2015	✓	✓				✓		3
End-stage renal disease								
Weisbord, <sup>73</sup> 2003	✓		✓				✓	3
Chan, <sup>74</sup> 2015	✓	✓	✓	✓	✓	✓	✓	7
Mixed								
Brumley, <sup>75</sup> 2003, Enguidanos, <sup>76</sup> 2005	✓	✓	✓		✓	✓	✓	6
Rabow, <sup>77,78</sup> 2003, 2004	✓	✓			✓	✓	✓	5
Aiken, <sup>79</sup> 2006	✓		✓		✓	✓	✓	5
Engelhardt, <sup>80</sup> 2006		✓	✓		✓		✓	3
Brumley, <sup>81</sup> 2007	✓	✓	✓	✓	✓	✓	✓	7
Abernethy, <sup>82</sup> 2013	✓					✓		2
Seow, <sup>83</sup> 2014	✓		✓		✓	✓		4
Total percentage	88	33	75	9	50	81	45	