

Implementation of integrated care for patients with cancer: a systematic review of interventions and effects

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Abstract

Purpose. To review integrated care interventions and their effects on the quality of care for patients with cancer.

Data sources. Search in Medline and Cochrane Library databases from January 1996 to October 2006.

Study selection. Randomized controlled trials and controlled before–after studies in which the intervention focused on at least one of the three principles of integrated care: patient-centredness, organization of care and multidisciplinary care.

Data extraction and results. Of the 1397 references, 33 studies were included and analysed. No study focused on all three principles of integrated care: 16 studies focused on patient-centredness (48%), 14 on the organization of care (42%), 1 on multidisciplinary care and 2 on both patient-centredness and organization of care. There was a large variation in interventions reported and in outcomes used for evaluation. Effective interventions to improve patient-centredness are the ‘provision of an audiotape of the consultation to the patient’, ‘provision of information to patients’ and ‘use of a decision aid’. Effective interventions to improve the organization of care can be ‘follow-up’ and ‘case management’, especially by nurses and ‘one-stop clinics’.

Conclusion. To improve integrated care for patients with cancer, a multicomponent intervention programme is required focusing on patients, professionals and the organization of care. The promising interventions found in this review should be part of this programme. This programme should be evaluated using rigorous methods and unequivocal outcome measures linked to the intervention.

Keywords: integrated care, neoplasms, health services research, quality improvement

Introduction

As a cause of death in the USA and Europe, cancer is exceeded only by cardiovascular disease [1, 2]. Earlier diagnosis, improved treatment modalities, and enhanced supportive care result in cancer taking more and more on the characteristics of a chronic disease [3]. The management of care for cancer patients is complex. First, cancer has a very significant impact on the patient’s physical, emotional and social well-being. Second, various professionals are involved in prevention, diagnosis, treatment and follow-up. This complexity can lead to suboptimal care and result in discontinuity and fragmentation of care [4]. Integrated care can help to solve this problem [4].

The essence of integrated care is that it is organized around the needs and preferences of patients, that patients

are actively involved in decisions about their own care (*patient-centredness*), that care is given in optimal collaboration of all the professionals involved (*multidisciplinary care*) and that seamless and continuous care is given with optimal coordination and organization of the total care process (*organization of care*) [5, 6]. Naturally, integrated care should also be based on the general principles of evidence-based medicine and continuous quality improvement.

Reviews of integrated care interventions for patients with heart failure, diabetes mellitus, rheumatoid arthritis, cardiovascular disease, stroke, chronic obstructive pulmonary diseases and chronic illnesses, in general, are available, but there are no such reviews for patients with cancer [7]. The interventions for improving integrated care in the reviews are: patient self-management support and education,

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arrangements for clinical follow-up, case management, introduction of a multidisciplinary patient-care team and a systematic evidence-based approach to change processes of care, for example, by using clinical pathways [7]. We found positive trends in effects of integrated care, mainly on functional health status, quality of life, patient satisfaction and intervention outcomes as guideline adherence [7].

To improve integrated care for patients with cancer, it is important to know which interventions sustain the principles of integrated care and to find out what is known about their effectiveness.

Methods

Search strategy

We searched Medline, the Cochrane Database of Systematic Reviews, the Cochrane Database of Abstracts of Reviews of Effects and the Cochrane Central Register of Controlled Trials for the period from January 1996 to October 2006. Our search strategy for Medline expanded the ‘gold standard’ search strategy of the Cochrane Effective Practice and Organisation of Care Group (EPOC) [8] with the MeSH terms ‘organization and administration’ or ‘patient-care management’ and the term ‘neoplasms’. The EPOC is a Cochrane Review Group of the Cochrane Library focusing on reviews of interventions designed to improve professional practice and the delivery of effective health services. We searched the Cochrane Library with the ‘gold standard’ search strategy of the EPOC for the Cochrane Library and the same MeSH terms we used for Medline, but with the term ‘neoplasms’ or ‘cancer’.

Inclusion criteria

We included studies that were written in English and that focus on a rigorous evaluation of an integrated care intervention or of a programme with the aim of improving care for adult patients with cancer in hospital or in an out-patient setting. Rigorous evaluations comprised randomized controlled trials, interrupted time series and controlled before–after studies. The intervention or programme had to consider one of the three principles of integrated care: patient-centredness, multidisciplinary care or organization of care. Studies that evaluated interventions for preventive health care, genetic counselling, complementary medicine and palliative care were excluded. Two reviewers (M.O. and M.H.) independently screened titles and abstracts, and if they were potentially relevant, the full-text articles were retrieved. In addition, the reference lists of the retrieved studies were screened for relevant publications.

Data extraction

A structured form, based on the data collection list of the EPOC [8], was used to extract the data: focus of the study, interventions, outcome measures, results and quality criteria.

Study quality was assessed against five methodological criteria published by the Cochrane Collaboration:

- Follow-up (at least 80% of the study population).
- Reliable outcomes (agreement of 90%, $\kappa > 0.8$, outcomes from some automated system or validated instruments with Cronbach’s $\alpha > 0.7$).
- Protection against contamination (it was unlikely that the control group received the intervention).
- Baseline measurement (performance and patient outcomes were measured prior to the intervention and no substantial differences were present, or the study was corrected for baseline).
- Concealment of allocation (randomization process is described explicitly).

To be included, the studies had to fulfil at least three of the five quality criteria.

The studies were distributed among a group of reviewers who contributed to a previous review on integrated care [7] (M.O., M.H., R.H., M.F., H.M. and H.W.), and always two reviewers independently extracted the data and assessed the quality of relevant studies. Outcomes within specific patient subgroups (e.g. women) were not included if the overall outcomes were reported. In the case of discrepancies between the two reviewers, a third reviewer was consulted. Our abstraction process showed good inter-rater reliability.

Data synthesis

Because of the heterogeneity of the interventions, patient populations and reported outcomes, we could not statistically pool the results of the studies. Instead, we qualitatively assessed the type of integrated care interventions for cancer patients and their reported effects. We grouped the studies according to intervention type. We distinguished four categories of study outcomes. The first category, the ‘intervention outcomes’, includes those outcomes that are most directly linked to the integrated care intervention itself. We consider the ‘intervention outcomes’ to be the most important when judging the effectiveness of an intervention, as they tend to be immediate and less likely to be confounded by other factors [9, 10]. For example, an intervention aimed at improving ‘patient-centredness’ may have selected an outcome measure closely related to this intervention such as ‘the number of questions asked by the patient’ or ‘the proportion of patients indicating that professional care was tailored to their needs’. Similarly, an intervention outcome regarding the ‘organization of care’ could be ‘the proportion of patients followed up’ or ‘the proportion of “case managed” patients’.

The other categories were: satisfaction (patient and/or professional), subjective health outcomes (e.g. quality of life and anxiety) and objective health outcomes (e.g. mortality and morbidity). Outcomes were reported as ‘having a positive effect’ if there was a significant difference between the intervention and control groups ($P < 0.05$). If more outcomes were used within one category, the intervention was qualified as ‘having a positive effect’ when more than half of the outcomes had significant positive effects.

Results

Search strategy

We identified 1397 references with the initial search strategy. We excluded 1187 studies on the basis of titles and abstracts. After more detailed assessment, 33 studies met the inclusion criteria and were included in the final analysis (Fig. 1). The most common reasons for exclusion were non-randomized design, uncontrolled before–after design and an intervention that did not specifically maintain integrated care principles. Eighteen studies were excluded because they fulfilled fewer than three quality criteria. One new study was found in the reference lists of the included studies. Of the 33 included studies, 31 were randomized or quasi-randomized controlled trials and 2 were controlled before–after studies.

Participants and settings

Most studies were undertaken in the UK (39%), the USA (18%) and Canada (15%). Forty-two per cent of the studies involved patients with breast cancer and 39% of the studies involved patients with different kinds of cancers. The other studies involved patients with lung cancer (two studies), prostate cancer (two studies), colorectal cancer (one study) and gastric cancer (one study) (Table 1).

Quality criteria

Only one study fulfilled all five quality criteria [11]. Of the 33 included studies, 26 (79%) had a follow-up of the study population of at least 80%. The criteria ‘reliable outcomes’ was used in 29 studies (88%); many studies reported satisfaction outcomes or subjective health outcomes (67%) that were determined with validated instruments. A baseline measurement was provided in 24 studies (72%). Both ‘protection against contamination’ and ‘concealment of allocation’ were met in 18 studies (55%) (see online supplementary material, Appendix).

Interventions and outcomes

Integrated care interventions maintaining the principle of patient-centredness were found in 16 of the 33 studies (48%), maintaining the principle of organization of care in 14 studies (42%) and maintaining the principle of multidisciplinary care in 1 study. Two studies evaluated interventions maintaining both the principles of patient-centredness and organization of care (Table 1). Outcomes directly linked to the integrated care intervention were measured in 25 studies (76%). Twenty-two studies reported on satisfaction (67%) and 22 on subjective health outcomes, such as quality of life and anxiety (67%). Objective health outcomes, such as morbidity and mortality, were assessed in five studies (15%) (Table 2).

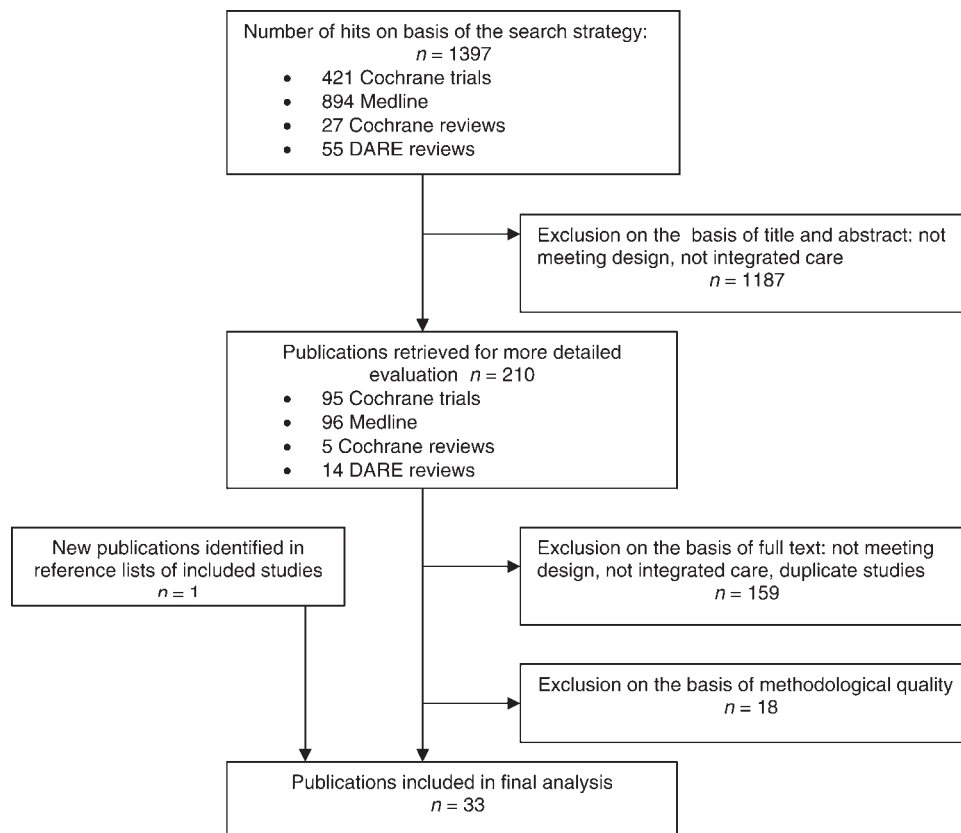


Figure 1 Selection process for studies included in the analysis.

Table 1 Characteristics of the interventions categorized by the three principles of integrated care

Year, country	Study population	Intervention
<i>Patient-centredness</i>		
2005, USA [11]	Breast cancer	<i>Information to patients (n = 3)</i> Preparatory video
2004, Australia [12]	Various cancers	Consultation preparation package
1999, UK [13]	Various cancers	Personalized computer information
2005, USA [17]	Breast cancer	<i>Decision aids for patients (n = 5)</i> Patient-specific decision aid
2004, Canada [18]	Breast cancer	Written in visual decision aid
2002, Canada [14]	Breast cancer	Personal decision profile
2001, Netherlands [16]	Breast cancer	Interactive CD-ROM
2001, Canada [15]	Breast cancer	Audiotape and workbook
2000, Netherlands [20]	Various cancers	<i>Audiotaped consultation (n = 2)</i> Audiotape of consultation
1999, Canada [19]	Various advanced cancers	Audiotape and written recommendations
2002, Netherlands [22]	Various cancers	<i>Patient-mediated interventions (n = 4)</i> Profile with quality-of-life information
2002, USA [23]	Breast cancer	Consultation planning session
2001, Australia [21]	Various cancers	Question sheet and active doctor
2000, Canada [24]	Lung cancer	Patient-specific quality-of-life information
2003, UK [26]	Oncologists	<i>Communication training for professionals (n = 2)</i> Communication skills training
2002, UK [25]	Oncologists	Communication course and feedback package
<i>Organization of care</i>		
2005, Denmark [32]	Colorectal cancer	<i>Follow-up by nurses (n = 7)</i> Home visits and calls by specialized nurses
2004, UK [33]	Breast cancer	Early discharge and nurse-led follow-up
2002, UK [27]	Breast cancer	Patient-initiated follow-up en support by nurse
2002, UK [31]	Lung cancer	Nurse-led follow up
2001, UK [28]	Prostate and bladder	Nurse-led follow up
2000, USA [30]	Various cancers	Home visits and calls by specialized nurses
2000, Sweden [29]	Prostate cancer	Follow-up by specialist nurse
2005, Norway [36]	Various cancers	<i>Follow-up by GP (n = 3)</i> GP follow-up
1999, UK [35]	Breast cancer	Follow-up by own GP
1996, UK [34]	Breast cancer	Follow-up by GP according standards
2003, USA [37]	Breast cancer	<i>Case management (n = 2)</i> Nurse case management
2002, USA [38]	Various cancers	Computer-based nursing intervention
2002, UK [39]	Suspicion breastcancer	<i>One-stop clinic (n = 2)</i> One-stop clinic
1998, UK [40]	Suspicion breastcancer	One-stop clinic and same day diagnosis
<i>Multidisciplinary care (n = 1)</i>		
2002, UK [41]	Gastric cancer	Radiologist working with MD-team
<i>Patient-centredness and organisation of care (n = 2)</i>		
2003, Denmark [42]	Various cancers	Shared-care programme
2001, UK [43]	Various cancers	Patient-held record

Patient-centredness

Regarding patient-centredness, 3 of the 16 studies involved the provision of information to patients [11–13], 5 reported the

effects of decision aids [14–18], 2 tested the effectiveness of providing an audiotape of the consultation to the patient' [19, 20], 4 had 'patient-mediated interventions' [21–24]

Table 2 Summary of effectiveness of the interventions

Intervention	Intervention outcomes ^a (<i>n</i> = 25)	Satisfaction ^a (<i>n</i> = 22)	Subjective health outcomes ^a (<i>n</i> = 22)	Objective health outcomes ^a (<i>n</i> = 5)
<i>Patient-centredness</i>				
Information to patients [11–13]	2/3	0/3	0/3	
Decision aids for patients [14–18]	3/5	2/3	1/3	
Audiotaped consultation [19, 20]	2/2	2/2	0/1	
Patient-mediated interventions [21–24]	0/4	1/4	0/2	
Communication training for professionals [25, 26]	0/2	0/1		
<i>Organization of care</i>				
Follow-up by nurses [27–33]	2/4	1/5	0/6	1/4
Follow-up by GP [34–36]	0/1	1/2	0/2	
Case management [37, 38]	1/1	1/1	0/1	1/1
One-stop clinic [39, 40]			2/2	
<i>Multidisciplinary care</i>				
Multidisciplinary team [41]	1/1			
<i>Combinations</i>				
Shared-care programme [42]	1/1	1/1	0/1	
Patient-held record [43]	0/1		0/1	

^aThe numerator represents the number of studies with a significant difference between intervention group and control ($P < 0.05$) and denominator represents the number of times that studies used this type of outcome measure.

(intervention to change the performance of health-care providers by seeking feedback from patients) and 2 reported on the effects of communication training for professionals [25, 26] (Table 1). All the studies reported on outcomes that were directly linked to the intervention (e.g. ‘number of questions asked to the physician’, ‘recall of information’ and ‘decision for adjuvant therapy or breast-conserving therapy’).

Most interventions including some form of information provision to patients (i.e. ‘information to patients’ [11–13], ‘decision aids’ [14–18] and ‘audiotape of the consultation given to patients’ [19, 20]) showed significant positive effects on intervention outcomes (Table 2). Decision aids and audiotapes of consultations also had positive effects on patient satisfaction [16, 18–20]. Only one study [16] showed positive effects on subjective health outcomes; a decision aid improved the quality of life for patients with breast cancer [16]. No studies reported on objective health outcomes.

None of the six patient-mediated or communication training interventions showed significant positive effects on intervention outcomes or subjective health outcomes; only one patient-mediated intervention showed a significant effect on satisfaction [23].

Organization of care

Regarding the organization of care, two types of interventions were evaluated: ‘revision of tasks and responsibilities’ (follow-up, case management) and ‘changes in settings’ (introduction of a one-stop clinic). Six of the 14 studies reported intervention outcomes (e.g. ‘carer burden’, ‘place of death’, ‘adverse events’ and ‘treatment according to guideline’).

‘Follow-up’ was the most evaluated intervention (10 of 14 studies, Table 1). Seven studies investigated ‘follow-up by

specialist nurses’ [27–33] and three ‘follow-up by general practitioner (GP)’ [34–36]. These studies showed that follow-up by nurses or GPs can lead to equal or better intervention outcomes, satisfaction and subjective health outcomes (such as quality of life or anxiety and depression) than follow-up by specialists (Table 2).

Two studies evaluated the effects of ‘case management’ [37, 38]. Case management can lead to significant improvements in intervention outcomes (appropriate treatment in accordance with the guideline), patient satisfaction and objective health outcomes (arm functioning) [38]. No significant effects on subjective health outcomes (psychosocial functioning, anxiety and depression) were found (Table 2).

Two studies reported the effects of a ‘one-stop clinic’ [39, 40]. One-stop clinics seemed to reduce negative subjective health outcomes (anxiety and depression) [39, 40] but effects on intervention outcomes (e.g. waiting and throughput times) and on costs remained unclear.

Multidisciplinary care

Only one study investigated multidisciplinary care [41]. This study showed that ‘having a radiologist as part of multidisciplinary team for patients with gastric cancer’ led to a significantly better agreement between tumour, nodal involvement and metastases (TNM) staging on the basis of computed tomography and histopathological stage (Table 2).

Combinations

Two studies evaluated combined interventions, both concerning patient-centredness and organization of care. One

study reported on a ‘shared-care programme’ [42]. The second study evaluated a ‘patient-held record’ that aimed at informing and involving patients, as well as improving continuity of care between professionals [43] (Table 1).

The ‘shared-care programme’ led to significantly more contacts with the GP (intervention outcome) and more satisfied patients, but had no effect on the subjective health outcome ‘quality of life’ (Table 2).

The ‘patient-held record’ improved neither patient perceptions of communication (intervention outcome) nor the quality of life. The use of the record did not lead to more use of resources or longer consultation times (Table 2).

Discussion

This is the first review describing interventions to improve integrated care for patients with cancer and their effects. Based on an earlier literature study, we defined that integrated care should be based on the principles of patient-centredness, organization of care and multidisciplinary care [7]. We also defined that, when judging the effectiveness of an intervention, the ‘intervention outcomes’ (i.e. outcome measures that are most directly linked to the integrated care intervention itself) are considered to be the most important outcomes, as these outcomes tend to be immediate and less likely to be confounded by other factors [9, 10].

This review showed that none of the included studies focused on all three principles of integrated care. Only two studies combined interventions regarding patient-centredness and organization of care. One of these studies, evaluating a shared-care programme with three elements (knowledge transfer from specialist to GP, giving names and contact numbers and giving written and oral information to patients), led to significantly more contacts with the GP (intervention outcome) and more satisfied patients. So, in this review, we can merely describe and evaluate the elements of integrated care interventions.

Most studies reported on evaluations of interventions that aimed to improve information and communication with the patient. Our review showed that patient-directed interventions such as ‘information packages’, ‘decision aids’ and ‘audiotapes’ seem easy to implement and mostly show positive effects on ‘intervention outcomes’ (e.g. ‘asking more questions to physicians’, ‘more knowledge among patients’ and better ‘recall of information’) and patient satisfaction. Literature shows that failure to provide sufficient information about the disease and its treatment is the most frequent source of patient dissatisfaction [44]. These ‘information’ interventions should therefore be included in any integrated care programme.

Another principle of integrated care that is often evaluated in cancer patients is ‘organization of care’ and, in particular, ‘follow-up by nurses or GPs’, ‘case management’ and ‘one-stop clinics’. Included studies showed that follow-up or case management, especially by nurses, can lead to equal or better outcomes than follow-up by specialists. This is in line with the studies on follow-up among other patient groups

[45]. Only 6 of the 12 studies included used intervention outcomes to measure the effectiveness of their intervention. Future research should focus more on using such outcome measures to enable a good judgement regarding effectiveness.

Both the studies on ‘one-stop clinics’ showed that patients who visited the clinics were less anxious and depressed (i.e. subjective health outcomes) [39, 40]. Again, further research is needed to evaluate such fast-track programmes on outcomes more directly linked to the intervention (e.g. ‘waiting times’).

Remarkably, we found only one study evaluating multidisciplinary care for patients with cancer. Literature on other groups of patients shows that a patient-care team that functions well leads to better outcomes [46–49]. Cancer studies on this subject with no rigorous designs (excluded in our review) show that team workload and the proportion of breast-care nurses positively predicted the overall clinical performance and that there were significant correlations between individual team inputs, team composition variables and clinical performance [49, 50]. The National Institute for Health and Clinical Excellence (NICE) cancer guidelines, therefore, recommend that cancer patients must be seen and treated by a multidisciplinary team of health-care professionals [51]. Further research should be performed on composition, functioning and impact of effective teamwork on intervention and patient outcomes for patients with cancer.

The strong points of our review are the clear inclusion criteria, the assessment of study quality and the attention to classification of intervention types and outcomes. We included only studies with rigorous study designs (randomized controlled trials, interrupted time series and controlled before–after studies). A limitation may be that this review included only studies published since 1996. The reason for this is that new models for managing patients were first introduced in the 1990s, and our review of the reviews of integrated care included studies that date mainly from the year 2000 or later [7]. In addition, we screened the reference lists of included studies, and this led to only one extra study. Another limitation of the study is that the heterogeneous nature of the studies (interventions, patient populations, types of outcomes and settings) and methodological deficiencies identified (only one of the 33 studies fulfilled all five quality criteria) did not permit the use of formal statistical techniques, such as meta-analysis [52]. In a meta-analysis, it is possible to correct for random errors but not for systematic errors or influencing factors, such as study setting or patient populations. Therefore, a good description of the studies and interpretation of the results are still necessary as we did in our review. The conclusions from our review should, therefore, be generalized with caution.

Conclusion

To improve integrated care for patients with cancer, a multicomponent intervention programme that maintains all three principles of integrated care (patient-centredness,

organization of care and multidisciplinary care) is required. This review found no such programme for patients with cancer. We found some evidence about effectiveness of integrated care interventions for patients with cancer. These promising interventions should be part of integrated care programmes, which should be evaluated with rigorous methods and unequivocal outcome measures linked to the intervention.

Supplementary material

Supplementary material is available at *International Journal for Quality in Health Care* online.

Funding

Funding by the Radboud University Nijmegen Medical Centre.

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Accepted for publication 9 December 2008