The Impact of Methods of Information on Chemotherapy-Related Side Effects: A Critical Review

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A systematic review of the literature regarding the effectiveness of various methods of information given to patients with cancer receiving chemotherapy education revealed that psycho-educational interventions minimized the intensity and impact of treatment-related fatigue on daily life in the short term for patients undergoing chemotherapy. Studies that investigated efficacy of interactive multimedia devices revealed no statistical improvement in information recall, quantity of self-care activities, and fatigue levels between groups. Three of the multimedia studies focused on anxiety and depression trends before and during treatment, with mixed results. Several studies revealed no significant difference in either anxiety or depression. Others concluded that patients who viewed video information in conjunction with standard care were less anxious and depressed. Combined, these studies revealed that multimedia devices did not improve the impact of treatment-related side effects, namely fatigue, in the short term. This suggests that the educational needs of patients with cancer require a complex series of factors that impact the individual’s ability to understand how and when to initiate recommended self-care strategies.

At a Glance

- Reviewing the current literature regarding prechemotherapy education highlights the complexities of supplying effective and sustainable benefits.
- Multimedia devices were beneficial when used as an adjunct to traditional education sessions.
- Reviewed supportive educational programs were able to show short-term improvements in select side effects, namely fatigue.

A diagnosis of cancer can elicit a range of emotions and feelings that can cause significant anxiety and depression for patients and their support networks (McCaughan & McKenna, 2006; Mills & Sullivan, 1999). One of the prominent coping strategies that patients with cancer use to lessen anxiety is seeking out information (McCaughan & McKenna, 2006; Van der Molen, 2001). Education needs of patients with cancer require health professionals to take into consideration an aging population, financial challenges, cultural diversity, and linguistic and literary barriers (Treacy & Mayer, 2000). Promotion and understanding of treatment and sufficient knowledge to initiate self-care strategies to lessen their impact, particularly in the older adult population, are believed to be among the top challenges in oncology nursing today and in the future (Goodman & Riley, 1997).

The patient’s need and wish to be provided information in regard to diagnosis and any risks, benefits, and impacts of the proposed treatment are important (Cox, Jenkins, Catt, Langridge, & Fallowfield, 2006). However, the reality of supplying timely and appropriate information for patients with cancer is of concern for patients and healthcare providers worldwide (Mills & Sullivan, 1999).

Background

Educating and supporting patients with cancer, particularly patients who are having chemotherapy, are regarded as two of the most important tasks carried out by oncology nurses (Ireland, DePalma, Arneson, Stark, & Williamson, 2004). Patients being informed and proactive in their own care because of information supplied by nursing staff is, unfortunately, not guaranteed (Dodd & Miaskowski, 2000). Reaching this desired goal can be problematic, particularly when patients receive treatment every two to four weeks in an outpatient setting and are expected to learn and...
implement lessons from relatively brief encounters. Numerous intervention-related studies have been conducted to improve the delivery method of patient information and include consultation encounters, consent to treat, and the focus in this article—chemotherapy education that goes beyond the traditional verbal educational sessions, such as reviews of written information and use of multimedia devices, various telephone triage models, and the Internet (Kinnane, Stuart, Thompson, Evans, & Schneider-Kolsky, 2007; McPherson, Higginson, & Hearn, 2001).

The effects of patient education deficits are apparent during times when chemotherapy-related side effects occur without the corresponding activation of potentially ameliorating interventions. The impact of this can become debilitating or even fatal for the patient (Cowan & Hoskins, 2007). Therefore, patient knowledge of when to activate timely self-care interventions or when to seek professional advice is imperative. This article aims to give insight to the extent that information interventions impact patients’ ability to assimilate the supplied information and then activate the recommended self-care strategies. Of additional interest is to what degree these strategies alleviate chemotherapy-induced side effects and secondary effects, such as anxiety and the perceptions of patients’ coping skills.

Objectives and Aims of the Critical Review

A review of the literature assessed any English language randomized, controlled trials (RCTs) published since 2000 that included participants 18 years or older, diagnosed with cancer, and planning to receive chemotherapy treatment. The review considered studies that included (a) patient understanding and recall of chemotherapy-related side effects and (b) activation of recommended self-care interventions with the intention of preventing or lessening the intensity of side effects, their impact, and/or the perception of experienced side effects.

Search Methods for Identification of Studies

The search strategy aimed to find either published or unpublished studies. An initial limited search of MEDLINE® and CINAHL® was undertaken, followed by an analysis of the text words contained in the title and abstract and of the index terms used to describe the article. A second search using all identified keywords and index terms was then undertaken across all included databases. In addition, the reference lists of all identified reports and articles were searched for additional studies. Key words used in the search were:

- Cancer, neoplasm, oncology, and carcinoma
- Chemotherapy, cytotoxic, anticancer drugs, and antineoplastic agents
- Patient education, teaching, information, communication, learn, and teaching material
- Recall, memory, compliance, noncompliance, self-care, self-care, side effect, side effects, symptoms, patient participation, counsel, behaviour, manage, adverse event, and decision making
- Evaluate, effectiveness, randomised controlled trial, and randomized controlled trial.

The database search included PubMed, MEDLINE, PsycINFO, EMBASE, CINAHL, the New York Academy of Medicine Grey Literature Database, and the following Evidence-Based Medicine Reviews databases: ACP Journal Club, Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effects, Cochrane Controlled Trials Register, Cochrane Methodology Register, Health Technology Assessment Database, and the NHS Economic Evaluation Database. The search for unpublished studies included hand searching unpublished works in the form of abstract reports, personal communications, reports, handbooks, conference data, or data from pharmaceutical or technology companies.

Data Collection and Analysis

Assessment of Methodologic Quality

The methodologic validity of each study was assessed with the Joanna Briggs Institute Appraisal Checklist for Experimental Studies, a standardized data appraisal checklist. The checklist was employed to extract data from experimental and observational studies to appraise strengths and weaknesses of each study. The checklist’s criteria include randomization, multiple blinding to exclude bias, follow-up of participants, comparability of control and treatment groups, identical treatment beyond the intervention for control and treatment groups, outcomes measured in a reliable and identical way for control and treatment groups, and the use of appropriate statistical analyses.

Results

Of the 664 articles found, 45 were retrieved for consideration. Nine satisfied the inclusion criteria and were included in the review. The nine studies compared teaching media such as use of patient diaries, various written formats, multimedia DVDs, and psycho-educational interventions. Additional details regarding aims, participants, and interventions of the studies are presented in Table 1.

Multimedia Devices and Information Recall

The ability to understand, retain, and act on information supplied by healthcare professionals, particularly oncology nurses, is of great importance. Two of the studies in this review examined the ability of patients to retain information using multimedia devices compared to the standard care of their institution. Kinnane et al. (2007) used a video-based education program; Olver, Whitford, Denson, Peterson, and Olver (2009) used an interactive CD-ROM. Both studies aimed to compare the information recall of pre-chemotherapy education over standard written information. The data from the two RCTs were gathered with a self-completed written questionnaire. Kinnane et al. (2007) revealed that participants who viewed the video displayed better recall in 3 of the 15 questions: mouth problems to report straight away (87% versus 78%, p = 0.45), symptoms of a low red blood cell count (80.6% versus 66.7%, p = 0.29), and prevention of constipation (74.2% versus 51.7%, p = 0.07). Despite the differences in recall, the study was unable to show any statistical differences between the groups. Olver et
al. (2009) also demonstrated similar results and concluded that the interactive CD-ROM did not improve patients' recall of treatment information enough to warrant changes to the informed consent process. However, Olver et al. (2009) did speculate that the findings showed a correlation between increased depression and patients' reduced ability to recall information independent of the information delivery format.

Outward similarities existed in the patient recall questionnaires supplied to patients in the Olver et al. (2009) and Kinnane et al. (2007) studies. However, some caution is needed when comparing

<table>
<thead>
<tr>
<th>Study</th>
<th>Aim</th>
<th>Participants</th>
<th>Intervention</th>
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<tr>
<td>Craddock et al., 1999</td>
<td>To determine whether women who received an intervention of three telephone calls and oral and written self-care measures used more self-care measures</td>
<td>48 chemotherapy-naive participants with stage I or II breast cancer in a private practice oncology clinic in the southeastern United States</td>
<td>Control group: Administration schedule, a copy of Chemotherapy and You: A Guide to Self-Help During Treatment, effectiveness of self-care questionnaire, and verbal information. Telephone interviews were conducted between three and five days after the second, third, and fourth chemotherapy cycles. Intervention group: Same as control group with the addition of participant-specific advice and written material</td>
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<td>Kinnane et al., 2007</td>
<td>To evaluate a video-based education for patients receiving standard instruction prior to chemotherapy</td>
<td>60 chemotherapy-naive participants requiring adjuvant chemotherapy for either breast or colorectal cancer at the Peter MacCallum Cancer Centre in Victoria, Australia</td>
<td>Control group: One-hour prechemotherapy education session with a nurse and written information regarding chemotherapy side effects and an alert card. Intervention group: Same as control group with the addition of an education video</td>
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<td>Olver et al., 2009</td>
<td>To evaluate whether an interactive CD-ROM improved patients' recall of chemotherapy treatment information to include chemotherapy side effects compared to standard written materials</td>
<td>101 chemotherapy-naive participants attending the Royal Adelaide Hospital in Adelaide, Australia</td>
<td>Control group: Verbal information about chemotherapy in conjunction with a hospital information sheet. Intervention group: Same as control group with the addition of an interactive multimedia CD-ROM with printed information from the CD-ROM available on request</td>
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<td>Ream et al., 2006</td>
<td>To evaluate a psycho-educational intervention aimed at educating and supporting patients in initiating self-care measures for managing fatigue during chemotherapy</td>
<td>103 chemotherapy-naive participants in two regional cancer centers in the United Kingdom</td>
<td>Control group: Information and/or education regarding fatigue management on an ad hoc basis. Intervention group: Same as control group with the addition of an education pack (comprised of information about daily activities, diet, and fatigue-related issues), a self-care diary, and a visit from a support nurse</td>
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<td>Schofield et al., 2007</td>
<td>To evaluate a prechemotherapy educational DVD focused on preparing the patient to receive chemotherapy and the self-management of eight common side effects</td>
<td>100 chemotherapy-naive patients scheduled for their first treatment in the Peter MacCallum Cancer Centre in Victoria, Australia</td>
<td>Control group: Verbal chemotherapy education provided by an oncologist or hematologist followed by a 30-minute prechemotherapy education session (with the nurse). Intervention group: Same as control group with the addition of an educational DVD or video supplied several days prior to the first treatment</td>
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<td>Thomas et al., 2000</td>
<td>To study the effect of a preparatory video cassette on psychological distress, depression, and anxiety</td>
<td>220 chemotherapy or radiotherapy participants at four hospitals in the United Kingdom</td>
<td>Control group: Verbal information delivered by an oncologist and nurse specialist in conjunction with written information. Intervention group: Same as control group with the addition of a 20-minute video to take home</td>
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<td>Williams &amp; Schreier, 2004</td>
<td>To research the impact of audiotaped education on frequency and effectiveness of chemotherapy side-effect self-care behavior</td>
<td>71 chemotherapy patients in a tertiary medical center and at a satellite cancer treatment clinic in the southeastern United States</td>
<td>Control group: Verbal prechemotherapy information regarding potential side effects and written information. Intervention group: Same as control group with the addition of a 20-minute audiotape supplied 12–24 hours prior to chemotherapy, a self-care diary, and three telephone interviews</td>
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<td>Wydra, 2001</td>
<td>To evaluate an interactive multimedia video disc resource for patient fatigue education</td>
<td>174 participants receiving initial cancer treatment</td>
<td>Control group: Instructions from the treatment center by a healthcare professional. Intervention group: Same as control group with the addition of an interactive video disc module</td>
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<td>Yates et al., 2005</td>
<td>To evaluate a psycho-educational intervention with the aim of improving the use of fatigue-management behaviors and minimizing the impact of fatigue</td>
<td>109 female patients with breast cancer receiving adjuvant chemotherapy with or without radiotherapy treatment at three Australian metropolitan hospitals</td>
<td>Control group: Three sessions with a nurse focusing on general cancer information and a locally published patient booklet. Intervention group: Three individualized sessions with a nurse that were tailored to the patient's specific needs and circumstances, a written patient booklet (Get Energized: Conquer Fatigue! from the Oncology Nursing Society), and a diary</td>
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the results because Kinnane et al. (2007) used a multiple-choice format compared to Olver et al.’s (2009) open-style questionnaire.

**Multimedia Devices and Treatment-Related Toxicities**

The use of multimedia devices was studied in four RCTs included in this review (Schofield et al., 2007; Thomas, Daly, Perryman, & Stockton, 2000; Williams & Schreier, 2004; Wydra, 2001). Schofield et al. (2007) evaluated the effectiveness of an educational DVD, Thomas et al. (2000) explored the benefits of receiving a video cassette, Williams and Schreier (2004) studied the effects of an audiotaped education and follow-up telephone communication, and Wydra (2001) analyzed the effects of an interactive video disc. Although the RCTs had similarities, differences existed in their primary outcome measurements and evaluation tools and, because of differing reporting methodologies, the data reported are incompatible for purposes of meta-analysis.

Schofield et al. (2007) reported no significant difference found in either the anxiety or depression subscale scores or supportive care needs for the intervention and control groups. However, of the participants who believed that their cancer was potentially curative (researchers did not verify the stage of their disease), an improvement in self-efficiency was shown in “seeking social support” (t[67] = –2.048) (p = 0.044). The findings were presented as pictorial diagrams opposed to numerical data and, as such, could not be independently verified.

Thomas et al. (2000) also investigated anxiety and depression as a primary outcome measurement and revealed that, during treatment, the mean anxiety scores in the control group increased from previsit values to three weeks after commencement of radiotherapy or chemotherapy (6.4 to 7.4) compared to the decrease seen in the intervention group (7.8 to 4.6). This pattern continued in the mean values measured for depression (intervention group [3.4 to 5.5] versus the control group [4.4 to 2.9]). As a result, Thomas et al. (2000) suggested that patients who viewed the video information in conjunction with standard care were less anxious and depressed as a result of having more information about cancer therapy.

Williams and Schreier (2004) investigated the relation of frequency and effectiveness of self-care behaviors initiated to lessen the side effects of chemotherapy treatment, such as fatigue, anxiety, and sleep disturbances. The study confirmed that the incidence of fatigue, anxiety, and sleep disturbance increased over time; however, despite the incidence of these side effects increasing, no statistical difference was detected in the severity of symptoms between groups. Participants in the intervention group used more self-care behaviors than the control group. However, only behaviors regarding anxiety symptoms showed any statistical significance; the control group had a mean self-care behavior score of 4.2 versus 6 for the intervention group (p = 0.022).

An RCT conducted by Wydra (2001) investigated whether participants who used a video disc that offered targeted information about fatigue used more self-care measures and demonstrated improvement of fatigue symptoms. The findings demonstrated no significant statistical differences in the quantity of self-care activities. The intervention group did demonstrate qualitative benefit from activities related to “sleeping better” (X = 11) compared to the control group (X = 8.38) (p = 0.0069). The level of fatigue increased in both groups and, although the intervention group experienced less fatigue, the difference was not significant.

**Psycho-Educational Interventions and Treatment-Related Toxicities**

Included in the critical review were three studies that investigated the effects of a psycho-educational intervention that was intended as an intervention to reinforce recommended information in relation to fatigue management (Craddock, Adams, Usui, & Mitchell, 1999; Ream, Richardson, & Alexander-Dann, 2006; Yates et al., 2005). The term psycho-educational intervention refers to the inclusion of educative and supportive cognitive behavioral strategies.

Craddock et al. (1999) investigated whether women who received a telephone contact intervention and oral and written self-care measures for specific side effects would use more effective self-care measures. Results showed that the intervention group instigated more self-care measures in regard to fatigue management than the control group, such as took naps and/or rested (72% for intervention versus 48% for control), slept longer (24% for intervention versus 4% for control), used caffeine (20% for intervention versus 0% for control), exercised (12% for intervention versus 0% for control), and paced self (72% for intervention versus 48% for control). The results revealed that the effectiveness of tailored information sessions in conjunction with specific written information showed no statistical differences between groups.

Yates et al. (2005) and Ream et al. (2006) investigated the effects of their interventions on fatigue during chemotherapy treatment. Yates et al. (2005) evaluated the efficacy of a psycho-educational intervention with the aim of improving the use of fatigue-management behaviors and minimizing the impact of fatigue. The intervention group reported a significantly greater mean increase in the number of recommended self-care strategies compared to the control group. Yates et al. (2005) noted that the fatigue experience was significantly greater for the control group in the short term (the estimated marginal change of average scores between time 1 and time 2 was 1 for the intervention group and 2.6 for the control group); however, these differences were not sustainable over the long term (by time 3, both groups had an average score of 3.2). No significant effects were seen for cancer self-efficacy, quality of life, or psychological well-being. Therefore, *in the short term*, a targeted information and psycho-educational intervention had a positive therapeutic effect in regard to fatigue experienced and the self-care strategies used.

Ream et al. (2006) evaluated a psycho-educational supportive intervention targeting fatigue in patients receiving chemotherapy. Significant reductions were noted across a range of issues inter-related with fatigue for the intervention group, such as the distress caused by fatigue, disruptions to pastimes, and fatigue-rating scores. The findings suggested that, although the groups had similar results for the impact of fatigue, the intervention group experienced less anxiety (X = 28) versus the control group (X = 47.9) (p = 0.03) and less depression (X = 37.6) versus the control group (X = 48.5) (p = 0.02).
Although some studies used the same measurement tools, the time points and frequency of data collection differed from study to study, so care is needed when comparing results.

Discussion

The included studies can be divided into two convenient groups: the use of multimedia devices and a psycho-educational intervention which aimed to observe whether differing information-delivery media could impact patients’ experiences, understanding, recall of treatment-related side effects, and the activation of recommended strategies to lessen the impact or perception of the experience.

Multimedia Interventions

The studies that included differing multimedia devices reported outcomes of informational recall, quantity of self-care activities, their benefits, and changes in anxiety and depression. Information recall was a primary endpoint in Olver et al. (2009) and Kinnane et al. (2007). The results of these studies detected no statistical improvement in information recall between the intervention and control groups. Wydra (2001) revealed no statistically significant differences between the intervention and control groups in the area of quantity of self-care activities and fatigue levels; however, the intervention group did demonstrate qualitative benefit from activities related to “sleeping better.”

Three of the multimedia studies focused on anxiety and depression trends before and during treatment. Olver et al. (2009) showed some correlation between anxiety and depression levels and recall of information independent of information delivery. Schofield et al. (2007) found no significant differences in either the anxiety or depression subscale scores or supportive care needs for the intervention and control group. However, Thomas et al. (2000) concluded that patients who viewed video information in conjunction with standard care were less anxious and depressed as a result of having more information about cancer therapy.

Psycho-Educational Interventions

A psycho-educational intervention minimized the intensity and impact of treatment-related fatigue on daily life in the short term for participants undergoing chemotherapy (Ream et al., 2006; Williams & Schreier, 2004; Yates et al., 2005). Unfortunately, despite increased use of self-care strategies in the psycho-educational cohorts, the strategies were unable to affect the impact of fatigue over the long term (Craddock et al., 1999; Ream et al., 2006; Williams & Schreier, 2004; Yates et al., 2005).

Limitations

The studies included in this review contain potentially confounding factors that may have influenced the statistical results. One factor is the proportion of female participants, with five out of the nine studies having significantly higher proportions of female participants—three of which exclusively consisted of female participants.

All studies included in the review were small; however, most of the studies (Kinnane et al., 2007; Olver et al. 2009; Ream et al., 2006; Wydra, 2001; Yates et al., 2005) accrued enough participants to show statistical differences. Of the remaining studies, whether the size was too small to reveal meaningful statistical differences was unclear.

Conclusion

This review revealed that multimedia devices did not improve recall of information; however, in addition to standard care, they can be a useful tool to improve the anxiety and depression that some patients with cancer experience prior to and during treatment of their disease. A psycho-educational intervention was able to improve the impact of treatment-related side effects, namely fatigue, in the short term by means of reinforcing recommended self-care strategies. However, the psycho-educational intervention had limited capacity to affect fatigue in the long term.

Additional research regarding how healthcare professionals can deliver cost-effective, comprehensive, and compassionate cancer treatment that meets the needs and expectations of patients is timely. Promotion and understanding of treatment and sufficient knowledge to initiate self-care strategies to lessen the impact of treatment are among the top challenges facing oncology nurses.

Implications for Nursing

The education needs of patients with cancer are complex and multidimensional, which could be attributed in some way to the awareness that, for many, cancer is a life-threatening illness that evokes feelings of anxiety and depression. With such knowledge, future studies investigating the potential synergistic association between the psychological and physical health of patients with cancer could reveal insightful information for healthcare professionals and consumers alike. Interventions to reduce anxiety and/or depression prior to or during education sessions may have an impact on a patient’s ability to absorb information irrespective of the medium used.

The use of multimedia devices in cancer education is not a new concept; however, the body of work evaluating its effectiveness is limited. A weakness exposed in the studies included during this critical review is that this medium has a limited capacity of use as a stand-alone educational device. Future analysis may reveal that multimedia devices are more efficacious when used as part of a multi-layered information program for patients with cancer.

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