COMPUTERISED SCREENING FOR ANXIETY, DEPRESSION AND RADIATION TOXICITY IN CANCER PATIENTS

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Background

Anxiety and depression associated with the diagnosis of cancer are widely prevalent1-6. Together with the side effects associated with cancer treatment, this can have significant effects on the quality of life of patients undergoing radiation therapy for cancer. Computer administered questionnaires have the potential to improve patient-provider communication and to improve patient outcomes in busy clinical settings3-9.

Radiotherapy is effective in the treatment of cancer, but is associated with a range of side-effects that vary depending on the part of the body that is treated with radiation. While it is routine for clinicians to inquire about side effects during patient review and follow-up meetings, there may be no systematic method of serially recording and monitoring symptoms. Inadequate recognition and response to the symptoms of radiation toxicity can adversely affect the patient's quality of life.

In this trial computerised (touchscreen) questionnaires were used to screen for anxiety, depression and the side effects of radiotherapy in patients with breast, bowel, prostate or head and neck cancer. Questionnaires were developed to screen for symptoms of radiation toxicity in each site. The Hospital Anxiety and Depression (HAD) scale was used to screen for anxiety and depression7. The program was evaluated for errors, logical inconsistencies and patient acceptability by trialling it on 50 newly diagnosed cancer patients.

Aim

To develop an interactive computerised system to provide feedback to clinicians on the incidence of treatment toxicity, anxiety and depression in cancer patients undergoing radiotherapy, and to trial the system on 50 patients newly diagnosed with breast, prostate, bowel or head and neck cancer.

Methods

Questionnaires

Radiation toxicity questionnaires were developed by radiation oncologists for each of the selected cancer sites (breast, prostate, bowel and head and neck cancer). Toxicity questions were based on scales developed by the Radiation Therapy Oncology Group and the European Organisation for Research and Treatment of Cancer (RTOG/EORTC)9. Three sets of questions were developed for each of the four cancer sites. The first set of questions (pre-treatment questionnaires) sought to ascertain baseline values such as the patient's normal bowel or urinary habits prior to radiation treatment. The second set of questions was designed to be answered by the patient during the course of their radiotherapy and contained questions dealing with expected immediate or acute toxicity. The final set of questions (post-treatment questionnaires) was designed to be answered by patients during their follow-up visits to the clinic after completion of their radiotherapy and dealt with the possible long-term side-effects of radiotherapy.

The HAD scale was used to screen for anxiety and depression. This scale was specifically developed for patients with physical illness and is designed so that somatic items are largely excluded from the depression sub-scale11. The HAD scale has previously been extensively tested and validated as a screening instrument for anxiety and depression in cancer patients9,14. The patients in this trial answered the HAD questionnaire every time they answered the touchscreen questionnaires.

Software

A commercial software company incorporated the questionnaires into an interactive touchscreen computer program and developed a database that would interface with the hospital cancer record system. To protect the security and integrity of the hospital cancer recording system, the link was designed to provide read-only access from the touchscreen database to patient identification and diagnosis details in the hospital cancer records.

The computer program opened with an introductory video clip including instructions for patients on how to use the program. Each question was presented individually on the screen in a multiple choice format and the patient was merely required to touch the screen next to the appropriate answer. The computer program generated two reports at the end of the session, one for the toxicity questionnaire and the second for the HAD questionnaire. The data was stored within the computer in a Microsoft Access database.

Patients

The program was piloted on 50 newly diagnosed cancer patients who presented for radiation treatment to the Cancer Therapy Centre at Liverpool Hospital. Patients were eligible for the trial if they were newly diagnosed with prostate, breast, bowel or head and neck cancer, were to receive potentially curative radiation treatment and could read English and perform a touchscreen survey. There were no age limits for the trial.

Trial

Patients were recruited into the trial prior to commencing radiotherapy. A researcher was present at the first touchscreen session to help patients through the program. The time taken to complete the initial questionnaires and any problems encountered were recorded. A verbal patient satisfaction questionnaire was administered at the end of the first touchscreen session.

Patients were requested to answer the touchscreen questionnaires once a week during their radiation treatment...
and at every follow-up visit. They were instructed to hand the print-out of their touchscreen results to their oncologist during their treatment review and follow-up visits.

All patients with elevated HAD scores (scores above eight) were referred to the psychosocial team, comprising a clinical psychologist, social worker and breast nurse trained in counselling. Treatment options included provision of information, problem solving, support, reassurance, psychotherapy, social interventions or recommendation for referral to a psychiatrist for further management of depression or anxiety.

**Results**

**Patient Characteristics**

A total of 50 patients with breast, prostate, bowel or head and neck cancer were recruited into the study. Twenty-one patients (42 per cent) were female. Table 1 shows the primary cancer site and median age of patients in the trial. The time that had elapsed since the diagnosis of primary cancer was five months or less in 63 per cent of patients.

The median time taken by patients to complete the touchscreen questionnaires ranged from nine minutes for breast cancer patients (who had the shortest questionnaire and were significantly younger than the other groups of patients) to 14 minutes for bowel cancer patients.

The majority of patients in the study (70 per cent) had not completed high school and more than half of the patients (56 per cent) had no prior experience with computers. About half of the patients in the study (54 per cent) did not encounter any problems in their first touchscreen session. Twenty-two percent of patients had difficulty with understanding one or more of the toxicity questions (some of these questions were later reworded to make them clearer). A small proportion (8 per cent) of patients experienced difficulty with starting the touchscreen program because they repeatedly entered their hospital number or date of birth incorrectly.

**Acceptability**

Despite the fact that many of the patients had never used a computer before, the vast majority of patients (93 per cent) found that the touchscreen survey was easy to use and all agreed that it did not take too long and was not stressful. All the patients felt that it was a good way to convey information to their treating doctor.

**Screening for Anxiety and Depression**

Out of the 50 patients who were screened for anxiety and depression, 30 per cent (15 patients) had at least one elevated HAD score. Thirteen patients had mildly elevated (8 –10) HAD scores, one patient had a moderately elevated (11-14) HAD score and one patient had a severely elevated (15-21) HAD score. Four patients had one or more elevated scores on the depression subscale only, one patient scored on the anxiety subscale only and 10 patients had elevated scores on both the anxiety and depression subscales.

Ten patients had an elevated HAD score on only one occasion. Out of these, seven patients had an elevated HAD score only at the first survey, with subsequent HAD scores being within normal limits. Thirty-eight per cent of female patients had one or more elevated HAD scores, compared to 24 per cent of male patients who had elevated scores on HAD.

### Table 1: Age, Primary cancer site and Time taken to complete initial touchscreen questionnaires

<table>
<thead>
<tr>
<th>Cancer site</th>
<th>No of patients</th>
<th>Median age (years)</th>
<th>Median Time to complete questionnaires (mins)</th>
<th>Number with Elevated* HAD scores (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>17</td>
<td>56</td>
<td>9 (7-16)</td>
<td>6 (35)</td>
</tr>
<tr>
<td>Prostate</td>
<td>15</td>
<td>66</td>
<td>12 (7-21)</td>
<td>1 (7)</td>
</tr>
<tr>
<td>Bowel</td>
<td>9</td>
<td>60</td>
<td>14 (9-23)</td>
<td>5 (55)</td>
</tr>
<tr>
<td>Head and neck</td>
<td>9</td>
<td>65</td>
<td>10 (8-15)</td>
<td>3 (33)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>50</td>
<td>63</td>
<td>15 (33)</td>
<td></td>
</tr>
</tbody>
</table>

* Score of 8 or above

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**Fig 2: Patient Compliance on Touchscreen Program**

![Graph showing patient compliance on touchscreen program over visits to radiotherapy centre. The x-axis represents visits to radiotherapy centre, and the y-axis represents the number of patients. The graph shows a trend where the number of patients decreases over subsequent visits.](image-url)
Screening for Radiation Toxicity

Most patients experienced some degree of radiation toxicity, which increased in severity with the duration of treatment. The majority (80 per cent) of patients with breast cancer reported no breast pain or discomfort during their first touchscreen session, but by their fifth touchscreen session, 70 per cent of patients experienced mild or moderate degrees of breast pain or discomfort. Patients with head and neck cancer reported maximal toxicity (pain or difficulty in swallowing) at their third touchscreen session. Patients with prostate cancer reported gradually increasing levels of bowel and bladder toxicity over visits one to five and similarly patients with bowel cancer experienced increasing symptoms over the duration of their treatment.

Patient Compliance

Patients were asked to continue to answer the touchscreen questionnaires on their own, once a week during their course of their radiation treatment and during all follow-up visits. As can be seen from Figure 2, patient compliance fell markedly with time. The average number of touchscreen sessions completed by patients on the trial was 4.6 (ranging from a minimum of one to a maximum of eight sessions). Patient compliance during follow-up visits was extremely poor with only nine patients answering at least one follow-up questionnaire (however some patients attended follow-up visits at other hospitals).

Discussion

Anxiety and depression are known to be widely prevalent in cancer patients. Approximately 25 to 30 per cent of cancer patients experience anxiety and/or depression severe enough to merit psychological intervention. Most of these patients receive no support for their psychological condition; McGuire reported that only 20 to 50 per cent of cancer patients with significant anxiety or depression were diagnosed and treated. DiMatteo et al. found that depressed patients were three times more likely to be non-compliant with medical treatment than patients who are not depressed. Patients need more support to deal with the side effects of cancer and cancer treatment.

Electronic self-administered questionnaires for the collection of patient information have several advantages, including increased patient privacy and confidentiality, more accurate data capture and improved storage of data. Velikova et al. compared touchscreen computerised administration of the HAD and EORTC QLQ-C30 with paper questionnaires and found that the differences between scores obtained with the two modes of administration were small, with equivalence for most of the QOL scales. On the emotional, fatigue and nausea/vomiting scales at the group level, patients tended to give more positive responses on the touchscreen than on paper questionnaires.

Several studies have examined patient preferences regarding electronic collection of data, mainly with reference to quality of life data. Bliven et al. sought to validate the electronic collection of health-related quality of life data relative to pencil and paper collection and found that 82 per cent of their patients preferred the computerised version to the paper version. Computer literacy, educational level, age and sex were not significantly associated with the ability to successfully complete the computer-assisted questionnaire. Newell et al. tested the acceptability of a touchscreen computer survey to assess the levels of physical side effects, anxiety, depression and perceived needs among cancer patients receiving chemotherapy and found that over 95 per cent of patients found the computerised survey easy and enjoyable.

The results reported above are similar to our findings in this trial where all of the patients surveyed agreed that the touchscreen program was a good method of conveying information about their symptoms to their treating doctor. Patients who had never used a computer before were initially apprehensive about completing a computer questionnaire, but once they found out that it was not as difficult as they had anticipated, they were happy to participate in the trial. However this initial enthusiasm for the project did not extend beyond the treatment course and into the follow-up phase and patient compliance declined with time. A weakness of this study is that patient satisfaction was not assessed at the end of the study period and that the reasons for the fall in patient compliance were not explored. Possible ways of improving compliance might include issuing reminders to patients who have missed a touchscreen session and clinicians and patients routinely discussing the results from the touchscreen survey during clinical consultations.

Screening for anxiety or depression among the cancer patients in our trial found that almost a third of the patients (30 per cent) had at least one positive result (using a HAD cutoff score of eight). Carroll et al. found that 48 per cent of 930 inpatients and outpatients with cancer had scores of 8 or above on the HAD scale. In our trial only two patients (four per cent) had HAD scores of 11 or higher. Pascoe et al. in a survey of oncology outpatients in four Sydney Hospitals found that 12 per cent of patients scored 11 or more in the anxiety subscale and seven per cent of patients had clinically significant depression (score of 11 or above). The possible explanations for the comparatively lower incidence of anxiety and depression in our study may be the small sample size, the time that had elapsed since the initial diagnosis and the fact that only outpatients receiving potentially curative radiation treatment were included in our study. Several studies have shown that cancer patients with advanced disease, more metastases, pain or restricted activity levels are more likely to be depressed than patients without these factors. Aass et al. found that the risk of psychiatric distress in hospitalised patients, measured using the HAD scale, was approximately twice that of patients in the outpatient clinic.

The majority (66 per cent) of patients in our trial who had elevated HAD scores were found to have an elevated score on only one occasion and this was often during their initial simulation visit before they commenced their radiation treatment. Ford et al. studied a group of 117 newly referred outpatients with cancer and found that the incidence of both anxiety and depression was greater at initial referral than at six-month follow-up.

Although other studies have looked at computerised administration of the HAD questionnaire, no previous studies have examined the use of computerised questionnaires to screen for the incidence of the side effects of radiotherapy, possibly because the questions need to be specific to the cancer site. Velikova et al. assessed the feasibility of immediate feedback of computer administered quality of life measurements of cancer patients receiving chemotherapy to medical oncologists in oncology clinics. They found that having symptoms and functional problems expressed quantitatively on a scale was useful for detection of change over time.

This trial has demonstrated that computerised screening for the side effects of radiation treatment is acceptable to patients. A further trial is currently being conducted to determine whether giving computerised feedback to oncologists about their patients’ incidence of radiation toxicity and level of anxiety and/or depression would result in a change in patient management and ultimately in better patient outcomes.
References


