REVIEW

Systematic Review of Psychological Therapies for Cancer Patients: Overview and Recommendations for Future Research

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Many cancer patients use psychological therapies because they expect them to cure their cancer or to improve their recovery. Despite these high expectations, both patients and oncologists report being moderately to very satisfied with the results of psychological therapies. Previous reviews of the literature have concluded that psychological therapies may help cancer patients in various ways, ranging from reducing the side effects of cancer treatments to improving patients' immune function and longevity. However, because those reviews lacked methodologic rigor, we critically and systematically reviewed all identifiable publications about psychological therapies used by cancer patients to provide an objective and scientific evaluation of nontraditional therapies. We identified 627 relevant papers that reported on 329 intervention trials by searching MEDLINE®, Healthplan®, Psychlit®, and Allied and Complementary Medicine® databases and in the bibliographies of the papers identified. Despite increased use of randomized, controlled trial designs over time, the methodologic quality of the intervention trials, on 10 internal validity indicators, was generally suboptimal, with only one trial achieving a quality rating of "good" for its methodology. Using effectiveness results from 34 trials with psychosocial outcomes, 28 trials with side effect outcomes, 10 trials with conditioned side-effect outcomes, and 10 trials with survival or immune outcomes, we make only tentative recommendations about the effectiveness of psychological therapies for improving cancer patients' outcomes. Nevertheless, by exploring the relative effectiveness of the different intervention strategies for each outcome and follow-up period, we suggest the specific therapies that should be considered for further investigation. In addition, we suggest how future trials can maximize their internal validity by describing the minimal reporting standards that should be required in this field. [J Natl Cancer Inst 2002; 94:558–84]

Recent surveys confirm the popularity of nontraditional therapies among cancer patients, with 23%–81% of U.S. and Canadian *(1–3[1])*, 22%–52% of Australian *(4–7),* 16%–32% of British *(8,9),* and 10%–61% of mainland European *(10–13)* cancer patients reporting having used at least one such therapy. Psychological therapies (e.g., relaxation, meditation, visual imagery, and hypnotherapy) are among the more popular nontraditional therapies, with more than 50% of Australian and up to 29% of U.S. and 10% of European and Canadian cancer patients reporting the use of at least one type of psychological therapy *(1,3,6,7,10,14).* Patients have high expectations of these therapies: In one study, up to 25% of participants expected the psychological therapy to cure their cancer and 75%–100% expected it to assist their traditional therapies *(7).*

Despite these high expectations, patients appear highly satisfied with their experiences with psychological therapies. In the one trial allowing comparisons, all patients using psychological therapies reported that they would use them again and would recommend them to other cancer patients. In comparison, 20% of patients using other nontraditional therapies reported that they would neither use the therapy again nor recommend it *(7).* Despite self-identified knowledge limitations, most oncologists also report having relatively positive attitudes about recommending these therapies for cancer patients *(15–17).*

Previous reviews of the literature have indicated that psychological therapies may help cancer patients by increasing their knowledge about their disease and treatment *(18–20);* by improving their emotional adjustment, quality of life, and coping skills *(18–22);* by improving their satisfaction with care *(21,22);* by improving their physical health and functional adjustment *(18–20,22);* by reducing treatment-related, disease-related, and conditioned symptoms *(19,21–23);* by increasing patients' compliance with traditional treatments *(21);* by improving immune system indicators *(18);* and by increasing the length of survival or time to recurrence *(18).* These reviews, however, lacked methodologic rigor in that only one excluded nonrandomized trials *(22)* and, although some discussed the methodologic limitations of the included trials *(20,21,23),* none excluded methodologically inadequate studies or provided separate summaries for the methodologically adequate studies. Therefore, despite the consistent conclusions reached by those reviews, we considered those reviews unlikely to convince cancer centers to incorporate psychological therapies into standard treatment protocols. Furthermore, recent articles in leading medical journals *(24–26)*

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See "Notes" following "References."

have highlighted the need for objective and scientific evaluations, as opposed to blind dismissals, of nontraditional therapies.

Consequently, we perceived a need to conduct a more critical review of this literature to identify areas where consistent evidence exists regarding the effectiveness of psychological therapies at reducing cancer patients' morbidity and mortality, as well as areas in which further research is required. By identifying methodologic shortfalls in the existing literature, we also aimed to make recommendations to improve the design of future studies in this area. As this literature spans more than 40 years, this review also explored the change over time in the types of papers published and in the methodologic quality of the intervention studies.

METHOD

This review describes a two-stage review process. In the first "literature overview" stage, we reviewed all types of papers about psychological therapies for cancer patients. In the second "effectiveness review" stage, we reviewed the outcome results from only the randomized, controlled trials categorized as having either fair or good methodologic quality.

Search Strategy and Data Sources (Literature Overview and Effectiveness Review)

We used multiple techniques to locate as many relevant papers as possible. First, we conducted an extensive search of the published literature through December 1998 on the MEDLINE®, Psychlit®, Healthplan®, and Allied and Complementary Medicine® databases using the following search terms (cancer OR neoplas* OR oncolog*) AND (relax* OR hypno* OR meditat* OR desensitis* OR desensitiz* OR imagery OR stress-psychological OR counsel* OR group therap* OR psychosoc* interven* OR psychotherapy OR psycholog* OR psychosoc* OR cognitive therapy OR behav* therapy OR self-help-groups OR support group* OR family therapy OR depressive disorder therapy), where * represents wildcard characters. Second, we searched the bibliographies of all located, relevant papers for additional potentially relevant references. This process was performed iteratively until no new potentially relevant references were identified. Third, we contacted relevant research groups within the Cochrane Collaboration and other key authors known or suggested by others to locate relevant but currently unpublished studies.

Paper Selection and Classification (Literature Overview and Effectiveness Review)

For inclusion in this review, papers had to be written in English and discuss any psychological therapy in relation to cancer patients. As indicated by the search terms employed, we used a very broad notion of what constitutes psychological therapy to maximize the chance of including all relevant papers. Eligible papers were coded by their year of publication (pre-1980, 1980s, or 1990s) and were classified into one of the following categories: 1) measures papers (primary data source papers describing the development or evaluation of the acceptability, economic, or psychometric properties of measures [e.g., survey instruments] relating to psychological therapies among cancer patients); 2) descriptive papers (primary data source papers describing the prevalence or predictors of use of psychological therapies among cancer patients); 3) intervention studies (primary data source papers, of any experimental design, that evaluate the effectiveness of psychological therapies among cancer patients); 4) reviews (secondary data source papers stating, at least, the databases and time periods searched, that provided systematic reviews of the literature regarding any aspect of psychological therapies among cancer patients; and 5) commentaries (other papers including letters, editorials, descriptions of psychological interventions or studies still to be conducted, and nonsystematic literature reviews with inadequate search strategy description).

Paper Selection and Classification (Effectiveness Review Only)

For inclusion in the effectiveness review stage of this review, papers had to discuss the results of a randomized, controlled trial that evaluated the effectiveness of a psychological intervention in improving cancer patients' psychosocial, side-effect, immune, or survival outcomes.

Data Extraction: Intervention Study Characteristics (Literature Overview and Effectiveness Review)

Data were extracted from each intervention study about the sex, age, disease, and treatment characteristics of the patient group targeted, the nature of the psychological therapies investigated, the nature of the outcome measures assessed, the length of follow-up, and the study design. For papers that included results from two or more separate intervention studies *(27–33),* each study was coded as a separate "trial," the term used throughout this review to indicate the total number of studies and substudies included in each "Results" section. Similarly, where multiple intervention arms were compared with one control arm in a single study, each intervention arm was coded, against the control, as a separate trial *(34–70).* Consequently, the number of references that are cited for any given statement might be less than the number of trials that are reported.

Data Extraction: Methodologic Quality of Randomized, Controlled Trials (Literature Overview and Effectiveness Review)

Although many scales of various lengths and complexities exist to assess the methodologic quality of a trial, there is little evidence that such scales improve the validity of reviews' conclusions. Consequently, the Cochrane Collaboration *(71)* recommends that quality assessments of randomized trials concentrate on whether potential threats to a trial's internal validity have been adequately controlled. Therefore, we rated each randomized, controlled trial against 10 indicators of internal validity, as recommended by the Cochrane Collaboration *(71)* and the New South Wales Health Department *(72).* According to Cochrane Collaboration Handbook guidelines *(71),* each trial was classified as having entirely fulfilled, mostly fulfilled, mostly not fulfilled, or not at all fulfilled each indicator or as providing insufficient information for adequate assessment. Table 1 summarizes the 10 methodologic quality indicators and the classification criteria that we used for each.

Assigning Quality Scores to the Randomized, Controlled Trials (Effectiveness Review Only)

We assigned an overall methodologic quality rating (to determine eligibility for the effectiveness review) to each trial by converting the above classifications into scores by use of the following criteria: A trial received 3 points for each indicator

Table 1. Methodologic quality indicators and proportions of the 155 randomized, controlled trials that achieved each classification*

Indicator, decade (total No. of trials)	Classifications and percentage of trials performing at each level of indicator†				
	Entirely fulfilled	Mostly fulfilled	Mostly not fulfilled	Not at all fulfilled	Insufficient information
1) Adequate concealment of allocation?	Randomization strategy stated and adequate	—	—	Randomization strategy stated and inadequate	Randomization strategy not stated
1980s (n = 64)	5%	—	—	27%	69%
1990s (n = 91)	4%	—	—	33%	63%
2) Patients randomly selected?	Stated that patients randomly, consecutively, or all selected	—	—	Volunteers or nonrandom or nonconsecutive patients	Patient selection process unclear
1980s (n = 64)	22%	—	—	48%	30%
1990s (n = 91)	27%	—	—	37%	35%
3) Patients blinded to treatment group (I or C)?	Stated how achieved (e.g., separate information sheets, placebo, deception)	—	—	Stated or clear that patients aware of group differences	Unclear whether patients blinded to group differences
1980s (n = 64)	14%	—	—	19%	67%
1990s (n = 91)	23%	—	—	18%	59%
4) Care-providers blinded to treatment group (I or C)?	Stated how achieved	—	—	Stated or clear that providers aware of group differences	Unclear whether providers blinded to group differences
1980s (n = 64)	5%	—	—	91%	5%
1990s (n = 91)	0%	—	—	97%	3%
5) Except trial intervention, other treatments equivalent?	Treatments stated for each group and clearly equivalent	Stated I group's treatment and usual care for C group	—	Treatments stated for each group and clearly nonequivalent	Treatments poorly stated for each group
1980s (n = 64)	27%	50%	—	0%	23%
1990s (n = 91)	34%	52%	—	3%	11%
6) Care-providers' adherence monitored?	Stated how monitored (e.g., videotape, audiotape, or asked patients)	Monitoring not stated but detailed description of group interventions	Monitoring not stated but some description of group interventions or detailed description of individual interventions	Stated monitoring not performed	Poor description of interventions and unclear if any monitoring
1980s (n = 64)	17%	17%	9%	0%	56%
1990s (n = 91)	9%	36%	3%	0%	52%
7) Detailed loss to follow-up information?	N lost *and* reasons given by group	Either N lost *or* reasons given by group	N lost *and* reasons given overall	Either N lost *or* reasons given overall	No information about loss to follow-up
1980s (n = 64)	30%	16%	20%	5%	30%
1990s (n = 91)	33%	8%	20%	16%	23%
8) % patients not in analyses?	⩽10%	11%–20%	21%–50%	>50%	Could not be calculated
1980s (n = 64)	30%	12.5%	12.5%	2%	44%
1990s (n = 91)	29%	13%	15%	0%	43%
9) Intention-to-treat analyses?	Explicitly stated or no loss to follow-up	—	Not intention to treat but some data adjustments made	Patients lost to follow-up clearly not in analyses	Unclear from information provided
1980s (n = 64)	17%	—	0%	50%	33%
1990s (n = 91)	16%	—	4%	55%	24%
10) Outcomes measured blind?	All objective measures *or* subjective measures with blinded rater	Mostly objective or blinded subjective measures but some unblinded subjective measures	Mostly unblinded subjective measures but some objective or blinded subjective measures	All unblinded subjective measures	All subjective measures where unclear if rater blinded
1980s (n = 64)	16%	3%	0%	17%	64%
1990s (n = 91)	27%	0%	1%	12%	59%

*— = classification not used for this indicator; I = intervention; C = control; N = number of participants.

†Percentage totals for each row may not add up to 100% because of rounding.

entirely fulfilled, 2 points for each mostly fulfilled, 1 point for each mostly not fulfilled, and 0 points for each indicator not at all fulfilled or with insufficient information for assessment. Consequently, each trial could achieve a maximum total score of 30 points. The quality of a trial was considered to be good if the trial had a total score greater than 20 points, fair if it scored 11–20 points, and poor if it scored less than 11 points.

Data Extraction: Trial Results (Effectiveness Review Only)

We extracted data on patient groups targeted, samples achieved, length of follow-up periods, and each strategy's nature and effectiveness from good- and fair-quality trials only. For trials in which the control groups received part of the treatments given to the intervention groups, we assessed only the effectiveness of the additional treatment strategies received by the intervention groups. To allow the comparison of outcomes across different trials, we grouped the measured outcomes into the following categories: 1) psychosocial outcomes (subdivided into patients' levels of anxiety, depression, other affect [including general or overall affect, hostility, and stress or distress], functional ability [including general or overall status or quality of life, coping or control skills, and vocational or domestic adjustment], and relationships [including interpersonal or social and sexual or marital relationships]); 2) side-effect outcomes (subdivided into patients' levels of nausea, vomiting, pain, fatigue, overall physical symptoms, conditioned nausea, and conditioned vomiting); and 3) survival and immune outcomes (subdivided into patients' lengths of survival and immune functions).

For trials that reported multiple interim outcome measures for patients receiving multisession psychological therapies, only the last set of such measurements was included and was labeled as immediately post-intervention. Each measure of each outcome was assessed as to whether each intervention group was statistically significantly better or worse than, or no different from, the control group. Where a measure was described as collected but no results were presented, we assumed that no statistically significant difference existed between the control and the intervention groups.

Data Extraction: Quality Assurance of Coding (Literature Overview and Effectiveness Review)

Two individuals were thoroughly trained by the first author in applying all classification systems, using detailed coding manuals and an iterative process, until all classifications were fully understood and consistently applied. The first 350 papers identified as being potentially eligible for inclusion in this review were independently coded by both coders as to their eligibility and classification. Approximately 10% (n = 25) of the papers that discussed intervention studies were randomly selected for double coding of their study characteristics and, where relevant, their methodologic quality classification.

Data Synthesis (Literature Overview Only)

Descriptive statistics were produced separately for each time period (pre-1980, 1980s, or 1990s) for all variables explored. Where relevant and appropriate, two-sided chi-square analyses were conducted to determine whether differences existed between the papers published during these three time periods. All analyses were conducted with SAS version 6.12 (SAS Institute Inc., Cary, NC).

Data Synthesis (Effectiveness Review Only)

Wide variations in the nature of interventions, outcome measures, length of follow-up periods, and presentation of trials' results prohibited us from using meta-analysis to analyze this effectiveness review. We therefore used the decision process that we developed for a previous literature review to allow us to analyze the results to produce recommendations for or against each intervention strategy *(73,74).* Because many interventions involved multiple strategies, results were analyzed in relation to each outcome for each component intervention strategy across all trials that had incorporated that strategy into their intervention. For trials that used multiple measures of an outcome, we recorded an overall statistically significant result only when more than half of the measures were statistically significant.

Each analysis resulted in one of five outcomes: 1) a strong recommendation for the intervention strategy, 2) a tentative recommendation for it, 3) a tentative recommendation against it, 4) a strong recommendation against it, or 5) no recommendation for or against it. Strong recommendations for or against an intervention strategy were made only when at least three trials, including at least one trial of good methodologic quality, had investigated the strategy and found consistent results (at least 75% of trials with statistically significant results). Tentative recommendations for or against an intervention strategy were made when consistent evidence (at least 75% of trials with statistically significant results) from fair-quality trials was obtained. Inconsistent evidence produced no recommendation for or against an intervention strategy.

The follow-up periods in the reviewed trials ranged from immediately after the intervention to 18 months after the intervention. Therefore, for each outcome, we calculated an overall summary and summaries for the following four follow-up periods: 1) immediately after the intervention, 2) short-term (up to 1 month after the intervention), 3) medium-term (1–6 months after the intervention), and 4) long-term (>6 months after the intervention).

Results: Literature Overview and Effectiveness Review

With regard to quality assurance of coding, the two coders were in 95% agreement (kappa statistic = 0.87) about the eligibility and classification of 331 of 350 references that were double-coded. There was at least 95% agreement between the coders regarding study, sample, and intervention characteristics extracted from the 25 intervention studies that were randomly selected for double coding. Among the 13 randomized, controlled trials included in these analyses, the coders were in 100% agreement for five of the methodologic quality indicators. The kappa statistics for the other five indicators were greater than 0.8.

Results: Literature Overview Stage

Paper Selection and Classification

A total of 627 eligible papers were located, with the earliest published in 1954 *(1,4,8,14,18,19,21–23,27–70,75–648).* Another 15 potentially eligible papers could not be located from the available references (*see* "Appendix" following "Notes" section). The 627 eligible papers included four measures studies, 47 descriptive studies, 271 intervention studies involving 329 sepa-

rate trials, 293 commentaries, and 12 reviews. The number of eligible papers published has steadily increased over time: Fifty relevant papers were published between 1954 and 1979, 274 were published in the 1980s, and 361 were published between 1990 and 1998. In each of these time periods, commentaries and intervention studies constituted the majority of the published papers.

Designs of Intervention Studies

Although the relative proportions of papers about intervention studies remained constant, the designs of these studies changed quite dramatically over time. The pre-1980 interventions were predominantly (70%) case studies with relatively few cohort studies and nonrandomized trials and no randomized trials. During the 1980s and 1990s, however, randomized, controlled trials became the preferred design for evaluating psychological therapies and represented 45% of such studies published in the 1980s and 55% of those published in the 1990s.

Characteristics of Participants in Intervention Studies

Table 2 summarizes the age, sex, cancer sites, disease stages, and concurrent traditional treatments of the patients who participated in the 329 intervention studies. Over time, the number of intervention studies that included both male and female patients increased, whereas the number of studies that only enrolled either patients of one sex or children decreased. Most of the studies enrolled patients who had cancers at any site, with breast cancer patients representing the most commonly specifically recruited patient group. Over time, the number of studies with samples composed of only patients with advanced disease decreased, and the number of studies with samples composed of patients with a range of disease stages increased.

Methodologic Quality of Randomized, Controlled Trials

Table 1 summarizes how the 155 randomized, controlled trials performed on each methodologic quality indicator. Most trials either failed to fulfill most indicators or provided insufficient information for assessment. There was little improvement in the methodologic quality of the trials over time: We found no statistically significant differences in the percentages of trials fulfilling each indicator between trials conducted in the 1990s and those conducted in the 1980s.

The median methodologic quality score for the 155 randomized trials was 9 points (range = 0–21 points), which was less than a third of the maximum number of points possible. Only 60 (39%) trials had scores of 10 or more points (i.e., at least one third of the maximum possible points), and only nine (6%) trials had scores of 15 or more points. We believe that some of this poor performance may be attributable to inadequate reporting of the methods in many trials: Only five (3%) trials could be assessed on all 10 methodologic indicators, whereas 52 (34%) trials provided insufficient information for assessment on five or more indicators.

Results: Effectiveness Review Stage

Trial Quality and Inclusion

We located 86 relevant papers that reported results from 129 trials with psychosocial outcomes *(27–29,33–37,39–44,46–53,55,56,59,60,62–64,66,69,70,79–81,84,93,102,103,110,111,114,117,123,124,149,154,156,169,170,173–176,200,206,212,*

Table 2. Characteristics of participants in the intervention studies reviewed

Characteristic	Time period*			
	Pre-1980, % of 23 studies	1980s, % of 142 studies	1990s, % of 164 studies	Overall, % of 329 studies
Patients' age and sex				
Adult women only	39	21	29	26
Adult men only	9	6	2	5
Adult men and women only	35	49	54	50
Children only	13	19	6	12
Adults and children	4	1	0	1
Unclear/not specified	0	4	8	5
Patients' cancer sites				
Breast cancer only	17	15	26	20
Lymphoma only	4	3	1	2
Cervical cancer only	4	1	2	2
Bowel cancer only	4	1	0	1
Other single cancer sites	13	14	10	12
Mixture of cancer sites	48	52	52	52
Unclear/not specified	9	15	9	12
Patients' disease stages				
Advanced disease only	39	16	10	15
Early-stage disease only	4	8	12	10
Mixture of disease stages	13	14	25	19
Unclear/not specified	43	62	53	56
Patients' concurrent traditional treatments				
Chemotherapy/hormone therapy only	13	30	16	22
Radiotherapy only	4	8	7	7
Other treatment only (e.g., had surgery)	17	12	6	9
Mixture of traditional treatments	26	15	28	22
No concurrent treatment	13	8	19	14
Unclear/not specified	26	27	24	26

*Column percentages may not add up to 100% because of rounding.

214,215,221,248,250–252,270,282,328,340,425,431,435,436, 475,498,501,533,534,537,572,577,579,581,637,638,641,643). We excluded 87 (67%) of those trials from this review because they produced poor methodologic quality scores *(27–29,33–35, 37,43,44, 46,48–52,55,56,59,60,62,64,66,69,79,110,114,117, 123,149,156,169,170,173–176,200,206,212,214,215,221,248, 250–252,270,282,340,425,431,435,475,498,501,533,577,579, 637,638,641,643).* Eight additional trials were excluded because the two papers in which they were reported did not present separate results for each trial *(36,41).* The remaining 34 trials explored interventions aimed at reducing patients' levels of anxiety *(39,40,42,43,47,53,66,80,81,84,93,102,103,111,436, 534,572,581)* or depression *(42,43,47,63,70,80,81,84,103,154,572)* or other negative affect *(39,42,43,47,53,59,63,70,80,81,93,102, 103,111,124,154,328,537,572)* or at improving the functional status of patients *(43,47,63,70,80,81,103,124,154,328,572,581)* or relationships of patients *(43,63,70,80,84,103,124,154,572).*

We located 57 relevant papers that reported results from 93 trials with physical side-effect outcomes *(28,29,32,33,36–38, 40–42,44,46–48,51–57,59,60,62,63,70,80,81,102,107,110,111, 117,124,156,169,170,174,176,186,248,250,270,282,328,436, 475,498,523,526,534,537,572,579,637,638,641).* We excluded 57 (61%) of those trials from this review because they produced poor methodologic quality scores *(28,29,32,33,37,38,44,46,48,51,52, 54–56,60,62,107,110,117,156,169,170,174,176,186,248,250, 270,282,475,498,523,526,579,637,638,641).* Eight additional trials were excluded because the two papers in which they were reported did not present separate results for each trial *(36,41).* The remaining 28 trials explored interventions aimed at reducing patients' levels of nausea *(40,42,53,57,534),* vomiting *(42,53, 534),* pain *(47,57,59,102,111,124,537),* fatigue *(47,63,81,328, 572),* or overall physical symptoms *(53,70,80,436).*

We located 10 relevant papers that reported results from 19 trials with conditioned side-effect outcomes *(37,39,40,53–55,61, 107,173,174).* We excluded nine (47%) of those trials from this review because they produced poor methodologic quality scores *(37,54,55,107,173,174).* The remaining 10 trials explored interventions aimed at reducing patients' conditioned nausea *(39,40,53,61)* and conditioned vomiting *(39,53,61).*

We located 12 relevant papers that reported results from 16 trials with survival or immune outcomes *(30,41,63,66,91,92, 154,536,539,580,639,640).* We excluded three (19%) of those trials from this review because they produced poor methodologic quality scores *(30,91,92).* Three additional trials were excluded because the paper in which they were reported did not present separate results for each trial *(41).* The remaining 10 trials explored interventions aimed at improving patients' lengths of survival *(154,580,639,640)* or immune outcomes *(63,66,536,539).*

Effectiveness of Interventions Targeting Patient Anxiety

Table 3 summarizes the study samples, interventions, and results, by type of outcome, of the 18 papers that discussed one good-quality trial and 24 fair-quality trials that explored interventions aimed at reducing patients' levels of anxiety *(39,40,42, 43,47,53,66,80,81,84,93,102,103,111,436,534,572,581).* Because some of the trials reported results for multiple follow-up points, we reviewed 39 separate sets of results, of which the data for 18 were collected immediately after the intervention, the data for 12 were collected at a short-term follow-up, the data for seven were collected at a medium-term follow-up, and the data for two were collected at a long-term follow-up. The overall results summarized in Table 4 suggest that music therapy can currently be tentatively recommended for reducing patients' anxiety levels, although this recommendation was based on results from only one trial *(436).* In addition, therapist-delivered interventions involving individual therapy, cognitive behavioral therapy, communication skills training, guided imagery, and self-practice of the intervention warrant further exploration before recommendations for or against their use can be made. The time-specific results from Table 5 show that tentative recommendations could be made for the long-term benefits of either structured or unstructured counseling and the short-term benefit of self-practice, although each of these recommendations was based on results from only one trial *(66,84).* In addition, individual therapy appeared to be worthy of future investigation in relation to its short-term and long-term benefits, whereas group therapy appeared to be worthy of future investigation in relation to its medium-term benefits.

Effectiveness of Interventions Targeting Depression

Table 3 summarizes the study samples, interventions, and results, by type of outcome, of the 11 papers that discussed 15 trials of fair quality that explored interventions aimed at reducing patients' levels of depression *(42,43,47,63,70,80,81,84,103, 154,572).* Because some of these trials reported results from multiple follow-up points, we reviewed 24 sets of results, of which the data for seven were collected immediately after the intervention, the data for seven were collected at a short-term follow-up, the data for eight were collected at a medium-term follow-up, and the data for two were collected at a long-term follow-up. The overall results from Table 4 suggest that no intervention strategy can be recommended for reducing patients' levels of depression. However, interventions involving group therapy, education, structured counseling, cognitive behavioral therapy, communication skills training, and self-esteem building warrant further exploration before recommendations for or against their use can be made. The time-specific results from Table 5 show that tentative recommendations could be made for the medium-term benefit of group therapy *(43,81)* and for the long-term benefits of education and structured counseling *(84),* although the latter two recommendations were based on results from only one trial. In addition, interventions involving patients' significant others and self-practice appeared to be worthy of future investigation in relation to their short-term benefits, and relaxation training appeared to be worthy of future investigation for its medium-term benefits.

Effectiveness of Interventions Targeting General or Overall Affect

Table 3 summarizes the study samples, interventions, and results, by type of outcome, of the 17 papers that discussed one good-quality trial and 21 fair-quality trials that explored interventions aimed at improving patients' levels of general or overall affect *(43,47,53,59,63,70,80,81,93,102,103,111,124,154, 328,537,572).* Because some of the trials reported results for multiple follow-up points, we reviewed 33 sets of results, of which the data for 11 were collected immediately after the intervention, the data for 12 were collected at a short-term follow-up, the data for eight were collected at a medium-term follow-

Table 3. Samples, interventions, and results, by type of outcome, of trials with psychosocial outcomes, in descending order by methodologic quality score*

Investigators (reference No.), y, country; quality score	Intervention description (No. of subjects at baseline, by experimental group)	Patient characteristics: Eligibility criteria	Patient characteristics: Age and % male	Length of follow-up and No. of subjects at each follow-up	No. of statistically significant measures ($P<.05$)/No. of measures, by outcome type†: Anxiety	Depression	Other affect: A) General B) Hostility C) Stress/distress	Functional ability: A) General B) Coping/control C) Vocational/ domestic	Relationships: A) Interpersonal/ social B) Sexual/marital
Wells et al. *(93),* 1995, United States; quality score = 21	I: Therapist-delivered, individual clinic orientation program (orientation tour of clinic, information, and discussion) (n = 17). C: Usual care (n = 16).	Newly diagnosed mixed cancer patients referred to hospital hematology/ oncology clinic	Mean age: 55 y % male: I = 53%; C = 38%	Post-I No.: I = 17; C = 16	2/2		A) 1/1		
Greer et al. *(80),* 1992, U.K.; quality score = 18	I: Individual (or with spouse), therapist-delivered adjuvant psychological therapy (CBT, PMR, coping skills, gaining control, and expressing feelings)—six to eight weekly sessions, 1 h each (n = 72). C: No details (n = 84).	Mixed cancer patients—newly diagnosed or first recurrence with high HADS score and ⩾1 y life expectancy.	Mean age: I = 51 y; C = 52 y % male: I = 28%; C = 14%	F1: post-I No.: I = 64; C = 78 F2: 4 mo No.: I = 57; C = 73	F1: 2/2 F2: 1/2	F1: 0/1 F2: 0/1	F1: A) 1/1 B) 0/1 F2: A) 0/1 B) 1/1	F1: A) 0/1 B) 3/3 C) 0/1 F2: A) 1/1 B) 0/3 C) 0/1	F1: A) 0/2 B) 0/1 F2: A) 0/2 B) 0/1
Sabo and Michael *(436),* 1996, United States; quality score = 17	I: Individual, audiotaped intervention (preselected taped music with encouraging message from physician), via earphones—four sessions (n = 50). C: Usual care (n = 50).	Mixed cancer patients receiving chemo for the first time.	Age range: 21–70 y % male: I = 42%; C = 38%	4 days to 9 wk No.: I = 47; C = 50	1/1				
Katz et al. *(102),* 1987, United States; quality score = 15	I: Individual, therapist-delivered hypnosis (eye fixation with or without eye closure induction, active imagery, deep muscle relaxation, and suggestion)—two 30-min sessions prior to first BMA + 20 min prior to next three BMAs (n = 17). C: Nondirected play (n = 19).	Outpatients from hematology/ oncology clinic with acute lymphoblastic leukemia—experiencing significant anxiety, fear, and pain during BMAs.	Mean age: 8 y % male: I = 71%; C = 63%	Post-I No.: I = 17; C = 19	0/1		A) 0/1 B) 0/1		
Larsson and Starrin *(328),* 1992, Sweden; quality score = 14	I: Individual, nurse-delivered relaxation (once for 15 min) + given audiotape and asked to practice 4 times a wk for ≈3 wk (n = 32). C: Usual care (n = 32).	Breast cancer outpatients receiving their first radiotherapy following surgery.	Mean age: I = 60 y; C = 61 y % male: 0%	F1: 2 wk F2: ≈3 wk F3: ≈5 wk No. at each: I = 32; C = 32			F1: A) 0/4 F2: A) 0/4 F3: A) 3/7 C) 0/2	F1: B) 0/2 F2: B) 0/2 F3: B) 0/2	

(Table continues)

Table 3 (continued). Samples, interventions, and results, by type of outcome, of trials with psychosocial outcomes, in descending order by methodologic quality score*

Investigators (reference No.), y, country; quality score	Intervention description (No. of subjects at baseline, by experimental group)	Patient characteristics: Eligibility criteria	Patient characteristics: Age and % male	Length of follow-up and No. of subjects at each follow-up	No. of statistically significant measures ($P<.05$)/No. of measures, by outcome type†: Anxiety	Depression	Other affect: A) General B) Hostility C) Stress/distress	Functional ability: A) General B) Coping/control C) Vocational/ domestic	Relationships: A) Interpersonal/ social B) Sexual/marital
Lyles et al. *(42)*, 1982, United States; quality scores: I1 = 14; I2 = 14	I1: Individual, therapist-delivered prechemotherapy relaxation training (PMR and GI)—three times for ≈45-min sessions + instructions for home practice. I2: As I1, but conversation only with therapist (initially structured and then unstructured). C: Relaxed alone before chemo and told it would be less unpleasant if relaxed and calm. (total No. = 50)	Mixed cancer patients with anticipatory nausea and vomiting in response to previous outpatient chemo.	Age: adults % male: 38%	F1: post-I No.: I1 = 18; I2 = 14; C = 18 F2: ≈15 days No.: I1 = 15; I2 = 14; C = 17	F1: I1 = 3/3; I2 = 0/3 F2: I1 = 1/3; I2 = 0/3	F1: I1 = 1/1; I2 = 0/1 F2: I1 = 0/1; I2 = 0/1	F1: I1 = B) 0/1; I2 = B) 0/1 F2: I1 = B) 0/1; I2 = B) 0/1		
Fawzy *(572)*, 1995, United States; quality score = 14	I: Individual, therapist-delivered PMR—3 hours for two sessions + asked to practice daily for 15 min + given educational manual and instruction on use + telephone reminder prior to appointment (n = 31). C: Usual care (n = 32).	Patients with stage 1 or 2 malignant melanoma attending cancer clinic. All patients had their malignant lesions excised prior to the intervention.	Mean age: I = 42 y; C = 46 y % male: I = 52%; C = 58%	F1: 6 wk F2: 3 mo No. at each: I = 28; C = 32	F1: 0/2 F2: 0/2	F1: 0/2 F2: 0/2	F1: A) 0/6 B) 0/2 F2: A) 1/6 B) 0/2	F1: B) 0/12 F2: B) 1/12	F1: A) 0/1 F2: A) 0/1
Davis *(66)*,‡ 1986, Canada; quality score = 14	I: Individual, therapist-delivered cognitive therapy for stress-coping (positive imagery, PMR, self-talk evaluation and education)—5 times twice weekly sessions and 3 times once weekly at 45 min each (n = 5). C: Usual care (n = 7).	Women with newly diagnosed breast cancer (stage 1). No patient underwent chemo during the study.	Mean age: I = 51 y; C = 51 y % male: 0%	F1: post-I F2: 8 mo No. at each: I = 5; C = 7	F1: 0/1 F2: 0/1				
Morrow *(40)*, 1986, United States; quality scores: I1 = 11; I2 = 14; I3 = 14	I1: Individual, therapist-delivered PMR + visual imagery—two 1-h sessions between the fourth and fifth chemo (n = 26). I2: As I1 without visual imagery (n = 26). I3: Person-centered Rogerian counseling (n = 20). C: Usual care (n = 20).	Patients receiving chemo at a university cancer center and reporting anticipatory side effects.	Age range: I1 = 21–76 y; I2 = 19–75 y; I3: 22–74 y; C = 19–74 y % male: I1 = 35%; I2 = 38%; I3 = 25%; C = 35%	F1: post-I F2: 2–4 wk No. at each: I1 = 26; I2 = 26; I3 = 20; C = 20	F1: I1 = 1/2; I2 = 0/2; I3 = 0/2 F2: I1 = 1/2; I2 = 0/2; I3 = 0/2				

(Table continues)

Table 3 (continued). Samples, interventions, and results, by type of outcome, of trials with psychosocial outcomes, in descending order by methodologic quality score*

Investigators (reference No.), y, country; quality score	Intervention description (No. of subjects at baseline, by experimental group)	Patient characteristics: Eligibility criteria	Patient characteristics: Age and % male	Length of follow-up and No. of subjects at each follow-up	No. of statistically significant measures ($P<.05$)/No. of measures, by outcome type†: Anxiety	Depression	Other affect: A) General B) Hostility C) Stress/distress	Functional ability: A) General B) Coping/control C) Vocational/ domestic	Relationships: A) Interpersonal/ social B) Sexual/marital
Linn et al. *(154),* 1982, United States; quality score = 13	I: Therapist-delivered, individual counseling to reduce denial but maintain hope. Patients seen several times a week till death or for 12 mo (n = 62). C: Standard care (n = 58).	Inpatients with stage 4 cancers with expected survival of 3–12 mo.	Mean age: 58 y % male: 100%	12 mo No.: I = 9; C = 14		0/1	A) 1/1	A) 2/3	A) 1/1
Maguire et al. *(124),* 1983, U.K.; quality score = 13	I: Individual, nurse specialist-delivered counseling before and after mastectomy (psychological and physical issues regarding surgery) + follow-up every 2 mo until patient adapted well. C: Usual care. (total No. = 172)	Patients admitted for modified radical mastectomy and axillary clearance.	Age: unknown % male: 0%	12–18 mo No.: I = 75; C = 77			A) 2/2	A) 1/1 C) 1/2	A) 1/1
Fawzy et al. *(81),* 1990, United States; quality score = 13	I: Therapist-delivered, group intervention (health education, problem-solving skills, relaxation, and psychological support)—six weekly sessions for 1½ h (n = 40). C: Usual care (n = 40).	Patients referred to cancer clinic with stage 1 or 2 malignant melanoma. All required excision of tumor and any metastatic lymph nodes. Patients were not undergoing immunotherapy.	Mean age: I = 46 y; C = 38 y % male: 47%	F1: post-I F2: 4½ mo No. at each: I = 38; C = 28	F1: 0/1 F2: 0/1	F1: 0/1 F2: 1/1	F1: A) 0/1 B) 0/1 F2: A) 1/1 B) 0/1	F1: B) 6/11 F2: B) 9/11	
Richardson et al. *(63),* 1997, United States; quality scores: I1 = 13; I2 = 13	I1: Therapist-delivered support group to minimize stress and isolation and enhance self esteem—six 1-h weekly support groups (self-esteem and managing stress and feelings of isolation) (n = 16). I2:As I1 + relaxation, breathing, imagery, beliefs, coping, support + given tapes practice (n = 16). C = Usual care (n = 15).	Women with breast cancer (except stage 4), 1–30 mo after treatment.	Mean age: 46 y % male: 0%	1 wk No.: I1 = 16; I2 = 16; C = 15		I1: 0/1 I2: 0/1	I1: A) 0/1 B) 0/1 C) 0/1 I2: A) 0/1 B) 0/1 C) 0/1	I1: A) 0/6 B) 1/1 I2: A) 0/6 B) 1/1	I1: A) 1/2 I2: A) 1/2

(Table continues)

Table 3 (continued). Samples, interventions, and results, by type of outcome, of trials with psychosocial outcomes, in descending order by methodologic quality score*

Investigators (reference No.), y, country; quality score	Intervention description (No. of subjects at baseline, by experimental group)	Patient characteristics: Eligibility criteria	Patient characteristics: Age and % male	Length of follow-up and No. of subjects at each follow-up	No. of statistically significant measures ($P<.05$)/No. of measures, by outcome type†: Anxiety	Depression	Other affect: A) General B) Hostility C) Stress/distress	Functional ability: A) General B) Coping/control C) Vocational/ domestic	Relationships: A) Interpersonal/ social B) Sexual/marital
Morrow and Morrell *(39),* 1982, United States; quality scores: I1 = 13; I2 = 12	I1: Individual, therapist-delivered PMR and G1–two 1-h sessions between fourth and fifth chemo (n = 26). I2: As I1, except therapy is Rogerian counseling with a supportive context (n = 24). C: Usual care (n = 27).	Mixed outpatients receiving multiple chemo infusions for cancer, reporting anticipatory side effects.	Median age: I1 = 50 y; I2 = 52 y; C = 54 y % male: I1 = 30%; I2 = 25%; C = 35%	Post-I No.: I1 = 20; I2 = 20; C = 20	I1: 0/2 I2: 0/2		I1: B) 0/1 I2: B) 0/1		
Carey and Burish *(53),* 1987, United States; quality scores: I1 = 12; I2 = 12; I3 = 12	I1: Individual, therapist-delivered PMR + GI—three ≈30-min sessions, prior to chemo. I2: As I1, but delivered by paraprofessional volunteer. I3: As I1, but delivered by audiotape. C: Allowed to rest quietly alone before chemo. (total No. = 45)	Mixed cancer patients receiving chemo and exhibiting conditioned anxiety and nausea likely to produce nausea and vomiting.	Mean age: 49 y % male: 44%	F1: Post-I F2: after next chemo No. at each: total No. = 45	F1: I1 = 2/3; I2 = 0/3; I3 = 0/3; F2: I1 = 2/3; I2 = 0/3; I3 = 0/3;		F1: I1 = A) 0/1; I2 = A) 0/1; I3 = A) 0/1 F2: I1 = A) 0/1; I2 = A) 0/1; I3 = A) 0/1		
Sloman *(59),*‡ 1995, Australia; quality score = 12	I: Individual, audiotaped therapy, via earphones (relaxation and GI)—two 30-min sessions per wk + asked to practice twice daily for 2 wk. C: Usual care. (total No. not stated)	Inpatients with intermediate or advanced cancers with cancer pain and no previous relaxation or meditation experience.	Mean age: 64 y % male: 46%	1 wk No.: I = 20; C = 20			A) 0/1		
Christensen *(103),* 1983, United States; quality score = 12	I: Therapist-delivered couples counseling (discussion of misconceptions affecting relationship, reading assignment, educational information, behavioral assignment, self-image, stress management, communication, and problem solving) (n = 10). C: Usual care (n = 10).	Patients had undergone a mastectomy not less than 2 mo ago and not greater than 3 mo ago (partners of patients also participated in the therapy).	Mean age: 40 y % male: 0%	1 wk No.: I = 10; C = 10	0/1	1/1	A) 0/1 C) 1/1	B) 0/1	A) 0/1 B) 1/2

(Table continues)

Table 3 (continued). Samples, interventions, and results, by type of outcome, of trials with psychosocial outcomes, in descending order by methodologic quality score*

Investigators (reference No.), y, country; quality score	Intervention description (No. of subjects at baseline, by experimental group)	Patient characteristics: Eligibility criteria	Patient characteristics: Age and % male	Length of follow-up and No. of subjects at each follow-up	No. of statistically significant measures ($P<.05$)/No. of measures, by outcome type†: Anxiety	Depression	Other affect: A) General B) Hostility C) Stress/distress	Functional ability: A) General B) Coping/control C) Vocational/ domestic	Relationships: A) Interpersonal/ social B) Sexual/marital
Dura and Ibanez *(70),* 1991, Spain; quality scores: I1 = 12; I2 = 12	I1: Individual, therapist-delivered information about breast cancer treatment and surgery in both verbal and booklet form—given at time of hospitalization + extra booklet, specific to adjuvant therapy, given 1 mo after surgery. All information provided in the presence of a relative (n = 24). I2: As I1, except information given with no relatives present (n = 22). C: Usual care (n = 25).	Women about to undergo surgery for breast cancer (all stages).	Mean age: I1 = 55 y; I2 = 57 y; C = 58 y % male: 0%	F1: 1 mo after surgery F2: 6 mo after surgery No. at each: I1 = 24; I2 = 22; C = 25		F1: I1 = 0/2; I2 = 0/2 F2: I1 = 0/2; I2 = 0/2	F1: I1 = A) 1/3; I2 = A) 0/3; I1 = C) 0/1; I2 = C) 0/1 F2: I1 = A) 1/3; I2 = A) 0/3; I1 = C) 0/1; I2 = C) 0/1	F1: I1 = B) 0/1; I2 = B) 0/1; I1 = C) 0/2; I2 = C) 1/2§ F2: I1 = B) 0/1; I2 = B) 0/1; I1 = C) 1/2; I2 = C) 1/2	F1: I1 = A) 0/3; I2 = A) 0/3; I1 = B) 0/1; I2 = B) 0/1 F2: I1 = A) 0/3; I2 = A) 2/3; I1 = B) 1/1; I2 = B) 1/1
Maguire et al. *(84),* 1980, U.K.; quality score = 11	I: Individual, therapist-delivered counseling before and after surgery + home visit by therapist after surgery to monitor progress. C: Usual care. (total No. 172)	Women admitted to hospital for mastectomy.	Age: not stated % male: 0%	F1: 3 mo F2: 12–18 mo No.: I = 152 and C = 77 (anxiety and depression); I = 50 and C = 48 (sexual problems)	F1: 0/1 F2: 1/1	F1: 0/1 F2: 1/1			F1: B) 0/1 F2: B) 1/1
Dodd *(581),* 1987, United States; quality score = 11	I: Individual, therapist-delivered side-effect management material + explanation of use (n = 30). C: Usual care (n = 30).	Mixed cancer patients scheduled to begin an initial course of external-beam radiotherapy for an average of 6 wk.	Mean age: 52 y % male: 57%	6 wk No.: I = 30; C = 30	0/2			A) 1/5 B) 0/3	
Arakawa *(534),* 1997, Japan; quality score = 11	I: Individual, therapist-delivered PMR—once for 45–60 min + 25-min tape for daily practice (n = 30). C: 10- to 15-min daily contact with experimenter to discuss any concerns (n = 30).	Mixed cancer patients with no relaxation practice experience scheduled for their first chemo at a cancer center.	Mean age: I = 57 y; C = 58 y % male: I = 53%; C = 67%	2 h before first chemo (time since therapy unclear) No.: I = 30; C = 30	1/1				
Zimmerman et al. *(537),* 1989, United States; quality score = 11	I: Given choice of relaxing taped music once for 30 min via earphones, in darkened room, individually (n = 20). C: Lie down quietly in darkened room for 30 min (n = 20).	Inpatients with metastatic cancer with bone involvement, in chronic pain and receiving constant pain medication.	Mean age: 60 y % male: 40%	Post-I No.: I = 20; C = 20			A) 1/1		

(Table continues)

Table 3 (continued). Samples, interventions, and results, by type of outcome, of trials with psychosocial outcomes, in descending order by methodologic quality score*

Investigators (reference No.), y, country; quality score	Intervention description (No. of subjects at baseline, by experimental group)	Patient characteristics: Eligibility criteria	Patient characteristics: Age and % male	Length of follow-up and No. of subjects at each follow-up	No. of statistically significant measures ($P<.05$)/No. of measures, by outcome type†: Anxiety	Depression	Other affect: A) General B) Hostility C) Stress/distress	Functional ability: A) General B) Coping/control C) Vocational/ domestic	Relationships: A) Interpersonal/ social B) Sexual/marital
Arathuzik *(47),* 1994, United States; quality scores: I1 = 11; I2 = 11	I1: Individual, therapist-delivered PMR + visualization/mental imagery + breathing for 75 min (n = 8). I2: As I1 + cognitive coping skills (attention diversion and positive affirmations for pain reduction) for 120 min (n = 8). C: Usual care (n = 8).	Outpatients and inpatients at hospitals or large medical centers who have metastatic breast cancer and are experiencing physical pain.	Age range: 31–80 y % male: 0%	I1, I2 post-I; C next day or next visit. No.: I1 = 8; I2 = 8; C = 8	I1: 0/1 I2: 0/1	I1: 0/1 I2: 0/1	I1: A) 0/1 B) 0/1 C) 0/1 I2: A) 0/1 B) 0/1 C) 0/1	I1: A) 1/1 I2: A) 1/1	
Domar et al. *(111),* 1987, United States; quality score = 11	I: Given tape with relaxation instructions + information sheets + asked to practice at home daily for 20 min (n = 31). C: Asked to read daily for 20 min (n = 23).	Patients with BCC, SCC, or malignant melanomas referred to plastic surgeon for surgery.	Age: <80 y % male: unknown	3–4 wk No.: I = 21; C = 21	0/2		A) 0/1		
Cain et al. *(43),*‡ 1986, United States; quality score = 11	I: Therapist-delivered, group counseling (cancer information, impact of treatment, relaxation, diet and exercise, relating to care givers, communications, and goal setting). Eight weekly sessions (n = 28). C: Usual care (n = 31).	Women with gynecological cancer admitted to a medical center. They had no previous cancer history and were expected to survive at least 1 y.	Age range: 18–75 y % male: 0%	F1: post-I No.: I = 22; C = 29 F2: 6 mo No.: I = 20; C = 23	F1: 0/1 F2: 1/1	F1: 0/1 F2: 1/1	F1: A) 1/1 C) 0/1 F2: A) 1/1 C) 1/1	F1: A) 0/1 C) 1/1 F2: A) 1/1 C) 0/1	F1: A) 0/1 B) 0/1 F2: A) 0/1 B) 0/1

*I = intervention; C = control; CBT = cognitive behavioral therapy; PMR = progressive muscle relaxation; HADS = Hospital Anxiety and Depression Scale; F = follow-up; post-I = follow-up was conducted immediately or shortly after the psychological intervention; BMA = bone marrow aspiration; chemo = chemotherapy; GI = guided imagery; BCC = basal cell carcinoma; SCC = squamous cell carcinoma.

†All statistically significant results represented improvements (i.e., intervention group was statistically significantly better than control group) unless otherwise indicated.

‡These papers also included results from additional trials that are not reported here because they failed to achieve adequate methodologic quality scores.

§Control group had statistically significantly better outcomes than the intervention group.

up, and the data for two were collected at a long-term follow-up. The overall results from Table 4 suggest that unstructured counseling and music therapy can currently be tentatively recommended for improving patients' general affect levels, although the latter recommendation was based on results from only one trial *(537).* In addition, therapist-delivered interventions involving group therapy, education, structured counseling, cognitive behavioral therapy, and communication skills training warrant further exploration before recommendations for or against their use can be made. The time-specific results from Table 5 show that tentative recommendations could also be made for the long-term benefits of therapist-delivered, individual interventions involving education, structured and unstructured counseling, cognitive behavioral therapy, and communication skills training *(124,154),* for the medium-term benefit of group therapy *(43,81),* and for the immediate benefits of interventions involving patients' significant others, education, and communication skills training *(43,80,93).*

Effectiveness of Interventions Targeting Hostility

Table 3 summarizes the study samples, interventions, and results, by type of outcome, of the six papers that discussed 10 fair-quality trials that explored interventions aimed at reducing patients' levels of hostility *(39,42,47,63,81,572).* Because some of the trials reported results for multiple follow-up points, we reviewed 14 sets of results, of which the data for five were collected immediately after the intervention, the data for four were collected at a short-term follow-up, and the data for five were collected at a medium-term follow-up. The overall results from Tables 4 and 5 suggest that no intervention strategy could be recommended for reduction of patients' hostility levels or for further exploration in relation to any time period.

Table 4. Overall recommendations regarding each trialed intervention strategy, by outcome measure*

Type of outcome measure	Recommendations (No. of statistically significant trials/total No. of trials) for each intervention strategy for each type of outcome																	
	Group therapy	Individual therapy	Nontherapist delivered	Therapist delivered	Audiotape delivered	Significant-other involvement	Information and education	Unstructured counseling	Structured counseling	Relaxation training	Cognitive behavioral therapy	Communication/expression training	Guided imagery/visualization	Self-practice	Improving self-esteem/self-image	Hypnosis	Music therapy	Electromyography feedback
Psychosocial outcomes																		
Anxiety	X(1/4)	?(9/34)	X(0/2)	?(9/33)	X(1/4)	?(1/3)	X(3/14)	X(1/7)	X(1/5)	X(7/28)	?(3/11)	?(2/7)	?(4/14)	?(2/7)	X(0/1)	—	✓(1/1)	—
Depression	?(2/6)	X(2/18)	—	X(4/24)	—	X(1/5)	?(4/13)	X(1/5)	?(2/5)	X(3/15)	?(3/10)	?(2/7)	X(0/3)	X(1/6)	?(1/3)	—	—	—
General affect	?(3/6)	X(6/27)	X(0/2)	?(8/26)	X(1/5)	X(1/5)	?(5/14)	✓(2/2)	?(1/2)	X(5/25)	?(5/10)	?(4/8)	X(0/8)	X(1/9)	X(0/3)	X(0/1)	✓(1/1)	—
Hostility	X(0/4)	X(0/10)	—	X(0/14)	—	—	X(0/4)	X(0/3)	X(0/2)	X(0/11)	X(0/4)	X(0/2)	X(0/4)	X(0/5)	X(0/2)	—	—	—
Stress/distress	X(1/4)	X(2/11)	✓(1/1)	X(3/15)	—	?(2/5)	X(1/6)	—	✓(1/1)	X(2/10)	?(3/7)	?(2/6)	X(0/2)	X(0/2)	?(1/3)	X(0/1)	—	—
Quality of life/ functioning	X(1/4)	?(5/7)	—	?(6/11)	—	?(1/2)	?(2/4)	✓(2/2)	✓(1/1)	?(4/8)	?(4/7)	?(2/6)	✓(1/1)	X(0/1)	X(0/2)	—	—	—
Coping/control	✓(3/4)	X(1/13)	—	X(4/17)	—	X(1/5)	X(2/10)	—	X(0/1)	?(4/12)	?(3/6)	?(2/5)	—	X(0/7)	X(0/2)	—	—	—
Vocational/ domestic adjustment	X(0/2)	X(0/7)	—	X(0/9)	—	X(0/4)	X(0/7)	X(0/1)	X(0/1)	X(0/4)	X(0/4)	X(0/4)	—	—	—	—	—	—
Social relationships	X(0/4)	X(3/10)	—	X(3/14)	—	X(0/4)	X(2/9)	✓(2/2)	✓(2/2)	X(0/8)	X(1/6)	X(0/6)	—	X(0/3)	X(0/2)	—	—	—
Marital relationships	X(0/2)	?(3/9)	—	?(3/11)	—	X(0/5)	?(3/9)	?(1/2)	?(1/3)	X(0/5)	X(0/5)	X(0/5)	—	X(0/1)	X(0/1)	—	—	—
Survival/immune outcomes																		
Survival length	?(1/3)	X(0/1)	—	X(1/4)	—	—	?(1/2)	X(0/2)	X(0/2)	?(1/3)	X(1/4)	X(0/1)	X(0/1)	X(0/1)	—	—	—	—
Immune system	X(1/4)	?(2/5)	—	?(3/9)	—	—	?(2/4)	—	—	?(3/9)	?(2/5)	X(1/4)	?(1/2)	X(1/4)	X(0/2)	—	—	?(1/2)
Side-effect outcomes																		
Nausea	—	?(6/22)	X(0/2)	?(6/18)	X(0/2)	—	X(0/1)	?(3/9)	X(0/2)	?(6/18)	X(0/2)	—	X(2/10)	?(4/11)	—	—	—	—
Vomiting	—	X(0/16)	X(0/2)	X(0/12)	X(0/2)	—	—	X(0/8)	X(0/2)	X(0/14)	—	—	X(0/8)	X(0/8)	—	—	—	—
Pain	—	?(3/9)	—	X(2/8)	?(1/3)	—	X(0/3)	X(0/1)	X(0/1)	?(3/7)	?(1/3)	—	X(1/4)	?(3/5)	—	X(0/1)	X(0/1)	—
Fatigue	X(1/4)	X(0/7)	—	X(1/11)	—	—	X(1/4)	—	—	X(1/11)	X(1/4)	X(0/2)	X(0/2)	X(0/6)	X(0/2)	—	—	—
Overall side effects	—	X(2/13)	X(0/2)	X(2/8)	X(0/3)	X(0/4)	X(0/4)	—	—	X(2/8)	X(0/3)	X(0/2)	?(2/6)	—	—	—	X(0/1)	—
Conditioned nausea	—	?(4/10)	X(0/1)	?(4/8)	X(0/1)	—	—	?(1/3)	—	?(3/7)	—	—	?(3/6)	✓(1/1)	—	✓(1/1)	—	—
Conditioned vomiting	—	?(2/7)	X(0/1)	?(2/5)	X(0/1)	—	—	X(0/2)	—	?(2/5)	—	—	?(2/5)	✓(1/1)	—	✓(1/1)	—	—

*✓ = tentatively for; ? = neither for nor against; X = tentatively against.

Effectiveness of Interventions Targeting Stress or Distress

Table 3 summarizes the study samples, interventions, and results, by type of outcome, of the eight papers that discussed 11 fair-quality trials that explored interventions aimed at reducing patients' levels of stress or distress *(43,47,63,70,80,102,103, 328).* Because some of these trials reported results from multiple follow-up points, we reviewed 15 sets of results, of which the data for five were collected immediately after the intervention, the data for five were collected at a short-term follow-up, and the data for five were collected at a medium-term follow-up. The overall results from Table 4 suggest that non-therapist-delivered interventions involving structured counseling can currently be tentatively recommended for reducing patients' levels of stress or distress. In addition, interventions involving patients' significant others, cognitive behavioral therapy, communication skills training, and self-esteem building warrant further exploration before recommendations for or against their use can be made. The time-specific results from Table 5 show that tentative recommendations could also be made for the medium-term benefits of interventions involving group therapy, cognitive behavioral therapy, and communication skills training *(43,80).* All of the other strategies examined, except self-practice, appeared worthy of further investigation in relation to either their short-term or medium-term benefits. No strategy, however, showed any benefits in reducing patients' stress levels immediately after the intervention was given.

Effectiveness of Interventions Targeting General or Overall Functional Ability or Quality of Life

Table 3 summarizes the study samples, interventions, and results, by type of outcome, of the seven papers that discussed nine fair-quality trials that explored interventions aimed at im-

Table 5. Follow-up period-specific tentative recommendations that could be made for each intervention strategy, by outcome measure*

Type of outcome measure	Follow-up periods where tentative recommendations could be made, for each intervention strategy: Group therapy	Individual therapy	Nontherapist delivered	Therapist delivered	Audiotape delivered	Significant-other involvement	Information and education	Unstructured counseling	Structured counseling	Relaxation training	Cognitive behavioral therapy	Communication/expression training	Guided imagery/visualization	Self-practice	Improving self-esteem/self-image	Hypnosis	Music therapy	Electromyography feedback
Psychosocial outcomes																		
Anxiety	—	—	—	—	—	I	—	L	L	—	—	—	—	S	—	—	S	—
Depression	M	—	—	—	—	—	L	—	L	—	—	—	—	—	—	—	—	—
General affect	M	L	—	L	—	I	I and L	L	L	—	L	I and L	—	—	—	—	—	I
Hostility	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Stress/distress	M	—	S	—	—	—	—	—	S	—	M	M	—	—	—	—	—	—
Quality of life/functioning	M	M and L	—	M and L	—	M	M and L	L	L	M	M and L	M	I	—	—	—	—	—
Coping/control	I and M	—	—	—	—	I	—	—	—	I	I	I	—	—	—	—	—	—
Vocational/ domestic adjustment	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Social relationships	—	L	—	L	—	—	L	L	L	—	L	—	—	—	—	—	—	—
Marital relationships	—	L	—	L	—	—	L	L	L	—	—	—	—	—	—	—	—	—
Survival/immune outcomes																		
Survival length	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Immune system	M	L	—	M and L	—	M and L	—	—	M and L	M and L	L	L	L	—	L	—	—	—
Side-effect outcomes																		
Nausea	—	—	—	—	—	—	—	—	—	M	—	—	M	—	—	—	—	—
Vomiting	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Pain	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Fatigue	M	—	—	—	—	—	—	—	—	—	M	—	—	—	—	—	—	—
Overall side effects	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Conditioned nausea	—	I	—	I	—	—	—	I	—	I	—	—	I and M	I	—	I	—	—
Conditioned vomiting	—	—	—	—	—	—	—	—	—	I and M	—	—	I and M	I	—	I	—	—

*I = immediately after intervention; S = short-term; M = medium-term; L = long-term.

proving patients' levels of general functional ability or quality of life *(43,47,63,80,124,154,581).* Because some of these trials reported results from multiple follow-up points, we reviewed 11 sets of results, of which the data for five were collected immediately after the intervention, the data for two were collected at a short-term follow-up, the data for two were collected at a medium-term follow-up, and the data for two were collected at a long-term follow-up. The overall results from Table 4 suggest that interventions involving structured or unstructured counseling and guided imagery can currently be tentatively recommended for improving patients' general functional ability or quality of life *(47,124,154).* In addition, therapist-delivered, individual interventions involving patients' significant others, education, relaxation training, cognitive behavioral therapy, and communication skills training warrant further exploration before recommendations for or against their use can be made. The time-specific results from Table 5 show that most of the benefits resulting from these interventions were found at the medium- and long-term follow-up periods *(43,80,124,154).*

Effectiveness of Interventions Targeting Coping or Control Skills

Table 3 summarizes the study samples, interventions, and results, by type of outcome, of the eight papers that discussed 10 fair-quality trials that explored interventions aimed at improving patients' coping or control skills *(63,70,80,81,103,328,572,581).* Because some of these trials reported results from multiple follow-up points, we reviewed 17 sets of results, of which the data for three were collected immediately after the intervention, the data for seven were collected at a short-term follow-up, and the data for seven were collected at a medium-term follow-up. The overall results from Table 4 suggest that group therapy can currently be tentatively recommended for improving patients' coping or control skills and that interventions involving relax-

ation training, cognitive behavioral therapy, and communication skills training warrant further exploration before recommendations for or against their use can be made. The time-specific results from Table 5 show that most of the benefits for these interventions were found immediately after the intervention was given *(80,81).* No trials explored the long-term effects of these interventions. Only group therapy could be tentatively recommended for its medium-term benefits *(81),* although the medium-term benefits of cognitive behavioral therapy and the short-term benefits of self-esteem building warrant further exploration before recommendations for or against their use can be made.

Effectiveness of Interventions Targeting Vocational or Domestic Adjustment

Table 3 summarizes the study samples, interventions, and results, by type of outcome, of the four papers that discussed five fair-quality trials that explored interventions aimed at improving patients' vocational or domestic adjustment *(43,70,80,124).* Because some of these trials reported results from multiple follow-up points, we reviewed nine sets of results, of which the data for two were collected immediately after the intervention, the data for two were collected at a short-term follow-up, the data for four were collected at a medium-term follow-up, and the data for one were collected at a long-term follow-up. The overall results from Tables 4 and 5 suggest that none of these intervention strategies could be recommended either for improving patients' vocational or domestic adjustment or for further investigation.

Effectiveness of Interventions Targeting Interpersonal or Social Relationships

Table 3 summarizes the study samples, interventions, and results, by type of outcome, of the seven papers that discussed nine fair-quality trials that explored interventions aimed at improving patients' interpersonal or social relationships *(43,63,70,80,124,154,572).* Because some of these trials reported results from multiple follow-up points, we reviewed 14 sets of results, of which the data for two were collected immediately after the intervention, the data for four were collected at a short-term follow-up, the data for six were collected at a medium-term follow-up, and the data for two were collected at a long-term follow-up. The overall results from Table 4 suggest that either structured or unstructured counseling can currently be tentatively recommended for improving patients' interpersonal or social relationships *(124,154).* The time-specific results from Table 5 show that most of the benefits were found in trials that explored the long-term effects of these interventions *(124,154).* We were unable to recommend the use or further investigation of any of the intervention strategies for benefits in any of the other time periods.

Effectiveness of Interventions Targeting Sexual or Marital Relationships

Table 3 summarizes the study samples, interventions, and results, by type of outcome, of the five papers that discussed six fair-quality trials that explored interventions aimed at improving patients' sexual or marital relationships *(43,70,80,84,103).* Because some of these trials reported results from multiple follow-up points, we reviewed 11 sets of results, of which the data for two were collected immediately after the intervention, the data for three were collected at a short-term follow-up, the data for five were collected at a medium-term follow-up, and the data for one were collected at a long-term follow-up. The overall results from Table 4 suggest that no intervention strategy could be recommended for improving patients' sexual or marital relationships. Therapist-delivered, individual interventions involving education and counseling, however, warrant further exploration before recommendations for or against their use can be made. The time-specific results from Table 5 show that tentative recommendations could be made for the long-term benefit of such strategies, although these recommendations were based on results from only one trial *(84).*

Effectiveness of Interventions Targeting Nausea

Table 6 summarizes the study samples, interventions, and results, by type of outcome, of the five papers that discussed 12 fair-quality trials that explored interventions aimed at reducing patients' nausea *(40,42,53,57,534).* Because some of these trials reported results from multiple follow-up points, we reviewed 22 sets of results, of which the data for eight were collected immediately after the intervention, the data for 11 were collected at a short-term follow-up, and the data for three were collected at a medium-term follow-up. The overall results from Table 4 suggest that no intervention strategy could be recommended for reducing patients' nausea. Therapist-delivered interventions involving individual therapy, unstructured counseling, relaxation training, and self-practice, however, warrant further exploration before recommendations for or against their use can be made. The time-specific results from Table 5 show that tentative recommendations could be made for the medium-term benefits of relaxation and guided imagery, although the latter recommendation was based on results from only one trial *(40).*

Effectiveness of Interventions Targeting Vomiting

Table 6 summarizes the study samples, interventions, and results, by type of outcome, of the three papers that discussed six fair-quality trials that explored interventions aimed at reducing patients' vomiting *(42,53,534).* Because some of these trials reported results from multiple follow-up points, we reviewed 16 sets of results, of which the data for five were collected immediately after the intervention and the data for 11 were collected at a short-term follow-up. The overall results from Tables 4 and 5 indicate that no intervention strategy could be recommended for reducing patients' vomiting in either follow-up period.

Effectiveness of Interventions Targeting Pain

Table 6 summarizes the study samples, interventions, and results, by type of outcome, of the seven papers that discussed 10 fair-quality trials exploring interventions aimed at reducing patients' pain *(47,57,59,102,111,124,537).* Because some of these trials reported results from multiple follow-up points, we reviewed 10 sets of results, of which the data for seven were collected immediately after the intervention, the data for two were collected at a short-term follow-up, and the data for one were collected at a long-term follow-up. The overall results from Table 4 suggest that no intervention strategy could be recommended for reducing patients' pain. Interventions involving individual therapy, audiotape delivery, relaxation training, cognitive behavioral therapy, and self-practice, however, warrant further exploration before recommendations for or against their use can be made. The time-specific results from Table 5 show that all of the benefits of these strategies were seen immediately

Table 6. Samples, interventions, and results, by type of outcome, of trials with physical and conditioned side effect outcomes, in descending order by methodologic quality score*

Investigators (reference No.), y, country; quality score	Intervention description (No. of subjects at baseline, by experimental group)	Patient characteristics		Length of follow-up and No. of subjects at each follow-up	No. of statistically significant measures ($P<.05$)/No. of measures, by outcome type†						
		Eligibility criteria	Age and % male		Physical symptoms					Conditioned side effects	
					Nausea	Vomiting	Pain	Fatigue	Overall	Nausea	Vomiting
Greer et al. *(80),* 1992, U.K.; quality score = 18	I: Individual (or with spouse), therapist-delivered adjuvant psychological therapy (CBT, PMR, coping skills, gaining control, and expressing feelings)—six to eight weekly sessions, 1 h each (n = 72). C: No details (n = 84).	Mixed cancer patients—newly diagnosed or first recurrence with high HADS score and ⩾1 y life expectancy.	Mean age: I = 51 y; C = 52 y % male: I = 28%; C = 14%	F1: 2 wk No.: I = 64; C = 78 F2: 4 mo No. I = 57, C = 73					F1: 0/1 F2: 0/1		
Sabo and Michael *(436),* 1996, United States; quality score = 17	I: Individual, audiotaped intervention (preselected taped music with encouraging messages from physician), via earphones—four sessions (n = 50). C: Usual care (n = 50).	Mixed cancer patients receiving chemo for the first time.	Age range: 21–70 y % male: I = 42%; C = 38%	4 days to 9 wks No.: I = 47; C = 50					0/1		
Syrjala et al. *(57),* 1995, United States; quality scores: I1 = 17; I2 = 17; I3 = 17	I1: Individual, therapist-delivered, psychotherapy (coping skills and information about pain, nausea, and treatments) + given tape to practice—twice for 90 min (before BMT) + bi-weekly sessions in hospital of ≈30 min for 5 wk (n = 42). I2: As I1, but I was PMR + imagery, deep breathing and positive affirmations + given tape to practice (n = 40). I3: As I2, + CBT (coping skills, distraction + goal setting) (n = 42). C: Usual care (n = 37).	Leukemia, myelodysplasia, or lymphoma patients undergoing their first BMT at cancer research center.	Mean age: 36 y % male: 56%	Daily for days 17–22 after BMT No.: I1 = 24; I2 = 23; I3 = 24; C = 23	I1: 0/1 I2: 0/1 I3: 0/1		I1: 0/1 I2: 1/1 I3: 1/1				
Katz et al. *(102),* 1987, United States; quality score = 15	I: Individual, therapist-delivered hypnosis (eye fixation ± eye closure induction, active imagery, deep muscle relaxation, and suggestion)—two 30-min sessions prior to first BMA + 20 min prior to next three BMAs (n = 17). C: Nondirected play (n = 19).	Outpatients from hematology/oncology clinic with acute lymphoblastic leukemia—experiencing significant anxiety, fear, and pain during BMAs.	Mean age: 8 y % male: I = 71%; C = 63%	Post-I No.: I = 17; C = 19			0/1				
Larsson and Starrin *(328),* 1992, Sweden; quality score = 14	I: Individual, nurse-delivered relaxation (one time for 15 min) + given audiotape and asked to practice 4 times a week for ≈3 wk (n = 32). C: Usual care (n = 32).	Breast cancer outpatients receiving their first radiotherapy following surgery.	Mean age: I = 60 y; C = 61 y % male: 0%	F1: 2 wk F2: ≈3 wk F3: ≈5 wk No. at each: I = 32; C = 32				F1: 1/1‡ F2: 1/1‡; F3: 1/1‡			

(Table continues)

Table 6 (continued). Samples, interventions, and results, by type of outcome, of trials with physical and conditioned side effect outcomes, in descending order by methodologic quality score*

Investigators (reference No.), y, country; quality score	Intervention description (No. of subjects at baseline, by experimental group)	Patient characteristics		Length of follow-up and No. of subjects at each follow-up	No. of statistically significant measures ($P<.05$)/No. of measures, by outcome type†						
					Physical symptoms					Conditioned side effects	
		Eligibility criteria	Age and % male		Nausea	Vomiting	Pain	Fatigue	Overall	Nausea	Vomiting
Lyles et al. *(42),* 1982, United States; quality scores: I1 = 14; I2 = 14	I1: Individual, therapist-delivered prechemotherapy relaxation training (PMR and GI)—three times for ≈45-min sessions + instructions for home practice. I2: As I1, but conversation only with therapist (initially structured and then unstructured). C: Relaxed alone prechemotherapy and told it would be less unpleasant if relaxed and calm. (total No. = 50)	Mixed cancer patients with anticipatory nausea and vomiting in response to previous outpatient chemo.	Age: adults % male: 38%	F1: post-I No.: I1 = 18; I2 = 14; C = 18 F2: ≈15 days No.: I1 = 15; I2 = 14; C = 17	F1: I1 = 4/4; I2 = 2/4 (1‡) F2: I1 = 1/4; I2 = 1/4	F1: I1 = 0/2; I2 = 0/2 F2: I1 = 0/2; I2 = 0/2					
Fawzy *(572),* 1995, United States; quality score = 14	I: Individual, therapist-delivered PMR—3 hours for two sessions + asked to practice daily for 15 min + given educational manual and instruction on use + telephone reminder prior to appointment (n = 31). C: Usual care (n = 32).	Patients with stage 1 or 2 malignant melanoma who were attending cancer clinic. All patients had their malignant lesions excised prior to the intervention.	Mean age: I = 42 y; C = 46 y % male: I = 52%; C = 58%	F1: 6 wk F2: 3 mo No. at each: I = 28; C = 32				F1: 0/2 F2: 1/2			
Morrow *(40),* 1986, United States; quality score: I1 = 11; I2 = 14; I3 = 14	I1: Individual, therapist-delivered PMR + visual imagery—two 1-h sessions between fourth and fifth chemo (n = 26). I2: As I1 without visual imagery (n = 26). I3: Person-centered Rogerian counseling (n = 20). C: Usual care (n = 20).	Patients receiving chemo at a university cancer center and reporting anticipatory side effects.	Age range: I1 = 21–76 y; I2 = 19–75 y; I3 = 22–74 y; C = 19–74 y % male: I1 = 35%; I2 = 38%; I3 = 25%; C = 35%	4–8 wk No. at each: I1 = 26; I2 = 26; I3 = 20; C = 20	I1: 2/2 I2: 2/2 I3: 0/2					I1: 2/2 I2: 0/2 I3: 0/2	
Richardson et al. *(63),* 1997, United States; quality scores: I1 = 13; I2 = 13	I1: Therapist-delivered support group to minimize stress and isolation and enhance self esteem—six 1-h weekly support group sessions (self-esteem and managing stress and feelings of isolation) (n = 16). I2: As I1 + relaxation, imagery, breathing, beliefs, coping, and support + given tapes for practice (n = 16). C: Usual care (n = 15).	Women with breast cancer (except stage 4), 1–30 mo after treatment.	Mean age: 46 y % male: 0%	1 wk No.: I1 = 16; I2 = 16; C = 15				I1: 0/2 I2: 0/2			

(Table continues)

Table 6 (continued). Samples, interventions, and results, by type of outcome, of trials with physical and conditioned side effect outcomes, in descending order by methodologic quality score*

Investigators (reference No.), y, country; quality score	Intervention description (No. of subjects at baseline, by experimental group)	Patient characteristics		Length of follow-up and No. of subjects at each follow-up	No. of statistically significant measures ($P<.05$)/No. of measures, by outcome type†						
					Physical symptoms					Conditioned side effects	
		Eligibility criteria	Age and % male		Nausea	Vomiting	Pain	Fatigue	Overall	Nausea	Vomiting
Maguire et al. *(124),* 1983, U.K.; quality score = 13	I: Individual, nurse specialist-delivered counseling before and after mastectomy (psychological and physical issues relating to surgery) + follow-up every 2 mo until patient adapted well. C: Usual care. (total No. = 172)	Patients admitted for modified radical mastectomy and axillary clearance.	Age: unknown % male: 0%	12–18 mo No.: I = 75; C = 77			0/2				
Fawzy et al. *(81),* 1990, United States; quality score = 13	I: Therapist-delivered, group intervention (health education, problem-solving skills, relaxation + psychological support)—six weekly sessions for 1½ h (n = 40). C: Usual care (n = 40).	Patients referred to cancer clinic with stage 1 or 2 malignant melanoma. All required excision of tumor and any metastatic lymph nodes. Patients were not undergoing immunotherapy.	Mean age: I = 46 y; C = 38 y % male: 47%	F1: post-I F2: 4½ mo No. at each: I = 38; C = 28				F1: 1/2 F2: 2/2			
Morrow and Morrell *(39),* 1982, United States; quality scores: I1 = 13; I2 = 12	I1: Individual, therapist-delivered PMR and GI—two 1-h sessions between fourth and fifth chemo (n = 26). I2: As I1, except therapy is Rogerian counseling with a supportive context (n = 24). C: Usual care (n = 27).	Mixed outpatients receiving multiple chemo infusions for cancer, reporting anticipatory side effects.	Median age: I1 = 50 y; I2 = 52 y; C = 54 y % male: I1 = 30%; I2 = 25%; C = 35%	Post-I No.: I1 = 20; I2 = 20; C = 20						I1: 3/3 I2: 0/3	I1: 2/3 I2: 0/3
Sloman *(59),*§ 1995, Australia; quality score = 12	I: Individual, audiotaped therapy, via earphones (relaxation + GI)—two 30-min sessions per wk + to practice twice daily for 2 wk. C: Usual care. (total No. not stated)	Inpatients with intermediate-stage or advanced-stage cancers with cancer pain and no previous relaxation or meditation experience.	Mean age: 64 y % male: 46%	1 wk No.: I = 20; C = 20			3/4				
Dura and Ibanez *(70),* 1991, Spain; quality scores: I1 = 12; I2 = 12	I1: Individual, therapist-delivered information about breast cancer treatment and surgery in both verbal and booklet form—given at time of hospitalization + extra booklet, specific to adjuvant therapy, given 1 mo after surgery. All information given in the presence of a relative (n = 24). I2: As I1, but information was given with no relatives present (n = 22). C: Usual care (n = 25).	Women about to undergo surgery for breast cancer (all stages).	Mean age: I1 = 55 y; I2 = 57 y; C = 58 y % male: 0%	F1: 1 mo after surgery F2: 6 mo after surgery No. at each: I1 = 24; I2 = 22; C = 25					F1: I1 = 0/1; I2 = 0/1 F2: I1 = 0/1; I2 = 0/1		

(Table continues)

Table 6 (continued). Samples, interventions, and results, by type of outcome, of trials with physical and conditioned side effect outcomes, in descending order by methodologic quality score*

Investigators (reference No.), y, country; quality score	Intervention description (No. of subjects at baseline, by experimental group)	Patient characteristics		Length of follow-up and No. of subjects at each follow-up	No. of statistically significant measures ($P<.05$)/No. of measures, by outcome type†						
		Eligibility criteria	Age and % male		Physical symptoms					Conditioned side effects	
					Nausea	Vomiting	Pain	Fatigue	Overall	Nausea	Vomiting
Hawkins et al. *(61)*, 1995, U.K. and Greece; quality scores: I1 = 12; I2 = 12	I1: Individual, therapist-delivered hypnosis (relaxation + visual imagery followed by suggestions of calmness and confidence + indirect suggestion) + asked to practice at home—one time for 1 h + one 20-min booster session for ≈4 h prior to chemo. I2: Individual, therapist contact where children could talk about whatever was on their minds for same time as I1. No coping skills were introduced. C: Usual care. (total No. = 30)	Children with osteogenic sarcoma, without previous hypnosis experience, being treated at a hematology/oncology department in a children's hospital. All had severe side effects of nausea and vomiting before and after chemo.	Mean age: 14 y % male: 40%	5 days from initial therapy session total No. = 30						I1: 1/1 I2: 1/1	I1: 1/1 I2: 0/1
Carey and Burish *(53)*, 1987, United States; quality scores: I1 = 12; I2 = 12; I3 = 12	I1: Individual, therapist-delivered PMR + GI—three 30-min sessions, prior to chemo. I2: As I1, but delivered by paraprofessional volunteer. I3: As I1, but delivered by audiotape. C: Allowed to rest quietly alone before chemo. (total No. = 45)	Mixed cancer patients receiving chemo and exhibiting conditioned anxiety and nausea likely to produce nausea and vomiting.	Mean age: 49 y % male: 44%	F1: post-I F2: before next chemo F3: after next chemo No. at each: total No. 45	F1: I1 = 0/1; I2 = 0/1; I3 = 0/1 F3: I1 = 0/1; I2 = 0/1; I3 = 0/1	F1: I1 = 0/1; I2 = 0/1; I3 = 0/1 F3: I1 = 0/1; I2 = 0/1; I3 = 0/1			F1: I1 = 1/1; I2 = 0/1; I3 = 0/1 F3: I1 = 1/1; I2 = 0/1; I3 = 0/1	F2: I1 = 0/1; I2 = 0/1; I3 = 0/1	F2: I1 = 0/1; I2 = 0/1; I3 = 0/1
Arakawa *(534)*, 1997, Japan; quality score = 11	I: Individual, therapist-delivered PMR—once for 45–60 min + 25-min tape for daily practice (N = 30). C: 10- to 15-min daily contact with experimenter to discuss any concerns (n = 30).	Mixed cancer patients with no relaxation practice experience scheduled for their first chemo at a cancer center.	Mean age: I = 57 y; C = 58 y % male: I = 53%; C = 67%	F1: 12 h after chemo initiation F2: 24 h after F3: 36 h after F4: 48 h after F5: 60 h after F6: 72 h after No. at each: I = 30; C = 30	F1: 0/1 F2: 0/1 F3: 0/1 F4: 1/1 F5: 1/1 F6: 1/1	F1: 0/1 F2: 0/1 F3: 0/1 F4: 0/1 F5: 0/1 F6: 0/1					
Arathuzik *(47)*, 1994, United States; quality scores: I1 = 11; I2 = 11	I1: Individual, therapist-delivered PMR and visualization using mental imagery and breathing for 75 min (n = 8). I2: As I1 + cognitive coping skills (attention diversion and positive affirmations for pain reduction) for 120 min (n = 8). C: Usual care (n = 8).	Outpatients and inpatients at hospitals or large medical centers who had metastatic breast cancer and were experiencing physical pain.	Age range: 31–80 y % male: 0%	I1 and I2 post-I; C next day or next visit No.: I1 = 8; I2 = 8; C = 8			I1: 0/1 I1: 0/2 I2: 0/1 I2: 0/2				

(Table continues)

Table 6 (continued). Samples, interventions, and results, by type of outcome, of trials with physical and conditioned side effect outcomes, in descending order by methodologic quality score*

Investigators (reference No.), y, country; quality score	Intervention description (No. of subjects at baseline, by experimental group)	Patient characteristics		Length of follow-up and No. of subjects at each follow-up	No. of statistically significant measures ($P<.05$)/No. of measures, by outcome type†						
		Eligibility criteria	Age and % male		Physical symptoms					Conditioned side effects	
					Nausea	Vomiting	Pain	Fatigue	Overall	Nausea	Vomiting
Zimmerman et al. *(537),* 1989, United States; quality score = 11	I: Given choice of relaxing taped music once for 30 min, via earphones, in darkened room, individually (n = 20). C: Lie down quietly in darkened room for 30 min (n = 20).	Metastatic cancer inpatients with bone involvement, in chronic pain and receiving constant pain medication.	Mean age: 60 y % male: 40%	Post-I No.: I = 20; C = 20			1/2				
Domar et al. *(111),* 1987, United States; quality score = 11	I: Given tape with relaxation instructions + information sheets + asked to practice at home daily for 20 min (n = 31). C: Asked to read daily for 20 min (n = 23).	Patients with BCC, SCC, or malignant melanomas who were referred to plastic surgeon for surgery.	Age: <80 y % male: unknown	3–4 wk No.: I = 21; C = 21			1/2‡				

*I = intervention; C = control; CBT = cognitive behavioral therapy; PMR = progressive muscle relaxation; HADS = Hospital Anxiety and Depression Scale: F = follow-up; post-I = follow-up was conducted immediately or shortly after the psychological intervention; ± = with or without; BMA = bone marrow aspiration; BMT = bone marrow transplant; chemo = chemotherapy; GI = guided imagery; BCC = basal cell carcinoma; SCC = squamous cell carcinoma.

†All statistically significant results represented improvements (i.e., intervention group was statistically significantly better than control group) unless otherwise indicated.

‡Control group had statistically significantly better outcomes than the intervention group.

§This paper also included results from additional trials that are not reported here because they failed to achieve adequate methodologic quality scores.

after the intervention or in the short-term follow-up; however, it was still not possible to make any tentative recommendations for any of the intervention strategies.

Effectiveness of Interventions Targeting Fatigue

Table 6 summarizes the study samples, interventions, and results, by type of outcome, of the five papers that discussed seven fair-quality trials that explored interventions aimed at reducing patients' fatigue *(47,63,81,328,572).* Because some of these trials reported results from multiple follow-up points, we reviewed 11 sets of results, of which the data for three were collected immediately after the intervention, the data for four were collected at a short-term follow-up, and the data for four were collected at a medium-term follow-up. The overall results from Table 4 suggest that no intervention strategy could be recommended for reducing patients' fatigue or for further exploration. However, Table 5 shows that tentative recommendations could be made for the medium-term benefits of interventions involving group therapy and cognitive behavioral therapy, although each was based on results from only one trial *(81).*

Effectiveness of Interventions Targeting Overall Physical Symptoms

Table 6 summarizes the study samples, interventions, and results, by type of outcome, of the four papers that discussed seven fair-quality trials that explored interventions aimed at reducing patients' overall physical symptoms *(53,70,80,436).* Because some of these trials reported results from multiple follow-up points, we reviewed 13 sets of results, of which the data for four were collected immediately after the intervention, the data for six were collected at a short-term follow-up, and the data for three were collected at a medium-term follow-up. The overall results from Table 4 suggest that, although no intervention strategy could be recommended for reducing patients' overall physical symptoms, guided imagery warrants further exploration before recommendations for or against it can be made.

Effectiveness of Interventions Targeting Conditioned Nausea

Table 6 summarizes the study samples, interventions, and results, by type of outcome, of the four papers that discussed 10 fair-quality trials that explored interventions aimed at reducing patients' conditioned nausea *(39,40,53,61).* Because some of these trials reported results from multiple follow-up points, we reviewed 10 sets of results, of which the data for two were collected immediately after the intervention, the data for three were collected at a short-term follow-up, and the data for five were collected at a medium-term follow-up. The overall results from Table 4 suggest that interventions involving self-practice and hypnosis can currently be tentatively recommended for reducing patients' conditioned nausea, although each recommendation was based on results from only one trial *(61).* In addition, therapist-delivered interventions involving individual therapy, unstructured counseling, relaxation training, and guided imagery warrant further exploration before recommendations for or against their use can be made. The time-specific results from Table 5 show that most of the benefits of these strategies were found immediately after the intervention or in the medium term, allowing us to make tentative recommendations for all of the intervention strategies in the immediate follow-up period *(61)* and for guided imagery in the medium term *(39,40).* In addition, therapist-delivered interventions involving individual therapy

and cognitive behavioral therapy warrant further exploration before recommendations for or against their use can be made in relation to their medium-term benefits.

Effectiveness of Interventions Targeting Conditioned Vomiting

Table 6 summarizes the study samples, interventions, and results, by type of outcome, of the three papers that discussed seven fair-quality trials that explored interventions aimed at reducing patients' conditioned vomiting *(39,53,61).* Because some of these trials reported results from multiple follow-up points, we reviewed seven sets of results, of which the data for two were collected immediately after the intervention, the data for three were collected at a short-term follow-up, and the data for two were collected at a medium-term follow-up. The overall results from Table 4 suggest that interventions involving self-practice and hypnosis can currently be tentatively recommended for reducing patients' conditioned vomiting, although each recommendation was based on results from only one trial *(61).* In addition, therapist-delivered interventions involving individual therapy, relaxation training, and guided imagery warrant further exploration before recommendations for or against their use can be made. The time-specific results from Table 5 show that all of the benefits were found immediately after the intervention or at the medium-term follow-up *(39,61),* allowing us to make tentative recommendations for the immediate benefit of interventions involving relaxation training, guided imagery, self-practice, and hypnosis *(61)* and for the medium-term benefits of relaxation training and guided imagery. Each of these recommendations, however, was based on results from only one trial.

Effectiveness of Interventions Targeting Survival

Table 7 summarizes the study samples, interventions, and results, by type of outcome, of the four papers that discussed four fair-quality trials that explored interventions aimed at increasing patients' lengths of survival *(154,580,639,640).* Each of these trials involved a single, long-term follow-up point: one at 12 months after the intervention *(154)* and three at 5–6 years after the intervention *(580,639,640).* The overall results from Tables 4 and 5 suggest that no intervention strategy could be recommended for increasing patients' survival. Interventions involving group therapy, education, and relaxation training, however, warrant further exploration before recommendations for or against their use can be made.

Effectiveness of Interventions Targeting Immune Outcomes

Table 7 summarizes the study samples, interventions, and results, by type of outcome, of the four papers that discussed six fair-quality trials exploring interventions aimed at improving patients' immune outcomes *(63,66,536,539).* Because some of these trials reported results from multiple follow-up points, we reviewed nine sets of results, of which the data for three were collected immediately after the intervention, the data for three were collected at a short-term follow-up, the data for one were collected at a medium-term follow-up, and the data for two were collected at a long-term follow-up. The overall results from Table 4 suggest that no intervention strategy could be recommended for improving patients' immune outcomes. Therapist-delivered interventions involving individual therapy, education, relaxation training, cognitive behavioral therapy, guided imagery, and electromyography feedback, however, warrant further exploration before recommendations for or against their use can be made. The time-specific results from Table 5 show that all of the benefits were seen in the medium- or long-term follow-up periods, allowing us to make tentative recommendations for all intervention strategies examined during these follow-up periods. These recommendations, however, should be treated with caution because many were based on results from only one trial *(66,536).*

Discussion

Literature Overview

We identified a growing body of literature that explored the effectiveness of psychological therapies for cancer patients. Despite the increased use of randomized, controlled trial designs over time, the methodologic quality of most of the trials that we reviewed was less than optimal. Many of the trials, however, failed to provide sufficient information for us to assess their performance on many of the methodologic indicators. Therefore, it is possible, although unlikely, that some trials could have achieved higher methodologic quality scores than they did had more information been available. Table 8 shows how easily the 10 indicators of methodologic quality can be achieved (with the exception of indicator 4 for therapist-delivered interventions) and adequately reported to maximize the internal validity and improve the reporting of randomized trials of psychological therapies. The latter is important, given the increasing number of systematic reviews of literature in this field of research and the weight given to such reviews in developing clinical guidelines and best-practice models of care.

Although this review represents one of the largest and most systematic explorations of this literature, it is not without limitations. First, as with any literature review, it is inevitable that some potentially relevant references were not identified. The iterative and multifaceted search strategies employed, however, should have minimized the number of unidentified references. Second, we excluded non-English language papers from this review. However, given that only about 100 potentially relevant, non-English language papers were identified and only three in every 20 potentially relevant English language references were actually included, we estimate that a maximum of 15 relevant non-English language references were excluded from this review. We believe that such a small number of references, when 627 relevant papers were identified, is unlikely to have substantially changed the conclusions of this review. Third, we were unable to contact the original authors of the papers included in this review to request missing information, which would have allowed us to assess the performance of more of the trials on the methodologic quality indicators. However, the age of many of the reviewed trials made it unlikely that much of the missing information would be found, thus possibly introducing a bias in favor of more recently published papers had we attempted this strategy. Furthermore, because researchers were considered more likely to report the strengths rather than the weaknesses of their studies, we thought it unlikely that the performances of the reviewed trials on the methodologic quality indicators assessed would have increased substantially.

Effectiveness Review

This stage of the review aimed to critically summarize the evidence about the effectiveness of specific psychological inter-

Table 7. Samples, interventions, and results, by outcome, of the trials with survival or immune outcomes, in descending order by methodologic quality score*

Investigators (reference No.), y, country; quality score	Intervention description (No. of subjects at baseline, by experimental group)	Patient characteristics		Length of follow-up and No. of subjects at each follow-up	No. of statistically significant measures ($P<.05$)/No. of measures, by outcome†	
		Eligibility criteria	Age and % male		Survival	Immune outcomes
Cunningham et al. *(639),* 1998, Canada; quality score = 17	C: Usual care + given audiotape and workbook for home practice of relaxation (n = 36). I: As C + therapist-delivered group intervention (psychological and supportive therapy + CBT)—35 weekly sessions at 2 h each + encouraged to attend weekend course (coping, relaxation, mental imagery, stress management, thought monitoring, and goal setting) + homework exercises (n = 30).	Patients with confirmed diagnoses of metastatic breast cancer, none with brain metastases.	Mean age: C = 50 y; I = 52 y % male: 0%	5 y from start of study No.: C = 36; I = 30	0/1	
Edelman et al. *(640),* 1999, Australia; quality score = 16	I: Therapist-delivered, group intervention (cognitive behavioral strategies, including communication, goal setting, relaxation, and thought monitoring)—eight weekly sessions (including a family night) + three monthly sessions + homework exercises (n = 60). C: Usual care (n = 61).	Patients with metastatic breast cancer.	Mean age: I = 60 y; C = 61 y % male: 0%	5 y from start of study No.: I = 60, C = 61	0/1	
Davis *(66),* 1986, Canada; quality scores: I1 = 14; I2 = 14	I1: Individual, therapist-delivered EMG and skin temperature biofeedback, using PMR and deep breathing—five twice weekly sessions and three once weekly sessions at 45 min each + homework exercises (n = 10). I2: As I1, but therapy was cognitive therapy for stress coping (positive imagery, PMR, self-talk evaluation, and education) (n = 5). C: Usual care (n = 7).	Women with newly diagnosed breast cancer (stage 1). No patient underwent chemo during the study.	Mean age: I1 = 49 y; I2 = 51 y; C = 51 y % male: 0%	F1: post-I F2: 8 mo No. at each: I1 = 7; I2 = 5; C = 7		F1: I1 = 0/1; I2 = 0/1 F2: I1 = 1/1; I2 = 1/1
Lekander et al. *(539),* 1997, Sweden; quality score = 14	I: Individual, therapist-delivered PMR + cue-controlled relaxation and reply relaxation association in response to tension and nausea—three 20- to 45-min sessions (over a 4-week period) + given tape for home practice (n = 12). C: Usual care (n = 10).	Ovarian cancer patients receiving their first four cycles of chemo postoperatively.	Mean age: I = 55 y; C = 59 y % male: 0%	1 mo No.: I = 12; C = 10		1/5
Fawzy et al. *(580),* 1993, United States; quality score = 14	I: Therapist-delivered, group psychiatric intervention (health education, problem solving, relaxation training, and psychological support)—six 1½-h weekly sessions (n = 40). C: None (n = 40).	Patients with malignant melanoma (stage 1 or 2) referred to cancer clinic for surgery. None were undergoing immunotherapy, radiotherapy, or chemo.	Mean age: I = 39 y; C = 46 y % male: I = 47%; C = 50%	5–6 y from start of study No.: I = 34, C = 34	1/1	
Linn et al. *(154),* 1982, United States; quality score = 13	I: Therapist-delivered, individual counseling to reduce denial but maintain hope. Patients seen several times a week until death or for 12 mo (n = 62). C: Usual care (n = 58).	Inpatients with stage 4 cancers with expected survival of 3–12 mo.	Mean age: 58 y % male: 100%	12 mo No.: I = 62; C = 58	0/1	

(Table continues)

Table 7 (continued). Samples, interventions, and results, by outcome, of the trials with survival or immune outcomes, in descending order by methodologic quality score*

Investigators (reference No.), y, country; quality score	Intervention description (No. of subjects at baseline, by experimental group)	Patient characteristics		Length of follow-up and No. of subjects at each follow-up	No. of statistically significant measures ($P<.05$)/No. of measures, by outcome†	
		Eligibility criteria	Age and % male		Survival	Immune outcomes
Richardson et al. *(63),* 1997, United States; quality scores: I1 = 13; I2 = 13	I1: Therapist-delivered support group aimed at minimizing stress and isolation and enhancing self esteem—six 1-h weekly support group sessions (self-esteem and managing stress and feelings of isolation) (n = 16). I2: As I1 + relaxation, imagery, breathing, beliefs, coping, and support + given tapes for home practice (n = 16). C: Usual care (n = 15).	Women with breast cancer (except stage 4), 1–30 mo after treatment.	Mean age: 46 y % male: 0%	1 wk No.: I1 = 16; I2 = 16; C = 15		I1: 0/3 I2: 0/3
Fawzy et al. *(536),* 1990, United States; quality score = 11	I: Therapist-delivered, group psychiatric intervention (health education, problem solving, relaxation training, and psychological support)—six 1½-h weekly sessions (n = 40). C: None (n = 40).	Patients with malignant melanoma (stage 1 or 2) referred to cancer clinic for surgery.	Mean age: 42 y % male: 45%	F1: before fifth or sixth group F2: 6 mo No.: I = 35; C = 26		F1: 1/6 F2: 5/6

*C = control; I = intervention; CBT = cognitive behavioral therapy; EMG = electromyograph; PMR = progressive muscle relaxation; chemo = chemotherapy; post-I = follow-up was conducted immediately or shortly after the psychological intervention; F = follow-up.

vention strategies in improving the outcomes of cancer patients. Unfortunately, despite the large number of randomized, controlled trials located, a number of limitations within the trials themselves hampered our ability to make strong recommendations about any of the intervention strategies.

First, the overall methodologic quality of the trials that we located was poor; the majority of the trials were excluded for being of poor methodologic quality and only one trial achieved a good-quality rating *(93).* While it could be argued that the quality-assessment criteria that we used should be reviewed in the light of such poor performances by so many trials, the indicators used represented only a basic assessment of the internal validity of each trial according to Cochrane Collaboration Handbook *(71)* recommendations. Therefore, we believe that our results indicate genuine weaknesses in the design and reporting of trials of psychological therapies for cancer patients. Second, the reviewed trials tended to employ very small samples, with the vast majority having fewer than 50 patients per experimental group. Small study samples increase the likelihood of making type II errors, unless large improvements in outcomes are achieved in the intervention groups. Third, the reviewed trials tended to employ relatively short follow-up periods, with few having follow-up periods greater than 6 months, which prohibited us from commenting on the long-term effectiveness of many of the intervention strategies.

Overview of Effectiveness Review Findings

Although this is one of the more extensive and rigorous literature reviews conducted in this area of research, we can offer only tentative recommendations for or against most intervention strategies overall or within the different follow-up periods. In addition, it is important to note that most of these recommendations are based on results obtained from only one or two fair-quality trials. Therefore, the future publication of any fair- or good-quality trials that show no statistically significant benefit for any of these tentatively recommended strategies would negate the recommendation. Thus, these recommendations should be considered with appropriate caution and should not be seen as supporting the current wide-scale adoption of these strategies.

With this caution in mind, however, some intervention strategies appeared to provide potential benefits. For example, group therapy, education, structured and unstructured counseling, and cognitive behavioral therapy offered the most promise for their medium- and long-term benefits for many of the psychosocial outcomes explored. The comparative lack of immediate- and short-term benefits could suggest that psychological therapies are more likely to offer psychosocial benefits over the longer term. This finding, however, may well be only an artifact of the smaller number of trials that assessed the long-term effects of intervention strategies, whereby one statistically significant trial carries more weight in the synthesized data.

Although some intervention strategies could be tentatively recommended for reducing patients' conditioned side effects, very few intervention strategies could be recommended for reducing patients' physical side effects, despite the fact that more trials explored many of these outcomes. Of all the strategies investigated, relaxation training and guided imagery appeared to provide benefits for most of the side-effect outcomes explored.

Although no intervention strategies could be recommended for improving patients' lengths of survival, some tentative recommendations were possible in relation to immune outcomes,

Table 8. Summary of recommendations to maximize the internal validity and to improve the reporting of future randomized, controlled trials of psychological therapies

Quality indicator	How the indicator can be achieved	Minimal information to be reported
Indicator 1: ensure adequate concealment of allocation	Assess patients' eligibility independent of and before allocation to experimental groups.	State the process of determining eligibility and randomly allocating patients to groups.
Indicator 2: ensure patients are randomly selected	Randomly select patients from a defined population or recruit all consecutive, eligible patients in a given time period.	State the target population, the eligibility criteria, and how sample was selected from all eligible patients.
Indicator 3: ensure patients are blinded to their experimental group	Use a placebo intervention, where possible. Otherwise, conceal the true nature of the study by presenting the intervention as part of routine care to intervention group only.	State if patients were aware of their experimental group. If unaware, state how this was achieved. If aware, discuss any implications.
Indicator 4: ensure care providers are blinded to patients' experimental group	Not possible for therapist-delivered interventions but can minimize impact by ensuring that indicators 5 and 10 are met.	State if providers were aware of patients' experimental groups. If unaware, state how this was achieved. If aware, discuss any implications.
Indicator 5: ensure all other treatments, except the trial intervention, are equivalent	Maintain usual-care practices for control groups. Ensure that there are no changes to usual-care practices during the study period.	Provide clear descriptions of the procedures for all experimental groups. State if there were any other differences or not. If there were other differences, discuss any implications.
Indicator 6: ensure care providers' adherence to the study protocol	Maximize adherence by thoroughly training and testing care providers. Monitor adherence by: taping (video or audio) randomly selected sessions; asking randomly selected patients about sessions.	Provide details of training given to care providers. Describe any steps taken to monitor their adherence.
Indicator 7: provide detailed loss to follow-up information *AND* Indictor 8: minimize the % of patients excluded from analyses	Before starting study, consider factors that could increase dropouts and try to minimize their impact. Keep detailed study log sheets, including reasons for any dropouts. Choose follow-up periods appropriate to the patient group and outcome measures.	State number of patients eligible. State number of patients analyzed at baseline and each follow-up period, by experimental groups. State reasons for any dropouts at each follow-up period, by experimental groups. Discuss implications of number of dropouts.
Indicator 9: conduct intention-to-treat analyses	Have 0% loss to follow-up. If not, conduct the following analyses to compare with the unadjusted data: For continuous data, assume no change or the average increase or loss shown by that experimental group. For categorical data, assume no change or the adverse outcome.	Having clearly stated numbers lost to follow-up and analyzed at each point (*see* indicators 7 and 8), describe any substitute data used in any intention-to-treat analyses. Discuss any differences between unadjusted and intention-to-treat analyses.
Indicator 10: ensure study outcomes are measured in a manner blinded to patients' experimental groups	Use objective measures where possible. If only subjective measures are feasible, ensure raters (i.e., patient, family, care provider) are blinded to the patients' experimental groups.	Describe the measures used. If subjective, ensure it is clear whether the rater was aware of the patients' experimental groups.

with all the strategies for which trials were performed indicating medium- or long-term immune benefits.

Comparison to Previous Reviews

Overall, the results of this review lead us to be considerably less enthusiastic about the likely benefits of psychological therapies for cancer patients than do the results of other recent reviews, many of which have recommended widespread and routine use of psychological therapies to improve patients' psychosocial, side-effect, survival, and immune outcomes. While we acknowledge that the small sample sizes in many of the reviewed trials increase the chance that we have underestimated the true effectiveness of psychological therapies, our cautious recommendations are considered to be warranted in light of the many other methodologic shortcomings of those trials.

Two other features of this review may have made it likely that we would find fewer statistically significant effects than previous reviews. First, some of the reviewed trials failed to present the data collected for all outcomes. In those cases, however, we assumed that authors were more likely to omit the statistically nonsignificant results than the statistically significant results from their papers. We considered this strategy, which does not appear to have been used in previous reviews, important for reducing the potential bias of relying only on presented results. Second, many of the reviewed trials employed multiple measures of the same outcome. In such cases, an overall statistically significant result was achieved only if more than half of the measures for that outcome were statistically significant. For example, a trial that reported two measures of patients' anxiety levels, one that showed a statistically significant benefit and one that did not, was coded as statistically nonsignificant overall. This conservative approach was considered warranted as a counterbalance to the fact that none of the reviewed trials appeared to adjust *P* values to compensate for frequent multiple comparisons, increasing the likelihood of obtaining statistically significant results due to chance.

Conclusions and Recommendations for Future Research

The major finding of the effectiveness review stage of this review was that, despite a body of literature that spans more than 40 years and includes more than 150 randomized, controlled trials, we could make no strong recommendations and relatively few tentative recommendations about the effectiveness of psychological intervention strategies at improving cancer patients' outcomes. By exploring the relative effectiveness of the different intervention strategies for each outcome and follow-up period,

however, we can suggest the most worthwhile strategies for future investigation in relation to each type of outcome. In addition, we provide a number of suggestions for how future trials of psychological intervention strategies can maximize their internal validity, as well as some minimal reporting standards that authors should observe, and journal editors should enforce, when publishing work in this area. As summarized in Table 8, such improvements in the quality of the conduct and reporting of future trials should be feasible without incurring many additional costs or requiring substantially more journal space when publishing results. Because the wide variation in the nature of interventions and outcome measures make meaningful meta-analyses very difficult in this area, we also suggest that future trials employ adequate sample sizes to detect feasible and statistically significant improvements in the outcomes of cancer patients.

APPENDIX

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NOTES

[1]*Editor's note:* Because of space limitations, all of the studies are not listed in the printed reference list. However, a complete reference list can be found on the *Journal of the National Cancer Institute* Cancer Spectrum Web site (http://jncicancerspectrum.oupjournals.org).

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