Table 1. Selected intervention characteristics (Number of interventions or studies and percent)

	Intervention Characteristic	Interventions N (%)	Studies N (%)
Site of intervention:	Health care setting	24 (33%)	14 (30%)
	Home	12 (17%)	7 (15%)
	Community	17 (24%)	12 (26%)
	School	8 (11%)	7 (15%)
	Worksite	20 (28%)	13 (28%)
	Government institution	2 (3%)	2 (4%)
	Child care	1 (1%)	1 (2%)
	Religious institution	1 (1%)	1 (2%)
	Exercise center	7 (10%)	4 (9%)
Additional components:	Diet	10 (14%)	6 (13%)
	Smoking cessation and diet	29 (40%)	19 (40%)
Physical activity mode:	Aerobic	22 (31%)	17 (36%)
	Aerobic and non-aerobic	8 (11%)	7 (15%)
	Not specified	42 (58%)	23 (49%)
Exercise level	Moderate	20 (28%)	16 (34%)
	Vigorous	4 (6%)	3 (6%)
	Not clearly specified	48 (67%)	28 (60%)
Intervention mode	Mail	31 (43%)	20 (43%)
	In person	54 (75%)	36 (77%)
	Telephone	12 (17%)	8 (17%)
	Mass media	1 (1%)	1 (2%)
	Unspecified	3 (4%)	3 (6%)
Theoretical constructs:	Education on the benefits of exercise	48 (67%)	33 (70%)
	Written and/or verbal feedback and/or encouragement	33 (46%)	23 (49%)
	Benefits and barriers	31 (43%)	21 (45%)
	Self-monitoring	28 (39%)	20 (43%)
	Goal setting	26 (36%)	19 (40%)
	Problem solving	19 (26%)	17 (36%)
	Education on normal response to exercise	19 (26%)	14 (30%)
	Social support	18 (25%)	14 (30%)
	Incentives and contracts	14 (19%)	12 (26%)
	Education on where and/or how to exercise	13 (18%)	11 (23%)
	Skill building	12 (17%)	9 (19%)
	Relapse prevention	12 (17%)	9 (19%)
	Self efficacy	9 (13%)	9 (19%)
	Modeling	4(6%)	4 (9%)
	Provision of equipment	4 (6%)	4 (9%)
	Self-reinforcement	4 (6%)	3 (6%)
	Decisional balance/outcome expectancies	2 (3%)	2 (4%)
	Social advocacy/marketing	2 (3%)	2 (4%)
	Self-talk strategies	2 (3%)	2 (4%)
	Awareness of abstinence violation effect	2 (3%)	1 (2%)
	Stimulus control	2 (3%)	1 (2%)
	Capacity building	1 (1%)	1 (2%)
	Assessment of motivation and confidence	1 (1%)	1 (2%)
	Maintenance strategies	1 (1%)	1 (2%)
	Resuming exercise safely after time off	1 (1%)	1 (2%)
	Injury concerns	1 (1%)	1 (2%)
	Self-evaluation	1 (1%)	1 (2%)
	Not specified	14 (19%)	10 (21%)

Table 1. Selected intervention characteristics (Number of interventions or studies and percent) (continued)

	Intervention Characteristic	Interventions N (%)	Studies N (%)
Tailoring of intervention:	None	36 (50%)	20 (43%)
	Stage of change	17 (24%)	12 (26%)
	Risk factor status	10 (14%)	7 (15%)
	Individualized counseling	9 (13%)	8 (17%)
	Fitness level or exercise preference	8 (11%)	5 (11%)
	Language	2 (3%)	2 (4%)
	Other psychological variables	2 (3%)	2 (4%)
	Disability status	1 (1%)	1 (2%)
	Enthusiasm	1 (1%)	1 (2%)
	Health	1 (1%)	1 (2%)
	Reading level	1 (1%)	1 (2%)
	Schedule/time preference	1 (1%)	1 (2%)
Theory used:	None	37 (51%)	23 (49%)
	Transtheoretical model	21 (29%)	13 (28%)
	Social learning theory	7 (10%)	6 (13%)
	Motivational interviewing	5 (7%)	2 (4%)
	Social cognitive theory	4 (6%)	3 (6%)
	Health belief model	2 (3%)	2 (4%)
	Relapse prevention model	2 (3%)	2 (4%)
	Precaution adoption process model	2 (3%)	1 (2%)
	Behavior change theory	1 (1%)	1 (2%)
	Diffusion of innovation theory	1 (1%)	1 (2%)
	Kanfer's model of self-control & self-change model	1 (1%)	1 (2%)

Table 2. Measures of intensity of the most intensive intervention in each of 47 studies

Number of Subject Contacts Over Intervention Period	Median = 4 (range 1 to >200)
Total length of intervention	
Less than 2 weeks	15 (32%)
2+ weeks to 6 months	20 (43%)
6 months to 3 years	9 (19%)
Over 3 years or more	3 (6%)
Overall intensity*	
1	10 (21%)
2	18 (38%)
3	15 (32%)
4	4 (9%)

* Studies in which there was no in-person contact were scored as “1”. If there was in-person contact, but less than a total of eight times, and the study was less than two years long, it was scored as a “2”. Studies that had ten or more in-person contacts and/or were large community trials that had a number of environmental and media changes and lasted five to seven years (such as Minnesota Heart Health Project,[49] Pawtucket,[50] and UK Heart Disease Prevention Project[51]) were scored as “3”. The remaining studies, one of which met four times weekly for four months and three of which had in-person contact three to five times weekly from one to three years were scored as a “4”.

Table 3. Percent of different outcome types found in included studies

	Percent of All Outcome Measures (n)	Percent of Studies with Outcome Type (n)
Daily activities	1.0% (1)	2.1% (1)
Exercise sessions	23.2% (23)	36.2% (17)
Fitness activities	1.0% (1)	2.1% (1)
Fitness	15.2% (15)	21.3% (10)
Leisure activity	13.1% (13)	19.1% (9)
Moderate activity	3.0% (3)	6.4% (3)
Other	4.0% (4)	8.5% (4)
Total activity	19.2% (19)	38.3% (18)
Vigorous activity	8.1% (8)	12.8% (6)
Walking	12.1% (12)	14.9% (7)

Table 4. Percent of outcomes, interventions, and studies that were statistically significant

	Statistically Significant Positive Effect
Studies	44.7% (21/47)
Interventions	31.9% (23/72)
Outcomes	22.3% (37/166)
Outcome Group	
Total activity group	8.3% (3/36)
Vigorous activity group	22.9% (19/83)
Moderate activity group	33.3% (15/45)
Other activity group	0% (0/2)

Table 5. Percent of individual outcomes that were statistically significant by outcome group

	Statistically Significant Positive Effect
Outcome Group	
Total activity group	13% (3/23)
Vigorous activity group	28% (14/50)
Moderate activity group	48% (12/25)[†]
Other activity group	0% (0/1)

[†] p=.008 versus Total activity group. Other two-way tests between Outcome groups not statistically significant.

Table 6. Statistically significant positive effects by setting of intervention delivery

	Healthcare	Home	Community	School	Worksite	Government	Other†
Study	(5/14) 35.7%	(2/7) 28.6%	(4/12) 33.3%	(4/7) 57.1%	(4/13) 30.8%	(2/2) 100%	(3/6) 50.0%
Intervention	(4/24) 16.7%	(2/12) 16.7%	(4/17) 23.5%	(5/8) 62.5%	(6/20) 30.0%	(2/2) 100%	(3/9) 33.3%
Outcome	(8/54) 14.8%	(2/22) 9.1%	(5/38) 13.2%	(10/39) 25.6%	(8/36) 22.2%	(2/3) 66.7%	(5/19) 26.3%

†children's center, exercise facility, and religious institution

Table 7. Hypothesized mediators (H), whether they were intervened on (I), measured (M), and results found

Study	Hypothesized Mediators	Effect of Intervention on Mediator
Bull & Jamrozik, 1998[113] Bull et al., 1999[57]	Barriers to exercise **H, I, M**	Although reported as measured, no results given
Miller et al., 2002[78]	Self-efficacy **H, I, M** Partner support **H, I, M**	Non-significant but positive effect on self-efficacy in the print plus community development intervention (compared to control or print alone) **Attenuation of overall effect seen when partner support and self-efficacy were added to the model suggesting they may be acting as mediators**
Bock et al., 2001[114] Marcus et al., 1998[73]	Self-efficacy **H, I, M** Decisional balance (benefits and barriers combo) **H, I, M** Benefits (pros) **H, I, M** Barriers (cons) **H, I, M** Cognitive processes **H, I, M** Behavioral processes **H, I, M** Mood depression (CES-D) **H, I, M** Mood positive and negative affect (PANAS) **H, I, M**	No statistically significant changes in mediators
Blalock et al., 2000[76]	Self-efficacy **H, I** Barriers to change **H, I**	Mediators not measured
Caserta & Gillett, 1998[115] Gillett et al., 1996[63] Gillett & Caserta, 1996[79]	Perceived importance of exercising with peers **H, I, M** Structural features of exercise programs **H, I, M** Experience of companionship and support during exercise **H, I, M** Perceived benefits of exercise **H, I, M**	No difference at 18 months in perceived importance of exercise, peer group factors, and companionship and support.
Godin et al., 1987[116]	Intention to exercise **H, I, M**	Greater intention to exercise at three months in the group that received physical fitness evaluation and health hazard appraisal compared with control. No differences in the groups that received only the physical fitness evaluation or health hazard appraisal.
Graham-Clarke & Oldenburg, 1994[117]	Intention to change **H, I, M**	No difference in progression of "intention to change" at 12 months between groups
Edmundson et al., 1996[118] Luepker et al., 1996[53] Nader et al., 1999[52] Perry et al., 1997[119] Simmons-Morton et al., 1997[120] Stone et al., 1996[121] Nader et al., 1996[122] McKenzie et al., 2001[123] McKenzie et al., 1996[124] McKenzie et al., 1994[125] Hearn, 1992[126]	Knowledge **H, I** Self-efficacy **H, I, M** Perceived social reinforcement and support **H, I, M** Intentions **H, I**	No statistically significant difference between control and intervention groups in perceived physical activity positive support, perceived physical activity negative support, and physical activity self-efficacy at end of trial)

Table 7. Hypothesized mediators (H), whether they were intervened on (I), measured (M), and results found (continued)

Study	Hypothesized Mediators	Effect of Intervention on Mediator
McKenzie et al., 1995[127]		
Mutrie et al., 2002[70]	Processes of change **H, I, M**	No change in mediators
Nader et al., 1986[128] Nader et al., 1989[129]	Family structure **H** Demographics **H** Family adaptability and cohesion **H, I, M** Perceived social support **H, I, M** Acculuration **H**	No results for family structure, demographics, family adaptability and cohesion, perceived social support and acculuration reported although it appears they were measured
Owen et al., 1987[77]	Self-efficacy for exercise **H, I**	Not reported by intervention group

Table 8. Study outcomes by intensity score of most intensive intervention in study

Intensity Score	Statistically Significant Study
1	4 (40.0%)
2	8 (44.4%)
3	5 (33.3%)
4	4 (100.0%)

Table 9. Statistically significant positive effects by whether intervention was theory based

	No Theory Used	Theory Used
Study	(13/23) 56.5%	(8/24) 33.3%
Intervention	(16/36) 44.4%	(7/36) 19.4%[†]
Outcome	(30/108) 27.8%	(7/58) 12.1%[†]

[†]p=.02

Table 10. Percent of studies theory based by intensity level of the study

Intensity Level	Percent Theory Based
1 (lowest)	70% (7/10)
2	50% (9/18)
3	47% (7/15)
4	25% (1/4)

Chi-Square not statistically significant

Table 11. Percent (n) statistically significant studies by length of followup
First followup ≥3 months

Time of Measurement	Statistically Significant Study	
	No	Yes
≥3 months and <6 months	(7) 53.8%	(6) 46.2%
≥6 months but <12 months	(9) 52.9%	(8) 47.1%
≥12 months	(10) 58.8%	(7) 41.2%

Table 12. Quality criteria met by studies

Study	Description		Sampling			Measurement					Analysis					Results		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Hillsdon et al., 2002[97]	✓		✓	✓		✓			✓		✓	✓					✓	✓
Bull & Jamrozik, 1998[113] Bull et al., 1999a[57]		✓	✓			✓					✓	✓					✓	✓
Miller et al., 2002[78]	✓	✓	✓	✓	✓						✓	✓				✓	✓	✓
Hilton et al., 1999[130] Steptoe et al., 1999[58] Steptoe et al., 2000[75] Steptoe et al., 2001[131]	✓	✓				✓			✓	✓	✓	✓	✓		✓		✓	✓
Halbert et al., 1999[132] Halbert et al., 2000[59]	✓	✓							✓	✓	✓	✓				✓	✓	✓
Kreuter et al., 2000[133] Bull et al., 1999b[134]				✓		✓					✓	✓			✓			✓
Harland et al., 1999[135]	✓		✓			✓					✓	✓	✓			✓	✓	✓
Kerse et al., 1999[60]			✓			✓					✓	✓	✓		✓	✓	✓	✓
Burke et al., 1998[65]											✓	✓	✓		✓		✓	✓
Eckstrom et al., 1999[136]				✓	✓						✓	✓	✓		✓		✓	✓
Bauer et al., 1985[51] Rose, 1970[137] Rose et al., 1980[138]				✓							✓	✓					✓	
Gomel et al., 1993[139] Gomel et al., 1997[140]	✓			✓							✓	✓	✓		✓	✓	✓	✓
Carlaw et al., 1984[141] Jacobs et al., 1986[142] Luepker et al., 1985[143] Luepker et al., 1994[49] Mittelmark et al., 1986[144]						✓	✓	✓			✓	✓	✓		✓		✓	✓
Bock et al., 2001[114] Marcus et al., 1998[73]									✓	✓	✓	✓					✓	
Belisle et al., 1987[74]		✓				✓					✓	✓	✓		✓		✓	✓
Belisle et al., 1987[74]		✓				✓					✓	✓	✓		✓		✓	✓
Blalock et al., 2000[76]			✓								✓	✓	✓		✓			✓
Caserta & Gillett, 1998[115] Gillett et al., 1996[63] Gillett & Caserta, 1996[79]						✓			✓	✓	✓	✓	✓				✓	✓

Table 12. Quality criteria met by studies (continued)

Study	Description		Sampling			Measurement					Analysis					Results		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Chen et al., 1998[145]	✓					✓	✓	✓	✓	✓	✓	✓				✓	✓	✓
Dale et al., 1998[146] Dale & Corbin, 2000[66]				✓					✓	✓	✓	✓						
Edye et al., 1989[147]				✓		✓			✓	✓	✓	✓					✓	
Elder et al., 1995[148] Elder et al., 1994[149]	✓					✓	✓	✓		✓	✓	✓	✓				✓	✓
Gemson & Sloan, 1995[68]											✓		✓				✓	✓
Godin et al., 1987[116]										✓	✓	✓	✓					
Graham-Clarke & Oldenburg, 1994[117]									✓	✓	✓	✓						✓
Green et al., 2002[61]	✓	✓			✓	✓			✓	✓	✓	✓	✓			✓	✓	✓
Howard et al., 1996[56]				✓							✓	✓						
Keyserling et al., 2002[150]	✓					✓			✓	✓	✓	✓	✓			✓	✓	✓
Knutsen & Knutsen, 1989[151] Knutsen & Knutsen, 1990[152] Knutsen & Knutsen, 1991[153] Thelle et al., 1976[154]			✓	✓	✓					✓	✓	✓				✓		✓
Kreuter & Strecher, 1996[155]	✓			✓							✓	✓	✓			✓	✓	
Linenger et al., 1991[71]									✓	✓	✓	✓	✓				✓	
Lombard et al., 1995[69]		✓	✓			✓	✓	✓	✓	✓	✓	✓	✓				✓	✓
Lovibond et al., 1986[156]									✓	✓	✓	✓	✓			✓		✓
Edmundson et al., 1996[118] Luepker et al., 1996[53] Nader et al., 1999[52] Perry et al., 1997[119] Simons-Morton et al., 1997[120] Stone et al., 1996[121] Nader et al.,[122] McKenzie et al., 2001[123] McKenzie et al., 1996[124] McKenzie et al., 1994[125] Hearn, 1992[126] McKenzie et al., 1995[127]	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MacKeen et al., 1985[157] Remington et al., 1978[158] Taylor et al., 1973[159]					✓				✓	✓	✓	✓					✓	✓

Table 12. Quality criteria met by studies (continued)

Study	Description		Sampling			Measurement					Analysis					Results		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Mutrie et al., 2002[70]				✓					✓	✓	✓	✓	✓					
Nader et al., 1986[128] Nader et al., 1989[129]						✓			✓	✓	✓	✓	✓			✓	✓	✓
O'Loughlin et al., 1996[67]						✓			✓	✓	✓	✓	✓				✓	✓
Ostwald, 1989[160]				✓							✓	✓				✓	✓	
Owen et al., 1987[161]		✓				✓					✓							
Owen et al., 1987[77]						✓					✓	✓	✓			✓	✓	✓
Kriska et al., 1986[162] Pereira et al., 1998[64]						✓			✓	✓	✓	✓	✓			✓	✓	✓
Perkio-Makela, 1999[72]						✓			✓	✓	✓	✓				✓	✓	
Sherman et al., 1989[163]											✓	✓				✓	✓	
Smith et al., 2000[164]						✓			✓	✓	✓	✓				✓		✓
Stevens et al., 1998[62]			✓	✓		✓					✓	✓					✓	
Carleton et al., 1987[165] Carleton et al., 1995[166] Eaton et al., 1999[50] Marcus et al., 1992[167] Levin et al., 1998[168] McGraw et al., 1989[169]		✓			✓	✓				✓	✓	✓			✓		✓	✓

Quality Measures

Description

1. Was the study sample well described?
2. Was the intervention well described (what, how, who, where)?

Sampling

3. Did the authors specify the sampling frame or universe of selection for the study sample?
4. Was the sample that served as the unit of analysis the entire eligible sample or a probability sample at the point of reference?
5. Are there other selection bias issues not otherwise addressed? [note: Check in table for "no"]

Measurement

6. Did the authors attempt to measure exposure to the intervention?
7. Was the exposure variable valid?
8. Was the exposure variable reliable (consistent and reproducible)?
9. Were the outcome and other independent (or predictor) variables valid?
10. Were the outcome and other independent (or predictor) variables reliable (consistent and reproducible)?

Table 12. Quality criteria met by studies (continued)

Analysis

Did the authors conduct appropriate statistical testing by:

11. conducting statistical testing (when appropriate)?
12. reporting which statistical tests were used?
13. controlling for repeated measures in samples that were followed over time?
14. controlling for differential exposure to the intervention?
15. using a model designed to handle multi-level data when they included group-level and individual covariates in the model?

Results

16. Did at least 80 percent of enrolled participants complete the study?
17. Did the authors assess if the units of analysis were comparable prior to exposure to the intervention?
18. Did the authors institute study procedures to limit bias appropriately (e.g. randomization, restriction, matching, stratification or statistical adjustment)?

Table 13. Percent of studies meeting individual quality criteria

	Percent of Studies Meeting Criterion
Description	
Was the study sample well described?	26%
Was the intervention well described (what, how, who, where)?	23%
Sampling	
Did the authors specify the sampling frame or universe of selection for the study sample?	19%
Was the sample that served as the unit of analysis the entire eligible sample or a probability sample at the point of reference?	32%
Are there other selection bias issues not otherwise addressed?	13%
Measurement	
Did the authors attempt to measure exposure to the intervention?	55%
Was the exposure variable valid?	11%
Was the exposure variable reliable (consistent and reproducible)?	11%
Were the outcome and other independent (or predictor) variables valid?	47%
Were the outcome and other independent (or predictor) variables reliable (consistent and reproducible)?	53%
Analysis	
Did the authors conduct appropriate statistical testing by conducting statistical testing (when appropriate)?	100%
Did the authors conduct appropriate statistical testing by reporting which statistical tests were used?	96%
Did the authors conduct appropriate statistical testing by controlling for repeated measures in samples that were followed over time?	55%
Did the authors conduct appropriate statistical testing by controlling for differential exposure to the intervention?	2%
Did the authors conduct appropriate statistical testing by using a model designed to handle multi-level data when they included group-level and individual covariates in the model?	26%
Results	
Did at least 80 percent of enrolled participants complete the study?	40%
Did the authors assess if the units of analysis were comparable prior to exposure to the intervention?	77%
Did the authors institute study procedures to limit bias appropriately (e.g. randomization, restriction, matching, stratification or statistical adjustment)?	70%

Table 14. Quality of studies with random treatment assignment at the individual level using criteria of Chalmers et. al.[80]

Author/Year	Method of Treatment Assignment	Control of Selection Bias After Treatment Assignment	Blinding of Participants and Investigators
Hillsdon et al., 2002[97]	2	0	1
Halbert et al., 2000[59]	2	2	1
Kreuter et al., 2000[133]	1	0	1
Harland et al., 1999[135]	2	1	1
Marcus et al., 1998[73]	1	0	1
Blalock et al., 2000[76]	1	0	1
Caserta & Gillett, 1998[115]	1	1	1
Chen et al., 1998[145]	1	0	1
Edye et al., 1989[147]	1	0	1
Elder et al., 1995[148]	1	0	1
Gemson & Sloan, 1995[68]	1	0	1
Godin et al., 1987[116]	1	0	1
Green et al., 2000[61]	1	0	1
Keyserling et al., 2002[150]	2	0	1
Knutsen & Knutsen, 1991[153]	1	0	1
Kreuter et al., 2000[133]	1	1	1
Lombard et al., 1995[69]	1	0	1
Lovibond et al., 1986[156]	1	0	1
MacKeen et al., 1985[157]	1	0	1
Mutrie et al., 2002[70]	3	0	1
Ostwald, 1989[160]	1	0	1
Pereira et al., 1998[64]	1	1	1
Stevens et al., 1998[62]	1	0	1

Table 15. Description of the interventions

Characteristic of Study or Intervention		Percent of Studies with this Characteristic or Mean Value
Timing	During treatment	54%
	Post treatment	46%
Framework PEACE category	Buffering	4%
	Coping	50%
	Rehabilitation	42%
	Health promotion	21%
	Survival	4%
	Palliation	0%
	Multiple categories in one study	21%
Sample size	Average sample size per control group	22.3 (mean) 4-98 (range)
	Average sample size per intervention group	23 (mean) 6-101 (range)
Cancer diagnoses included	Breast	83%
	Colon	4%
	Lung	13%
	Ovarian	8%
	Leukemia	8%
	Lymphoma	13%
	Testicular	4%
	Sarcoma	17%
	Stomach	4%
	Prostate	4%
	Other	21%
Behavioral intervention	Yes	25%
	No	75%
Study design	Randomized Controlled Trial (RCT)	83%
	Non-randomized	17%
Exercise only (versus exercise plus other intervention components)		79%
Intervention length	One month or less	8%
	5 weeks to 3 months	71%
	More than 3 months	4%
	Not clear/reported	17%
Exercise mode	Aerobic (alone or combined with other modes)	88%
	Only non aerobic	8%
	Not specified	4%
Exercise intensity	Light	4%
	Moderate to vigorous	83%
	Not specified	12.5%
Exercise frequency	3+ times per week	88%
	Less than 3 times per week	8%
	Not specified	4%
Exercise duration	40+ minutes per session	13%
	Less than 40 minutes per session	58%
	Not specified	29%
Percent lost at followup	All studies	10.8%
	During treatment	10.28%
	Post treatment	11.46%

Table 16. Outcomes reported in cancer and physical activity interventions in cancer survivors

Outcome Category	Construct Assessed	Number of Studies	Number of Measurement Tools
Physical activity behavior	Physical activity behavior	6	4
Physical fitness	Cardiovascular fitness	12	5
	Strength	2	2
	Flexibility	2	1
Fatigue/tiredness	Fatigue/tiredness	12	6
Mental/emotional/psychological well-being	Anxiety/worry/tension	10	8
	Depression	10	7
	Anger/hostility	3	3
	Mental health QOL	2	1
	Multiple constructs ¥	9	11
Other psychosocial outcomes	Happiness/hope	2	2
	Social functioning	2	1
	Multiple other constructs*	5	5
Body image/dissatisfaction	Body image/dissatisfaction	4	4
Quality of life	Quality of life	10	8
Confusion	Confusion	2	2
Difficulty sleeping	Difficulty sleeping	2	1
Self-esteem	Self-esteem	3	2
Physiologic outcomes	Multiple constructs	5	23
Body size	Fatness measures (%, absolute, waist circumference, skinfolds)	5	2
	Body weight or BMI	8	1
	Other (arm volume, arm muscle area, lean body weight)	3	3
Pain	Pain	3	2
Vigor/vitality	Vigor/vitality	6	3
Symptoms/side effects	Multiple constructs**	5	3
Immune parameters	Multiple constructs***	4	18

¥ Including: Avoidance, fatalistic, fighting spirit, hopelessness, emotional well-being, total mood disturbance, impact of medical illness on subject, psychologic distress

* Including: Cognitive functioning, role limitations, activities in the community, activities in the home, change of lifestyle, satisfaction about information given, sick leave, work status, communication with staff, satisfaction with life, and power

** Including: Aversions, mixed symptoms, mucous membrane disturbances, sexual problems, surgery effects, breast cancer subscale, somatization, severity of diarrhea, severity of infection, severity of mucositis, severity of pain, nausea, vomiting

*** Including: Duration of neutropenia, duration of thrombopenia, T-cells, lymphocytes, white blood cells, natural killer cells, mononuclear cells, neutrophils, leukocytes

Table 17. Instruments used

Outcome Category	References
Physical Activity Behavior	
Godin Leisure-Time Exercise Questionnaire	Godin et al., 1986[170] Godin & Shepard, 1985[171]
Exercise Level Rating Scale	Mock et al. 1994[99] Mock, et al. 1997[94]
Self-report Diary	Mock et al. 2001[95] Pickett et al. 2002[96] Segal et al., 2001[87]
Cardiorespiratory Fitness, Strength, and Flexibility	
Balke Treadmill Test	American College of Sports Medicine, 2000[172]
Cycle ergometer test with metabolic measurements and ECG and/or heart rate measures	MacVicar et al., 1989[88] Bhambhani and Singh, 1985[173] Courneya et al., 2003[90] MacVicar et al., 1986[112]
12 Minute Walk Test	McGavin et al., 1976[174]
6 Minute Walk Distance	Nieman et al., 1995[103]
Modified Canadian Aerobic Fitness Test (mCAFT)	Jette et al., 1994[175]
Standard Load Test	Invergo et al., 1991[176]
Kin Com computerized testing station	Nieman et al., 1995[103]
Sit and Reach	Baumgartner & Jackson, 1995[177]
Fatigue / Tiredness	
Unknown Scale	Berglund et al., 1993[92] Berglund et al., 1994[93]
Linear Analog Self-Assessment Measure (LASA) or Symptom Assessment Scales (SAS)	Sutherland et al., 1988[178]
Functional Assessment of Cancer Therapy-Fatigue (FACT-F)	Yellen et al., 1997[179]
Profile of Mood Status measure (POMS)	Shacham, 1983[180] CIPS, 1981[181] McNair et al., 1971[182]
Personal interview	Dimeo et al., 1997[102]
Piper Fatigue Scale	Piper et al., 1998[183]
Body image / Dissatisfaction	
Unknown scale	Berglund et al., 1993[92] Berglund et al., 1994[93]
Linear Analog Self-Assessment Measure (LASA) or Symptom Assessment Scales (SAS)	Sutherland et al., 1988[178]
Body Image Visual Analogue Scale (BIVAS)	Mock, 1988[184] Mock, 1993[185]
Physical Self Subscale of the Tennessee Self-Concept Scale (TSCS)	Roid & Fitts, 1988[186]
Quality of Life	
Unknown scale	Berglund et al., 1993[92] Berglund et al., 1994[93]
QOL Index for Cancer Patients	Padilla et al., 1983[187]
Functional Assessment of Cancer Therapy-General FACT-G scale	Cella et al., 1993[188]
Functional Assessment of Cancer Therapy-Breast FACT-B scale	Brady et al., 1997[189]
FACT-B Breast cancer subscale	Brady et al., 1997[189]
Medical Outcomes Trust 36-Item Short Form Survey (SF-36)	Ware et al., 1993[190] Ware & Sherbourne, 1992[191]
Karnofsky Performance Status scale (KPS)	Mor et al., 1984[192]
Functional Assessment of Cancer Therapy-Prostate (FACT-P)	Cella, 1997[193]

Table 17. Instruments used (continued)

Outcome Category	References
Confusion	
Linear Analog Self-Assessment measure (LASA) or Symptom Assessment Scales (SAS)	Sutherland et al., 1988[178]
Profile of Mood Status measure (POMS)	Shacham, 1983[180] CIPS, 1981[181] McNair et al., 1971[182]
Difficulty Sleeping	
Linear Analog Self-Assessment measure (LASA) or Symptom Assessment Scales (SAS)	Sutherland et al., 1988[178]
Self-Esteem	
Rosenberg Self-Esteem Scale	Rosenberg, 1995[194] Curbow & Somerfield, 1991[195]
Tennessee Self-Concept Scale (TSCS)	Roid & Fitts, 1988[186]
Psychosocial Outcomes	
Unknown scale	Berglund et al., 1993[92] Berglund et al., 1994[93]
Happiness Measure	Fordyce, 1988[196]
Functional Assessment of Cancer Therapy-Breast FACT-B scale	Brady et al., 1997[189]
Satisfaction with Life Scale (SWLS)	Diener et al., 1985[197]
Functional Assessment of Cancer Therapy-General FACT-G scale	Cella et al., 1993[188]
Medical Outcomes Trust 36-Item Short Form Survey (SF-36)	Ware et al., 1993[190] Ware & Donald-Sherbourne, 1992[191]
Herth Hope Index (HHI)	Herth, 1992[198]
PKPCT VII- Semantic Differential Test	Barrett, 1987[199]
Body Size	
Body Mass Index/Body weight/ height	Measured by all studies
Body fat via Skinfolds	Durin & Womersley, 1974[200] Grant, 1979[201] Barale et al., 1981[202]
Arm fat/muscle area	Frisancho, 1981[203]
Arm volume	Farncombe et al., 1994[204]
Waist circumference	American College of Sports Medicine, 2000[172]
Pain	
Unknown scale	Berglund et al., 1993[92] Berglund et al., 1994[93]
Medical Outcomes Trust 36-Item Short Form Survey (SF-36)	Ware et al., 1993[190] Ware & Donald-Sherbourne, 1992[191]
Vigor/Vitality	
Linear Analog Self-Assessment measure (LASA) or Symptom Assessment Scales (SAS)	Sutherland et al.,[178]
Profile of Mood Status measure (POMS)	Shacham, 1983[180] CIPS, 1981[181] McNair et al., 1971[182]
Medical Outcomes Trust 36-Item Short Form Survey (SF-36)	Ware et al., 1993[190] Ware & Donald-Sherbourne, 1992[191]
Symptoms/Side-Effects	
Unknown Scale	Berglund et al., 1993[92] Berglund et al., 1994[93]
Symptom Check List (SCL-90-R)	Derogatis, 1977[205]
Linear Analog Self-Assessment Measure (LASA) or Symptom Assessment Scales (SAS)	Sutherland et al., 1988[178]

Table 17. Instruments used (continued)

Outcome Category	References
Mental /Emotional / Psychological Well-being	
Modified Hospital Anxiety and Depression (HAD) scale	Berglund et al., 1993[92] Berglund et al., 1994[93] Zigmond & Snaith, 1983[206]
Linear Analog Self-Assessment measure (LASA) or Symptom Assessment Scales (SAS)	Sutherland et al., 1988[178]
Centre for Epidemiological Studies Depression (CES-D) scale	Radloff, 1977[207]
State-Trait Anxiety Inventory (STAI)	Spielberger et al., 1970[208]
Functional Assessment of Cancer Therapy-General FACT-G scale	Cella et al., 1993[188]
Functional Assessment of Cancer Therapy-Breast FACT-B scale	Brady et al., 1997[189]
Trial Outcome Index (TOI)	Courneya et al., 2003[90] Fairey et al., 2003[100]
Mental Adjustment to Cancer Scale (MAC)	Greer & Watson, 1987[209]
Physical Symptoms Related to Breast Cancer Scale	Berglund et al., 1993[92] Berglund et al., 1994[93]
Symptom Check List (SCL-90-R)	Derogatis, 1977[205]
Profile of Mood Status measure (POMS)	Shacham, 1983[180] CIPS, 1981[181] McNair et al., 1971[182]
Medical Outcomes Trust 36-Item Short Form Survey (SF-36)	Ware et al., 1993[190] Ware & Donald-Sherbourne, 1992[191]
Psychological Adjustment to Illness Scale	Derogatis, 1986[210]
Brief Symptom Inventory	Derogatis & Spencer, 1993[211]
Beck Depression Inventory	Beck, 1972[212]

Table 18. Positive findings and statistically significant findings

Outcome Type	Positive Effect	Statistically Significant Positive Effect	Mean Effect Size	# of Studies for which Effect Size was Calculated	Effect Size Range
Physical activity behavior	3 (50%)	3 (50%)	2.93	1	Only 1 effect size
Physical fitness					
Cardiorespiratory fitness	10 (83%)	9 (75%)	0.647	6	0.00 – 1.242
Strength	2 (100%)	1 (50%)	Not calculable	0	-
Flexibility	2 (100%)	2 (100%)	0.345	2	0.024 – 0.666
Fatigue/tiredness	12 (100%)	10 (83%)	0.217	4	0.031 – 0.645
Body image/dissatisfaction	3 (75%)	1 (25%)	0.310	1 (2 outcomes from one study)	0.301 – 0.318
Quality of life	9 (90%)	8 (80%)	0.427	5	0.00 – 1.689
Confusion	2 (100%)	0 (0%)	0.402	1	Only 1 effect size
Difficulty sleeping	2 (100%)	2 (100%)	None calculable	0	-
Self-esteem	3 (100%)	1 (33%)	0.100	2	0.044 – 0.154
Psychosocial outcomes	6 (100%)	5 (83%)	0.191	3	0.00 – 0.612
Physiological outcomes	4 (80%)	4 (80%)	0.173	3	-0.475 – 0.822
Body size					
(goal to reduce)	6 (100%)	2 (33%)	0.187	3	0.015 – 0.636
(goal to gain or avoid muscle mass loss)	1 (25%)	0 (0%)	None calculable	0	-
Pain	2 (67%)	1 (33%)	None calculable	0	-
Vigor/vitality	6 (100%)	3 (50%)	0.850	2	0.434 – 1.265
Symptoms/side effects	4 (80%)	3 (60%)	0.400	2	-0.130 – 0.849
Immune parameters	4 (100%)	3 (75%)	-0.055	2	-0.799 – 1.047
Mental/emotional/ psychological well-being					
Depression	9 (90%)	4 (40%)	0.418	3	0.005 – 1.279
Anxiety	9 (90%)	6 (60%)	0.333	3	0.00 – 0.901
Anger/hostility	2 (67%)	1 (33%)	0.070	2	-0.114 – 0.266
Mental health quality of life	2 (100%)	1 (50%)	None calculable	0	-
Multiple constructs	6 (86%)	3 (43%)	0.356	4	0.00 – 0.896

Table 19. Positive effects by timing (during versus post treatment)

Outcome Type	During Treatment				Post Treatment			
	Positive	Statistically Significant	Effect Size Mean	Effect Size Range	Positive	Statistically Significant	Effect Size Mean	Effect Size Range
Physical activity behavior	2 (50%)	2 (50%)	2.93	Only 1 effect size	1 (50%)	1 (50%)	None calculable	
Physical fitness:								
Cardiorespiratory fitness	6 (85.7%)	5 (71.4%)	.781	0.319 – 1.242	4 (80%)	4 (80%)	.602	0.00 - .950
Strength	1 (100%)	1 (100%)	Not calculable		1 (100%)	0 (0%)	Not calculable	-
Flexibility	-	-	-	-	2 (100%)	2 (100%)	.345	0.024 – 0.666
Fatigue/tiredness	6 (100%)	5 (83%)	0.130	Only 1 effect size	6 (100%)	4 (67%)	0.246	0.031 – 0.645
Body image/dissatisfaction	2 (100%)	1 (50%)	0.310	0.301– 0.318	1 (50%)	0 (0%)	None Calculable	-
Quality of life	4 (100%)	3 (75%)	.662	0.168 – 1.155	6 (100%)	5 (83%)	.360	0.00 – 1.689
Confusion	1 (100%)	0 (0%)	Not calculable	-	1 (100%)	0 (0%)	0.402	Only 1 effect size
Difficulty sleeping	2 (100%)	2 (100%)	Not calculable	-	-	-	-	-
Self-esteem	1 (100%)	0 (0%)	.154	Only 1 effect size	2 (100%)	1 (50%)	0.044	Only 1 effect size
Psychosocial outcomes	2 (100%)	1 (50%)	0.446	0.280 – 0.612	4 (100%)	4 (100%)	0.093	0.00 – 0.302
Physiological outcomes	2 (67%)	2 (67%)	0.275	0.00 – 0.528	2 (100%)	2 (100%)	0.105	-0.475 – 0.822
Body size:								
(goal to reduce)	2 (100%)	1 (50%)	Not calculable	-	4 (100%)	1 (25%)	0.187	0.015 – 0.636
(goal to gain or avoid muscle loss)	0 (0%)	0 (0%)	Not calculable	-	1 (50%)	0 (0%)	1.442	1.262 – 1.642
Pain	1 (100%)	0 (0%)	Not calculable	-	1 (50%)	1 (50%)	Not calculable	-
Vigor/vitality	4 (100%)	1 (25%)	0.434	Only 1 effect size	2 (100%)	2 (100%)	1.265	Only 1 effect size
Symptoms/side effects	4 (100%)	3 (75%)	0.400	-0.130 – 0.849	0 (0%)	0 (0%)	None calculable	-
Immune parameters	3 (100%)	3 (100%)	0.543	0.442 – 0.643	1 (100%)	0 (0%)	-0.226	-0.799 – 1.047
Mental/emotional/ psychological well-being								
Depression	5 (100%)	2 (40%)	0.079	Only 1 effect size	4 (80%)	2 (40%)	0.665	0.005 – 1.279
Anxiety	3 (50%)	3 (50%)	0.216	0.154 – 0.278	3 (60%)	3 (60%)	0.451	0.00 – 0.901
Anger/hostility	2 (100%)	1 (50%)	0.165	0.063 – 0.266	0 (0%)	0 (0%)	-0.114	Only 1 effect size
Mental health QOL	-	-	-	-	2 (100%)	1 (50%)	Not calculable	-
Multiple constructs	4 (100%)	2 (50%)	0.521	0.253 – 0.896	2 (67%)	1 (33%)	0.192	0.00 – 0.375

Table 20. Quality criteria met by studies

Study	Description		Measurement		Analysis				Results		
	1	2	3	4	5	6	7	8	9	10	11
Berglund et al., 1993[92]					✓	✓	✓			✓	✓
Berglund et al., 1994[93]			✓	✓	✓	✓	✓		✓	✓	✓
Burnham and Wilcox 2002[86]					✓	✓	✓		✓	✓	✓
Chen 1999[47]					✓	✓					✓
Courneya et al., 2002[82] Courneya et al., 2003[83]		✓	✓	✓	✓	✓	✓		✓	✓	✓
Courneya et al., 2003[90] Fairey et al., 2003[100]		✓	✓	✓	✓	✓	✓		✓	✓	✓
Cunningham et al., 1986[85]		✓	✓	✓	✓	✓					✓
Dimeo et al., 1999[106]			✓	✓	✓	✓					✓
Dimeo et al., 1997[101]			✓	✓	✓	✓				✓	✓
Dimeo et al., 1997[102]		✓	✓	✓	✓	✓			✓		✓
Djuric et al., 2002[81]					✓	✓					✓
Hayes et al., 2003[104]			✓	✓	✓	✓	✓			✓	
MacVicar et al., 1989[88]			✓	✓	✓	✓	✓				✓
MacVicar et al., 1986[112]			✓	✓							
McKenzie et al., 2003[107]			✓	✓	✓	✓	✓		✓	✓	✓
Mock et al., 1994[99]			✓	✓	✓	✓					✓
Mock et al., 1997[94] Mock et al., 1998[98]	✓	✓	✓	✓	✓	✓	✓		✓		
Mock et al., 2001[95] Pickett et al., 2002[96]	✓	✓			✓	✓					✓
Na 2000[105]		✓	✓	✓	✓	✓					✓
Nieman et al., 1995[103]			✓	✓	✓	✓	✓				✓
Segal et al., 2001[87]			✓	✓	✓	✓				✓	✓
Segal et al., 2003[91]			✓	✓	✓	✓			✓	✓	✓
Segar et al., 1998[84]			✓	✓	✓	✓	✓		✓	✓	✓
Wall, 2000[213]			✓	✓	✓	✓	✓		✓		✓
Winningham et al., 1989[108]			✓	✓	✓	✓	✓		✓		✓
Winningham et al., 1988[89]			✓	✓	✓	✓	✓		✓	✓	✓

Quality Measures

Description

1. Was the study sample well described as to race/ethnicity, sociodemographics, cancer diagnosis and treatment, as well as age?
2. Was the intervention well described (what, how, who, where)?

Measurement

3. Were the outcome and other independent (or predictor) variables valid?
4. Were the outcome and other independent (or predictor) variables reliable (consistent and reproducible)?

Analysis

Did the authors conduct appropriate statistical testing by:

5. conducting statistical testing (when appropriate)?
6. reporting which statistical tests were used?
7. controlling for repeated measures in samples that were followed over time?
8. controlling for differential exposure to the intervention?

Results

9. Did at least 80 percent of enrolled participants complete the study?
10. Did the authors assess if the units of analysis were comparable prior to exposure to the intervention?
11. Did the authors institute study procedures to limit bias appropriately (e.g., randomization, restriction, matching, stratification or statistical adjustment)?

Table 21. Percent of studies meeting individual quality criteria

Quality Measures	Percent Studies Meeting Criterion
Description	
Was the study sample well described as to race/ethnicity, sociodemographics, cancer diagnosis and treatment, as well as age?	8%
Was the intervention well described (what, how, who, where)?	29%
Measurement	
Were the outcome and other independent (or predictor) variables valid?	83%
Were the outcome and other independent (or predictor) variables reliable (consistent and reproducible)?	83%
Analysis	
Did the authors conduct appropriate statistical testing by conducting statistical testing (when appropriate)?	96%
Did the authors conduct appropriate statistical testing by reporting which statistical tests were used?	96%
Did the authors conduct appropriate statistical testing by controlling for repeated measures in samples that were followed over time?	54%
Results	
Did the authors conduct appropriate statistical testing by controlling for differential exposure to the intervention?	0%
Did at least 80 percent of enrolled participants complete the study?	46%
Did the authors assess if the units of analysis were comparable prior to exposure to the intervention?	50%
Did the authors institute study procedures to limit bias appropriately (e.g., randomization, restriction, matching, stratification or statistical adjustment)?	88%

Table 22. Summary of results from the 14 studies excluded due to no concurrent comparison group

Outcome Category	Number of Studies Reference #s of Studies	Summary of Results
Physical fitness		
Cardiorespiratory fitness	10 Sharkey et al., 1993[214] Schwartz, 2000[217] Decker et al., 1989[219] Dimeo et al., 1996[220] Young-McCaughan et al., 2003[221] Schwartz et al., 2001[218] Schwartz, 1999[215] Durak & Lilly, 1998[222] Kolden et al., 2002[223] Dimeo et al., 1998[224]	9 reported improvements (the one that did not was an intervention during bone marrow transplant in acute leukemia patients)
Strength	2 Durak & Lilly, 1998[222] Kolden et al., 2002[223]	Both studies reported improvements
Flexibility	0	
Fatigue	5 Schwartz, 2000[217] Porock et al., 2000[225] Schwartz, 2000[216] Schwartz et al., 2001[218] Schwartz, 1999[215]	Consistent report of improvements
Quality of life	6 Durak & Lilly, 1998[222] Peters et al., 1994[226] Porock et al., 2000[225] Young-McCaughan et al., 2003[221] Schwartz, 1999[215]	Consistent report of improvements
Confusion	0	
Sleep	1 Young-McCaughan et al., 2003[221]	No improvement noted
Self-esteem	0	
Psychosocial outcomes	0	
Physiological outcomes		
Resting blood pressure	1 McTiernan et al., 1998[5]	No improvement noted
Sex hormones	1 McTiernan et al., 1998[5]	No improvement noted
Body size (goal to reduce weight and/or fat)	3 Schwartz, 2000[216] McTiernan et al., 1998[5] Kolden et al., 2002[223]	2 reported decreases, 1 reported no increases
Pain	1 Durak & Lilly, 1998[222]	Improvement reported
Vigor	2 Schwartz, 1999[215] Kolden et al., 2002[223]	One study reported improvement, one reported decline
Symptoms/Side effects	3 Peters et al., 1994[226] Porock et al., 2000[225] Schwartz, 2000[216]	2 reported improvements
Immune parameters	1 Peters et al., 1994[226]	Improvement noted in some but not all parameters

Table 22. Summary of results from the 14 studies excluded due to no concurrent comparison group (continued)

Outcome Category	Number of Studies Reference #s of Studies	Summary of Results
Mental/emotional/psychological well-being		
Depression	3 Porock et al., 2000[225] Decker et al., 1989[219] Kolden et al., 2002[223]	1 of 3 studies reported improvement
Anxiety	2 Porock et al., 2000[225] Kolden et al., 2002[223]	No studies reported improvements