Promoting Healthy Eating and Physical Activity Behaviors: A Systematic Review of Multiple

Health Behavior Change Interventions among Cancer Survivors

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Running title: Multiple Health Behavior Change Interventions

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Supplementary File 1. The Electronic Databases Search Strategy

The electronic databases search strategy was developed for MEDLINE (via Pubmed; 1950 – 2015) and adapted for Cochrane Library (via Cochrane Central Register Controlled Trials; 1992 – 2015), and Psyc INFO (1806 – 2015). For all databases, the following search terms were used to search in title and abstract: ((exercise OR "physical activity") AND diet OR nutri* OR lifestyle OR health behavior) AND (cancer OR neoplasm* OR tumor) AND (intervention*). In addition, index or MeSH terms, were used. Full details of the electronic search, including limitations and specific research fields, for all databases are presented in Table 1 to Table 3. Note that books, book sections and conference abstracts were excluded.

Table 1. Documenting the Search- Cochrane Library

Name of the database (range of dates)	Cochrane Library (1992 –)
Date of the search	July 31th 2014 Updated February 19th 2015 and November 2nd 2015
Initials of the person who ran the search	SA
Limits : Cochrane Central Register Controlled Trials (Clinical Trials) Search fields: Title/Abstract/keywords and MeSH terms	Key words and MeSH terms: S1- exercise S2- exercise [MeSH] S3- motor activity [MeSH] S4- "physical activity" S5- S1 or S2 or S3 or S4 S6- diet* S7- diet [MeSH] S8- food habit [MeSH] S9- nutrition* S10- S6 or S7 or S8 or S9
Multiple behaviour #1 (Exercise + Diet)	S11- S5 and S10
Multiple behaviour #2 (Lifestyle)	S12- lifestyle* S13- life style [MeSH] S14- S12 or S13
Combining multiple behaviour #1 and #2	S15- S11 or S14
Cancer	S16- cancer S17- lymphoma S18- neoplasm* S19- tumor S20- neoplasms [MeSH] S21- S16 or S17 or S18 or S19 or S20
Intervention	S22- intervention* S23- health promotion [MeSH] S24- intervention studies [MeSH] S25- program evaluation [MeSH] S26- S22 or S23 or S24 or S25
Combined themes	S27- S15 and S21 and S26
Number of hits	606

Table 2. Documenting the Search- MEDLINE via Pubmed

Name of the database (range of dates)	MEDLINE (Pubmed: 1950 –)
Date of the search	July 31th 2014 Updated February 19th 2015 and November 2nd 2015
Initials of the person who ran the search	SA
Limits : English and French language publications	Key words and MeSH terms:
	S1- exercise
Search fields: Title/Abstract, MeSH terms, and Publication Type	S2- exercise [MeSH] S3- motor activity [MeSH] S4- "physical activity" S5- S1 or S2 or S3 or S4
	S6- diet* S7- diet [MeSH] S8- food habit [MeSH] S9- nutrition* S10- S6 or S7 or S8 or S9
Multiple behaviour #1 (Exercise + Diet)	S11- S5 and S10
	S12- lifestyle* S13- life style [MeSH]
Multiple behaviour #2 (Lifestyle)	S14- S12 or S13
Combining multiple behaviour #1 and #2	S15- S11 or S14
	S16- cancer S17- lymphoma S18- neoplasm* S19- tumor S20- neoplasms [MeSH]
Cancer	S21- S16 or S17 or S18 or S19 or S20
	S22- intervention* S23- health promotion [MeSH] S24- intervention studies [MeSH] S25- program evaluation [MeSH]
Intervention	S26- S22 or S23 or S24 or S25
Combined themes	S27- S15 and S21 and S26
	S28 trial

Study design	S29 random* S30 Randomized Controlled Trial [Publication Type] S31 Controlled Clinical Trial [Publication Type] S32 Clinical Trial [Publication Type] S33- S28 or S29 or S30 or S31 or S32
Combining themes and study design	S34- S27 and S33
Number of hits (with language limits)	740

Table 3. Documenting the Search- PsycINFO

Name of the database (range of dates)	PsycINFO (1806 –)
Date of the search	July 31th 2014 and updated February 10th 2015 Updated February 19th 2015 and November 2nd 2015
Initials of the person who ran the search	SA
Limits : English and French language publications	Key words and Thesaurus terms:
	S1- exercise
Search fields: Title/Abstract and Index terms	S2- exercise [Thesaurus term]/exp S3-"physical activity" S4- physical activity [Thesaurus term]/exp S5- S1 or S2 or S3 or S4
	S6- diet S7- dietary S8- diets [Thesaurus term] S9- eating behavior [Thesaurus term]/exp S10- nutrition S11- nutrition [Thesaurus term] S12- S6 or S7 or S8 or S9 or S10 or S11
Multiple behaviour #1 (Exercise + Diet)	S13- S5 and S12
	S14- lifestyle S15- lifestyles S16- life style [Thesaurus term]/exp
Multiple behaviour #2 (Lifestyle)	S17- S14 or S15 or S16
Combining multiple behaviour #1 and #2	S18- S13 or S17
	S19- cancer S20- lymphoma S21- neoplasm S22- tumor S23- neoplasms [Thesaurus term]/exp
Cancer	S24- S19 or S20 or S21 or S22 or S23
	S25- intervention S26- health promotion [Thesaurus term]/exp S27- program evaluation [Thesaurus term]/exp
Intervention	S28- S25 or S26 or S27
Combined themes	S29- S18 and S24 and S28

	S30- trial
	S31- random
	S32- "Randomized Controlled Trial"
	S33- "Controlled Clinical Trial"
	S34- "Clinical Trial"
Study design	S35- S29 or S30 or S31 or S32 or S33
Combining themes and study design	S36- S29 and S35
Number of hits	81

Supplementary File 2. Description of the formula used effect size (Cohen's *d* effect sizes;

SMD) from information that is reported in the article

1- Obtaining Standard Mean Difference and its Variance from *F*-test

Standard Mean Difference (SMD) calculated from *F*-test (when Mean Square of Error not reported)[1]	$SMD = \sqrt{F \times [(n_1 + n_2)/(n_1 \times n_2)] \times [(n_1 + n_2)/(n_1 + n_2 - 2)]}$
Variance (V) of SMD[2]	$V_{SMD} = [(n_1 + n_2)/(n_1 \times n_2)] + [SMD^2/ 2 \times (n_1 + n_2)]$

2- Obtaining Standard Mean Difference and its Variance from Treatment Effects Reported as

Proportion

Based on this nomenclature for 2×2 table of behavioral outcome by treatment:

	Meeting behavioral guideline	Not meeting behavioral guideline
MHBC intervention	A	B
Control	C	D

Odds Ratio (OR) and its variance were calculated[3]; and	Odds Ratio = (A × D) / (B × C)
	$V_{Odds\ Ratio} = 1/A + 1/B + 1/C + 1/D$

they were converted into SMD and V_{SMD}[4]	$SMD = Log\ Odds\ Ratio \times \sqrt{3}/\pi$ $V_{SMD} = V_{Log\ Odds\ Ratio} \times 3/\pi^2$

3- Obtaining Within group Standard Deviation from Standard Error and Confidence Intervals, for Difference in Mean

Standard Error (SE) calculated from confidence intervals for difference in means[5]	$SE = (upper\ limit - lower\ limit)/ (2 \times t_{value})$
Within group Standard Deviation (SD) calculated from SE[5]	$SD = SE/\sqrt{(1/n_1 + 1/n_2)}$

4- Combining Effect Sizes for Fruit and Vegetable Intake, When They are Reported Separately

Combine Standard Mean	$SMD_{FV} = 1/2 \times (Mean_F + Mean_V)$

Difference (SMD$_{FV}$)[6]	
Variance of SMD$_{FV}$ (V$_{FV}$)	V$_{FV}$ = 1/2 × V × (1 + r)
	V: Variances for SMD$_F$ and SMD$_V$ were equal, thus the value of either SMD$_F$ or SMD$_V$ = V.
	r: A correlation between Fruit and Vegetable intake of .41 was assumed based on the finding reported in Kellar & Abraham[7]

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Supplementary File 3. Characteristics of the participants, control group and outcome measures, and MHBC interventions.

Table 1. Characteristics of the participants, control group and outcome measures.

Reference (year)	Study population (randomized)	Type of cancer	Time since cancer diagnosis/treatment	Measurement instrument of behavioral outcomes	Type of control group	Risk of Bias Due to Conflict of Interest
Andersen et al.[1] Andersen et al.[2] Andersen et al.[3]	N = 227 Mean age (years): 51 % Female: 100 Number of years of education: 14.8 BMI: Not reported Country: USA	Breast	After primary treatment (surgery) but before radiotherapy	Healthy eating: Food frequency questionnaire Physical activity: 7-Day PA recall questionnaire	No-treatment	Low
Anderson et al.[4]	N = 55 Mean age (years): 49 % Female: 100 65.4% completed undergraduate program BMI: Not	Breast	After primary treatment	Healthy eating: Dietary Questionnaire for Epidemiological Studies (Version 2) Physical activity: International Physical Activity Questionnaire (IPAQ)	Standard care- Participants received a booklet on breast cancer and early menopause Access to usual breast care nurse and other	Low

	reported Country: Australia				services Breast cancer support program	
Bloom et al.[5]	$N = 404$ Mean age (years): ≤ 50 % Female: 100 Education: 61% completed college BMI: Not reported Country: USA	Breast	Cancer free ≥ 5 years after diagnosis; aged ≤ 50 at diagnosis	Healthy eating: Self-report questionnaire for assessing F&V and fat intake Block's food frequency questionnaire (brief version) Physical activity: Self-report questionnaire	Delayed intervention-Waitlist	Unclear Sources of founding and conflict of interest undisclosed
Bourke et al.[6]	$N = 50$ Mean age (years): 72 % Female: 0 Education: Not reported BMI: 27.7 kg/m^2 Country: UK	Prostate	During treatment	Healthy eating: 3-day diet diaries Physical activity: Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ)	Standard care-Participants were followed-up in urology clinic and asked not to change their healthy eating and physical activity behaviors	Unclear Sources of foundlings undisclosed

Bourke et al.[7]	N = 18 Mean age (years): 69 % Female: 33 Education: Not reported BMI: 26.5 kg/m^2 Country: UK	Colon	~ 16 weeks after treatment	Healthy eating: 3-day diet diaries Physical activity: Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ)	Standard of care-Followed-up in a colorectal cancer service	Low
Bourke et al.[8]	N = 100 Mean age (years): 71 % Female: 0 Education: Not reported BMI: 28.7 kg/m^2 Country: UK	Prostate	During treatment	Healthy eating: 3-day diet diaries Physical activity: Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ)	Standard of care-Followed-up in urology clinic. No restrictions were placed on healthy eating and physical activity behaviors	Low
Campbell et al.[9]	N = 735 Mean age (years): 66.5 % Female: 49.4	Colorectal (n = 266)	2-5 years after diagnosis	Healthy eating: Block's Food Frequency Questionnaire (modified version) Physical activity:	Attention-Received two mailings of generic health information	Unclear Conflict of interest undisclosed

				7-Day Physical Activity Recall (modified version)	related to cancer topics	
	Education: 78% completed high school BMI: 29.1 kg/m^2 Country: USA					
Demark-Wahnefried et al.[10] **Protocol**: Demark-Wahnefried et al.[11]	N = 182 (all ≥ 65 years) Mean age (years): 72 % Female: 58 Education: 67% completed high school BMI: 28.0 kg/m^2 Country: USA	Breast and prostate	Within 18 months of cancer diagnosis	Healthy eating: Diet History Questionnaire 3-Day Dietary Recall Physical activity: Community Healthy Activities Model Program for Senior (CHAMPS)	Attention-Received workbook and bimonthly telephone counseling for 6 months on general health information related to cancer topic	Low
Demark-Wahnefried et al.[12] Christy et al.[13] Mosher et al.[14]	N = 543 Mean age (years): 57 % Female: 56 Education: 58% completed college	Breast and prostate	Within 9 months of cancer diagnosis	Healthy eating: Diet History Questionnaire Physical activity: 7-Day Physical Activity Recall	Attention-Received a personalized workbook that included cancer topic and health education materials on a healthful	Low

Ottenbacher et al.[15] **Protocol**: Demark-Wahnefried et al.[16] Demark-Wahnefried et al.[17]	BMI: 27.6 kg/m^2 Country: Canada and USA				diet and exercise	
Demark-Wahnefried et al.[18]	$N = 90$ Mean age (years): 42 % Female: 100 Education: Not reported BMI: 25.8 kg/m^2 Country: USA	Breast	During treatment	Healthy eating: Diet History Questionnaire (144 items) Physical activity: Longitudinal Study Physical Activity Questionnaire (LSPAQ) Accelerometer	Attention-Calcium rich diet Alternative treatment-Calcium rich diet with physical activity behavior change intervention	Unclear Conflict of interest undisclosed
Demark-Wahnefried et al.[19]	$N = 68$ dyads (mother-daughter) Mean age (years): 47.1 % Female: 100	Breast	After treatment, but within 5 years of diagnosis	Healthy eating: 2 random 24-hour dietary recalls Physical activity: Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ;	Attention-Received a personalized workbook that included cancer topic and health education	Low

				modified version)	materials on a healthful diet and exercise	
	Education: 34.3% completed college					
	BMI: 32.0 kg/m^2			Accelerometer		
	Country: USA					
Djuric et al.[20]	N = 48 Mean age (years): 51.7 % Female: 100 Education: 63% completed college BMI: 35.5 kg/m^2 Country: USA	Breast	≥ 3 months after treatment	Healthy eating: 3-day food records Physical activity: Lifestyle Questionnaire* Physical activity-log*	Attention-Received mailed information that included cancer topic and health education materials on a healthful diet and exercise	High Weight Watchers Group Inc. partly sponsored the study
Djuric et al.[21]	N = 40 Mean age (years): 52 % Female: 100 Education: Not reported BMI: 26.6 kg/m^2 Country: USA	Breast	During treatment	Healthy eating: All Day screener for F&V (17-item; from the National Cancer Institrute) Percent Energy from Fat screener (19-item; from the National Cancer Institute) 1 un-announced 24-hour recall Physical activity: Women Health Initiative's	Attention-Received mailed information that included cancer topic and health education materials on a healthful diet and exercise	Unclear Conflict of interest undisclosed

				questionnaire		
Goodwin et al.[22]	$N = 338$ (post-menopause) Mean age (years): 61 % Female: 100 Education: Not reported BMI: 31.3 kg/m^2 Country: Canada	Breast	After treatment	Healthy eating: Montreal Food Frequency Questionnaire Physical activity: International Physical Activity Questionnaire (IPAQ)	Attention-Received mailed information that included cancer topic and health education materials on a healthful diet and exercise	High Pfizer and Novartis Pharmaceutical partly sponsored the study. Conflict of interests shared by on co-author
Greenlee et al.[23]	$N = 42$ (Hispanic and black) Mean age (years): 51 % Female: 100 Education: 21.4% completed college BMI: 33.2 kg/m^2 Country: USA	Breast	≥ 6 months after treatment	Healthy eating: Block's Food Frequency Questionnaire Physical activity: Kaiser physical activity survey Computerized Curves attendance logs	Delayed intervention-Waitlist	Low
Hawkes et al.[24]	$N = 410$ Mean age (years):	Colorectal	Within 12 months after cancer diagnosis	Healthy eating: Cancer Council Victoria Food Frequency	Attention-Received mailed	Low

Protocol Hawkes et al.[25]	66 % Female: 46 Education: Not reported BMI: 25.5 kg/m^2 Country: Australia			Questionnaire Physical activity: Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ; modified version)	information that included cancer topic and health education materials on a healthful diet and exercise	
Hébert et al.[26]	*N* = 54 dyads (partners) Mean age (years): 70 % Female: 0 Education: 44% completed college BMI: 29.1 kg/m^2 Country: USA	Prostate	After treatment	Healthy eating: 3 randomly selected days 24-Hour Dietary Recall Physical activity: Community Healthy Activities Model Program for Senior (CHAMPS)	Delayed intervention- Waitlist	Low
Hung et al.[27]	*N* = 37 Mean age (years): 58.7 % Female: 46	Lymphoma Myeloma	After treatment (post PBSC transplantation)	Healthy eating: Interviewer-administered 7-day diet history Physical activity: Active Australia Survey*	Standard of care- Received best practice nutrition counselling and	Low

	Education: Not reported BMI: 40.5% were overweight or obese (BMI ≥ 25 kg/m^2) Country: USA					assessment, and an intensive nutrition support during hospitalization involving dietary reviews and the use of high protein and –energy nutrition supplement
James et al.[28] **Protocol** James et al.[29]	$N = 174$ Mean age (years): 57 % Female: 77.4 Education: 35% completed university BMI: Not reported Country: Australia	Bowel/ Colorectal Breast Prostate Melanoma Non-Hodgkins Lymphoma leukemia Ovarian Thyroid	After treatment	Healthy eating: Diet Questionnaire for Epidemiological Studies (Version 2) Physical activity: Pedometer (Yamax SW200) PA log Active Australia survey	Delayed intervention-Waitlist	Low
Kim et al.[30]	$N = 45$	Breast	Within 2 years of diagnosis	Healthy eating: Diet Quality Inventory	Not specified	Unclear

	Mean age (years): 45.9			(South Korean version)		Conflict of interests undisclosed
	% Female: 100			Physical activity: International Physical Activity Questionnaire (IPAQ)		
	Education: 35% completed university					
	BMI: 22.5 kg/m^2					
	Country: South Korea					
Lee et al.[31]	N = 59	Breast	After treatment	Healthy eating: 3-day dietary recall	Attention-Received mailed information that included education materials on a healthful diet and exercise	Low
	Mean age (years): 42.4			Diet Quality Inventory (South Korean version)		
	% Female: 100			Physical activity: 7-day exercise diaries*		
	Education: 73% completed college					
	BMI: Not reported					
	Country: South Korea					
Morey et al.[32] Demark-Wahnefried	N = 641 Mean age (years): 73; all ≥ 65 years	Colorectal Breast Prostate	Within 5 years of cancer treatment	Healthy eating: 24-Hour Dietary Recall Physical activity: Community Healthy	Delayed intervention-Waitlist	Low

et al.[33]	% Female: 54			Activities Model Program for Senior (CHAMPS)		
Protocol Snyder et al.[34]	Education: 62% has some college education BMI: 29.2 kg/m^2 Country: Canada, UK, USA					
Moyer-Mileur et al.[35]	$N = 14$ Mean age (years): 6.5 % Female: 54 Education: N/A BMI: Not reported Country: USA	Lymphoblastic Leukemia	During treatment	Healthy eating: 3-day food intake Recall (completed by parents)* Physical activity: Activity GRAM questionnaire (completed by parents) Pedometer	Standard of care-Provided recommendations to eat a well-balanced diet, take multivitamin with low or no folic acid, and to perform physical activity	Unclear Conflict of interest undisclosed
O'Carroll Bantum et al.[36]	$N = 352$ Mean age (years): 51 % Female: 82 Number of years	Breast Endometrial Uterine Ovarian Other types of cancer	At least 4 weeks, but not more than 5 years after treatment	Healthy eating: Block's Food Frequency Questionnaire Physical activity: Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ)	Delayed intervention-Waitlist	High Conflict of interest shared by the lead author

	of education: 16					
	BMI: Not reported					
	Country: USA					
Ornish et al.[37] **Protocol** Ornish et al.[38]	N = 93 Mean age (years): 66 % Female: 0 Education: Not specified BMI: not specified Country: USA	Prostate	Elected not to undergo conventional treatment	HE: Food Frequency Questionnaire (unknown source)* Physical Activity: Self-report questionnaire (unknown source)* Pedometer	Standard of care- Asked to follow the advice of their physician regarding lifestyles changes	High Conflict of interest shared by the lead author
Von Gruenigen et al.[39]	N = 45 Mean age (years): 55 % Female: 100 Education: 35.6% completed college BMI: 42.3	Endometrial	After treatment	Healthy eating: Two 24-Hour Dietary Recall Physical activity: Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ)	Standard of care- Received 3 counseling sessions regarding overall health concerns; Did not receive advice	Unclear Conflict of interest undisclosed

	Country: Ireland				related to healthy eating and physical activity	
Von Gruenigen et al.[40]	$N = 75$ Mean age (years): 58 % Female: 100 BMI: 36.4 kg/m^2 Country: USA	Endometrial	Within 3 years of cancer diagnosis	Healthy eating: Two 24-Hour Dietary Recalls Physical activity: Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ) Pedometer	Standard of care- Received 3 counseling sessions regarding overall health concerns; Received an informational brochure on healthy eating and physical activity.	Unclear Sources of funding undisclosed

*Measurement instrument of unknown validity

Table 2. Characteristics of the Multiple Health Behavior Change Intervention.

Reference (year)	Targeted behaviors	Theoretical framework	Approach to MHBC	Modalities and Delivery Mode	Behavior change techniques	Effect size [95%CI] of the MHBC intervention on healthy eating and physical activity behaviors	
						Post-intervention	Follow-up

Andersen et al.[1] Andersen et al.[2] Andersen et al.[3]	Healthy eating Physical activity Smoking	None reported	Simultaneous	**Dose:** 18 group sessions (1.5 hours); 4 sessions devoted to health behavior change **Material:** Food intake diary Sampling of low-fat snacks **Providers:** Clinical psychologist **Delivery:** In-person **Duration of the intervention:** 4 months (17 weeks) **Follow-up:** 8 months (34 weeks)	Prompt self-monitoring of behavior (HE) Food substitution[g] (HE) Provide information on consequences of behavior in general (HE) Provide instruction on how to perform the behavior (PA) Stress management/ Emotional control training	**Healthy eating**: F&V intake *Assessed but data not reported* Fat intake (avoiding fat)[a]: -0.28 [-0.55; -0.01] Diet quality (healthy food)[a]: 0.32 [0.03; 0.60] **Physical activity:** Moderate-to-vigorous physical activity[a] 0.25 [-0.02; 0.53]	**Healthy eating**: F&V intake *Unclear* Fat intake (avoiding fat) *Unclear* Diet quality (healthy food) *Assessed but data not reported for the control group* **Physical activity:** Moderate-to-vigorous physical activity *Assessed but data not reported for the control group*
Anderson et al.[4]	Alcohol intake	Social cognitive theory	Simultaneous	**Dose:** Follow-up calls weekly	Provide information on consequences	**Healthy eating**: Fruit intake -0.23 [-0.78; 0.32]	N/A

Author	Behavior	Theory	Type	Intervention	Behavior change technique	Effect size	Effect size
	Healthy eating Physical activity			(first 2 wk) Follow-up calls or emails (throughout the 12 wk) Monthly letters **Material**: Journal Book Health education material **Providers:** Nurse **Delivery:** In-person Phone Web E-mails **Duration of the intervention:** 3 months (12 weeks)	of behavior in general (HE + PA) Goal setting (HE + PA) Prompt self-monitoring (HE + PA) Prompt self-monitoring (outcomes) Action planning (PA) Provide feedback on (?) Plan social support/social change Follow-up prompts	Vegetable intake -0.09 [-0.64; 0.46] F&V intake -0.16 [-0.61; 0.29] Fat intake (saturated) 0.09 [-0.32; 0.45] Total energy intake 0.04 [-0.51; 0.59] **Physical activity:** Moderate-to-vigorous physical activity[b] -0.22 [-0.83; 0.39]	N/A N/A N/A N/A N/A
Bloom et al.[5]	Healthy eating Physical activity	Social support Network conceptual framework	Simultaneous	**Dose**: 3 one-day workshops (6 hours/ workshop)	Provide information on consequences of behavior in general (HE + PA)	N/A	**Healthy eating:** F&V intake (eating ≥ 5 servings/d)[b] -0.03 [-0.27; 0.21]

Material: Stretch bands	Provide instruction on how to perform the behavior (weight-bearing PA)	N/A	Fat intake (eating low-fat or non-fat foods most of the time)[b] -0.07 [-0.29; 0.16]
Providers: Medical oncologist, pharmacist, gynecologist, attorneys, exercise physiologist, representative of the WHEL study	Provide information on where and when to perform the behavior (HE)	N/A	**Physical activity:** Exercising $\geq$ 2 days/wk[b] -0.05 [-0.32; 0.22]
Delivery: In- person	Model/ Demonstrate the behavior (PA)		
Duration of the intervention: 3 months (13 weeks- monthly interval)	Barrier identification/ Problem solving (PA)		
Follow-up: 3 months (13 weeks)	General communication skills training		
	Stress management/ Emotional control training		

Bourke et al.[6]	Alcohol Intake Healthy eating Physical activity	None specified	Simultaneous *-tapered*	**Dose**: 18 supervised exercise sessions (30 min/session) 6 small group healthy- eating seminars (15-20 min /seminar) **Material**: Nutrition advice pack **Provider**: Exercise physiologist **Delivery**: In-person **Duration of the intervention**: 3 months (13 weeks) **Follow-up**: 6 months (26 weeks)	Prompt self-monitoring (PA) Prompt practice (PA) Prompting generalisation of a target behavior (PA) Provide instruction on how to perform the behaviors (HE) Follow-up prompts (PA)	**Healthy Eating**: Fat intake -1.00 [-1.59; -0.41] Total energy intake -0.66 [-1.23; -0.29] **Physical Activity**: Total LTPA[c] 1.22 [0.62; 1.83]	**Healthy Eating:** Fat intake *Not assessed* Total energy intake *Not assessed* **Physical activity:** Total LTPA[c] 0.92 [0.34; 1.51]
Bourke et al.[7]	Alcohol intake	None specified	Simultaneous *-tapered*	**Dose**: 18 Supervised exercise sessions	Prompt self-monitoring (PA)	**Healthy Eating**: Fat intake -0.93 [-1.92; 0.05]	N/A

				Dose / Material / Provider / Delivery / Duration	BCTs	Healthy eating results	Follow-up
	Healthy eating			(30 min/session)	Prompt practice (PA)	Total energy intake -0.12 [-1.04; 0.81]	N/A
	Physical activity			6 small group healthy- eating seminars (15-20 min/ seminar)	Prompting generalisation of a target behavior (PA)	**Physical activity**: Total LTPA[d] 0.78 [-0.18; 1.75]	N/A
				Material: Exercise workbook			
				Nutrition advice pack	Provide instruction on how to perform the behaviors (HE + PA)	All effect sizes are adjusted for baseline behavior	
				Provider: Exercise physiologist	Follow-up prompts (PA)		
				Delivery: In-person			
				Duration of the intervention: 3 months (13 weeks)			
Bourke et al.[8]	Alcohol	None specified	Simultaneous -*tapered*	**Dose**: 18 Supervised exercise sessions (30 min/session)	Provide information on consequences of behavior in general (PA)	**Healthy eating:** Fat intake[c] -0.43 [-0.83; -0.03]	**Healthy eating:** Fat intake: *Not assessed*
	Healthy eating					Total energy intake[c]	Total energy intake
	Physical activity			6 small group healthy- eating	Goal setting	-0.22 [-0.61; 0.17]	*Not assessed*

seminars (15-20 min/ seminar)	(HE + PA)	**Physical activity**: Total LTPA[c] 0.85 [0.44; 1.26]	**Physical activity**: Total LTPA[c] 0.42 [0.02; 0.81]
Materials: Exercise workbook	Barrier identification/ Problem solving (HE + PA)	All effect sizes are adjusted for baseline behavior	Effect size is adjusted for baseline behavior
Nutrition advice pack	Prompt review of behavioral goals (HE + PA)		
Provider: Exercise physiologist	Prompt self-monitoring (PA)		
Delivery: In-person	Prompt practice (PA)		
Duration of the intervention: 3 months (13 weeks)	Prompting generalization of a target behavior (PA)		
Follow-up: 6 months (26 weeks)	Provide feedback on behavioral performance (HE + PA)		
	Provide instruction on		

					how to perform the behaviors (HE + PA)	
					Facilitate social comparison (HE)	
					Plan social support/social change (PA)	
Campbell et al.[9]	Healthy eating Physical activity	Social Cognitive Theory Trans-theoretical Model	Simultaneous	**Dose**: 4 computer-tailored and personalized newsletters 4 motivational interviewing sessions (20 min/session) **Provider:** Research team members with training in motivational interviewing **Delivery:** Mail	Barrier identification/ Problem solving (HE + PA) Provide feedback on behavioral performance (HE + PA) Plan social support/social change (HE + PA) Motivational Interviewing (HE + PA)	**Healthy eating:** F&V intake 0.20 [-0.88; 1.28] **Physical activity**: No difference in moderate-to-vigorous physical activity ($p > 0.05$) *Data required for effect size calculation were not reported*

For the Campbell row, the last column values N/A appear:
- N/A (Healthy eating)
- N/A (Physical activity)

				Phone	Testimonial written by cancer survivors[g]		
				Duration of the intervention: 6 months (26 weeks)			
Demark-Wahnefried et al.[10] **Protocol** Demark-Wahnefried et al.[11]	Healthy eating Physical activity	Social cognitive theory Trans-theoretical Model	Sequential	**Dose:** 12 counseling sessions (20-30 min/session) **Material:** Personalized workbook (Including HE and PA logbooks) Pedometer **Providers:** Dietician, Exercise physiologist **Delivery:** Phone **Duration of the intervention:** 6 months (26 weeks)	Provide information on consequences of behavior in general (HE + PA) Goal-setting (HE + PA) Prompt self-monitoring of behavior (HE + PA) Provide feedback on performance (HE + PA) Provide information on where and when to perform the behavior (HE)	**Healthy Eating:** F&V intake 0.21 [-0.09; 0.51] Fat intake -0.07 [-0.38; 0.23] Diet quality 0.36 [0.06; 0.67] **Physical activity** Frequency of exercise session 0.11 [-0.19; 0.41] Physical activity energy expenditure 0.19 [-0.12; 0.49] All effect sizes are adjusted for baseline behavior	**Healthy Eating** F&V intake -0.05 [-0.36; 0.26] Fat intake -0.10 [-0.41; 0.21] Diet quality 0.07 [-0.24; 0.38] **Physical activity** Frequency of exercise session -0.08 [-0.39; 0.23] Physical activity energy expenditure -0.26 [-0.57; 0.06] All effect sizes are adjusted for baseline behavior

				Follow-up: 6 months (26 weeks)			
Demark-Wahnefried et al.[12]	Healthy eating	Social cognitive theory	Sequential	**Dose:** 6 computer-tailored newsletters	Provide information on consequences of behaviour in general (HE + PA)	**Diet**: F&V intake 0.22 [0.05; 0.39]	**Diet**: F&V intake 0.11 [-0.07; 0.29]
Christy et al.[13]	Physical activity	Trans-theoretical model		6 update cards		Fat intake -0.41 [-0.58; -0.24]	Fat intake -0.25 [-0.43; -0.07]
Mosher et al.[14]				1 summary newsletter	Goal setting (HE + PA)	Diet quality 0.38 [0.21; 0.55]	Diet quality 0.25 [0.07; 0.42]
Ottenbacher et al.[15]				**Material:** Personalized workbook	Barrier identification/ problem solving (HE + PA)	**Physical activity**: Moderate-to-vigorous PA 0.24 [0.08; 0.39]	**Physical activity**: Moderate-to-vigorous PA 0.07 [-0.11; 0.24]
Protocol Demark-Wahnefried et al.[16]				Pedometer			
				Resistance band	Provide feedback on performance (HE + PA)	All effect sizes are adjusted for baseline behavior	All effect sizes are adjusted for baseline behavior
Demark Wahnefried [17]				Dried fruit samples			
				Fat gram counter booklet	Provide rewards (praises and encouragements) contingent on successful behaviors (HE + PA)		
				Butter substitute samples			
				Provider: Computer-			

				assisted			
				Delivery: Mail	Prompt self-monitoring of behaviour (HE + PA)		
				Duration of the intervention: 10 months (43 weeks)	Prompt review of behavioral goals (HE + PA)		
				Follow-up: 12 months (52 weeks)	Set graded tasks (HE + PA)		
					Environmental restructuring (HE + PA)		
					Testimonials[g] (tailored on age, race, and cancer coping style)		
Demark-Wahnefried et al.[18]	Healthy eating Physical activity	Social cognitive theory	Simultaneous	**Dose**: 14 counseling sessions (10-30 min/session) **Material**: Participant workbook (detailed instruction)	Provide information on consequences of behavior in general (HE + PA) Provide instruction on how to perform the behavior	**Healthy Eating** F&V intake 0.64 [0.10; 1.17] Fat intake -1.35 [-1.93; -0.76] Total energy intake 0.04 [-0.49; 0.56]	N/A N/A N/A

						(HE + PA)	**Physical activity**:	
					Videotape (detailed instruction)		PA assessed with an accelerometer: -0.16 [-0.68; 0.37]	N/A
						Prompt self-monitoring of behavior (HE + PA)		
					Heart rate monitor		PA assessed with a questionnaire: 0.08 [-0.45; 0.61]	N/A
						Goal-setting (HE + PA)		
					Exercise ball			
					Resistance bands	Model/ Demonstrate the behavior (PA)		
					Water-fillable ankle weight			
					Provider: Counselor with dual degrees in Nutrition and Kinesiology			
					Delivery: Phone Mail			
					Duration of the intervention: 6 months (26 weeks)			
Demark-Wahnefried et al.[19]	Healthy eating	Interdependence theory	Simultaneous	**Dose**: 6 newsletters-tailored		Goal-setting (HE + PA)	**Healthy Eating**: Total energy intake	N/A

			feedback	Set graded task (HE + PA)	-0.07 [-0.70; 0.56]	
Physical activity	Social cognitive theory		**Material:** Tailored workbook	Prompt self-monitoring of behavior (HE + PA)	Diet quality 0.33 [-0.33; 0.96]	N/A
	Theory of communal coping		Logbooks and reference manuals or website (for self-monitoring)	Barrier identification/ Problem solving (HE + PA)	**Physical activity**: Moderate to vigorous PA (assessed with an accelerometer) 0.42 [-0.21; 1.06]	N/A
	Transtheor e-tical Model		iPods and shoe chips (for self-monitoring)	Prompt rewards contingent on effort or progress towards behavior (HE + PA)	PA energy expenditure (assessed with a questionnaire) 0.55 [-0.09; 1.18]	N/A
			Portion control tableware			
			Provider: Computer-assisted	Action planning (HE + PA)		
			Delivery: Mail	Feedback on behavioral performance (HE+ PA)		
			Duration of the intervention: 12 months (13 weeks)			
				Facilitate social comparison (HE + PA)		

					Relapse prevention/ Coping planning (HE + PA) Provide normative information about others' behavior (HE + PA) General communication skills training		
Djuric et al.[20]	Healthy eating Physical activity	Social cognitive theory	Simultaneous	**Dose**: 24 counselling sessions 12 group meetings (monthly basis) One-on-one meeting 52 Weight Watcher sessions	Goal-setting (weight loss) Goal-setting (HE+ PA) Prompt rewards contingent on effort or progress towards behavior (HE + PA) Self-monitoring	**Healthy Eating** Fat intake -2.29 [-3.52; -1.07] Total energy intake -1.58 [-2.65; -0.51] **Physical activity**: PA (*p* > 0.05) *Assessed, but data required for effect size calculation were not reported*	N/A N/A N/A

				Material: 12 Monthly packet of written information Pedometer	of outcome (body weight) Self-monitoring of behaviors (HE+ PA)		
				Provider: Dietician **Delivery:** Phone In-person Mail **Duration of the intervention:** 12 months (52 weeks)	Prompt review of behavioral goals (HE + PA) Provide feedback on behavioral performance (HE + PA) Environmental restructuring (HE + PA) Relapse prevention/ coping planning (HE + PA)		
Djuric et al.[21]	Healthy eating Physical activity	None specified Based on MI and social cognitive	Simultaneous	**Dose**: 19 counselling sessions Educational materials	Motivational interviewing (HE + PA) Provide information on consequences	**Healthy Eating:** Fat intake -0.73 [-1.47; 0.02] F&V intake 1.66 [0.81; 2.52]	N/A N/A

		theory principles		**Material:** Pedometer Daily Diet and PA log Fast tracker Food booklet Fat gram counter/food exchange list book Example of menus **Provider:** Dietician **Delivery:** Phone Mail **Duration of the intervention:** 12 months (52 weeks)	of behavior in general (HE + PA) Goal-setting (HE + PA) Provide feedback on behavioral performance (HE + PA) Prompt rewards contingent on effort or progress towards behavior (HE + PA)	**Physical activity:** Time spent walking and performing mild, moderate, and strenuous PA 0.54 [-0.20; 1.28]	N/A
Goodwin et al.[22]	Healthy eating Physical	None specified	Simultaneous	**Dose**: 19 counselling sessions (30-60	Provide information on consequences of behaviour in	**Healthy Eating:** Total energy intake *Assessed, and data*	N/A

activity	min/session)	general (HE + PA)	*reported at baseline and 12 months. However, data required for effect size calculation at 24 months were not reported*	
	Additional material: Workbook	Goal-setting (weight loss)		
	Written information (from Canadian Cancer Society, Health Canada)	Goal-setting (HE + PA)		
		Relapse prevention/ Coping planning (HE + PA)	Fat intake *Assessed, and data reported at baseline and 12 months. However, data required for effect size calculation at 24 months were not reported*	N/A
	2-year subscription to the Canadian Health Magazine	Time management (HE+ PA)		
	Provider: Lifestyle coaches			
		Barrier identification/ Problem solving (HE + PA)	F&V intake *Assessed, and data reported at baseline and 12 months. However, data required for effect size calculation at 24 months were not reported*	N/A
	Delivery: Phone Mail			
		Provide feedback on performance (HE + PA)		
	Duration of the intervention: 24 months (104 weeks)			
		Stress management/ Emotional	**Physical activity:** Moderate-to-	N/A

					control training	vigorous PA ($\geq$ 150 min/wk)[b] 0.09 [-0.22, 0,40]	
						Higher levels of walking behavior (min/wk) in the MHBC intervention condition; data reported as median [Q1, Q3] ($p < 0.05$)	N/A
Greenlee et al.[23]	Healthy eating Physical activity	None specified	Simultaneous -*tapered*	**Dose**: Curves Weight Management Program (memberships to Curves fitness center; including 3 one-on-one training sessions and Curves diet plan) 6 nutrition group sessions (1 hour/session) 6 counselling sessions **Material:**	Provide membership to Curves® fitness center[g] Goal-setting (HE + PA) Prompt practice (HE + PA) Model/ Demonstrate the behavior (HE) Set-graded task-(PA) Goal-setting	**Healthy Eating** F&V intake 0.14 [-0.49, 0,78] Fat intake 0.16 [-0.47, 0,80] Total energy intake -0.30 [-0.93, 0,34] **Physical activity** Sport/exercise 1.72 [0.97, 2,47]	N/A N/A N/A N/A

				Curves book	(weight loss)		
				DVDs, manuals, and recipe book	Provide instruction on how to perform the behavior (HE)		
				Heart rate monitor			
				Provider: Curves staff	Barriers identification/ Problem solving (HE + PA)		
				Delivery: In person Phone			
				Duration of the intervention: 6 months (26 weeks)			
Hawkes et al.[24] **Protocol** Hawkes et al.[25]	Alcohol Healthy eating Physical activity Smoking	Acceptance commitment therapy	Simultaneous	**Dose:** 11 counselling sessions 10 postcard prompts 4 study newsletters **Material:** Participant handbook	Provide information on consequences of behavior in general Goal-setting of behaviors (PA) Barrier identification/ problem solving (HE + PA)	**Healthy Eating** Vegetable intake 0.32 [0.11, 0.53] Fruit intake 0.17 [-0.04, 0.44] F&V intake 0.25 [0.13, 0.37] Fat intake -0.31 [-0.52, -0.09]	**Healthy Eating** Vegetable intake 0.16 [-0.06, 0.38] Fruit intake 0.00 [-0.22, 0.22] F&V intake 0.08 [-0.10, 0.26] Fat intake -0.25 [-0.47, -0.03]

						Physical activity: Moderate to vigorous PA[e] 0.11 [-0.10, 0.32]	Physical activity: Moderate to vigorous PA[e] 0.20 [-0.02, 0.42]
				Pedometer **Provider:** Health coaches **Delivery:** Phone Mail **Duration of the intervention:** 6 months (26 weeks) **Follow-up:** 6 months (26 weeks)	Action planning (HE + PA) Prompt self-monitoring of behaviors (PA) Use of follow-up prompts (HE + PA) Motivational interviewing (HE + PA) Stress management/ emotional control training Cancer-related symptoms management	All effect sizes are adjusted for baseline behavior	All effect sizes are adjusted for baseline behavior
Hébert et al.[26]	Healthy eating Physical activity	Mind-fulness Based Stress Reduction	Simultaneous	**Dose:** 12 group sessions (2.5 hours/session) 3 booster group sessions	Goals-setting (HE + PA) Prompt practice (daily homework assignment; cooking, PA, stress reduction	**Healthy Eating** Fruit intake[f] 0.35 [-0.23, 0.93] Vegetable intake[f] 0.19 [-0.38, 0.77] F&V intake 0.27 [-0.22, 0.76]	N/A N/A N/A

				3 booster phone calls	activities)	Total energy intake[f]* -0.12 [-0.70, 0.45]	N/A
				Provider: Not specified	Provide instruction on how to perform the behavior (HE + PA)	Fat intake[f]* -0.52 [-1.11, 0.06]	N/A
				Delivery: In person Phone	Use of follow-up prompts (HE + PA)	**Physical activity**: Total PA energy expenditure[f] 0.13 [-0.44, 0.71]	N/A
				Duration of the intervention: 6 months (26 weeks)	Stress management/ Emotional control training	Moderate-to-vigorous PA energy expenditure[f]* 0.01 [-0.57, 0.58]	N/A
						*Significant time × group interaction effect; between-group difference change at 3 months ($p < 0.05$)	
Hung et al.[27]	Healthy eating Physical activity	None specified	Simultaneous	**Dose**: 1 behavioral counseling session 10 telephone sessions	Goal setting (HE + PA) Provide instruction on how to perform the behavior	**Healthy Eating:** Total energy intake[c] -0.15 [-0.84, 0.55] **Physical activity**: Moderate PA[c]	N/A N/A

					(HE + PA)	0.27 [-0.44, 0.98]	
				Providers: Dietician Exercise physiologist	Prompt review of behavioral goals (HE + PA)	Vigorous PA^c 0.41 [-0.30, 1.12]	N/A
				Delivery: In person Phone	Provide feedback on behavioral performance (HE + PA)	Walking PA^c -0.24 [-0.94, 0.45] *Adjusted for age, gender, diagnosis, LOS, PG-SGA score	N/A
				Duration of the intervention: 12 weeks			
James et al.[28] **Protocol** James et al.[29]	Healthy eating Physical activity	Social cognitive theory Chronic disease self-management approach	Simultaneous	**Dose:** 4 weekly sessions 2 fortnightly sessions (60 min/session)	Provide information on consequences of behavior in general (HE + PA)	**Healthy Eating:** Fruit intake^c 0.28 [-0.10, 0.66] Vegetable intake^c 0.19 [-0.19, 0.57]	**Healthy Eating:** Fruit intake^c 0.36 [-0.03, 0.75] Vegetable intake^c 0.49 [0.10, 0.88]
				Material: Elastic tubing-Gymstick^{TM} Pedimeter Steps count diary Written ressources	Provide information on consequences of behavior to the individual (HE + PA) Prompt self-monitoring of behavior (PA)	F&V intake 0.24 [-0.07, 0.55] Fat intake^c -0.17 [-0.55, 0.21] Total energy intake^c -0.08 [-0.46, 0.30]	F&V intake 0.43 [0.10, 0.76] Fat intake^c -0.22 [-0.60, 0.16] Total energy intake^c -0.13 [-0.51, 0.25]
				Provider: Exercise specialist	Goal setting (PA)	**Physical activity:** Daily steps^c 0.59 [0.21, 0.97]	**Physical activity:** Daily steps^c 0.30 [-0.08, 0.68]

	Dietician		
Delivery: In person	Goal setting (outcome)	Moderate-to- vigorous PA[c] 0.27 [-0.44, 0.98]	Moderate-to- vigorous PA[c] -0.13 [-0.51, 0.25]
Duration of the intervention: 8 weeks	Prompt self- monitoring (PA)	Resistance training[c] 0.23 [-0.15, 0.61]	Resistance training[c] 0.16 [-0.22, 0.54]
	Barrier identification/pr oblem solving (PA)	All effect sizes are adjusted for the baseline value of the outcome	All effect sizes are adjusted for the baseline value of the outcome
	Provide instruction on how to perform the behavior (HE + PA)		
	Prompt practice (PA) Model or demonstrate the behavior (role modeling) (HE + PA)		
	Plan social support/social change (HE + PA)		
	Chronic disease		

					self-management techniques[g] (building self-efficacy, motivation, action plans, role modeling)		
Kim et al.[30]	Healthy eating Physical activity	Trans-theoretical Model	Simultaneous	**Dose**: 12 counseling sessions (30 min/session) **Material**: Heart rate monitor Workbook-stage-match information **Provider:** Nurse **Delivery:** Phone **Duration of the intervention:** 3 months (12 weeks)	*Pre-contemplation* Provide information on consequences of behavior in *general* (HE + PA) *Contemplation* Provide information on consequences of behavior to the *individual* (HE + PA) Barrier identification/ Problem solving (HE + PA)	**Healthy Eating** Diet quality** 0.92 [0.30, 1.53] **Physical activity**: Moderate-to-vigorous PA* 0.63 [0.03, 1.24] *A non significant time × group interaction ($p = 0.09$) was reported by the authors **Lower score indicate better quality	N/A N/A

Prompt use of
imagery
(HE + PA)

Preparation

Provide
instruction on
how to perform
the behavior
(HE + PA)

Prompt self-
monitoring
(HE + PA)

Provide
information on
consequences
of behavior to
the *individual*
(HE + PA)

*Action and
maintenance*

Provide
feedback on
performance
(HE + PA)

Prompt rewards
contingent on

					effort or progress towards behavior (HE + PA)	
					Plan social support/ Social change (HE + PA)	
					Behavioral substitution: substitution of exercise for sedentary behavior and a balanced diet for one that was unbalanced[g]	
					Environmental restructuring (HE + PA)	
Lee et al.[31]	Healthy eating Physical activity	Trans-theoretical model	Simultaneous	**Dose**: Web-based self-management exercise and diet intervention (WSEDI) Tailored	_Pre-contemplation_ Provide information on consequences of behavior in _general_	**Healthy Eating:** F&V intake ($\geq$ 5 servings/d)[b]* 0.52 [-0.07, 1.12] Fat intake -0.18 [-0.70, 0.34]	N/A N/A

feedback	(HE + PA)	Diet quality 0.92 [0.38, 1.47]	N/A
Encourage to use the WSEDI twice a week	*Contemplation*		
Provider: Self-management	Provide information on consequences of behavior to the *individual* (HE + PA)	**Physical activity**: Moderate-to-vigorous PA ($\geq$ 150 min/d)[b]* 0.67 [0.08, 1.27]	N/A
Delivery: Online SMS	Barrier identification/ Problem solving (HE + PA)	*When adjusted for baseline behavior, the reported *p*-value was < 0.001.	
Duration of the intervention: 3 months (12 weeks)	Prompt use of imagery (HE + PA)		
	Preparation		
	Action planning (HE + PA)		
	Goal-setting (HE + PA)		
	Provide instruction on how to perform the behavior		

(HE + PA)

Prompt self-
monitoring
(HE + PA)

Provide
information on
consequences
of behavior (HE
+ PA) to the
individual

Provide
feedback on
performance
(HE + PA)

*Action and
maintenance*

Goal-setting
(HE + PA)

Action planning
(HE + PA)

Provide
feedback on
performance
(HE + PA)

Prompt rewards

contingent on
effort or
progress
towards
behavior
(HE + PA)

Plan social
support/
Social change
(HE + PA)

Behavioral
substitution:
substitution of
exercise for
sedentary
behavior
and a balanced
diet for one that
was
unbalanced[g]

Environmental
restructuring
(HE + PA)

Morey et al.[32]	Healthy eating	Social cognitive Theory	Simultaneous	**Dose**: 15 counseling sessions (15-30 min)	Provide information on consequences of behavior to the individuals (HE + PA)	**Healthy Eating** F&V intake 0.50 [0.34, 0.65]	N/A
Demark-Wahnefried et al.[33]	Physical activity	Trans-theoretical model		8 postcard prompts		Fat intake (saturated) -0.33 [-0.49, -0.18]	N/A

Protocol				
Snyder et al.[34]	4 study newsletters	Goal-setting (HE + PA)	Diet quality 0.35 [0.19, 0.50]	N/A
	Materials: Personalized workbook	Barrier identification/ problem solving (HE + PA)	**Physical activity**: Moderate-to-vigorous PA 0.24 [0.08, 0.39]	N/A
	Pedometer			
	3 exercise bands	Prompt self-monitoring of behavior (HE + PA)	Frequency of strength training exercise[c] 0.41 [0.25, 0.57]	N/A
	1 poster depicting 6 lower-body strength training exercises	Provide feedback on performance (HE + PA)	Frequency of endurance exercise[c] 0.23 [0.07, 0.39]	N/A
	Table guide to food portioning	Set graded tasks (HE + PA)	All effect sizes are adjusted for baseline behavior	
	Fat gram booklet			
	Provider: Health Counselor	Provide rewards-reinforcements contingent on successful behavior (HE + PA)		
	Delivery: Phone Mail			
	Duration of the intervention:	Model/ demonstrate the behavior		

				12 months (52 weeks)	(HE + PA)		
				Follow-up: 12 months (52 weeks)	Environmental restructuring (HE + PA)		
Moyer-Mileur et al.[35]	Healthy eating Physical activity	None specified	Simultaneous	**Dose**: 5 clinical appointments **Materials:** Physical Activity Pyramid for youth US Department of Agriculture Food Guide Pyramid; Nutrition related activities **Provider:** Dietician **Delivery:** In-person or phone **Duration of the intervention:** 12 months	Prompt self-monitoring (PA) Provide feedback on performance (HE + PA) Provide instruction on how to perform the behavior (HE + PA) Model/ Demonstrate the behavior (HE + PA)	**Health Eating** No difference in total energy intake ($p > 0.05$) *Data required to calculate effect size were not reported* No difference in F&V intake ($p > 0.05$) *Data required to calculate effect size were not reported* No difference in in fat intake ($p > 0.05$) *Data required to calculate effect size were not reported* **Physical activity**: Higher levels of	N/A N/A N/A N/A

				(52 weeks)		total PA minutes were reported in the MHBC intervention condition ($p = 0.05$)		
						Higher number of steps taken were recorded for the MHBC intervention condition ($p = 0.06$)	N/A	
O'Carrols Bantum et al.[36]	Healthy eating Physical activity	None specified	Simultaneous	**Dose**: 6 workshop sessions (30-35 webpages of didactic material) **Provider:** Peer facilitators (former cancer survivors) **Delivery:** Web **Duration of the intervention:** 6 weeks	Goal-setting (HE + PA) Barrier identification/ Problem solving (HE + PA) Action planning (HE + PA) Provide feedback on performance (HE + PA) Facilitate social support	N/A N/A N/A N/A		**Healthy Eating** F&V intake SMD = 0.21*; $p = 0.24$** **Physical activity**: Moderate-to-vigorous LTPA SMD = 0.29*; $p = 0.45$** Vigorous LTPA SMD = 0.36*; $p = 0.01$** Moderate or Mild LTPA SMD = 0.10; $p \geq 0.28$**

				Follow-up: 20 weeks	comparison (HE + PA)		*Mean differences from the predicted model, adjusted for age, race, sex, marital status, smoking status, education, year since diagnosis, site of cancer diagnosis, and cancer stage.
					Prompt self-monitoring (HE + PA)		
					General communication skills training		
					Stress management/ Emotional control training		**time × group interaction
Ornish et al.[37] **Protocol** Ornish et al.[38]	Healthy eating Physical activity	None specified	Simultaneous	**Dose**: 52 group meetings (1 hour/meeting) 21 counselling sessions **Provider:** Dietician **Delivery:** In person Phone **Duration of the intervention:** 12 months	Provide instruction on how to perform the behavior (HE + PA) Plan social support/social change (HE + PA) Stress management/ Emotional control training	**Healthy Eating** Fat intake -0.34 [-0.77, 0.09] **Physical activity**: Total PA (min/wk) 0.51 [0.07, 0.94] Total PA (d/wk) 0.64 [0.21, 1.08]	N/A N/A N/A

				(52 weeks)			
Von Gruenigen et al.[39]	Healthy eating Physical activity	Social cognitive theory	Simultaneous	**Dose**: 11 group sessions (60 min/session) 3 Physician counseling sessions 11 Newsletters **Material**: Pedometer **Providers:** Researcher, dietician, psychologist **Delivery:** In-person Mail Phone **Duration of the intervention:** 6 months (26 weeks)	Provide information on consequences of behavior in general (HE + PA) Goal setting (body weight, HE, PA) Provide feedback on performance (HE + PA) Prompt rewards contingent on effort or progress towards behavior (praise, encouragement) Set graded task (PA) Prompt practice (PA) Stress	**Healthy Eating** Total energy intake -0.20 [-0.89, 0.50] **Physical activity**: Total LTPA 0.64 [-0.07, 1.35]	**Healthy Eating** Total energy intake -0.17 [-0.83, 0.50] **Physical activity**: Total LTPA 0.76 [0.07, 1.45]

					management/ Emotional control training		
Von Gruenigen et al.[40]	Healthy eating Physical activity	Social cognitive theory	Simultaneous	**Dose**: 16 group sessions (60 min/session) 3 physician counseling sessions Newsletters Additional contacts (feedback and support) **Materials**: Pedometer Heart rate monitor 3-pound hand and adjustable weights **Delivery:** In-person Mail Email; phone	Goal-setting (outcome; weight loss) Goal-setting (HE + PA) Action planning (HE + PA) Prompt self-monitoring of behavior (HE + PA) Provide feedback on performance (HE + PA) Model/ Demonstrate the behavior (HE + PA) Provide instruction on how to perform the behavior (HE + PA)	**Healthy Eating** F&V intake* 0.32 [-0.14, 0.78] Total energy intake* -0.35 [-0.80, 0.14] **Physical activity**: Total LTPA* 0.56 [0.10, 1.02] Steps taken[c]* 0.58 [0.12, 1.04] *Significant when difference in means was adjusted for age, BMI, stage of cancer, time since diagnosis, adjuvant treatment and baseline behavior ($p < 0.001$)	**Healthy Eating** F&V intake* 0.19 [-0.27, 0.65] Total energy intake* -0.35 [-0.81, 0.11] **Physical activity**: Total LTPA* 0.36 [-0.19, 0.74] Steps taken *Not assessed* *Significant when difference in means was adjusted for age, BMI, stage of cancer, time since diagnosis, adjuvant treatment and baseline behavior ($p < 0.001$)

Provider:
Physician, psychologist, dietician, and physical therapist

Duration of the intervention:
6 months (26 weeks)

Follow-up:
6 months (26 weeks)

Note. SMD: Standardized Mean Difference. F&V: Fruit and Vegetable. HE: Healthy Eating. PA: Physical Activity.

[a]Effect size calculated from *F*-test.
[b]Treatment effect was reported as a difference in proportion; Odds Ratio was computed and then converted into Standardized Mean Difference (Cohen's *d*).
[c]The average of standard deviations of the experimental and control groups were calculated from the 95% confidence interval for the difference in means.
[d]Mean and standard deviation were extracted from Figure of the original article.
[e]Results of zero-inflated negative binomial models (expressed as incidence rate ratio) were 1.3 [0.9, 1.9] at post-intervention) and 1.7 [1.2, 2.6] at follow-up.
[f]The standard deviation for the experimental and control group were calculated from the 95% confidence interval for the difference in means.
[g]Behavior change technique not listed the CALO-RE taxonomy.

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Supplementary File 4. Matrix of Intervention Characteristics

Table 1. Matrix of Intervention Characteristics

| Providers | Mean | | | Frequency | | |
| | Median (Q1-Q3) | | | (%) | | |
	Length (weeks)	Contacts (number)	Intensity (contact/week)	Tailored and Theory-based	Non tailored and Theory-based	Non tailored and non-theory based
Exercise specialist-led ($k = 4$)	16 13 (13 − 20)	21 24 (18 − 24)	1.50 1.8 (1.2 − 1.8)	0 (0%)	0 (0%)	4 (15.4%)
Dietician-led ($k = 4$)	46 52 (39 − 52)	46 46 (12 − 81)	1.31 0.9 (0.2 − 2.4)	0 (0%)	2 (7.7%)	2 (7.7%)
Nurse or Multidisciplinary team-led ($k = 14$)[a]	31 26 (13 − 52)	15 13 (11 − 19)	0.63 0.64 (0.36 − 0.92)	6 (23.1%)	5[b] (19.0%)	3 (11.5%)
Web/computer assisted ($k = 4$)	29 28 (10 − 48)	18 19 (12 − 25)	0.85 0.7 (0.2 − 1.5)	3 (11.5%)	0 (0%)	1[b] (3.8%)

[a]Five MHBC interventions were delivered by a multidisciplinary team that include both exercise specialist and a dietitian. [b]Reported only long-term MHBC intervention effects. $k = 26$ due to one missing data for intervention provider.

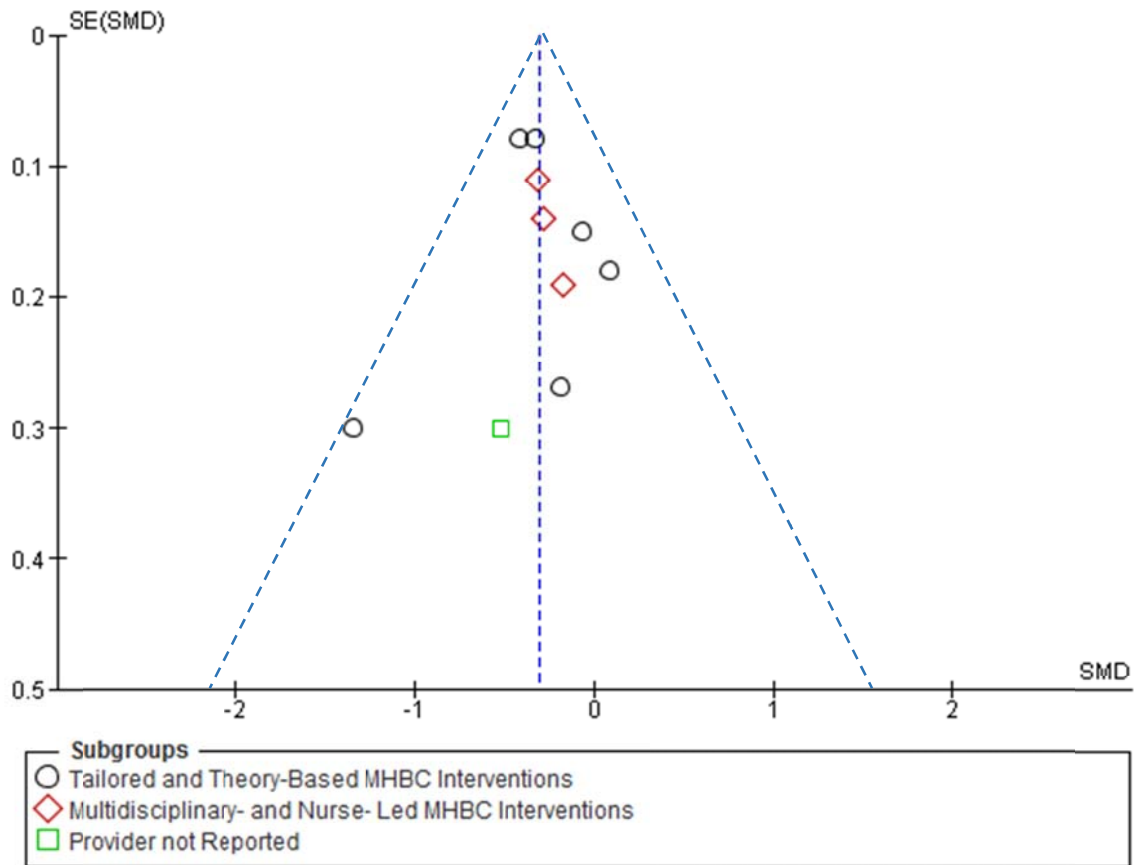**Supplementary File 5.** Publication Bias Assessment

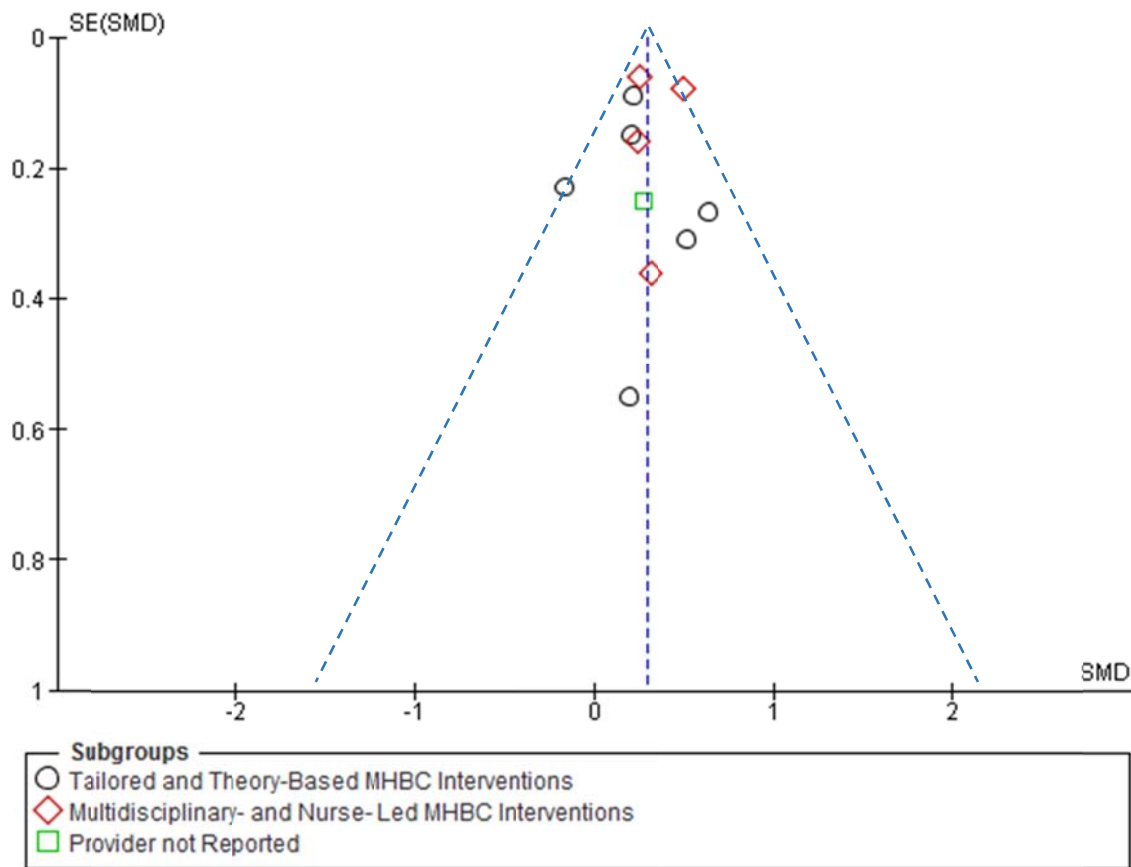**Figure 1.** Funnel Plot for Fat Intake ($k = 10$).

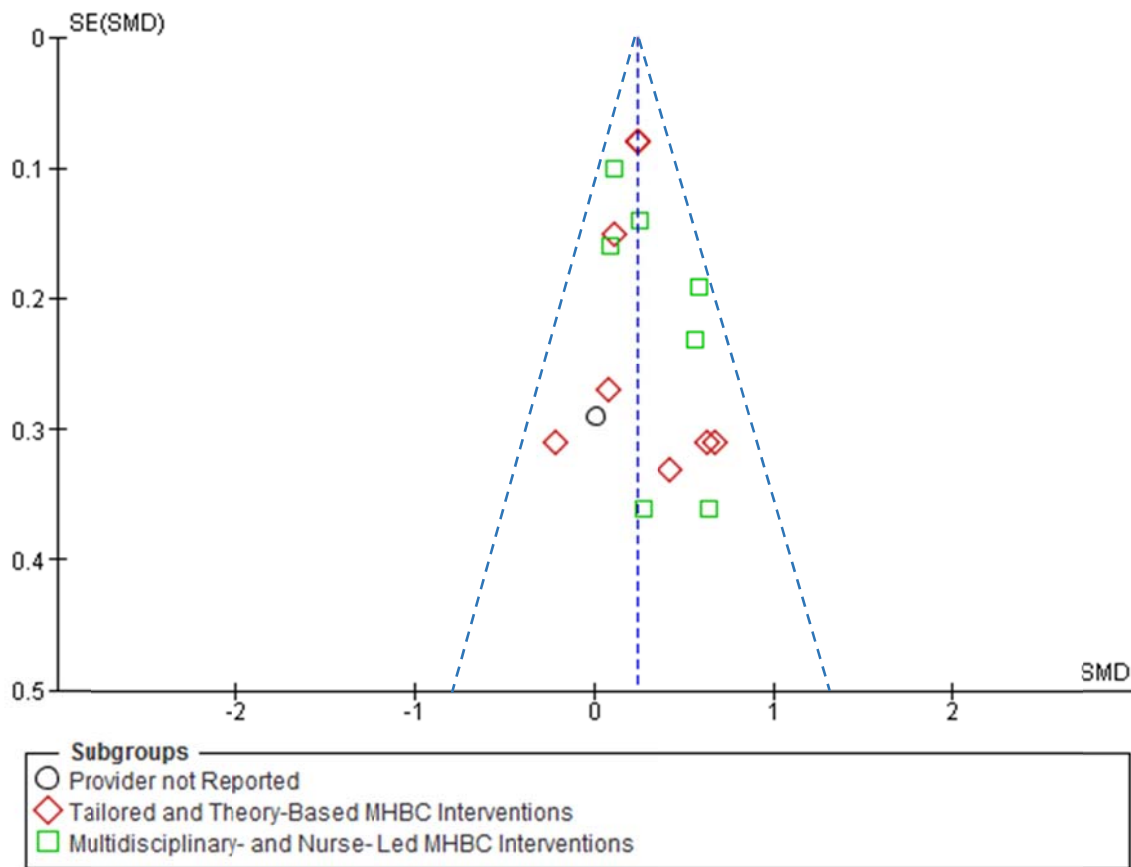**Figure 2.** Funnel Plot for Fruit and Vegetable Intake ($k = 11$).

Figure 3. Funnel Plot for Physical Activity ($k = 16$).

Supplementary File 6. Distribution of Behavioral Effect Sizes According to Risk of Bias

Table 1. Distribution of Physical Activity Effect Sizes According to Risk of Bias

	Median	Q1	Q3	Minimum	Maximum
Overall (*k* = 22)	0.54	0.24	0.64	-0.16	1.72
Risk of bias:					
Random sequence generation					
Low (*k* = 12)	0.47	0.18	0.73	-0.22	1.22
High (*k* = 1)	0.64	-	-	-	-
Unclear (*k* = 9)	0.42	0.11	0.56	-0.16	1.72
Allocation concealment					
Low (*k* = 12)	0.48	0.18	0.73	-0.22	1.22
High (*k* = 10)	0.45	0.09	0.63	-0.16	1.72
Blinding of outcome assessor					
Low (*k* = 5)	0.64	0.24	0.78	0.11	0.85
High (*k* = 17)	0.42	0.11	0.63	-0.22	1.72
Incomplete outcome data					
Low (*k* = 4)	0.74	0.60	1.01	0.56	1.22
High (*k* = 18)	0.30	0.11	0.64	-0.22	1.72

Table 2. Distribution of Fruit and Vegetable Effect Sizes According to Risk of Bias

	Median	Q1	Q3	Minimum	Maximum
Overall ($k = 13$)	0.25	0.21	0.50	-0.16	1.66
Risk of bias:					
Random sequence generation					
Low ($k = 6$)	0.25	0.22	0.50	-0.16	0.52
High ($k = 0$)	-	-	-	-	-
Unclear ($k = 7$)	0.27	0.20	0.64	0.14	1.66
Allocation concealment					
Low ($k = 8$)	0.24	0.21	0.51	-0.16	1.66
High ($k = 5$)	0.27	0.24	0.32	0.14	0.64
Blinding of outcome assessor					
Low ($k = 3$)	0.25	0.20	0.50	0.20	0.50
High ($k = 10$)	0.26	0.21	0.52	-0.16	1.66
Incomplete outcome data					
Low ($k = 1$)	0.32	-	-	-	-
High ($k = 12$)	0.25	0.21	0.51	-0.16	1.66

Table 3. Distribution of Fat Intake Effect Sizes According to Risk of Bias

	Median	Q1	Q3	Minimum	Maximum
Overall (*k* = 17)	-0.34	-0.73	-0.07	-2.29	0.28
Risk of bias:					
Random sequence generation					
Low (*k* = 9)	-0.33	-0.43	-0.17	-1.00	0.18
High (*k* = 2)	-1.32	-	-	-2.29	-0.34
Unclear (*k* = 6)	-0.30	-0.73	0.16	-1.35	0.28
Allocation concealment					
Low (*k* = 11)	-0.34	-0.73	-0.07	-1.00	0.18
High (*k* = 6)	-0.35	-1.35	0.16	-2.29	0.28
Blinding of outcome assessor					
Low (*k* = 5)	-0.34	-0.43	-0.33	-0.93	-0.31
High (*k* = 12)	-0.29	-0.87	0.13	-2.29	0.28
Incomplete outcome data					
Low (*k* = 2)	-0.72	-	-	-1.00	-0.43
High (*k* = 15)	-0.33	-0.73	0.09	-2.29	0.28

Table 4. Distribution of Total Energy Intake Effect Sizes According to Risk of Bias

	Median	Q1	Q3	Minimum	Maximum
Overall (k = 13)	-0.15	-0.30	-0.08	-1.58	0.04
Risk of bias:					
Random sequence generation					
Low (k = 6)	-0.14	-0.22	-0.08	-0.66	0.04
High (k = 1)	-1.58	-	-	-	-
Unclear (k = 6)	-0.16	-0.30	-0.07	-0.35	0.04
Allocation concealment					
Low (k = 5)	-0.12	-0.22	-0.07	-0.66	0.04
High (k = 8)	-0.18	-0.33	-0.10	-1.58	0.04
Blinding of outcome assessor					
Low (k = 2)	-0.17	-	-	-0.22	-0.12
High (k = 11)	-0.15	-0.35	-0.07	-1.58	0.04
Incomplete outcome data addressed					
Low (k = 3)	-0.35	-0.66	-0.22	-0.66	-0.22
High (k = 10)	-0.12	-0.20	-0.07	-1.58	0.04

Supplementary File 7. The PRISMA Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	1-2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	2-3
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	3
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	N/A
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	3
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	3 and Supplementary File 1
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	3 and Supplementary File 1
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	3

Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	3-4
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	3-4
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	4
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	4 and Supplementary File 2
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	4

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	4
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	5-7;10
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	5
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	5-6 and Supplementary File 3
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	6, Table 1, Figure 2, and Supplementary File 4

Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	6-10, Table 2, Supplementary File 3 (Table 2)
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	9, Table 2
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	10; Supplementary File 5
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	10, Table 2
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	10-12
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	10-12
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	12-13
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	13

For more information, visit: **www.prisma-statement.org**.