h e d s
Haute école de santé
Genève
Filière Nutrition et diététique

Rue des Caroubiers 25
CH-1227 Carouge

T +41 22 388 34 60
F +41 22 388 34 50

diet.heds@hesge.ch
www.hesge.ch/heds

Description des interventions visant une perte de poids chez les femmes traitées pour un cancer du sein à l'aide de la Behaviour Change Techniques Taxonomy version 1 (BCTTv1).

Travail de Bachelor

Maillard Sophie et de Watteville Aude

N°12823118 et N°14587042

Directrice de TBSc:	Soguel Alexander Ludivine - Diététicienne ASDD, Professeure HES, Filière Nutrition et diététique, Haute école de santé Genève
Membre du jury:	Dr Bodmer Alexandre - Médecin adjoint, Centre du sein, Responsable de l'unité d'oncogynécologie des Hôpitaux Universitaires de Genève (HUG)

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MAILLARD SOPHIE, DE WATTEVILLE AUDE

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Résumé

Introduction
La qualité des descriptions des études d'intervention visant un changement de comportement est très variable. Par conséquent, ces interventions sont difficilement implantables dans la pratique professionnelle. Dans le cadre du cancer du sein, les femmes ont une tendance à prendre du poids suite aux traitements. Il n'y pas de recommandation pour la prise en charge du poids de ces patientes. Cela est principalement dû à un manque de preuves solides, malgré qu'une perte de poids soit réalisable. Les composantes efficaces des interventions réalisées ne sont pas connues. Le but de ce travail est d'identifier les ingrédients actifs des interventions visant une perte de poids chez les femmes traitées pour un cancer du sein à l'aide de la taxonomie Behaviour Change Technique Taxonomy version 1 (BCTTv1).

Méthodes
24 études d'intervention visant une perte de poids chez les femmes traitées pour un cancer du sein ont été analysées. Une analyse descriptive des interventions menées a été effectuée sur la base du fondement de l'intervention, du type d'intervention auto-déclaré par les auteurs, de la description de l'intervention, du public cible de l'intervention, des modalités d'intervention et des ressources matérielles et humaines. Les 24 interventions ont également été codées à l'aide de la taxonomie BCTTv1 afin d'en dégager les ingrédients actifs.

Résultats
Dix-huit études sur vingt-quatre ont une composante alimentaire ainsi qu'une composante d'activité physique. Six études ont également une composante de soutien social. Les descriptions des études inclues sont très variables dans la précision et dans le vocabulaire utilisé pour les qualifier, malgré que les interventions soient très similaires. Les modalités d'interventions ainsi que les ressources matérielles et humaines ne sont pas toujours explicitées de manière claire. Nous avons pu identifier 25% des labels BCT possibles. Les labels les plus fréquents sont *Goal setting (behavior) (1.1)*, *Social support (unspecified) (3.1)*, *Instruction on how to perform the behavior (4.1)* et *Goal setting (outcome) (1.3)* par ordre décroissant.

Conclusion
Nos résultats ont montré la variabilité des descriptions pour des interventions qui sont finalement semblables. Le faible nombre de labels BCT trouvé montre le manque de précision dans les descriptions pour que l'ingrédient actif soit clairement identifié. Nos résultats montrent l'importance de l'utilisation d'un langage commun afin que ces interventions puissent être comparées beaucoup plus facilement et de ce fait, apporter encore plus de poids aux résultats de toutes les études portant sur le sujet des femmes atteintes d'un cancer du sein. Ce travail est une première étape vers la compréhension des mécanismes de perte de poids dans le cadre du cancer du sein. Il est important, dans les futures études, que les interventions soient décrites de manière structurée et avec un langage commun. Ceci dans le but de les rendre plus systématiques et d'augmenter les preuves quant au bénéfice d'une prise en charge du surpoids et de l'obésité chez les femmes traitées pour un cancer du sein, avec un objectif de changement de comportement à long terme.

Mots-clés
Cancer du sein – Behaviour Change Technique Taxonomy – BCTTv1 – Perte de poids – Intervention – Ingrédients actifs

Abréviations

Par ordre alphabétique:

AND = Academy of Nutrition and Dietetics

ASCO = American Society of Clinical Oncology

BCT = Behavior change technique

BCTTv1 = Behaviour Change Technique Taxonomy version 1

BMI = Body Mass Index

CONSORT = The Consolidated Standards of Reporting Trials

FFQ = Food Frequency Questionnaire

HDL = High density lipoprotein

HEDS = Haute Ecole de Santé Genève

IMC = Indice de Masse Corporelle

ITAX = Intervention Taxonomy

LAMal = Loi fédérale sur l'assurance maladie

LDL = Low density lipoprotein

OFS = Office Fédérale de la Statistique

OMS = Organisation Mondiale de la Santé

SFNEP = Société francophone Nutrition Clinique et Métabolisme

TG = Triglycérides

TIDieR = Template for intervention description and replication

1. Introduction

Dans la littérature, les interventions effectuées dans un but de changement de comportement sont souvent mal décrites. Cela rend les techniques ayant fait leurs preuves difficilement applicables et, de ce fait, l'implémentation dans la pratique professionnelle en est compliquée.

Notre travail se concentre sur le contexte du cancer du sein, qui est le plus fréquent et le plus meurtrier chez la femme en Suisse. L'avancée dans les traitements permet de diminuer la mortalité et par conséquent, de plus en plus de femmes vivent avec un antécédent de cancer du sein.

Le surpoids et l'obésité dans le cadre du cancer du sein ont un impact négatif sur le pronostic, la morbidité, la récidive et la mortalité. Ils favorisent également le développement de maladies chroniques telles que les maladies cardiovasculaires ou le diabète.

Actuellement, aucune guideline ne recommande de prendre en charge ces femmes pour intervenir au niveau de leur poids. Le manque de preuve est important malgré qu'une perte de poids soit réalisable dans cette population. Les mécanismes qui mènent à la perte de poids doivent être encore étudiés. Les études menées manquent de transparence dans leur méthode et ceci empêche une reproductibilité et une comparaison entre ces dernières.

Le but de ce travail de Bachelor est d'identifier les ingrédients actifs des interventions visant une perte de poids chez les femmes traitées pour un cancer du sein à l'aide de la taxonomie Behaviour Change Technique Taxonomy version 1 (BCTTv1). Ceci sera une première étape vers la déconstruction des interventions et vers une meilleure compréhension des mécanismes de cette perte de poids.

2. Cadre de référence

2.1. Cancer du sein et traitements

Selon l'Office Fédéral de la Statistique (OFS) (1), le cancer du sein est le plus fréquent ainsi que le plus meurtrier chez la femme. La prévalence est estimée à 72'000 femmes en Suisse pour l'année 2010. Le taux d'incidence est de 112.4 nouveaux cas pour 100'000 habitantes en Suisse et le taux de mortalité de 34.5 pour 100'000 habitantes[1] (2). Le cancer du sein correspond à 31.9% des nouveaux cas de cancer et à 19% des cas mortels par cancer chez les femmes (3). L'incidence à tendance à rester stable au cours des années et le taux de mortalité tend à diminuer (3).

Il existe trois sous-types principaux de cancers du sein (4,5):

- Les carcinomes du sein hormono-sensibles. Ils expriment les récepteurs transmembranaires à l'œstrogène (ER) et/ou à la progestérone (PR) et représentent 50-65% des cancers du sein totaux.
- Les carcinomes du sein « HER2 positifs ». Ils présentent une surexpression de la protéine ou du gène HER2. Ils représentent au total 20% des cancers du sein.
- Les cancers du sein triples négatifs, qui ont une absence d'expression des récepteurs hormonaux et de surexpression de la protéine ou du gène HER2 (ER-, PR-, HER2-). Ils représentent 15% des cancers du sein et sont principalement dus à une mutation dans les gènes BRCA1(6).

Le ou les traitements qui seront prodigués dépendent du type de cancer et du stade de celui-ci. Les traitements comprennent (6):

- La chirurgie qui peut être une tumorectomie pour une tumeur unique et de petite taille ou une mastectomie totale dans un cas de grande tumeur ou de tumeurs multiples. La chirurgie est généralement pratiquée pour tout type de cancer du sein.
- La radiothérapie pour des traitements locaux (après une tumorectomie par exemple).
- Des traitements ciblés : Anti-hormonothérapie pour les carcinomes hormonosensibles et les Anti-HER2 pour les carcinomes « HER2 positif ».
- La chimiothérapie pour les cancers triples négatifs et en complément des traitements ciblés.

Ces traitements jouent un rôle essentiel dans le pronostic des patientes mais comportent aussi des effets secondaires qui peuvent être lourds. L'hormonothérapie par exemple provoque des effets similaires à l'arrivée de la ménopause avec des bouffées de chaleur, des fatigues

[1] Moyennes annuelles effectuées entre 2009 et 2013

récurrentes, une sécheresse vaginale, des troubles sexuels, ou encore un risque d'ostéoporose plus élevé (6).

2.2. Cancer du sein et prise de poids

Une prise de poids est fréquente chez les patientes atteintes d'un cancer du sein, quel que soit le traitement et sa durée ou leur statut ménopausique. Le mécanisme de cette prise de poids est peu clair (7) et n'a été que très peu étudié (8). Les études se contredisent sur le facteur qui prédit cette prise de poids, pouvant atteindre 1 à 6 kg (9). Certains suspectent l'hormonothérapie et d'autres la chimiothérapie adjuvante (10). Une hypothèse actuelle est que le traitement de chimiothérapie pourrait en être la cause, en partie car il provoque une diminution du métabolisme de base. De plus, la fatigue due au traitement provoque une diminution de l'activité physique et par conséquent une moindre dépense énergétique. Une non-adaptation des apports alimentaires à ces changements pourrait expliquer une prise de poids. Ce phénomène semble moins clair depuis l'amélioration des traitements (7) mais la prise de poids est toujours observée et reste un sujet préoccupant (9). D'autres facteurs comme un statut pré-ménopausique, le jeune âge et un indice de masse corporelle (IMC) bas au diagnostic semblent être prédicteurs d'une plus grande prise de poids (11).

Une étude qualitative a cherché à comprendre comment les femmes vivaient cette prise de poids et quels étaient leurs besoins (12). Il est ressorti que cette prise de poids est difficile pour les femmes pour qui la prise de poids était inattendue (12). Elles ont connaissance du risque de récidive avec un surpoids et ont l'intention de faire attention à leur alimentation. Cela se révèle toutefois plus difficile une fois les traitements débutés quand les aliments à plus forte palatabilité sont choisis pour le confort qu'elles y trouvent (12). Elles manquent d'informations sur les changements alimentaires et auraient souhaité voir un diététicien (12).

En ce qui concerne les apports alimentaires : les résultats des études diffèrent, certaines montrant une diminution des apports et d'autres des apports inchangés (7) (traduction libre). Il est difficile de se positionner quant à ces résultats car très peu d'études ont évalué la prise alimentaire (7,13,14).

2.3. Effets de la prise de poids

Le surpoids est défini par un IMC entre ≥25 et <30 kg/m^2 et l'obésité par un IMC ≥30 kg/m^2 par l'Organisation Mondiale de la Santé (OMS)(15).

Il a été démontré que l'obésité est un facteur de risque de développement du cancer du sein, que ce soit en lien avec des profils hormonaux anormaux ou en lien avec l'état inflammatoire continu qu'il engendre. Une association positive a été montrée entre la prise de poids à l'âge

adulte et le développement de cancer du sein chez des femmes post-ménopausées. Les autres facteurs de risques probables sont le tour de taille ainsi que le rapport taille-hanche (16).

Dans le contexte d'un cancer du sein diagnostiqué, la prise de poids est associée à un moins bon pronostic, à une augmentation de la mortalité et de la morbidité, avec un risque augmenté de maladies chroniques (11).

La prise de poids pourrait avoir un impact négatif sur le traitement du patient ainsi que sur sa qualité de vie. En effet, la prise de poids a tendance à changer la composition corporelle en augmentant la masse grasse (7). Étant donné que l'aromatisation des androgènes en œstrogènes se fait dans le tissu adipeux, l'augmentation de celui-ci pourrait augmenter le taux d'œstrogènes et diminuer l'effet des traitements anti-hormonaux (17). La prise de poids pourrait aussi favoriser la survenue d'une récidive et ce, notamment en augmentant la densité mammaire. Ce qui augmente le risque de cancer du sein (18).

La prise de poids peut également provoquer une altération de l'image corporelle parfois importante. Cette dernière s'ajoute à celle provoquée par la chirurgie. De plus, la prise de poids apporte son lot de comorbidités : fatigue, bouffées de chaleur, résistance à l'insuline, diabète, arthrose et augmentation des facteurs de risques cardiovasculaires. Les femmes victimes du cancer du sein ont plus de risques de décéder de maladies cardiovasculaires que de leur cancer (7).

2.4. Etudes d'intervention de perte de poids

Dans le contexte de prise de poids lors d'un traitement du cancer du sein, plusieurs études ont été menées afin de déterminer les bénéfices d'une perte de poids. Leurs résultats montrent qu'une perte de poids est possible et qu'elle induit certains bénéfices. Tout d'abord sur les comorbidités (19,20) avec une diminution de l'inflammation chronique, de la résistance à l'insuline, du diabète de type 2 et des maladies cardiovasculaires. Une autre étude montre des avantages à cette perte de poids comme une diminution des lymphœdèmes, de la fatigue, des bouffées de chaleur ainsi qu'une meilleure récupération post-chirurgicale (7).

Malheureusement, à ce jour, il n'y a aucune évidence du bénéfice de la perte de poids sur le pronostic ou encore sur la récidive (19). Le manque de preuves est important et ne permet pas d'avoir des arguments forts sur les bénéfices de cette perte de poids ni de connaître à quel moment il est important de la prendre en charge pour être le plus efficace (21).

Plusieurs études d'intervention avec un suivi long sont en cours en ce moment et testent les effets d'une perte de poids sur les comorbidités et le risque de récidive (22,23). Elles vont être déterminantes pour augmenter le nombre et la qualité des preuves.

A ce jour, les résultats dont nous disposons grâce aux études d'intervention, en cours ou avec un suivi à court terme, sont en lien avec la perte de poids chez les patientes traitées pour un cancer du sein. Deux revues systématiques ont été publiées récemment à ce sujet (21,24). Elles montrent qu'une perte de poids est réalisable avec les interventions des études incluses. Les mesures principales relevées par ces deux revues sont la perte de poids, la circonférence de la taille, le rapport taille-hanche et le pourcentage de matière grasse. Elles ont aussi relevé les changements sanguins, particulièrement le cholestérol total, le HDL cholestérol et les triglycérides. Les apports alimentaires, l'activité physique et la qualité de vie ont aussi été pris en compte. Néanmoins, ces deux revues ne permettent pas de déterminer les bénéfices de la perte de poids sur le risque de récidive et les comorbidités. Elles soulignent l'importance de réaliser des études afin de trouver quelle(s) sont les composante(s) des interventions réellement efficace(s) et possible(s) d'implémenter dans le suivi de ces patientes.

L'argumentation nécessaire à l'évolution de la pratique et de la prise en charge de ces patientes demande de mieux connaître les effets bénéfiques d'une perte de poids. Un autre élément essentiel est de mieux comprendre quelles interventions peuvent être efficaces et quelles composantes de ces interventions sont déterminantes afin d'optimiser la perte de poids et ses potentiels effets bénéfiques. Vagenas et al. soulignent le fait primordial de comprendre quel type d'intervention est efficace contre cette prise de poids. De plus, ils insistent sur l'importance d'avoir plus de matière pour déterminer les composantes comportementales dans le maintien du poids chez les femmes atteintes du cancer du sein (11).

2.5. Guidelines actuelles

Lorsqu'on s'intéresse aux guidelines des grandes sociétés savantes en matière d'oncologie et plus spécifiquement aux recommandations pour la nutrition en cas de cancer du sein, on trouve des recommandations générales. La plupart des sociétés savantes s'accordent sur un maintien d'un poids santé (IMC entre 18.5 et 25kg/m^2) tout au long de la vie après le cancer et pour une alimentation riche en fruits et légumes, en céréales complètes et réduite en acides gras saturés (25). Nous ne trouvons cependant pas de recommandations de prise en charge des femmes en situation de surpoids ou d'obésité. L'Académie Américaine de Nutrition (AND) et la Société Francophone Nutrition Clinique et Métabolisme (SFNEP) n'abordent pas la situation dans leur guidelines respectives pour l'oncologie (26,27). Dans toutes ces guidelines, la prévention de la dénutrition est principalement abordée. Seule l'American Society of Clinical Oncology (ASCO) recommande aux oncologues de promouvoir, auprès de leurs patientes en situation d'obésité, des programmes de prise en charge de l'obésité à plusieurs composantes (25).

La principale cause de ce manque de recommandations dans le cadre de la prise en charge des femmes en rémission d'un cancer du sein est le manque de preuves solides. Nous trouvons

beaucoup de recommandations pour le diagnostic et les traitements mais rien pour la survie à long terme (25).

2.6. Importance de la qualification des interventions

Les interventions visant un changement de comportement sont complexes et comprennent souvent plusieurs composantes qui interagissent afin de mener au comportement souhaité (28). La complexité des interventions dépend de plusieurs facteurs : le nombre de composants qui sont en interaction, le nombre de comportements à modifier et la difficulté à les adopter, ainsi que le nombre et la variété des mesures effectuées (29). Ce type d'intervention diffère des interventions pharmacologiques où une molécule est testée avec un groupe contrôle.

Les interventions visant une perte de poids requièrent également des changements de comportement sur le long terme. Les recommandations actuelles pour une perte de poids sont de faire des changements comportementaux au niveau alimentaire ainsi que de l'activité physique (30–32). Dans le cadre du cancer du sein, deux revues systématiques ont fait le constat que les interventions comprenant l'alimentation et l'activité physique au travers des changements de comportement permettent généralement d'atteindre une perte de poids plus grande que celles qui n'ont pas d'intervention à plusieurs composantes (21,24).

Qualifier précisément les interventions visant un changement de comportement est important pour l'implémentation des interventions dans la pratique professionnelle (33). Les interventions sont très complexes et les déconstruire en ingrédients actifs permet de mieux comprendre les mécanismes d'action (34). Actuellement, peu d'interventions sont suffisamment décrites. Seules 29% des interventions non-pharmaceutiques sont décrites de manière adéquate contre 67% des études pharmaceutiques (35). Les descriptions sont souvent très courtes et peu détaillées. De plus, quand les interventions sont décrites, il n'existe pas de langage standardisé pour parler des ingrédients actifs. Plusieurs « labels » peuvent être utilisés pour parler d'une même technique (34). Dans cette jungle de descriptions des interventions, il est donc compliqué de s'y retrouver et la réplication d'une technique ayant fait ses preuves est difficile voire impossible à implanter dans la pratique professionnelle.

Par ailleurs, les descriptions pauvres (dont en résultent des « black boxes ») sont problématiques autant dans les études avec de bons résultats que celles qui ont de moins bons résultats. Si ces black boxes ne sont pas déconstruites, il est difficile de comparer les études entre elles. Les avancées pourraient être d'autant plus grandes si toutes les descriptions étaient disponibles (36).

Dans le cadre de l'obésité, ceci est d'autant plus vrai au vu de la complexité de cette pathologie. Une intervention visant une perte de poids passe principalement par des

changements de comportements qui demandent de travailler sur plusieurs composantes en parallèle. Ceci rend l'intervention plus complexe que dans une étude pharmaceutique, comme expliqué ci-dessus (36).

En s'intéressant aux études portant sur la perte de poids chez les femmes atteintes du cancer du sein, plusieurs auteurs font le même constat : la littérature manque de connaissances sur les composantes des interventions qui permettent une perte de poids (24) et manque de descriptions d'interventions qui peuvent être implémentées dans la pratique (21).

Décrire les interventions de manière harmonisée amène à reproduire de façon plus systématique les interventions (37,38). Cela permet d'améliorer les connaissances pour créer des interventions efficaces et optimiser la translation de la recherche vers la pratique (39).

2.7. Taxonomies permettant la description des interventions

Plusieurs guidelines et taxonomies ont été mises au point dans le but d'améliorer et d'uniformiser la description des interventions.
En voici quelques exemples :

- CONSORT guideline est une checklist de 22 items visant la standardisation des publications, notamment des RCT. Cela concerne la structure de l'article comme par exemple le fait d'avoir un titre et un abstract, ou encore que la méthode comprenne des informations sur les participants, l'intervention, les objectifs etc. (35). La partie de l'intervention doit avoir suffisamment de détails pour être répliqué pour chaque groupe. On doit aussi savoir comment et quand l'intervention est administrée (40).
- TIDieR, taxonomie qui a été développée en complément aux guidelines CONSORT, recommande aux auteurs de décrire 12 dimensions de l'intervention menée : le nom de l'intervention, le matériel utilisé ou donné aux participants, les procédures et activités, l'entrainement des intervenants, le mode de délivrance, l'emplacement de l'intervention et les infrastructures, la fréquence, l'intensité, la dose, les modifications de l'intervention, les méthodes d'adhérence et de fidélité ainsi que des données d'adhérence et de fidélité (36).
- ITAX est une taxonomie qui comprend différentes dimensions : le mode, le matériel, le lieu, la durée, le script, la sensibilité aux caractéristiques des participants, les caractéristiques des intervenants, l'adaptabilité, l'implémentation de l'activité, le contenu, les stratégies et les mécanismes d'action (41). Elle a été développée dans le but de combiner et d'examiner des interventions de plusieurs études dans le cadre de démences (42).
- La Behaviour Change Technique Taxonomy version 1 (BCTTv1) est une taxonomie complémentaire aux guideline CONSORT. Elle est particulièrement intéressante car elle

permet de déconstruire les interventions en ingrédients actifs précis avec un langage standardisé. Sa hiérarchisation en catégories la rend facile d'utilisation.

2.8. Taxonomie BCTTv1

L'approche de Susan Michie avec la Behaviour Change Technique Taxonomy version 1 (BCTTv1) ne se concentre que sur le contenu, autrement dit sur ce que l'intervention fait pour changer le comportement et non sur les autres aspects de l'intervention (comme la dose, le moyen de délivrance, etc) (36) (traduction libre). La taxonomie BCTTv1 comprend 93 labels différents aussi appelés behavior change technique ou labels BCT. Ils sont définis comme une composante observable, réplicable et irréductible d'une intervention afin de toucher ou rediriger le processus causal qui régule le comportement (36) (traduction libre). Ils se retrouvent dans la taxonomie sous forme de codes, de labels BCT aussi appelés « ingrédients actifs », suivis d'une définition et d'un exemple concret (36).

Afin de développer cette taxonomie, Susan Michie, professeure en psychologie, s'est entourée de 54 experts internationaux (USA, Canada, UK, the Pays-Bas, Finlande et Allemagne) du changement de comportement (37). La méthode suivante a été utilisée : les labels et définitions de six systèmes de classification de techniques de changement de comportement (BCT) (43–48) déjà existants ont été identifiés. Ils les ont ensuite modifiés afin d'inclure un verbe actif et de ne pas être unidirectionnels (applicable à l'adoption du nouveau comportement et à l'arrêt du comportement non voulu). Ceci a fait office de prototype contenant 124 labels BCT différents (37) (traduction libre).

L'équipe de la professeure Michie, a ensuite utilisé la méthode Delphi pour analyser les définitions selon une structure précise. Le but étant de savoir si la définition comprend effectivement un ingrédient actif et s'il y a une redondance avec d'autres labels. Les labels BCT pour lesquels plus d'un quart des experts doutent qu'ils contiennent l'ingrédient actif et/ou plus d'un tiers les considèrent comme redondants sont présentés pour le deuxième round de l'exercice Delphi (37) (traduction libre). Une fois la sélection et la modification des labels BCT par la méthode Delphi effectuée, un regroupement a été pratiqué avec les experts afin de hiérarchiser la liste de labels BCT obtenue. Les participants ont classifié les labels BCT par groupes de maximum 24. Les labels ont été classifiés selon la similarité des ingrédients actifs du mécanisme de changement (pas la méthode de délivrance). Au final, la taxonomie comporte 93 labels BCT clairement définis et non redondants, groupés dans 16 catégories (37) (traduction libre). (Annexe I).

En comparaison aux multiples autres « taxonomies » qui sont actuellement décrites comme « nomenclatures », BCT Taxonomie v1 n'est pas seulement une liste de labels BCT fiables et

distincts mais aussi une structure hiérarchique (37) (traduction libre). Cela facilite son utilisation et la rend plus facilement applicable, malgré le nombre important de labels BCT différents.

Plusieurs études ont déjà utilisé la taxonomie BCTTv1 pour décrire des interventions dans plusieurs domaines comme le diabète (49), l'obésité (36), la prévention de l'obésité pédiatrique (50) et aussi le surpoids chez les survivants du cancer (51). Dans l'étude qui a utilisé la BCTTv1 pour décrire les interventions dans le diabète, les auteurs ont conclu que cette taxonomie pouvait être utilisée pour caractériser les ingrédients actifs dans les études d'intervention et qu'elle permettait de spécifier le contenu des interventions, au-delà de ce qui pouvait être décrit par des labels plus larges (49) (traduction libre).
La figure 1 ci-dessous résume les 93 labels BCT.

Figure 1: BCT Taxonomy (v1): 93 hierarchically-clustered techniques

BCT Taxonomy (v1): 93 hierarchically-clustered techniques

Page	Grouping and BCTs	Page	Grouping and BCTs	Page	Grouping and BCTs
1	**1. Goals and planning**	8	**6. Comparison of behaviour**	16	**12. Antecedents**
	1.1. Goal setting (behavior) 1.2. Problem solving 1.3. Goal setting (outcome) 1.4. Action planning 1.5. Review behavior goal(s) 1.6. Discrepancy between current behavior and goal 1.7. Review outcome goal(s) 1.8. Behavioral contract 1.9. Commitment		6.1. Demonstration of the behavior 6.2. Social comparison 6.3. Information about others' approval		12.1. Restructuring the physical environment 12.2. Restructuring the social environment 12.3. Avoidance/reducing exposure to cues for the behavior 12.4. Distraction 12.5. Adding objects to the environment 12.6. Body changes
3	**2. Feedback and monitoring**	9	**7. Associations**	17	**13. Identity**
	2.1. Monitoring of behavior by others without feedback 2.2. Feedback on behaviour 2.3. Self-monitoring of behaviour 2.4. Self-monitoring of outcome(s) of behaviour 2.5. Monitoring of outcome(s) of behavior without feedback 2.6. Biofeedback 2.7. Feedback on outcome(s) of behavior		7.1. Prompts/cues 7.2. Cue signalling reward 7.3. Reduce prompts/cues 7.4. Remove access to the reward 7.5. Remove aversive stimulus 7.6. Satiation 7.7. Exposure 7.8. Associative learning		13.1. Identification of self as role model 13.2. Framing/reframing 13.3. Incompatible beliefs 13.4. Valued self-identify 13.5. Identity associated with changed behavior
5	**3. Social support**	10	**8. Repetition and substitution**	18	**14. Scheduled consequences**
	3.1. Social support (unspecified) 3.2. Social support (practical) 3.3. Social support (emotional)		8.1. Behavioral practice/rehearsal 8.2. Behavior substitution 8.3. Habit formation 8.4. Habit reversal 8.5. Overcorrection 8.6. Generalisation of target behavior 8.7. Graded tasks		14.1. Behavior cost 14.2. Punishment 14.3. Remove reward 14.4. Reward approximation 14.5. Rewarding completion 14.6. Situation-specific reward 14.7. Reward incompatible behavior 14.8. Reward alternative behavior 14.9. Reduce reward frequency 14.10. Remove punishment
6	**4. Shaping knowledge**	11	**9. Comparison of outcomes**	19	**15. Self-belief**
	4.1. Instruction on how to perform the behavior 4.2. Information about Antecedents 4.3. Re-attribution 4.4. Behavioral experiments		9.1. Credible source 9.2. Pros and cons 9.3. Comparative imagining of future outcomes		15.1. Verbal persuasion about capability 15.2. Mental rehearsal of successful performance 15.3. Focus on past success 15.4. Self-talk
7	**5. Natural consequences**	12	**10. Reward and threat**	19	**16. Covert learning**
	5.1. Information about health consequences 5.2. Salience of consequences 5.3. Information about social and environmental consequences 5.4. Monitoring of emotional consequences 5.5. Anticipated regret 5.6. Information about emotional consequences		10.1. Material incentive (behavior) 10.2. Material reward (behavior) 10.3. Non-specific reward 10.4. Social reward 10.5. Social incentive 10.6. Non-specific incentive 10.7. Self-incentive 10.8. Incentive (outcome) 10.9. Self-reward 10.10. Reward (outcome) 10.11. Future punishment		16.1. Imaginary punishment 16.2. Imaginary reward 16.3. Vicarious consequences
		15	**11. Regulation**		
			11.1. Pharmacological support 11.2. Reduce negative emotions 11.3. Conserving mental resources 11.4. Paradoxical instructions		

i

3. Définition de l'étude

3.1. But du travail

Le but de notre travail est de caractériser les différentes interventions visant une perte de poids chez les femmes traitées pour un cancer du sein, décrites dans les études inclues dans notre travail. Ceci afin de mieux comprendre quels sont les éléments clés ou actifs de ces interventions. Décrire ces interventions permettra, à terme, de mieux comprendre les mécanismes sous-jacents, de favoriser une meilleure prise en charge des patientes atteintes du cancer du sein et d'améliorer les descriptions dans des études futures.

3.2. Objectifs

Les objectifs de notre travail sont :

- Décrire les caractéristiques des interventions visant une perte de poids chez les femmes traitées pour un cancer du sein dans les 24 études incluses.
- Identifier les ingrédients actifs de ces interventions à l'aide de la Behaviour Change Techniques Taxonomy version 1 (BCTTv1).

3.3. Hypothèse

Notre hypothèse est la suivante :

La qualification des interventions visant une perte de poids chez les femmes traitées pour un cancer du sein a des niveaux de précision très variables et diffère fortement dans le vocabulaire utilisé pour un même type d'intervention. De plus, certains éléments clés ne sont pas décrits de manière adéquate. Tous ces éléments empêchent la reproductibilité des interventions dans la pratique clinique.

4. Méthodes

4.1. Sélection des articles

Nous avons inclus les 22 études analysées dans les deux revues systématiques portant sur la faisabilité d'une perte de poids dans des interventions de changement de comportement menées chez des femmes atteintes d'un cancer du sein (21,24). En plus de cela, nous avons ajouté les études ENERGY et LISA (52,53), dont on parle dans les revues comme études en cours mais dont les résultats sont sortis depuis. Notre analyse comprend donc 24 études d'interventions.

Ces deux revues systématiques ont été identifiées grâce à une stratégie de recherche structurée sur le moteur de recherche PubMed.

La stratégie de recherche ci-dessous nous a permis de trouver les deux revues systématiques sur lesquelles nous allons baser notre travail. Les termes utilisés pour la recherche sur PubMed sont les suivants :

Concept 1 : Cancer du sein	Concept 2 : Intervention visant une perte de poids
– Breast neoplasms "MeSH Terms" – Breast cancer "MeSH Terms" – Unilateral Breast Neoplasms "MeSH Terms" – Breast cancer survivors "Title/ abstract"	– weight loss "MeSH Terms" – weight reduction programs "MeSH Terms" – diet, reducing "MeSH Terms" – weight loss intervention "Title/ abstract" – weight loss programs "Title/ abstract" – caloric restriction "MeSH Terms" – diet "MeSH Terms" – diet therapy "MeSH Terms" – patient education as topic "MeSH Terms" – lifestyle intervention "Title/ abstract" – motor activity "MeSH Terms" – physical activity "Title/ abstract"

Limite utilisée : Female

Pour la recherche des mots-clés, nous avons eu l'aide du documentaliste de la HEDS ainsi que de notre directrice de travail de Bachelor. De plus, nous nous sommes aidées de la stratégie de recherche du World Research Cancer Fund International Systematic Literature Review Continuous Update Report pour le cancer du sein et la nutrition (54).

4.2. Extraction des données

Afin d'extraire les données pertinentes des 24 articles inclus dans notre analyse, nous avons créé un tableau Excel nous permettant de regrouper toutes les informations. Celui-ci contient

les données de bases tel que : titre, auteurs, journal de publication, date de publication, lieu de l'étude, design, population étudiée, nombre de personnes inclues, taux d'abandon, raison de l'abandon, % de participation, mesures effectuées, outils de mesures et principaux résultats.

Nous avons également relevé des données plus spécifiques aux interventions : le fondement de l'intervention (construction de l'intervention sur base d'un modèle), le type d'intervention auto-déclaré par les auteurs, la description de l'intervention (copier/coller du texte trouvé dans les articles), le public cible de l'intervention, les modalités d'intervention et les ressources matérielles et humaines. Nous avons décidé d'extraire les données en anglais afin d'éviter les biais d'interprétation lors de la traduction des informations.

Afin de rendre l'extraction la plus systématique possible, nous avons testé la grille avant le commencement de la période d'extraction. Nous avons extrait les données du premier article indépendamment. Puis nous avons effectué une mise en commun afin de voir si les données recueillies étaient les mêmes et améliorer la grille pour faciliter notre travail de codage. Nous avons partagé le nombre d'articles en deux et avons extrait les données de 12 articles chacune.

4.3. Entrainement en ligne à la BCTTv1

En parallèle à l'extraction de données, nous avons effectué un entrainement en ligne dans le but d'apprendre à coder les interventions à l'aide de la taxonomie BCTTv1. Cet entrainement est composé de 6 sessions d'entrainement et de 2 sessions d'examen. La première session d'examen se situant entre la session 4 et la session 5. Pour les sessions d'exercices, nous avions accès à la correction avec les réponses et des explications. Pour les deux sessions d'évaluation, nous n'avions pas accès à un corrigé et devions atteindre les 60% de réponses correctes afin de passer à la suite. Il en était de même avec la dernière évaluation à la suite de laquelle nous recevions un certificat de réussite. Nous nous sommes fixées comme objectif de faire une session d'entrainement par semaine durant la formation pratique afin de terminer à la fin de celle-ci. Nous avons effectué plusieurs fois chaque session pour d'obtenir un résultat satisfaisant. Afin de comparer nos techniques de codage et de les uniformiser, nous nous sommes rencontrées pour faire la première session d'examen ensemble et nous avons pu discuter des difficultés rencontrées. Nous avons ensuite terminé la formation séparément jusqu'à l'obtention du certificat de réussite (Annexe II).

4.4. Codage des interventions taxonomie BCTTv1

Une fois la formation terminée, nous avons codé les articles. Pour ce faire, nous avons décidé de faire une feuille de codage par article (annexe III) avec un copier/coller de la description des interventions que nous avons préalablement reportées dans notre tableau d'extraction de données. Deux études (55,56) reprennent l'intervention d'une autre étude (57). Nous avons donc décidé de reprendre les codes de l'étude de base (57) et d'y ajouter d'autres codes s'il y

en a. Nous avons pris en compte le protocole d'une étude (58) car il était cité dans sa méthode (53) que l'intervention avait été décrite dans un protocole et que seul les points clés étaient reportés dans l'étude en question.

Nous avons testé cette feuille de codage en codant le premier article ensemble, toujours dans le but de rendre le codage systématique. Nous avons codé indépendamment chaque article, puis mis en commun lors d'une séance de travail hebdomadaire. Les différences de codages ont été discutées afin de trouver un consensus. Le codage a donc été partagé en quatre phases de 6 articles par semaine.

En effectuant la mise en commun de notre codage, nous nous sommes rendues compte que plusieurs questions revenaient régulièrement au fil des articles. Nous avons effectué une fiche de prise de décision (annexe IV) décrivant à quelles conditions nous avons décidé de coder ou alors de ne pas coder certains éléments des interventions. Le but de cette fiche de décision est d'expliquer la logique que nous avons utilisée afin d'avoir une approche systématique et reproductible d'articles en articles.

4.5. Synthèse des données

Nous avons analysé les données extraites de la façon suivante :
Premièrement, nous avons présenté les 24 études inclues dans notre analyse sous forme de tableau descriptif. Nous avons fait ressortir les éléments clés étant la population étudiée, le type d'intervention proposée, les mesures effectuées et les résultats principaux. Deuxièmement, nous avons analysé la description des interventions effectuées dans ces 24 études par rapport aux points suivants : le fondement des interventions (si précisé dans l'étude), le type d'intervention auto-déclaré par les auteurs afin d'en évaluer la variété, ainsi que les moyens, le matériel et les ressources humaines à disposition.

Finalement, nous avons effectué un tableau regroupant tous les labels BCT identifiés, correspondant aux ingrédients actifs des interventions de chacune des études. Nous avons réalisé une analyse descriptive du résultat de notre codage :

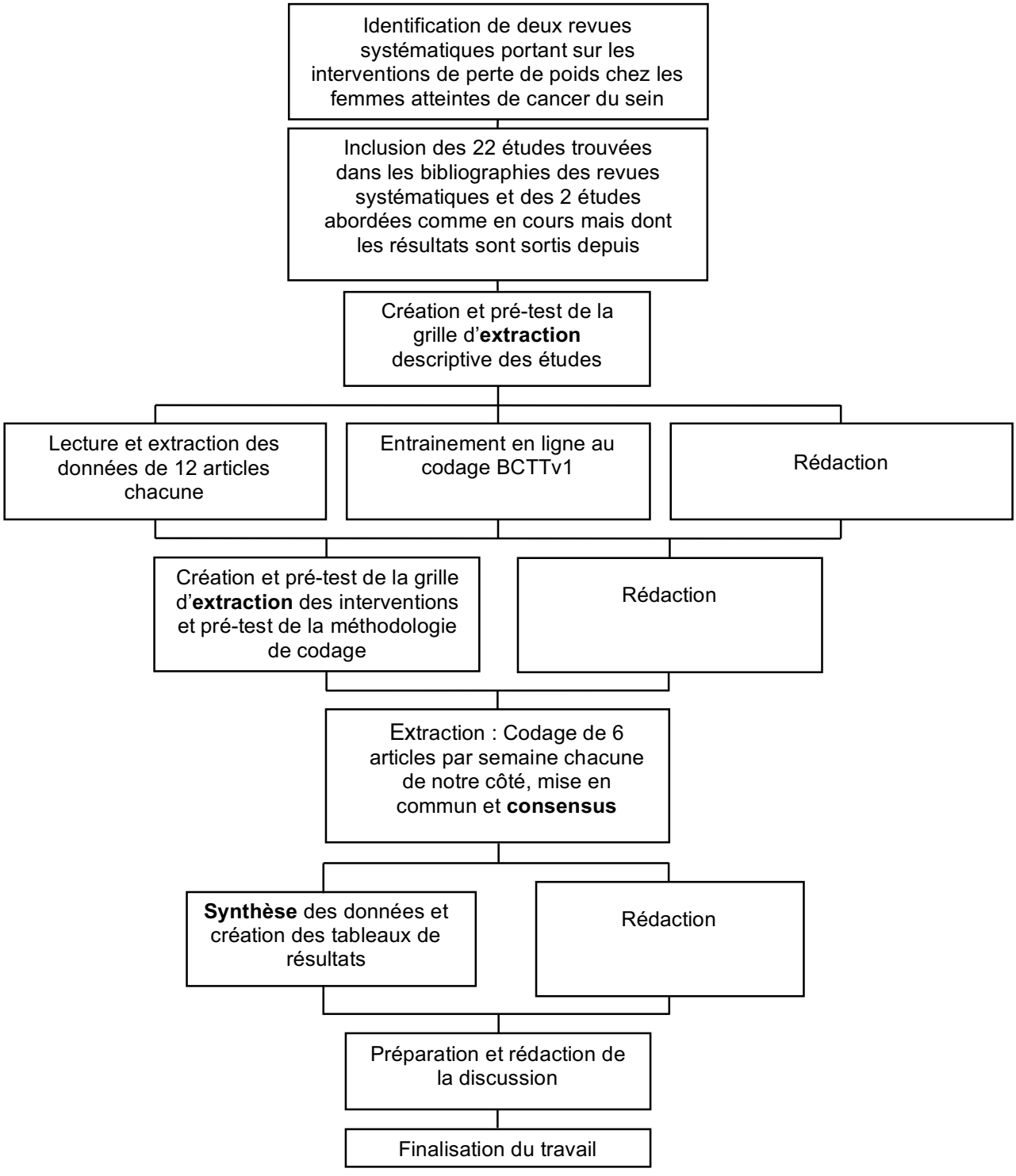
- Le nombre de labels BCT identifiés toutes études confondues
- Le nombre de catégories utilisées
- Les principaux codes se retrouvant dans les articles
- La fourchette de labels BCT (min et max) identifiés dans les articles
- La médiane des labels BCT retrouvés dans nos 24 articles

Afin d'évaluer la qualité de notre codage, nous avons relevé le pourcentage de codes identiques trouvés avant la mise en commun. Nous avons également relevé les labels BCT

codés séparément, le nombre de codes gardés, ainsi que ceux que nous avons éliminés et ajoutés, lors du consensus.

4.6. Résumé du déroulement

Figure 2



5. Résultats

5.1. Données de bases des études incluses

Notre analyse se porte sur 24 études : 22 études incluses dans les deux revues systématiques mentionnées plus haut dans le travail (21,24) et 2 études mentionnées dans ces mêmes revues mais qui étaient en cours lors de leurs publications. Ce sont des essais cliniques randomisés (RCT) pour la majorité (16/24) ou des études d'intervention à un (5/24) ou plusieurs bras (3/24).

Toutes les études sont effectuées sur une population de femmes adultes. La majorité ne prend pas en compte le statut ménopausique mais trois études (52,59,60) se concentrent uniquement sur les femmes ménopausées. Les populations étudiées sont pour 16/24 études des personnes en surpoids ou obèses selon les normes de l'OMS (61). Trois études incluent seules les personnes obèses (55,56,62), une étude (63) prend en compte une population avec IMC entre 20 – 35 kg/m^2, quatre études (57,64–66) ne prennent pas le poids en compte dans leurs critères d'inclusion. Dans 18/24 études, il est précisé que les participantes de l'étude doivent avoir complété le traitement initial. Le nombre de participants varie entre 10 et 697.

Une étude sur les 24 a un taux de participation de 100% (67). Sur les 23 autres études, 5 ne donnent pas d'information sur les raisons des abandons (55,58,60,66,68). Sur les 18 études restantes, les raisons les plus fréquentes dans l'explication des abandons sont : le manque de compliance menant à l'exclusion de l'étude (8/18), des problèmes médicaux (7/18), une perte de contact inexpliquée (6/18) et une récidive du cancer du sein (5/18).

Une large majorité des interventions (18/24) se base sur l'alimentation et sur l'activité physique. Il y a 5/24 études qui se basent uniquement sur l'alimentation et 1/24 étude qui inclut en plus de l'alimentation et l'activité physique, une composante spirituelle.

Le taux de participants ayant terminé les études varie de 64% à 100%. La durée de suivi des études varie entre 8 semaines et 3 ans avec des intensités d'intervention très variables selon les études. La majorité des études (20/24) ont une durée de suivi variant entre 6 mois et une année.

Les mesures anthropométriques systématiquement mesurées sont le poids et la taille. Dans une majorité des études (14/24), nous avons l'information sur l'outil de mesure du poids, mais dans 10 études nous n'avons aucune information à ce sujet. Certaines études ont également mesuré la circonférence de la taille et des hanches ainsi que la composition corporelle.

Concernant les apports alimentaires, bien que la totalité des interventions aient une composante alimentaire, 7/24 études n'évaluent pas la consommation alimentaire. Un Food Frequency Questionnaire (FFQ) est utilisé dans 7/24 études. Un carnet alimentaire sur 3 jours

est utilisé dans 5/24. Le rappel de 24h est utilisé dans 2 études. Pour les 3 autres études restantes, ils expliquent dans leurs méthodes de manière assez peu précise l'évaluation de la consommation alimentaire.

Dans les études qui ont une intervention comprenant l'activité physique, le niveau d'exercice est mesuré en termes de temps et/ou de nombre de pas dans les activités de la vie quotidienne. Certaines études mesurent également les laboratoires sanguins, notamment les lipides afin de voir si l'intervention provoque une amélioration. Il s'agit principalement du cholestérol total, du cholestérol HDL, du cholestérol LDL et des triglycérides. Finalement, l'aspect psychologie/qualité de vie est aussi mesuré par questionnaire ou checklist dans 7 études (52,59,62,63,67,69,70).

Il y a une perte de poids significative dans la totalité des études incluses dans notre travail. La perte de poids moyenne varie entre 0.53 kg (63) et 12.5 kg (59). Les pertes de poids ne sont pas comparables entre elles étant donné la variété des interventions en termes de temps et de contenu. Concernant l'alimentation, certaines études (63,67) ne trouvent pas de changements significatifs en termes de calories alors que d'autres (64,69,71) trouvent une diminution significative. Les études ayant évalué l'alimentation relèvent par contre des changements qualitatifs, notamment en ce qui concerne la diminution des matières grasses et des hydrates de carbone ou encore l'augmentation de la consommation de fruits, de légumes et de fibres. Le niveau d'activité physique augmente dans la majorité des études. Concernant les laboratoires sanguins, ils tendent à montrer une amélioration des taux de cholestérols sanguins (diminution LDL, TG et cholestérol total et augmentation HDL). Finalement, les questionnaires de qualité de vie et des variables psychologiques montrent eux aussi une amélioration lors des différentes interventions. Les études incluses dans notre analyse sont décrites dans la Table 1 ci-dessous.

Table 1 : Tableau descriptif des 24 études incluses

Auteur (référence); Année publication; Pays	Design	Durée de l'étude	Population (âge ; statut ménopausique ; BMI/Poids ; stade du cancer/traitement, % de participation)	N inclus ; Dropout	Outcomes mesurés ; outils de mesures	Résultats
de Waard F (60); 1992 ; Netherland and Polanda	RCT	1 year (Poland) to 3 years (the Netherlands)	> 50 years; post-menopausal; > 27kg/m^2; no metastases Completion: 73.5%	102 ; 94	weight	W*eight loss:* Netherlands: -6 kg. Weight change distributions of both groups differ significantly (P <0.001) Poland: -6kg, slower than Netherlands. Weight change distributions of both groups differ significantly (P <0.001)
Flynn MM (72); 2010 ; USA	Cross-over trial	44 weeks	> 50 years; between 25-35kg/m^2; treatment completed Completion: 64%	44 ; 16	weight; height; waist and hips circumferences; body composition; total cholesterol; TG; HDL-C; CRP; insulin; glucose; carotenoids	*Weight loss* : 80% PBOO diet achieved a weight loss of >5% compared to 31% who started with the NCI diet (p < 0.01) *Bloods samples:* PBOO diet resulted in lower TG and higher HDL
Goodwin P (63); 1998 ; Netherland	Non-randomized intervention	12 months	<70 years; between 20–35 kg/m^2 Completion: 64%	61 ; 22	weight; height; skin fold thickness; dietary intake reviewed by a trained dietician and analysed using the Minneapolis Nutrition database.; physical activity; self-administred psychological questionnaires	*Weight loss* : mean lost = 0.53kg ± 3.72 kg *Physical activity*: exercise significantly increased (63.5 ± 54.2 versus 108.9 ± 58.7 minutes/weekly, p = 0.00005). *Nutrition*: No significant change in total caloric intake. Fat intake decreased by 4.5%AET (p = 0.003); carbohydrate intake increased by 2.5% AET (p = 0.006); fibre intake by 3.9 g/day (p = 0.004). *Eating behaviour* : Disinhibited eating and hunger decreased marginally *Psychosocial variables:* Significant improvements in total mood disturbance. Reduced intrusive and avoidance symptoms of the stress-response syndrom

Auteur (référence); Année publication; Pays	Design	Durée de l'étude	Population (âge ; statut ménopausique ; BMI/Poids ; stade du cancer/traitement, % de participation)	N inclus ; Dropout	Outcomes mesurés ; outils de mesures	Résultats
Greenlee HA (73); 2013 ; USA	RCT, Cross over study	12 months	21–70 years; >25 kg/m^2; completed surgery, chemotherapy, and radiation therapy at least 6 months prior Completion: 90%	42 ; 4	weight; height, waist and hip circumferences; body composition; VO2max; phyisical activity; diet intake with a FFQ (Block'98); serum metabolic marker: cholesterol (total, HDL, lipoprotein, LDL), TG, glucose, CRP, insulin, total ghrelin, adiponectin, IGF, insuline resistance	W*eight loss*: immediate arm lost an average of 3.3% (±3.5%) and waitlist control group lost an average 1.8% (±2.9%) *Physical activity*: increase baseline levels of physical activity (P = 0.03). *Metabolic biomarkers*: ≥2% fat loss was associated with a statistically significant decrease in insulin, glucose, and HOMA-IR and weight loss ≥5% statistically significant increase in IGF binding protein-1 and decrease in glucose
Campell KL (67); 2012 ; Canada	Single-arm Intervention study	24 weeks (study) + 12 weeks (follow-up)	>18 years; between 25-35kg/m^2; completed adjuvant treatment Completion: 100%	14 ; 0	weight; height, waist and hips circumferences; body composition; dietary intake with a 3 days diet record; VO2max; physical activity; total cholesterol; TG; HDL; LDL; CRP; c-peptide; glucose; insulin levels; quality of life	*Weight loss* : mean lost 3.8±5.0 kg (P= 0.01) and decreased BMI by 1.4±1.9 (P 0.01) *Physical activity*: Aerobic fitness increased by 11% (0.2 L/min; P= 0.001) *Nutrition*: no significant changes in energy intake *Quality of life*: score improved at 24 weeks (9.6 9.9; P=0.01) and continued to improve at 36 weeks (= 0.01) Blood samples: increase in HDL level (P= 0.04)
McTiernan A (64); 1998 ; USA	Single-arm Intervention study	8 weeks	25-75 years Completion : 90%	10 ; 1	weight; waist and hips circumference; adiposity; fat-free mass; dietary intake with self-monitoring mesurement; serum sex hormone concentration (E1, E2, free E2, SHBG, E1 sulfate, free and total testosterone)	*Weight loss* : statistically significant decreases in body weight *Nutrition*: -7.5% of total energy intake, decreased total fat grams (P=0.05), increased daily intake of fruits and vitamin C (P> 0.1). *Blood serum*: no significant change
Mefferd K (74); 2007 ; USA	RCT	16 weeks	>18 years; > 25kg/m^2; completed initial treatments (surgery, adjuvant chemotherapy, radiation therapy) Completion: 89.4%	85 ; 9	weight; height; waist and hips circumference; body composition; physical activity; cholesterol; triglycerides; HDL	*Weight loss* : Weight and BMI decreased by approximately 7% in the intervention group, and the means of both variables were significantly different (P< 0.05) *Physical activity*: levels increased by about 2 h per week in the intervention group but not significant *Blood lipids*: no significant difference between groups

Auteur (référence); Année publication; Pays	Design	Durée de l'étude	Population (âge ; statut ménopausique ; BMI/Poids ; stade du cancer/traitement, % de participation)	N inclus ; Dropout	Outcomes mesurés ; outils de mesures	Résultats
Harris MN (75); 2013 ; USA	Two-arms Intervention study	1 year	30 to 75 years; ≥25 and ≤45 kg/m^2; treatment completed Completion: 78.8%	52 ; 11	weight; height; waist circumference; total cholesterol; HDL; LDL; TG; Glucose; retention and adherence; effectiveness; feasibility of using motivational, behavioral lifestyle intervention	*Weight loss*: change in weight was significant in the telephone-based (P<00.012) but not the group-based intervention (P<00.119) *Blood samples*: No significant differences in the changes in HDL, LDL, or glucose within or between groups were found.
Scott E (70); 2013 ; UK	RCT	24 weeks	> 25kg/m^2; completed treatment (surgery, chemotherapy, and radiotherapy) Completion: 87.8%	90 ; 11	weight; waist circumference; waist to hips ratio; body composition; dietary intake with a 3 days diet record analyzed for total energy and macronutrient intake (NetWisp 3: Tinuviel Software Systems, Cheshire, UK); aerobic fitness; resting sytolic and diastolic blood pressures; quality of life	*Weight loss*: significant reduction in the intervention group vs controls (P= 0.03) *Aerobic fitness*: intervention group showed a significantly greater improvement in cardiorespiratory fitness (p \ 0.001) and diastolic blood pressure (p = 0.03) than the controls *Nutrition*: intervention group showed a significantly greater reduction in total fat (P = 0.021) and saturated fat (P = 0.006) *Quality of life*: Greater increases in the FACT-B and breast cancer subscale scores were also observed in the intervention group.
Befort CA (76); 2012 ; USA	Single-arm Intervention study	6 months	< 75 years; post-menopausal; 27-45 kg/m^2; completed local treatment and chemotherapy Completion: 91%	35 ; 4	weight; height; dietary intake with two 24-hour dietary recalls: one week day and one weekend day; physical activity; insulin, leptin; adiponectin; quality of life	*Weight loss* : -12.5 ± 5.8 kg, 13.9% of baseline weight *Physical activity*: 71% of completers met the 225 min/week physical activity goal *Nutrition:* daily energy intake (-349 ± 550 kcal/day), fruits and vegetables (+3.7 ± 4.3 servings/day), percent kcal from fat (-12.6 ± 8.6%) *Blood samples*: significant reductions in insulin (P = 0.006) and leptin (p <0 .001) no change for adiponectin *Quality of life*: Significant improvements for joint pain (P=0 .001), depressive symptoms (P = 0.001), body image subscales (P = 0.02 to <0 .001).

Auteur (référence); Année publication; Pays	Design	Durée de l'étude	Population (âge ; statut ménopausique ; BMI/Poids ; stade du cancer/traitement, % de participation)	N inclus ; Dropout	Outcomes mesurés ; outils de mesures	Résultats
Shaw CA (71); 2007 ; UK	RCT	12 weeks	≥25 kg/m^2; remission from cancer Completion: 87.5%	24 ; 3	weight; height; skinfold thickness; dietary intake with a diet record; arm volume	*Nutrition*: Significant reduction in intake of energy, fat, and carbohydrate in the weight-reduction group *Arm volume*: weight-reduction group reduced from 24%±12% to 15%±10%. Significant correlation between changes in arm volume and weight loss with a correlation coefficient of 0.513 (P=0.017)
Stendell-Hollis NR (77); 2010 ; USA	RCT	6 months	18-80 years; between 25-40 kg/m^2; have received chemotherapy Completion: 72.2%	54 ; 15	weight; height; waist and hip circumference; body composition; resting energy expenditure; dietary intake with a FFQ (AFFQ) at baseline and 6 months; physical activity; glucose; insulin; total cholesterol; HDL; LDL; TG	*Weight loss*: mean loss -1.2 kg at 6 months but not significant, same for BMI *Physical activity*: no significant change *Nutrition*: average reduction in energy intake, in the green tea intervention *Blood samples*: improvements in LDL in all subjects; HDL levels significantly increased only in the green tea group
Stolley MR (78); 2009 ; USA	Single-arm Intervention study	6 months	> 18 years; >25kg/m^2; completed breast cancer treatment (except endocrine treatment) Completion: 83% Nearly 55% of the 20 participants attended at least 75% of the classes	23 ; 3	weight; height; BMI; dietary intake with a FFQ(Block'98); physical activity; quality of life; endocrine symptoms; satisfaction questionnaire	*Weight loss*: mean loss was 5.6 pounds and BMI decreases from 1.0 kg/m2 *Physical activity*: Median time spent in vigorous activity increased significantly from 0 minutes per day to 23.6 minutes per day *Nutrition*: Vegetable (1.6 serving/day) and fiber consumption increased significantly *Quality of life*: no significant change *Satisfaction questionnaire*: all respondents reported that they enjoyed all parts of the program in the format they were presented

Auteur (référence); Année publication; Pays	Design	Durée de l'étude	Population (âge ; statut ménopausique ; BMI/Poids ; stade du cancer/traitement, % de participation)	N inclus ; Dropout	Outcomes mesurés ; outils de mesures	Résultats
Thompson HJ (66); 2012 ; USA	Three-arms intervention study	6 months	after chemotherapy, radiation, surgical treatment Completion: non-intervention group: 90.6%; Low-carb group: 87.1%; low-fat group: 88.7%	?; 142	weight; waist-to-hip ratio; BMI; body composition; dietary intake with some FFQ (VioFFQ; Viocare, Princeton, NJ); fasting glucose; total cholesterol; HDL; TG	*Weight loss*: for low-fat group between 3.5 to 18.9 kg, for low-carbohydrate group, between 2.1 to 17.2 kg *Blood sample*: fasting glucose decrease with weight loss; significantly beneficial weight loss for HDL, LDL, total cholesterol, TG. For cholesterol (P = 0.07) and LDL (P = 0.13), greater reductions appeared on the high-carbohydrate diet pattern; whereas, for triglycerides (P = 0.01) and HDL (P = 0.08), changes in the beneficial direction were greater on the high-fat dietary pattern.
Shaw C _ B (65); 2007 ; UK	RCT	24 weeks	remission from cancer Completion : 79.7%	64 ; 13	weight; height; skinfold thickness; arm volume	*Weight loss:* significant difference in mean weight loss between the 3 groups at both 12 weeks (P=0.001) and 24 weeks (P=0.006) *Arm volume*: statistically significant correlation between weight loss and loss of swollen arm volume
Thomson CA (68); 2010; USA	RCT	24 weeks	50-60 years; 25 -35 kg/m^2; completed treatment, currently receiving hormonal suppression therapy Completion: 80%	40 ; 8	weight; height; waist and hip circumferences; body composition; sarcopenia; resting energy expenditure; dietary intake with a FFQ (AFFQ) ; physical activity; fasting glucose; insulin; HbA1c; total cholesterol; HDL; LDL; TG; hsCRP	*Weight loss*: Significant weight loss in every diet group. *Blood samples*: insulin (P = 0.002), HbA1c (P = 0.006), and HOMA (P = 0.002) were all significantly reduced regardless of diet assignment. Low-fat diet group: more significant reduction in HDL cholesterol

Auteur (référence); Année publication; Pays	Design	Durée de l'étude	Population (âge ; statut ménopausique ; BMI/Poids ; stade du cancer/traitement, % de participation)	N inclus ; Dropout	Outcomes mesurés ; outils de mesures	Résultats
Djuric Z (62); 2009 ; USA	RCT	18 months	18–70 years; 30–45 kg/m^2; completed chemotherapy or/and radiation therapy Completion: 71%	31 ; 9	weight; height; hip and waist measures; physical activity; diet intake with a FFQ (Block'98) (NutritionQuest, Berkeley, CA); medical history; medications; stress levels; aspects of spirituality	*Weight loss*: Weight loss in the study mean loss of 2% of baseline weight at 6 months. Weight change from 6 to 18 months: a slight regain of 0.7 % in the dietitian only arm and no regain in the spirituality arm, but not significant between groups *Physical activity*: no significant change *Nutrition*: no significant difference between group *Spirituality*: no significant difference in mean score by diet arm assignment at baseline. After 18 months, decrease in spiritual well-being in the dietitian only arm and there was no change in FACIT-Sp score of 42 in the spirituality arm.
Djuric Z (57); 2002 ; USA	RCT	12 months	18-70 years; completed chemotherapy or/and radiation therapy Completion: 81.2% Attendance at weekly WW meetings were 76%, 50%, and 28% (3; 6;12 months) and the comprehensive arm: 93%, 79%, and 52%.	48 ; 9	weight; height; body fat composition; dietary intake with a 3 days food record; physical activity; general health status; medications; menstrual status; psychiatric interview	*Weight loss*: the individualized counseling group experienced a statistically significant weight loss at 12 months only. Minimum weight loss in the control group, no significant change in the WW only group *Physical activity*: no support for physical activity in weight loss *Nutrition*: mean energy and fat intakes were decreased in all three interventions arms.
Rock C (58); 2013 ; USA	RCT	18 months	> 18 years; >25.0 kg/m^2; completion of initial treatments (surgery, adjuvant chemotherapy, radiation therapy) Completion: no information	220 ; ?	weight; weight history; BMI; menopausal status; medical history; medications post-diagnosis; FSH; estrogens; SHBG; serum insulin; leptin	*Weight loss*: 31% of the women (37% of intervention and 25% of control) achieved a >5% weight loss at 18 months. *Blood samples*: weight loss of at least 5% resulted in lower leptin and insulin levels, increased SHBG

Auteur (référence); Année publication; Pays	Design	Durée de l'étude	Population (âge ; statut ménopausique ; BMI/Poids ; stade du cancer/traitement, % de participation)	N inclus ; Dropout	Outcomes mesurés ; outils de mesures	Résultats
Goodwin PJ (52); 2014 ; Canada and USA	RCT	24 months	24-40 kg/m^2; post-menopausal; received definitive surgery, currently receiving letrozole Completion: 82.5% 62% completed all 19 calls	338 ; 59	disease-free survival; weight; height; quality of life; other medical endpoints: diabetes; cardiovascular disease; hypertension; orthopedic events; diet intake with a FFQ (Montreal Food Frequency Questionnaire)	*Weight loss*: statistically significant greater weight loss in the telephone-based arm than the mail-based (P<0.001) *Physical activity*: the increased level of total activity in the telephoned-based arm was significantly (P <0.004) greater than that in the mail-based arm. *Quality of life*: Improvements were seen in women on both study arms.
Rock C (69); 2015 ; USA	RCT	24 months	> 21 years; 25-45 kg/m^2; completion of initial therapies not including endocrine therapy Completion: 84.2%	697 ; 110	disease-free survival analysis; weight; height; BMI; index of adiposity; waist circumference; blood pressure; dietary intake with Automated Self-administered 24-hour Dietary Recall (ASA24); cardiopulmonary fitness; physical activity; depression; Breast Cancer Prevention Trial (BCPT) Symptom Scales; quality of life	*Weight loss:* mean weight loss in the intervention and control groups was 3.7% and 1.3%, respectively (P<0 .001).
Jen KLC (56); 2004 ; USA	RCT	12 months	18-70 years; >30kg/m^2; free of any recurrence, completed treatment except endocrine therapy Completion: 81.2%	48 ; 9	anthropometric measures; dietary intake with a 3 days diet record analyzed using the Minnesota Nutrition Data System Research software; glucose; triglycerides; total cholesterol; HDL-C; LDL-C	*Weight loss*: significant body weight and BMI losses as compared with their baseline levels were observed only in the individualized and comprehensive groups *Nutrition*: however, there was no difference in the changes of dietary fat per centage among the four groups. *Blood sample*: cholesterol levels were reduced from the baseline in all three intervention groups. Comprehensive group showed a significant increase in HDL-C.

Auteur (référence); Année publication; Pays	Design	Durée de l'étude	Population (âge ; statut ménopausique ; BMI/Poids ; stade du cancer/traitement, % de participation)	N inclus ; Dropout	Outcomes mesurés ; outils de mesures	Résultats
Pakiz B (79); 2011 ; USA	RCT	12 months	>18 years; ≥ 25kg/m^2; completed initial treatments (i.e., surgery, adjuvant chemotherapy, radiation therapy) Completion: 81.1%	85 ; 16	weight; height; body composition; physical activity; physical fitness; IL-6; TNF-α; IL-8; VEGF	*Weight loss*: −6.8% in intervention group, significant difference with control group (P < 0.0001) *Physical activity*: better fitness (P < 0.05), and hours of moderate or vigorous physical activity improved significantly more in the intervention group than for controls (P<0.05 *Blood samples*: inflammatory factors: the intervention group TNF-α significantly reduced (P < 0.05). Also for IL-6 level (P=0.06). TNF-α was also found to be decreased at 16 weeks for the control group (P < 0.05).
Darga LL (55); 2007 ; USA	RCT	12 months	18-70 years; 30–44kg/m^2; completed therapy except hormonal therapies Completion: 81.2%	48 ; 9	weight; quality of life: fatigue; anemia score; meeting daily needs without physical symptoms), emotional (degree of worry and sadness), social or family (good support), and functional (enjoyment and fulfillment), diet intake with A 3 days diet record	*Weight loss*: mean weight change in the individualized and combination diet arms was –8.7 kg + 7.1 kg (p = 0.003) *Quality of life*: physical and functional QOL subscales were significant predictors of weight loss success.

5.2. Description des interventions

Il y a une description de l'intervention pour les 24 études analysées. Toutes les interventions menées avaient pour cible les patients. Aucune n'avait pour cible les professionnels de la santé ou les proches des patients. Seules neuf études expliquent le fondement de leur intervention (53,55–57,62,75,76,78,79). Quatre modèles de changement de comportement différents sont spécifiés sur ces neuf études: Behaviour stage of change model (75), Social cognitive framework (76,78), Social Cognitive theory Health Belief Model (78) et le Theoritical Framework of Bandura's social cognitive theory (55,56,62,80).

Les termes utilisés par les auteurs pour définir l'intervention menée varient fortement d'une étude à l'autre. Aucun consensus sur les termes utilisés n'a pu émerger. Pour l'alimentation on retrouve par exemple « diet » (72), « reduce energy diet » (67), « dietary program » (64). Les 18 études qui associent l'alimentation et l'activité physique qualifient leur intervention par « Diet and physical activity behaviour change » (76), « a structured diet/physical activity program » (66) ou encore « dietary and exercise counseling » (62). D'autres sont plus générales, en utilisant « weight loss program » (53,73), « behaviour and attitudinal change » (74), « weight loss lifestyle program » (75), « lifestyle intervention » (52,70), « semi-structured diet/physical activity program » (69) ou encore « cognitive behavioural therapy for obesity » (79). Cette variété de termes est souvent utilisée pour décrire des interventions relativement semblables.

Composante alimentation

Les interventions alimentaires comprennent majoritairement des restrictions énergétiques (16/24). Parmi ces 16 études, trois mettent également en place des changements qualitatifs et trois utilisent aussi un guide alimentaire ou régime existant (Exemple : Weight Watchers (80)). D'autres mettent seulement en place des changements qualitatifs (2/24), en tous cas de manière explicite. Quatre utilisent seulement un guide alimentaire ou régime existant (Exemple : Régime Atkins modifié (68), National Cancer Institute diet (72)). Une étude utilise l'alimentation équilibrée (63) et une étude (77) ne prévoit pas de changement alimentaire en tant que tel mais ajoute la consommation de thé vert quotidienne pour viser la perte de poids.

Les modalités d'intervention sont des rendez-vous individuels, des sessions de groupe, des cours, des appels téléphoniques, des séminaires d'éducation, par email, par fax, conférences téléphoniques. Quatre études utilisent un programme commercial (Weight Watchers et Curves) (55,56,62,73). Cinq études sur 24 ne donnent pas de précision sur la modalité d'intervention (55,56,65,66,71).

Les ressources matérielles utilisées sont des plans alimentaires, carnets alimentaires, informations écrites sur l'alimentation (type brochure de grandes sociétés), guides alimentaires,

livres, DVD, tables de composition, ressources sur le web, matériel didactique, livres de recettes, journaux d'information santé, pèse-personne. Six études ne donnent pas de précision du matériel utilisé (55–57,60,65). Il est difficile de différencier les ressources matérielles qui concernent l'évaluation dans le cadre de l'étude (récolte de données) de celles qui sont utilisées dans l'intervention spécifiquement, car cela n'est pas précisé ou séparé explicitement dans les études.

Les ressources humaines sont des diététiciens, des diététiciens reconnus (registred dietician), des nutritionnistes, des personnes avec une assise en diététique. Huit études (66,70,72–75,77,78) ne donnent pas d'information sur la personne en charge de la composante alimentation de l'intervention.

Composante activité physique

Les différents types d'activités physiques explicités dans les 18 études ayant une composante d'activité physique sont l'exercice aérobique (14/18), les exercices de force (8/18), une valorisation de l'activité physique au quotidien (4/18) et les exercices de souplesse (3/18).

Les modalités d'intervention sont les suivantes : session individuelle, session d'exercice supervisée, session de groupe, guidage visuel, cours en classe, DVD, conseils individualisés. Cinq études (55–57,63,66) ne donnent pas d'information quant à la manière de délivrer la composante activité physique de leur intervention.

Les ressources matérielles utilisées sont des cardiofréquencemètres, des podomètres, des DVD, des installations de sport communautaires, des tapis roulants, des cross-trainer, des cycles ergomètre, des bandes de résistance, des poids et des ballons de stabilité. Sur les 18 études ayant une composante d'activité physique, six (58,63,66,67,75,79) ne donnent pas de détails pour le matériel utilisé. Comme pour la composante de l'alimentation, nous ne trouvons pas de précision quant à l'utilisation de ces ressources matérielles pour la récolte de données ou pour l'intervention en elle-même.

Les ressources humaines qui ont dispensé les interventions visant à augmenter l'activité physique sont des physiothérapeutes, des entraineurs, des physiologistes de l'exercice ou des instructeurs en activité physique certifiés. Dix études (52,55,56,62,63,70,74,76,79,80) sur les 18 ayant une composante activité physique ne donnent pas de précisions sur les personnes s'en occupant.

Composante soutien social

Sur les 24 études, six explicitent une composante de soutien social, de manière générale, incluse dans l'intervention (53,60,62,63,78,81). Sur ces six, deux explicitent clairement une

composante psychologique (60,63) et une composante spirituelle (62). Pour la composante psychologique, de Waard et al. ne donnent pas d'explication claire. En ce qui concerne Goodwin et al., la partie psychologique se fait en groupe où ils parlent de leurs émotions quant au cancer, reçoivent un soutien et développent des stratégies de résolution de problèmes ou encore de relaxation. Pour la composante spirituelle, les thèmes abordés sont les mêmes que pour les composantes psychologiques avec en plus, un encouragement à la pratique de la méditation au quotidien et l'écriture d'un journal des pensées.
Ces différentes interventions de soutien social sont données par des experts dans le domaine psychosocial, des doctorants en psychologie, un conseiller spirituel et une personne avec une assise en psychologie.

5.3. Résultats du codage

Dans les 24 études analysées, nous avons codé 23 labels BCT différents, ce qui correspond à l'utilisation de 25% des 93 BCTs possibles de la taxonomie. Nous avons utilisé 12 des 16 catégories. Les catégories qui n'ont pas été utilisées sont les suivantes : *Associations, Scheduled consequences, Self-belief* et *Covert learning.* Les deux catégories les plus utilisées sont *Goals and planning (catégorie 1)* et *Social Support (catégorie 3).* Nous les retrouvons dans 21/24 (88%) articles et 17/24 (71%) articles respectivement.

Les labels BCT que l'on retrouve le plus dans les articles sont *Goal setting (behavior) (1.1)* se retrouvant dans 88% des articles*, Social support (unspecified) (3.1)* dans 71 % des articles*, Instruction on how to perform the behavior (4.1) dans 58.3%, Goal setting (outcome) (1.3)* dans 58.3% ainsi qu'Action *planning (1.4)* dans 54.2%. Nous avons été confrontées à certaines difficultés pour coder car parfois le label BCT nous semblait présent mais la description n'étant pas assez précise pour correspondre aux critères de codage BCTTv1.

Voici les définitions des principaux labels BCT utilisés avec des exemples tirés des études analysées :

> *Goal setting (behavior) (1.1):* « Set or agree on a goal defined in terms of the behavior to be achieved. »

Exemple: « A deficit of 500–1,000 kcal/day was the goal (…)» (74)

> *Social support (unspecified) (3.1)*: « Advise on, arrange or provide social support (e.g. from friends, relatives, colleagues,' buddies' or staff) or non- contingent praise or reward for performance of the behavior. It includes encouragement and counselling, but only when it is directed at the behavior. »

Exemple: «(…) participants received weekly motivational telephone calls from the instructor (…)» (73)

Instruction on how to perform the behavior (4.1): « Advise or agree on how to perform the behavior (includes 'Skills training'). »

Exemple: « Participants were instructed on how to modify the diet to include home-prepared and restaurant foods while staying within their calorie range. » (76)

Goal setting (outcome) (1.3): « Set or agree on a goal defined in terms of a positive outcome of wanted behavior. »

Exemple: « Participants were given a minimum weight loss goal of 5% from baseline weight. » (72)

Action planning (1.4): « Prompt detailed planning of performance of the behavior (must include at least one of context, frequency, duration and intensity). Context may be environmental (physical or social) or internal (physical, emotional or cognitive) (includes 'Implementation Intentions'). »

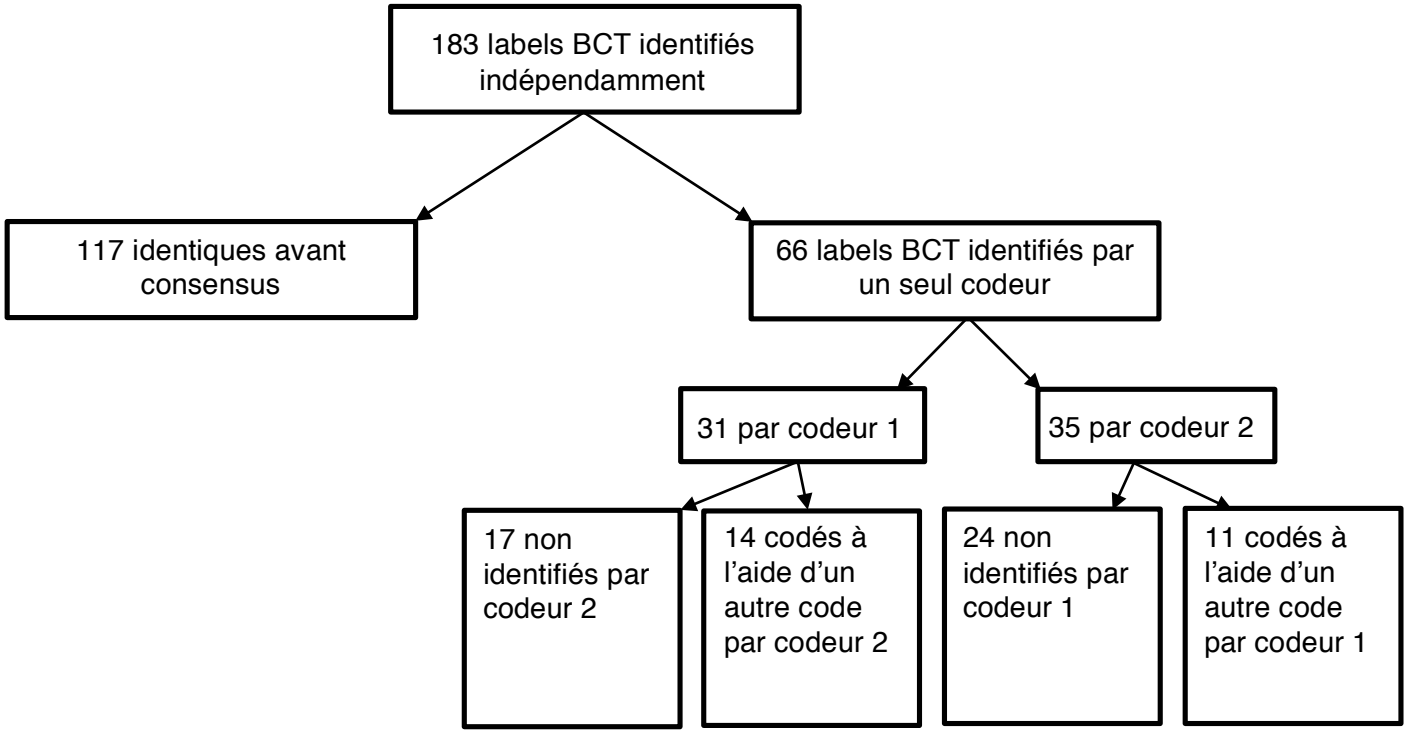
Exemple: « Participants were instructed to follow a diet that included ≥5 fruit and vegetable servings per day, approved prepackaged frozen entrees (2 per day at < 350 kcal and < 9 g of fat each) or their equivalent (e.g. soup, other portion-controlled meals), and shakes (2 per day at 110 kcal each, Safely Slim©, Science Foods, LLC). » (76)

Le nombre de labels BCT codé par article varie entre 1 (66) et 16 labels BCT (69) avec une médiane de 7.5 labels BCT pour nos 24 articles.

Lors de la première étape, nous avons identifié 183 codes indépendamment. Sur les 183, 117 étaient identiques avant le consensus (63.9%). Sur les 66 codes restant, 31 ont été codés uniquement par le codeur 1. Dans ces 31 codes, 17 n'ont pas été identifiés et 14 ont été codés différemment par le codeur 2. Il y en a 35 codés uniquement par le codeur 2. Dans ces 35, 24 n'ont pas été identifiés et 11 ont été codés différemment par le codeur 1. Suite à la discussion et au consensus, 149 codes ont été conservés, 34 codes ont été éliminés, et 12 codes ont été ajoutés. Un total de 161 labels BCT sur la totalité des articles a donc été conservé.

Figure 3 : Analyse de la qualité du codage

Avant la mise en commun



Durant et après le consensus

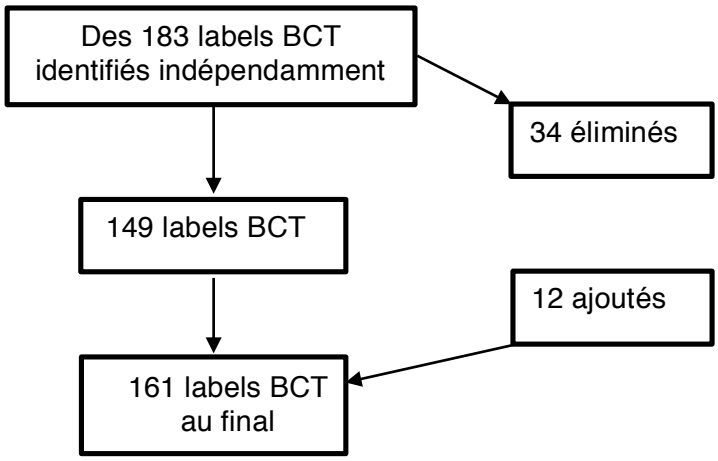
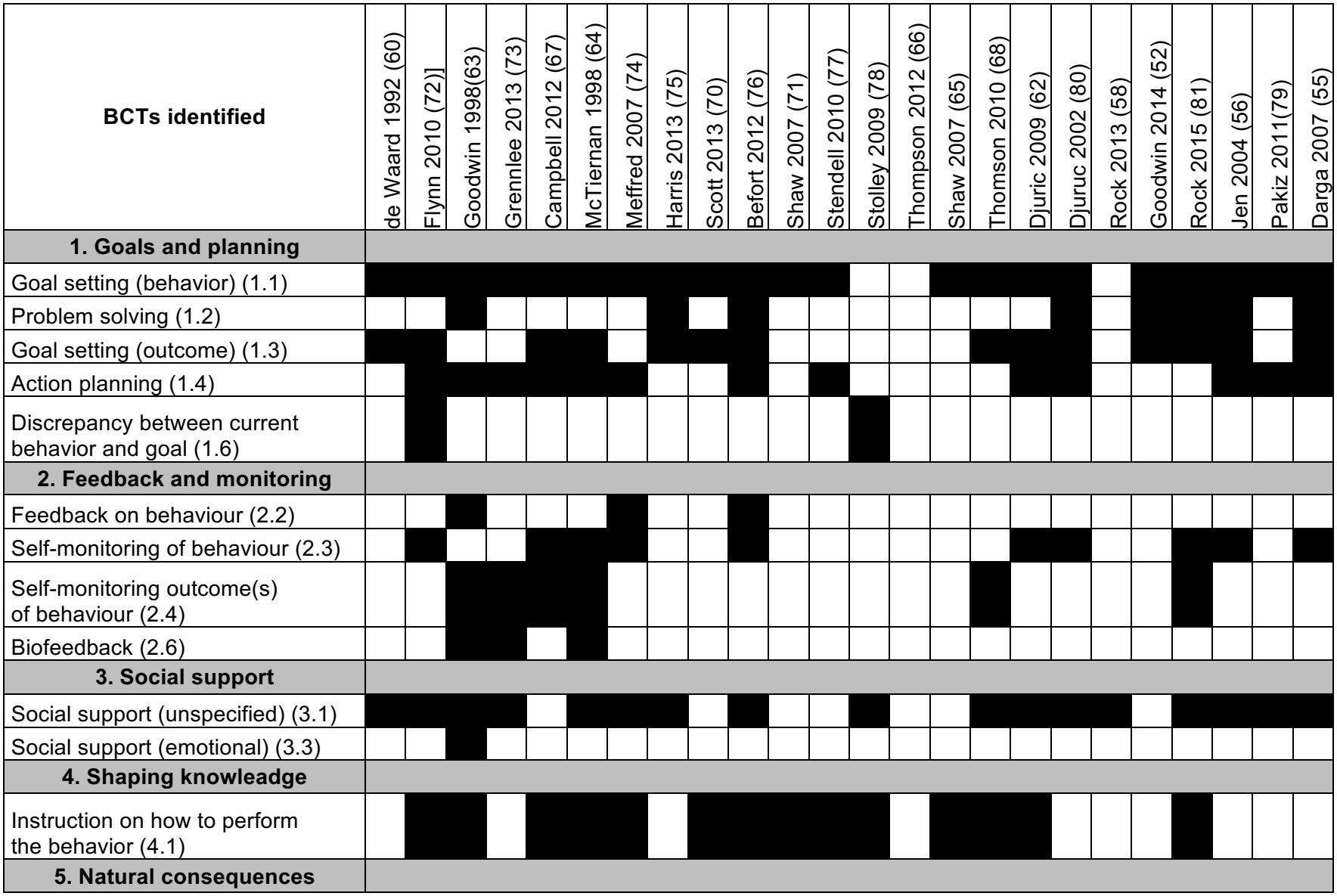


Figure 4 : Liste des labels BCT codés dans les 24 études



BCTs identified	de Waard 1992 (60)	Flynn 2010 (72)]	Goodwin 1998(63)	Grennlee 2013 (73)	Campbell 2012 (67)	McTiernan 1998 (64)	Meffred 2007 (74)	Harris 2013 (75)	Scott 2013 (70)	Befort 2012 (76)	Shaw 2007 (71)	Stendell 2010 (77)	Stolley 2009 (78)	Thompson 2012 (66)	Shaw 2007 (65)	Thomson 2010 (68)	Djuric 2009 (62)	Djuruc 2002 (80)	Rock 2013 (58)	Goodwin 2014 (52)	Rock 2015 (81)	Jen 2004 (56)	Pakiz 2011(79)	Darga 2007 (55)
Information about health consequences (5.1)														■										
6. Comparison of behaviour																								
Demonstration of behavior (6.1)				■	■	■	■		■	■			■		■						■			
8. Repetition and substitution																								
Behavioral practice/rehearsal (8.1)			■	■	■	■	■		■				■								■			
Habit formation (8.3)																					■			
Graded tasks (8.7)			■	■	■		■			■						■				■	■			
9. Comparison of outcomes																								
Credible source (9.1)			■			■				■	■		■		■	■	■	■			■	■		■
10. Reward and threat																								
Material reward (behavior (10.2)																					■			
11. Regulation																								
Reduce negative emotions (11.2)			■														■			■	■			
12. Antecedents																								
Restrucuring the physical environment (12.1)				■																				
Adding objects to the environment (12.5)		■		■			■			■		■					■	■			■	■		■
13. Identity																								
Farming/refarming (13.2)							■											■			■	■		■

6. Discussion

Les études que nous avons incluses dans notre travail ont toutes permis une perte de poids statistiquement significative variant entre 0.53 kg (63) et 12.5 kg (82) selon les interventions. La majorité des interventions combine une composante alimentation et une composante activité physique, ce qui est recommandé pour le traitement de l'obésité (31). Les durées d'intervention sont extrêmement variables d'une étude à l'autre (de 8 semaines à 3 ans) et utilisent des moyens très différents. Bien que toutes les études incluses fournissent une description de leur intervention, il y a une grande variabilité dans la qualité de cette description. Pour des interventions relativement semblables, le vocabulaire utilisé peut être fortement différent et laisser place à une grande interprétation du lecteur. De plus, les ressources matérielles, les modalités d'intervention et les ressources humaines ainsi que leurs rôles sont rarement clairement explicités. Cela confirme notre hypothèse de départ.

L'analyse des interventions selon la taxonomie BCTTv1 (37) a permis d'identifier 23 labels BCT différents sur les 93 possibles (25%). Les labels BCT les plus utilisés dans les articles sont *Goal setting (behavior) (1.1), Social support (unspecified) (3.1), Instruction on how to perform the behavior (4.1) et Goal setting (outcome) (1.3)* et *Action planning (1.4).* Les labels *Social support (practical) (3.2)* et *Social support (emotional) (3.3)* n'ont pas pu être codés par manque de description du soutien social. C'est donc le label plus général, *Social support (unspecified) (3.1),* qui a été préféré. La fourchette du nombre de labels BCT utilisés par intervention est de 1 à 16 avec une médiane de 7.5 labels BCT pour la totalité de nos articles.

6.1. Description des interventions

Nous n'avons pu coder qu'une petite partie des labels BCT possibles au vu de la variété des concepts énoncés et du vocabulaire trouvé dans les études analysées. Paradoxalement, les interventions, en les analysant, sont relativement semblables. Nos résultats montrent une grande variabilité de descriptions menant à une difficulté de compréhension des interventions ainsi que de comparaison entre elles. Cela renforce l'importance de l'utilisation d'un langage commun afin que ces interventions puissent être comparées beaucoup plus facilement et apporter, de ce fait, encore plus de poids aux résultats de toutes les études sur le sujet.

Nos résultats sont comparables, en termes de quantité de labels BCT identifiés, avec l'analyse de Presseau et al., qui se concentre sur des interventions visant la prise en charge du diabète. Ils ont identifié 19.4% (18 sur 93) de la totalité des labels BCT dans les 23 études incluses dans leur analyse (38). Les labels BCT que nous retrouvons les plus fréquemment ne sont pas les mêmes que ceux retrouvés dans l'analyse de Presseau et al. Chez eux, on retrouve le label BCT *Prompts/cues (7.1)* en tant que label BCT le plus identifié. Ceci s'explique car la cible de l'intervention et la prise en charge du diabète et non la perte/le maintien du poids. L'analyse d'Hoedjes et al. (51), se concentre sur le surpoids et l'obésité dans le cadre de l'oncologie, tous

cancers confondus. En termes de contenu, nous avons identifié des labels BCT semblables, avec *Goal setting (behaviour) (1.1), Action planning (1.4), Social support (unspecified)(3.1) et Instruction on how to perform the behaviour (4.1)* comme labels BCT principaux dans l'analyse de Hoedjes et al. (51).

En terme de quantité de labels BCT, ils ont identifié 32% de la totalité des labels (30 sur 93). Le nombre de labels par intervention variant de 8 à 18 labels avec une médiane à 12.5 (51). Cette différence avec nos résultats peut être expliquée par le fait qu'ils ont préalablement sélectionné les études avec une intervention considérée comme ayant un «design robuste », en excluant les études non randomisées ainsi que les RCT ayant un groupe contrôle avec soins habituels. Nous avons fait le choix, dans notre travail, d'inclure les études tous designs confondus afin d'en explorer la variété.

Ils ont ensuite catégorisé les interventions par différents composants. Nous pouvons faire un parallèle entre les données qu'ils ont extraites et les items de la liste TIDieR (35) (Annexe V) : le but de l'intervention correspondant à l'item « pourquoi », ainsi que les items « quand et combien », « comment » et « où ». Nous avons effectué ce même travail lors de l'extraction de nos données avec les items suivants: le fondement de l'intervention correspondant aux « procédures », les modalités d'intervention correspondant aux items « comment, quand et combien et où », les ressources matérielles correspondant à l'item « quoi » et les ressources humaines correspondant à « qui a réalisé ? ». Le but de l'intervention, correspondant à l'item « pourquoi » a été explicité dans les données de bases sur les études. Cette liste d'items TIDieR (35) peut être utile afin de catégoriser les composants d'une intervention et peut être une première étape afin de faciliter le codage à l'aide de la taxonomie BCTTv1 (37). Néanmoins, nous avons pris l'option de garder un copier/coller exact de la description de l'intervention dans les articles pour effectuer notre codage. Cela afin de ne pas avoir oublier certains composants qui n'entrent pas forcément dans une de ces catégories. Les données extraites et catégorisées des interventions nous ont, par contre, été d'une grande utilité pour la partie « description des interventions » de nos résultats.

Dans les études incluses dans notre analyse, la majorité ont à la fois une composante alimentaire et d'activité physique. Il est maintenant soutenu par de nombreuses preuves probantes que c'est la manière la plus efficace de parvenir à une perte de poids (21,51,83,84). Nous avons pu évaluer quels étaient les composants BCT présents dans les études analysées. Il sera maintenant important, dans de futures recherches, d'évaluer quels sont les composants efficaces pour une perte et un maintien d'une perte de poids. Une étude, Greaves et al. (83), a évalué l'efficacité des composants des interventions au niveau de l'alimentation et de l'activité physique dans le cadre de la prévention de diabète de type 2. Tout comme nous, ils ont pu

constater que la catégorisation des interventions qu'ils ont évaluées variait considérablement. Beaucoup de concepts se chevauchent et sont définis de manière très vague.

Les résultats de cette revue systématique montrent une association positive entre une description d'intervention utilisant les labels BCT et l'efficacité de celle-ci (83). Ils soulignent l'importance d'effectuer un modèle d'intervention cohérant et pour ce faire, recommandent le fait d'avoir une approche planifiée de l'intervention. Les principaux labels BCT que nous avons pu identifier (Goals setting, social support) ont été reconnus comme étant des composants des interventions de changement de comportement efficaces (51,83). Il ressort également chez Greaves et al, que le self-monitoring est un label BCT important dans l'efficacité de la perte de poids. Dans nos résultats, le self-monitoring du comportement ou le self-monitoring du résultat du comportement sont présents dans respectivement 10/24 et 6/24. Il y a donc moins de la moitié des interventions qui utilisent ces labels BCT. Cela serait un point d'amélioration dans l'efficacité des interventions. Nous imaginons que le fait d'utiliser le self-monitoring dans les interventions permet aux participants d'avoir un feedback régulier de leurs progrès et de les responsabiliser par rapport au changement de comportement.

Il est important de créer des prises en charges transposables à la pratique clinique avec les ressources disponibles et dans un but de diminution des coûts de la santé. En effet, dans la Loi fédérale sur l'assurance maladie (LAMal) (85), nous trouvons l'article suivant : « Les prestations mentionnées aux art. 25 à 31 doivent être efficaces, appropriées et économiques. L'efficacité doit être démontrée selon des méthodes scientifiques » (Article 32) (85). Une description adéquate des interventions permet de démontrer l'efficacité d'une prise en charge selon les méthodes scientifiques. Cela va donc tout à fait dans le sens des demandes de la LAMal et donc du système de santé actuel. Pour cela, il peut être intéressant de créer des interventions en partant directement des labels BCT afin que toutes soient comparables entre elles et puissent apporter de nouvelles preuves sur les techniques de changement de comportement les plus efficaces (37). Si les chercheurs ne codent pas directement leurs interventions, il est important qu'ils donnent assez de détails afin que des codeurs, externes à l'étude puissent le faire (36). La revue de Greaves et al. a établi des recommandations pour la pratique visant à une amélioration des descriptions et de la qualité des interventions (83).
Voici un résumé des recommandations émises avec le grade de recommandations le plus haut:

- Les interventions doivent promouvoir le changement alimentaire et l'activité physique (A).
- Elles doivent utiliser des techniques de changement de comportement établies (A).
- Elles doivent encourager les participants à utiliser les soutiens sociaux à disposition (A).
- Elles peuvent être délivrées par un certain nombre de professionnels, qui ont préalablement eu un entrainement adéquat. (Par exemple : médecins, infirmiers,

diététiciens, spécialistes de l'activité physique ayant l'habitude de travailler dans une équipe multidisciplinaire) (A).
- Elles peuvent être délivrées dans un large choix d'emplacement. (Par exemple dans un centre de soins, au travail, à la maison, dans une communauté) (A).
- Elles peuvent être délivrées en groupe, en individuel ou en mixant les deux modes (A).
- Elles doivent inclure un focus important sur le maintien (A).

6.2. Prise en charge du poids dans le contexte du cancer du sein

Plusieurs revues effectuées sur les changements de comportements dans le cadre de l'obésité et du surpoids (86–88) ont montré que bien que la perte de poids soit significative dans la majorité des interventions, il est beaucoup plus difficile de maintenir cette perte de poids sur le long terme. Le maintien de la perte de poids est défini dans ces revues comme « une personne ayant perdu intentionnellement au moins 10% de leur poids corporel et qui maintient cette perte durant au moins un an » (86). En faisant le parallèle avec nos résultats, nous pouvons remarquer que seules 10 études sur les 24 ont un suivi d'une année ou plus. Ceci est un réel manque pour pouvoir évaluer l'efficacité de l'intervention. Le but étant de maintenir une perte de poids sur le long terme afin d'avoir un impact sur les comorbidités et la qualité de vie.

Ces mêmes revues ont identifié les caractéristiques suivantes chez les personnes ayant maintenu une perte de poids à long terme : environ une heure d'activité physique par jour, une alimentation diminuée en calories et pauvre en graisse, des repas pris à un rythme régulier et un maintien d'un contrôle du poids (self-monitoring) (86–88). Un autre élément qui ressort comme facilitateur de la perte et du maintien du poids est le soutien social, qui aide au maintien de la motivation (86). Dans les interventions que nous avons analysées nous retrouvons, dans la plupart, ces éléments décrits ci-dessus. La grande majorité des études analysées rapportent l'utilisation d'une restriction calorique (16/24 études), parfois importante (-1000kcal/jour). Une balance énergétique négative est nécessaire pour engager une perte de poids (30,31) mais il est important de faire des changements qui sont tenables sur le long terme (30) et pas trop restrictifs au risque d'avoir l'inverse de l'effet escompté. Au cours de notre formation, nous avons acquis les compétences pour prendre en charge les patients de manière individualisée et de les accompagner dans une perte de poids adaptée à leurs habitudes de vie (89). Nous privilégierions plutôt un suivi rapproché, individualisé (31) et basé sur l'éducation thérapeutique (30) et l'entretien motivationnel (31). A l'inverse des régimes non-personnalisés menant à la restriction qui ont été utilisés dans certaines études analysées.

Ils soulignent aussi l'importance que ces interventions de changement de comportement soient menées par des personnes qualifiées (86,87). La problématique avec le cancer du sein est cet équilibre fragile du maintien du poids entre la perte et la prise du poids, tous les deux dus aux conséquences du traitement. Le référentiel de compétences du métier de diététicien diplômé

comprend la prise en charge de ces deux problématiques (89). Le rôle du diététicien peut intervenir à toutes les étapes de la prise en charge oncologique, dans un but de maintien de l'état nutritionnel. Il peut être là autant pour les questions de maintien du poids, que pour les questionnements autour de la nutrition dans le cadre du cancer. Les patientes nouvellement diagnostiquées peuvent être submergées de représentations de l'alimentation dans le cadre oncologique, représentations qu'elles trouveront dans les médias et internet. Les diététiciens ont les connaissances de l'impact des aliments, régimes, médecine alternative ou compléments alimentaires sur l'efficacité des traitements (90). Dans la pratique, il arrive souvent que la patiente mette en place des changements au niveau alimentaire dans un but de veiller à sa santé, comme par exemple la prise de comprimés vitaminés. Ici, le diététicien peut informer les patientes sur les interactions avec les traitements et les effets sur l'efficacité de ceux-ci. Il a été démontré que les patientes montrent un réel besoin d'informations, et cela, dès le diagnostic (12). Ceci leur permet d'acquérir les outils pour gérer leur alimentation, qui est la seule partie du traitement dont elles aient en grande partie le contrôle (90).

Une collaboration interprofessionnelle au Centre du Sein de Berne montre l'importance de l'implication de l'équipe diététique à un stade précoce de la prise en charge de la patiente afin de stabiliser le poids dans un sens comme dans l'autre (91). Le cabinet des oncologues et le service diététique sont l'un à côté de l'autre, ce qui leur permet de travailler en interdisciplinarité (équipe composée de médecins-oncologues, d'infirmier(ière)s, diététicien(ne)s, physiothérapeutes, psychol-oncologues et autres professionnels de santé). Ils peuvent suivre les patientes en ayant le même discours, du diagnostic au suivi de contrôle en passant par la thérapie (91). Le surpoids et l'obésité sont des pathologies multifactorielles et, par conséquent, demandent une intervention individualisée et multidisciplinaire, centrée autour des patients, pour les prendre en charge dans leur globalité (86). Une équipe comprenant un médecin accompagné de personnes formées dans la thérapie cognitivo-comportementale et des professionnels de la santé de plusieurs horizons (nutrition, activité physique, suivi psychologique) a montré des résultats prometteurs dans une perte de poids à long terme (86).

Dans le cadre du cancer du sein, les patientes sont entourées d'une équipe multidisciplinaire durant toute la durée du traitement. Il serait intéressant d'avoir une approche similaire, intégrant un suivi diététique, afin de soutenir les patientes et de leur fournir les outils nécessaires pour faire face à cette prise de poids. Le but étant un maintien du poids dans les normes de santé selon l'OMS (61). L'idéal, serait de travailler toutes les composantes de l'intervention de manière rapprochée dans une unité spécifiquement dédiée au changement de comportement (86) adaptée à l'oncologie.

6.3. Limites

Notre travail présente certaines limites. Nous n'avons pas effectué de revue systématique au préalable de notre codage pour inclure toutes les études visant la perte de poids chez les femmes traitées pour un cancer du sein mais nous nous sommes basées sur les références de deux revues systématiques parues auparavant (21,84). Notre stratégie de recherche pourrait être lacunaire et il est possible que nous soyons passées à côté d'autres travaux qui auraient pu être inclus et qui auraient potentiellement pu présenter d'autres types d'intervention. Nous n'avons pas évalué la qualité des études incluses dans ce travail. Le risque de biais des études provenant de Reeves 2014 (21) a été évalué par les auteurs de la revue et a été considéré comme important dans la majorité des études incluses. Ce n'est pas le cas des études provenant de la revue Playdon 2013 (84). Notre travail inclut donc des études de qualité variable et nos résultats ne sont pas différentiés en fonction de la qualité des études.

Ce travail était également notre première expérience de codage avec la BCTTv1. Nous avons fait face à des difficultés pour éviter toute interprétation et coder la manière la plus objective possible. Nous avons opté pour la formation du codage afin d'augmenter l'objectivité de nos résultats. La barrière de la langue anglaise est aussi une limite. Nous avons une bonne compréhension écrite, mais les subtilités de la langue autant dans la lecture des études que des labels BCT, a pu entacher notre compréhension et notre codage.

Aucun auteur n'a été contacté pour obtenir plus d'informations sur les interventions menées. Notre analyse est donc le reflet de ce que les auteurs ont rapporté sur les interventions menées. Ceci peut être une limite car nous n'avons pas forcément accès à toutes les informations. Les descriptions pauvres des interventions des études ont pu nous amener à sous-estimer le nombre de labels BCT.

Notre travail ne permet pas d'identifier quelles sont les interventions les plus efficaces et d'émettre des recommandations pour la pratique dans ce sens. Il est par contre une importante première étape vers la déconstruction des interventions visant une perte de poids et la compréhension des mécanismes. Il permet également d'attirer l'attention sur l'importance de la description des interventions menées.

6.4. Points forts

A notre connaissance, ce travail est le premier à utiliser la BCTTv1 pour dégager les ingrédients actifs des interventions visant une perte de poids chez les femmes atteintes du cancer du sein.

Un point fort de notre travail est l'approche systématique que nous avons eue tout au long dans un souci de reproductibilité. La double vérification du codage et la fiche de décision de codage

nous ont permis d'être rigoureuses et d'apporter une plus grande valeur à nos résultats. Travailler à deux a permis de remettre en question et de pousser plus loin nos réflexions.

Nous avons diminué au minimum le risque de biais dû à notre première expérience de codage en participant à la formation en ligne BCTTv1 jusqu'à l'obtention du certificat. Ceci a permis de nous confronter à nos manques de compréhension des labels BCT et de les combler au mieux. Ceci apporte un plus grand poids à notre travail.

7. Perspectives

Les perspectives de notre travail de Bachelor pourraient être de faire un lien entre les labels BCT trouvés et l'efficacité de ceux-ci dans la perte de poids, comme l'a fait l'étude Greaves et al. (83). Le but étant de prolonger notre travail et d'apporter plus de preuves dans la prise en charge des femmes atteintes du cancer du sein.

Dans le but de faire connaître notre travail dans la communauté de la santé en Suisse-Romande, nous allons créer un poster. Nous aimerions présenter nos résultats auprès de certains groupes spécialisés comme le groupe OncoNut des Hôpitaux Universitaires de Genève ainsi qu'auprès des Centres du Sein du CHUV et des HUG. Nous allons également proposer notre résumé et notre poster au congrès des Nutridays de l'ASDD, de Journées Francophones de Nutrition et à la Société Suisse de Nutrition Clinique.

Dans un futur proche, nous aimerions travailler à la publication de notre travail dans un journal scientifique afin de faire part de nos résultats à la communauté scientifique à un plus large niveau.

8. Conclusion

Les changements de comportements visant une perte de poids sont complexes et nécessitent une prise en charge globale, comprenant de multiples composantes. D'autant plus dans le cadre du cancer du sein, où il faut prendre en compte d'autres problématiques directement liées au cancer.

Les interventions de perte de poids menées dans le cadre du cancer du sein sont décrites de manière très variable selon les études, ce qui empêche une bonne comparaison entre elles. Nos résultats sont comparables avec d'autres analyses effectuées avec la taxonomie BCTTv1 dans le cadre du diabète (49) et des cancers, tous types confondus (51).

Notre analyse a permis de mettre en lumière les ingrédients actifs principaux des interventions selon la taxonomie BCTTv1. Nous avons également fait ressortir un manque de description et une grande variabilité du vocabulaire utilisé, ce qui rend la comparaison entre les interventions difficile. Ceci est une première étape vers la compréhension des mécanismes de perte de poids dans le cadre du cancer du sein.

Il est important, dans les futures études, que les interventions soient décrites de manière structurée et avec un langage commun. Ceci dans le but de les rendre plus systématiques et d'augmenter les preuves quant au bénéfice d'une prise en charge du surpoids et de l'obésité chez les femmes traitées pour un cancer du sein, avec un objectif de changement de comportement à long terme.

De futures recherches sont nécessaires afin d'identifier les ingrédients actifs les plus efficaces pour la perte de poids, et ainsi de créer une intervention adaptée aux femmes atteintes d'un cancer du sein dans la pratique clinique.

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Annexes

Annexe I: BCT Taxonomy (v1): 93 hierarchically-clustered techniques

Annexe II: Online Training Certificate of Completion

Annexe III: Fiches de codage des 24 articles

Annexe IV: Fiche de prise de décision codage

Annexe V: Liste items TIDieR

Annexe I : BCT Taxonomy (v1): 93 hierarchically-clustered techniques

BCT Taxonomy (v1): 93 hierarchically-clustered techniques

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BCT Taxonomy (v1): 93 hierarchically-clustered techniques

Note for Users

The definitions of Behavior Change Techniques (BCTs):

i) contain verbs (e.g., provide, advise, arrange, prompt) that refer to the action(s) taken by the person/s delivering the technique. BCTs can be delivered by an 'interventionist' or self-delivered

ii) contain the term **"behavior"** referring to a single action or sequence of actions that includes the performance of **wanted** behavior(s) and/or **inhibition** (non-performance) of **unwanted** behavior(s)

iii) note alternative or additional coding where relevant

iv) note the technical terms associated with particular theoretical frameworks where relevant (e.g. 'including implementation intentions)

No.	Label	Definition	Examples
1. Goals and planning			
1.1	***Goal setting (behavior)***	Set or agree on a goal defined in terms of the behavior to be achieved *Note: only code goal-setting if there is sufficient evidence that goal set as part of intervention; if goal unspecified or a behavioral outcome, code* ***1.3, Goal setting (outcome)****; if the goal defines a specific context, frequency, duration or intensity for the behavior, also code* ***1.4, Action planning***	Agree on a daily walking goal (e.g. 3 miles) with the person and reach agreement about the goal Set the goal of eating 5 pieces of fruit per day as specified in public health guidelines
1.2	***Problem solving***	Analyse , or prompt the person to analyse, factors influencing the behavior and generate or select strategies that include overcoming barriers and/or increasing facilitators (includes '**Relapse Prevention**' *and* '**Coping Planning**') *Note: barrier identification without solutions is not sufficient. If the BCT does not include analysing the behavioral problem, consider* ***12.3, Avoidance/changing exposure to cues for the behavior, 12.1, Restructuring the physical environment, 12.2, Restructuring the social environment, or 11.2, Reduce negative emotions***	Identify specific triggers (e.g. being in a pub, feeling anxious) that generate the urge/want/need to drink and develop strategies for avoiding environmental triggers or for managing negative emotions, such as anxiety, that motivate drinking Prompt the patient to identify barriers preventing them from starting a new exercise regime e.g., lack of motivation, and discuss ways in which they could help overcome them e.g., going to the gym with a buddy
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1.3	***Goal setting (outcome)***	Set or agree on a goal defined in terms of a positive **outcome** of wanted behavior *Note: only code guidelines if set as a goal in an intervention context; if goal is a behavior, code **1.1, Goal setting (behavior)**; if goal unspecified code **1.3, Goal setting (outcome)***	Set a weight loss goal (e.g. 0.5 kilogram over one week) as an outcome of changed eating patterns
1.4	***Action planning***	Prompt detailed planning of performance of the behavior (must include at least one of context, frequency, duration and intensity). Context may be environmental (physical or social) or internal (physical, emotional or cognitive) (includes *'**Implementation Intentions**'*) *Note: evidence of action planning does not necessarily imply goal setting, only code latter if sufficient evidence*	Encourage a plan to carry condoms when going out socially at weekends Prompt planning the performance of a particular physical activity (e.g. running) at a particular time (e.g. before work) on certain days of the week
1.5	***Review behavior goal(s)***	Review behavior goal(s) jointly with the person and consider modifying goal(s) or behavior change strategy in light of achievement. This may lead to re-setting the same goal, a small change in that goal or setting a new goal instead of (or in addition to) the first, or no change *Note: if goal specified in terms of behavior, code **1.5, Review behavior goal(s)**, if goal unspecified, code **1.7, Review outcome goal(s);** if discrepancy created consider also **1.6, Discrepancy between current behavior and goal***	Examine how well a person's performance corresponds to agreed goals e.g. whether they consumed less than one unit of alcohol per day, and consider modifying future behavioral goals accordingly e.g. by increasing or decreasing alcohol target or changing type of alcohol consumed
1.6	***Discrepancy between current behavior and goal***	Draw attention to discrepancies between a person's current behavior (in terms of the *form, frequency, duration, or intensity* of that behavior) and the person's previously set outcome goals, behavioral goals or action plans (goes beyond self-monitoring of behavior) *Note: if discomfort is created only code **13.3, Incompatible beliefs** and not **1.6, Discrepancy between current behavior and goal**; if goals are modified, also code **1.5, Review behavior goal(s)** and/or **1.7, Review outcome goal(s)**; if feedback is provided, also code **2.2, Feedback on behaviour***	Point out that the recorded exercise fell short of the goal set
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1.7	***Review outcome goal(s)***	Review outcome goal(s) jointly with the person and consider modifying goal(s) in light of achievement. This may lead to re-setting the same goal, a small change in that goal or setting a new goal instead of, or in addition to the first *Note: if goal specified in terms of behavior, code **1.5, Review behavior goal(s)**, if goal unspecified, code **1.7, Review outcome goal(s);** if discrepancy created consider also **1.6, Discrepancy between current behavior and goal***	Examine how much weight has been lost and consider modifying outcome goal(s) accordingly e.g., by increasing or decreasing subsequent weight loss targets
1.8	***Behavioral contract***	Create a written specification of the behavior to be performed, agreed on by the person, and witnessed by another *Note: also code **1.1, Goal setting (behavior)***	Sign a contract with the person e.g. specifying that they will not drink alcohol for one week
1.9	***Commitment***	Ask the person to affirm or reaffirm statements indicating commitment to change the behavior *Note: if defined in terms of the behavior to be achieved also code **1.1, Goal setting (behavior)***	Ask the person to use an "I will" statement to affirm or reaffirm a strong commitment (i.e. using the words "strongly", "committed" or "high priority") to start, continue or restart the attempt to take medication as prescribed
2. Feedback and monitoring			
2.1	***Monitoring of behavior by others without feedback***	Observe or record behavior with the person's knowledge as part of a behavior change strategy *Note: if monitoring is part of a data collection procedure rather than a strategy aimed at changing behavior, do not code; if feedback given, code only **2.2, Feedback on behavior**, and not **2.1, Monitoring of behavior by others without feedback**; if monitoring outcome(s) code **2.5, Monitoring outcome(s) of behavior by others without feedback**; if self-monitoring behavior, code **2.3, Self-monitoring of behaviour***	Watch hand washing behaviors among health care staff and make notes on context, frequency and technique used
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2.2	***Feedback on behavior***	Monitor and provide informative or evaluative feedback on performance of the behavior *(e.g. form, frequency, duration, intensity)* *Note: if Biofeedback, code only* ***2.6, Biofeedback*** *and* *not* ***2.2, Feedback on behavior****; if feedback is on* ***outcome(s)*** *of behavior, code* ***2.7, Feedback on outcome(s) of behavior****; if there is no clear evidence that feedback was given, code* ***2.1, Monitoring of behavior by others without feedback****; if feedback on behaviour is evaluative e.g. praise, also code* ***10.4, Social reward***	Inform the person of how many steps they walked each day (as recorded on a pedometer) or how many calories they ate each day (based on a food consumption questionnaire).
2.3	***Self-monitoring of behavior***	Establish a method for the person to monitor and record their behavior(s) as part of a behavior change strategy *Note: if monitoring is part of a data collection procedure rather than a strategy aimed at changing behavior, do not code; if monitoring of outcome of behavior, code* ***2.4, Self-monitoring of outcome(s) of behavior****; if monitoring is by someone else (without feedback), code* ***2.1, Monitoring of behavior by others without feedback***	Ask the person to record daily, in a diary, whether they have brushed their teeth for at least two minutes before going to bed Give patient a pedometer and a form for recording daily total number of steps
2.4	***Self-monitoring of outcome(s) of behavior***	Establish a method for the person to monitor and record the **outcome(s)** of their behavior as part of a behavior change strategy *Note: if monitoring is part of a data collection procedure rather than a strategy aimed at changing behavior, do not code ; if monitoring behavior, code* ***2.3, Self-monitoring of behavior****; if monitoring is by someone else (without feedback), code* ***2.5, Monitoring outcome(s) of behavior by others without feedback***	Ask the person to weigh themselves at the end of each day, over a two week period, and record their daily weight on a graph to increase exercise behaviors
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2.5	***Monitoring outcome(s) of behavior by others without feedback***	Observe or record outcomes of behavior with the person's knowledge as part of a behavior change strategy *Note: if monitoring is part of a data collection procedure rather than a strategy aimed at changing behavior, do not code; if feedback given, code only* ***2.7, Feedback on outcome(s) of behavior****; if monitoring behavior code* ***2.1, Monitoring of behavior by others without feedback****; if self-monitoring outcome(s), code* ***2.4, Self-monitoring of outcome(s) of behavior***	Record blood pressure, blood glucose, weight loss, or physical fitness
2.6	***Biofeedback***	Provide feedback about the body *(e.g. physiological or biochemical state)* using an external monitoring device as part of a behavior change strategy *Note: if Biofeedback, code only* ***2.6, Biofeedback*** *and not* ***2.2, Feedback on behavior*** *or* ***2.7, Feedback on outcome(s) of behaviour***	Inform the person of their blood pressure reading to improve adoption of health behaviors
2.7	***Feedback on outcome(s) of behavior***	Monitor and provide feedback on the outcome of performance of the behavior *Note: if Biofeedback, code only* ***2.6, Biofeedback*** *and not* ***2.7, Feedback on outcome(s) of behavior****; if feedback is on* ***behavior*** *code* ***2.2, Feedback on behavior****; if there is no clear evidence that feedback was given code* ***2.5, Monitoring outcome(s) of behavior by others without feedback;*** *if feedback on behaviour is evaluative e.g. praise, also code* ***10.4, Social reward***	Inform the person of how much weight they have lost following the implementation of a new exercise regime
3. Social support			
3.1	***Social support (unspecified)***	Advise on, arrange or provide social support *(e.g. from friends, relatives, colleagues,' buddies' or staff)* or non-contingent praise or reward for performance of the behavior. It includes encouragement and counselling, but only when it is directed at the **behavior** *Note: attending a group class and/or mention of 'follow-up' does not necessarily apply this BCT, support must be explicitly mentioned; if practical, code* ***3.2, Social support (practical)****; if emotional, code* ***3.3, Social support (emotional)*** (includes '**Motivational interviewing**' and '**Cognitive Behavioral Therapy**')	Advise the person to call a 'buddy' when they experience an urge to smoke Arrange for a housemate to encourage continuation with the behavior change programme Give information about a self-help group that offers support for the behaviour Back to index page

3.2	***Social support (practical)***	Advise on, arrange, or provide **practical** help *(e.g. from friends, relatives, colleagues, 'buddies' or staff)* for performance of the behavior *Note: if emotional, code **3.3, Social support (emotional)**; if general or unspecified, code **3.1, Social support (unspecified)** If only restructuring the physical environment or adding objects to the environment, code **12.1, Restructuring the physical environment** or **12.5, Adding objects to the environment;** attending a group or class and/or mention of 'follow-up' does not necessarily apply this BCT, support must be explicitly mentioned.*	Ask the partner of the patient to put their tablet on the breakfast tray so that the patient remembers to take it
3.3	***Social support (emotional)***	Advise on, arrange, or provide **emotional** social support *(e.g. from friends, relatives, colleagues, 'buddies' or staff)* for performance of the behavior *Note: if practical, code **3.2, Social support (practical)**; if unspecified, code **3.1, Social support (unspecified)***	Ask the patient to take a partner or friend with them to their colonoscopy appointment
4. Shaping knowledge			
4.1	***Instruction on how to perform a behavior***	Advise or agree on how to perform the behavior (includes '**Skills training**') *Note: when the person attends classes such as exercise or cookery, code **4.1, Instruction on how to perform the behavior, 8.1, Behavioral practice/rehearsal** and **6.1, Demonstration of the behavior***	Advise the person how to put a condom on a model of a penis correctly
4.2	***Information about antecedents***	Provide information about antecedents (*e.g. social and environmental situations and events, emotions, cognitions)* that reliably predict performance of the behaviour	Advise to keep a record of snacking and of situations or events occurring prior to snacking
4.3	***Re-attribution***	Elicit perceived causes of behavior and suggest alternative explanations *(e.g. external or internal and stable or unstable)*	If the person attributes their over-eating to the frequent presence of delicious food, suggest that the 'real' cause may be the person's inattention to bodily signals of hunger and satiety

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4.4	***Behavioral experiments***	Advise on how to identify and test hypotheses about the behavior, its causes and consequences, by collecting and interpreting data	Ask a family physician to give evidence-based advice rather than prescribe antibiotics and to note whether the patients are grateful or annoyed
5. Natural consequences			
5.1	***Information about health consequences***	Provide information (e.g. written, verbal, visual) about health consequences of performing the behavior *Note: consequences can be for any target, not just the recipient(s) of the intervention; emphasising importance of consequences is not sufficient; if information about emotional consequences, code **5.6, Information about emotional consequences**; if about social, environmental or unspecified consequences code **5.3, Information about social and environmental consequences***	Explain that not finishing a course of antibiotics can increase susceptibility to future infection Present the likelihood of contracting a sexually transmitted infection following unprotected sexual behavior
5.2	***Salience of consequences***	Use methods specifically designed to **emphasise** the consequences of performing the behaviour with the aim of making them more memorable (goes beyond informing about consequences) *Note: if information about consequences, also code **5.1, Information about health consequences, 5.6, Information about emotional consequences** or **5.3, Information about social and environmental consequences***	Produce cigarette packets showing pictures of health consequences e.g. diseased lungs, to highlight the dangers of continuing to smoke
5.3	***Information about social and environmental consequences***	Provide information (e.g. written, verbal, visual) about social and environmental consequences of performing the behavior *Note: consequences can be for any target, not just the recipient(s) of the intervention; if information about health or consequences, code **5.1, Information about health consequences**; if about emotional consequences, code **5.6, Information about emotional consequences**; if unspecified, code **5.3, Information about social and environmental consequences***	Tell family physician about financial remuneration for conducting health screening Inform a smoker that the majority of people disapprove of smoking in public places
5.4	***Monitoring of emotional consequences***	Prompt assessment of **feelings** after attempts at performing the behavior	Agree that the person will record how they feel after taking their daily walk
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5.5	***Anticipated regret***	Induce or raise awareness of expectations of future regret about performance of the unwanted behavior *Note: not including* ***5.6, Information about emotional consequences****; if suggests adoption of a perspective or new perspective in order to change cognitions also code* ***13.2, Framing/reframing***	Ask the person to assess the degree of regret they will feel if they do not quit smoking
5.6	***Information about emotional consequences***	Provide information (e.g. written, verbal, visual) about emotional consequences of performing the behavior *Note: consequences can be related to emotional health disorders (e.g. depression, anxiety) and/or states of mind (e.g. low mood, stress); not including* ***5.5, Anticipated regret****; consequences can be for any target, not just the recipient(s) of the intervention; if information about health consequences code* ***5.1, Information about health consequences****; if about social, environmental or unspecified code* ***5.3, Information about social and environmental consequences***	Explain that quitting smoking increases happiness and life satisfaction
6. Comparison of behaviour			
6.1	***Demonstration of the behavior***	Provide an observable sample of the performance of the behaviour, directly in person or indirectly e.g. via film, pictures, for the person to aspire to or imitate (includes '**Modelling**'). *Note:* if advised to practice, also code, ***8.1, Behavioural practice and rehearsal;*** *If provided with instructions on how to perform, also code* ***4.1, Instruction on how to perform the behaviour***	Demonstrate to nurses how to raise the issue of excessive drinking with patients via a role-play exercise
6.2	***Social comparison***	Draw attention to others' performance to allow comparison with the person's own performance *Note: being in a group setting does not necessarily mean that social comparison is actually taking place*	Show the doctor the proportion of patients who were prescribed antibiotics for a common cold by other doctors and compare with their own data
6.3	***Information about others' approval***	Provide information about what other people think about the behavior. The information clarifies whether others will like, approve or disapprove of what the person is doing or will do	Tell the staff at the hospital ward that staff at all other wards approve of washing their hands according to the guidelines

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7. Associations			
7.1	***Prompts/cues***	Introduce or define environmental or social stimulus with the purpose of prompting or cueing the behavior. The prompt or cue would normally occur at the time or place of performance *Note: when a stimulus is linked to a specific action in an if-then plan including one or more of frequency, duration or intensity also code* ***1.4, Action planning****.*	Put a sticker on the bathroom mirror to remind people to brush their teeth
7.2	***Cue signalling reward***	Identify an environmental stimulus that reliably predicts that reward will follow the behavior (includes ***'Discriminative cue'***)	Advise that a fee will be paid to dentists for a particular dental treatment of 6-8 year old, but not older, children to encourage delivery of that treatment (the 6-8 year old children are the environmental stimulus)
7.3	***Reduce prompts/cues***	Withdraw gradually prompts to perform the behavior (includes ***'Fading'***)	Reduce gradually the number of reminders used to take medication
7.4	***Remove access to the reward***	Advise or arrange for the person to be separated from situations in which unwanted behavior can be rewarded in order to reduce the behavior (includes ***'Time out'***)	Arrange for cupboard containing high calorie snacks to be locked for a specified period to reduce the consumption of sugary foods in between meals
7.5	***Remove aversive stimulus***	Advise or arrange for the removal of an aversive stimulus to facilitate behavior change (includes ***'Escape learning'***)	Arrange for a gym-buddy to stop nagging the person to do more exercise in order to increase the desired exercise behaviour
7.6	***Satiation***	Advise or arrange repeated exposure to a stimulus that reduces or extinguishes a drive for the unwanted behavior	Arrange for the person to eat large quantities of chocolate, in order to reduce the person's appetite for sweet foods
7.7	***Exposure***	Provide systematic confrontation with a feared stimulus to reduce the response to a later encounter	Agree a schedule by which the person who is frightened of surgery will visit the hospital where they are scheduled to have surgery
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7.8	***Associative learning***	Present a neutral stimulus jointly with a stimulus that already elicits the behavior repeatedly until the neutral stimulus elicits that behavior (includes ***'Classical/Pavlovian Conditioning'***) *Note: when a BCT involves reward or punishment, code one or more of:* ***10.2, Material reward (behavior); 10.3, Non-specific reward; 10.4, Social reward, 10.9, Self-reward; 10.10, Reward (outcome)***	Present repeatedly fatty foods with a disliked sauce to discourage the consumption of fatty foods
8. Repetition and substitution			
8.1	***Behavioral practice/ rehearsal***	Prompt practice or rehearsal of the performance of the behavior one or more times in a context or at a time when the performance may not be necessary, in order to increase habit and skill *Note: if aiming to associate performance with the context, also code* ***8.3, Habit formation***	Prompt asthma patients to practice measuring their peak flow in the nurse's consulting room
8.2	***Behavior substitution***	Prompt substitution of the unwanted behavior with a wanted or neutral behavior *Note: if this occurs regularly, also code* ***8.4, Habit reversal***	Suggest that the person goes for a walk rather than watches television
8.3	***Habit formation***	Prompt rehearsal and repetition of the behavior in the same context repeatedly so that the context elicits the behavior *Note: also code* ***8.1, Behavioral practice/rehearsal***	Prompt patients to take their statin tablet before brushing their teeth every evening
8.4	***Habit reversal***	Prompt rehearsal and repetition of an alternative behavior to **replace** an unwanted habitual behavior *Note: also code* ***8.2, Behavior substitution***	Ask the person to walk up stairs at work where they previously always took the lift
8.5	***Overcorrection***	Ask to repeat the wanted behavior in an exaggerated way following an unwanted behaviour	Ask to eat only fruit and vegetables the day after a poor diet
8.6	***Generalisation of a target behavior***	Advise to perform the wanted behaviour, which is already performed in a particular situation, in another situation	Advise to repeat toning exercises learned in the gym when at home
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8.7	***Graded tasks***	Set easy-to-perform tasks, making them increasingly difficult, but achievable, until behavior is performed	Ask the person to walk for 100 yards a day for the first week, then half a mile a day after they have successfully achieved 100 yards, then two miles a day after they have successfully achieved one mile
9. Comparison of outcomes			
9.1	***Credible source***	Present verbal or visual communication from a **credible source** in favour of or against the behavior *Note: code this BCT if source generally agreed on as credible e.g., health professionals, celebrities or words used to indicate expertise or leader in field and if the communication has the aim of persuading; if information about health consequences, also code **5.1, Information about health consequences**, if about emotional consequences, also code **5.6, Information about emotional consequences**; if about social, environmental or unspecified consequences also code **5.3, Information about social and environmental consequences***	Present a speech given by a high status professional to emphasise the importance of not exposing patients to unnecessary radiation by ordering x-rays for back pain
9.2	***Pros and cons***	Advise the person to identify and compare reasons for wanting (pros) and not wanting to (cons) change the behavior (includes '**Decisional balance**') *Note: if providing information about health consequences, also code **5.1, Information about health consequences**; if providing information about emotional consequences, also code **5.6, Information about emotional consequences**; if providing information about social, environmental or unspecified consequences also code **5.3, Information about social and environmental consequences***	Advise the person to list and compare the advantages and disadvantages of prescribing antibiotics for upper respiratory tract infections
9.3	***Comparative imagining of future outcomes***	Prompt or advise the imagining and comparing of future outcomes of changed versus unchanged behaviour	Prompt the person to imagine and compare likely or possible outcomes following attending versus not attending a screening appointment
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10. Reward and threat			
10.1	***Material incentive (behavior)***	Inform that money, vouchers or other valued objects ***will be*** delivered if and only if there has been effort and/or progress in performing the behavior (includes ***'Positive reinforcement'***) *Note: if incentive is social, code **10.5, Social incentive** if unspecified code **10.6, Non-specific incentive,** and not **10.1, Material incentive (behavior)**; if incentive is for **outcome,** code **10.8, Incentive (outcome).** If reward is delivered also code one of: **10.2, Material reward (behavior); 10.3, Non-specific reward; 10.4, Social reward, 10.9, Self-reward; 10.10, Reward (outcome)***	Inform that a financial payment will be made each month in pregnancy that the woman has not smoked
10.2	***Material reward (behavior)***	Arrange for the delivery of money, vouchers or other valued objects if and only if there ***has been*** effort and/or progress in performing the behavior (includes '**Positive reinforcement**') *Note: If reward is social, code **10.4, Social reward**, if unspecified code **10.3, Non-specific reward**, and not **10.1, Material reward (behavior)**; if reward is for **outcome**, code **10.10, Reward (outcome).** If informed of reward in advance of rewarded behaviour, also code one of: **10.1, Material incentive (behaviour); 10.5, Social incentive; 10.6, Non-specific incentive; 10.7, Self-incentive; 10.8, Incentive (outcome)***	Arrange for the person to receive money that would have been spent on cigarettes if and only if the smoker has not smoked for one month
10.3	***Non-specific reward***	Arrange delivery of a reward if and only if there ***has been*** effort and/or progress in performing the behavior (includes '**Positive reinforcement**') *Note: if reward is material, code **10.2, Material reward (behavior)**, if social, code **10.4, Social reward**, and not **10.3, Non-specific reward**; if reward is for **outcome** code **10.10, Reward (outcome).** If informed of reward in advance of rewarded behaviour, also code one of: **10.1, Material incentive (behaviour); 10.5, Social incentive; 10.6, Non-specific incentive; 10.7, Self-incentive; 10.8, Incentive (outcome)***	Identify something (e.g. an activity such as a visit to the cinema) that the person values and arrange for this to be delivered if and only if they attend for health screening
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10.4	***Social reward***	Arrange verbal or non-verbal reward if and only if there ***has been*** effort and/or progress in performing the behavior (includes '**Positive reinforcement**') *Note: if reward is material, code* ***10.2, Material reward (behavior)****, if unspecified code* ***10.3, Non-specific reward****, and not* ***10.4, Social reward****; if reward is for* ***outcome*** *code* ***10.10, Reward (outcome).*** *If informed of reward in advance of rewarded behaviour, also code one of:* ***10.1, Material incentive (behaviour); 10.5, Social incentive; 10.6, Non-specific incentive; 10.7, Self-incentive; 10.8, Incentive (outcome)***	Congratulate the person for each day they eat a reduced fat diet
10.5	***Social incentive***	Inform that a verbal or non-verbal reward ***will be*** delivered if and only if there has been effort and/or progress in performing the behavior (includes '**Positive reinforcement'**) *Note: if incentive is material, code* ***10.1, Material incentive (behavior)****, if unspecified code* ***10.6, Non-specific incentive****, and not* ***10.5, Social incentive****; if incentive is for* ***outcome*** *code* ***10.8, Incentive (outcome).*** *If reward is delivered also code one of:* ***10.2, Material reward (behavior); 10.3, Non-specific reward; 10.4, Social reward, 10.9, Self-reward; 10.10, Reward (outcome)***	Inform that they will be congratulated for each day they eat a reduced fat diet
10.6	***Non-specific incentive***	Inform that a reward ***will be*** delivered if and only if there has been effort and/or progress in performing the behavior (includes '**Positive reinforcement'**) *Note: if incentive is material, code* ***10.1, Material incentive (behavior)****, if social, code* ***10.5, Social incentive*** *and not* ***10.6, Non-specific incentive****; if incentive is for* ***outcome*** *code* ***10.8, Incentive (outcome).*** *If reward is delivered also code one of:* ***10.2, Material reward (behavior); 10.3, Non-specific reward; 10.4, Social reward, 10.9, Self-reward; 10.10, Reward (outcome)***	Identify an activity that the person values and inform them that this will happen if and only if they attend for health screening
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10.7	***Self-incentive***	Plan to reward self in future if and only if there has been effort and/or progress in performing the behavior *Note: if self-reward is material, also code **10.1, Material incentive (behavior)**, if social, also code **10.5, Social incentive**, if unspecified, also code **10.6, Non-specific incentive**; if incentive is for **outcome** code **10.8, Incentive (outcome).** If reward is delivered also code one of: **10.2, Material reward (behavior); 10.3, Non-specific reward; 10.4, Social reward, 10.9, Self-reward; 10.10, Reward (outcome)***	Encourage to provide self with material (e.g., new clothes) or other valued objects if and only if they have adhered to a healthy diet
10.8	***Incentive (outcome)***	Inform that a reward ***will be*** delivered if and only if there has been effort and/or progress in achieving the behavioural **outcome** (*includes* ***'Positive reinforcement'***) *Note: this includes social, material, self- and non-specific incentives for outcome; if incentive is for the **behavior** code **10.5, Social incentive, 10.1, Material incentive (behavior), 10.6, Non-specific incentive** or **10.7, Self-incentive** and not **10.8, Incentive (outcome).** If reward is delivered also code one of: **10.2, Material reward (behavior); 10.3, Non-specific reward; 10.4, Social reward, 10.9, Self-reward; 10.10, Reward (outcome)***	Inform the person that they will receive money if and only if a certain amount of weight is lost
10.9	***Self-reward***	Prompt self-praise or self-reward if and only if there ***has been*** effort and/or progress in performing the behavior *Note: if self-reward is material, also code **10.2, Material reward (behavior)**, if social, also code **10.4, Social reward**, if unspecified, also code **10.3, Non-specific reward**; if reward is for **outcome** code **10.10, Reward (outcome).** If informed of reward in advance of rewarded behaviour, also code one of: **10.1, Material incentive (behaviour); 10.5, Social incentive; 10.6, Non-specific incentive; 10.7, Self-incentive; 10.8, Incentive (outcome)***	Encourage to reward self with material (e.g., new clothes) or other valued objects if and only if they have adhered to a healthy diet
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10.10	***Reward (outcome)***	Arrange for the delivery of a reward if and only if there ***has been*** effort and/or progress in achieving the behavioral **outcome** (includes '**Positive reinforcement**') *Note: this includes social, material, self- and non-specific rewards for outcome; if reward is for the* ***behavior*** *code* ***10.4, Social reward, 10.2, Material reward (behavior), 10.3, Non-specific reward*** *or* ***10.9, Self-reward*** *and not* ***10.10, Reward (outcome).*** *If informed of reward in advance of rewarded behaviour, also code one of****: 10.1, Material incentive (behaviour); 10.5, Social incentive; 10.6, Non-specific incentive; 10.7, Self-incentive; 10.8, Incentive (outcome)***	Arrange for the person to receive money if and only if a certain amount of weight is lost
10.11	***Future punishment***	Inform that future punishment or removal of reward will be a consequence of performance of an unwanted behavior (may include fear arousal) (includes **'Threat'**)	Inform that continuing to consume 30 units of alcohol per day is likely to result in loss of employment if the person continues
11. Regulation			
11.1	***Pharmacological support***	Provide, or encourage the use of or adherence to, drugs to facilitate behavior change *Note: if pharmacological support to reduce negative emotions (i.e. anxiety) then also code* ***11.2, Reduce negative emotions***	Suggest the patient asks the family physician for nicotine replacement therapy to facilitate smoking cessation
11.2	***Reduce negative emotions*** [b]	Advise on ways of reducing negative emotions to facilitate performance of the behavior (includes '**Stress Management**') *Note: if includes analysing the behavioural problem, also code* ***1.2, Problem solving***	Advise on the use of stress management skills, e.g. to reduce anxiety about joining Alcoholics Anonymous
11.3	***Conserving mental resources***	Advise on ways of minimising demands on mental resources to facilitate behavior change	Advise to carry food calorie content information to reduce the burden on memory in making food choices
11.4	***Paradoxical instructions***	Advise to engage in some form of the unwanted behavior with the aim of reducing motivation to engage in that behaviour	Advise a smoker to smoke twice as many cigarettes a day as they usually do Tell the person to stay awake as long as possible in order to reduce insomnia
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12. Antecedents			
12.1	***Restructuring the physical environment***	Change, or advise to change the **physical** environment in order to facilitate performance of the wanted behavior or create barriers to the unwanted behavior (other than prompts/cues, rewards and punishments) *Note: this may also involve* ***12.3, Avoidance/reducing exposure to cues for the behavior****; if restructuring of the social environment code* ***12.2, Restructuring the social environment;*** *if only adding objects to the environment, code* ***12.5, Adding objects to the environment***	Advise to keep biscuits and snacks in a cupboard that is inconvenient to get to Arrange to move vending machine out of the school
12.2	***Restructuring the social environment***	Change, or advise to change the **social** environment in order to facilitate performance of the wanted behavior or create barriers to the unwanted behavior (other than prompts/cues, rewards and punishments) *Note: this may also involve* ***12.3, Avoidance/reducing exposure to cues for the behavior****; if also restructuring of the physical environment also code* ***12.1, Restructuring the physical environment***	Advise to minimise time spent with friends who drink heavily to reduce alcohol consumption
12.3	***Avoidance/reducing exposure to cues for the behavior***	Advise on how to avoid exposure to specific social and contextual/physical cues for the behavior, including changing daily or weekly routines *Note: this may also involve* ***12.1, Restructuring the physical environment*** and/or ***12.2, Restructuring the social environment***; if the BCT includes analysing the behavioral problem, only code ***1.2, Problem solving***	Suggest to a person who wants to quit smoking that their social life focus on activities other than pubs and bars which have been associated with smoking
12.4	***Distraction***	Advise or arrange to use an alternative focus for attention to avoid triggers for unwanted behaviour	Suggest to a person who is trying to avoid between-meal snacking to focus on a topic they enjoy (e.g. holiday plans) instead of focusing on food
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12.5	***Adding objects to the environment***	Add objects to the environment in order to facilitate performance of the behavior *Note: Provision of information (e.g. written, verbal, visual) in a booklet or leaflet is insufficient. If this is accompanied by social support, also code **3.2, Social support (practical)**; if the environment is changed beyond the addition of objects, also code **12.1, Restructuring the physical environment***	Provide free condoms to facilitate safe sex Provide attractive toothbrush to improve tooth brushing technique
12.6	***Body changes***	Alter body structure, functioning or support **directly** to facilitate behavior change	Prompt strength training, relaxation training or provide assistive aids (e.g. a hearing aid)
13. Identity			
13.1	***Identification of self as role model***	Inform that one's own behavior may be an example to others	Inform the person that if they eat healthily, that may be a good example for their children
13.2	***Framing/reframing***	Suggest the deliberate adoption of a perspective or new perspective on behavior (e.g. its purpose) in order to change cognitions or emotions about performing the behavior (includes '**Cognitive structuring**'); *If information about consequences then code **5.1, Information about health consequences, 5.6, Information about emotional consequences** or **5.3, Information about social and environmental consequences** instead of **13.2, Framing/reframing***	Suggest that the person might think of the tasks as reducing sedentary behavior (rather than increasing activity)
13.3	***Incompatible beliefs***	Draw attention to discrepancies between current or past behavior and self-image, in order to create discomfort (includes **'Cognitive dissonance'**)	Draw attention to a doctor's liberal use of blood transfusion and their self-identification as a proponent of evidence-based medical practice
13.4	***Valued self-identity***	Advise the person to write or complete rating scales about a cherished value or personal strength as a means of affirming the person's identity as part of a behavior change strategy (includes **'Self-affirmation'**)	Advise the person to write about their personal strengths before they receive a message advocating the behavior change
13.5	***Identity associated with changed behavior***	Advise the person to construct a new self-identity as someone who 'used to engage with the unwanted behavior'	Ask the person to articulate their new identity as an 'ex-smoker'

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14. Scheduled consequences			
14.1	***Behavior cost***	Arrange for withdrawal of something valued if and only if an unwanted behavior is performed (includes **'Response cost'**). Note if withdrawal of contingent reward code***, 14.3, Remove reward***	Subtract money from a prepaid refundable deposit when a cigarette is smoked
14.2	***Punishment***	Arrange for aversive consequence contingent on the performance of the unwanted behavior	Arrange for the person to wear unattractive clothes following consumption of fatty foods
14.3	***Remove reward***	Arrange for discontinuation of contingent reward following performance of the unwanted behavior (includes **'Extinction'**)	Arrange for the other people in the household to ignore the person every time they eat chocolate (rather than attending to them by criticising or persuading)
14.4	***Reward approximation***	Arrange for reward following any approximation to the target behavior, gradually rewarding only performance closer to the wanted behavior (includes **'Shaping'**) *Note: also code one of* ***59-63***	Arrange reward for any reduction in daily calories, gradually requiring the daily calorie count to become closer to the planned calorie intake
14.5	***Rewarding completion***	Build up behavior by arranging reward following final component of the behavior; gradually add the components of the behavior that occur earlier in the behavioral sequence (includes **'Backward chaining'**) *Note: also code one of* ***10.2, Material reward (behavior); 10.3, Non-specific reward; 10.4, Social reward, 10.9, Self-reward; 10.10, Reward (outcome)***	Reward eating a supplied low calorie meal; then make reward contingent on cooking and eating the meal; then make reward contingent on purchasing, cooking and eating the meal
14.6	***Situation-specific reward***	Arrange for reward following the behavior in one situation but not in another (includes **'Discrimination training'**) *Note: also code one of* ***10.2, Material reward (behavior); 10.3, Non-specific reward; 10.4, Social reward, 10.9, Self-reward; 10.10, Reward (outcome)***	Arrange reward for eating at mealtimes but not between meals
14.7	***Reward incompatible behavior***	Arrange reward for responding in a manner that is incompatible with a previous response to that situation (includes **'Counter-conditioning'**) *Note: also code one of* ***10.2, Material reward (behavior); 10.3, Non-specific reward; 10.4, Social reward, 10.9, Self-reward; 10.10, Reward (outcome)***	Arrange reward for ordering a soft drink at the bar rather than an alcoholic beverage
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14.8	***Reward alternative behavior***	Arrange reward for performance of an alternative to the unwanted behavior (includes ***'Differential reinforcement'***) *Note: also code one of* ***10.2, Material reward (behavior); 10.3, Non-specific reward; 10.4, Social reward, 10.9, Self-reward; 10.10, Reward (outcome);*** *consider also coding* ***1.2, Problem solving***	Reward for consumption of low fat foods but not consumption of high fat foods
14.9	***Reduce reward frequency***	Arrange for rewards to be made contingent on increasing duration or frequency of the behavior (includes ***'Thinning'***) *Note: also code one of* ***10.2, Material reward (behavior); 10.3, Non-specific reward; 10.4, Social reward, 10.9, Self-reward; 10.10, Reward (outcome)***	Arrange reward for each day without smoking, then each week, then each month, then every 2 months and so on
14.10	***Remove punishment***	Arrange for removal of an unpleasant consequence contingent on performance of the wanted behavior (includes ***'Negative reinforcement'***)	Arrange for someone else to do housecleaning only if the person has adhered to the medication regimen for a week
15. Self-belief			
15.1	***Verbal persuasion about capability***	Tell the person that they can successfully perform the wanted behavior, arguing against self-doubts and asserting that they can and will succeed	Tell the person that they can successfully increase their physical activity, despite their recent heart attack.
15.2	***Mental rehearsal of successful performance***	Advise to practise imagining performing the behavior successfully in relevant contexts	Advise to imagine eating and enjoying a salad in a work canteen
15.3	***Focus on past success***	Advise to think about or list previous successes in performing the behavior (or parts of it)	Advise to describe or list the occasions on which the person had ordered a non-alcoholic drink in a bar
15.4	***Self-talk***	Prompt positive self-talk (aloud or silently) before and during the behavior	Prompt the person to tell themselves that a walk will be energising
16. Covert learning			
16.1	***Imaginary punishment***	Advise to imagine performing the **unwanted** behavior in a real-life situation followed by imagining an unpleasant consequence (includes ***'Covert sensitisation'***)	Advise to imagine overeating and then vomiting

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16.2	***Imaginary reward***	Advise to imagine performing the **wanted** behavior in a real-life situation followed by imagining a pleasant consequence (includes ***'Covert conditioning'***)	Advise the health professional to imagine giving dietary advice followed by the patient losing weight and no longer being diabetic
16.3	***Vicarious consequences***	Prompt observation of the consequences (including rewards and punishments) for others when they perform the behavior *Note: if observation of health consequences, also code **5.1, Information about health consequences**; if of emotional consequences, also code **5.6, Information about emotional consequences**, if of social, environmental or unspecified consequences, also code **5.3, Information about social and environmental consequences***	Draw attention to the positive comments other staff get when they disinfect their hands regularly
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[a] Notes are provided underneath most BCTs to help distinguish them from similar techniques

[b] An additional technique 'Increase positive emotions' will be included in BCT Taxonomy v2

Annexe II : Online Training Certificate of Completion

Annexe III : Fiches de codage des 24 articles

E_1 : de Waard 1992 (60)

E_2 : Flynn 2010 (72)

E_3 : Goodwin 1998 (63)

E_4 : Greenlee 2013 (73)

E_5 : Campbell 2012 (67)

E_6 : McTiernan 1998 (64)

E_7 : Meffred 2007 (74)

E_8 : Harris 2013 (75)

E_9 : Scott 2013 (70)

E_10 : Befort 2012 (82)

E_11 : Shaw 2007A (71)

E_12 : Stendell-Hollis 2010 (77)

E_13 : Stolley 2009 (78)

E_14 : Thompson 2012 (66)

E_15 : Shaw 2007B (65)

E_ 16 : Thomson 2010 (68)

E_17 : Djuric 2009 (62)

E_18 : Djuric 2002 (80)

E_19 : Rock 2013 (81)

E_20 : Goodwin 2014 (52)

E_21 : Rock 2015 (69)

Protocole E_21 : Rock 2013 (58)

E_22 : Jen 2004 (92)

E_23 : Pakiz 2011 (79)

E_24 : Darga 2007 (55)

Annexe III : Fiches de codage des 24 articles

Fiche codage BCTTv1 : E_1

Target behaviour : Energy restriction

Copier-coller intervention :

Because previous experience in the Netherlands with doctor's efforts to bring about weight reduction had been somewhat disappointing, professional dieticians were recruited for this task. It was felt that both nutritional knowledge and time for discussion any problems of patients were essential in achieving our goal of substantial weight loss. The dieticians in close operation with responsible clinicians looked for patients who fulfilled the eligibility criteria and they randomized them according to a 3:2 ratio in intervention and control arms, respectively. The aim was to achieve a weight loss in patients of the intervention group about 10 kg (or even more if the initial degree of overweight warranted this). The method was bases on dietary advice and psychological support. No anorectic drugs were to be given. The women could start their slimming efforts as soon as postoperative recovery and radiotherapy allowed. Since weight reduction is sensible advice in obese women there were no ethical dilemmas in the intervention needing long explanations. All women were, of course, aware of their overweight. When controls spontaneously expressed a wish to reduce their weight they received the necessary help; however, this happened in a very few cases only. Diagnostic and therapeutic information as well as follow-up data on body weight and clinical events concerning breast cancer were collected systematically. The project stared in spring 1987 in three hospitals in The Netherlands. Two oncological hospitals in the city of Poznan (Poland) joined the project in 1989. Here one of us (RR) co-ordinate intake, randomization in a 3:2 ratio and contact with treating physicians. He explained the study to all eligible patients and arranged for those in the intervention group to meet with one of the dieticians in the hospitals. A balanced diet of 1500 kcal was prescribed and discusses; if insufficient weight loss was noted a 1000 kcal was tried.

The aim was to achieve a weight loss in patients of the intervention group about 10 kg : 1.3

The method was bases on dietary advice and psychological support. : 3.1

A balanced diet of 1500 kcal was prescribed and discusses; if insufficient weight loss was noted a 1000 kcal was tried : 1.1

Fiche codage BCTTv1 : E_2

Target behaviour : Low-fat diet / plant-based olive oil diet or National Cancer Institute (NCI) diet

Copier-coller intervention :

Participants consumed two diets for 8 weeks of weight loss, each with random assignment of diet order: (1) an NCI diet for women with breast cancer3 and (2) PBOO diet. The PBOO diet was designed by the study PI and previously had been compared with lower-fat diets in patients with heart disease15 and in overweight but otherwise healthy participants.16 Both diets were prescribed at 1500 calories. The NCI diet had dietary fat of 25–50 g=day (>15% and <30% fat for 1500 calories); unlimited fruits and vegetables, with a minimum of 5 servings of fruits and vegetables=day; and up to 7 oz of lean meat=day. Canola oil was provided to the participants while on the NCI diet, as it is low in omega-6 polyunsaturated fats, which have been associated with an increase in breast cancer risk.17,18 The PBOO diet prescribed was for at least 3 tablespoons=day of extra virgin olive oil, with sufficient extra virgin olive oil provided during the PBOO diet; unlimited vegetables; 3 servings=day of fruit and up to 6 oz=week of poultry and up to 8 oz=week of seafood. Whole grain products and legumes were encouraged for both diets, and alcohol was proscribed.

Diet instruction was provided before each of the 8 weeks of weight loss. Participants were provided with meal plans, recipes, and instructions for following each of the diets. For the PBOO diet, the recipes were primarily vegetarian and included 1–2 tablespoons of extra virgin olive oil used to cook the vegetables. Participants were given a minimum weight loss goal of 5% from baseline weight. Participants met weekly with the PI or the study assistant.
After completing both diets, participants were asked to select one of the diets for 6 months of continued weight loss or weight management, with semi-monthly meetings with re- search staff. Subjects were encouraged to maintain the diet of choice and to increase their physical activity. For the PBOO diet, they were instructed to use a minimum of 2 tablespoons of olive oil/day and were allowed up to 21oz of poultry/seafood/week. Participants were not provided with either olive oil or canola oil during follow-up.

Three-day food diaries were kept during weeks 4 and 8 of each diet and during months 3 and 6 of the follow-up period. Data were analyzed using DietAnalysistþ V 8 (Thompson Wadsworth, 2007). Daily records of amount and type of dietary fat, fruit, vegetable, whole grains, and animal protein were recorded during the 8 weeks of weight loss and during 1 week=month in follow-up. Deviations from the diets were assessed by the PI; participants unwilling to consume the diet as prescribed were removed from the study.

Measurements were done on days 1 and the day after each 8 weeks of diet were completed, which was the day of the final blood sample of each diet and at the end of the 6-month follow-up. These measurements were height by stadiometer, weight by balance beam, waist circumference at the smallest area of the torso, hips measured at the widest area of the buttocks, and bioelectric impedance analysis (BIA) RJL, Inc Systems) for body composition. Weights were recorded weekly throughout the study. Two blood samples were taken at the end of each of the 8 weeks of weight loss, and one was taken after the 6 months of follow-up.

Both diets were prescribed at 1500 calories. : 1.1

was provided to the participants : 12.5

prescribed was for at least 3 tablespoons=day of extra virgin olive oil, with sufficient extra virgin olive oil provided during the PBOO diet; unlimited vegetables; 3 servings=day of fruit and up to 6 oz=week of poultry and up to 8 oz=week of seafood. : 1.4

were provided with meal plans, recipes, and instructions for following each of the diets : 4.1

were given a minimum weight loss goal of 5% from baseline weight. : 1.3

were encouraged to maintain the diet of choice : 3.1

were instructed to use a minimum of 2 tablespoons of olive oil/day and were allowed up to 21oz of poultry/seafood/week. : 1.4

Three-day food diaries were kept during weeks 4 and 8 of each diet: 2.3

Deviations from the diets were assessed by the PI: 1.6

Fiche codage BCTTv1 : E_3

Target behaviour : Balanced diet (Canada's food guide) and physical activity

Copier-coller intervention :

The one year intervention involved a group approach, supplemented by individual weight goals, and nutrition and exercise programs. The groups consisted of 6–10 women with breast cancer and 2 leaders. One leader was required to have expertise in the psychosocial area (psychiatrist, psychotherapist) and the other leader was a nutritionist. At least one leader was female. The groups met for 90 minutes weekly for 10 weeks (intensive phase) and then monthly for 10 months (booster phase). Meetings were scheduled at times that were convenient for participants. Group membership was closed to enhance cohesion and consistency. All group sessions were videotaped; these tapes were reviewed by the investigators to ensure that key components of the intervention were addressed and to facilitate training of new group leaders. Women received educational materials that included information on breast cancer and its treatment, nutrition, physical activity, and psychological adaptation to breast cancer. Leaders were provided with an outline of the intervention which described goals, content, therapeutic strategies, and homework to be completed by participants. Early sessions focused on the introduction of members and approaches to nutrition, exercise, and coping. A family session at week 5 usually led to greater subsequent emotional expressiveness; remaining intensive phase sessions focused on life change, problem solving, and transition to monthly meetings. Booster sessions focused on relapse prevention, monitoring and maintaining changes, planning for an uncertain future, living with fears of recurrence, and termination issues. Leaders observed groups, reviewed videotapes and co-led groups with an experienced leader as part of their training.

The nutrition component:
The program was based on Canada's Food Guide [43]. This Food Guide includes 4 food groups (grains; fruits and vegetables; milk and milk products; meats and alternatives). Adherence to the guide results in a balanced diet which is moderate in fat (25–30% of calories) and relatively high in carbohydrates and fibre. A range of servings for each food group leads to a range of caloric intakes; each women was assigned a specific number of daily servings based on her current weight and need to lose weight. The individualized nutrition programs reflected food likes and dislikes as determined during an individual interview. Women were encouraged to eat 3 meals per day, with snacks as necessary. Meal planning and avoidance of periods of extreme hunger were encouraged. Calorie counting was discouraged. Women were provided with individualized, written feedback at each group session. Detailed information on sources of dietary fat, low-fat preparation of meals, and serving sizes was provided. Common nutritional problems, such as treatment related nausea, hidden sources of fat, and stress-related eating were discussed in the group.

The physical activity component:
The program encouraged (i) long term changes in everyday activities (for example, climbing stairs instead of taking elevators), (ii) strength and flexibility exercises three times weekly, and (iii) moderate aerobic activity. The central role of physical activity in weight management was emphasized; group sessions addressed motivation and the need to modify priorities to find time for exercise. During the early intensive phase women were given individual physical activity programs that reflected preexisting habits, exercise likes and dislikes, and lifestyle. Individual written feedback gradually increased aerobic exercise to at least 20–30 minutes at least 3 times weekly at 70% of maximum predicted heart rate. Intensive phase sessions included a 5–10 minute fit break during which women practiced strength and flexibility exercises and learned to monitor their pulse rates at rest and during mild aerobic activity.

The psychosocial component of the program occupied 75–80% of the meeting time. The group sessions focused on creating a safe environment in which women could express emotions regarding breast cancer (both positive and negative), provide and receive support, develop and practice new coping and problem solving strategies, and develop skills in relaxation. Normalization of the breast cancer experience and utilization of that experience as a

stimulus for long-term life change were facilitated. Reordering of priorities, reexamination of life goals, and reevaluation of family and social network was encouraged. A series of themes emerged: Why me?; Existential issues – death, dying, and the future; Recurrence in a group member; Doctor-patient relationships; Treatment related concerns; Self and body image; Changing priorities and life goals; Family and social network. One session during the intensive phase involved family members and friends and focused on obtaining support for the changes women were undertaking. All sessions ended with a relaxation guided imagery exercise.

One leader was required to have expertise in the psychosocial area (psychiatrist, psychotherapist) and the other leader was a nutritionist : 9.1

A family session at week 5 usually led to greater subsequent emotional expressiveness : 3.3

problem solving : 1.2

relapse prevention : 1.2

living with fears of recurrence : 11.2

were encouraged to eat 3 meals per day, with snacks as necessary. : 1.4

were provided with individualized, written feedback at each group session : 2.2

Detailed information on sources of dietary fat, low-fat preparation of meals, and serving sizes was provided. : 4.1

stress-related eating were discussed in the group : 11.2

Individual written feedback: 2.2

gradually increased aerobic exercise : 8.7

to at least 20–30 minutes at least 3 times weekly at 70% of maximum predicted heart rate. : 1.1; 1.4

Intensive phase sessions included a 5–10 minute fit break during which women practiced strength and flexibility exercises : 8.1

to monitor their pulse rates at rest and during mild aerobic activity : 2.4 ; 2.6

could express emotions regarding breast cancer : 3.3

provide and receive support : 3.1

develop and practice new coping and problem solving strategies : 1.2

develop skills in relaxation : 11.2

Fiche codage BCTTv1 : E_4

Target behaviour : Physical Activity, dietary changes and energy restriction

Copier-coller intervention :

The study made use of the Curves Weight Management Program curriculum, which at the time of the study was widely available to the public. The Curves program included use of the Curves fitness centers and a Curves diet plan, which was taught by Curves staff via a standardized nutrition course that made use of a book, DVDs, and an instructor's manual all published by Curves. At the time of the study, based on company policy, Curves fitness centers had the option of offering the group nutrition course to their members at their discretion. Many of the participating Curves centers did not offer the nutrition course on a regular basis. In order to ensure that all study participants across New York City could have access to the nutrition course, two Curves fitness center owners conducted the nutrition courses at the CUMC for study participants.

Exercise—During the 6-month intervention period, participants were provided with memberships to a Curves fitness center that was convenient to their home and/or workplace. The study had a target goal for women to exercise at the fitness centers 3 days/week. Women were told by study staff that the target was for women to exercise 5 days/ week; this "reach goal" approach was used because it was expected that women would attend the fitness center on a fewer number of days than the stated goal. The Curves circuit-based exercise program alternates 30 s of bi-directional, strength-training pneumatic resistance machine exercises prescribed at an individual intensity with 30 s of low-impact aerobic activity. An exercise session includes 25 min of the circuit followed by 5 min of cool down and stretching. At the beginning of their exercise program, subjects met individually with a Curves trainer to receive three one-on-one training sessions. The training program began with 15-min sessions targeting ≤60% of the individual's maximal heart rate, and by week 8 gradually increased to 30-min sessions while maintaining 70–75% of maximal heart rate. The program is a moderate-intensity workout, based on targeted heart rate (24).

Safety—New York State law required that all fitness center staff be CPR certified. All fitness centers had at least one Curves certified circuit trainer, and all staff received verbal and written instructions on how to work with study participants. Participants were provided Polar S-610 heart rate monitors, (Polar Electro Oy, Finland) along with verbal and written instructions on their use, to monitor and record heart rate during all exercise sessions. A study physician was always on-call to handle any urgent medical issues. Participants self- reported any adverse events during study follow-ups.

Dietary change—The dietary change component of the program began ~1 month after beginning the exercise program. Participants attended a nutrition course that consisted of six 1-h weekly group sessions over 6 consecutive weeks taught by a bilingual instructor at the CUMC. Each session involved a 15–20 min DVD presentation, a 15–20 min lecture based on an instructor's manual, and 20 min of discussion. Session topics included setting weight loss goals, dietary recommendations, food shopping, eating out, understanding energy balance, the Curves workout, and troubleshooting barriers to adhering to the weight loss program. During the sessions, the following daily behaviors were encouraged: eat breakfast, eat five small meals, eat ≥2 servings fruit, eat ≥3 servings vegetables, drink 2 l of water, read food labels when choosing foods, and pay attention to intake of total calories, protein, fat, and carbohydrates. Participants were provided with a Curves weight loss program instruction and recipe book (25). General guidelines were to reduce caloric intake (1,200 cal/day for 1 to 2 weeks, followed by 1,600 cal/day) and to distribute calorie intake as 45% protein/30% carbohydrates/25% fat. During the 6-week period, participants received weekly motivational telephone calls from the instructor and participants were allowed to make-up missed sessions by phone or in person. Participants were given the choice of enrolling in a nutrition course that was taught in English or in Spanish; courses were scheduled once enough participants had been enrolled to fill a course. During the study, a total of eight nutrition courses were offered, six in Spanish and two in English. More courses were offered in Spanish than in English due to participant preference.

Study participants and fitness center staff were advised that study participants were not permitted to use protein powders or dietary supplements sold by Curves as the effects of these are not known in breast cancer survivors.

were provided with memberships to a Curves fitness center that was convenient to their home and/or workplace : 12.1

target goal for women to exercise at the fitness centers 3 days/week : 1.1

to receive three one-on-one training sessions. : 4.1 ; 6.1; 8.1

The training program began with 15-min sessions targeting ≤60% of the individual's maximal heart rate, and by week 8 gradually increased to 30-min sessions while maintaining 70–75% of maximal heart rate : 8.7

were provided Polar S-610 heart rate monitors : 12.5

to monitor and record heart rate during all exercise sessions : 2.4 ; 2.6

daily behaviors were encouraged: eat breakfast, eat five small meals, eat ≥2 servings fruit, eat ≥3 servings vegetables, drink 2 l of water, read food labels when choosing foods, and pay attention to intake of total calories, protein, fat, and carbohydrates : 1.4

were provided with a Curves weight loss program instruction and recipe book : 4.1

General guidelines were to reduce caloric intake (1,200 cal/day for 1 to 2 weeks, followed by 1,600 cal/day) and to distribute calorie intake as 45% protein/30% carbohydrates/25% fat. : 1.1

received weekly motivational telephone calls from the instructor : 3.1

Fiche codage BCTTv1 : E_5

Target behaviour : Energy restriction and physical activity

Copier-coller intervention :

Study design: The study used an experimental pre–post test, single group design, to assess the feasibility of the intervention. Participants completed a 24-week group-based intervention that consisted of a combined reduced-energy diet and exercise intervention. Study outcome measures were completed at baseline, 24, and 36 weeks (see the Figure). Sample size was calculated using the amount of expected weight loss equaling 7% weight loss in women with a BMI 25, 30, and 35 and standard deviations provided in the literature on weight loss in breast cancer survivors (12,13). Twelve participants were needed to detect 7% weight loss (80% power, level .05), and to account for a possible maximum 10% drop out we enrolled 14 participants.

Diet intervention: The diet intervention was instructed by an experienced RD and included 16 group-based sessions following the DPP curriculum (14,15). Participants attended one group dietary session per week for the first 8 weeks followed by biweekly group sessions (weeks 9 through 24). Women were instructed to follow an individually prescribed reduction in energy intake according to their weight loss goal of loss of 7% of their baseline body weight and a dietary fat intake 20% of total energy intake. Specific amounts of energy were not prescribed but rather strategies to reduce energy intake were records and body weights. Participants also used food diaries along with weighting as self-monitoring tools. The modifications to the DPP program included group vs individual sessions and included supplementary information on diet and weight loss relevant to breast cancer survivors (eg, calcium and vitamin D and bone loss, factors associated with weight gain during cancer treatment, and the safety of alcohol and soy phytoestrogens post-diagnosis).

Exercise intervention: The exercise intervention format was modified substantially from the DPP program, which consisted of telephone-based counseling to promote a home-based program of 150 minutes/week of moderate-intensity physical activity, such as brisk walking. In our pilot, participants completed two supervised 45-minutes exercise sessions per week for 24 weeks at a dedicated research fitness facility, and were asked to complete additional home-based exercise to achieve a total of 150 minutes per week of moderate to vigorous aerobic exercise (see the Figure). The exercise prescription was progressive, starting with 20 to 30 minutes at 60% of the maximum heart rate (HRmax), and gradually increased to 45 minutes per session by week 6. Weeks 7 through 12 focused on increasing intensity from 60% HRmax to 80% HRmax, whereas weeks 13 through 24 added one interval workout session per week supervised by the exercise trainers.

weight loss goal of loss of 7% of their baseline body weight : 1.3

dietary fat intake 20% of total energy intake : 1.1

used food diaries along : 2.3

with weighting as self-monitoring tools : 2.4

completed two supervised 45-minutes exercise sessions per week for 24 weeks at a dedicated research fitness facility , and were asked to complete additional home-based exercise : 4.1 ; 6.1 ; 8.1 ; 1.4

to achieve a total of 150 minutes per week of moderate to vigorous aerobic exercise : 1.1

progressive, starting with 20 to 30 minutes at 60% of the maximum heart rate (HRmax), and gradually increased to 45 minutes per session by week 6. : 8.7

Fiche codage BCTTv1 : E_6

Target behaviour : Physical activity and dietary program

Copier-coller intervention :

Exercise program: The exercise program consisted of moderate intensity exercise (e.g stationery bicycle or brisk walking). The goal was 30-45 min per day, 6 days per week, by the end of the 8-week intervention period. The program was individually prescribed, based on the woman's level of fitness, as determined on the treadmill test, with a goal of 70-80% maximal heart rate. The program was based on similar successful programs conducted at the University of Washington Exercise Physiology Laboratory. Initially, patients met individually or in small groups with the exercise physiologist in monitored exercise sessions three times per week. Starting at about halfway monitored days. All exercise sessions were monitored with upper and lower pulse alarms. Patients kept a daily exercise diary, where they recorded exercise done, length of session, and pulse rate.

Dietary program: The dietary program consisted of a low-fat (20% calories from fat) diet. The dietary change program was modified from the Women's Health Initiative Dietary Change program to fit into the time and resource constraints of this feasibility study. Patients met one individually or in a group with a nutritionist (C.U). At this meeting, patients learned skills to change eating behaviors to adopt the dietary program. Patients were given programmatic written intervention materials that explained in sequential detail the nutritional concepts and behavioral techniques needed to change to the new diet. They were also instructed in completion of a daily self-monitoring measurement, which they used for about 2 weeks. Patients were given the phone number of the nutritionist and invited to call her if they had any questions. In addition, the nutritionist called each woman about 3 weeks after the counseling session to assess adherence and to provide additional counseling, if needed. Adherence to the dietary program was measured with a modified Block 98-item food frequency questionnaire, administered at baseline and at 8-week follow-up, in which patients were asked to recall the frequency at which they had eaten selected foods over the preceding month.

The goal was 30-45 min per day, 6 days per week, by the end of the 8-week intervention period : 1.1; 1.4

a goal of 70-80% maximal heart rate : 1.3

patients met individually or in small groups with the exercise physiologist in monitored exercise sessions three times per week. : 4.1, 6.1, 8.1; 9.1; 1.4

were monitored with upper and lower pulse alarms : 2.4; 2.6

kept a daily exercise diary, where they recorded exercise done, length of session , and pulse rate : 2.3; 2.4

learned skills to change eating behaviors to adopt the dietary program : 4.1

were given programmatic written intervention materials that explained in sequential detail the nutritional concepts and behavioral techniques needed to change to the new diet. : 4.1

call her if they had any questions. In addition, the nutritionist called each woman about 3 weeks after the counseling session to assess adherence and to provide additional counseling, if needed : 3.1

Fiche codage BCTTv1 : E_7

Target behaviour : Physical activity and negative energy balance diet

Copier-coller intervention :

Enrolled study participants were stratified by age and BMI and assigned to either the intervention group or a wait-list group. Participants assigned to the intervention group attended group sessions using curriculum based on the new elements of CBT for obesity in addition to many elements of standard behavioral treatment for obesity, included self-monitoring, realistic goal-setting and cognitive restructuring, as applied to behavior and attitudinal change (relevant to increased physical activity, food choices, and body image). Participants were advised to self-monitor with food diaries and exercise logs, monitoring negative and positive thoughts and feelings in addition to actual behavior. Telephone contact was made four times in the initial 2 weeks and once weekly following this period. Content of the calls reviewed the previous days' physical activity and food choices and provided feedback to develop subgoals and goals.

The physical activity (PA) component of the intervention involved encouraging and promoting regular planned aerobic exercise, with an initial goal of daily activity and a step-wise increase in time and intensity with the overall long-term goal being an average of 1 h per day of moderate to vigorous PA. Additionally, muscle strengthening exercises were demonstrated, practiced, and encouraged during group sessions, with the goal of performing this activity 2–3 times per week. Finally, increased lifestyle activity was strongly encouraged, and a pedometer was provided as one approach to monitoring and goal setting for this aspect of PA.

The main goal of the **dietary guidance** was to promote negative energy balance through energy restriction and increased energy expenditure. A deficit of 500–1,000 kcal/day was the goal, particularly via reduced energy density of the diet, plus avoidance of overly strict dieting behavior that did not promote satiety or long-term maintenance. Participants were encouraged to include high-fiber vegetables, whole grains, and fruit, which add bulk and weight to the diet, thereby reducing energy density. Adequate protein to meet nutritional needs and to contribute to satiety was also encouraged.

cognitive restructuring : 13.2

to self-monitor with food diaries and exercise logs : 2.3

provided feedback to develop subgoals and goals : 2.2

encouraging and promoting regular planned aerobic exercise : 3.1

a step-wise increase in time and intensity with the overall long-term goal being an average of 1 h per day of moderate to vigorous PA. : 8.7; 1.1

were demonstrated, practiced, and encouraged during group sessions : 4.1; 6.1; 8.1

with the goal of performing this activity 2–3 times per week. : 1.1; 1.4

pedometer was provided : 12.5

to monitoring : 2.3

A deficit of 500–1,000 kcal/day was the goal : 1.1

Fiche codage BCTTv1 : E_8

Target behaviour : Physical activity and dietary restriction

Copier-coller intervention :

Notably, CASTLE was a pilot study in which the authors wished to determine the feasibility of (1) being able to recruit this population (recently remitted breast cancer survivors of a varied stage) for a weight loss lifestyle program and (2) developing comparable materials between the in-person and telephonic approaches. The group-based materials were developed and implemented by the study team, whereas the telephone-based intervention utilized materials developed by a company (TrestleTree®, Inc.) with expertise in motivational approaches. The authors reviewed the materials to confirm that the behavioral and motivational techniques used were comparable between the two conditions.

General organization
Group-Based intervention: The group-based intervention focused on strategies to help promote and maintain weight loss through increased physical activity and dietary restriction. Participants attended a total of 16 group meetings which occurred over a 6-month period (60–90 min/session) during phase I and were led by a trained interventionist. During phase II, participants were contacted monthly via telephone on an individual basis by a trained interventionist to provide support and guidance to promote further weight loss or maintenance. Phase II reinforced the key behavioral constructs that had been taught in phase I (e.g., self-monitoring, encouragement/support, problem solving, etc.).

Telephone-Based Intervention:
TrestleTree®, Inc. (Fayetteville, AR, USA) is a company that utilizes the behavioral stage of change model (pre-contemplation, contemplation, preparation, action, and maintenance) in order to promote and maintain positive lifestyle changes. Participants selected to the telephone-based intervention were contacted by TrestleTree® personnel once a week for 15–60 min each session. All contacts took place via telephone and were scheduled at the participant's convenience. During each session, trained TrestleTree® healthcare professionals spoke with participants to identify their current stage of change and intervened accordingly using similar behavioral principles as found in the group-based intervention. During phase II, participants were contacted monthly via telephone by the same TrestleTree® healthcare professional as phase I and provided support and guidance to promote further weight loss or maintenance.

Both interventions also incorporated lifestyle approaches associated with maintenance of weight loss during phase II, such as continued motivation and relapse prevention.

Physical activity and dietary restriction:
The physical activity goal was 150 min/week of moderate physical activity consisting primarily of walking exercise. Dietary restriction goals were to lose approximately 1–2 lbs/week and followed the Diabetes Prevention Program guidelines [21].

encouragement/support : 3.1

problem solving : 1.2

provided support : 3.1

relapse prevention : 1.2

was 150 min/week of moderate physical activity consisting primarily of walking exercise. : 1.1

to lose approximately 1–2 lbs/week : 1.3

Fiche codage BCTTv1 : E_9

Target behaviour : Physical activity and hypocaloric healthy eating program
Copier-coller intervention :

The 24-week lifestyle intervention combined three weekly supervised exercise sessions and an individually tailored hypocaloric healthy eating program.

Physical activity:
Exercise sessions comprised 30 min of aerobic exercise (65–85 % age-predicted maximum heart rate) using treadmill, cross-trainer, cycle ergometer, and/or rowing ergometer, followed by 10–15 min of muscle-strengthening exercises using resistance bands, hand weights, and stability balls.

Diet:
Each participant also received one-to-one individualized dietary advice and written information (‘‘Weight Loss On A Plate,’’ Scottish Dietetic Association). The written information included information on portion sizes from common foods in each food group and a healthy eating plan. The goal was to reduce the patient’s total daily calorie intake to 600 kcal below their calculated energy requirements, thereby inducing an estimated steady weight loss of up to 0.5 kg each week. Additional weekly small-group nutrition education seminars included topics such as dietary fat intake, hydration, achieving a healthy balanced diet, and alcohol consumption.

Exercise sessions comprised 30 min of aerobic exercise (65–85 % age-predicted maximum heart rate) using treadmill, cross-trainer, cycle ergometer, and/or rowing ergometer, followed by 10–15 min of muscle-strengthening exercises using resistance bands, hand weights, and stability balls. : 4.1; 6.1; 8.1

was to reduce the patient’s total daily calorie intake to 600 kcal below their calculated energy requirements : 1.1

thereby inducing an estimated steady weight loss of up to 0.5 kg each week. : 1.3

Fiche codage BCTTv1 : E_10

Target behaviour : Diet and physical activity behavioral change
Copier-coller intervention :

The intervention was guided by a social cognitive framework and incorporated self- regulation skills (goal-setting, self-monitoring, problem-solving, stimulus control) and social support to enhance self-efficacy for diet and physical activity behavior change, targeting 10% weight loss [19]. The intervention was tailored to the special needs of breast cancer survivors and rural women. The intervention provided opportunity for shared identity among rural breast cancer survivors while at the same time recognizing that traditions and access to resources vary from town to town and from farm to town. Breast cancer survivorship topics included dietary and physical activity recommendations related to breast cancer risk, body image as impacted by breast cancer treatment and weight, and managing lymphedema, arthralgia, and other late side effects. Topics targeted for rural women included problem-solving regarding barriers to accessing physical activity facilities and healthy foods in grocery stores and restaurants, linking behavior change to cultural values related to family and hard work, and modifying traditional "country cooking" or "potluck" dishes to be low calorie, including a cookbook of recipes submitted by the participants and modified by dietitian staff. Session topics are included in Table 1.

Diet:
Participants were instructed to follow a diet that included ≥5 fruit and vegetable servings per day, approved prepackaged frozen entrees (2 per day at < 350 kcal and < 9 g of fat each) or their equivalent (e.g. soup, other portion-controlled meals), and shakes (2 per day at 110 kcal each, Safely Slim©, Science Foods, LLC). Participants purchased food in their local grocery stores except for shakes which were provided to them. Prepackaged meals and shakes have consistently shown greater weight loss and weight loss maintenance compared to diets that rely completely on individuals preparing all their own meals [20-23], as well as greater adherence and nutrition improvement (greater increases in fruit and vegetables and fiber, greater decrease in fat intake) [21, 24-26]. Participants were given a calorie goal of 1200, 1400, 1600, or 1800 kcal/day calculated by subtracting 1000 kcal/day from maintenance requirements as determined by the Harris-Benedict equation [27] and rounding to the nearest calorie goal level. Participants were instructed on how to modify the diet to include home-prepared and restaurant foods while staying within their calorie range. Participants kept daily records of number of fruit and vegetable servings, shakes and entrees, snacks, and meals out, and they reported this information by email, fax, or voice message to their group leader the morning of each session. For one week per month, they also kept a complete food log including calorie information and mailed the log to their group leader. Group leaders reviewed all weekly reports and food logs and provided feedback during the conference calls in the context of group problem-solving. For participants who emailed their weekly records, group leaders responded to the email acknowledging receipt and providing a brief note of encouragement and feedback.

Physical activity:
Participants were guided to gradually increase their physical activity over the first 12 weeks to 225 minutes per week of moderate intensity activity (brisk walking), consistent with national guidelines for weight loss maintenance [28]. Participants were instructed in types of activities (any moderate intensity planned activity lasting 10 minutes or longer), as well as strategies to monitor intensity, plan for weather, and increase enjoyment. To enhance functional fitness, light resistance training was included as an optional component using lightweight dumbbells with visual guidance provided by a module-based DVD for breast cancer rehabilitation titled "Strength and Courage" (www.strengthandcourage.net). Participants received a pedometer and self-monitoring calendars and charts and reported their physical activity minutes and steps on their weekly log.

Participants met for 24 consecutive weeks in groups of 8 to 14 by calling a toll-free conference line at a standing meeting time. Group sessions were 60 minutes and were structured to allow all participants opportunity to contribute. Ground rules and group norms measures included no multi-tasking while on the call, being in a location free from distractions, and active member-to-

member interaction. Group counselors called on individuals during the session if they had not spoken and directed participants to speak directly to one another to normalize active participation among all members. Each session began with an open-ended check-in question relevant to the previous session's topic, followed by review of weekly progress toward goals, and ended with a diet, physical activity, behavioral, or survivorship topic of the week. A trained masters-level dietitian and a doctorate-level clinical psychologist with experience in delivering a structured weight control intervention and understanding of breast cancer survivorship topics provided the counseling. Individual sessions were not provided, and participants did not have routine contact with one another outside of the group sessions. If participants called the group leader outside of the regular group session, the group leader addressed the concern and encouraged them to bring their questions or concerns to the group as appropriate. Group counselors followed a standardized treatment manual that outlined the structure of the calls, group phone facilitation strategies, and the content and goals of each session. All sessions were recorded. After each session, group counselors completed treatment fidelity checklists documenting the content covered and the quality of the group interaction to facilitate on-going supervision and help ensure standardized delivery. The primary investigator met weekly with group leaders and listened to sessions, reviewed treatment fidelity, and discussed counseling strategies.

problem-solving : 1.2

social support : 3.1

targeting 10% weight loss : 1.3

included problem-solving regarding barriers to accessing physical activity facilities and healthy foods in grocery stores and restaurants : 1.2

instructed to follow a diet that included ≥5 fruit and vegetable servings per day, approved prepackaged frozen entrees (2 per day at < 350 kcal and < 9 g of fat each) or their equivalent (e.g. soup, other portion-controlled meals), and shakes (2 per day at 110 kcal each, Safely Slim©, Science Foods, LLC). : 4.1; 1.4

shakes which were provided to them : 12.5

were given a calorie goal of 1200, 1400, 1600, or 1800 kcal/day calculated by subtracting 1000 kcal/day from maintenance requirements : 1.1

were instructed on how to modify the diet to include home-prepared and restaurant foods while staying within their calorie range. : 4.1

kept daily records of number of fruit and vegetable servings, shakes and entrees, snacks, and meals out : 2.3

also kept a complete food log including calorie information : 2.3

and provided feedback during the conference calls in the context of group problem-solving. : 2.2; 1.2

a brief note of encouragement : 3.1

were guided to gradually increase their physical activity over the first 12 weeks : 8.7

to 225 minutes per week of moderate intensity activity : 1.1

were instructed in types of activities (any moderate intensity planned activity lasting 10 minutes or longer), : 4.1

visual guidance provided by a module-based DVD for breast cancer rehabilitation titled “Strength and Courage” : 6.1

received a pedometer and self-monitoring calendars and charts : 12.5

reported their physical activity minutes and steps on their weekly log. : 2.3

A trained masters-level dietitian and a doctorate-level clinical psychologist with experience in delivering a structured weight control intervention and understanding of breast cancer survivorship topics provided the counseling. : 9.1; 3.1

Fiche codage BCTTv1 : E_11

Target behaviour : Hypocaloric diet
Copier-coller intervention :

On recruitment to the study and prior to randomization to the control and dietary-intervention groups, the participants completed a 7-day dietary diary to assess their habitual dietary intake. The diary used was based on household measures for assessment of portion size with additional photographs to help determine the portion sizes that were eaten. Participants were randomized to the following groups, taking into account excess limb volume and concurrent drug treatment.

Control group: No specific dietary intervention advice was given. Patients were given the Royal Marsden NHS Trust Patient Information Series Booklet No. 31 on healthy eating, which provides advice on how to maintain a healthy diet.

Weight-reduction group: Individualized dietary advice was given on a weight-reduction diet with the objective of reducing body weight to the acceptable average weight for height. Diet plans were designed to produce an energy deficit of 1000 kcal (4184 kJ) per day from habitual intake derived from the pre-randomization diet record, and no participant was recommended a daily intake <1000 kcal (4184 kJ).
The majority of participants were advised to reduce their dietary intake to between 1000 and 1200 kcal (4184–5020 kJ) per day. Advice was based around the participant's usual meal pattern, and the reduction of energy intake was achieved by reducing foods that contained fat and refined carbohydrate. A system of exchanges was used to enable consumption of a variety of foods that contained for protein, fat, and starchy carbohydrate.
Dietary advice and intervention was given by the same registered dietitian (C.S.) for the duration of the study. Exercise and activity were not monitored in the study, and no specific advice was given to participants.

designed to produce an energy deficit of 1000 kcal (4184 kJ) per day from habitual intake derived from the pre-randomization diet record : 1.1

Advice was based around the participant's usual meal pattern, and the reduction of energy intake was achieved by reducing foods that contained fat and refined carbohydrate. : 4.1

Dietary advice and intervention was given by the same registered dietitian : 9.1

Fiche codage BCTTv1 : E_12

Target behaviour : Daily consumption of decaffeinated green tea daily
Copier-coller intervention :

Using a randomized, double-blind, placebo-controlled design this pilot study sought to test the hypothesis that daily decaffeinated green tea consumption as compared to herbal placebo tea consumption for a period of 6 months would result in significant reductions in body weight and improvements in metabolic parameters among overweight breast cancer survivors. All subjects who successfully completed the run-in period were randomized to either decaffeinated green tea or herbal placebo tea. Randomization was completed using a table of random numbers, independent of study personnel, at the Biometry Shared Service at the Arizona Cancer Center. The investigators and subjects were blinded to the tea compositions until all subjects had completed the trial and data analysis was underway.

Materials: This study used decaffeinated green tea and herbal tea product provided by Unilever, Lipton (Unilever Bestfoods Company, North America located in Englewood, New Jersey). The green tea bags were comprised of between 550–700 mg tea solids providing an average catechin dose of 58.91 mg/bag and 32.21 mg EGCG per bag. Caffeine content averaged 6.68 mg/bag. The citrus-based herbal placebo tea used in this study was specifically manufactured for use in tea intervention trials of this nature and blinded taste testing prior to study initiation showed people (n=6) were unable to correctly differentiate green tea from herbal tea product.

Intervention and Adherence: Women were asked to consume 960 mL of green tea daily. Specific instructions for tea preparation were provided by the study coordinator during the initial clinic visit. To review, individual tea bags were placed in the study provided tea mug and 240 mL boiling water was added and allowed to steep for a period of 3 minutes. The tea bag was then removed from the cup and stored in a study provided bag to track compliance to tea intake. Subjects were asked to consume the tea product 4 times daily and up to 2 doses were allowed at any single dosing (2 bags in 500 mL boiling water).
Adherence was assessed using daily tea logs where participants recorded the number of tea bags consumed daily. In addition, participants returned all used and unused tea bags to the clinic during their regularly scheduled monthly visits. Overall compliance among study participants from both groups was good with average tea consumption among women completing the study of 24.8 ± 4.9 bags/week (mean, SD) (5952 ± 1176 mL/week).

This study used decaffeinated green tea and herbal tea product provided by Unilever, Lipton : 12.5

were asked to consume 960 mL of green tea daily. : 1.1

Specific instructions for tea preparation were provided by the study coordinator : 4.1

were asked to consume the tea product 4 times daily and up to 2 doses were allowed at any single dosing (2 bags in 500 mL boiling water). : 1.4

Fiche codage BCTTv1 : E_13

Target behaviour : Dietary behaviour change and physical activity
Copier-coller intervention :

Dietary intervention : The intervention took place over 6 months and included 2 weekly classes. The first weekly class was 2 hours and involved discussions of knowledge, attitudes, barriers, facilitators, benefits, and costs related to changes in diet, exercise, and weight (see Table 1 for weekly topics). These discussions often included hands-on activities such as weighing and measuring foods according to participants' typical portions and then according to recommended portions, a field trip to the grocery store to practice reading food labels, creating weekly meal plans, and preparing a healthier version of a particular dish. Monday night classes began with an ice breaker that focused on participants' experiences as breast cancer survivors with topics such as "What was the most difficult phase of your breast cancer experience?" and "What is your funniest memory of your experience?" The group shared potluck dinners in honour of holidays, a breast cancer advocate who has done much for the African American community in Chicago, and significant events (1 woman's 5-year survival anniversary, the Moving Forward graduation).

Physical activity : the last 60 minutes involved an exercise class. The second weekly class was also an exercise class. Exercise classes were taught by a certified exercise instructor who also conducted community-based classes in African American neighbourhoods. She incorporated a variety of activities in her classes, including traditional aerobics, line dancing, African dance, salsa, yoga, Pilates, strength training, and flexibility training. Occasionally, activities outside of the intervention were also planned. These included a cancer survivor walk, the American Cancer Society Making Strides walk, and Cancer Survivor Day at a professional baseball game.

Social support : Social support was a component of the program. Activities to promote group cohesion were incorporated into the intervention. Friends and family were invited to all classes and activities.

These discussions often included hands-on activities such as weighing and measuring foods according to participants' typical portions and then according to recommended portions, a field trip to the grocery store to practice reading food labels, creating weekly meal plans, and preparing a healthier version of a particular dish : 1.6; 4.1; 6.1; 8.1

involved an exercise class : 4.1 ; 6.1 ; 8.1

were taught by a certified exercise instructor who also conducted community-based classes in African American neighbourhoods : 9.1

Social support was a component of the program : 3.1

Fiche codage BCTTv1 : E_14

Target behaviour : Structured diet and physical activity program
Copier-coller intervention :

Alimentation : Groupe Control : Individuals not interested in joining the weight-loss arms of the study but who wished to participate were assigned to the non-intervention control group and were given the same information currently provided to all breast-cancer patients about the importance of avoiding post-treatment weight gain, and the health benefits of having a BMI in the normal range.
Groupes Intervention (les 2) : The diet plan for each group comprised a 28-day cycle of menus and recipes. The ingredients for each day's diet plan were entered into ProNutra Diet Analysis software. The macronutrient composition of the 28-day menu plan is shown in Table 1. The intended diet composition was derived from (a) identifying the most popular weight-loss programs undertaken by the clinic breast-cancer population; (b) conducting a systematic review of the literature to define the macronutrient composition of these diets and the actual intakes during weight-loss studies to determine feasible upper and lower limits; (c) defining an acceptable overlap that ensured diet separation (< 5% for fat and carbohydrate). The 28-day meal plans were designed for five calorie-levels in each diet arm. The meal plans included interchangeable meal options (home-prepared recipes and meal instructions; eating out; and convenience meal options), educational material and a program incorporating weight-loss strategies based on a systematic review of those that support successful weight loss and maintenance and promote high levels of dietary adherence. The intervention was designed to reflect a feeding study in free-living individuals, where strict dietary structure is presented in a format that also offers enough flexibility to be adopted into daily living and by the families and social-support networks of participants.

Physical activity : The intervention groups received the same physical-activity protocol promoting the physical-activity guidelines and translated into step recommendations, but one of two diets that reflect commonly used weight-loss approaches that were identified in women attending a private oncology practice for long-term breast-cancer follow-up.

were given the same information currently provided to all breast-cancer patients about the importance of avoiding post-treatment weight gain, and the health benefits of having a BMI in the normal range. : 5.1

Fiche codage BCTTv1 : E_15

Target behaviour : Dietary change
Copier-coller intervention :

Control group:
Participants were asked to continue with their habitual diet for the 6-month period.

Weight-reduction group:

Dietary advice was given on a weight-reduction diet with the aim of reducing body weight to the acceptable average weight for height. Participants were advised to reduce their intake to 1000–1200 kcal (4.2– 5.0 MJ) per day. Individualized advice was based around individual meal patterns and the reduction of energy intake was achieved by reduction of intake of foods high in fat or refined carbohydrates. Exchange lists were given for foods supplying protein, fat, and starchy carbohydrate in order to enable a varied diet to be chosen.

Low-fat diet group:

Women were advised to reduce dietary fat intake to 20% of total energy intake. This was achieved by teaching the participants to use a series of 5 g fat exchanges. The subjects were issued a list of foods containing 5 g fat together with information on how many of these exchanges should be consumed in a day. Advice was given to maintain energy intake at the normal level by increasing carbohydrate intake.
Dietary advice and intervention was given by the same registered dietitian (C.S.) for the duration of the study. Exercise and activity were not monitored in the study and no specific advice was given to subjects. Subjects in this group were given dietary advice to increase their carbohydrate intake with the aim of maintaining their weight.

were advised to reduce their intake to 1000–1200 kcal (4.2– 5.0 MJ) per day. : 1.1

were advised to reduce dietary fat intake to 20% of total energy intake. : 1.1

teaching the participants to use a series of 5 g fat exchanges. : 4.1; 6.1

Dietary advice and intervention was given by the same registered dietitian : 9.1

Fiche codage BCTTv1 : E_16

Target behaviour : Low-fat diet or modified Atkins diet
Copier-coller intervention :

Diet Interventions and Counseling

Overweight breast cancer survivors were randomized 1:1 to one of two calorie-restricted diets—a low-fat diet or a modified Atkins/reduced carbohydrate diet. Caloric requirements were individualized, that is, estimated using (individual measured resting energy expenditure) × (an individual activity factor)—500 calories daily. The goal was to induce a 1-1.5 pound weight loss weekly in both diet groups. The modified Atkins/reduced carbohydrate diet was higher in fat and protein, and restricted in carbohydrate (35% carbohydrate, 25–30% protein, and 35–40% fat with greater monounsaturated fat). Subjects randomized to this diet were instructed to reduce carbohydrate to <30 g/day during the first 2 wk in order to induce ketosis. Subjects monitored urine daily using ketone dip-strips to assure ketosis was present. After the 2-wk induction period, carbohydrate intake was gradually increased during weekly counseling sessions until the 35% carbohydrate dietary goal was achieved, at which point women were counseled to maintain this carbohydrate intake level throughout the 6 mo of study. A daily carbohydrate (g/day) goal was set for each subject. The low-fat diet intervention was based on guidelines of the Dietary Reference Intake for macronutrient composition (55–60% carbohydrates, 25% fat, 15–20% protein) as recommended for use by survivors in the American Cancer Society Guidelines (27). Daily fat gram goals were provided. Dietary counseling for the individual study subjects began with a clinic-based, face-to-face, 45-min counseling session with a registered dietitian who had demonstrated expertise in.

was to induce a 1-1.5 pound weight loss weekly in both diet groups. : 1.3

(35% carbohydrate, 25–30% protein, and 35–40% fat with greater monounsaturated fat). : 1.1

were instructed to reduce carbohydrate to <30 g/day during the first 2 wk in order to induce ketosis. : 4.1

monitored urine daily using ketone dip-strips to assure ketosis was present. : 2.4

carbohydrate intake was gradually increased during weekly : 8.7

until the 35% carbohydrate dietary goal was achieved : 1.1

(55–60% carbohydrates, 25% fat, 15–20% protein) : 1.1

Dietary counseling for the individual study subjects began with a clinic-based, face-to-face, 45-min counseling session with a registered dietitian who had demonstrated expertise in. : 9.1 ; 3.1

Fiche codage BCTTv1 : E_17

Target behaviour : Control caloric intake and physical activity and using spiritual ties
Copier-coller intervention :

Individualized counseling led by a registered dietitian was provided to all study participants for 18 months. The counseling was done in person at the baseline, 6, and 12 month visits with interim contacts by telephone. The aim was to provide weekly contacts for the first 3 months, biweekly for months 3–6 and monthly thereafter. If a subject was not available at the appointed time for the call, a message was left. The goal was to attain a weight loss of 10% of initial weight using realistic short-term goals that included exercise and dietary energy control using balanced diet plans. The dietitian-led counseling approach utilized the theoretical framework of Bandura's social cognitive theory. Weight Watchers coupons also were provided for free weekly attendance throughout the study since we found previously that Weight Watchers increased early weight loss success over individualized counseling alone. Weight Watchers pre-packaged meals were not recommended by the dietitian. A monthly newsletter included topics on environmental control, goal setting, negative/positive thinking, body image, self-monitoring, social support, and time management.
Counseling for the weight loss goal of 10% of baseline body weight targeted a 1 to 2 pound/ week weight loss using the American Dietetic Association dietary exchange list diet method. The recommendation was for a deficit of 500 to 1000 kcal per day below the calculated. maintenance intake for a given body weight (using an estimate of 11 kcal/pound needed for maintenance). Subjects were asked to decrease fat to 20–25% of calories, to keep protein at about 20% of calories, to use whole grains for at least half of their daily grain intake, and include at least 6–8 servings of fruits and vegetables each day, depending on energy intake (with an emphasis on variety). The exchange list method was chosen since it accommodates individual food preferences, which appears important for AA women.

In addition to control of caloric intake, study participants were asked to exercise at least 30 minutes most days each week (at least 5), in accord with currently accepted guidelines, using their preferred mode of exercise. Subjects were given pedometers for self-monitoring, and instructed that 10,000 steps each day is a desirable goal. Lists of local resources such as mall walking clubs, biking clubs, library exercise videos and community facilities near their place of work or home were provided. Subjects were asked to keep a log of time spent on exercise together with their dietary exchange log in the same weekly self-monitoring booklet. Envelopes with postage were provided for mailing this log to the dietitian before the scheduled call. This method was successful in our previous study of breast cancer survivors. In addition, a pilot study with 12 AA obese breast cancer survivors showed that this published dietitian-led approach resulted in a mean loss of 9.8% of baseline weight over 6 months (unpublished data).

The spirituality approach was selected based on two focus groups that we conducted with 15 women before we initiated this study. The focus groups indicated that overweight and obese AA breast cancer survivors were attracted to an approach that uses spirituality to help them incorporate and follow new lifestyle patterns for maintenance of a lower body weight. The spirituality counseling was aimed at addressing the following areas which we identified as important to weight loss maintenance: 1) coping in a crisis; 2) setting priorities; 3) dealing with emotional issues which trigger old behavior patterns; and 4) developing accountability for following desired diet and exercise behaviors. The most common cause of relapse during behavior change attempts has been identified as distress. Other causes of relapse include social pressure from a social network, and lifestyle issues where time is a factor in accomplishing desired diet and exercise goals.
Spirituality is thought to build the inner strength that is necessary to reduce stress and to prioritize one's own needs, both of which are important in weight management. Connectedness with others and a higher power (key elements of spirituality) also can be used to create accountability outside of one's own self for maintaining weight loss behaviors. The goal of the spiritual counseling therefore was to strengthen and utilize spiritual ties to incorporate healthy lifestyle behaviors into each woman's own value system. Some participants already had strong spiritual ties that could be applied towards weight loss behaviors while others needed to first build their spiritual ties before they could be used to foster healthy lifestyle behaviors. A spiritual

counselor with a Master's degree in Counseling Psychology and a certification in Biblical Counseling conducted this intervention. Contacts with the spiritual counselor were exclusively by telephone. These contacts were scheduled to be weekly for 3 months, biweekly for the next 3 months, and then monthly, with flexibility for each individual based on need. The frequency of contacts was documented. The spiritual counselor also discussed the progress of each participant with the dietitian, so that the counseling was coordinated. Subjects were taught to use daily meditation, daily readings, and the recording of thoughts in a journal. It has been suggested that in order to achieve a greater spiritual influence in one's life, time and space must be found for "exercises" that heighten awareness of one's actions and feelings. Existing weight loss programs conducted in the community through churches, such as Faithful Fitness and First Place: A Christ-centered Health Program, utilize motivational readings from the Bible organized around specific topics relevant to weight loss such as "Value Your Body (your body .....God's temple)", "On loan from God", "Going God's Way" and "Practical love with difficult people". The spiritual counselor offered guidance to study participants on developing meditations that helped them observe their own actions and build better behaviors. For some participants, Scripture or prayer was preferred. The book "Walk Tall: Affirmations for People of Color" (C. Brice, RPI Publishing: San Diego, 1994) was given to all participants since it provides daily inspirational readings, generally given as quotes from prominent figures. In addition, subjects were given the book "God Just Showed Up" (L. Watkins, Moody Press: Chicago, 2001).
A reflection journal was used to develop an understanding between experiences and feelings and making sense of those feelings, which can affect faith. These reflections were a step towards identifying gainful engagement, and the counselor could be consulted for development of engagement strategies that lead to behavior change. Ongoing questions suggested for reflection in the journal were: 1) How does this experience or event help me discern the presence or absence of a Higher Power in my life? 2) What insights do these events/experiences offer into myself as a person? 3) How does this help me respond to and with others who seek to involve a Higher Power in our lives as part of the community? The spirituality counseling included recommendations to spend time each day on spiritual activities to enforce the requested lifestyle changes.

Individualized counseling led by a registered dietitian was provided to all study participants : 9.1; 3.1

The goal was to attain a weight loss of 10% of initial weight : 1.3

Weight Watchers coupons also were provided for free weekly attendance throughout the study : 12.5

Counseling for the weight loss goal of 10% of baseline body weight targeted a 1 to 2 pound/ week weight loss: 1.3

The recommendation was for a deficit of 500 to 1000 kcal per day below the calculated : 1.1

were asked to decrease fat to 20–25% of calories, to keep protein at about 20% of calories : 1.1

include at least 6–8 servings of fruits and vegetables each day, depending on energy intake (with an emphasis on variety). : 1.4

were asked to exercise at least 30 minutes most days each week (at least 5), : 1.1 ; 1.4

were given pedometers : 12.5

for self-monitoring, : 2.3

10,000 steps each day is a desirable goal. : 1.1

dealing with emotional issues which trigger old behavior patterns : 11.2

to reduce stress : 11.2

A spiritual counselor with a Master's degree in Counseling Psychology and a certification in Biblical Counseling conducted this intervention. : 9.1

were asked to keep a log of time spent on exercise together with their dietary exchange log in the same weekly self-monitoring booklet. : 2.3

were taught to use daily meditation, daily readings, and the recording of thoughts in a journal. : 4.1 ; 2.3

Fiche codage BCTTv1 : E_18

Target behaviour : Control arm or Weight Watchers arm (attend WW meetings) or Individualized arm (energy restriction, physical activity) or comprehensive arm (energy restriction, physical activity and attend WW meetings).
Copier-coller intervention :

Control group arm :
Subjects randomized to the control arm received the National Cancer Institute's "Action Guide to Healthy Eating" and the "Food Guide Pyramid" pamphlets, but they received no other dietary or exercise instructions or help. They met with the dietitian at baseline, 3, 6, and 12 months for the required assessments. Controls were allowed to follow a weight-reduction diet on their own if desired.

Weight Watchers Arm:
For the WW arm, women were encouraged to attend WW meetings but received no other dietary or exercise instruction. These meetings were conveniently available throughout the Detroit area at various times during the day. Coupons for weekly attendance were provided free of charge. The "weigh-in" data card from the WW meetings was faxed or mailed to the dietitian as proof of attendance, and this also provided additional data to assess weight-loss patterns and attendance. The WW program is designed for weekly attendance.

Individualized Arm:
Contacts by the dietitian were scheduled to be weekly for the first 3 months, biweekly for months 3 to 6, and monthly thereafter. Women were accommodated if they needed a greater or lesser frequency of contacts at any given time. They were also free to call the dietitian, and some women enjoyed sharing their successes as they occurred. Apart from the quarterly data collection visits, all of the individual contacts were by telephone appointment. A monthly group meeting was held during the lunch hour, and women were encouraged, but not required, to attend. A monthly packet of written information was prepared on various weight-loss topics (environmental control, serving-size control, exercise, motivation, goal setting, holiday eating, seasonal foods) and either presented to the women at the monthly meeting or mailed to their homes. One-on-one counseling was provided regarding diet and exercise by a registered dietitian. There was only one dietitian for the study, and she had over 10 years of experience in weight-loss counseling in clinical settings. The weight-loss goal was an initial decrease of 10% of baseline weight over 6 months. This goal was discussed at the beginning of the study to determine if a woman's own goals needed to be adjusted to a "reasonable body weight" instead of an "ideal body weight." Previous studies demonstrated that an average weight loss of 8% of body weight can be achieved in 6 months. Because this is an average figure, a goal of 10% of initial body weight is not unrealistic and is generally considered to be a reasonable and physiologically significant goal (25). The goal was to be achieved with a 1 to 2 lb/wk weight loss by decreasing energy and fat intakes combined with 30 to 45 min/d of moderate activity most days of the week. The dietary goals were derived for each woman using the American Dietetic Association Exchange List diet plan (26). Energy intake was decreased 500 to 1000 kcal/d relative to the calculated energy requirements for a sedentary person using an estimate of 11 kcal/lb body weight needed for weight maintenance (27). Target fat intake was 20% to 25% of energy from fat. The fruit and vegetable intake goal was at least 5 servings/d, and protein intake was up to 20% of energy. Emphasis was also placed on increasing fiber intakes through whole grain choices. The overriding philosophy of the program was that a new lifestyle must be developed that supports a lower body weight. Contacts were by phone or in person, and food and exercise records were mailed to the dietitian before the scheduled contact. The counseling session varied in length depending on individual needs. The dietitian first verified whether or not the participant was meeting behavior-change goals set in the previous week. If not, the problem was delineated, and the dietitian helped the subject devise a plan that would be used to circumvent the problem. The techniques taught included goal-setting, menu planning, self- efficacy, self-monitoring, consideration of body image, social support, social eating, removing roadblocks, positive thinking, dealing with high-risk situations and slips, and cue elimination.

The counseling approach used the theoretical framework of Bandura's social cognitive theory (28). This framework has been particularly useful in nutrition interventions, such as weight control and low-fat diets (29). According to the model, behavior is determined by an interaction between cognitive mediators (such as beliefs of self-efficacy, outcome expectancy, and self-regulatory processes) and influences of society and environment (28,30). Participants also were encouraged throughout the treatment to address their thoughts and beliefs about themselves and their weight, especially with regard to self-image and self-acceptance (31).

Comprehensive Arm For the comprehensive arm, subjects received the individualized counseling described above and were asked to attend weekly WW meetings using free coupons. Because the subjects had group meetings with WW, and it was felt that adding the dietitian-led monthly group might be an overly burdensome time commitment, the monthly meeting was omitted. The WW program has dietary guidelines that coincide well with cancer-prevention guidelines and with the dietary-exchange goals that were presented to the participants, and this was explained in detail. The women learned how the "points" system of WW, which takes into account energy, fat, and fiber contents of foods, coincides well with the food-group exchanges that were assigned for each individualized diet plan. It was requested that exercise and dietary logs be kept daily.

Individualized Arm : combined with 30 to 45 min/d of moderate activity most days of the week. Pedometers were provided for self-monitoring and goal-setting. It was requested that exercise and dietary logs be kept daily, and these were reviewed together with each subject.

Coupons for weekly attendance were provided free of charge. : 12.5

One-on-one counseling was provided regarding diet and exercise by a registered dietitian. : 9.1; 3.1

The weight-loss goal was an initial decrease of 10% of baseline weight over 6 months. : 1.3

goal was to be achieved with a 1 to 2 lb/wk weight loss : 1.3

combined with 30 to 45 min/d of moderate activity most days of the week. : 1.1

was decreased 500 to 1000 kcal/d relative to the calculated energy requirements for a sedentary person : 1.1

was 20% to 25% of energy from fat. The fruit and vegetable intake goal was at least 5 servings/d, and protein intake was up to 20% of energy. : 1.1; 1.4

the problem was delineated, and the dietitian helped the subject devise a plan that would be used to circumvent the problem. : 1.2

were encouraged throughout the treatment to address their thoughts and beliefs about themselves and their weight, especially with regard to self-image and self-acceptance (31).
: 13.2

It was requested that exercise and dietary logs be kept daily. : 2.3

Pedometers were provided : 12.5

for self-monitoring : 2.3

It was requested that exercise and dietary logs be kept daily : 1.3

Fiche codage BCTTv1 : E_19

Target behaviour : Modest reduction in energy intake, healthy eating and physical activity
Copier-coller intervention :

Groupe "immediate": The intervention focused on promoting regular physical activity, a modest reduction in energy intake, and healthy eating attitudes and behaviors in order to facilitate weight loss. The immediate program curriculum consisted of group sessions that met weekly for 6 months and then approximately once per month through 18 months. The group meetings were closed group contingents with an average of 12–15 women, led by trained investigators and research staff. The sessions consisted of discussion and educational sessions, emphasizing planned aerobic exercise, increased daily physical activity, strength training, and dietary guidance to promote weight loss and maintenance. Additionally, the curriculum incorporated psychological components (e.g., self-acceptance, body image). In addition to the group sessions, participants received individualized telephone-based counseling from the study coordinator with four contacts in the initial two weeks, weekly calls over the following ten weeks, and once a month thereafter.

Wait list group : During the immediate intervention period, wait-list participants were followed and received general contact (such as mailed communication, seasonal cards, and monthly check-up calls) and were invited to educational sessions. At the end of the immediate intervention period, they were provided all written intervention material and a facilitated discussion in a seminar format.

received individualized telephone-based counseling from the study coordinator 3.1

Fiche codage BCTTv1 : E_20

Target behaviour : Healthy lifestyle
Copier-coller intervention :

Mail-based education intervention arm + individualized lifestyle intervention to reduce weight arm: Both study arms received mailed information on healthy living obtained from public sources (Canadian Cancer Society, Health Canada, and similar organizations) at random assignment and at 1 year. The content addressed healthy diets, physical activity, breast cancer, compliance with therapy, osteoporosis, and other general medical issues. Women also received a 2-year subscription to the Canadian Health Magazine (Canadian medical association)

Individualized lifestyle intervention to reduce weight arm: Women allocated to the individual lifestyle intervention (LI) arm also participated in a 2-year telephone-based intervention patterned on the DPP (diabete program). Goals included 10% weight loss (1 to 2 lbs per week) to a BMI not less than 21 kg/m2; calorie reduction to attain a 500 to 1,000 kcal daily deficit, with initial recommended daily intake of 1,250, 1,500, or 1,750 kcal and reduction in fat to approximately 20% of calories and increased intake of fruits, vegetables, and grains; a gradual increase in moderate-intensity aerobic physical activity (walking for the majority of participants) to 150 to 200 minutes per week; and behavioral change–motivation, relapse prevention, reducing emotional distress, time management, and overcoming barriers. The intervention was delivered centrally in English or French by trained lifestyle coaches from a call center at the University of Ottawa supervised by R.J.S. Nineteen telephone contacts were scheduled during the intensive phase (weeks 0, 1, 2, 3, and 4), the consolidation phase (every 2 weeks during months 2 to 3 and monthly during months 4 to 6), and during the maintenance phase (every 2 months during months 7 to 12 and every 3 months during months 13 to 24). Participants received a workbook that provided detailed information regarding each call. Calls lasted 30 to 60 minutes and were scripted, semi-structured, and standardized; they involved a review of progress and problems since the previous call and setting of goals (diet, activity, behavioral) to be addressed before the next call. Lifestyle coaches individualized the intervention as necessary and highlighted problem solving and motivation. Standardization involved standardized training and supervision, recruitment of a lead coach, scripting of telephone calls, and recording and centralized review of at least 50% of phone calls.

Goals included 10% weight loss (1 to 2 lbs per week) to a BMI not less than 21 kg/m2; : 1.3

calorie reduction to attain a 500 to 1,000 kcal daily deficit, with initial recommended daily intake of 1,250, 1,500, or 1,750 kcal and reduction in fat to approximately 20% of calories and increased intake of fruits, vegetables, and grains; : 1.1

a gradual increase in moderate-intensity aerobic physical activity (walking for the majority of participants) : 8.7

to 150 to 200 minutes per week : 1.1

relapse prevention : 1.2

reducing emotional distress : 11.2

problem solving : 1.2

Fiche codage BCTTv1 : E_21

Target behaviour : cognitive-behavioral therapy for obesity, increased physical activity, and individualized diet modification that promotes an energy deficit.
Copier-coller intervention :

Intervention details have been reported previously.10 The goal of the intervention was a 7% weight loss at 2 years after random assignment. Briefly, the intervention began with an intensive phase that consisted of 4 months of weekly 1-hour group sessions for closed groups of an average of 15 women, tapering to every other week for 2 months. From 6 months onward, the groups met monthly for the remainder of the first year. The strategies and guidance discussed in the group sessions were reinforced by brief (10- to 15-minute) personalized guidance delivered by telephone and/or e-mail.
The goal of dietary guidance was to promote a reduction in energy intake, aiming for a deficit of 500 to 1,000 kcal a day relative to expenditure. The physical activity goal was an average of at least 60 minutes per day of purposeful exercise at a moderate level of intensity. Tailored print newsletters provided additional support when the groups met less frequently. Newsletters were provided quarterly from 6 to 24 months; were individually tailored based on information about physical activity, dietary intake, and weight; and provided guidance for overcoming barriers to increase physical activity and regulate dietary intake. Control group participants were provided weight management resources and materials in the public domain. An individualized diet counseling session was provided at baseline and 6 months, and current physical activity recommendations (at least 30 minutes per day) were advised. Control group participants also received monthly telephone calls and/or e-mails from the study coordinator and were invited to attend optional informational seminars on aspects of healthy living other than weight control every other month during the first year.

Protocole:
Group intervention—The goal of the intervention was to achieve a modest weight loss of at least 7% body weight that would be sustained, and behavioral goals to achieve that outcome were reduced energy intake relative to expenditure and increased physical activity. The intervention began with an intensive phase that consisted of four months of weekly one- hour group sessions for closed-group contingents of an average of 15 women, tapering to every other week for two months. The group sessions had 1–2 leaders, who had backgrounds in dietetics, psychology and/or exercise physiology, and who remained assigned to the closed group throughout the intervention. Sessions were scheduled at convenient times, including evening and daytime hours, to facilitate attendance. From 6 months onward, the groups met monthly for the remainder of the year. The core content was standardized, although group leaders had flexibility in adapting the material and discussions to be relevant to the needs and characteristics of a given group.
The group program was supported by personalized guidance delivered by telephone and/or email to individualize the feedback, goal-setting, planning and follow-through for specific behavioral goals. These individualized contacts were highly focused and brief (10–15 minutes) and were designed to reinforce goal-setting and follow-through. The goal was for each participant in the intervention arm to receive a total of approximately 14–16 counseling calls or contacts in the first study year and a total of 24–38 calls or messages (depending on need for support and feedback) during the two-year period of the intervention. Completed contacts were noted in the database, and inability to contact triggered follow-up by the site project coordinator. Tailored print newsletters provided additional support and reinforced self-management when the groups met less frequently. These were produced by a health communications consulting and development firm with expertise in health communication and individually-tailored messaging (People Designs, Durham, NC). Newsletters were provided quarterly from 6–24 months and were individually tailored on information about physical activity (minutes/day and pedometer counts), dietary intake, and weight, and provided suggestions for overcoming common barriers to exercise and weight management and reinforcement for progress and appropriate goal setting.
The Coordinating Center at UCSD provided continuing oversight for quality assurance (QA) for intervention sessions and related activities across sites. These activities included standardization of the intervention program by providing session materials, training and

oversight of the group sessions across sites; structuring of overall content of group sessions; monitoring group sessions by logging attendance and a post-group summary; and teleconferencing with staff across sites at least once per month (weekly during the initial phase of the study) to promote uniformity of the delivery and responses to issues that arise.

The foundation of the intervention was based on several theoretical models. The primary theory that forms the basis is the behavioral determinants model [35], which is based on Social Cognitive Theory [36–38]. This model posits there are personal, social, and physical environmental antecedents and consequences of behavior that affect one's motivation and self-efficacy for behavior change. According to this theory, participant goal-setting is encouraged to provide direction. Self-efficacy is built and maintained by having the participant commit to explicit, proximal subgoals, which are instrumental in achieving the larger behavioral goals. Self-efficacy is reinforced when the participant overcomes perceived barriers and has successfully achieved the short-term subgoal. Another central concept of Social Cognitive Theory is one of self-monitoring, which was an important focus of the intervention, as participants were instructed to actively monitor their weight, dietary intake and pedometer counts daily throughout the intervention.

One-to-one interactions between group leaders and participants, and the telephone and email counseling component, utilized strategies of motivational interviewing techniques [39], which have been successfully incorporated into behavioral weight loss programs [40]. Finally, the cognitive restructuring component of the intervention is derived from a concept that the maintenance of a problem is promoted by cognitive processes [41, 42]. A major barrier to the acquisition of weight maintenance behavior has been proposed to be cognitive in nature [43, 44], so a particular focus on cognitive factors, such as a tendency to evaluate self-worth in terms of shape and weight, is incorporated into the intervention. Most behavioral weight loss programs currently include a few sessions on topics such as negative thinking patterns, but this particular intervention aimed to more specifically include cognitive therapy techniques with the goal of optimizing maintenance of weight loss [45]. As proposed by Wilson [46], self-acceptance is appropriately included in the cognitive restructuring component of the treatment of obesity. Overweight or obese individuals may achieve a clinically meaningful degree of weight loss in a comprehensive behavioral program, but not an unrealistic goal weight, so self-acceptance at a healthier (although perhaps not ideal) weight is theorized to promote better weight maintenance.

Content of the intervention The overall content of the intervention consisted of both standard and new elements of cognitive-behavioral therapy for obesity, increased physical activity, and individualized diet modification that promotes an energy deficit. The cognitive behavioral aspect in this intervention incorporates the key aspects of a behavioral approach to obesity treatment. Briefly, strategies and approaches that were applied in this intervention included self-monitoring of food intake and exercise; realistic goal-setting, using behavior-specific goals and a step-wise approach to progress to promote self-efficacy; addressing body image concerns; training and role-playing in problem-solving; and relapse prevention. Compared to the general population, breast cancer survivors have specific issues and problems that can influence response to weight loss strategies and guidance. These include body image issues related to cancer and cancer treatments; enduring psychosocial symptoms, such as depression and fatigue; changes in family dynamics that may affect social support; arthralgias and pain related to anti-estrogen therapy; and changes in body composition associated with cancer treatment. Thus, the intervention information specific to breast cancer-related problems and symptoms, including fatigue, symptoms of estrogen withdrawal, body image concerns and lymphedema, were addressed in the intervention, so it was tailored to this population.

The main goal of dietary guidance was to promote a reduction in energy intake relative to expenditure, aiming for a 500–1000 kcal/day deficit relative to expenditure to promote a weight loss of 1–2 pounds/week. Lower energy density of the diet was accomplished by advocating high-fiber vegetables, whole grains, and fruit to add bulk and weight to the diet, as these changes promote maximal satiety while reducing energy intake. Behavioral strategies that enable conscious eating were also used, such as stimulus control and planning meals. The curriculum included discussion of myths and realities about food, diet, weight control, popular diets, and other popularized strategies that are incorrectly believed to promote long-term weight

loss.

The physical activity component emphasized planned aerobic exercise, increased physical activity in the lifestyle, and strength training. A priority was placed on regular planned aerobic exercise because it creates an energy deficit that is much greater per unit of time than strength training. The long-term goal prescribed was an average of at least 60 min/day of purposeful exercise at a moderate level of intensity, which is consistent with current recommendations for weight management [47]. As a component of the group discussion and notebook material, participants were taught how to recognize perceived level of exertion to enable them to gauge whether they were achieving the goal level of intensity when exercising. Current evidence suggests that this level of physical activity (approximately 2500 kcal/week) is associated with better long-term weight loss than the standard levels prescribed in behavioral weight loss interventions and in cardiovascular disease prevention guidelines [48, 49]. Notably, the vast majority of women who have been diagnosed with breast cancer have very low levels of physical activity, and age-related problems such as degenerative joint disease and therapy-related arthralgias impose some restrictions on the pace of increase in intensity and duration that can be achieved in many middle-aged and older women. Thus, the initial goal communicated in the program was to plan and implement daily purposeful mild to moderate exercise for a minimum of at least 10 minutes/ day with a step-wise increase in time and intensity that was evaluated and modified on a twice per week (initially) and weekly basis. Subjects who exercised at a higher level than 10 minutes/day at enrollment were instructed to aim for an incrementally greater goal of daily exercise (e.g., weekly increases of 5 minutes more per day until the goal of 60 minutes/day is reached) and to plan to increase intensity as tolerated. This approach results in an individualized plan of specific activities and goals, based on capabilities, lifestyle pattern and preferences, and the participants were encouraged to set realistic, achievable goals at each step of the process of working toward the long-term goal.

A second aspect of the physical activity component was strength training. These exercises were demonstrated in the group sessions, and participants were encouraged to perform this activity on their own at home or at an exercise facility 2–3 times per week. The specific training exercises began with a focus on the core, and new resistance training exercises were introduced and demonstrated at specific intervals. The intervention did not include a large resistance training component because of concerns with arm and shoulder morbidity associated with unsupervised resistance training in women who have been treated for breast cancer [50]. Finally, increased lifestyle activity was strongly encouraged as a third aspect of physical activity, and pedometers were distributed in the first group session. Participants were encouraged to work toward achieving 10,000 steps per day. In all aspects of increased physical activity, standard behavioral elements such as convenience, enjoyment, time management, managing the environment, and social support were addressed as well as overconcern with weight and problems and body image. Also, small but important barriers to exercise in middle-aged and older sedentary women were identified and addressed, such as planning around showering, hair styling, and bathroom accessibility.

Even though the intervention material emphasized weight loss, there was a significant focus on teaching skills for long-term weight loss maintenance. Relapse prevention techniques and cognitive restructuring to promote weight maintenance were therefore woven throughout the curriculum to reduce the likelihood of weight regain, with increasing emphasis on relapse prevention later in the program. For example, participants learned to recognize their own high-risk situations and were taught how to handle them or avoid them, and to develop coping strategies for those that were unavoidable.

Materials and other items were provided to all intervention group participants to facilitate behavioral changes and strategies for promoting weight reduction. A participant notebook with worksheets, handouts and illustrations was developed and provided at the beginning of the group sessions. At the first group session, participants also were provided food and exercise journals, in which they were encouraged to monitor intake, and a pedometer (Classic Step Only Pedometer, Walk4Life, Plainfield, IL) to measure steps per day. At the second group session, participants received books with caloric content of food (CalorieKing Publications, Costa Mesa, CA) and were instructed to record calorie content of foods and drinks consumed and to plan a

daily caloric deficit. Recommended web-based resources for monitoring intake and expenditure were also discussed as an alternative approach to self- monitoring. Participants also received a digital scale (EatSmart Precision Digital Scale, Eat Smart-HEALTH TOOLS, Wyckoff, NJ) and were advised to weigh themselves similar time, record their daily weight in their journal, and graph their weight. In subsequent sessions, all participants were provided two digital video discs for walking three and five miles (Leslie Sansone's Walk at Home, Anchor Bay Entertainment, Beverly Hills, CA).daily at a similar time, record their daily weight in their journal, and graph their weight. In subsequent sessions, all participants were provided two digital video discs for walking three and five miles (Leslie Sansone's Walk at Home, Anchor Bay Entertainment, Beverly Hills, CA).

Less intensive intervention control group :
Participants in the less intensive intervention control group were provided weight management resources and materials that were based on standard weight loss and maintenance guidelines available for the general public. Materials provided included brochures and information available to the public from the National Institutes of Health, the American Heart Association, the American Institute for Cancer Research, the United States Department of Health and Human Services, and the United States Department of Agriculture (e.g., ChooseMyPlate.gov). An individualized weight loss counseling session was provided at baseline and at 6 months, during which a calorie level appropriate for weight loss was prescribed (1200–2000 kcal/day, based on estimated energy requirements) and current physical activity recommendations (at least 30 minutes/day) were advised. In addition, participants in the control arm received monthly telephone calls from the study coordinator. These calls had a standardized script and served the purpose of staying in touch with the participants and promoting retention as well as updating health and personal information. As with the intervention participants, completed contacts were noted in the database, and inability to contact triggered follow-up by the site project coordinator.

Finally, these participants were also invited to attend informational optional seminars every other month during the first study year. The topics for these seminars focused on aspects of healthy living other than weight control, such as supplement use, food safety and healthy cooking. These seminars were tailored to the unique nature of the study population of breast cancer survivors.

Retention strategies

Coordinators at each site oversaw the cohort maintenance efforts directed at participants in both study arms. These activities included monthly standardized contacts, invitation to bimonthly seminars, mailing personalized cards, including birthday and secular holiday cards, as well as distribution of donated items (e.g., massage vouchers, coupons, beauty and clothing items) at regular intervals and monthly newsletters. Approximately two-thirds of the participants attended the seminars, which were offered as 1–2 sessions per topic (if two were offered, one was in the morning and one was in the afternoon) and were attended by 20–30 participants per session topic. In addition, staff at each site were trained to develop and maintain good rapport with participants, and an effort was made to schedule clinic visits and intervention sessions at times that were convenient to the participants, including week nights, early weekdays and weekends. The study manager at the Coordinating Center provided ongoing monitoring of activities at each site and provided assistance with retention activities.

Every attempt was made to complete the entire assessment battery, especially the body weight, which was the most critical outcome measure. Weight obtained within a three- month window of the clinic visit was used as the outcome of that assessment point. If the participant could not complete a follow-up clinic visit, they were asked to mail in completed study questionnaires in provided preaddressed postage-paid envelopes. For follow-up visits, participants also were given the option for a home visit at some sites.

In order to prevent loss to follow-up, participants were asked to provide multiple contact information (e.g., home, cell and work telephone numbers and email address) at study enrollment and follow-up time points. Additionally, contact information of up to three close

relatives/friends who are not in the same household, as well as the contact information for the primary care physician and oncologist, was obtained at study entry.

The goal of the intervention was a 7% weight loss at 2 years after random assignment. 1.3

The goal of dietary guidance was to promote a reduction in energy intake, aiming for a deficit of 500 to 1,000 kcal a day relative to expenditure. 1.1

The physical activity goal was an average of at least 60 minutes per day of purposeful exercise at a moderate level of intensity. : 1.1

Newsletters were provided quarterly from 6 to 24 months; were individually tailored based on information about physical activity, dietary intake, and weight 4.1

An individualized diet counseling session 3.1

The goal of the intervention was to achieve a modest weight loss of at least 7% body weight 1.3

The group sessions had 1–2 leaders, who had backgrounds in dietetics, psychology and/or exercise physiology, and who remained assigned to the closed group throughout the intervention. 9.1; 4.1; 6.1

The goal was for each participant in the intervention arm to receive a total of approximately 14–16 counseling calls or contacts in the first study year and a total of 24–38 calls or messages (depending on need for support and feedback) during the two-year period of the intervention. 3.1

Newsletters were provided quarterly from 6–24 months and were individually tailored on information about physical activity (minutes/day and pedometer counts), dietary intake, and weight, and provided suggestions for overcoming common barriers to exercise and weight management and reinforcement for progress and appropriate goal setting. : 4.1

proximal subgoals, which are instrumental in achieving the larger behavioral goals. 8.7

were instructed to actively monitor their weight, dietary intake and pedometer counts daily throughout the intervention. : 2.3, 2.4

utilized strategies of motivational interviewing techniques 3.1

cognitive restructuring 13.2

include a few sessions on topics such as negative thinking patterns 11.2

self-monitoring of food intake and exercise 2.3

training and role-playing in problem-solving 1.2

relapse prevention. 1.2

aiming for a 500–1000 kcal/day deficit relative to expenditure 1.1

weight loss of 1–2 pounds/week. 1.3

The long-term goal prescribed was an average of at least 60 min/day of purposeful exercise at a moderate level of intensity 1.1

were taught how to recognize perceived level of exertion to enable them to gauge whether they were achieving the goal level of intensity when exercising. 4.1; 2.3

the initial goal communicated in the program was to plan and implement daily purposeful mild to moderate exercise for a minimum of at least 10 minutes/ day 1.1

step-wise increase in time and intensity 8.7

weekly increases of 5 minutes more per day until the goal of 60 minutes/day is reached 1.1; 8.7

were demonstrated in the group sessions 6.1

were encouraged to perform this activity on their own at home or at an exercise facility 2–3 times per week. 8.1, 8.3

pedometers were distributed 12.5

were encouraged to work toward achieving 10,000 steps per day. 1.1

teaching skills for long-term weight loss maintenance 4.1

Relapse prevention techniques 1.2

cognitive restructuring 13.2

relapse prevention 1.2

own high-risk situations and were taught how to handle them or avoid them, and to develop coping strategies 1.2

were provided food and exercise journals 12.5

were encouraged to monitor intake 2.3

pedometer 12.5

to measure steps per day. 2.3

were instructed to record calorie content of foods and drinks consumed and to plan a daily caloric deficit. 4.1; 2.3

received a digital scale 12.5

were advised to weigh themselves similar time, record their daily weight in their journal, and graph their weight. 2.4

during which a calorie level appropriate for weight loss was prescribed (1200–2000 kcal/day, based on estimated energy requirements) 1.1

distribution of donated items (e.g., massage vouchers, coupons, beauty and clothing items) 10.2

Fiche codage BCTTv1 : E_22

Target behaviour : Control arm or Weight Watchers arm (attend WW meetings) or Individualized arm (energy restriction, physical activity) or comprehensive arm (energy restriction, physical activity and attend WW meetings).
Copier-coller intervention (Idem E_18) :

The detailed procedures of the four treatment groups have been described previously (16). In brief, subjects assigned to the Control group were given only the National Cancer Institute's "Action Guide to Healthy Eating" and the "Food Guide Pyramid" pamphlets without any other dietary or exercise instruction. Subjects in the Weight Watchers group were provided with free coupons for weekly attendance at Weight Watchers meetings, without any other added diet or exercise instruction. For subjects assigned to the Individualized group, a registered dietitian provided weekly one-on- one counseling for the first 3 months, biweekly for the next 3 months, and monthly for the last 6 months. Subjects were free to call the dietitian at any time if they needed more counseling. A monthly packet of information on various weight loss topics was given to each subject in this group. Subjects were also required to keep exercise and diet records. Subjects in the Comprehensive group received individualized dietary counseling plus free coupons for weekly Weight Watchers group meetings. Diet and exercise records were required to be kept. However, there was no noticeable difference in exercise patterns at baseline and during the study period, nor was there any difference among the four groups. Because of the large variability within each group, the exercise data would not be presented.

were provided with free coupons for weekly attendance at Weight Watchers meetings : 12.5

a registered dietitian provided weekly one-on- one counseling for the first 3 months, biweekly for the next 3 months, and monthly for the last 6 months. : 9.1; 3.1

were also required to keep exercise and diet records : 2.3

received individualized dietary counseling : 3.1

plus free coupons for weekly Weight Watchers group meetings : 12.5

Diet and exercise records were required to be kept. : 2.3

Fiche codage BCTTv1 : E_23

Target behaviour : Regular physical activity and reduced energy intake
Copier-coller intervention :

The intervention sessions were led by trained investigators and research staff. The program curriculum consisted of group sessions provided according to the following schedule: weekly for 4 months, and follow-up monthly sessions through 12 months. The primary goal of the intervention was to promote regular physical activity and reduced energy intake in order to facilitate weight loss (Fig. 2). The group meetings consisted of discussion and educational/didactic sessions that covered the content areas, with the major proportion of time devoted to increasing physical activity. All intervention subjects also received intensive individualized telephone-based counseling from the study coordinator, starting with weekly calls and decreasing in frequency after the first month (every other week for the next 2 months, and once a month thereafter). The time points for data collection from all subjects were baseline, 16 weeks, and 12 months. The group sessions offered to the treatment study arm was closed-group contingents (with an average of 12-15 women). To equalize possible seasonal effects on targeted behaviors and weight change in the two study arms, wait list subjects were followed concurrent with intervention group subjects and received general contact such as mailed communications during the study period. At study end, they were provided all written intervention materials and a concise version of the didactic material along with facilitated discussion in the format of a 2-day seminar.

Components of the intervention
The overall content of the intervention included behavioral and cognitive strategies for implementing dietary modification and increasing physical activity [35]. The goal was to achieve a modest weight loss that is sustained, with an emphasis on features that increase this likelihood, such as acceptance of modest weight loss and focusing on skills for weight maintenance. The physical activity component involved encouraging and promoting regular planned aerobic exercise. The long-term goal was to achieve an average of at least 1 h/day of planned exercise at a moderate level of intensity, which is consistent with the current Institute of Medicine recommendations [36]. The main goal of the dietary guidance component was to promote a reduction in energy intake relative to expenditure, with a goal being an energy deficit of 500-1,000 kcal/day by individualized diet modification that emphasized reduced energy density of the overall diet [37], while avoiding excessive dietary restraint. The wait list group participants were provided only general contact (monthly check-up calls, holiday and seasonal cards, and mailed communications) without specific reference to weight management topics through a 12-month period of data collection. Following that period, they were provided all written intervention materials and a concise version of the didactic material, and facilitated discussion was offered in the format of a 2-day seminar.

also received intensive individualized telephone-based counseling : 3.1

long-term goal was to achieve an average of at least 1 h/day of planned exercise at a moderate level of intensity : 1.1 ; 1.4

with a goal being an energy deficit of 500-1,000 kcal/day by individualized diet modification that emphasized reduced energy density of the overall diet : 1.1

Fiche codage BCTTv1 : E_24

Target behaviour : Control arm or Weight Watchers arm (attend WW meetings) or Individualized arm (energy restriction, physical activity) or comprehensive arm (energy restriction, physical activity and attend WW meetings).
Copier-coller intervention (idem E_18):

Subjects were randomized to one of four groups for 12 months: (a) a control group that received only the National Cancer Institute's "Action Guide to Healthy Eating" and the "Food Guide Pyramid" pamphlets without any other instruction, (b) a Weight Watchers® (Weight Watchers International, Inc., New York, NY) only group, (c) an intervention group that received one-on-one dietary counseling, and (d) a combined Weight Watchers and individualized counseling group. Individualized counseling included dietary advice to decrease total energy intake and avoid high-fat foods and a recommendation of moderate exercise for 30 – 45 minutes per day. The counseling was performed by telephone, weekly for three months, biweekly during months three through six, and monthly thereafter. Women assigned to the Weight Watchers groups received free coupons for attending meetings of their choosing.

received one-on-one dietary counseling : 3.1

recommendation of moderate exercise for 30 – 45 minutes per day : 1.1, 1.4

received free coupons for attending meetings of their choosing : 12.5

Annexe IV : Fiche de prise de décision

Fiche décision codage

Conditions	Code
Action Planning : seulement si directement en rapport avec le comportement visé (Ex : Les coordinateurs de l'étude voient les participants une fois par semaine durant deux heures → on ne code pas)	1.4 (Action planning)
Recommandations nutritionnelles et d'activités physiques : si précision de la quantité, fréquence, contexte, intensité, durée Attention % de l'AET ne rentre pas en compte.	1.4 (Action planning)
Cours de sport / supervised sport session	4.1 (Instruction on how to perform the behaviour) **et** 6.1 (Demonstration of the behaviour) **et** 8.1 (Behaviour practice/rehearsal)
Group sessions en rapport explicites avec le comportement visé	4.1 (Instruction on how to perform the behaviour) **et** 6.11 (Demonstration of the behaviour)
Monitoring physical activity with pulse rate (si c'est le participant qui le fait)	2.4 (Self-monitoring of behaviour) **et** 2.6 (Biofeedback)
Encouragement et conseils (Ex : téléphone aux participants pour les encourager à maintenir le nouveau comportement.)	3.1 (Social support, unspecified)

Annexe V : Liste d'items TIDieR

Liste d'items TIDieR - Modèle pour la description et la réplication des interventions

Liste d'items TIDieR (Template for Intervention Description and Replication)

Informations à mentionner dans la description d'une intervention et emplacement de l'information

Numéro d'item	Item	Emplacement** : Article principal (page ou nombre d'annexe)	Emplacement** : Autre † (détails)
1.	**PRÉSENTATION SUCCINTE** Présenter le nom de l'intervention ou la phrase qui décrit l'intervention		
2.	**POURQUOI** Décrivez tout raisonnement logique, théorie, ou objectif relatifs aux éléments essentiels de l'intervention.		
3.	**QUOI** Matériel : Décrivez tout matériel et document d'information utilisé durant l'intervention, en incluant le matériel mis à disposition des patients, ou utilisé dans la réalisation de l'intervention, ou utilisé pour la formation des personnes qui réalisent l'intervention. Présentez où il est possible d'accéder au matériel (p. ex. annexe mise en ligne, lien internet)		
4.	**PROCÉDURES** Décrivez chacune des procédures, activités, et/ou procédés utilisés dans l'intervention, y compris toute activité de soutien et d'aide à la réalisation		
5.	**QUI A RÉALISÉ** Décrivez le niveau d'expertise, le bagage de formation et toute formation spécifique dispensée pour chaque catégorie de personne qui réalise l'intervention (p. ex. psychologue, infirmière auxiliaire)		
6.	**COMMENT** Décrivez les modes de réalisation de l'intervention (p. ex. face-à-face ou d'autre manière, tel que par internet ou par téléphone), ainsi que si elle était réalisée individuellement ou en groupe		
7.	**OÙ** Décrivez le(s) type(s) de lieu de réalisation de l'intervention, en mentionnant toute infrastructure requise et caractéristiques appropriées TIDieR checklist		
8.	**QUAND et COMBIEN** Décrivez le nombre de fois que l'intervention a été réalisée, durant quelle période, en mentionnant le nombre de séances, leur calendrier, ainsi que leur duré, l'intensité et le dosage		
9.	**INDIVIDUALISATION** S'il était planifié que l'intervention soit personnalisée, ajustée, ou adaptée, décrivez en quoi, pourquoi, quand et comment		
10. ‡	**MODIFICATIONS** Au cas où l'intervention a été modifiée en cours d'étude, décrivez les changements (quoi, pourquoi, quand et comment).		
11.	**FIDÉLITÉ [1] À L'INTERVENTION** Tel que planifié : si l'adhérence ou la fidélité à l'intervention a été évaluée, décrivez comment et par qui, et au cas où des stratégies ont été utilisées pour préserver ou améliorer la fidélité, décrivez-les		
12. ‡	Tel que réalisé : si l'adhérence ou la fidélité à l'intervention a été évaluée décrivez dans quelle mesure l'intervention a été réalisée telle que planifié		

** **Auteurs** – utilisez N/A si un item ne s'applique pas pour l'intervention décrite. **Relecteurs** – utilisez ? si une information n'est pas rapportée/insuffisamment rapportée pour un élément donné.

† Si l'information n'est pas fournie dans l'article principal, explicitez où cette information est disponible. Ce peut être dans des emplacements tels qu'une publication de protocole, ou d'autres articles publiés (précisez la référence bibliographique), ou un site internet (mentionnez le lien).

‡ Au cas où vous complétez la liste d'items TIDieR pour un protocole, ces items ne sont pas appropriés pour un protocole et ne peuvent pas être présentés avant la fin de l'étude.

* Nous recommandons vivement d'utiliser la liste d'items en se référant au guide d'utilisation TIDieR (voir BMJ 2014;348:g1687), qui inclut une explication et un développement détaillé pour chaque item

* L'attention de TIDieR se centre sur la description précise des éléments de l'intervention (et lorsque c'est approprié, à la comparaison des éléments). Les autres éléments et caractéristiques méthodologiques des études qui doivent être décrites sont répertoriés par d'autres document et liste d'items, et n'ont pas été répétées dans la liste d'items TIDieR. Lors de la description d'un **essai clinique randomisé**, la liste d'items TIDieR devrait être utilisée en association avec la Recommandation CONSORT (voir www.consort-statement.org), en tant que développement de l'**Item 5 du CONSORT 2010**. Lorsqu'un **essai clinique** est décrit, la liste d'items TIDieR devrait être utilisée en association avec SPIRIT, en tant que développement de l'**Item 11 de SPIRIT** (voir www.spirit-statement.org). Pour d'autre types d'études, TIDieR peut être utilisé en association avec la liste d'items appropriée au type d'étude (Voir www.equator-network.org).

1 Précision et constance d'une intervention, afin d'assurer qu'elle est appliquée telle que planifiée et que chacun de ses composants est administré de manière comparable dans le temps entre tous les participants de l'étude [Traduction]. Smith SW, Daunic AP, Taylor GG. Treatment fidelity in applied educational research : Expanding the adoption and application of measures to ensure evidence-based practice. Education and Treatment of Children. 2007;30(4):121-34

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