

ANALYTIC R E V I E W

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Compendium of the Health and Wellness Coaching Literature

Abstract: *Health and wellness coaching (HWC) for lifestyle behavior change is emerging as a practice, role, and profession, in diverse health care, employee wellness, and community settings. Health care professionals apply HWC as a behavior change methodology for the prevention and treatment of diabetes, hypertension, hyperlipidemia, heart disease, cancer, and other chronic disorders. The purpose of this systematic review was to provide a comprehensive and organized compendium of HWC literature. To date, extant HWC literature remains scattered with no meaningful summary accessible. Lack of comprehensive summary stems from lack of consensus on HWC definition and standards. We applied a recently proposed, standardized definition of HWC to determine compendium inclusion criteria for peer-reviewed, data-based literature from relevant search engines (ie, PubMed, PsychInfo, and CINAHL). A systematic review process was executed and ultimately yielded 219 articles meeting HWC inclusion criteria. Of these, 150 were data-based and the remainder were expert opinion or review-style articles. A summary of results generally reveals HWC as a promising intervention for chronic diseases though further research is needed in most categories.*

The resulting HWC compendium organizes and describes the quantity and quality of available literature for the use and benefit of HWC practitioners and researchers.

Keywords: behavior change; chronic disease management; risk factor management; lifestyle medicine; health behaviors; cancer; diabetes; heart disease; hypertension; obesity; wellness

HWC research is not easily evaluated.² Developing a comprehensive compendium of literature, while examining related strengths and weaknesses, represents an important step in the evolution of the HWC profession. Such a unifying body of information can assist HWC practitioners in their work and encourage researchers to frame relevant HWC study questions. For a HWC compendium to be developed, a common definition of

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Health and wellness coaching (HWC) is rapidly emerging as an adjunct treatment for lifestyle diseases, which collectively are the greatest causes of morbidity and mortality in the developed world. HWC holds great potential for advancing healthy behavior change and stemming the rising tide in prevalence of chronic disease.¹ The HWC profession is growing; however, the existing body of

“coaching” must be adopted and uniformly applied. A recent systematic review provided a well-founded, clear, and concise definition of HWC by examining the related literature.³ Furthermore, another reviewer arrived at a similar conclusion on how to best define HWC.⁴ These works help clarify coaching is defined as a client- or patient-centered process that assumes a working relationship/partnership develops between

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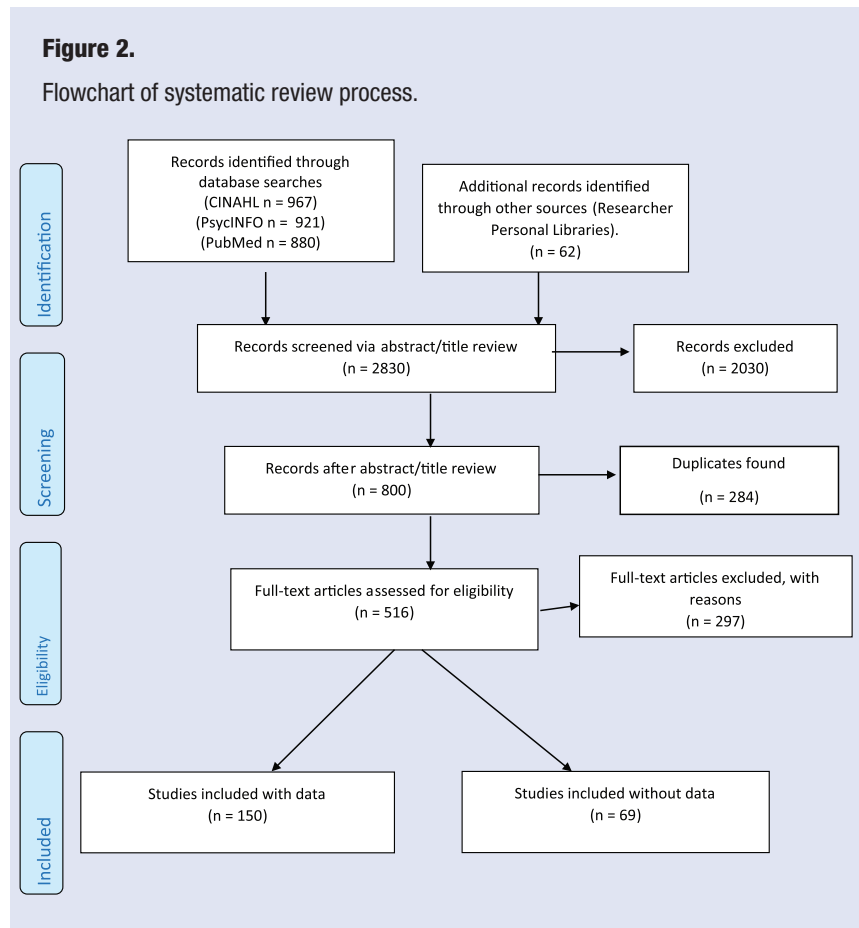


developed and conducted the searches. A previously successful HWC search strategy was modified to maximize initial inclusion by using additional terms to describe HWC roles such as positive psychology and motivational interviewing.³ The search was also adjusted depending on the database searched. For example, truncation was not used in PubMed as it is implied and not recommended. Moreover, the search strategy was revised to include 8 clinical categories as explained below.

We conducted searches in 3 databases: PubMed, CINAHL via EBSCO, and PsycInfo via ProQuest. The syntax for each of these searches is found in Online Appendix C (available at <http://journals.sagepub.com/doi/suppl/10.1177/1559827617708562>). The searches were limited to peer-reviewed articles in the English language and published after 1989. This base syntax was developed following Wolever et al and data range was selected because that thorough review did not return any HWC articles before 1990.³ Syntax was customized using appropriate subject headings and keywords for each particular database. Next, keywords and subject headings were developed for the 8 clinical topics (cancer, cholesterol, diabetes, fibromyalgia, heart disease, hypertension, obesity, and wellness) using database-specific terms. The terms searched were limited to the title or abstract fields within each database. Furthermore, article acquisition from the personal libraries of our authors, and reference daisy-chaining, were added to ensure a more complete HWC review. These processes were completed knowing that some relevant journals may not be indexed in the databases or because limiting to title and abstract may exclude records without abstracts. The database search results were imported into Mendeley (<https://www.mendeley.com/>). Duplicates were identified and removed before and during the review process. The initial searches returned 2830 records with the subsequent review process outlined in Figure 2 and detailed below.

Study Initial Selection

For the initial review, one reviewer (KC) completed a title and abstract



examination of all articles within the Mendeley database. The intention at this step was to be as inclusive as possible and retain any article potentially reflecting a HWC process. A tagging system was developed to indicate which studies should be included, excluded, or required further inspection. A second reviewer (GS) resolved questionable articles making a decision on potential relevance and inclusion based on the title and abstract. After the title/abstract review was complete, the citation information for all included articles was exported from Mendeley into an Excel spreadsheet. The spreadsheet was then made available to all compendium group reviewers using cloud-based storage (Dropbox; www.dropbox.com) for the full-text review stage of the process. Reviewers were assigned clinical categories and ultimately each was analyzed by a dedicated author: cancer (SH), cholesterol (SH), diabetes (GS), fibromyalgia (GS—only one article),

heart disease (EF), hypertension (IT), obesity (IT), and wellness (MK). Multiple clinical categories were sometimes apparent in a single article and this was noted in the spreadsheet. An article with multiple clinical populations was placed in the category from which it was retrieved. For example, an article retrieved while searching the diabetes literature was classified in the Diabetes category unless it became obvious another clinical population was the primary object of the research. Overlapping clinical populations were common in HWC articles, so the interested reader should comb all related categories in the compendium to get full coverage of any given patient presentation.

Study Inclusion

For close examination of full text, 5 criteria were devised from analysis of previous HWC definitions^{3,4} to provide reviewers guiding information to include

or exclude any particular article. Those 5 criteria for inclusion coding were the following:

- HC1:** Training: Health coach was trained and used behavior change theory and coaching processes.
- HC2:** Professionals: Health coach was a trained health care professional.
- HC3:** Goals: Patient partially or wholly determined behavior change or health goals.
- HC4:** Accountability: Patient progress was monitored.
- HC5:** Relationship: Patient-clinician relationship provided opportunity to develop (one coach per patient and at least 3 sessions).

Ultimately, inclusion was at the discretion of the reviewer in that not all criteria had to be met for an article to be retained. For example, a study sometimes met most criteria but coaching was conducted using well-trained peers or medical assistants⁸; after deliberation, reviewers often chose to retain these as HWC despite not meeting the HC2 criterion. This was deemed acceptable in the spirit of not excluding articles describing a HWC process our expert reviewers otherwise deemed appropriate. When a reviewer had any doubt about inclusion, they were instructed to record “?” for that article and a second reviewer was assigned to clarify final compendium inclusion. A third reviewer would have been used if further resolution was needed but was never necessary. Figure 2 is a flowchart illustrating the systematic 3-step process of article selection starting with 2830 articles initially retrieved and resulting in 219 articles retained in the final HWC Compendium (Parts A and B).

Study Description and Quality Columns

Once inclusion was determined, the next step was to provide coding in the compendium database (Part A) to describe each article and provide some measure of study quality analysis. Columns coded are institutional review board approval; Design; Sample size; Sampling procedure; Confounders; Duration; Sessions; and Blinding. Figure

1 shows a sample screen shot depicting this section of the compendium. Design, sampling, confounders, and blinding information were generated from simple questions derived after considering the Centre for Reviews and Dissemination⁵ and Cochrane guidelines.⁶ Reviewers were asked to choose the most appropriate code from 10 choices for study design (RCT or nonrandomized 1-9 = nonrandomized control, time-series, historical control, cohort, before-after, case series, survey, case control, or qualitative) and 9 options for sampling procedures (random, concealed, quasi, purposive, time difference, location difference, treatment related, patient preference, or other). It was understood that sometimes more than one code might apply, but the most relevant code was chosen with any related germane information recorded in a Comments column. Other descriptive and study quality questions (ie, size, sessions, confounders, etc) yielded dichotomous (Yes/No) or numerical data. Potential confounders examined for each article included equivalent baseline data between groups; fidelity of intervention; and handling of missing data. The intention of this portion of the review was not to provide a comprehensive examination of confounders but provide an overview of each article to the reader. Examining these issues also allowed reviewers a sense of study quality associated with that HWC research.

Study Outcomes Data (Results)

The Compendium (Part A only) spreadsheet columns addressing results identify 9 commonly studied outcomes in HWC research. These are Body Weight (or BMI), Systolic blood pressure (SBP), Low-density lipoproteins (LDL), Hemoglobin A1C, Health risk appraisal (HRA), Pain, Psychological factors, Exercise behaviors, and Nutrition behaviors. Additional columns were created for important study-unique outcomes and a description of those variables. For example, a small number of studies focused on medication adherence, or cost analysis, and these were valuable to report but did not merit

a dedicated column in the spreadsheet. With similar organizational logic, the number of psychological variables was potentially vast so these were grouped, and if significant results were observed, they were coded for in a single column and then detailed in the Comments column.

Reviewers coded if a significant finding was reported for an outcome studied. Significant improvements were coded with “Y+” while those deemed significant worsening in a variable were coded “Y-”. Nonsignificant findings were coded “0” for primary variables in a category (eg, weight loss in obesity or A1C in diabetes) but reviewers may not have coded, for a sometimes multitude of nonsignificant secondary variables, in that category. The compendium is meant to be a collection of the HWC literature with no further analysis or formal consideration of other statistics (eg, effect size, meta-analysis). Now that a compendium is compiled, future reviews are encouraged to consider and apply such procedures to shed further light on strength of results.

Summary Reporting

Summary reporting results addressed categories from Compendium Part A following a template that had a reviewer tally types of articles and coding responses in their respective clinical categories. For example, one reviewer (EF) wrote the summary report for the heart disease category appearing in the Results Summary Reporting section below. In addition to making tallies, each reviewer also commented on category study quality. A summary of study outcomes was also provided for each population studied. Finally, reviewers provided expert insights specifically related to their patient population while forming a summary opinion related to the potential effects and limitations of coaching in that clinical category.

Results: Summary Reporting

The results of studying the HWC Compendium are presented below. After a review of the overall compendium, the

subsequent sections describe each clinical category or patient group. Each description includes a numerical summary of article types with a synopsis of methods, study quality, and a brief overview of outcome data reported for that patient population. Each section below also includes brief interpretation of the current state of the HWC literature for the specified patient category.

Overall Compendium

The HWC Compendium (Parts A and B) contains 219 articles of which 150 are data-based (Compendium Part A) and the remainder can be classified as opinion, commentary, or review style (Compendium Part B). The coaching literature has grown progressively over time as have the number of RCTs examining HWC (Figure 3). Examining Table 1, of the 150 articles nearly half (72) are classified as RCT while 9 are qualitative studies. There are 15 studies in the compendium with mixed-methods design. Diabetes and obesity represent the largest patient populations investigated using a HWC intervention with 32 and 31 articles, respectively. With 38 studies, the wellness category is the largest in the compendium but the studied populations differ greatly (eg, glaucoma, multiple sclerosis, fibromyalgia, older adults, others with high risk, and healthy adults). Cancer is the least reported on category; however, with 13 articles there is adequate information to study a HWC effect in this important group of patients.

Cancer

The HWC Compendium contains 13 peer-reviewed journal articles focusing on cancer patients and this is the smallest compendium category. Of these publications, 4 were not considered original research but commentary, opinion, or review articles and are found in Compendium Part B. The remaining 9 studies containing data are described below.

Eight studies (89%) reported quantitative information and one study was mixed methods in nature but there

Figure 3.

Health and wellness coaching (HWC) articles published since 2000 and found in Compendium Parts A and B. R, randomized, controlled trials; NR5, before and after trials; NR9, qualitative studies; other, all other nonrandomized designed studies with data; CND, coaching articles without data (eg, commentary, opinions, reviews).

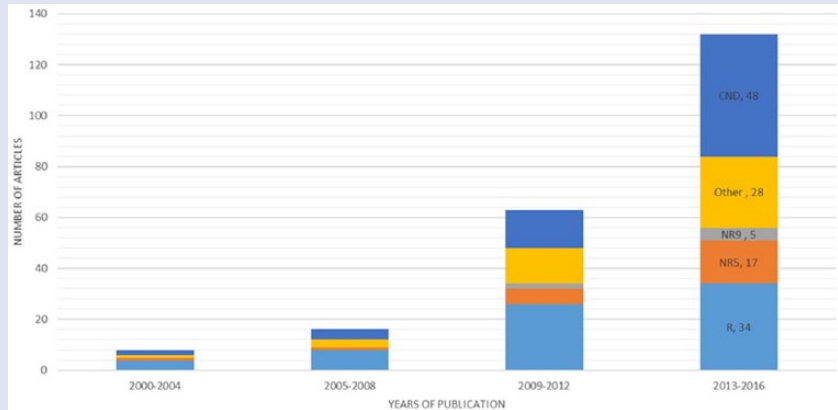


Table 1.

Health and Wellness Coaching Articles in Compendium Part A Organized by Compendium Category (ie, Patient Presentation).

Topic	R	NR5	NR9	Other	Total
Cancer	7	0	0	2	9
Cholesterol	9	0	0	5	14
CFS	0	0	0	0	0
Diabetes	14	7	3	8	32
Heart disease	7	3	0	2	12
Hypertension	7	2	1	4	14
Obesity	13	6	0	12	31
Wellness	15	7	3	13	38
Total	72	25	7	46	150

Abbreviations: R, randomized, controlled studies; NR5, nonrandomized before-after studies; NR9, qualitative studies; CFS, chronic fatigue syndrome; Other represents all other designs for studies in that category.

were no purely qualitative reports. For these studies in cancer patients, coaching interventions lasted 1.5 to 6 months (mean: 3.1 ± 2.1) with between 4 and 11 coaching sessions conducted (mean: 6.1

± 2.2). As a group, the research designs in this selection of studies may be considered strong. Of the 9 studies, 7 (78%) were conducted in RCT fashion with 5 studies (56%) sufficiently powered

to detect small effect sizes (ie, $N < 240$). Yet there is a substantial risk of bias in these retrieved cancer studies. This is due to a general lack of reporting of comorbidities as cancer patients (survivors) often struggle with physiological and psychological consequences of the disease and treatment. However, these factors were not explicitly measured and stated in the identified studies. Also, a general limitation of HWC studies is the impracticality of blinding participants and coaches leaving group allocation of the data collection staff as the only feasible means of blinding. Only one study explicitly stated any blinding procedure.

Results mainly suggested psychological benefits of HWC for cancer patients. Most studies (67%) indicated an increase in favorable psychological outcomes (eg, psychosocial outcomes, general mental health, quality of life). In addition, 4 studies (44%) suggested behavioral changes as a result of HWC. In particular, one study indicated an increase in patient questioning of their physician about their condition.⁹ In addition, 2 observational studies indicated a change in nutritional behavior and one a change in exercise behavior with HWC. Yet due to the study nature (eg, pilot, cohort) and small sample sizes ($n = 19-54$), these findings should be interpreted with caution. There were no physiological changes reported as a result of HWC in cancer patients.

In summary, the selected studies employed strong, randomized and controlled designs, which aids in the interpretability of the presented evidence. HWC coaching seems to be valuable to improve psychological outcomes in cancer patients. In particular, an increase of quality of life and psychosocial factors seem to be potential benefits of HWC intervention for this group. This may be particularly important because cancer patients experience a high prevalence of adverse psychological effects associated with the disease and treatment. Changes in behavior may be triggered by HWC in cancer patients; however, most of this

evidence is from observational data and further research is needed to strengthen this finding.

Cholesterol

In total, 16 studies were included in the compendium and categorized with focus on cholesterol management. Out of these 2 were opinion or commentary (Part B) and the remaining 14 studies in Compendium Part A are described below. An RCT design is used in 10 (71%) of 14 studies while 2 analyzed data retrospectively, and 2 employed a cohort design. All studies reported only quantitative information. The interventions lasted between 2 and 24 months (mean: 12.4 ± 7.3) with 2 to 22 coaching consults (mean: 9 ± 5.4). Three studies (21%) reported results from coaching sessions combined with other interventions (eg, exercise) while the remaining studies (79%) reported results from coaching-only interventions.

Due to the mostly RCT nature of these studies, the presented evidence may be considered strong. In addition, most studies (11, 71%) were sufficiently powered to detect small to medium effect sizes ($N < 200$). Despite the robustness of the presented evidence in this category, the selected studies are not free of limitations. Most studies recruited participants with various comorbidities. This is not surprising as increased cholesterol levels is often associated with other maladaptive conditions (eg, obesity, diabetes). Yet the lack of control for these conditions limits the internal and external validity of the presented studies. Another general limitation is lack of participant blinding, but this is near impossible with a patient-coach treatment intervention.

The vast majority of the studies (93%) reported favorable outcomes as a result of HWC with only one study (7%) reporting no effect of HWC.¹⁰ The main physiological outcomes of HWC were a reduction in body weight or BMI, blood pressure, and LDL cholesterol (each reported in 5 studies, 38%). Only 3 studies (21%) reported an increase in HDL, and 1 study¹¹ (8%) reported a reduction in blood glucose. Behavior change in nutrition (found in 5 studies,

38%) and exercise (reported in 4 studies, 31%) were reported with HWC. These findings indicate generally favorable outcomes of HWC in patients with high cholesterol.

To summarize, the selected HWC studies retrieved as cholesterol-focused employed mostly RCT designs with very adequate sample sizes supporting strength of the mainly positive findings. Yet it should be noted that there is an absence of general trends in the selected studies. No single outcome (eg, LDL) was reported in more than half of the studies. As such, the consistency of the HWC effect of HWC in patients with high cholesterol is still an open question. There is also great variation in settings, lengths of the intervention, and the number of coaching sessions between the cholesterol studies. However, while outcomes fluctuated, not a single study reported an adverse effect of HWC. More methodological consistency, and greater specific focus on cholesterol outcomes, is needed to clearly elucidate the HWC effects in patients with high cholesterol.

Diabetes

The HWC Compendium holds 49 journal articles classified as diabetes focused. Of these, 32 are data-based articles while the remainder are opinion, commentary, or review articles (ie, in Compendium B). Diabetes is the largest disease category in the compendium and only Wellness contains more data-based articles. There are 14 RCTs addressing the effects of HWC on diabetes. There are 7 observation (before-after) studies and 1 meta-analysis. Of these, 3 articles reported purely qualitative data while 5 utilized mixed-methods designs and 24 studies yielded strictly quantitative results. The coaching intervention for diabetic patients lasted between 2 and 24 months (mean: 11.1 ± 5.7) with a wide range of 3 to 20 coaching consults (mean: 9.0 ± 4.2).

As a group, the potential for bias in HWC diabetes studies is high. The vast majority (98%) contain at least one confounding factor with some not clearly reporting on possibly confounding issues. Blinding is rare and when

reported restricted to data collectors. Furthermore, a majority of HWC diabetes studies (56%) did not have a comparator group leaving before and after, or only posttreatment analysis, as the sole means of data inspection.

The diabetes articles in the compendium present an overwhelmingly positive group of outcomes for the effects of HWC. Most (78%) provided positive findings for A1C improvement with 5 articles reporting no effect and no articles showing a negative HWC impact on A1C. In one study showing no effect,¹² A1C declined nearly 40% in both the control and HWC, while in another,¹³ 25% of patients actually received no HWC sessions. Of RCTs studying A1C, 7 of 9 HWC articles reported a positive impact on A1C.

Of the diabetes-classified articles measuring body weight (or BMI), a high percentage (59%) found HWC treatment lowering weight while the balance find no weight impact of the intervention. Other outcomes (eg, disease management, quality of life, medication adherence) including psychological variables (eg, self-efficacy, satisfaction) were measured often in the diabetes studies. Scanning these revealed 19 of 20 articles found improvements in at least one of these measures with quality of life the most frequently addressed variable.

Examining outcome results it appears HWC is a potentially valuable intervention for diabetic care. RCTs and observational study designs both yielded a general positive effect on A1C, the primary research and care variable for diabetes management. While there are only a limited number of RCT design studies with no confounders, the sheer abundance of positive findings cannot be overlooked. It is rare to find A1C improving or weight loss occurring spontaneously in diabetic patients, meaning that simple observational studies can be considered potentially impactful. When all practice-based trials are considered, given coaching intervention as the common thread, a real-world positive impact of HWC on diabetic patients is evident. Future research, such as a large-scale RCT with

no confounding factors, and intent-to-treat analysis, on type 2 diabetics will be a welcomed addition to the literature. Furthermore, studies examining the optimal HWC dosing (number and duration of sessions) for diabetic patients are also in need.

Heart Disease

There are 13 journal articles classified as heart disease in the HWC Compendium with 12 being data-based in Part A (Table 1). Of these, 7 (58%) are RCTs, 2 are nonrandomized controls, 2 are prospective studies, and 1 is a retrospective study. Most (11 of 12) yielded quantitative outcomes while one study was qualitative reporting on patient logs and narratives only.¹⁴ For heart disease articles, the typical length of study averaged 8.7 months (± 6.5 ; range: 3-24 months) employing 5 to 20 coaching sessions (10.7 ± 5.6).

In these heart disease articles, the potential for bias is moderate to high with 4 studies not using a pure coaching intervention and most studies not indicating how they managed dropouts. No studies reported on blinding research staff. Several studies do not use cardiac patients describing primary prevention and not focused on a diagnosed population.¹⁵ Accordingly, this section of the HWC Compendium addresses both primary and secondary heart disease treatment.

The HWC Compendium heart disease articles demonstrated a very positive outcome with 11 of 12 studies (91%) revealing significant improvements. The one study reporting no improvement used tele-monitoring and a mobile phone coaching protocol.¹⁶ The 11 studies with positive results employed traditional coaching methods, primarily face-to-face with one study using telephone delivered coaching. Specifically, the HWC group had lowering overall risk of heart disease (100% of 2 studies), lowered cardiac risk factors such as LDL levels (60% of 5), total cholesterol levels (67% of 3), glucose control (50% of 4 studies), blood pressure (60% of 5), weight (67% of 3), BMI (60% of 5), and waist

circumference (100% of 2). Other positive outcomes include improving healthy behaviors: better diet (75% of 4), increased days exercising (100% of 6), quitting smoking (50% of 2), and lowering alcohol consumption (1/1). In terms of psychological outcomes, collectively the HWC articles reveal improved mental well-being including lowering anxiety levels (100%), stress levels (50% of 2), improving mood (33% of 3), improving relationship satisfaction (1/1), setting goals (100% of 2), increasing self-regulation skills (1/1), improved readiness to change (100% of 2), and increasing patient activation (1/1). One study looked at cardiac hospital admissions rates in postcardiac rehabilitation patients demonstrating lowered rates with HWC intervention.

In summary, the heart disease-related compendium articles reveal HWC as a potentially effective adjunct treatment for both primary and secondary care. Positive effects are mainly seen in risk factor analysis and psychological benefits with no HWC studies of arterial health or plaque burden. There is a need for more HWC research on heart disease patients with greater fidelity of the coaching treatment and more focus on disease-specific outcomes.

Hypertension

The HWC Compendium includes 27 journal articles retrieved studying hypertension. Of these, 22 are data-based articles while the rest are commentaries, opinions, and review articles. Of the 22 data-based articles, 7 are categorized in other parts of the compendium but deal substantially with hypertension and are considered here. Of the 22 empirical studies, most employ quantitative research (82%), 2 are qualitative,^{14,17} and 2 are mixed-methods designs.^{18,19} There are 11 RCTs, 5 are before-and-after designs, 2 are case-control studies (of which one is a single case study), and one each of a cohort design and a survey. One qualitative study employs focus groups and thematic analysis,¹⁷ while the other analyzes subject logs and practitioner narratives.¹⁴

Among the quantitative studies, sample sizes range from 101 to over 60 000 in the cohort study²⁰, with most in the 400 to 1000 range. The length of the intervention varied from 2 to 18 months, with an average of 10.4 (± 4.5). The number of coaching sessions varied from 4 to 20, with an average of 11.7 (± 5.3). Of the RCTs, 4 were blinded for group allocation of the data collection staff. Most of the HWC hypertension studies have a comparison group, though 5 do not. For studies using a comparison group there was additional potential for bias with the most significant confounder being that the coaching intervention is usually not purely coaching; in 73% of cases additional treatment components (eg, elaborate education or provision of other resources) were not adequately controlled.

All studies included patients with hypertension (usually treated) but not all tracked blood pressure (BP) outcomes. Five articles stem from the same RCT and address BP in one²¹ but emphasize different outcomes for hypertensive patients in the others.^{8,22-24} In total, 12 articles reported BP outcomes with 8 (67%) finding a lowering effect with HWC intervention. Of these, 4 are RCTs, 3 before-and-after studies, and 1 a case study with multiple BP measures over 12 months.²⁵ One study is a follow-up to a previous RCT and showed sustained BP changes for 12 months after HWC completion.²⁶ The other 4 articles (33%) did not find significant BP changes with HWC with 3 being RCTs and the last a case-control study.¹⁸

The studies included 9 tracking weight/BMI, of which 7 found positive impact of coaching but 2 did not. Six studies measured LDL and 5 reported a lowering effect of HWC. Moreover, 5 studies found positive changes in nutrition behavior result of coaching and one did not. Perceived quality of care,^{21,22} medication adherence,²³ avoidable hospitalizations,²⁰ and cost savings as a result of coaching²⁴ were other outcomes addressed in studies with hypertensive patients.

The 2 qualitative articles presented important findings with Margolius et al¹⁷ demonstrating clinicians are positive

about working with health coaches because coaches promote medication adherence and hypertension control while helping clinicians learn about patient barriers to effective treatment. Carroll et al¹⁴ reported on the experience of advanced practice nurses and their potentially unique role during health coaching elders including patient education, validation and feedback, encouragement and support, and problem solving.

In summary, most studies tend to show a positive impact of coaching on hypertension. However, interventions often have multiple components and there are questions about properly controlling for the isolated effect of HWC. In practice, this is a common situation for health coaches in real-world clinical care settings as the coach is often a member of a multidisciplinary treatment team. While existing data are promising, to clearly evaluate the effect of HWC on BP there is a need for more well-controlled and designed studies.

Obesity

The HWC Compendium includes 35 articles classified as coaching for reducing overweight and obesity. There are 33 data-based articles while 2 are commentaries or review style. Of these, 4 articles are classified in other compendium categories but are also considered here in obesity. Within the 33 empirical studies, most employ quantitative research (28), 1 is a qualitative single case study,²⁷ and 4 are case studies that collect mixed-methods data. Of the 28 HWC quantitative studies, there are 16 RCTs addressing overweight or obesity. Of the other quantitative articles, 5 are before-and-after designs, 3 are cohort studies, 3 are case-control studies, and 1 is a nonrandomized controlled study. The duration of the obesity studies ranged from 2 to 24 months (9.6 ± 6.2) utilizing from 4 to 30 coaching sessions (12.8 ± 7.0).

There is potential for bias in these HWC weight reduction studies with various confounding factors. Of the RCTs, 10 reported blinding and these studies were blinded to group allocation

for data collection staff. Most of the quantitative studies have a comparison group; in addition to the 16 RCTs, 2 of the others also have control groups. Among the quantitative studies, sample sizes range 46 to 10 304 in the case-control study²⁸ with most samples being in the N = 200 to 1000 range. However, in several RCTs, groups ended up with a small sample size (~ 30).²⁹⁻³² The most important potential confounder is the coaching intervention is not always purely coaching. Of all the obesity studies, 38% were not pure coaching. Of those using a comparison group (N = 19), nearly half (47%) are not pure coaching interventions and include extensive educational, web-based support, and/or provision of other resources, which were not controlled.

Of 32 HWC articles with outcomes related to weight, 28 (87%) found a positive effect for weight reduction and/or BMI. Of these, 14 are RCTs, 4 are pre-post studies, 3 are cohort studies, and 7 are case-control, including single-case studies. While the very well-powered and designed LOOZit study found reduction of weight, an additional impact of coaching was not found.^{33,34} Two RCTs^{35,36} did not find changes in weight or BMI in the coaching compared to control group.

Case studies, which followed single participants (3-17 months) all found positive effects of coaching on weight reduction and allow in-depth understanding of HWC and its impact. The coaching process is illuminated in detail over 17 months in a qualitative case study.²⁷ Of the 2 articles with single subject designs, one found effects of coaching on weight reduction³⁷ and one did not.³⁸

In addition to weight, the reviewed studies also often tracked exercise and nutrition behaviors. Of these, 11 of 15 studies found a positive effect of coaching on exercise activity while 6 of 9 reported positive changes in nutrition behavior.

In summary, most HWC studies, including a large number of RCTs, found a significant positive impact of coaching on weight reduction. In many cases the

intervention is multifaceted and therefore does not isolate the coaching impact on weight reduction; this is a realistic situation for health coaches who are often part of a team of health care professionals. Future research should be carefully designed so only coaching is added to the intervention arm, thereby clearly isolating any HWC effect on obesity and weight loss.

Wellness

As displayed in Table 1, there are 38 data-based articles in the HWC Compendium with a focus on wellness or other conditions (eg, smokers, socially isolated, multiple sclerosis patients, fibromyalgia patients, glaucoma patients, older adults) not well captured by patient categories presented in the Compendium. Together these articles comprise nearly 29% of the articles in the Compendium. In these studies, coaching intervention lasted between 1.5 and 12 months (6.22 ± 3.69) and the number of HWC sessions ranged from 3 to 54 (9.00 ± 11.35); 12 of the articles did not include information regarding either the length of the intervention or the number of sessions, or indicated that sessions were patient selected.³⁹

RCT was the most common study design to address HWC effects in the wellness category (39% of 38); however, the coaching aspect of these articles was not consistently randomized. For example, in one of the RCTs, coaching participation was purposive.³⁹ Pre-post (19% of 38) and cohort designs (16% of 38) were also common in the wellness category followed by other nonrandomized controlled studies and case series (each 8% of 38).

As a group, the potential for bias in HWC wellness studies is relatively high as all but one⁴⁰ contained at least one coded confounding factor. The majority of HWC wellness studies (58% of 38) included a comparison group; however, this was not necessarily a comparison solely of HWC to another treatment or no treatment. In fact, nearly half of the studies (45% of 38) were not purely coaching, incorporating other aspects such as formal exercise programs, diet

prescription, and health education as program components that may have affected findings.

The compendium wellness articles present a mixture of outcomes including, but not limited to, weight/BMI (37% of 38), exercise behavior (32% of 38), psychological variables as well as factors such as quality of life, stress, and depression (27% of 38), nutrition behavior (21% of 38), blood pressure (18% of 38), smoking cessation (16% of 38), cholesterol (8% of 38), and HRA (8% of 38). There are also articles focused on outcomes such as coaching costs, medical adherence, and hospital admissions. In addition, 2 articles did not measure health-related outcomes but reported clinicians' perspectives on HWC⁴¹ and who was likely to enroll in HWC.⁴²

The most consistent effects of HWC on these outcomes were observed for exercise behavior (11 out of 12, 92%), psychological outcomes (8 out of 10, 80%), nutrition behavior (7 out of 8, 88%), and A1C (2 out of 2, 100%). The weight/BMI outcome showed 71% (10 out of 14), blood pressure (5 out of 7, 71%), of HWC studies demonstrating a positive effect with similar patterns apparent for HWC on cholesterol (2 out of 3, 67%) and HRA (2 out of 3, 67%). The effect of HWC on smoking cessation was mixed with half of the studies reporting a positive change (3 out of 6, 50%) while one study showed that coaching participants had a lower quit rate than those receiving only health education.⁴³

Examining outcome results it appears HWC is more valuable as an intervention for some outcomes than others. While there are a very limited number RCTs with no confounders, the profusion of positive findings on outcomes such as exercise behavior and nutrition behavior cannot be overlooked. However, the confounder of multicomponent intervention (eg, nutrition program) limits unequivocal interpretation, and future studies need to be designed so as to tease out whether coaching or other factors are most related to successful behavior change. While additional and

more definitive research is needed, HWC appears a viable option for behavior change for many seeking wellness.

Discussion

HWC is a rapidly emerging field with a growing base of literature. The HWC Compendium we assembled here illustrates this point with 150 peer-reviewed, data-based articles meeting criteria operationally defining the coaching process. A secondary collection (Compendium B) adds another 69 HWC articles with most providing positive commentary on clinical application of HWC practices. Temporally, the literature base is expanding exponentially as the HWC profession advances, and these events are likely interrelated. Articles meeting our definition of HWC numbered only 23 between 2000 and 2008, but from 2009 to 2016, another 196 such articles were published. In the same time period, the number of certified and practicing health and wellness coaches has soared and a national board certification for health and wellness coaches (and national training and education standards) was launched in 2017 by a partnership between the International Consortium for Health & Wellness Coaching and the National Board of Medical Examiners.⁴⁴

The HWC Compendium is a tool for widespread use by practicing health and wellness coaches, clinicians, and those interested in HWC research. Practicing coaches now have an accessible resource for examining current literature on many client characteristics and patient presentations they address on a daily basis. Clinicians who are not coaches, including physicians, can use the compendium and potentially determine if HWC is a useful adjunct treatment for their patients. In the hands of those interested in HWC research, the Compendium may hold the most promise as there are many coaching questions yet to be addressed. The Compendium's organization into the most studied clinical subpopulations allows those interested in cancer, heart disease, hypertension, hyperlipidemia

(cholesterol), obesity, and wellness research to readily access relevant work in each area. Using the Compendium helps researchers identify important gaps in the literature for these clinical areas, and for those clinical subpopulations not well studied (eg, fibromyalgia). Moreover, the compendium provides direction for systematic analysis, or meta-analysis, of relevant coaching research permitting isolation of RCTs alone or inclusion of simple observational trials as well. Coaching practice issues, like optimum dosing (ie, frequency, length, and number of sessions), become apparent with examination of the compendium. With such opportunities, focused research can help identify best HWC strategies and ultimately define scope of practice for the coaching profession. These findings will contribute to better education, training, and certification programs for future health and wellness coaches ideally leading to optimization of patient services.

The Compendium has limitations and weaknesses deserving of consideration. Some relevant HWC articles were likely missed (eg, not in search engine databases or human error) and unintentionally omitted from the final compilation. Compendium reviewers also speculated a publication bias might exist leading to positive HWC findings being published more often than negative. Moreover, in our zeal to be inclusive, some may argue there are articles included not reflecting the spirit of HWC.

There are articles included in the compendium that did not meet all 5 HWC defining criteria, while some articles meeting all criteria were debatable for inclusion. As an example in the former case, there were articles²² using nonprofessionals as health coaches who were deemed well trained; it was determined these articles were better kept in than left out of our review. In the latter case, discussions often centered on including articles emphasizing motivational interviewing though the intervention never identified as health coaching⁴⁵; in these cases, reviewers used their best judgement to determine if

the article not only met criteria but also captured the broad spirit of HWC. Finally, there were also cases of interventions claiming to use “health coaches” but failing to define coach preparation, or describing an educational process wholly prescribed and not client- or patient-centered.⁴⁶ Articles not using a behavior change model of coaching were not included in the review despite using the term “health coach.” In the final analysis, some articles not identifying as HWC were included in the Compendium while others claiming to be coaching were excluded.

There is also the matter of coding compendium articles for study quality characteristics. A good example of how this might become a limitation is seen in our Confounder 2 analysis (has the experimental intervention isolated a purely coaching process?). If coaches go beyond what is deemed normal services (eg, managing primary care visits with patient⁸) are we isolating and studying a typical coaching strategy? If the control group is not afforded the same advantage, then are we really looking at usual care versus a “coaching-plus” intervention? Clearly this is not as cut and dry as might be the interpretation of some other clinical treatment studies (eg, new drug trials). Reviewers struggled with analyzing such articles and provided their expert interpretation; in most cases, there is no right or wrong but simply a need to exercise best judgement. There were many of these instances and undoubtedly readers, or original article authors, may occasionally disagree with coding decisions in the HWC Compendium. We not only expect but welcome these discrepancies with the hope we are provided meaningful feedback from readers.

In the end we expect the Compendium to be a working document with periodic updates as the HWC literature further expands and matures. When users provide valuable insights (eg, new articles or alternative interpretations of existing articles) those will be incorporated into future editions of the compendium. Our aim is to have the HWC Compendium become a living and

widely used tool with as much accurate information as possible for the use of the coaching community.

The Compendium results summaries point to HWC intervention as a treatment adjunct worthy of consideration for cancer, diabetic, and heart disease patients. Improvements in primary outcomes, such as A1C, risk factors, or psychological profile were often seen in these clinical populations. In addition, compendium reviewers found hypertension, obesity, and cholesterol as possibly benefitting from coaching involvement making HWC a potentially valuable primary prevention intervention. There is generally a need for more carefully planned research isolating the coaching effect as a treatment and eliminating confounding factors. Moreover, the database could also be advanced by epidemiological or large population, practice-based studies and well-designed qualitative works. At this point in the evolution of the literature, however, there does seem to be a preponderance of favorable findings for the effects HWC.

Conclusions

The HWC Compendium provides substantial evidence for a clinical intervention yielding a positive impact on the chronic, often lifestyle-related diseases, scourging our modern health care system. Lifestyle behavior change as a treatment for chronic disorders is long recognized as effective, but viewed as unachievable in a sufficiently scalable manner. The Compendium brings together a body of literature suggesting HWC may be a valuable tool for improving the applicability of behavior change interventions in the treatment of chronic disease.

The HWC Compendium is useful because it identifies, quantifies, and analyzes existing coaching literature while categorizing it by clinical population. Furthermore, it helps bring to light both the strengths and weaknesses of the existing HWC literature. The Compendium should be viewed not only as an existing resource

to utilize but also one to be expanded. Users should provide compendium group authors feedback on how to best evolve the Compendium. Moreover, closely examining the compendium raises addressable questions allowing prospective HWC researchers to identify important gaps in the coaching literature. They can then assist in expanding the knowledgebase of the coaching profession by executing relevant and high-quality investigation. Using these mechanisms, the hope is to continue to expand and refine the HWC Compendium for the future benefit of the HWC community.

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