ANALYTIC REVIEW

Gary A. Sforzo, PhD, Miranda P. Kaye, PhD, Sebastian Harenberg, PhD, Kyle Costello, BS, Laura Cobus-Kuo, MLIS, MPA, Erica Rauff, PhD, Joel S. Edman, DSc, Elizabeth Frates, MD, and Margaret Moore, MBA

Compendium of Health and Wellness Coaching: 2019 Addendum

Abstract: *The 2019 Addendum, in conjunction with the original health and wellness coaching (HWC) Compendium, organizes HWC literature with the aim of assisting researchers while providing a resource for practitioners. The 2019 Addendum to the HWC Compendium extends the initial work by adding HWC-related literature published in the past 2 years. The 2019 Addendum divides articles retrieved into 8 categories, including a new miscellaneous section complementing categories examining HWC effects on cancer, cholesterol, diabetes, heart disease, hypertension, obesity, and wellness. The 2019 Addendum again provides in-depth information about the nature, quality, and results from each article in a detailed spreadsheet provided as an electronic appendix. The 2019 Addendum contributes another 104 peer-reviewed coaching-related articles to the HWC Compendium. This most recent research again describes HWC as a favorable intervention with treatment potential in all categories, though only 3 new cancer articles were included in the 2019 Addendum. Trends in HWC (ie, e-coaching and group coaching) are identified, and there is also discussion of future research needs. In conclusion, the field of HWC continues to grow, as does the research describing this clinical practice; the 2019 Addendum to the Compendium of HWC organizes and assists understanding of this literature.*

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

Introduction

Health and wellness coaching (HWC) is an emerging discipline championing healthy behavior change as a means of averting or mitigating chronic lifestyle-related diseases. In 2017, our team published a compendium describing HWC literature accumulated over the previous 16 years.[1] We discovered a vast and growing body of research describing HWC as an intervention, with clear potential for clinical effectiveness. The HWC scholarship continues to grow rapidly, and with this current work, we created the 2019 Addendum to supplement the original Compendium. Here, we gather HWC literature accumulated in the past 2 years while commenting on the results and quality of that work. In addition, we identify trends beginning to take shape in the literature and provide insights for further research in the HWC field. Our intention with the HWC Compendium remains the same; we aim to provide HWC practitioners with the latest findings while also assisting HWC researchers in identifying gaps in the literature to further advance the related knowledge base.

As with the previous HWC Compendium, the 2019 Addendum intends simply to describe an existing body of HWC literature. Our review attempts to be highly inclusive and not restricted by the constraints of any single type of research design. Randomized controlled trials (RCTs) tend often to be the focus of literature reviews, but an RCT design may be criticized for lacking external validity or real-world application. The HWC Compendium 2019 Addendum includes all recovered, peer-reviewed HWC studies meeting inclusion criteria and published in the past 2 years. There are many RCTs, but there are also many articles with designs

DOI:10.1177/1559827619850489. Manuscript received January 28, 2019; revised March 22, 2019; accepted April 24, 2019. From the Department of Exercise & Sport Sciences, Ithaca College, Ithaca, New York (GAS, SH, LC-K); The Clearinghouse for Military Family Readiness at Penn State, State College, Pennsylvania (MPK); Springfield College, Springfield, Massachusetts (KC); Seattle University, Seattle, Washington (ER); Edman Wellness Services, Media, Pennsylvania (JSE); Harvard Medical School, Boston, Massachusetts (EF, MM); and Institute of Coaching, McLean Hospital, Belmont, Massachusetts, and Wellcoaches Corporation, Wellesley, Massachusetts (MM). Address correspondence to: Gary A. Sforzo, PhD, Department of Exercise & Sport Sciences, Ithaca College, Ithaca, NY 14850; e-mail: sforzo@ithaca.edu.

not meeting that scientific standard (eg, retrospective analysis). In the Compendium, we delineate the study design type and thoroughly describe every article but leave it to the reader to ultimately determine the value (eg, internal vs. external validity) of each citation.

New to the HWC Compendium 2019 Addendum is a clinical category described as Miscellaneous. This category catches HWC studies in clinical populations with only a small number of relevant citations. Chronic kidney disease[2] is an example of a clinical topic with only 1 HWC article in the 2016-2018 time frame and is therefore part of the Miscellaneous category. In the original Compendium, articles on clinical topics with limited study were organized into the Wellness category, which was a relatively large category. Wellness in the 2019 Addendum is defined as the study of HWC for primary prevention. Now, the Wellness category focuses on participants primarily making behavior change for risk factor reduction. Accordingly, the Wellness category in the HWC Compendium 2019 Addendum does not include articles describing limited-research coverage clinical populations, but the Miscellaneous category was created to accommodate this important part of the literature.

To be clear, this article is simply a companion piece to the actual HWC Compendium 2019 Addendum, which is attached as an electronic appendix. Although it is hoped that readers will benefit from the summary information presented in this companion article, they should be aware that the real bulk of our effort resides in the Compendium (2 large spreadsheets located at https://journals.sagepub.com/doi/pdf/10.1177/1559827619850489). We have a sense that there was some confusion related to the importance of the electronic appendices with the publication of the initial Compendium in 2017.[1] Accordingly, we strongly encourage readers to visit the appendices to this article (ie, HWC Compendium 2019 Addendum) where full citations and details of HWC articles published over the previous 2 years are available. Although this companion article should prove informative, the details of the HWC Compendium allow fuller depth of study and understanding of the literature.

Note that the complete collection of HWC coaching literature is fully appreciated by using this 2019 Addendum in conjunction with the original HWC Compendium, which is freely accessible (https://journals.sagepub.com/doi/full/10.1177/1559827617708562). The purpose of the HWC Compendium 2019 Addendum is to complement the original with the intention of assimilating and describing a comprehensive body of HWC scholarly literature. The ultimate objective is for this compendium to help coaches in their practice, and researchers in their efforts, to advance the HWC profession.

Methods

This 2019 Addendum was produced using methodology much like the 2017 Compendium HWC,[1] with the primary difference being that the 2019 Addendum describes only articles published in the 2 years since completion of the original. The reader is directed to the original methods section for details describing search procedures and article selection/review processes. An abbreviated description of the methods follows.

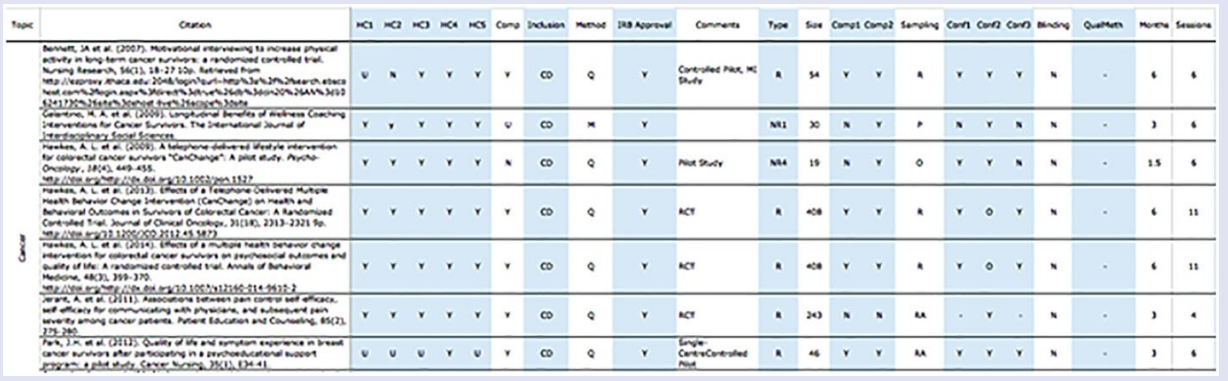
As with the original HWC Compendium, the literature retrieved for this addendum is organized into 2 online appendices, Parts A and B (these spreadsheets are available at https://journals.sagepub.com/doi/pdf/10.1177/1559827619850489 as Appendices A and B). Part A contains data-based HWC articles, whereas Part B contains reviews, commentary, and opinion type articles. Full citations populate the spreadsheet rows of both Part A and Part B, whereas descriptive details of each article are contained in the spreadsheet columns. Parts A and B are again organized by patient presentation (eg, diabetes, obesity, heart disease), but in the 2019 Addendum, after adding Miscellaneous, there are 8 clinical categories instead of 7 found in the original Compendium. The data-based articles in Part A were evaluated and coded for study design variables, study confounders, and outcomes (ie, results). Figure 1 provides a partial screenshot illustrating the columns and rows of Compendium Part A. A system for coding the columnar description of each article is provided in a legend found within the borders of each spreadsheet. The interested reader is strongly encouraged to visit and become immersed in the details of the Compendium HWC 2019 Addendum.

The definition of HWC, from the original Compendium, was again applied for selecting articles included in the 2019 Addendum. Briefly, we adapted the health coaching definition determined systematically by Wolever et al[3] to identify 5 criteria related to training, professional background, patient-centered goal setting, accountability, and relationship. All articles selected involved a HWC process with the same coach delivering at least 3 sessions to a patient. For the 2019 Addendum, there were more than 900 articles returned from the initial search of PubMed, CINAHL via EBSCO, and PsychInfo via ProQuest databases. Search syntax is fully described in Appendix C, which contains the details of all searches used in the 2019 Addendum. The flowchart presented in Figure 2 describes the review process and illustrates that 297 articles remained after the title/abstract review stage. Following the full article review stage, ensuring compliance with our HWC definition, there remained 81 data-based articles (for Part A) and 23 non–data-containing articles (for Part B) to comprise the 2019 Addendum to the HWC Compendium.

Readers should note that many articles discuss comorbidities, and a thorough examination of any given clinical topic requires searching the complete HWC Compendium. As was the case with the original Compendium, each clinical category was assigned a dedicated author. Comprehensive article review, spreadsheet coding, and summary reporting for cancer (GAS), cholesterol (ER), diabetes (GAS), heart disease (EF), hypertension (JSE), miscellaneous (JSE), obesity (SH), and wellness (MPK/ER) was carefully provided. Summary reporting was done,

Figure 1.

Partial screenshot of Health and Wellness Coaching Compendium Part A. Meant to convey concept of Compendium but not provide detailed information. For more details see Online Appendices A and B (supplemental material available online).



as with the original Compendium, in template fashion for each clinical category quantitatively describing the types of studies, including research designs, methods, confounding factors, and a brief overview of primary outcomes.

Results: Summary Reporting

Overall

As illustrated in Figure 3, the 2019 Addendum to the HWC Compendium contains 104 articles of which 81 are data based (Part A) and 23 are reviews, commentary program descriptions, or opinion style (Part B). Outsized, maybe exponential growth of HWC data-based literature has continued with nearly as many experimentally designed reports in the past 2 years (n = 81) as in the previous 3.5 years (n = 84). In contrast, the rate of production for non–data-based HWC scholarship may have leveled, with about half as many articles written in the past 2 years (ie, 23) as in the previous 3.5 years, when 43 were identified. This evolution of experimental versus descriptive scholarship may be indicative of HWC maturing as a topic of scientific inquiry.

The percentage of RCT-designed studies in the 2019 Addendum was very similar to that in 2017, at just <50%. The rate of qualitative investigation remains substantially low, with only 3 pure qualitative studies found in the previous 2 years. Table 1 displays the numerical breakout of articles, with Obesity as the clinical category getting the most research attention over the past 2 years. Diabetes and Wellness are again categories receiving a high level of study. Surprisingly, there was only 1 data-based, cancer-related HWC article uncovered by our recent search compared with 13 found in the original Compendium. There were also 2 non–data-containing cancer-related articles returned for the 2019 Addendum. Despite consideration to remove it as a major Compendium category, cancer was retained because of clinical importance and history of HWC study. A summary report for cancer was not completed; however, the interested reader can see the 3 related articles in the 2019 Addendum.[4-6] The new Miscellaneous category contains 8 articles on a great variety of topics describing the impact of HWC. The effects of HWC on menopause[7] and chronic obstructive pulmonary disease (COPD)[8] are examples of the topics addressed in the Miscellaneous category. Summary reports for each individual clinical category follow.

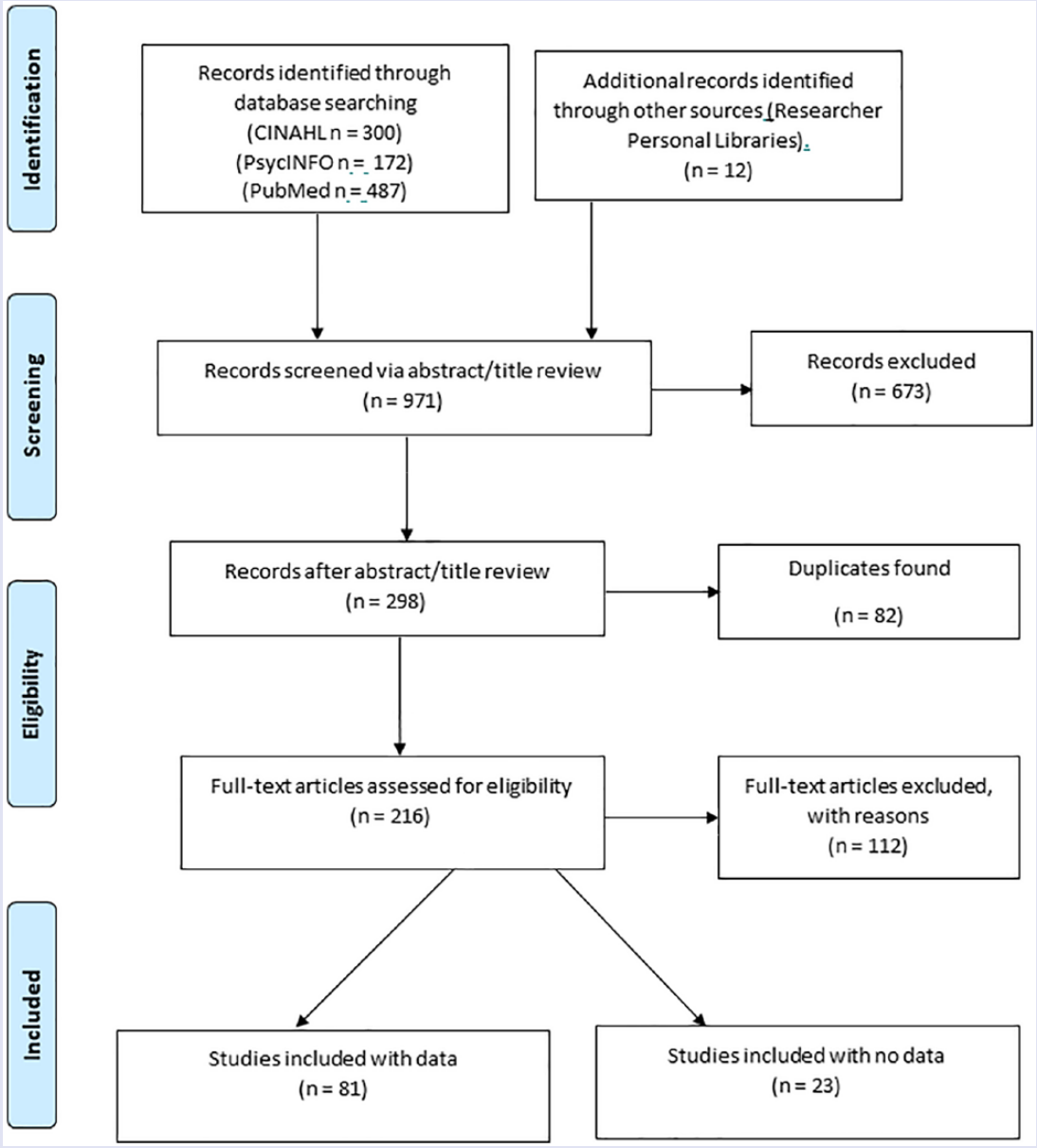
Cholesterol

The HWC Compendium 2019 Addendum includes 5 articles classified as cholesterol focused published in the past 2 years. In the 2019 Addendum, 2 RCTs, 2 non–randomized controlled studies, and 1 single-arm pretest/posttest study were located examining the influence of HWC on cholesterol management. All 5 studies were purely quantitative, and no qualitative studies were found examining the influence of HWC on cholesterol outcomes. Coaching interventions for cholesterol patients lasted 6 to 12 months (mean [*M*] ± SD = 8.7 ± 2.7) and included a small number of individual coaching sessions, ranging from 3 to 4 (*M* ± SD = 3.5 ± 0.5). In the previous compendium, 3/16 studies were not purely coaching interventions (21%); however, all the 5 studies located for the 2019 Addendum used complementary interventions. The most commonly observed strategy, used in combination with HWC, was nutrition related (eg, dietary education or counseling). The complex interventional nature of these studies makes it much more challenging to isolate the influence of HWC on cholesterol management.

As with the original Compendium, the majority of studies in the Cholesterol category recruited participants with various comorbidities (ie, heart disease, diabetes). This appears to be common in cholesterol-focused HWC studies

Figure 2.

Flowchart of systematic review process.

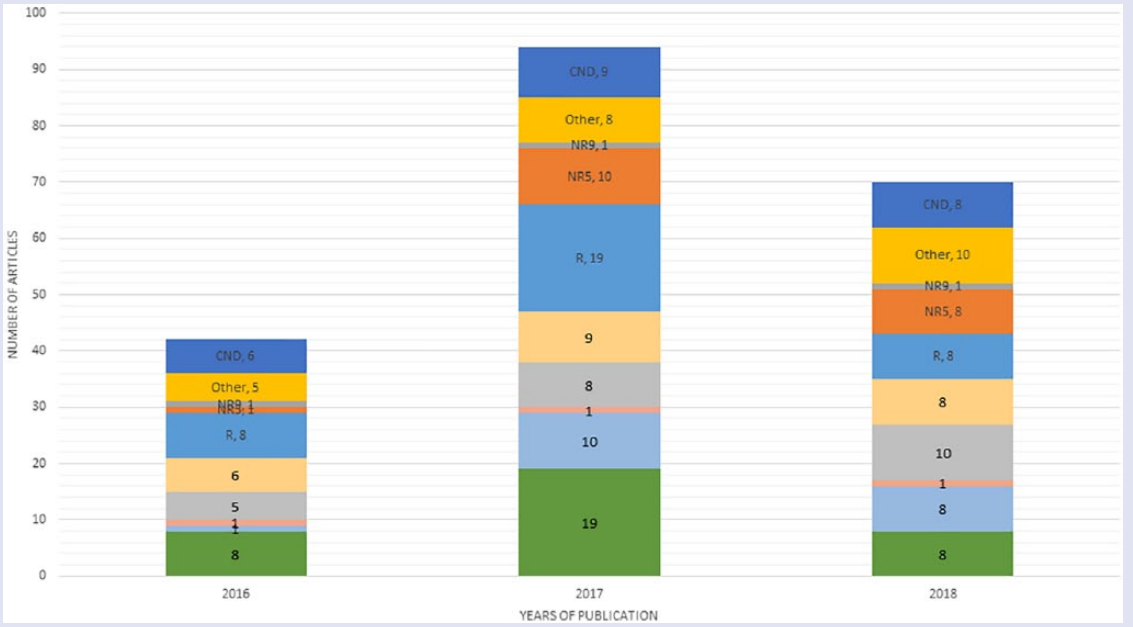


because elevated cholesterol levels are often associated with other maladaptive health conditions. Of the 5 articles included in the 2019 Addendum, one study used intention-to-treat analysis.[9] Blinding of participants was only conducted in 1/5 studies and only for data collection purposes. Blinding coaches or patients in HWC research is very challenging. Similar to the original Compendium, the majority of HWC cholesterol studies (4/5) had a comparison group.

All cholesterol focused studies (5/5) reported favorable outcomes as a result of HWC. As with the original Compendium, there was great variability in outcomes assessed with the use of many different cholesterol biomarkers (ie, low-density lipoprotein [LDL] particle number, small LDL-P, ApoA1, APoB/ApoA1 ratio, large very-low-density lipoprotein-P). Results reported include a drop in LDL cholesterol,[9,10] total cholesterol,[10,11] and LDL particle size.[9,12] Reductions in body weight or body mass index (BMI)[11,13] and blood pressure[10,13] were also reported. Behavioral changes were assessed in 2/5 studies, with one study finding a significant increase in

Figure 3.

Health and wellness coaching (HWC) articles published since 2016 and found in the 2019 Addendum to the HWC Compendium Parts A and B.



Abbreviations: 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.

Articles in the 2019 Addendum to Health and Wellness Coaching Compendium (Part A) Organized by Patient Category.

Type of Patient	R	NR5	NR9	Other[a]	Total
Cancer	1	0	0	0	1
Cholesterol	2	1	0	2	5
Diabetes	4	4	0	4	12
Heart disease	6	1	0	0	7
Hypertension	2	4	1	0	7
Miscellaneous	5	3	0	1	9
Obesity	10		2	15	27
Wellness	6	6	0	1	13
Total	36	18	3	23	81

Abbreviations: R, randomized, controlled studies; NR5, nonrandomized before-after studies; NR9, qualitative studies.
[a]Other represents all other designs for studies in that category.

physical activity,[11] whereas another saw no changes in physical activity.[13] For dietary outcomes, one study[11] reported increased fruit and vegetable consumption, whereas another study reported reduced sugar-sweetened beverage consumption at an early follow-up; but this reduction was not sustained at any other follow-up time points.[13]

In summary, the cholesterol-related studies included in the 2019 Addendum to the HWC Compendium used mostly RCTs with either positive or null findings regarding primary study outcomes. No negative cholesterol outcomes or effects of HWC were observed in any of these studies. Additionally, variability was observed across settings and the length of programs, suggesting a continued need for methodological consistency across these HWC studies. Future HWC studies focusing on cholesterol management should ensure rigorous study designs.

Diabetes

The 2019 Addendum to the HWC Compendium holds 13 journal articles classified as diabetes focused and published in the past 2 years. Of these, 12 are data-based articles, whereas the other is a commentary (ie, in Part B) for nurses who are coaching patients.[14] As with the original Compendium, coaching for diabetes remains one of the most studied diseases; however, study of the obesity content area has clearly overtaken diabetes in sheer quantity of research. In the 2019 Addendum, there are 3 RCTs addressing the effects of HWC on diabetes. There are 7 observation (before-after) studies and 1 meta-analysis. Since 2016, this represents an increasing percentage of observational HWC articles, with a decreasing percentage of RCTs for diabetes in the 2019 Addendum. Although the Addendum does not contain any purely qualitative studies on diabetes, there are 3 that utilized mixed-methods designs, whereas 9 provide strictly quantitative results. The coaching interventions for diabetic patients lasted between 3 and 16 months ($M \pm SD = 7.0 \pm 3.8$), with a wide range of 3 to 12 coaching consults ($M \pm SD = 8.9 \pm 3.6$). The potential for study bias caused by not having a pure coaching intervention in diabetes studies was much better than reported in the original Compendium. Only 4/12 studies in the 2019 Addendum used a complex intervention, thereby confounding the impact of HWC. In the original Compendium, accounting for patients who dropped out of the coaching intervention with intent-to-treat analysis was rare; however, in the 2019 Addendum, not a single diabetes study performed this bias-reducing analysis. Blinding of experimental group participants, although a laudable methodological practice, is simply one that does not apply well in coaching studies. As with the original Compendium, a slight majority of HWC diabetes studies (6/11; excludes the meta-analysis) did not have a comparator group leaving before and after, or only posttreatment analysis, as the sole means of data inspection in these articles.

In the 2019 Addendum, we again see the diabetes articles presenting an overwhelmingly positive group of outcomes for the effects of HWC. A large majority of studies (85%) measuring glycosylated hemoglobin (A1C) provided positive findings for improvement, with only one reporting no HWC impact on A1C. Only 1 RCT studied A1C and reported a significant improvement with HWC intervention.[15] In addition, a meta-analysis[16] of 22 RCTs (since 1990) found that HWC intervention significantly improved A1C. Other outcomes (eg, disease management, quality of life, medication adherence, healthy eating), including psychological variables (eg, self-efficacy, stage of change, satisfaction) were measured in 9/12 diabetes HWC studies. Scanning these revealed all articles that found improvements in at least one of these measures, with quality of life the most frequently addressed variable. Somewhat surprisingly, the meta-analysis[16] did not find a significant impact of coaching on quality of life as measured in 10 reviewed studies. Notably, a study of HWC cost-effectiveness found the best return on investment when treating diabetic patients, with cardiac patients also treated with an acceptably moderate cost.[17]

In agreement with our summary from the original HWC Compendium, the Addendum shows outcome results consistent with HWC as a potentially valuable intervention for diabetic care. After coaching intervention, there was a near unanimous finding of improved A1C, the primary research and care variable for diabetes management. The fact that A1C improvements were reported in 8/9 studies over the past 2 years extends a similar finding reported in the original Compendium. Although these are not all RCT studies, we again point out that it is rare to find A1C improving spontaneously in diabetic patients, meaning that simple observational studies can be considered potentially meaningful. Furthermore, the addition of a meta-analysis to our database, providing a collective agreement on A1C findings, bolsters the argument for a positive HWC effect on diabetes treatment. Moreover, variables indicative of better knowledge of disease (and disease management) all showed improvement trajectory with coaching intervention in the studies conducted over the past 2 years. Clearly, more can be done to improve the experimental design of HWC diabetes research. We await a large-scale, multicenter RCT, with intent-to-treat analysis and isolation of HWC effects. Furthermore, future studies of intervention specifics (eg, dose-response) will advance knowledge and better define HWC treatments for diabetics. However, given the large corpus of research accumulated, in the original Compendium and current 2019 Addendum, it seems clear that HWC has a positive effect on diabetic patients.

Heart Disease

The 2019 Addendum to HWC Compendium holds 7 journal articles classified as heart disease focused and published in the past 2 years. They are all data-based articles, and 6/7 (86%) of them are RCTs. This is a change from the original Compendium in which 58% of the studies were RCTs. One study in this 2019 Addendum is a prospective cohort study. The coaching interventions for heart disease patients lasted between 3 and 48 months ($M = 13.7$), with a wide range of 4 to 24 coaching consults ($M = 9.9$). The potential for study bias caused by not having a pure coaching intervention in heart disease studies was much better in the Addendum than reported in the original Compendium. Only 1 of the 7 studies in the new compendium used a complex intervention, thereby confounding the impact of HWC. This is different from the original Compendium in which 31% of the studies did not use coaching alone as the intervention. As with the original Compendium, the majority of studies (4/7) did not account for patients who dropped out of the coaching intervention with intent-to-treat analysis. Only one of the heart disease studies reported that researchers were blinded. The majority of studies in the 2019 Addendum (6/7)

had a comparison group, with only 1 study using a prospective cohort analysis. The coaching methodology was telephonic in the majority of studies (6/7) compared with the original Compendium in which the majority of coaching interventions were face-to-face.

As with the original Compendium, the 2019 Addendum reveals very positive outcomes for coaching heart disease patients in the majority of studies (4/7). In 1 pilot study,[18] there was no increase in physical activity levels compared with the control group, but the control group in this study was daily feedback and encouragement and a home exercise routine. Thus, both were actually an intervention to keep patients accountable. In another study, heart failure patients experienced a reduced rate of hospitalization with HWC, but those with multiple chronic conditions did not experience the same reduction.[19] Another study with mixed results found that the coaching intervention worked well for older patients and led to reduced rates of hospitalization but did not do the same for younger patients.[20] In this Addendum, 3/7 articles examined rates of rehospitalization. One study examined the impact of HWC on not just physical activity levels but also maximal oxygen consumption (VO_{2max}, an indicator of cardiorespiratory fitness), and the coaching group did significantly better than controls for increasing levels of activity as well as improving VO_{2max}.[21] A new variable in Heart Disease for the 2019 Addendum was the outcome of adherence to medication. Patients in the coaching intervention were more adherent to antiplatelet medications post–coronary stent placement than those in the control group.[22] With regard to mental health in heart disease patients, 2/7 articles addressed these factors in the 2019 Addendum. One new article did not show a difference in quality of life, depression, or anxiety, but did show improvement in stress levels for the coaching group as well as increased physical activity levels and improved diet.[23] However, another article revealed increased quality of life, reduced depression, and overall improvement in mental health.[24]

In summary, the latest research using HWC with heart disease patients reveals that telephonic coaching has the potential to reduce hospital readmission while improving activity levels (VO_{2max}) and mental health. There is also promising evidence that telephonic health coaching can improve medication adherence. There is still a need for more studies with longer-term results in heart disease patients and more focus on disease-specific outcomes in this population.

Hypertension

The 2019 Addendum to the HWC Compendium holds 7 journal articles classified as hypertension focused and published in the past 2 years, and all these articles are data based. Like the original Compendium, which had 22 data-based coaching articles, the Hypertension category is again well represented in this 2-year period. In the 2019 Addendum, there is 1 RCT addressing the effects of HWC on hypertension, 4 observation (before-after) studies, and 1 meta-analysis. Since 2016, this represents an increasing percentage of observational HWC articles and a decreasing percentage of RCTs. Although the 2019 Addendum does not contain any purely qualitative studies for hypertension, one utilized a mixed-methods design (mostly qualitative results), whereas 6 yielded strictly quantitative results. The coaching interventions for hypertension patients lasted between 2 and 24 months ($M \pm SD = 10.2 \pm 9.0$; $n = 5$), with a wide range of 3 to 12 coaching sessions ($M \pm SD = 6.3 \pm 4.0$; $n = 3$); however, this included 3 studies with uncertainty in reporting length of the coaching program and/or number of coaching sessions. As with the original Compendium, hypertension-focused studies did not (0/6) account for patients who dropped out of the coaching intervention with any kind of intent-to-treat analysis. Blinding of experimental group participants is not a process that applies well in coaching studies. As with the original Compendium, more HWC hypertension studies (4/6; excludes the meta-analysis) did not have a comparison group, and therefore, the before and after posttreatment analysis was the sole data analysis method.

We again see the hypertension articles in the Compendium present a positive group of outcomes for the effects of HWC. Although limited in number, 5/6 studies measuring systolic and diastolic blood pressure provided positive findings for improvement. The one RCT that studied systolic and diastolic blood pressure reported a significant improvement with HWC intervention,[25] although it should be mentioned that this study was done in 18 low-income health centers. Moreover, HWC was combined with support for the DASH diet, increased exercise, and more effective medication adherence. It is noteworthy that the meta-analysis (26) of 39 RCTs found that HWC intervention significantly improved blood pressure. In contrast to the original Compendium, where hypertension studies assessed other outcomes (eg, disease management, medication adherence), including psychological variables (eg, self-efficacy, satisfaction), the hypertension studies in the 2019 Addendum did not frequently assess these factors.

In agreement with our summary from the original HWC Compendium, the 2019 Addendum shows outcome results consistent with HWC as a potentially valuable intervention for hypertension care. Albeit, this summary result is from fewer and less well-controlled studies than reported in 2017.[1] Although the 2019 Addendum hypertension articles were mostly not RCTs, it is rare to find improving blood pressure in hypertensive patients without a specific intervention. Therefore, simple observational studies can be considered potentially impactful. Also, a substantial meta-analysis[26] from 39 RCTs (at least 6 months in duration), provided collective agreement on positive blood pressure findings significantly enhancing the argument for a beneficial HWC effect on hypertension treatment. Although these

effects are promising, a large-scale, multicenter RCT, with intent-to-treat analysis, examining HWC effects on hypertension is needed. Furthermore, future studies of intervention specifics (health coach experience, training and techniques, and dose information) will advance and better define treatments for hypertension. To summarize, despite a need for further study; a large body of research accumulated in the original Compendium and the 2019 Addendum makes evident that HWC has a positive effect on hypertensive patients.

Miscellaneous

In the 2019 Addendum to the HWC Compendium, we are including this Miscellaneous section for the first time. As the section title suggests, it includes HWC research articles that do not fit into the other categories, and as such, it is more challenging to uniformly characterize and present. There are 9 journal articles classified as Miscellaneous and published in the past 2 years. Of these, 8 are data-based articles, although 5 studies evaluated specific health outcomes, and 3 examined health coaching processes or health-related operations. In this new HWC Compendium section, there are 4 RCTs, and 4 are observational (before-after) studies. Although the Miscellaneous section does not contain any purely qualitative studies, there are 4 that utilized mixed-methods designs, whereas 5 yielded strictly quantitative results. The coaching interventions for these HWC studies lasted between 3 and 12 months ($M \pm SD = 6.06 \pm 4.29$; n = 6), but methods sections often did not clearly report the number of coaching sessions (only 3/7 studies provided clear information). Several studies in Miscellaneous used a pure coaching intervention, though only 1 article[27] accounted for program dropouts with an intent-to-treat analysis. Several Miscellaneous studies (3/8) did not have a comparator group leaving before and after, or only posttreatment analysis, as the sole means of data inspection.

The HWC Miscellaneous articles examined influences in 5 disorders (menopausal depression, COPD, chronic kidney disease, Duchenne muscular dystrophy, and drug abuse). A study also examined HWC effects in emergency department "super utilizers"[28] and found significantly reduced emergency department visits with significant health care cost savings.

In general, the Miscellaneous section articles suggest positive results and influences from HWC for a range of disorders and health care system outcomes. For example, one study found that HWC helped reduce menopausal depression symptoms,[27] whereas another showed that nurse coaches improved health outcomes and self-management in COPD.[8] The Miscellaneous section is so diverse, it is difficult to reach a broad and appropriate conclusion on HWC effects. However, it does appear that HWC is generally effective in these studies of health coaching.

Although this Miscellaneous category is presented for the first time and was limited to the 2 years since the original Compendium publication, the trajectory for HWC studies in other lesser-studied areas seems clear. A future HWC Compendium will likely include categories on pulmonary diseases (mainly COPD and asthma), gastrointestinal disorders (mostly gastroesophageal reflux disorder, irritable bowel syndrome, and inflammatory bowel disease), neuropsychological disorders (depression, anxiety, bipolar disorder, multiple sclerosis, Parkinson disease, and others), and pain disorders (fibromyalgia, low back pain, migraines, and others). It will be important to ensure that well-trained health coaches are experienced with these conditions and mindful of what is necessary for best practices in these populations. The hope is that future HWC research on these topics provides that information.

Obesity

The 2019 Addendum to the HWC Compendium includes 27 articles on coaching an overweight or obese population. Similar to the original Compendium, coaching in overweight or obese individuals remains one of the largest areas of study in HWC. In fact, of all HWC Compendium categories, Obesity comes closest to matching the original number of studies reported in 2017, when there were 33, in just the 2 years since. Most of the published articles are quantitative in nature (25/27), and there were 2 qualitative studies. Similar to the original Compendium, the largest group of quantitative studies had RCT designs, with 10, followed by 6 applied cohort, 6 retrospective, and 2 nonrandom controlled studies and 1 survey design study. Since 2016, this marks a slight decrease in the number of RCTs and increase in observational designs published. In particular, the increase in assessment of health outcomes via existing data (ie, retrospective analyses) was noticeable. The duration of the coaching interventions ranged from 2 to 24 months ($M \pm SD = 7.1 \pm 6.1$), with 2 to 96 coaching sessions ($M \pm SD = 14.4 \pm 20.0$). Noticeably, 5 studies reported the use of electronic devices and/or social media in addition to live sessions with the coach.

Bias might be present in the selected HWC obesity studies. In particular, blinding of participants remains an issue for HWC studies that will not likely be resolved, with only 6 studies reporting any use of blinding procedures. Half of the studies did not use a control group, and of those that did, 6 did not analyze or report differences between the experimental and control group at baseline. It is encouraging to report that 14 studies used a pure coaching intervention, not supplemented with other behavior change strategies. Although this marks an improvement from the original Compendium, mixed interventions are still present in almost half of obesity studies. The sample sizes of the studies ranged from 19 to 4108 participants ($M \pm SD = 688 \pm 997$), with 8 studies having a sample size <100. The majority (13/25) of studies recruited between 100 and 1000 participants; however, 6 recruited more than 1000 participants. It should be noted that 4 of these are retrospective in nature. The sample sizes of RCTs ranged from 25 to

664 ($M \pm SD = 303 \pm 198$). In comparison to the original Compendium, this shows an increase in well-powered RCTs, which is commendable. In addition, 9 studies applied intention-to-treat analysis, accounting for participant dropouts—a welcome improvement from our 2016 collection.

Unsurprisingly, the majority of obesity-related studies analyzed weight loss as the main outcome variable. Similar to the original HWC Compendium, the vast majority (20/25) found a positive effect for weight/BMI reduction. Of those 20, 7 were RCTs, 6 were retrospective, 5 were cohort designed, and 2 were nonrandom controlled studies. Although the percentage of studies supporting weight reduction (74%) is a slight decrease compared to the original Compendium (87%), the results still indicate effectiveness of HWC on this outcome. Only 2 studies reported nonsignificant changes in weight reduction, and although those were RCTs, the authors used HWC only as a supplemental intervention in addition to other treatments. In addition, there was some mixed evidence on effects of HWC on exercise and nutritional behavior. For both variables, a subset (ie, 4-6 studies) showed a positive effect, yet an even smaller subset (ie, 2 studies) in each showed no effect. In addition, longitudinal research showed that the positive effects on exercise behavior may subside over time. In the obesity studies, cardiovascular risk factors (eg, blood pressure, cholesterol, triglycerides, blood glucose) seemed to be mostly unaffected by HWC. Whereas single studies showed positive effects, the majority of the studies showed no change in these factors. Three studies showed positive psychological effects of HWC, which included an increase in mood, sleep quality, and quality of life. The 2 qualitative studies added by exploring important considerations of program delivery to enhance patients' satisfaction with HWC.

In summary, the findings of the 2019 Addendum to the HWC compendium are in line with the original. A large portion of the studies showed a positive effect of HWC on weight reduction. However, just about half of these studies also included other interventional strategies, which is likely to occur in a multidisciplinary health care setting. Most of the studies were well powered and used appropriate designs. There was a noticeable increase in large-scale retrospective studies in the 2019 Addendum, which adds important longitudinal information to the existing knowledge. Future research should continue to use RCTs and add meta-analytical approaches to examining the effectiveness of HWC in overweight or obese populations.

Wellness

In the 2019 Addendum to the HWC Compendium, 13 articles were classified as wellness with data. An additional 7 HWC articles were identified without data (eg, examining policy change, comparing exercise at home vs in a gym as opposed to the effects of coaching, examining characteristics of community health workers delivering coaching program; see Part B). As with the original HWC Compendium, coaching for wellness is again one of the top studied categories comprising many areas (eg, physical activity, leadership, stress, self-efficacy) and conditions/populations (eg, employees, older adults, smoking).

These studies mainly utilize a quantitative data collection analysis (10/13) with 2 mixed-method studies and 1 qualitative study, indicating some diversity in the type of research. Similar to the 2017 findings, the most common study design was RCT (~50%; 7/13), with pre-post (2/13) and non-RCT (1/13) designs also used. This represents an increase in the proportion of RCTs and a decrease in the proportion of pre-post designs since 2016. Similar to the previous Compendium, many of the RCTs used purposeful sampling with random assignment rather than true random sampling. The coaching interventions for this group of studies lasted between 1 and 12 months ($M \pm SD = 3.79 \pm 2.75$), with at least 3 to 24 sessions either recommended or completed ($M \pm SD = 8.36 \pm 6.67$), a slight reduction in both from our 2016 report. As a group, a potential for bias was high because 57% of study interventions were not purely HWC (eg, added physical activity, smoking cessation), and only 50% included a comparison group. About 25% (3/13) accounted for dropouts using an intent-to-treat analysis. In comparison to the 2017 findings, this is a nearly identical proportion of studies with a comparison group and a slight increase in the proportion that were not solely coaching. It seems that, in general, studies tend to use coaching as part of another intervention, which is common in real-world applications. These studies also used a variety of HWC approaches in addition to in-person HWC including hybrid (ie, mixture of in-person and telephonic), web-based, or telephonic coaching (7/13) and solely motivational interviewing (2/13) as well as a variety of different coach backgrounds (eg, community health workers, exercise physiologists, researchers).

The wellness articles had focus on psychological variables such as self-efficacy, perspective taking, irrational beliefs, stress, anxiety, and depression (8/13). Similar to 2016, there were a wide range of other findings assessed, including, but not limited to, exercise behavior (5/13), weight/BMI/body fat (4/13), nutrition behavior (1/13), health risk assessment (HRA) (1/13), and blood pressure (1/13). Other articles focused on outcomes such as goal attainment (1/13), coaches' perspectives/training satisfaction (2/13), cost-effectiveness (1/13), hospital admissions (1/13), and smoking cessation quit-line enrollment (1/13). Unlike the 2016 Compendium, the consistency of effects was harder to determine because of the smaller number of coaching studies published and wider range of outcomes assessed. In agreement with our summary from Wellness in the first HWC Compendium, positive effects were reported for psychological variables (6/8) and exercise behavior (3/5).[29-34]

Weight-related variables (ie, weight, BMI, percentage body fat) also seemed to be affected by HWC (2/3), especially when weight change was a goal.

These results, in conjunction with those compiled in 2017,[1] support the effects of HWC on wellness outcomes, but some notable limitations remain. First, coaching in wellness studies was not often completed as prescribed. As noted in one study,[29] less than half of participants completed their scheduled coaching. There is, however, no clear known dose of coaching needed to affect outcomes. Second, nearly one-third of studies did not control for the large number of outcome variables assessed, so there was a highly inflated rate of type I error. There is the potential that results are sometimes a result of chance and not HWC effects, which is a concern. Future studies ought to make appropriate statistical adjustments (eg, Bonferroni) to lessen this concern. On the other hand, there appear to be positive effects for HWC, particularly when participants are motivated/ready to change. Third, there are a variety of populations studied in the Wellness category studies; thus, identifying change in a particular population represents a need of further HWC study.

Discussion

In 2017, the National Board for Health and Wellness Coaching (National Board of Medical Examiners subsidiary) delivered the first national certification exam for HWC. The new NBC-HWC (National Board Certified) credential provides a unifying standard and a milestone for the HWC field. Nearly 2000 HWC professionals were certified in 2017-2018 and that number is expected to grow substantially. As an emerging field of health care, it is reassuring that HWC is supported by a substantial and continually expanding scholarship base. The 2019 Addendum to the Compendium of HWC describes the related research and writings of the prior 2 years.

Perusal of the 2019 Addendum Results Summaries makes it clear that HWC appears to yield generally favorable effects across clinical categories reviewed. The rapidly expanding work in obesity and diabetes is particularly noteworthy because a very strong positive recommendation for HWC effects is evident. This dovetails very nicely with a report of excellent cost-effectiveness for diabetic treatment with HWC.[17] The lack of reported studies on cancer makes it difficult to say much more about a HWC impact for this group of patients. The HWC literature on heart disease, hypertension, cholesterol, and wellness continues to advance and, as with the original Compendium, generally positive HWC effects continue to accumulate.

It should be noted that several new and important HWC reviews were published in the previous 2 years.[6,16,35,36] These summarized HWC research on cancer,[6] obesity,[36] and diabetes,[16] with each concluding a beneficial effect of HWC. Dejonghe et al[35] reviewed HWC long-term effectiveness and revealed coaching may have an impact more than 6 months after stopping treatment, though these authors clearly called for more research before reaching firm conclusions. As valuable as these reviews are, they each only address a small slice of the HWC literature base. They do not try to and cannot provide a comprehensive view of the existing HWC scholarship. Newly published HWC reviews and meta-analyses are essential and critically add to the existing HWC knowledge base. However, these works do not provide readers a complete sense of scope for accumulating HWC research. The HWC Compendium provides a comprehensive repository of related HWC scholarship. We expect that the Compendium will continue to uniquely serve HWC professionals as a highly relevant resource, but also hope that more clinical topic-specific meta-analysis are done in the near future.

In the spirit of developing a compendium (ie, a collection of literature), we have carefully assembled articles and described findings but did not attempt to fully evaluate results of the reported HWC research. Instead, we have systematically organized the HWC literature to encourage engagement of others in the work of more carefully analyzing results and drawing conclusions. With the literature compilation done, we hope performing meta-analysis on selected topics, or the HWC research base as a whole, will be the natural next step. Pirbaglou et al[16] is a fine example of such an effort reporting improvements in diabetic glycemic control after performing meta-analysis on data from 22 studies. We expect others will follow this example for meta-analysis and use the Compendium's database to more precisely examine HWC results.

Articles included in the Compendium (and the 2019 Addendum) made use of a wide range of outcome variables. It was common to see the primary outcome variable in a study be specific to the target population under consideration (eg, A1C for diabetic; BP for hypertensive). However, when considering the HWC literature spectrum, it becomes clear that there is no single or core set of outcomes to define coaching effectiveness. Measures of self-efficacy and quality of life are frequently included in coaching research, but there is no consistency or consensus on the best outcomes to measure. Development of a core outcome set will be a great boost to the HWC field, and future research should address this need.

Limitations

The 2019 Addendum makes it clear that HWC research is making progress toward addressing study limitations and confounders. Although extremely rare in the original compendium, now 9 of the 27 articles in the obesity category accounted for patients leaving the study, with most of these studies performing intent-to-treat analysis. This statistical strategy (ie, intent-to-treat) considers participant dropouts and avoids the bias of following only patients who may be most receptive, or susceptible, to treatment effects. Although this is a commendable improvement in managing a confounding variable, there are still more HWC studies that do not address

dropouts than those that do; future HWC research studies will be better off with most doing intent-to-treat analysis. Still larger problems with HWC research design are a lack of appropriate controls and studies not isolating the coaching effect. Much HWC research (32/81) does not use a control group, and of those that do, most use a usual treatment control or a comparison group. Although a usual treatment control is experimentally stronger than no control, future HWC researchers should consider developing attentional controls acting more as a "sham" coaching treatment to better explore the coaching effect. Nearly half of the coaching studies (40/81) in the 2019 Addendum appropriately isolate the coaching effect, with many still incorporating HWC treatment into a larger intervention. These programmatic designs often involve providing additional services (eg, exercise or nutritional counseling). Such studies provide valuable real-world application, but do not allow a clear interpretation of the coaching impact on patient outcomes. HWC research should be designed so that a patient may choose to alter behaviors (eg, exercise or dietary habits); however, they should not be directed to make such changes. Only then can a true patient-centric coaching effect be properly isolated and its impact on outcomes properly accounted.

As with HWC research in general, our Compendium also has limitations deserving mention. Similar to the 2017 original, it is likely that some relevant HWC articles were missed (eg, not in search engine databases or human error) and unintentionally omitted from the final compilation of the 2019 Addendum. Moreover, a recently published commentary opined strongly for dropping "health care professional" from our list of HWC article inclusion criteria.[37] A good case made by these authors came too late for consideration in this Addendum, though we will deliberate on coaching qualifications criteria for future addendums to the Compendium. We also remind readers that a publication bias likely exists in the HWC literature, leading to more positive than negative findings being published and reviewed. Moreover, in our zeal to be inclusive, some may argue that there are articles included not reflecting the spirit of HWC. There are many opportunities for reviewer interpretation arising while assessing individual studies, and sometimes information needed for accurate or complete coding of the Compendium columns is missing. Readers can rest assured that our expert referees used their best judgment in making each of these assessments. We are fully aware, however, that readers will have differing interpretations, and we welcome those opinions to be shared with us. This feedback can only inform our work, thereby improving future editions, and bettering the potential value, of the HWC Compendium.

It should also be noted that neither the Compendium nor the 2019 Addendum contains a coding column for studies using a holistic or integrative coaching approach. These styles of coaching can represent a more intensive intervention; yet in the Compendium, inclusion is simply based on our 5 inclusion criteria with no further distinction of coaching methodology. An editorial or follow-up using Compendium resources could nicely address this issue by determining studies using a holistic approach and examining the results of these interventions.

Trends

HWC using digital assistance,[38] or strictly an e-coaching platform,[39] has become a prominent trend, with many studies using virtual aids (eg, web platforms, sms/texts, online chat, emails, use of daily reminders/nudges). Berman et al[38] is good example of a hybrid program combining daily use of a phone app designed to assist nutrition education, meal planning, and health education with telephonic coaching sessions every 2 weeks. Patients accessed the app more than 4 times a day and after 12 weeks reported a drop in A1C. Although there is a clear and substantial trend for digital coaching emerging, we did not include pure electronic coaching studies in the HWC Compendium. After considerable deliberation, it was decided that the human element and the ensuing coach-patient relationship was an integral part of the coaching experience—and relationship is 1 of our 5 primary coaching criteria. Therefore, although the HWC Compendium includes many studies making use of digital assistance to coaches, studies using solely electronic interventions are omitted.

Group coaching is also gaining more attention as a cost-effective alternative to one-on-one coaching sessions. One study in fibromyalgia patients[40] is a good example of using group, combined with individual, coaching sessions to produce a potentially effective intervention. Using a group-only HWC process, Bezner et al[41] demonstrated that university employees could improve self-efficacy and physical fitness. As with electronic coaching, personal relationships with group coaching are more challenging to develop, and articles using a purely group coaching strategy were not included in the 2019 Addendum. Other possible drawbacks to be aware of, is that group coaching may sometimes be primarily educational in nature, and this process might also present challenges to an individual patient-centered process. On the other hand, group coaching presents a potentially leverageable social dynamic, possibly allowing greater interventional success than seen with strictly personal coaching. It is unclear if group coaching is as effective as individual coaching, though this question is an important one to be addressed with future research.

Future Research

As described above in the Trends section, electronic coaching and group coaching are emerging HWC strategies in need of further study, and questions include the following: "Does group coaching, or e-coaching, prove effective in some patient categories but not others?" "Does e-coaching work best in conjunction with human coaching?" "What is the best frequency and duration of group coaching sessions?" "Does group coaching work best in conjunction with individual sessions?" "Does a web

platform work as well as a phone app providing regular reminders (ie, a push or nudge) to cue desired behavior?" Further and detailed study of these and similar research questions will allow us to better understand the potential interventional benefits of e-coaching and group coaching strategies.

Clinician, or health-care provider, burnout is rapidly becoming a critical topic of interest across medical communities.[42] Occupation-related stress is too often claiming the careers, and sometimes the lives, of the essential (and limited) human resources who provide the health care we need. This emerging crisis needs solutions, and interventions are being examined,[43] but the potential for HWC as a treatment for "burned-out" health care providers is yet to be explored. HWC provides a logical avenue to assist doctors and nurses who may be in need of lifestyle assessment and behavioral changes, but there is no empirical evidence to support this application for coaching. Studies of HWC intervention to mitigate health care provider burnout are needed and may potentially provide treatment assistance for this emergent health care crisis.

Better appreciation of what constitutes an effective coaching session and assessing the operative scope of practice for HWC intervention need to become topics of research interest. Determining a clear, assessable outcome measure to reflect quality in coaching will be an important step for evaluating the process. Understanding differences in clinical effectiveness for various patient presentations, genders, or age groups can provide important information for the application of HWC. A preliminary example of this sort of research examined cost-effectiveness of HWC intervention in a large group of patients.[17] In this study, HWC had greater impact on quality-adjusted life years in diabetic and coronary artery disease patients than in other patient presentations across a sample of 970 participants. Although this is a single study on an isolated outcome, greater emphasis on comparative effectiveness analysis of the HWC intervention is needed; such study will ultimately define scope of practice for HWC professionals.

HWC treatment guidelines need to be better defined to most effectively and efficiently use this intervention. In each clinical category, determining typically successful frequency and duration of coaching, as well as intrasession strategies, will lead to a better HWC practice. Although coaching must be recognized as patient centered, greater standardization will potentially lead to greater clinical acceptance and, ultimately, improved reimbursement for coaching treatments. Consider that most other medical therapies (eg, medications, rehabilittion therapy, counseling) are often delivered in a certain amount for a certain time course, with prescriptions for these treatments amendable based on patient needs. The same should be true for HWC interventions, and a goal of more clearly defined practice guidelines is achievable with greater attention to comparative effectiveness study in HWC research. The HWC Compendium should, and hopefully will, add many such studies to the collection in the next iteration.

Finally, the HWC literature database will also be advanced by epidemiological (and large population) practice-based studies. There is also a need for well-designed qualitative works that can shed more light on what happens during a coaching session. Collectively, these studies provide external validity to HWC research and complement conclusions of well-designed clinical trials.

Summary and Conclusions

Similar to the original HWC Compendium, the 2019 Addendum provides substantial evidence for a clinical intervention yielding a positive impact on the chronic, often lifestyle-related, diseases. Diabetic and heart disease patients may derive the most valuable benefit, but obesity continues to be a hotly investigated topic, with positive outcomes apparent from coaching intervention. There is a need to design more studies delving into the scope and strategies of coaching practice while isolating the coaching effect and accounting for patient drop out. However, the maturity of HWC research seems to be slowly evolving, and this evolution is gradually providing more information about coaching effectiveness. The HWC Compendium is valuable because it provides a comprehensive database identifying, quantifying, and analyzing existing coaching literature while categorizing by clinical population. Furthermore, it helps bring to light both the strengths and weaknesses of the existing HWC literature. This 2019 Addendum to HWC Compendium allows practitioners to examine the latest clinical findings while also assisting researchers to identify current and relevant gaps in the coaching literature. We hope that the Compendium continues to serve all HWC professionals while stimulating further advancement of coaching knowledge.

Declaration of Conflicting Interests

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: GAS declares potential conflict of interest as a research consultant to Wellcoaches. MPK, SH, KC, LC-K, and JSE declare no potential conflicts of interest. EF declares potential conflict of interest being in private practice called Wellness Synergy for lifestyle counseling and health and wellness coaching; MM declares potential conflict of interest as an owner and CEO of the Wellcoaches School of Coaching for health professionals. The authors have prepared this article with fidelity and objectivity; though a potential for conflict exists, great care was taken for no bias to be reflected in this work.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Ethical Approval

Not applicable, because this article does not contain any studies with human or animal subjects.

Informed Consent

Not applicable, because this article does not contain any studies with human or animal subjects.

Trial Registration

Not applicable, because this article does not contain any clinical trials.

ORCID iD

Gary A. Sforzo https://orcid.org/0000-0002-2346-4751

Supplemental Material

Supplemental material for this article is available online. AJLM

References

1. Sforzo GA, Kaye MP, Todorova I, et al. Compendium of the health and wellness coaching literature. *Am J Lifestyle Med.* 2017;12:436-447. doi:10.1177/1559827617708562
2. Meuleman Y, Hoekstra T, Dekker FW, et al. Sodium restriction in patients with CKD: a randomized controlled trial of self-management support. *Am J Kidney Dis.* 2017;69:576-586. doi:10.1053/j.ajkd.2016.08.042
3. Wolever RQ, Simmons LA, Sforzo GA, et al. A systematic review of the literature on health and wellness coaching: defining a key behavioral intervention in healthcare. *Glob Adv Health Med.* 2013;2:38-57. doi:10.7453/gahmj.2013.042
4. Sturgeon K, Dean L, Heroux M, et al. Commercially available lifestyle modification program: randomized controlled trial addressing heart and bone health in BRCA1/2+ breast cancer survivors after risk-reducing salpingo-oophorectomy. *J Cancer Surviv.* 2017;11:246-255. doi:10.1007/s11764-016-0582-z
5. Thomson CA, Crane TE, Miller A, Garcia DO, Basen-Engquist K, Alberts DS. A randomized trial of diet and physical activity in women treated for stage II-IV ovarian cancer: rationale and design of the Lifestyle Intervention for Ovarian Cancer Enhanced Survival (LIVES): an NRG Oncology/Gynecologic Oncology Group (GOG-225) study. *Contemp Clin Trials.* 2016;49:181-189. doi:10.1016/j.cct.2016.07.005
6. Barakat S, Boehmer K, Abdelrahim M, et al. Does health coaching grow capacity in cancer survivors? A systematic review. *Popul Health Manag.* 2018;21:63-81. doi:10.1089/pop.2017.0040
7. Fujimoto K. Effectiveness of coaching for enhancing the health of menopausal Japanese women. *J Women Aging.* 2017;29:216-229. doi:10.1080/08952841.2015.1137434
8. Early F, Young JS, Robinshaw E, Mi EZ, Mi EZ, Fuld JP. A case series of an off-the-shelf online health resource with integrated nurse coaching to support self-management in COPD. *Int J Chron Obstruct Pulmon Dis.* 2017;12:2955-2967. doi:10.2147/COPD.S139532
9. Bhanpuri NH, Hallberg SJ, Williams PT, et al. Cardiovascular disease risk factor responses to a type 2 diabetes care model including nutritional ketosis induced by sustained carbohydrate restriction at 1 year: an open label, non-randomized, controlled study. *Cardiovasc Diabetol.* 2018;17:56. doi:10.1186/s12933-018-0698-8
10. Zhang P, Hu YD, Xing FM, Li CZ, Lan WF, Zhang XL. Effects of a nurse-led transitional care program on clinical outcomes, health-related knowledge, physical and mental health status among Chinese patients with coronary artery disease: a randomized controlled trial. *Int J Nurs Stud.* 2017;74:34-43. doi:10.1016/j.ijnurstu.2017.04.004
11. Sweet CMC, Chiguluri V, Gumpina R, et al. Outcomes of a digital health program with human coaching for diabetes risk reduction in a Medicare population. *J Aging Health.* 2018;30:692-710. doi:10.1177/0898264316688791
12. Miller KE, Martz DC, Stoner C, et al. Efficacy of a telephone-based medical nutrition program on blood lipid and lipoprotein metabolism: results of our healthy heart. *Nutr Diet.* 2018;75:73-78. doi:10.1111/1747-0080.12366
13. Viester L, Verhagen EALM, Bongers PM, van der Beek AJ. Effectiveness of a worksite intervention for male construction workers on dietary and physical activity behaviors, body mass index, and health outcomes: results of a randomized controlled trial. *Am J Health Promot.* 2018;32:795-805. doi:10.1177/0890117117694450
14. Lenzen SA, Daniëls R, van Bokhoven MA, van der Weijden T, Beurskens A. What makes it so difficult for nurses to coach patients in shared decision making? A process evaluation. *Int J Nurs Stud.* 2018;80:1-11. doi:10.1016/j.ijnurstu.2017.12.005
15. Cinar AB, Freeman R, Schou L. A new complementary approach for oral health and diabetes management: health coaching. *Int Dent J.* 2018;68:54-64. doi:10.1111/idj.12334
16. Pirbaglou M, Katz J, Motamed M, Pludwinski S, Walker K, Ritvo P. Personal health coaching as a type 2 diabetes mellitus self-management strategy: a systematic review and meta-analysis of randomized controlled trials. *Am J Health Promot.* 2018;32:1613-1626. doi:10.1177/0890117118758234
17. Oksman E, Linna M, Horhammer I, Lammintakanen J, Talja M. Cost-effectiveness analysis for a tele-based health coaching program for chronic disease in primary care. *BMC Health Serv Res.* 2017;17:138. doi:10.1186/s12913-017-2088-4
18. Shoemaker MJ, Oberholtzer NL, Jongekrijg LE, et al. Exercise-and psychosocial-based interventions to improve daily activity in heart failure: a pilot study. *Home Health Care Manag Pract.* 2017;29:111-120. doi:10.1177/1084822316683660
19. Harter M, Dirmaier J, Dwinger S, et al. Effectiveness of telephone-based health coaching for patients with chronic conditions: a randomised controlled trial. *PLoS One.* 2016;11:e0161269. doi:10.1371/journal.pone.0161269
20. Balaban RB, Zhang F, Vialle-Valentin CE, et al. Impact of a patient navigator program on hospital-based and outpatient utilization over 180 days in a safety-net health system. *J Gen Intern Med.* 2017;32:981-989. doi:10.1007/s11606-017-4074-2
21. Duscha BD, Piner LW, Patel MP, et al. Effects of a 12-week Health program on peak VO_2 and physical activity patterns after completing cardiac rehabilitation: a randomized controlled trial. *Am Heart J.* 2018;199:105-114. doi:10.1016/j.ahj.2018.02.001
22. Palacio AM, Vidot DC, Tamariz LJ, et al. Can we identify minority patients at risk of nonadherence to antiplatelet medication at the time of coronary stent placement? *J Cardiovasc Nurs.* 2017;32:522-529. doi:10.1097/JCN.0000000000000387
23. Tiede M, Dwinger S, Herbarth L, Härter M, Dirmaier J. Long-term effectiveness of telephone-based health coaching for heart failure patients: a post-only randomised controlled trial. *J Telemed Telecare.* 2017;23:716-724. doi:10.1177/1357633X16668436
24. Bakitas M, Dionne-Odom JN, Pamboukian SV, et al. Engaging patients and families to create a feasible clinical trial integrating palliative and heart failure care: results of the ENABLE CHF-PC pilot clinical trial. *BMC Palliat Care.* 2017;16:45. doi:10.1186/s12904-017-0226-8
25. He J, Irazola V, Mills KT, et al; HCPIA Investigators. Effect of a community health worker-led multicomponent intervention on blood pressure control in low-income patients in Argentina: a randomized clinical trial. *JAMA.* 2017;318:1016-1025. doi:10.1001/jama.2017.11358

26. Mills KT, Obst KM, Shen W, et al. Comparative effectiveness of implementation strategies for blood pressure control in hypertensive patients: a systematic review and meta-analysis. *Ann Intern Med*. 2018;168:110-120. doi:10.7326/M17-1805
27. Almeida OP, Marsh K, Murray K, et al. Reducing depression during the menopausal transition with health coaching: results from the healthy menopausal transition randomised controlled trial. *Maturitas*. 2016;92:41-48. doi:10.1016/j.maturitas.2016.07.012
28. Anderson D, Patch E, Oxandale B, Kincade A, Gamber A, Ohm R. Nursing student coaches for emergency department super utilizers. *J Nurs Educ*. 2017;56:27-30. doi:10.3928/01484834-20161219-06
29. Alley S, Jennings C, Plotnikoff RC, Vandelanotte C. Web-based video-coaching to assist an automated computer-tailored physical activity intervention for inactive adults: a randomized controlled trial. *J Med Internet Res*. 2016;18:e223. doi:10.2196/jmir.5664
30. Bus K, Peyer KL, Bai Y, Ellingson LD, Welk GJ. Comparison of in-person and online motivational interviewing-based health coaching. *Health Promot Pract*. 2018;19:513-521. doi:10.1177/1524839917746634
31. Ewald B, Stacey F, Johnson N, et al. Physical activity coaching by Australian exercise physiologists is cost effective for patients referred from general practice. *Aust N Z J Public Health*. 2018;42:12-15. doi:10.1111/1753-6405.12733
32. Grant AM, Studholme I, Verma R, Kirkwood L, Paton B, O'Connor S. The impact of leadership coaching in an Australian healthcare setting. *J Health Organ Manag*. 2017;31:237-252. doi:10.1108/JHOM-09-2016-0187
33. O'Halloran PD, Shields N, Blackstock F, Wintle E, Taylor NF. Motivational interviewing increases physical activity and self-efficacy in people living in the community after hip fracture: a randomized controlled trial. *Clin Rehabil*. 2016;30:1108-1119. doi:10.1177/0269215515617814
34. Patten CA, Boyle R, Tinkelman D, et al. Linking smokers to a quitline: randomized controlled effectiveness trial of a support person intervention that targets non-smokers. *Health Educ Res*. 2017;32:318-331. doi:10.1093/her/cyx050
35. Dejonghe LA, Becker J, Froboese I, Schaller A. Long-term effectiveness of health coaching in rehabilitation and prevention: a systematic review. *Patient Educ Couns*. 2017;100:1643-1653. doi:10.1016/j.pec.2017.04.012
36. Muñoz Obino KF, Pereira CA, Caron-Lienert RS. Coaching and barriers to weight loss: an integrative review. *Diabetes Metab Syndr Obes*. 2017;10:1-11. doi:10.2147/DMSO.S113874
37. Taylor SS, Kennedy AB. Health and wellness coaching: providers and practice—a commentary on Sforzo and Colleagues (2018). *Am J Lifestyle Med*. 2018;13:451-455. doi:10.1177/1559827618790531
38. Berman MA, Guthrie NL, Edwards KL, et al. Change in glycemic control with use of a digital therapeutic in adults with type 2 diabetes: cohort study. *JMIR Diabetes*. 2018;3:e4. doi:10.2196/diabetes.9591
39. Everett E, Kane B, Yoo A, Dobs A, Mathioudakis N. A novel approach for fully automated, personalized health coaching for adults with prediabetes: pilot clinical trial. *J Med Internet Res*. 2018;20:e72. doi:10.2196/jmir.9723
40. Hackshaw KV, Plans-Pujolras M, Rodriguez-Saona LE, et al. A pilot study of health and wellness coaching for fibromyalgia. *BMC Musculoskelet Disord*. 2016;17:457. doi:10.1186/s12891-016-1316-0
41. Bezner JR, Franklin KA, Lloyd LK, Crixell SH. Effect of group health behaviour change coaching on psychosocial constructs associated with physical activity among university employees [published online April 22, 2018]. *Int J Sport Exerc Psychol*. doi:10.1080/1612197X.2018.1462232
42. Dyrbye LN, Shanafelt TD, Sinsky CA, et al. *Burnout Among Health Care Professionals: A Call to Explore and Address This Underrecognized Threat to Safe, High-Quality Care. NAM Perspectives. Discussion Paper*. Washington, DC: National Academy of Medicine; 2017. doi:10.31478/201707b
43. West CP, Dyrbye LN, Rabatin JT, et al. Intervention to promote physician well-being, job satisfaction, and professionalism: a randomized clinical trial. *JAMA Intern Med*. 2014;174:527-533. doi:10.1001/jamainternmed.2013.14387