2020

Workplace Well-Being Factors That Predict Employee Participation, Health and Medical Cost Impact, and Perceived Support

Jessica Grossmeier

Patricia H. Castle

Jennifer S. Pitts

Colleen Saringer

Kristi Rahrig Jenkins

See next page for additional authors

Authors

Jessica Grossmeier, Patricia H. Castle, Jennifer S. Pitts, Colleen Saringer, Kristi Rahrig Jenkins, Mary T. Imboden, David J. Mangen, Sara S. Johnson, Steven P. Noeldner, and Shawn T. Mason

Workplace Well-Being Factors That Predict Employee Participation, Health and Medical Cost Impact, and Perceived Support

Jessica Grossmeier, PhD, MPH[1], Patricia H. Castle, PhD[2], Jennifer S. Pitts, PhD[3], Colleen Saringer, PhD[4], Kristi Rahrig Jenkins, PhD[5], Mary T. Imboden, PhD[1,6], David J. Mangen, PhD[7], Sara S. Johnson, PhD[2], Steven P. Noeldner, PhD, MS[8], and Shawn T. Mason, PhD, LP[9]

Abstract

Purpose: This study tested relationships between health and well-being best practices and 3 types of outcomes.

Design: A cross-sectional design used data from the HERO Scorecard Benchmark Database.

Setting: Data were voluntarily provided by employers who submitted web-based survey responses.

Sample: Analyses were limited to 812 organizations that completed the HERO Scorecard between January 12, 2015 and October 2, 2017.

Measures: Independent variables included organizational and leadership support, program comprehensiveness, program integration, and incentives. Dependent variables included participation rates, health and medical cost impact, and perceptions of organizational support.

Analysis: Three structural equation models were developed to investigate the relationships among study variables.

Results: Model sample size varied based on organizationally reported outcomes. All models fit the data well (comparative fit index > 0.96). Organizational and leadership support was the strongest predictor ($P < .05$) of participation (n = 276 organizations), impact (n = 160 organizations), and perceived organizational support (n = 143 organizations). Incentives predicted participation in health assessment and biometric screening ($P < .05$). Program comprehensiveness and program integration were not significant predictors ($P > .05$) in any of the models.

Conclusion: Organizational and leadership support practices are essential to produce participation, health and medical cost impact, and perceptions of organizational support. While incentives influence participation, they are likely insufficient to yield downstream outcomes. The overall study design limits the ability to make causal inferences from the data.

Keywords

workplace health promotion, culture of health, leadership support, organizational support, participation, health impact, medical cost impact, employee perceptions of support

Introduction

The popularity of health and well-being (HWB) initiatives is increasing among employers.[1] While there is evidence that comprehensive initiatives can improve employee health and positively impact important business outcomes,[2-5] not all programs have demonstrated effectiveness, and the success of these initiatives can be influenced by many factors.[6,7] To address this limitation, researchers and industry experts have outlined a set of evidence-based practices used to develop and evaluate such initiatives.[8,9] Many of these practices have been codified into industry best practice scorecards aimed at helping employers and practitioners identify strengths and gaps in their

[1] Health Enhancement Research Organization, MN, USA
[2] Pro-Change Behavior Systems, Inc., South Kingstown, RI, USA
[3] Independent Consultant, Cambria, CA, USA
[4] Alliant Employee Benefits, GA, USA
[5] MHealthy, University of Michigan, Health and Well-being Services, Ann Arbor, MI, USA
[6] George Fox University, Health and Human Performance, Newberg, OR
[7] Mangen Research Associates, Inc., Mound, MN, USA
[8] Mercer Health & Benefits LLC., Irvine, CA, USA
[9] Johnson & Johnson Health & Wellness Solutions, Inc., Behavioral Science and Advanced Analytics, New Brunswick, NJ, USA

Corresponding Author:
Jessica Grossmeier, Health Enhancement Research Organization, 24 S. Olive Street, #301, Waconia, MN 55387, USA.
Email: jessica.grossmeier@hero-health.org

initiatives.[10-15] While these best practice scorecards have been instrumental in guiding the development of comprehensive initiatives, research is needed to understand which HWB practices are most effective at improving health outcomes and worksite culture across a broad range of organizations.

One of the first studies to assess the influence of specific HWB practices on population health outcomes, as measured by a best practice scorecard, was a cross-sectional study based on the American Heart Association's Workplace Health Achievement Index (WPAI).[16] Researchers attempted to identify the subcategories of practices on the WPAI associated with favorable cardiovascular health risks and costs. However, the study authors concluded that more research was needed to identify specific practice areas that drive outcomes. A more recent 2018 study was based on measures from the CDC Worksite Health Scorecard. This study of 41 employers evaluated associations among 7 culture of health elements and employee perceptions of organizational support for health and lifestyle risk.[17] Of the elements included, only leadership support predicted study outcomes. Studies such as these provide useful insights for employers, but additional research is needed to determine which best practices predict other HWB outcomes.

The HERO Health and Well-Being Best Practices Scorecard in collaboration with Mercer (HERO Scorecard)[13] collects information about specific HWB practices. It asks organizations to report their program participation rates as well as health and medical cost impacts. Over the past decade, more than 2000 organizations have provided information on their implementation practices and outcomes.[18] Research has consistently shown that the widely used HERO Scorecard is a well-established measurement tool. Organizations that achieved higher overall scores had better health impact and medical cost trends than organizations with lower scores.[19] Further, a simulation analysis demonstrated that publicly traded organizations with scores in the top quartile (ie, 125 or higher) outperformed the Standard and Poor's 500 Index for company stock price, yielding a greater return to stockholders over time.[20] These studies focused on the overall score associated with organizational responses to the HERO Scorecard, but did not identify the specific practices that might have driven study outcomes. A 2013 study was the first to identify relationships between 16 practices measured on the HERO Scorecard and telephonic health coaching participation and health outcomes. The study found that employee age and gender influenced the strength of relationships and that there was considerable diversity in both the size and the direction of the age and gender relationships across companies.[21] Ongoing descriptive analyses on HERO Scorecard data demonstrate positive associations between many individual practices and outcomes such as employee perceptions of organizational support, participation, health, and medical cost impacts. However, more rigorous research comparing the strength of predictive associations among the practices is needed.[18]

A recent study[22] using data from the HERO Scorecard Benchmark Database used exploratory and confirmatory factor analysis to identify a 4-factor model comprised of 24 items representing all 6 domains of the HERO Scorecard. These factors included (1) organizational and leadership support, (2) program comprehensiveness, (3) program integration, and (4) incentives. The aim of the current study is to extend this earlier research to examine the predictive power of the newly developed subscales on 3 sets of HWB outcomes:

- Participation in health assessments and biometric screening
- Impact of HWB programs on health risks and medical costs
- Perceived organizational support of employee HWB

Thus, the current study uses structural equation modeling (SEM) to assess the relationships among the factors developed from the psychometric evaluation of the HERO Scorecard to identify those factors most predictive of important HWB outcomes.

Methods

Design

A cross-sectional retrospective design leveraged data from organizationally reported responses to version 4 of the HERO Scorecard.[13] The HERO Scorecard was originally designed to help organizations self-assess implementation of best practices for their workplace HWB initiatives and identify opportunities to improve.[23] The HERO Scorecard is comprised of 6 domains with 48 scored items: (1) Strategic Planning; (2) Organizational and Cultural Support; (3) Programs; (4) Program Integration; (5) Participation Strategies; and (6) Measurement and Evaluation. Each practice in the HERO Scorecard is associated with a numeric score. Organizations that complete it receive an overall best practice score (maximum 200 points) as well as 6 domain scores, each based on the best practices implemented in that domain. Additional information about the development of the HERO Scorecard is reported elsewhere.[19,23] Data were collected from organizations that voluntarily completed the HERO Scorecard. Data are typically submitted by individuals responsible for managing and implementing an organization's HWB initiatives or by those that worked closely with the organizations in a consulting or advisory role.

Sample

The study was based on a convenience sample drawn from the HERO Scorecard Benchmark Database. If an organization submitted more than 1 HERO Scorecard response, the most recent submission was retained for the study. A total of 845 organizations completed the HERO Scorecard at least one time between January 12, 2015 and October 2, 2017. Due to the exploratory nature of this study and the desire to maintain an adequate study sample, exclusion criteria were kept to a minimum. Analyses were limited to the organizations that employed more than one individual and completed a majority of the items (ie, were not missing any sections or more than 4

Table 1. Description of Study Variables.

Organizational characteristics	
Gender	Percent of organization's active employees that are male
Age	Average age of organization's active employees
Size	Small (less than 500 employees) Medium (500 to 4999 employees) Large (5000 or more employees)
Region (headquarters)	Midwest Northeast South West
Industry type	Manufacturing ○ Mining, construction, energy ○ Products ○ Transportation, communications, utilities Services ○ Colleges and universities ○ Other educational organizations ○ Financial ○ Hospitals and health care clinics ○ Other health services ○ Technical/professional ○ Other Other ○ Retail, wholesale, food services, lodging, entertainment ○ Government ○ Other
HWB practices (factors)	
Organizational and leadership support	Factor comprised of practices related to how senior leadership views, supports, and communicates about the value of employee HWB as well as broader organizational support for employee HWB
Program comprehensiveness	Factor comprised of practices related to provision of various programs to employees at all levels of health to support lifestyle behavior change
Program integration	Factor comprised of practices related to program integration through program partner referrals, monitoring, and tracking
Incentives	Factor comprised of practices related to provision of financial incentives to employees and spouses/partners for health assessment-related activities
Outcomes measures	
Health assessment participation	Percent of eligible employees who completed a health assessment questionnaire
Biometric screening participation	Percent of eligible employees who participated in biometric screenings
Health impact	Organizationally reported degree of population level health impact demonstrated in association with HWB initiative
Medical cost impact	Organizationally reported population level medical cost impact demonstrated in association with HWB initiative
Perceptions of organizational support	Reported percent of employees who responded positively to the statement, "My employer supports my health and well-being."

Abbreviation: HWB, Health and well-being.

total items). Approximately 4% of the original sample was excluded for failure to meet these eligibility criteria. The final study sample included 812 organizations.

Measures

A previous study identified a reduced set of the full inventory of practices. Factor analysis statistically grouped the measures into 4 factors, creating a shorter version more suitable for research purposes.[22] These factors included: (1) organizational and leadership support, (2) program comprehensiveness, (3) program integration, and (4) incentives. Each of these factors was scored on a scale of 0 to 100 representing the percentage of the maximum possible score across the items in that factor. Employers also self-reported demographic and organizational characteristics that were used as covariates. The dependent variables included the categories of (1) participation (in health assessments and biometrics screening), (2) impact (on health risks and medical costs), and (3) employee perceptions of organizational support. A detailed description of study variables is provided in Table 1.

Data Analysis

Linear SEM was conducted using Stata (Release 15) to investigate relationships among the 4 implemented practices and the

Table 2. Sample Characteristics.

	n (%)
Organization size	
Small (<500 employees)	255 (32)
Medium (500-4999 employees)	351 (44)
Large (5000+ employees)	192 (24)
Organization industry	
Manufacturing/mining/construction	172 (21)
Service	468 (58)
Other	167 (21)
Headquarters region	
Midwest	169 (21)
Northeast	247 (31)
South	171 (22)
West	202 (26)

Table 3. Descriptive Statistics of Independent and Dependent Variables.

Variable	n	Mean (SD)
Independent variables		
Incentives	812	52.74 (36.98)
Program integration	812	29.38 (25.43)
Program comprehensiveness	812	51.48 (28.50)
Organizational and leadership support	812	37.63 (21.79)
Dependent variables		
Biometric screening participation	330	49.36 (27.46)
Health assessment participation	336	51.24 (28.92)
Health risk impact (0-2)	247	1.03 (0.627)
Medical cost impact (0-2)	201	0.99 (0.748)
Perceptions of organizational support	146	72.66 (23.14)

Abbreviation: SD, standard deviation.

3 outcome measures of interest. Health and medical cost impacts were measured using ordinal dependent variables, so this analysis assumed equality of the intervals between the ordered categories. For each of the 3 analyses, a series of models were evaluated to test the impact of the 4 measures and potential covariates (eg, organizational size, gender of employees, average age of employees, geographical region of organization's headquarters) on each of the outcome measures. The analysis of each outcome followed a similar logical process to identify a model that adequately explained the relationships among the measures.

The first estimated model in each series was a baseline theoretical model that tested the impact of the covariates on the 4 factors, and the 4 factors on the outcome measures for that analysis. This model specifies that the covariates have no direct effects on the outcome measure, and that any effect of the covariates on outcomes is mediated through the factors. Furthermore, the baseline model specified that there were significant relationships among the 4 factors based on prior research indicating such associations.[22]

The next step in the process simplified the model by removing all statistically nonsignificant effects. Finally, covariates that were uniformly irrelevant in the modeling process were removed from the analysis to simplify the model and presentation of the results. Throughout this process, a statistical significance level of $P < .05$ was used as the criterion for retaining a predictor or covariate in the model. A variety of model fit metrics, including the Confirmatory Fit Index, Tucker Lewis Index, and Root Mean Square Error of Approximation, were used to determine the best fitting models.

Results

The final study sample included 812 organizations, comprised of more than 4.7 million employees. Organizations ranged in size from those employing just 2 employees to those employing more than 175 000 employees (see Table 2). Forty-four percent were medium-sized organizations; 31% were headquartered in the Northeastern United States, and 58% represented the service industry. Employees of the 812 organizations were 50% male with an average age of 43 years (standard deviation = 5.33).

Descriptive statistics for each best practice area and outcome measure are provided in Table 3. Average participation rates across all employers were 49% for biometric screening and 51% for health assessment, with significant variation across the sample. Of the organizations reporting health risk impact results, 18% reported no improvement (scored as 0), 61% reported a slight improvement (scored as 1), and 21% reported a significant improvement in health risk (scored as 2).

Fewer employers provided data on medical cost impact but most reported either a substantial positive impact on medical trend with savings exceeding the cost of the HWB initiative (27%, scored as 2 for the modeling) or a small positive impact with savings less than the cost of the initiative (44%, scored as 1). A relatively small number of organizations provided data on the results from their employee perceptions surveys. Of those who did, an average of 73% of employees reported agreeing that the organization supported their HWB.

Predictors of Participation

Table 4 outlines the fit indices for the final fitted models for each of the 3 classes of outcome measures. The modeling process yielded an excellent model predicting participation, with a nonsignificant ($P > .05$) goodness-of-fit statistic and adequate estimates of model fit.

The final fitted model indicated that organizational and leadership support practices and incentives significantly impacted participation in both health assessments and biometric screening. Figure 1 presents the standardized coefficients from the final fitted model. Higher levels of organizational and leadership support led to higher levels of participation in both biometric screening and health assessment questionnaire participation. Similarly, stronger incentives also led to higher levels of participation in biometric screening and health assessment questionnaire participation.

Organization size, average proportion male, and average employee age influenced the implementation of certain practices. Compared to large organizations, small organizations were less

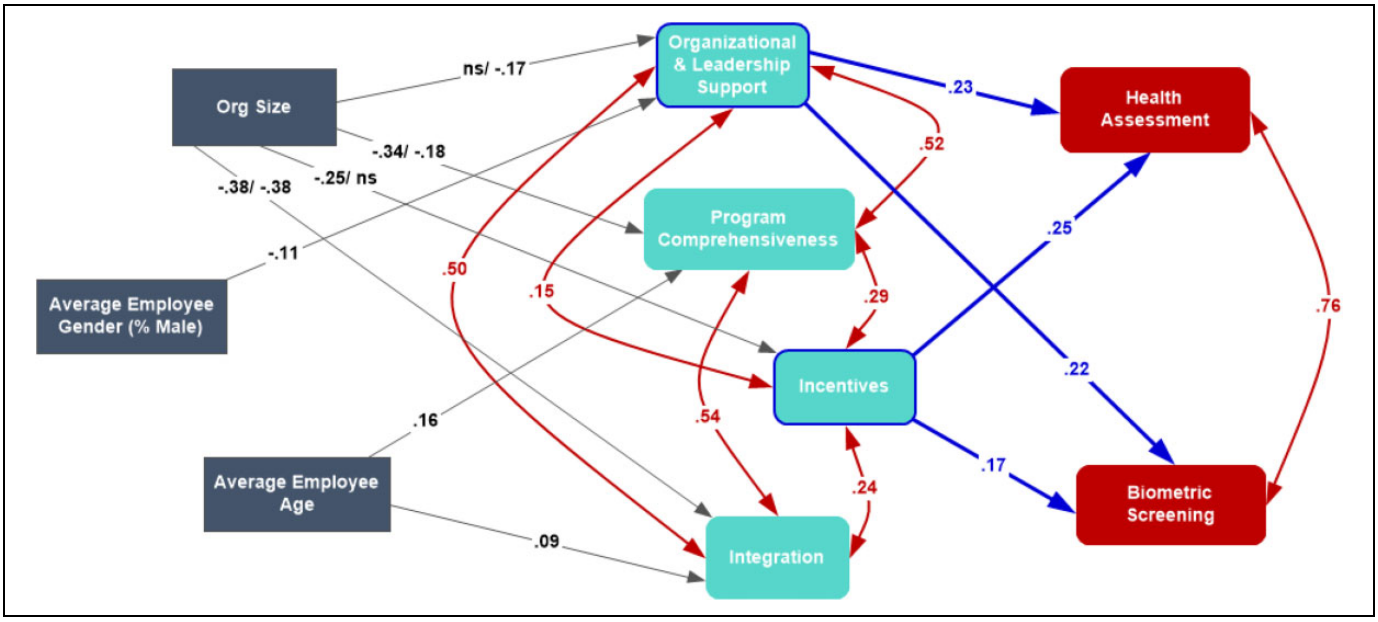

Figure 1. Predictive validity between practices and participation.
Note. Effect coefficients for Org Size include 2 values, with the first representing small size and the second representing medium size. ns indicates not significant.

Table 4. Summary of Final Fitted Models.

Model	n	χ^2	D.F.	Comparative Fit Index	Tucker-Lewis Index	RMSEA
Participation model	276	31.35	19	0.98	0.96	0.05
Impact model	160	29.94	20	0.96	0.94	0.06
Organizational support model	143	10.75	8	0.99	0.97	0.05

Abbreviation: RMSEA, Root Mean Square Error of Approximation.

likely to implement best practices in all 4 areas. Organizations with higher percentages of male employees were less likely to implement organizational and leadership support practices while organizations with older employees were more likely to use program comprehensiveness and program integration practices.

Statistically significant positive relationships among all 4 factors, and between the dependent variables, were also found. For example, organizations implementing organizational and leadership support practices were also more likely to implement program integration, incentives, and program comprehensiveness practices. Health assessment questionnaire participation and biometric screening participation rates were also highly correlated, which makes sense given that many organizations offer biometric screenings in conjunction with health assessment surveys that focus on self-reported lifestyle behaviors.

Predictors of Impact

The second line of Table 4 presents the goodness-of-fit statistics for the final model predicting impact. The final fitted model for this analysis indicated that organizational and leadership support significantly influenced health risk and medical cost impact, with higher levels of support yielding improved health outcomes and lower costs (see Figure 2). None of the other factors significantly influenced these outcomes.

Organization size and the employee gender mix influenced the implementation of certain practices. Compared to large organizations, small organizations were less likely to implement practices associated with comprehensive programs, incentives, and program integration. Organizations with higher percentages of male employees were more likely to implement financial incentives. As observed in the participation model, there were many statistically significant relationships among the factors and among the dependent variables. Reports of health risk and medical cost impact were also highly correlated after controlling for the influence of organizational and leadership support.

Predictors of Perceived Organizational Support

The third line of Table 4 presents the goodness-of-fit statistics for the final model that was estimated for the predictors of perceived organizational support. This model suggested an excellent fit to the data. Only organizational and leadership support significantly influenced Perceived Organizational Support (see Figure 3), with higher levels of support related to increased perceived support. Organization size influenced the implementation of program practices. Compared to large organizations, small organizations were less likely to implement practices associated with comprehensive programs, incentives, and program integration. As observed in the previous 2 models, statistically significant relationships among the factors were found.

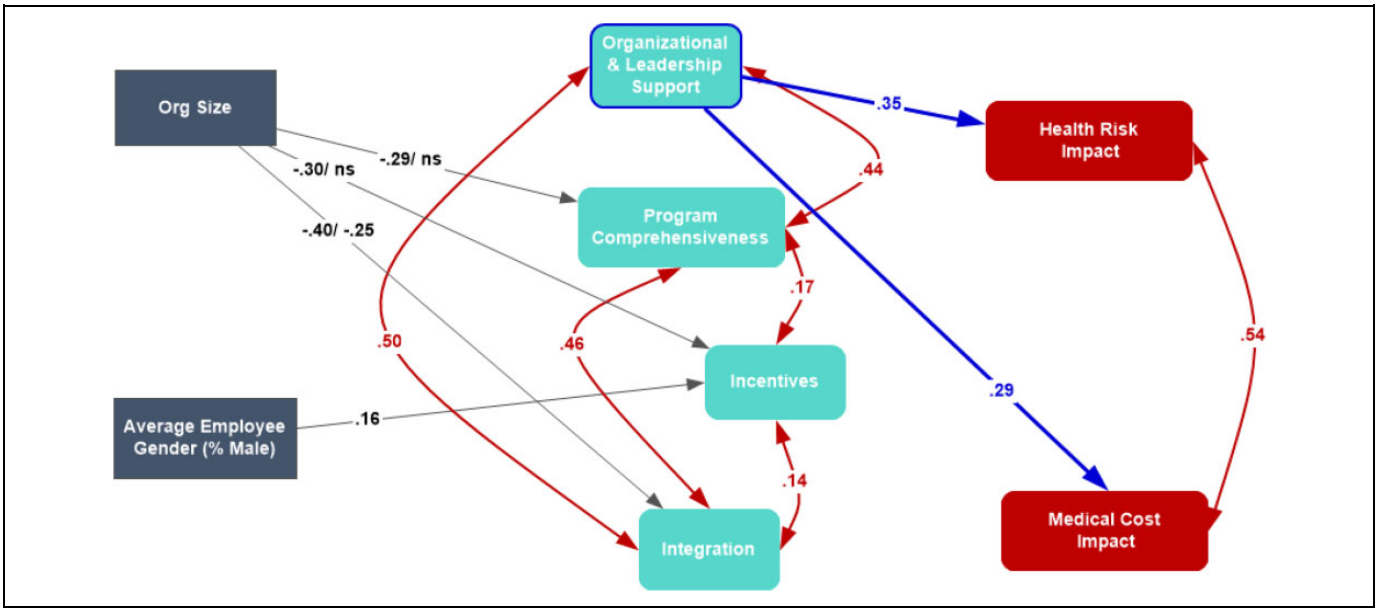

Figure 2. Predictive validity between practices and impact.
Note. Effect coefficients for Org Size include 2 values, with the first representing small size and the second representing medium size. ns indicates not significant.

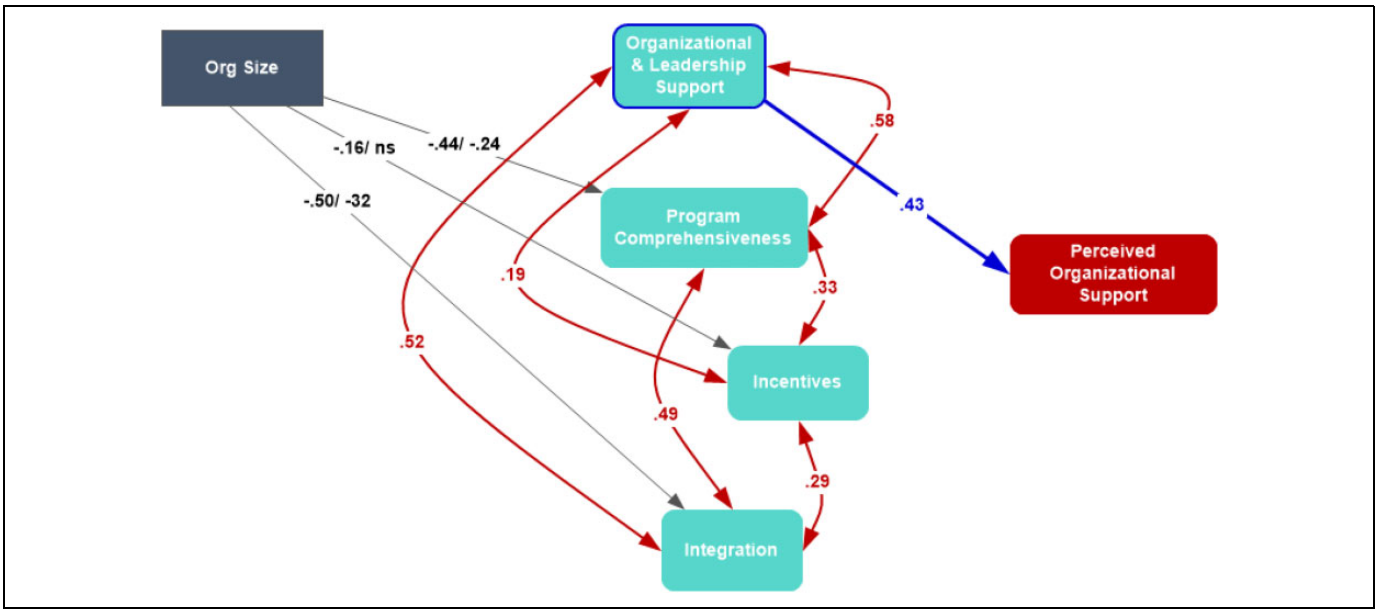

Figure 3. Predictive validity between practices and perceived organizational support.
Note. Effect coefficients for Org Size include 2 values, with the first representing small size and the second representing medium size. ns indicates not significant.

Discussion

The current study examined the power of 4 HERO Scorecard subscales to predict various HWB outcomes. Among the 4 implemented practices examined, organizational and leadership support emerged as the most consistent predictor of participation, impact, and perceived organizational support. Incentives also emerged as a predictor of participation in both health assessment and biometric screening. Taken altogether, the models demonstrated that while incentive practices significantly predicted participation in health assessment questionnaires and biometric screening, organizational and leadership support was more strongly associated with biometric screening participation than were incentives. Organizational and leadership support was also predictive of a broader array of critical outcomes. When all 4 factors were included in the same measurement model, program comprehensiveness and program integration practices did not significantly predict any tested outcomes.

Some findings, such as incentives increasing participation in health assessment questionnaires and biometrics screening, are consistent with previous research[24-28]; however, incentives may not be predictive of population-level health impact. A 2015 systematic review and meta-analysis reported that financial incentives can be effective for at least short-term changes in health behaviors but may not sustain behavior change for long enough to improve clinical health outcomes.[29,30] In a recent commentary published in *JAMA*, researchers summarized several studies indicating that incentives were not effective in improving health promoting behaviors related to treatment adherence or downstream clinical health outcomes. The authors identified issues related to incentive design, execution, and communication as possible contributors to the lack of study effects.[31] The HERO Scorecard practices represented in the incentives factor in this study did not assess such elements, and it is possible that incentive designs or associated communications strategies used by the majority of study companies were insufficient to yield an impact on health and medical cost impact.

The finding that organizational and leadership support practices were the most predictive of study outcomes underscores that workplace health promotion initiatives are most effective when implemented within the context of a broader organizational culture of health.[8,32-35] The organizational and leadership support factor includes 10 distinct practices including leaders viewing HWB initiatives as connected to business objectives, leaders supporting and actively participating in HWB initiatives, health supporting policies, and the implementation of wellness champion networks, among others. These are among the recommended practices represented in the broader body of "culture of health" research that reinforces the importance of using socio-ecological approaches to create environments and systems within organizations that support HWB programs aimed at individual behavior change.[36]

While the importance of organizational and leadership support for the effectiveness of HWB initiatives has long been recognized,[17,21,25,28,33,34,37] research linking specific practices with different types of outcomes is just beginning to emerge.[18] Leadership support is particularly evident in previous research on practices associated with effective HWB initiatives. Researchers from The RAND Corporation emphasized the importance of leadership support at all levels, including the need for senior leaders to view HWB as a priority and for direct supervisors to generate excitement and help connect their employees to resources.[27] A previous study identified the need to have senior management involved as key members of the HWB initiative,[34] and a subsequent study recommended communicating successful outcomes to key stakeholders, including senior leaders.[37] All of these practices are represented in the HERO Scorecard organizational and leadership support factor. Other practices that are linked to effective HWB initiatives include using wellness champions or ambassadors to promote the initiative,[34] supporting employee HWB with health-related policies,[37] having a written strategic plan for HWB,[14,35] including employee input as part of initiative design and execution,[14,35] and using targeted HWB communications with different groups of employees in the organization.[38-40]

A recent study found other measures of leadership support predicted employee perceptions of organizational support.[17] Specific leadership practices included showing organizational commitment and support of worksite health promotion at all management levels, having a paid health promotion coordinator, having an annual budget or dedicated funding for health promotion, supporting other health initiatives in the community, and providing training for managers to identify and reduce workplace stress-related issues. None of these practices were included in the present study's measurement of organizational and leadership support. Future research may explore if augmenting the practices in the present study with other leadership support practices improves the prediction of study outcomes. The present study's findings reinforce and contribute to the existing research, underscoring how essential organizational and leadership support is to the success of HWB initiatives. Without it, the success of the HWB initiative may be limited.

A somewhat unexpected finding of the analysis was the impact that average employee age and the percentage of the company's employees who were male had on the best practices that were implemented. Companies with a relatively more female employee base were more likely to score higher on the organizational and leadership support dimension, suggesting perhaps that the management of these companies is more sensitive to a perceived need to be on-board with the HWB program. Similarly, companies that trended older were more likely to have comprehensive and integrated programs, a finding that might stem from the greater health-related needs associated with an older employee population.

This study did not demonstrate that practices in the program comprehensiveness or program integration factors improved any of the study outcomes. This finding is contrary to other research supporting the impact of these practices. Two key recommendations when implementing HWB initiatives have been to ensure comprehensiveness and to integrate the available programs and services across the organization. A systematic review by Soler et al presented strong evidence for the effectiveness of program comprehensiveness, which they defined as including health risk assessment and feedback, along with education and/or other interventions.[41] The results showed that an array of health promotion activities more positively impacted multiple health behaviors and conditions than programs that only included health risk assessment. With regard to program integration, study findings by Loeppke et al support their statement that "good health is good business."[42] Specifically, Loeppke et al found that employees exposed to an integrated HWB program composed of lifestyle support, demand management, and disease management experienced significant improvements in health risks and productivity compared to employees who did not participate in the program. Similarly, Goetzel et al found that organizations integrating HWB programs into their central operations and across departments had more successful HWB initiatives.[37] But using an integrated

approach is often challenging for organizations due to their functional departments working in silos.[43]

The most likely reason for the lack of alignment between the previous studies and the current study is the diversity of analytic approaches used to examine influential practices on HWB outcomes. The current study simultaneously tested the impact of program comprehensiveness and program integration alongside the organizational and leadership support and incentives factors. Combining the 4 factors into the same model allowed for a more rigorous test of the impact on study outcomes than previous research that examined the individual impact of each practice. In this more rigorous test, program comprehensiveness and program integration failed to emerge as statistically significant predictors of outcomes, although both are strongly related to organizational and leadership support. Previous studies did not use an analytic approach that tested the influence of program integration or program comprehensiveness practices alongside practices related to organizational and leadership support or incentives. The study by Goetzel et al[37] surveyed companies with exemplary health and productivity initiatives to identify the practices they held in common and identified program integration practices as one of many the exemplary companies had implemented. Loeppke et al[42] used a quasi-experimental study design to compare a cohort of employees exposed to an integrated health improvement and disease management program to employees not exposed to the intervention. The intervention may have included practices related to program comprehensiveness and organizational and leadership support, but the focus for the study did not test which specific elements of the multi-faceted intervention had the biggest impact on outcomes. The systematic review by Soler et al[41] was focused only on program comprehensiveness and did not include practices related to the other factors examined in the current study. In addition, a recent study on the HERO Scorecard practices found that the program integration and comprehensiveness factors were highly correlated with organizational and leadership support.[22] Future research should attempt to modify the items on HERO Scorecard subscales such that they are capturing more unique variance on these constructs.

Limitations

Limitations for this study fall into 3 broad categories including sample characteristics, methodological issues, and data characteristics. One sampling issue that may limit the generalizability of study findings is that the study data relied on a convenience sample of organizations that completed the HERO Scorecard. However, these data did reflect a large sample of organizations from a fairly even distribution of organizational size as well as participation from diverse industry types from all regions of the United States. Another limitation is that not all organizations in the study sample completed the optional outcomes section of the HERO Scorecard. This reduced the sample size for the models that used impact and perceived organizational support data for outcomes.

Structural equation modeling is a useful method for testing conceptual models that potentially describe causal mechanisms in a system and facilitating inferences about those causal relationships. It has been argued that this method is an improvement on simpler quasi-experimental, pre–post designs.[44,45] Even so, the strength of causal inference in this study is limited by the cross-sectional nature of the data. Stronger causal inference could be made with models tested using longitudinal data. Future research could benefit by using longitudinal HERO Scorecard data to test how improvements in HWB initiatives are associated with changes in HWB outcomes.

With respect to the data used in this study, one limitation is that the outcomes variables were based on organizations' self-report of program impact. Thus, they may contain some bias, either intentional or unintentional. In future research, more objective sources of outcomes data would be valuable for further exploring the nature of the relationships seen in this study. Another data limitation is that the health and medical cost impact measures were imprecise. These impact measures were each based on responses to single items using ordinal type response scales; as such these measures have unknown test–retest or internal consistency reliability and only face validity. A more robust approach would rely on quantitative, continuous measures of health and medical cost impact. This would provide more sensitive outcome measures, which would allow for the effects of the measured best practices on these outcomes to be better evaluated. Future research using HERO Scorecard data from nationally representative samples of organization sizes and types and using more objective and sensitive data collected over time, would be important contributions to the HWB field.

Given that the nature of the factors and outcomes data in this study were at the organizational level, it was appropriate to use the organization as the unit for analysis. More research is needed on the influence of such factors on individuals, while controlling for individual characteristics. It's likely that these factors influence study outcomes differently for different types of people. A multilevel statistical approach would be better suited to identify such differences. A 2013 study based on HERO Scorecard data found that age and gender differences had an influence on how HWB practices were linked to health coaching participation and health impact.[21]

One final limitation was inclusion of organizations with a very small number of employees. Some of the practices on the HERO Scorecard may not make sense for smaller organizations. While this study did control for organization size, future studies might explore the relevance and importance of organizational and leadership support practices in very small organizations.

Despite these limitations, this study provides new evidence associating organizational and leadership support practices, using a newly identified HERO Scorecard subscale, with health and medical cost impact. This extends existing research about the importance of these practices for effective HWB initiatives.

So What?

What is already known about this topic?

While industry best practice scorecards guide the development of evidence-based, comprehensive HWB initiatives, more research is needed to help understand which HWB practices are most effective at improving participation and health outcomes across a broad range of organizations

What does this article add?

This study confirms the role of incentives for driving participation in simple awareness-raising activities. However, organizational and leadership support practices are more important predictors of employee perceptions of organizational support and health and medical cost impacts

What are the implications for health promotion practice or research?

Effective workplace health and well-being initiatives will require robust organizational and leadership support, and the HERO Scorecard can help organizations identify specific practices in that domain that will maximize the success of their HWB initiatives

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: Jessica Grossmeier and Mary Imboden are employees of HERO and completed research, authorship and publication as part of their work at HERO.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This project was funded by HERO Research Partners including Kaiser Permanente, Prudential Financial, and The StayWell Company, LLC. Patty Castle, Sara Johnson, and Jennifer Pitts received funding from HERO as contracted work for hire for research, authorship, and publication. David Mangen received funding from HERO as contracted work for hire for research.

ORCID iD

Jessica Grossmeier, PhD, MPH https://orcid.org/0000-0002-7920-4887

References

1. National Business Group on Health. Employers continue to expand well-being programs and increase financial incentives for employees. May 3, 2018. https://www.businessgrouphealth.org/news/nbgh-news/press-releases/press-release-details/?ID=343. Accessed June 20, 2019.
2. Baicker K, Cutler D, Song Z. Workplace wellness programs can generate savings. *Health Aff*. 2010;29(2):304-311.
3. Cancelliere C, Cassidy JD, Ammendolia C, Cote P. Are workplace health promotion programs effective at improving presenteeism in workers? A systematic review and best evidence synthesis of the literature. *BMC Public Health*. 2011;11:395.
4. Gubler T, Larkin I, Pierce JL. Doing well by making well: the impact of corporate wellness programs on employee productivity. *Manage Sci*. 2017;64(11):4967-4987.
5. Heaney C, Goetzel RZ. A review of health-related outcomes of multi-component worksite health promotion programs. *Am J Health Promot*. 1997;11(4):290-307.
6. Jones D, Molitor D, Reif J. What do workplace wellness programs do? Evidence from the Illinois workplace wellness study. National Bureau of Economic Research. January 2018. Updated June 2018. www.nber.org/papers/w24229. Accessed July 8, 2019.
7. Song Z, Baicker K. Effect of a workplace wellness program on employee health and economic outcomes: a randomized clinical trial. *JAMA*. 2019;231(15):1491-1501.
8. Johns Hopkins Bloomberg School of Public Health, Transamerica Center for Health Studies. *From Evidence to Practice: Workplace Wellness that Works*. Published September 2015. https://www.transamericacenterforhealthstudies.org/health-wellness. Accessed May 10, 2019.
9. Pronk N. Best practice design principles of worksite health and wellness programs. *ACSM Health Fit J*. 2014;18(1):42-46.
10. American Heart Association. Workplace Health Achievement Index. Updated May 11, 2018. https://www.heart.org/en/professional/workplace-health/workplace-health-achievement-index/workplace-health-solutions-how-it-works. Accessed May 10, 2019.
11. Centers for Disease Control and Prevention. *CDC Worksite Health ScoreCard: an Assessment Tool to Promote Employee Health and Well-Being*. Atlanta: U.S. Department of Health and Human Services; 2019. Updated January 2019. https://www.cdc.gov/workplacehealthpromotion/initiatives/healthscorecard/worksite-scorecard.html Accessed May 10, 2019.
12. Goetzel RZ, Tabrizi MJ, Roemer EC, Smith KJ, Kent K. A review of recent organizational health assessments. *Am J Health Promot*. 2013;27(5):TAHP1-TAHP10.
13. HERO. *HERO Health and Well-being Best Practices Scorecard in Collaboration with Mercer*. Version 4. 2014. Update date 2017. https://hero-health.org/wp-content/uploads/2017/01/US-Scorecard-V4-writable_1.2017.pdf Accessed May 10, 2019.
14. Kent KB, Goetzel RZ, Roemer EC, et al. Developing two culture of health measurement tools: examining employers' efforts to influence population health inside and outside company walls. *J Occup Environ Med*. 2018;60(12):1087-1097.
15. WELCOA. *WELCOA's Well Workplace Checklist*. 2018. https://www.welcoa.org/get-started/checklist/ Accessed May 10, 2019.
16. Goetzel RZ, Henke RM, Head MA, Benevent R, Calitz C. Workplace programs, policies, and environmental supports to prevent cardiovascular disease. *Health Aff*. 2017;36(2):229-236.
17. Payne J, Cluff L, Lang J, Matson-Koffman D, Morgan-Lopez A. Elements of a workplace culture of health, perceived

organizational support for health, and lifestyle risk. *Am J Health Promot*. 2018;32(7):1555-1567.
18. HERO. *2018 HERO Scorecard Progress Report*. December 17, 2018. https://hero-health.org/hero-scorecard/ Accessed May 10, 2019.
19. Goetzel RZ, Henke RM, Benevent R, et al. The predictive validity of the HERO Scorecard in determining future health care costs and risk trends. *J Occup Environ Med*. 2014;56(2):136-144.
20. Grossmeier J, Fabius R, Flynn JP, Noeldner SP, Fabius D, Goetzel RZ, Anderson DR. Linking workplace health promotion best practices and organizational financial performance: tracking market performance of companies with highest scores on the HERO scorecard. *J Occup Environ Med*. 2016;58(1):16-23.
21. Terry PE, Grossmeier J, Mangen DJ, Gingerich SB. Analyzing best practices in employee health management. How age, sex, and program components relate to employee engagement and health outcomes. *J Occup Environ Med*. 2013;55(4):378-392.
22. Imboden MT, Castle PH, Johnson SS, et al. Development and validity of a workplace health promotion best practices assessment. *J Occup Environ Med*. 2020;62(1):18-24.
23. HERO. *HERO Scorecard Background*. February 16, 2016. https://hero-health.org/hero-scorecard Accessed May 10, 2019.
24. Anderson DR, Grossmeier J, Seaverson ELD, Snyder D. The role of financial incentives in driving employee engagement in health management. *ACSM Health Fit J*. 2008;12(4):18-22.
25. Heltemes KJ, Pelletier KR, Ippolito AC, Do DC, Boylan BC. The association between incentive designs and health assessment or biometric screening completion. *J Occup Environ Med*. 2019; 61(4):e146-e149.
26. Fronstin P, Roebuck MC. Financial incentives, workplace wellness program participation, and utilization of health care services and spending. *EBRI Issue Brief*. 2015;(417):1-23.
27. Mattke S, Liu HH, Caloyeras JP, et al. *Workplace Wellness Programs Study: Final Report*. 2013. Santa Monica, CA: RAND Corporation. https://www.rand.org/pubs/research_reports/RR254.html. Accessed May 20, 2019.
28. Seaverson ELD, Grossmeier J, Miller TM, Anderson DR. The role of incentive design, incentive value, communications strategy, and worksite culture on health risk assessment participation. *Am J Health Promot*. 2009;23(5):343-352.
29. Mantzari E, Vogt F, Shemilt I, Wei Y, Higgins JPT, Marteau TM. Personal financial incentives for changing habitual health-related behaviors: a systematic review and meta-analysis. *Prev Med*. 2015;75:75-85.
30. Ng JY, Ntoumanis N, Thøgersen-Ntoumani C, et al. Self-determination theory applied to health contexts: A meta-analysis. *Perspect Psychol Sci*. 2012;7(4):325-340.
31. Thirumurthy H, Asch DA, Volpp KG. The uncertain effect of financial incentives to improve health behaviors. *JAMA*. 2019; 321(15):1451-1452.
32. Aldana SG, Anderson DR, Adam TB, et al. A review of the knowledge base on healthy worksite culture. *J Occup Environ Med*. 2012;54(4):414-419.
33. Goetzel RZ, Henke RM, Tabrizi M, et al. Do workplace health promotion (wellness) programs work? *J Occup Environ Med*. 2014;56(9):927-934.
34. Goetzel RZ, Ozminkowski RJ, Asciutto AJ, Chaouinard P, Barrett M. MEDSTAT Group. Survey of Koop award winners: life-cycle insights. *Art Health Promot*. 2001;5(2):1-8.
35. Henke RM, Head MA, Kent KB, Goetzel RZ, Roemer EC, McCleary K. Improvements in an organization's culture of health reduces workers' health risk profile and health care utilization. *J Occup Environ Med*. 2019;61(2):96-101.
36. Flynn JP, Gascon G, Doyle S, et al. Supporting a culture of health in the workplace: a review of evidence-based elements. *Am J Health Promot*. 2018;32(8):1755-1788.
37. Goetzel RZ, Shechter D, Ozminkowski RJ, Marmet PF, Tabrizi MJ, Roemer EC. Promising practices in employer health and productivity management efforts: findings from a benchmarking study. *J Occup Environ Med*. 2007;49(2):111-130.
38. De La Torre H, Goetzel R. How to design a corporate wellness plan that actually works. *Harvard Bus Rev*. March 31, 2016. https://hbr.org/2016/03/how-to-design-a-corporate-wellness-plan-that-actually-works Accessed June 19, 2019.
39. Kent K, Goetzel RZ, Roemer EC, Prasad A, Freundlich N. Promoting healthy workplaces by building cultures of health and applying strategic communications. *J Occup Environ Health*. 2016;58(2):114-122.
40. Schmid KL, Rivers SE, Latimer AE, Salovey P. Targeting or tailoring? Maximizing resources to create effective health communications. *Mark Health Serv*. 2008;28(1):32-37.
41. Soler RE, Leeks KD, Razi S, et al. A systematic review of selected interventions for worksite health promotion. *Am J Prev Med*. 2010;38(suppl 2):S237-S262.
42. Loeppke R, Nicholson S, Taitel M, Sweeney M, Haufle V, Kessler RC. The impact of an integrated population health enhancement and disease management program on employee health risk, health conditions, and productivity. *Popul Health Manag*. 2008; 11(6):287-296.
43. Sorensen G, McLellan D, Dennerlein J, et al. Integration of health protection and health promotion: Rationale, indicators, and metrics. *J Occup Environ Med*. 2013;55(suppl 12): S12-S18.
44. Hayduk LA. *LISREL Issues, Debates, and Strategies*. Baltimore, MD: Johns Hopkins University Press; 1996.
45. Jöreskog KG. Testing structural equation models. In: Bollen KA, Long JS, *Testing Structural Equation Models*, Beverly Hills, CA: Sage Publications; 1993.