Development and Validation of the Health-Friendly Activity Index: An Assessment Tool to Improve Consumers' Health-Related Outcomes

Young Ho Yun (lawyun08@gmail.com)
Seoul National University College of Medicine https://orcid.org/0000-0002-2740-7279

Sinae Oh
Seoul National University Hospital

Jin Ah Sim
Saint Jude Children's Research Hospital

Sujee Lee
University of Wisconsin Madison

Eun-Jung Sohn
University of Miami

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Abstract

Objectives We developed the Health-Friendly Activity Index (HFAI) to measure the health-friendly activity of corporations or organizations comprehensively. We validated the developed tool and reported on its use as an assessment tool to improve consumers' health-related outcomes.

Study Design This is a cross-sectional study

PUBH-D-20-02610 Development of the HFAI questionnaire followed a three-phase process: item generation, item construction, and validation with field testing. Using relevance and feasibility criteria, we developed a 105-item questionnaire with six domains (Governance and Infrastructure, Needs Assessment, Planning, Implementation, Monitoring and Feedback, and Outcomes). To assess the sensitivity and validity of the questionnaire, we recruited two different groups. We assessed Group One (31 companies) based on their recent sustainability reports and compared their HFAI scores with the Contribution Assessment Tool for Consumer's Health (CATCH) scores from 400 people from the general Korean population. For Group Two, we recruited 19 worksites and asked them to complete the HFAI and CATCH.

Results Each domain of HFAI exhibited a Cronbach's α coefficient between 0.382 and 1.000 for Group One and a Cronbach's α coefficient between 0.676 and 0.938 for Group Two.

Introduction

The world is facing increasing health problems, and health has become an important global issue addressed in the United Nations' Sustainable Development Goals.[1] People have begun to recognize that although health is mainly the responsibility of the government in most countries, companies can play an important role in building a health ecosystem.[2] In fact, companies affect consumers' health and wellness both positively and negatively, directly through their products and services, and therefore they have the opportunity to address the nonmedical, social, and environmental determinants of health and reframe consumers' health and wellness.[2,3] Stakeholders, including consumers, employees, investors, community organizations, and government officials, understand that companies face increasing pressure to improve health outcomes.[2,3] However, many companies try to make customers' health and wellness "less bad" rather than "good."[2–4]

We proposed the concept of "health-friendly management," which deals with health-friendly products and services as a corporate responsibility, based mainly on the concept of creating shared values (CSV).[3] In early 2018 we surveyed 1,200 individuals from the general Korean population; results suggested that most consumers perceive health-friendly labels as important when purchasing products or services and are willing to pay extra for health-friendly products or services. [3,5–8] Emphasizing health-friendly labels accredited by reputable organizations for products or services would help to build brand reliability and awareness among consumers.[8,9]

For workplace health and wellness programs to improve employee health as corporate social responsibility, the Centers for Disease Control and Prevention (CDC) developed the Worksite Health ScoreCard (HSC), a self-assessment survey instrument.[10] Additionally, we developed the Worksite Health Index (WHI) to assess comprehensive worksite health programs.[11] To our knowledge, however, there is currently no assessment tool to measure the health-friendly activity of corporations or organizations and to improve consumers' health-related outcomes.

In the present study, we developed and validated a new instrument to measure the health-friendly activity of corporations or organizations, the Health-Friendly Activity Index (HFAI). We designed this tool to assist managers in addressing the challenges of producing high quality health-friendly products and services and implementing science- and practice-based strategies that improve customers' health and wellness.

Methods

Development and validation of the HFAI was carried out in three phases following the assessment tool development process: (1) item generation; (2) construction of domains, subdomains, and items; and (3) validation with field testing. Statistical analyses for reliability and validity were conducted.

Phase I: Item Generation

For Phase 1, we organized lists of indicators relevant for company health-friendly activities, as well as for Corporate Social Responsibility (CSR) and Creating Shared Value (CSV) sectors that are associated with social contribution. We developed the list of indicators in tandem with our development of the Worksite Health Index.[11] We first reviewed more than 20 published indexes, such as the FSG Measuring Shared Value,[12] the B Corporation GIIRS Index,[13,14] the Dow Jones Sustainability Index,[15] the Health Impact Assessment,[16] the Nestlé CSV Report,[17] the British Government's CSR Index,[18,19] Creating Shared Value,[20,21] Porter & Kramer Moore,[19] the CDC Worksite Health Scorecard[10,22], and CSR.[2,4] We conducted semi-structured interviews with 24 health and CSV professionals (two family medicine doctors, one psychiatrist, four chief executive officers (CEOs), one consulting firm director, two non-profit organization security generals, two CSV experts, one economist, one nutritionist, three physical education experts, three psychologists, two CSR staff members, one Korea Occupational Health Agency assistant chief, and one occupational health nurse). We generated new assessment items for health-friendly activity to determine their contribution to consumers' health. We summarized field experiences and insights and used them to construct the framework of HFAI.

We then generated six domains for a total of 125 items reflecting key issues as follows: (1) Governance and Infrastructure, (2) Needs Assessment, (3) Planning, (4) Implementation, (5) Monitoring and Feedback, and (6) Outcomes. The Governance and Infrastructure domain includes three subdomains: Philosophy, Policy, and Infrastructure of company. The Needs Assessment domain includes two subdomains: Needs Assessment and Actual Condition Investigation. The Planning domain includes three subdomains: Planning, Budget, and Participation and Cooperation. The Implementation domain includes eight

subdomains: (1) Research & Development, (2) Purchase of Raw Material, (3) Product Production / Service Provision, (4) Promotion / Marketing, (5) Packing / Distribution, (6) Sales / Disposal / Post-marketing Management, (7) Information Disclosure, and (8) Creating Health Value for Products / Services. The Monitoring and Feedback domain includes three subdomains: Evaluation System, Monitoring, and Reflection on Post-plan. Finally, the Outcome domain includes no subdomain.

Phase Ii: Original Item Construction

The list was created using the Delphi method originally developed in 1967 by the RAND Corporation.[23] A group of 28 experts anonymously checked the feasibility and reliability of each item based on a five-point Likert scale and subsequently provided feedback. This was repeated twice. Items remained on the list if four criteria were met: (1) relevance mean score ≥ 3.0, (2) feasibility mean score ≥ 2.5, (3) prevalence ratio of less than relevance mean score 3 ≤ 25%, and (4) prevalence ratio of less than feasibility mean score 3 ≤ 25%. Items that did not meet these four criteria were deleted. Utilizing this method, we deleted 20 items, and the first version of the HFAI was reduced to 105 items on the questionnaire. To rate the assessment tool for evaluation, we utilized a yes/no scale.

Phase Iii: Validation With Field Testing

The purpose of field testing is to test reliability and validity. Considering statistical power, thirty companies should participate in this study. For Group One, our goal was to include at least 30 companies representing 10 business sectors and 24 industry groups selected based on the Global Industry Classification Standard (GICS) 2014; we succeeded in including 31 companies. Two research assistants assessed Group One with a provisional HFAI based on their recent sustainability reports. Then the corresponding author assessed the reports independently with reference to their assessment. However, we did not evaluate the outcomes of HFAI in sustainability reports as the reports did not show the activity of measuring outcomes for health-friendly activities.

For Group Two, we recruited a sample of 19 worksites to participate in this study. To test reliability and concurrent validity, enrolled worksites were asked to have two knowledgeable employees complete the provisional HFAI and Contribution Assessment Tool for Consumer's Health (CATCH).[3] With the CATCH, participants rated how products or services of their company contribute to the physical, mental, social, and spiritual health status of consumers (0 = not at all helpful, 10 = very helpful) (Table 1). We also collected information about worksite demographics, such as number of employees, business type, and industry. The survey was conducted online.

Table 1
Contribution Assessment Tool for Consumer's Health

Company's health-friendly activities that make an important contribution to consumers' physical health
Reflecting physical health status during product / service development / improvement
Reflecting the enhancement of physical health activities when developing / improving products / services
Quality control for raw materials
Minimization of harmful elements of production / service process
Active compensation for health-related accidents
Company's health-friendly activities that make an important contribution to consumers' mental health
Reflecting mental health status during product / service development / improvement
Reflecting the promotion of mental health activities when developing / improving products / services
Customer friendly service
Actively coping with customer complaints
Building confidence in corporation-made products / services
Company's health-friendly activities that make an important contribution to consumers' social health
Reflecting social health status during product / service development / improvement
Reflecting on social health activity promotion when developing / improving products / services
Constantly building relationships with customers
Respecting customers without discrimination
Contributing to improvement of family / relationship with others
Company's health-friendly activities that make an important contribution to consumers' spiritual health
Reflecting spiritual health status during product / service development / improvement
Reflecting on spiritual health activity promotion when developing / improving products / services
Providing products / services that respect the person as a human being
Providing products /services make a person feel worthy and valuable
Providing products / services that help improve life satisfaction
(0 = not at all helpful, 10 = very helpful)

Additional evaluation

In addition, from March to May 2018 we conducted another survey of the general Korean population, including people 20–70 years old residing across 17 major cities and local districts. In each major city and local district, all participants were recruited using two strata (age and sex) following the guidelines of the 2016 census of Korea. We used a probability-proportional-to-size technique for sample selection to represent a nationwide sample.[24] Approximately 4,000 people were contacted over the 17 major cities and local districts. The World Research Co., Ltd., conducted the survey, and 1,200 individuals were included in the final sample (the response rate was 30%). Using the CATCH, participants were asked to rate how a company's product or service helped their physical, mental, social, and spiritual health status (Table 1). For the total 100 companies evaluated, 400 people rated 33 companies, another 400 people rated 33 different companies, and the final 400 people rated 34 companies. The 31 companies of Group One were included in the 100 companies evaluated. The Cronbach's α of the CATCH for the 31 companies of Group One suggested high reliability with good internal consistency (Appendix 1).

Our study developing and validating the HFAI was reviewed and approved by the Institutional Review Board (IRB) of the Seoul National University Hospital (SNUH) (IRB No. 1904-082-1026) as an IRB Review Exemption study. Ethics approval was obtained from the IRB of the SNUH for participants' self-reported questionnaire of the general population as an IRB Review Exemption study. (IRB No. 1804-024-934)

Reliability and validity test

To estimate the reliability of all five HFAI domains and subdomains for Group One and all six HFAI domains and subdomains for Group Two, Cronbach's α coefficients were used. To assess the concurrent validity of the HFAI domains, we investigated the correlation of HFAI domains with consumers' evaluation of each company's health-friendly activities that made an important contribution to their health (CATCH) in the general population. To establish the validity of the HFAI scale, the Spearman correlation was constructed to determine meaningful associations between the HFAI score and scores of contributions to the health status of general population. In addition, for the 19 companies in Group Two, the Spearman correlation was constructed to determine meaningful associations between their self-rated HFAI score and scores of their contributions to consumers' health status.

All calculated p-values were two-sided with the significance level set at $p < 0.05$. SAS statistical package version 9.3 (SAS Institute, Cary, NC, 1990) and R 3.5.1 were used for all analyses.

Results

Sample characteristics

The study sample included a total of 51 companies in two groups (31 companies in Group One and 19 companies in Group Two). The companies represented different sizes, industry sectors, and business types in the Republic of Korea. Table 2 summarizes the study sample companies' demographics.

Table 2
Demographics of Study Participant Companies

	Group One (31 companies) n (%)	Group Two (19 companies) n (%)
Organization size		
1-10th ranked company	9 (29.0)	1 (5.2)
11-30th ranked company	9 (29.0)	0 (0)
31-100th ranked company	13 (42.0)	1 (5.2)
> 100th ranked company		17 (89.5)
Business type		
Public firm	2 (6.5)	4 (21.1)
Private firm	29 (93.5)	15 (78.9)
Manufacturing	18 (58.1)	10 (52.6)
Service	11 (41.9)	9 (47.4)
Industry		
Energy	1 (3.2)	2 (10.5)
Materials	3 (9.7)	1 (5.2)
Industrial	4 (12.9)	5 (26.3)
Consumer discretionary	8 (25.8)	5 (26.3)
Consumer staples	2 (6.5)	1 (5.2)
Finance	5 (16.1)	1 (5.2)
Information technology	6 (19.4)	1 (5.2)
Public goods	2 (6.5)	3 (15.8)

Reliability

We assessed the tool's reliability by determining the Cronbach's α coefficient for the HFAI scores. All HFAI domains exhibited a Cronbach's α coefficient between 0.382 and 1.000 for Group One and a Cronbach's α coefficient between 0.676 and 0.938 for Group Two, suggesting acceptable reliability with good internal consistency (Table 3).

Table 3
Domain, Scale Organization, and Reliability for HFAI Scores

		Group One (31 companies)	**Group Two (19 companies)**
Domain	Number of Questions	Cronbach's alpha	Cronbach's alpha
Governance and infrastructure	24	0.571	0.938
Needs assessment	6	1.000	0.676
Planning	14	0.382	0.905
Implementation	40	0.794	0.930
Monitoring and feedback	12	0.667	0.925
Outcomes	9	NA	0.876
Total	105	0.879	0.982

Validity

The overall HFAI scores among Group One (31 companies) correlated significantly positively with certain health outcomes, such as physical and social status scores, that 400 participants evaluated using the CATCH (Table 4). However, only the Planning domain scores correlated positively with all four health outcomes evaluated by the 400 participants using the CATCH. The significant Spearman correlation (r) range was 0.43 to 0.52.

Table 4
Correlation between HFAI score and scores of contributions to health status of the general population.

	Group One (31 companies)				**Group Two (19 companies)**			
	Health Status				Health Status			
Domain	Physical	Mental	Social	Spiritual	Physical	Mental	Social	Spiritual
Governance/ infrastructure	0.28	0.26	0.27	0.27	0.69**	0.63**	0.48*	0.65**
Needs assessment	-0.27	-0.24	-0.26	0.26	0.40	0.65**	0.46*	0.57*
Planning	0.52*	0.46**	0.43*	0.45*	0.66**	0.67**	0.57*	0.70**
Implementation	0.30	0.22	0.27	0.22	0.62**	0.46*	0.37	0.58**
Monitoring/ feedback	0.13	0.08	0.13	0.09	0.64*	0.68**	0.55*	0.81**
Outcomes	NA	NA	NA	NA	0.62**	0.50*	0.44	0.62**
Total	0.42**	0.33	0.37*	0.33	0.73**	0.69**	0.55*	0.75**

*p-value < 0.05,**p-value < 0.01.

Appendix 1
Cronbach's α of the company's health-friendly activities that make a significant contribution to consumers' health

		Group One (31 companies)	**Group Two (19 companies)**
	Number of Questions	Cronbach's alpha	Cronbach's alpha
Physical health	5	0.892	0.739
Mental health	5	0.905	0.927
Social health	5	0.909	0.917
Spiritual health	5	0.913	0.938
(0 = not at all helpful, 10 = very helpful)			

Additionally, as expected, the HFAI scores in Group Two correlated significantly positively with most of all self-rated health outcomes that the 19 companies evaluated with the CATCH. The significant Spearman correlation (*r*) range was 0.37 to 0.81. (Table 4).

Discussion

The 105-item HFAI has good psychometric properties with reliability and validity. The HFAI consists of domains that assess a number of key practices, strategies and interventions for consumers' health and wellness which could be implemented by a corporation. We tested for internal consistency and concurrent validity (i.e., the degree to which the HFAI score is consistent with general-population consumers' assessment of the contribution of the corporation's product / service to their health) for Group One. For Group Two we tested for concurrent validity (i.e., the degree to which a corporation's self-rated HFAI score is consistent with the self-rated contribution of the corporation's product / service to their consumers' health).

Companies with higher HFAI scores, especially in the Planning domain, showed significantly better health outcomes as evaluated by the participants. Companies with higher total HFAI score, which include those in the Governance and Infrastructure, Needs Assessment, Planning, Implementation, Monitoring and Feedback, and Outcomes domains, also showed significantly better self-rated contribution to consumer's health. Managers can use the HFAI to assess their current activities related to consumers' health and wellness, identify policy gaps, and prioritize high-impact interventions for critical health topics.[10] Companies could find that this tool serves as a powerful method for boosting consumer motivation and strengthening consumer loyalty.[11]

Perhaps the most interesting finding of this study was that the HFAI appears to be sensitive to consumers' rating of how much corporations contributed to consumer health. Significant associations were found between the total HFAI score and consumers' rating of the Group One companies' contributions to consumers' physical and social health. Most notably, significant associations were found between the planning domains of HFAI and consumers' rating of the companies' contribution to their physical, psychological, social, and spiritual health. These findings are noteworthy because they suggest the usefulness and impact of the HFAI on companies' health-friendly activities. The HFAI exhibited more association with consumers' rating of the corporation's contribution to their physical health than with other health, suggesting that corporations focus more on the physical aspect of company activities than the emotional, social, and spiritual aspects. Therefore, in order to maintain good relationships with consumers, it is particularly crucial for managers to focus on holistic health needs, as our earlier study suggested.[3] In the spirit of total quality management, the HFAI also includes a comprehensive evaluation framework to inform managers and consumers about the companies' health-friendly activities.[25]

We also compared evaluation results with the HFAI and self-rated the CATCH from each company. In addition, there might be some differences between our assessments based on the companies' recent sustainability reports and responses from each company. In the reliability and validity test of the HFAI in Group Two (19 companies), significant associations were found between most HFAI domains scores and companies' self-rating on their contributions to consumers' physical, social, and spiritual health. These findings support the excellent psychometric properties of the HFAI.

Our research further suggests that companies should broaden their scope to address not just the health of their employees[11] but also the health of other key populations they influence. Nine out of ten companies agree that they could help strengthen consumers' health and have a greater impact on health and wellness

across the value chain.[2] To integrate health-friendliness into their value chain and culture, companies can use our assessment tool to discover key performance indicators (KPIs) in a full and transparent manner, motivating employees to strengthen their customers' health through daily actions.[2] The HFAI could enable companies' key stakeholders to understand how companies can specifically improve the health of their consumers and make informed decisions about future investments.[2,3,21,26] All of these factors might contribute to improving a managers' competitiveness in the marketplace.[3,9,11]

Companies can use the HFAI to comprehensively understand their current health-friendly activities related to consumers' health and wellness from governance and infrastructure to outcomes measurement and to implement key practices, strategies, and interventions for consumers' health and wellness. Companies may evaluate their own health-friendly activities, but this may also be conducted by experts or specialized institutions through document reviews and in-depth visits.

However, the HFAI has several limitations. First, in the development of HFAI the definition of health-friendly activities of corporations would be unclear.[27] Further studies could improve the conception and implementation of the tool. Second, as this study was conducted only in Korea, further validation studies are necessary for generalization to other countries. Third, respondents might have difficulty in determining whether a health-friendly activities counted for a 'YES' response in each HFAI item.[11] Finally, Cronbach's α coefficient for the Planning domain of HFAI was very low for Group One. We assessed the health-friendly activities of the 31 companies based on their recent sustainability reports. However, HFAI tool's reliability for Group Two suggested acceptable reliability with good internal consistency based on self-reported assessments. We still need further research to modify the construct of domains and items. These trials might improve the reliability and validity of HFAI.

In conclusion, we believe that the HFAI, a unique assessment tool with proper psychometric properties, can help managers assess and modify their health-friendly activities.

Declarations

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Author Contributions YHY participated in the study design, provided

financial support and study materials, collected and assembled

the data, interpreted the analyses, participated in the sequence alignment,

drafted the manuscript, and finally approved the paper. SNO participated in the study design and coordination, collected study materials, conducted data analyses, and wrote the manuscript. JAS participated in the study design, collected study materials, and wrote the manuscript. SL participated in the study design, collected study materials, and wrote the manuscript. EJS participated in the study design, collected study materials, and wrote the manuscript.

Compliance with ethical standards

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

Competing interests

We declare no competing interests.

Data management and sharing: Data available only if requested to author.

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