

Employees' Perception of Workplace Health Promotion Initiatives in Taiwan: A Cross-sectional Survey of 30 Worksites

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Abstract: The present study was to describe the input/process and evaluate the effectiveness of Taiwanese Workplace Health Promotion Initiatives based on employees' perspectives. This study employed a cross-sectional design by a structured questionnaire that was completed by 842 employees in 30 workplaces that participated in the *Taiwan Workplace Health Promotion (WHP) Initiatives* which supported by Ministry of Health from 2004 to 2006. The results found that the employees generally agreed that WHP improved their personal health skills. There was a lower level of agreement with respect to other input/process domains such as workplace healthy policy, workplace supportive health environments and WHP activities and services and the WHP effectiveness. With regard to the prediction of WHP effectiveness, the domain of workplace health activities/services could only predict 50.5% of the variation of the effectiveness in a regression model. Three domains of workplace — health activities/services, personal health skills and supportive health environments — were significantly correlated to the agree level of health promotion effectiveness. The results suggest that companies that intend initiating health promotion programs need to conduct a detailed assessment of the nature of the workplace settings and the perceptions of employees.

Key words: Workplace health promotion, Employee, Health policy

Introduction

Traditional occupational health and safety practices have significantly improved employee health in the workplace by reducing accidents and preventing diseases. However, it has become evident that these practices alone cannot solve all workplace health issues¹. Health promotion is the process of enabling people to take control over the determinants of health and thereby improve their own health². Many studies support the notion of health

promotion, indicating that an increased personal control over the work situation is conducive to the health and well-being of employees in the workplace^{3,4}. The US Department of Health and Human Services⁵ established a goal of having 75 percent of all workplaces provide comprehensive health promotion wellness programmes by 2010.

Workplace health promotion (WHP) is defined as the application of the concepts, principles and strategies enshrined in the Ottawa Charter for Health Promotion to both the community of employees and managers, and to the organizational and environmental aspects of the workplace itself⁶. In the European Union, the Luxembourg

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Declaration on Workplace Health Promotion, which was adopted by all member states in November 1997, defines WHP as the combined efforts of employers, employees and society to improve the health and well-being of people at work⁷. Gradually, the workplace setting, along with the school, the hospital, the city and the island of Taiwan, has become established as one of the most important settings for health promotion in the world⁸ and studies have shown the workplace to be an effective channel for health promotion^{8–10}.

WHP has been associated with a reduction in health risks and promotion of healthy lifestyles and with improvements in economic and productivity factors such as medical costs, compensation benefits, employee absenteeism and job satisfaction^{11–13}. Although prevention is increasingly a public policy priority, WHP currently has limited support in practice. Downey & Sharp¹⁴ found there was no social expectation that organizations should provide WHP programmes in a national health coverage system in Canada. The main reason for this lies in the difficulty to assess the effectiveness of WHP; the evaluation of health promotion is a difficult task which is often done poorly¹⁵. Traditional WHP research has overemphasized the impact of individual behavior on employee well-being and neglected the importance of the work environment¹⁶. Nutbeam¹⁵ considered that evaluation of health promotion interventions is not necessarily best achieved by measuring conventional, long-term health outcomes. In addition, Castillo-Salgado¹⁷ stated the need to fulfill the functions of health promotion programs by modifying the work environment in addition to providing information and support systems to employees for improving employees' health and safety.

In Taiwan, the Bureau of Health Promotion (Ministry of Health) initiated a 3-yr Workplace Health Promotion Programme from 2004 to 2006. Its aim was to raise workplace health promotion awareness for which the theory of Ottawa Charter for Health Promotion was adopted to establish health promotion plans and activities based on their workplace health needs to improve employees' health and safety. In order to facilitate the development of WHP, there is a need for health care providers, decision-makers and researchers, regardless of their disciplinary backgrounds, to build partnerships and for coordinating bodies to improve links, share information and provide mutual support⁸. To fulfill this goal, information that includes employees' perceptions of health needs and program effectiveness are vital for the proper implementation of WHP programmes. The purpose of this study was thus to describe the provision profile of input/process, and to evaluate the relationship between input/process and the effectiveness of Taiwan's Workplace Health Promotion Initiatives based on employees' perspectives.

Subjects and Methods

For research purposes, evaluation of the health promotion programme in this study was divided into two parts: (1) inputs & process (resources & activities) and (2) outcome (effects). The input/process part adopted the action framework of the Ottawa Charter for Health Promotion² and merged parameters into four domains (study framework) as follows: workplace healthy policy, workplace supportive health environments, workplace health promotion activities and services, and personal health skills. We used an effectiveness analysis of workplace health promotion as the outcome domain of the study. In order to identify health promotion issues in workplaces, a number of questions (indicators) were proposed for each domain of the input/process and outcome parts. Workplace employees were asked to express their opinions in terms of level of agreement for each question within specific domains. The agreement level score for each question ranged from 1 to 5, with a score of 1 representing least agreement (strongly disagree) to the health promotion issue, and a score of 5 indicating strong agreement. Questions in each domain were specifically designed and based primarily on the indicators of "Quality Criteria of Workplace Health Promotion — Healthy Employees in Healthy Organizations: Good Practice in Workplace Health Promotion in Europe"¹⁸. In order to improve validity, the questionnaire was reviewed by eight experts and practitioners in the field of health promotion, health service management, nursing, environmental health and community development. The indicators of each domain in the questionnaire were (Tables 2–6): workplace health policy (11 questions), personal health skills (11 questions), workplace supportive health environments (13 questions), workplace health promotion activities and services (8 questions), and workplace health promotion effectiveness (8 questions).

The study employed a cross-sectional design by a structured questionnaire that was completed by employees of each workplace between August 1, 2006 and August 31, 2006. The key information survey, consisting of all 30 workplaces that participated in the *Taiwan Workplace Health Promotion Initiatives (TWHPI)* programme and which received financial support from the Bureau of Health Promotion, of the Ministry of Health from 2004 to 2006, was used to establish health promotion plans and activities based on workplace health needs. The 30 workplaces included manufacturing companies, electronics factories, telecommunication companies, medical settings and newspaper publishers (comprising a total of 48,341 employees in 2005). We asked workplace nurses to randomly recruit to the study 900 non-managerial employees (30 subjects/workplace) with knowledge of workplace

health promotion activities. There was no significant difference among respondents from the different workplace sectors in terms of their participation in health promotion activities ($p=0.625$). In an attempt to increase the response rate, the questionnaire sent to each respondent was accompanied by the gift of a pedometer to thank participants for their cooperation. The worksite nurses helped to randomly distribute questionnaires to respondents and to collect the questionnaires at the end of the study. Of the 900 questionnaires distributed to the respondents, 842 valid questionnaires were returned, giving a response rate of 94%.

Statistical analyses

The collected data were entered into a database and analyzed using SPSS 13.0 software. Cronbach's α values for the indicators in each domain were 0.939, 0.941, 0.933, 0.922 and 0.934, indicating good reliability of the data. We used number and percent to describe the personal characteristics and perceptions toward workplace health promotion among the subjects. The mean rating score was also used to present the perception level toward workplace health promotion issues among the subjects. Pearson's correlation analyses were used to test the relationship between health promotion effectiveness and perceptions of each dimension. Finally, a multiple stepwise regression model was employed to predict workplace health promotion effectiveness among the subjects.

Results

Table 1 describes the personal characteristics of the respondents; 58.3% were female and the average age was 35.7 yr ($SD=8.85$), 75.8% had obtained a vocational college or university degree and 7.4% had a masters or doctoral degree. The average working hours per week of the employees was 44.17 ($SD=6.65$), and average working years in the company was 9.13 (7.67).

Perception of workplace healthy policy

Table 2 shows the distribution of mean rating scores of perception of workplace healthy policy of the respondents: the distribution of each item was from 3.62 to 4.37 and the mean of all item ratings was 3.84. Respondents acknowledged that they agreed or strongly agreed that their workplaces had a clear health promotion policy (mean rating=4.37) and increased employee health promotion awareness (mean rating=4.11). The mean rating of other indicators of health promotion policies showed that the respondents were uncertain about the importance of policies such as 'enterprise regards health as business capital' (mean rating=3.93), 'resource support from the organization' (mean rating=3.89), and 'high ranked man-

Table 1. The demographic characteristics of the subjects

Characteristics	Number (%)
Gender (n=842)	
Male	351 (41.7)
Female	491 (58.3)
Education (n=840)	
Junior high school and the less	5 (0.6)
Senior high school	134 (15.9)
Vocational College	302 (35.9)
University	336 (39.9)
Master	61 (7.2)
Doctoral	2 (0.2)
Age (n=837)	
≤ 20	5 (0.6)
21-30	296 (35.4)
31-40	309 (36.9)
41-50	161 (19.2)
>50	66 (7.9)
Working hours per week (n=827)	
≤ 39	19 (2.3)
40-49	672 (81.3)
≥ 50	136 (16.4)
Working years in the company (n=830) [‡]	
<1	77 (9.3)
1.0-4.9	223 (26.9)
5.0-10.9	234 (28.2)
11.0-20.0	209 (25.2)
>20	87 (10.5)

[†]Mean (SD).

[‡]Working years until August 31, 2006.

agers as the model to enforce the program' (mean rating=3.78).

Perception of personal health skills

Respondents generally agreed that workplace health promotion improved their personal skills (mean rating=4.0) and the mean score's of this domain's issues were between 3.84 and 4.18 (Table 3). Respondents agreed more on personal health skill issues attributed to the workplace health promotion initiatives such as 'they have adequate job skills' (mean rating=4.18), 'having opportunities to learn job skills' (mean rating=4.12), 'they can gradually exercise more control over health determinants' (mean rating=4.09), 'having adequate health promoting skills' (mean rating=4.08), 'organizations committed to in-job training' (mean rating=4.08), and 'can use health skills in daily living' (mean rating=4.01).

Perception of workplace supportive health environments

Table 4 describes the distribution of mean scores of perception of supportive health environments of the respondents, for which the distribution each item ranged

Table 2. Perception toward workplace healthy policy among the subjects

Items of perception	Likert's rating scores (5–1) [†]					Mean rating	Mean of all items rating
	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree		
	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)		
							3.84
1. Clear health promotion policy (n=839)	376 (44.8)	412 (49.1)	38 (4.5)	9 (1.1)	4 (0.5)	4.37	
2. Increase awareness of health promotion (n=838)	246 (29.4)	472 (56.3)	92 (11.0)	23 (2.7)	5 (0.6)	4.11	
3. Workplace health promotion initiative committee (n=837)	160 (19.1)	379 (45.3)	217 (25.9)	62 (7.4)	19 (2.3)	3.72	
4. Health promotion enforcement team (n=837)	153 (18.3)	347 (41.5)	250 (29.9)	65 (7.8)	22 (2.6)	3.65	
5. Health promotion in the management agenda (n=840)	143 (17.0)	400 (47.6)	239 (28.5)	44 (5.2)	14 (1.7)	3.73	
6. Resource support from the organization (n=838)	194 (23.2)	414 (49.4)	181 (21.6)	38 (4.5)	11 (1.3)	3.89	
7. Health promotion program evaluation (n=836)	132 (15.8)	358 (42.8)	282 (33.7)	49 (5.9)	15 (1.8)	3.65	
8. Health promotion capacity training for the team (n=834)	112 (13.4)	378 (45.3)	281 (33.7)	45 (5.4)	18 (2.2)	3.62	
9. Regard health as the business capital (n=839)	194 (23.1)	445 (53.0)	158 (18.8)	35 (4.2)	7 (0.8)	3.93	
10. The high ranked managers as the model to enforce the program (n=838)	158 (18.9)	394 (47.0)	238 (28.4)	36 (4.3)	12 (1.4)	3.78	
11. The high ranked managers continuously support the program (n=840)	149 (17.7)	402 (47.9)	237 (28.2)	39 (4.6)	13 (1.5)	3.76	

[†]Strongly agree to strongly disagree: the score is from 5 to 1.

Table 3. Perception toward personal health skills among the subjects

Items of perception	Likert's rating scores (5–1) [†]					Mean rating	Mean of all items rating
	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree		
	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)		
							4.00
1. Having adequate job skills (n=840)	236 (28.1)	518 (61.7)	83 (9.9)	2 (0.4)	0 (0)	4.18	
2. Having adequate health promoting skills (n=841)	189 (22.5)	541 (64.3)	98 (11.7)	12 (1.4)	1 (0.1)	4.08	
3. Having opportunities to learn job skills (n=838)	205 (24.5)	540 (64.4)	83 (9.9)	9 (1.1)	1 (0.1)	4.12	
4. Organizations committed to the in-job trainings (n=841)	230 (27.3)	470 (55.9)	123 (14.6)	15 (1.8)	3 (0.4)	4.08	
5. Continually learning of healthy behaviors (n=841)	165 (19.6)	493 (58.6)	164 (19.5)	15 (1.8)	4 (0.5)	3.95	
6. The workplace health department can help you to develop personal health skills (n=841)	151 (18.0)	454 (54.0)	195 (23.2)	35 (4.2)	6 (0.7)	3.84	
7. Activities participation to learn accurate healthy behaviors (n=840)	167 (19.9)	501 (59.6)	148 (17.6)	17 (2.0)	7 (0.8)	3.96	
8. Can use health skills in daily living (n=841)	166 (19.7)	537 (63.9)	124 (14.7)	11 (1.3)	3 (0.4)	4.01	
9. Gain more control over the health determinants gradually (n=841)	195 (23.2)	531 (63.1)	108 (12.8)	6 (0.7)	1 (0.1)	4.09	
10. Understanding the health determinants in the workplace (n=841)	150 (17.8)	495 (58.9)	174 (20.7)	17 (2.0)	5 (0.6)	3.91	
11. More employees participation in the workplace health promotion than before (n=840)	144 (17.1)	468 (55.7)	199 (23.7)	22 (2.6)	7 (0.8)	3.86	

[†]Strongly agree to strongly disagree: the score is from 5 to 1.

Table 4. Perception toward workplace supportive health environments among the subjects

Items of perception	Likert's rating scores (5-1)					Mean rating	Mean of all items rating
	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree		
	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)		
							3.79
1. Design and implement by the enterprise (n=842)	164 (19.5)	476 (56.9)	173 (20.5)	19 (2.3)	7 (0.8)	3.92	
2. Creating a good health communication channel (n=842)	108 (12.8)	427 (50.7)	266 (31.6)	31 (3.7)	10 (1.2)	3.70	
3. Survey and analyzing health data regularly (n=841)	125 (14.9)	430 (51.1)	238 (28.3)	38 (4.5)	10 (1.2)	3.74	
4. Appropriate health education channels & methods (n=840)	169 (20.1)	533 (63.5)	118 (14.0)	17 (2.0)	3 (0.4)	4.01	
5. Providing opportunities to employees on health decisions making (n=841)	112 (13.3)	451 (53.6)	238 (28.3)	31 (3.7)	9 (1.1)	3.74	
6. Emphasize appropriate communication, cooperation and team work (n=838)	137 (16.3)	477 (56.9)	195 (23.3)	18 (2.1)	11 (1.3)	3.85	
7. Job design meets your demands (n=839)	126 (15.0)	459 (54.7)	214 (25.5)	32 (3.8)	8 (1.0)	3.79	
8. Easy to use health facilities (n=841)	158 (18.8)	393 (46.7)	205 (24.4)	67 (8.0)	18 (2.1)	3.72	
9. Active participating opportunities to discuss the health promotion program (n=840)	110 (13.1)	365 (43.5)	287 (34.2)	64 (7.6)	14 (1.7)	3.59	
10. Have appropriate plans to help employees from ill recovery to their job positions (n=840)	120 (14.3)	352 (41.9)	298 (35.5)	54 (6.4)	16 (1.9)	3.60	
11. Managers support employees participate health promotion activities (n=841)	175 (20.8)	476 (56.6)	165 (19.6)	22 (2.6)	3 (0.4)	3.95	
12. Managers activate & create good working environments (n=842)	152 (18.1)	442 (52.5)	200 (23.8)	36 (4.3)	12 (1.4)	3.81	
13. The enterprise takes care of employees' families as well (n=841)	151 (18.0)	443 (52.7)	204 (24.3)	31 (3.7)	12 (1.4)	3.82	

from 3.59 to 4.01 and the mean of all item ratings was 3.79. Respondents agreed that health promotion initiatives provided appropriate health education channels and methods to employees (mean rating=4.01). The mean scores of other indicators of supportive health environments were less than 4, meaning that most of the respondents were uncertain of the importance of supportive health environment initiatives at their workplaces. These initiatives concerned issues such as 'managers support employees' participation in health promotion activities' (mean rating=3.95), health promotion initiatives 'designed and implemented by the enterprise' (mean rating=3.92), and 'the enterprise emphasizes communication, cooperation and team work' (mean rating=3.85).

Perception of workplace health promotion activities and services

Table 5 shows the distribution of respondents' perceptions of workplace health promotion activity and service initiatives within the enterprises. We found that the mean rating score of this domain's issues ranged from 3.70 to 4.01 and the general mean of all indicator ratings was 3.79. Respondents generally agreed with the enterprises

initiatives regarding health and environment protection as being a priority (mean rating=4.01) in health promotion initiatives. Other top-ranking priorities such as the enterprise 'systematically collected and analyzed employee's health data' (mean rating=3.86) and 'continue improvement program according to outcome evaluation' (mean rating=3.81) since initiating workplace health promotion programme.

Perception of effectiveness of workplace health promotion

With regards to the outcome evaluation, results showed that the mean rating scores of indicators of health promotion effectiveness among the respondents were between 3.68 and 3.92 and the general mean of all indicator ratings was 3.80 (Table 6). The level of agreement of respondents with respect to health promotion effectiveness was between 'agree' and 'uncertain'. The analysis showed that the indicator 'you are healthier than before' was the most positive perception among the respondents (mean rating=3.92). The next three top-ranking indicators among workplace health promotion initiatives were 'increased employee's satisfaction' (mean rating=3.87), 'improved workplace health & safety' (mean

Table 5. Perception toward workplace health promotion activities and services among the subjects

Items of perception	Likert's rating scores (5–1) [†]					Mean rating	Mean of all items rating
	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree		
	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)		
							3.79
1. Regards health and environment protection as enterprise's vital priority (n=839)	222 (26.5)	437 (52.1)	156 (18.6)	17 (2.0)	3 (0.8)	4.01	
2. Activate support workplace health promotion activities (n=839)	136 (16.2)	421 (50.2)	244 (29.1)	30 (3.6)	8 (1.0)	3.77	
3. More frequently to evaluate health promotion strategies to meet employees' needs (n=838)	104 (12.4)	427 (51.0)	269 (32.1)	27 (3.2)	11 (1.3)	3.70	
4. Integrate monitoring and assessment methods of employees' health (n=837)	95 (11.4)	431 (51.5)	280 (33.5)	21 (2.5)	10 (1.2)	3.69	
5. Systematically collected and analyzed enterprise's data of workplace health determinants (n=838)	109 (13.0)	437 (52.1)	266 (31.7)	18 (2.1)	8 (1.0)	3.74	
6. Systematically collected and analyzed employee's health data (n=837)	127 (15.2)	496 (59.3)	188 (22.3)	18 (2.2)	8 (1.0)	3.86	
7. Analyzing the input, process and output of health promotion activities (n=839)	119 (14.2)	456 (54.4)	231 (27.5)	22 (2.6)	11 (1.3)	3.77	
8. Continue improvement initiative according to outcome evaluation (n=839)	122 (14.5)	476 (56.7)	211 (25.1)	20 (2.4)	10 (1.2)	3.81	

[†]Strongly agree to strongly disagree: the score is from 5 to 1.

Table 6. Perception toward workplace health promotion effectiveness among the subjects

Items of perception	Likert's rating scores (5–1)					Mean rating	Mean of all items rating
	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree		
	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)		
							3.80
1. Increasing employee's satisfaction (n=840)	147 (17.5)	465 (55.4)	205 (24.4)	18 (2.1)	5 (0.6)	3.87	
2. Improving workplace health & safety (n=840)	132 (15.7)	469 (55.8)	219 (26.1)	16 (1.9)	4 (0.5)	3.84	
3. Affecting enterprise's management (n=835)	110 (13.2)	387 (46.3)	314 (37.3)	20 (2.4)	4 (0.5)	3.69	
4. The enterprise more focus on working process improvement (n=839)	111 (13.2)	434 (51.7)	268 (31.9)	22 (2.6)	11 (0.5)	3.75	
5. The enterprise more focus on employee's needs (n=838)	119 (14.2)	445 (53.1)	246 (29.4)	23 (2.7)	5 (0.6)	3.78	
6. The enterprise adopts new technologies to improve efficiency (n=838)	100 (11.9)	416 (49.6)	280 (33.3)	37 (4.4)	5 (0.6)	3.68	
7. You are healthier than before (n=839)	167 (19.9)	453 (54.0)	205 (24.4)	12 (1.4)	2 (0.2)	3.92	
8. The working environments are more comfortable than before (n=839)	141 (16.8)	441 (52.6)	238 (28.4)	14 (1.7)	5 (0.6)	3.83	

rating=3.84) and 'working environments became more comfortable to employees' (mean rating=3.83).

Relations of health promotion input/process and effectiveness

Table 7 shows the relationship between the workplace health promotion input/process domains and effectiveness. The results show that each domain was statistically correlated to the health promotion effectiveness ($p < 0.01$). It

also found that each domain of health promotion input/process was statistically correlated. Finally, a multiple stepwise regression was conducted to examine which input/process health promotion domain would more likely show a high level of agreement with respect to workplace health promotion effectiveness, with the factors listed in Table 8 identified as statistically significant independent variables. Regression model 1 revealed that the domain of workplace health activities/services alone can

Table 7. The Pearson's correlation among health promotion effectiveness and each perceptual dimension among the subjects

Item	1	2	3	4	5
1. Workplace health policy	1	-	-	-	-
2. Personal health skills	0.716*	1	-	-	-
3. Supportive health environments	0.738*	0.749*	1	-	-
4. Workplace activities & services	0.651*	0.704*	0.781*	1	-
5. Health promotion effectiveness	0.559*	0.672*	0.688*	0.711*	1

* $p < 0.01$ (two-tailed).

Table 8. Multiple stepwise regression of workplace health promotion effectiveness

Model	Constant	R ² (Adjusted)	Explain power increase	F value	p-value
	2.485				
Model 1	0.358	0.505	0.505	857.564	<0.0001
Model 2	0.230	0.563	0.058	540.937	<0.0001
Model 3	0.141	0.577	0.014	380.911	<0.0001

Model 1: (Constant), workplace health activities/services.

Model 2: (Constant), workplace health activities/services, personal health skills.

Model 3: (Constant), workplace health activities/services, personal health skills, supportive health environments.

predict a 50.5% variation of the health promotion effectiveness ($p < 0.0001$). Model 2 showed that the two domains of workplace health activities/services and personal health skills can predict a 56.3% variation of the health promotion effectiveness ($p < 0.0001$). A third model revealed that the three domains — workplace health activities/services, personal health skills and supportive health environments — were significantly correlated to a high level of agreement with respect to health promotion effectiveness, ($R^2 = 0.577$; $p < 0.0001$). However, the domain of workplace health policy was not statistically correlated to health promotion effectiveness.

Discussion

The purpose of this study was to describe input/process domains and evaluate the effectiveness of Taiwan's WHP Initiatives based on employees' perspectives of workplace health. WHP is a modern corporate strategy that aims to prevent ill-health at work and enhance health-promoting potential and well-being in the work force. WHP influences a wide range of work factors, which in turn are aimed at improving employees' health¹. Our study found that employees generally agreed that workplace health promotion improved their personal health skills (mean rating=4.0). Other input/process domains and WHP effectiveness had levels of agreement between 'agree' and 'uncertain'. The purpose of health promotion is to strengthen the skills and capabilities of individuals and enable them to take action, and the capacity of groups or

communities to act collectively to exert control over the determinants of health¹⁹). Thus, empowerment of individuals and communities are valued outcomes, and explain the employees' positive perception with respect to improving their personal health skills. However, it is difficult to make definite conclusions about the effectiveness of WHP in a short-term study such as the present one. Talvi *et al.*²⁰ evaluated the long-term effects of a WHP intervention programme and suggested that health promotion should be established as a continuous process rather than a single project; their study's results found that the employees had new health promotion needs during the follow-up period. Therefore, it is necessary to design a long-term evaluation of health promotion effectiveness for employees when monitoring the input-process-outcome of WHP.

The present study found that each domain of the health promotion input/process was statistically correlated with WHP effectiveness. With regard to the prediction of workplace health promotion effectiveness, the domain of workplace health activities/services can predict only 50.5% of the variation of the effectiveness. A possible explanation for this is that the activity and service-based WHP is favored by most employees. A similar result was found by Reid & Malone²¹ who conducted a study of employees in the Irish Civil Service. Their results suggested that, in addition to health protection, workers would look favorably upon health promotion being included in the services supplied by the occupational health unit.

The other domains examined here such as personal health skills and supportive health environments were also significantly correlated to the level of agreement of health promotion effectiveness in the study. Supportive environments for health offer people protection from threats to health, and enable people to expand their capabilities and develop self-reliance in health¹⁹). Activities to create supportive environments for health may include direct political action to develop and implement policies and regulations, and economic and social action, which help create supportive environments⁶). However, the WHP policy domain was not related to the perception of effectiveness. One possible reason is that the health promotion policy issue is pitched at the management level, and that general employees in the workplace are not aware of the policy.

While the workplace has great potential as a setting for improving the health of employees, many initiatives still ignore the needs and views of the target population in the planning and implementation of WHP programmes²²). If health promotion activities or services are provided to employees at a worksite, assessment of their needs is necessary in order to identify those employees with the greatest need of health promotion actions²³). Practitioners involved in developing WHP programmes therefore need to advocate for more comprehensive, settings-based initiatives to be developed²⁴). The present study reveals that health promotion input/process and WHP effectiveness were statistically correlated. The entire health promotion continuum is interrelated, and future strategy should adopt, as suggested by Lindsay²⁵), new approaches and innovative programming if programmes are to remain effective. The questionnaire used in the present study adopted the action framework of the Ottawa Charter for Health Promotion, and merged parameters into the four domains of workplace healthy policy, workplace supportive health environments, workplace health promotion activities and services, and personal health skills. This provided a comprehensive and ecological way to evaluate health promotion activities in the workplace. However, the model was developed based on the philosophy of Western countries, and should be revised according to the domains and contents of local culture to adopt a 'think globally and act locally' approach to meet the needs of Asia's workplaces in the future.

The study has limitations that need to be kept in mind when assessing its results. A cross-sectional design was employed and therefore the results are limited to short-term effects. There are thus inherent difficulties to build causal relationships between effects and health promotion initiatives which the participants expressed. Secondly, the results were affected by the participants' subjective attitudes and expectations toward the health promotion ini-

tiatives. Thirdly, due to the anonymous and confidential nature of the questionnaire, we can not match the actual health status of each employee and their perception of health promotion in the workplace, thus limiting our understanding of the real effects of health promotion programs addressed in the study. The final limitation relates to the study's mode of sampling of worksites, which may not correctly represent the general population of employees of companies in Taiwan. However, this study is one of the first in Taiwan to describe the profile of workplace health promotion. The results provide an example of how the employees express their perceptions of workplace health promotion, and suggest that companies intending to initiate health promotion programs should conduct detailed assessments of workplace settings and the perceptions of their employees.

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