



Taipei Bus Drivers' Attitude and Intention to Control Hypertension

Mei-Ju Chen¹, Chu-Shin Zheng², Huey-Mei Jeng²

Abstract

Background This study aims to examine the prevalence rate of hypertension and the perception of hypertension, health belief and other factors among hypertensive and none-hypertensive bus drivers.

Methods The Health Belief Model (HBM) was used as a tool for examination of bus drivers in Taipei. The key variables of HBM are perceived susceptibility to contracting a health condition, perceived severity, perceived benefits, perceived barriers and cues to action. Face-to-face interviews using standardized questionnaire based on the HBM were administered. A total of 1,091 employees from a bus company in Taipei, who were professional drivers and without psychiatric conditions, participated in the cross-sectional study in July and August, 2011.

Results Twenty percent of male bus drivers suffered from hypertension. Regarding knowledge of hypertension, the group with hypertension scored higher than the non-hypertensive group ($p < 0.001$), although scores remained quite low. The key variables of the HBM after controlling for the confounders, regularly BP checking helped identify early hypertension (perceived benefits), perceived likelihood of developing hypertension (perceived susceptibility) and information received from health care providers (cues to action), non-hypertensive respondents perceived significantly lower likelihood than their hypertensive counterparts, with OR = 0.037 ($p < 0.05$), 0.081 ($p < 0.001$) and 0.396 ($p < 0.01$), respectively.

Conclusions This investigation found that bus drivers had inadequate knowledge and attitude about hypertension. Data showed relatively low perceived severity of disease. Although perceived benefits were higher than perceived barriers, cues to action remained insufficient. Their behavioral intention also needed to be enhanced.

About the AUTHORS

1 Community Medicine Division, Taipei City Hospital

2 Department of Health Promotion and Health Education, National Taiwan Normal University

Contact:
Mei-Ju Chen
DXD41@tpech.gov.tw

Introduction

Bus drivers, when compared to employees of other occupational groups, have higher rates of mortality and morbidity from hypertension, gastrointestinal illnesses and musculoskeletal problems (1). Wellbeing of bus drivers is associated with safety of travelers and other road users, and therefore researchers have been concerned about the physical and mental health of bus drivers (2-4). Some studies on health of professional drivers in Taiwan identified cardiovascular disease (such as hypertension, coronary artery disease, myocardial infarction), cerebral vascular disease (stroke), gastrointestinal illnesses (such as peptic ulcer and digestive problems, musculoskeletal disorders (including back and neck pain), cancer, etc. to be common diseases and ailments among bus drivers (5;6).

Researchers have defined lifestyle as behaviors or habits that affect individual health (7). Among bus drivers, the percentages of substance use were: smoking 65%, chewing betel nuts 21%, drinking

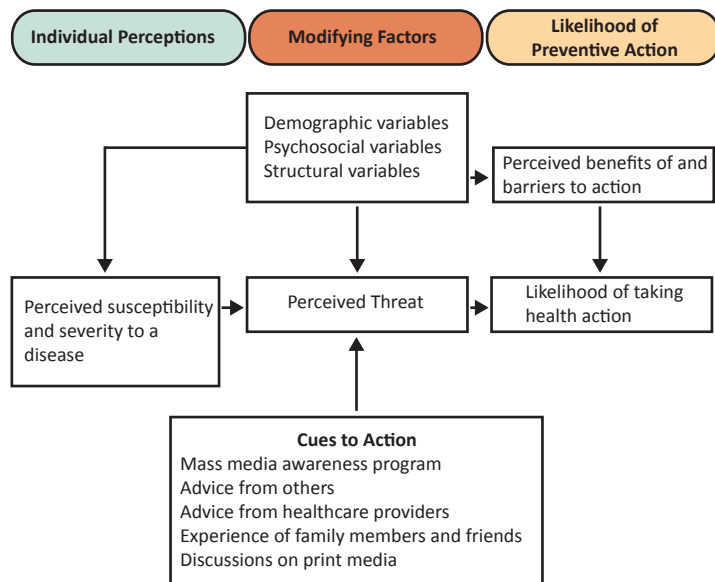
tea 79%, drinking coffee 71%, and consuming energy enhancing drinks 40%. Only 26% of bus drivers regularly exercise (8). Bus drivers tend to exercise less and work under stress due to the nature of their work. Any health impairment not only affects the driver's wellbeing but may cause undesired consequences for passengers and traffic safety (9).

Based on expectancy theory, the Health Belief Model (HBM) (Figure 1) postulates that health-seeking behavior is influenced by a person's perception and motivation (10). It addresses the relationship between a person's beliefs and behaviors. Self-efficacy is a powerful construct in the model and can be used to predict and explain a person's health behaviors. Recent studies using self-efficacy to understand health-related behaviors such as smoking, weight control, birth control, alcohol abuse and cardiovascular disease prevention proved that self-efficacy was significantly associated with behavior change and maintenance (11-15).



Research and Best Practice

Figure 1 Health Belief Model (10)



In Taiwan, research applying the HBM to explore factors associated with cardiovascular diseases and hypertension found that 38% of the variance of modifying behaviors was explained by self-efficacy, actual risk factors, work status and health beliefs. Self-efficacy was the strongest predictor (16). In other cases, research that adopted HBM examined a community sample of Korean Americans and concluded that knowledge of hypertension, self-efficacy and self-care behaviors were positively associated with hypertension self-care. Self-efficacy emerged as the most significant contributor (17).

In terms of cues for action, previous research indicated that lecture-based health education and telephone counseling were effective to improve knowledge, self-efficacy and health-related quality of life among patients with chronic diseases, but ineffective in modifying smoking and exercise behavior (18). Media awareness programs targeting hypertensive patients showed significantly reduced blood pressure (BP) compared to control (19). Other important factors that influence health behaviors also include work site policies and environment (20).

This study aims to examine the prevalence rate of hypertension and the perception of hypertension, health belief and other factors among hypertensive and non-hypertensive bus drivers.

Methods and Materials

Subjects

1,091 out of the total of 1,100 employees from a bus company in Taipei participated in the cross-sectional study.

All were professional drivers and without psychiatric conditions. Subjects were recruited through signing a consent form during the company's annual health examination in July and August 2011.

Methods

Face-to-face interviews using a standardized questionnaire were administered collecting data on perceptions regarding hypertension prevention, susceptibility, severity, benefits and barriers, cues to action, taking health action, etc.

A five-member expert panel was convened to ensure validity of the first draft questionnaire. The total CVI (content validity index) was 0.88, indicating high content validity. Modification was made accordingly. Thereafter, the questionnaire was pilot tested in a group of 31 taxi drivers and further revised before being administered by trained staff. This study was approved by the ethics committee of Taipei City Hospital (TCHIRB-1000508-E).

Measurements

The questionnaires came in three parts:

- Part I obtained demographic data including sex, age, educational level, length of service, presence of hypertension, presence of chronic disease, self-perceived health, self-reported economic status, exercise habits, frequency of measuring BP, etc.
- Part II contained 8 items regarding knowledge of hypertension control, where correct responses scores 1 point and incorrect or 'don't know' responses scored 0 point.
- Part III: Key variables of the HBM include perceived susceptibility of a health condition, perceived severity of a health condition, perceived benefits and barriers, cues to action and taking health actions. Reliability of perceived susceptibility, perceived severity, perceived benefits and barriers, cues to action and taking health action was 0.916, 0.849, 0.790, 0.703 and 0.851 measured by Cronbach's α , indicating good reliability.

Statistical Analysis

SPSS 17.0 was used for descriptive and inferential analyses including chi-square tests and logistic regression. We used those with hypertension as reference group and adjusted for demographic variables and knowledge of hypertension.

Results

A total of 1,091 interviews were conducted. Some surveys were excluded because of incomplete data, leaving 963 valid copies for analysis. It represented a response rate of 88%.



Research and Best Practice

Demographic profile of the sample is shown in table 1. The majority of the respondents were men (n=936), accounting for 97%. Among male respondents, 20% or 187 of them had hypertension. Age distribution of hypertension was 18% in the 30-40 age group, 41% in the 40-50 age group, and 42% in the group over age 50. Most (70%) were high school graduates.

80% of hypertensive drivers also suffered from other chronic diseases ($p < 0.001$). However, no significant difference was observed regarding smoking, betel nut chewing, alcohol use and exercise between hypertensive and non-hypertensive respondents.

As BP checking was required before each duty regardless of having hypertension or not, no statistical difference was observed between two groups. 72% of drivers had

their BP regularly checked, but 28% below 3 times per week.

Table 1 indicated better hypertension knowledge in the hypertension group (28%) than its counterpart (15%), but overall scores remained low ($p < 0.001$).

Table 2 (appendix) and Table 3 show that the perceived susceptibility part, where 71% of non-hypertensive respondents did not think they were likely to develop hypertension; 54% hypertensive and 30% non-hypertensive respondents perceived a likeliness of developing cerebral vascular disease due to poor BP control ($p < 0.001$). Non-hypertensive respondents perceived significantly lower likelihood than their hypertensive counterparts, with OR = 0.081 ($p < 0.001$).

Table 1 Bivariate analysis of the dimensions in Health Brief Model

	No Hypertension		Hypertension		Total		p-value
	n	%	n	%	n	%	
Sex					963	100%	N.S.
Male	749	97%	187	98%	936	97%	
Female	22	3%	5	3%	27	3%	
Age					963	100%	< 0.000
<30	34	4%	0	0%	34	4%	
30-40	251	33%	34	18%	285	30%	
40-50	294	38%	78	41%	372	39%	
50-60	176	23%	76	40%	252	26%	
>60	16	2%	4	2%	20	2%	
Education					956	100%	N.S.
Junior school or less	210	27%	56	29%	266	28%	
High school	531	70%	136	71%	667	70%	
College	23	3%	0	0%	23	2%	
Missing value					7		
Driving Seniority					963	100%	< 0.000
<5 yrs	289	37%	41	21%	330	34%	
5-10 yrs	253	33%	70	36%	323	34%	
10-20 yrs	101	13%	31	16%	132	14%	
20-30 yrs	101	13%	40	21%	141	15%	
>30 yrs	27	4%	10	5%	37	4%	
Other Chronic disease					963	100%	< 0.000
No	712	92%	38	20%	750	78%	
Yes	59	8%	154	80%	213	22%	
Smoking					956	100%	N.S.
Quit	104	14%	38	20%	142	15%	
Everyday	333	44%	79	41%	412	43%	
Occasionally	79	10%	13	7%	92	10%	
Never	249	33%	61	32%	310	32%	
Missing values	6		1		7		



Research and Best Practice

Chewing Betnuts							947	100%	N.S.
Quit	141	19%	32	17%	173	18%			
Everyday	18	2%	6	3%	24	3%			
Occasionally	88	12%	29	15%	117	12%			
Never	510	67%	123	65%	633	67%			
Missing values	14		2		16				
Drinking							959	100%	N.S.
Quit	40	5%	8	4%	48	5%			
Everyday	17	2%	3	2%	20	2%			
Occasionally	362	48%	111	58%	473	50%			
Never	340	45%	68	36%	408	43%			
Missing values	12		2		14				
Exercise							943	100%	N.S.
No	232	31%	66	35%	298	32%			
1 time/week	268	36%	65	35%	333	35%			
2-3 times/week	159	21%	33	18%	192	20%			
4-5 times/week	63	8%	13	7%	76	8%			
6-7 times/week	33	4%	11	6%	44	5%			
Missing values	16		4		20				
BP Measurement Habit							940	100%	N.S.
No	33	4%	4	2%	37	4%			
1 time/week	133	18%	24	13%	157	17%			
2-3 times/week	51	7%	19	10%	70	8%			
4-5 times/week	77	10%	27	15%	104	11%			
6-7 times/week	451	61%	111	60%	562	60%			
Missing values	16								
Perceived Economic status							100%	N.S.	
Very good		2%	1	1%	19	2%			
Good		11%	17	9%	98	10%			
Common		70%	144	75%	683	71%			
Bad		13%	26	14%	126	13%			
Worst		4%	3	2%	31	3%			
Missing values			1		6				
Perceived Health status							100%	0.000	
Very good		5%	4	2%	40	4%			
Good		29%	35	18%	254	27%			
Common		61%	131	69%	589	62%			
Bad		5%	18	9%	54	6%			
Worst		1%	2	1%	10	1%			
Missing values			2		16				
Knowledge about Hypertension*							100%	0.000	
Score < 8		85%	138	72%	795	83%			
Score >= 8		15%	54	28%	168	17%			

The sum of items does not equal the total number of items because of missing values. When test assumptions were violated, Fisher's exact test was used. Also, the Bonferroni correction was used in this study.

* The respondents were asked 8 questions about hypertension: (1) What are threshold values for hypertension? (2) Hypertensive disorders can be effectively controlled. (3) Hypertension patients should follow physician's medication advice. (4) Irregular lifestyle or fatigue can cause elevated BP. (5) You can talk while taking your BP. (6) The arm should be at the level of the heart when taking BP. (7) You should avoid caffeine-containing drinks 30 minutes before taking BP. (8) Eating more pickles can prevent elevated BP.



Research and Best Practice

Table 3 Logistic regression of the dimensions in Health Brief Model

	O.R.	P
Perceived Benefits		
Checking BP regularly helps identify early stages of hypertension.	.037	0.017
Perceived Barriers		
You do not know the causes of hypertension.	.799	N.S.
You do not know how to take BP.	.508	N.S.
No BP measuring instrument is available in the place you live.	1.505	N.S.
Perceived Severity		
You agree that your company places emphasis on employee's health.	.650	N.S.
You will be mentally disturbed if you develop high BP	2.105	N.S.
Your physical condition will be seriously affected if you develop high BP	.712	N.S.
Your social life will be seriously affected if you develop high BP	1.572	N.S.
Your family's livelihood will be seriously affected if you develop high BP	1.378	N.S.
Your career prospects will be seriously affected if you develop high BP	1.651	N.S.
Perceived Susceptibility		
How likely do you feel you may develop hypertension?	.081	0.000
How likely do you feel you may develop cerebral vascular disease due to poor BP control?	.780	N.S.
How likely do you feel you may develop cardiovascular disease due to poor BP control?A3	2.379	N.S.
How likely do you feel you may develop kidney disease due to poor BP control?	.578	N.S.
How likely do you feel you may develop eye complications due to poor BP control?	1.424	N.S.
Cues to Action		
You have read electronically transmitted messages about hypertension control from TV, radio, internet or outdoor LCD monitor.	1.479	N.S.
You have read messages about hypertension control from print media such as magazines, newspapers, booklets, posters or pamphlets.	.738	N.S.
You have received information about hypertension control from friends and family members.	.919	N.S.
You have received information about hypertension control from healthcare providers	.396	0.002
-2 Log likelihood	473.037	

Reference group: hypertension subgroup

Control variables: age, driving seniority, others chronic disease history, knowledge, perceived health status.

As for the perceived benefits and barriers, only regular BP measuring was significantly different between two groups ($p < 0.05$). Nonetheless, 97% of respondents agreed that regular BP checking helped identify early hypertension. Non-hypertensive respondents perceived

significantly lower likelihood than their hypertensive counterparts, with OR = 0.037 ($p < 0.05$).

Regarding cues to action (Table 4), information acquired from health care providers (75%). Distribution among the hypertensive respondents in the above mentioned items was significantly higher than the non-hypertensive group ($p < 0.001$). Non-hypertensive respondents perceived significantly lower likelihood than their hypertensive counterparts, with OR = 0.396 ($p < 0.01$).

Other variables of the HBM, after controlling for the confounders, did not reach the significantly different level in our study.

Discussion

Creating Health Promoting Workplace

The main finding from this project investigating knowledge, attitude and intention about hypertension among bus drivers was that about 1/5 suffered from hypertension. The prevalence doubled for drivers older than 45 years of age, and the large majority of hypertensive drivers had supplemental co-morbidity. Although the scores on knowledge remained quite low, the hypertension group scored significantly higher than the none-hypertensive group.

Although the prevalence rate seems to have declined when compared with data in 2001 (21), it was still higher than other populations receiving health examinations. Prevalence of everyday smoking (43%), chewing betel nut (3%), drinking alcohol (2%) and no regular exercise (32%) became lower than in 2008 (2).

In Sweden, a 15-year follow-up study observed a 50% increase in mortality from myocardial infarction among male drivers compared to other groups of employment. Moreover, bus drivers are also at high risk of ischemic heart disease (IHD), as seen in a 10-year panel study in Denmark of bus drivers working in a high traffic intensity area (22).

Another study using medical records of annual physical examinations in Taipei Municipality indicated significant higher prevalence of IHD among bus drivers (9). Similarly, hypertension rate for bus drivers in Taipei Municipality was significantly greater than the reference group after adjusting for age. In our study, 80% of hypertensive drivers also suffered from other chronic diseases.

In our study, almost everyone agreed that regular BP



Research and Best Practice

Table 4 Bivariate analysis of the action cues in the Health Brief Model

	No Hypertension		Hypertension		Total		P-value	
	n	%	n	%	n	%		
Have participated in any lecture-based hypertension control health education							957	N.S.
No	654	85%	155	81%	809	85%		
Yes	112	15%	36	19%	148	15%		
Missing data							6	
Have read electronically transmitted messages about hypertension control from TV, radio, internet or outdoor LCD monitor.							958	0.003
No	398	52%	76	40%	474	49%		
Yes	369	48%	115	60%	484	51%		
Missing data							5	
Have read messages about hypertension control from print media such as magazines, newspapers, booklets, posters or pamphlets.							957	0.000
No	384	50%	57	30%	441	46%		
Yes	383	50%	133	70%	516	54%		
Missing data							6	
Have received information about hypertension control from friends and family members.							956	0.000
No	377	49%	52	28%	429	45%		
Yes	390	51%	137	72%	527	55%		
Missing data							7	
Have received information about hypertension control from health-care providers.							957	0.000
No	429	56%	48	25%	477	50%		
Yes	339	44%	141	75%	480	50%		
Missing data							6	

The sum of items does not equal the total number of items because of missing values. When test assumptions were violated, Fisher's exact test was used. And the Bonferroni correction was used in this study.

checking helped identify early hypertension, but about one third of all respondents did not know the causes of hypertension one fifth to one quarter did not know how to take a BP, did not have a BP measuring instrument around or even considered BP measuring troublesome. Results from local and international research suggest a necessity to improve hypertension knowledge, control and occupational health awareness.

In general, the bus drivers demonstrated insufficient knowledge and attitude about hypertension, despite a higher likelihood in the hypertension group of receiving health education from health providers due to their physical condition.

Moreover, there remained room for improved behavioral action. Road passenger transport industry should be responsible for not only quality transport but safety for both passengers and other road users, and the key to

ensure safety is driver's physical and mental health. Work conditions play a critical role in driver's overall performance. The job requires long periods of sitting in the same position as well as over time and shift work. Therefore, it is necessary for professional drivers to have adequate knowledge and attitude about hypertension.

It is believed that personal trait and experience, perception of a particular behavior and consequence of the behavior are three important factors that contribute to health promoting behavior change (23). To achieve this, interventions that ensure tangible benefits and produce cost-effective results in a short time might be a good strategy. Health promoting workplace should be a good approach to start with.

At present, tobacco control was the main agenda for the Bureau of Health Promotion in the workplace setting. We suggest that knowledge and health behaviors



Research and Best Practice

regarding chronic diseases and creating a friendly environment to exercise should be integrated in the workplace health promoting programs, particularly in the passenger transport industry.

In reality, managers' intention about worksite health promotion seem to be influenced by their beliefs, moral responsibility and social expectation, in addition to cost (24). Social expectations and public incentives played a significant role to motivate business owners to implement worksite health promotion programs (25).

Accessibility of Diversified Health Education

Our findings indicate that in three items, i.e. regularly BP checking helped identify early hypertension, perceived likelihood of developing hypertension and information received from health care providers, non-hypertensive respondents perceived significantly lower likelihood than their hypertensive counterparts.

Findings from this study point out that bus drivers with hypertension do not perceive their disease to be of high severity. But although they perceived higher benefits than barriers, cues to action were still lacking, leaving room for improved likelihood of behavior change.

A minor part participated in health education lectures but more reported other channels of receiving information such as electronic media, print media, friends and family, and health care providers, with higher prevalence in the hypertensive group. It suggests that traditional approaches like lectures was not effective for professional drivers and therefore do not achieve expected results. Nevertheless, non-hypertensive bus drivers reported a lower likelihood to receive health information from health care providers than hypertensive drivers did.

Multiple channels of information transmission and localized health promotion strategy should be highlighted in today's work site health promotion programs. As Maibach and colleagues pointed out (26), health communication is a key component of disease prevention and health promotion. Providing persuasive health information is part of the socialization process in which every individual is empowered to view health as his own business.

In Taiwan, health issues such as wide application of biotechnology, universal health insurance, spread of epidemics, litigation against physicians and fitness awareness have become an increasingly vital part in life. Health has also gained prominence in the political agenda. In recent years, people's increased attention to en-

vironmental factors and preventive medicine prompted them to seek health-related information.

Studies in other countries have shown that media campaigns are effective to facilitate behavioral change, which in turn reduce risks, mortality and morbidity. Health communication through media has evolved from using single channel to multiple mass media such as TV, radio, newspaper, magazine and internet. Traditional consumer-oriented strategy has also applied the concept of integrated marketing communication, encompassing elements like social marketing, public relations, advertisement, health education, personal influence, media strategy and entertainment.

Health campaign for bus drivers should be tailored and different from other segments of the population in order to meet their need. For example, chronic diseases prevalence in this group should be identified and addressed in work site health screening programs and policies. Campaign scheduling should also take into account work pattern of bus drivers. Health communication should be made easily accessible, easy to understand, up-to-date and digitalized whenever needed.

The limitation of this study is the lack of self-efficacy and health-related quality of life domains. And the managers' intention would be a critical variance in the workplace; it is needed for further evaluation.

Conclusions

This investigation found that bus drivers had inadequate knowledge and attitude about hypertension, and that their behavioral intention also need to be enhanced. Data showed relatively low perceived severity of disease. Although perceived benefits were higher than perceived barriers, cues to action remained insufficient. Thus, likelihood of preventive action need a boost.

Safety of passengers and other road users are major concern of the mass transportation industry. Work site health promotion will be effective strategies to ensure safety. Intentions of corporate managers and executives to implement work site health promotion programs are influenced by cost-containment, personal belief, moral responsibility and social norms. It is a common challenge for employees, employers, unions and health professionals to tackle in order to come up with a model that caters to workers of different characteristics.

In this study we found that the two groups showed no significant difference in terms of health lecture, one of the cues to action. Only 15.5% attended such lectures,



Research and Best Practice

but about 70% of them received information from other means such as electronic media, print media, friends and family and health providers. It could be concluded that since lecture-based health promotion was proven ineffective, efforts should be made towards diversified health communication and context-specific health promotion. It is important to further explore the potential of media, today's main source of health information for most people, in order to improve individual and public health.

Acknowledgments

This study was supported by a grant from the Department of Information Technology of Taipei City Government.

Competing Interests: None declared.

References

- (1) Winkleby M, Ragland D, Syme SL. Excess risk of sickness and disease in bus drivers: Are view and synthesis of epidemiological studies. *Int J Epidemiol*. 1998; 17: 255-62.
- (2) John LMT, Rhona F, Kathryn M. Bus driver well-being review: 50 years of research. *Transportation Research Part F*. 2006; 9: 89-114.
- (3) Kompier MAJ, di Martino V. Review of bus drivers' occupational stress and stress prevention. *Stress Medicine*. 1995; 11: 253-62.
- (4) Evans GW. Working on the hot seat: Urban bus operators. *Accident Analysis and Prevention*. 1994; 26:181-93.
- (5) Lin KY (2005). Management of Labor's Sleep Quality. (document on the Internet). Institute of Occupational Safety and Health; 2003 (updated 2009 July 13; cited 2012 May 3). Available from: http://www.iosh.gov.tw/Book/Report_Publish.aspx?PID=979&UID=F3440
- (6) Chen CR, Hwang YH, Sung FC, Chang SJ. Health survey for the long-distance bus drivers(document on the Internet). Institute of Occupational Safety and Health; 2003 (updated 2008 August 25; cited 2012 May 1). Available from: http://www.iosh.gov.tw/Book/Report_Publish.aspx?PID=826&UID=F1165
- (7) Chyun Chiang. Health promotion and lifestyle. *Physical education of school* 2006; 16:31-5.
- (8) Liou SH, Chen HI, Loh CH, Lai CH, Tsai SS, Wei CC, Guo ML. The Association between Shift work and Fatigue among Bus Drivers (document on the Internet). Institute of Occupational Safety and Health; 2008 (updated 2009 June 8; cited 2012 June 1). Available from: http://www.iosh.gov.tw/Book/Report_Publish.aspx?PID=1241&UID=F4159
- (9) Wu TY, Wang KC, Chi CC. Health Status of Occupational Drivers. *Chinese Journal of Occupational Medicine* 2009;16: 169-76.
- (10) Rosenstock, I. M. Historical origins of the healthbelief model. *Health Education Quarterly* 1974; 2: 328-35.
- (11) Myung SK, Seo HG, Cheong YS, Park S, Lee WB, Fong GT. Association of sociodemographic factors, smoking-related beliefs, and smoking restrictions with intention to quit smoking in Korean adults: findings from the ITC Korea Survey. *J Epidemiol* 2012; 22: 21-7.
- (12) Senuzun F, Fadiloglu C, Burke LE, Payzin S. Effects of home-based cardiac exercise program on the exercise tolerance, serum lipid values and self-efficacy of coronary patients. *Eur J Cardiovasc Prev Rehabil* 2006; 13:640-5.
- (13) Annesi JJ, Marti CN. Path analysis of exercise treatment-induced changes in psychological factors leading to weightloss. *Psychol Health* 2011; 26:1081-98.
- (14) Brown KE, Hurst KM, Arden MA. Improving adolescent contraceptive use: evaluation of a theory-driven classroom-based intervention. *Psychol Health Med* 2011; 16:141-55.
- (15) Holt LJ, Litt MD, Cooney NL. Prospective analysis of early lapse to drinking and smoking among individuals in concurrent alcohol and tobacco treatment. *Psychol Addict Behav* 2012; 26:561-72.
- (16) Chiou AF, Wang HL, Chan P, Ding YA, Hsu KL, & Hsien-Li Kao. Factors Associated With Behavior Modification for Cardiovascular Risk Factors in Patients with Coronary Artery Disease in Northern Taiwan. *The Journal of Nursing Research* 2009; 17:221-30.
- (17) Lee JE, Han HR, Song H, Kim J, Kim KB, Ryu JP, Kim MT. Correlates of self-care behaviors for managing hypertension among Korean Americans: a questionnaire survey. *Int J Nurs Stud* 2010; 47:411-7.
- (18) Ok Ham K, Jeong Kim B.(2011). Evaluation of a cardiovascular health promotion programme offered to low-income women in Korea. *J Clin Nurs* 2011; 20:1245-54.
- (19) Petrella RJ, Speechley M, Kleinstiver PW, Ruddy T. Impact of a social marketing media campaign on public awareness of hypertension. *Am J Hypertens* 2005; 18: 270-75.
- (20) Merrill RM, Anderson A, Thygeson SM. Effectiveness of a worksite wellness program on health behaviors and personal health. *J Occup Environ Med* 2011; 53:1008-12. doi: 10.1097/JOM.0b013e3182281145.
- (21) Wang PD, Lin RS. Coronary heart disease risk factors in urban bus drivers. *Public Health*. 2001; 115:261-4.
- (22) Netterström B, Suadicani P. Self-assessed job satisfaction and ischaemic heart disease mortality: a 10-year follow-up of urban bus drivers. *Int J Epidemiol*. 1993; 22: 51-6.
- (23) Pender NJ. *Health promotion in nursing practice*. 3rd ed. East Norwalk, CT: Appleton & Lange; 1996.
- (24) Downey AM, Sharp DJ. Why do managers allocate resources to workplace health promotion programmes in countries with national health coverage? *Health Promot Int* 2007; 22:102-11.
- (25) Peltomäki P, Johansson M, Ahrens W, et al. Social context for workplace health promotion: feasibility considerations in Costa Rica, Finland, Germany, Spain and Sweden. *Health Promot Int* 2003; 18: 115-26.
- (26) Maibach E. Social marketing for the environment: using information campaigns to promote environmental awareness and behavior change. *Health Promotion International* 1993; 8:209-24.



Research and Best Practice

Appendix: Table 2 Bivariate analysis of the dimensions in Health Brief Model

	No Hyper-tension		Hyperten-sion		Total		P-value
	n	%	n	%	n	%	
Perceived Benefits							
Checking BP regularly keeps you informed of current health condition.					955		N.S.
Disagree	45	6%	9	5%	54	6%	
Agree	721	94%	180	95%	901	94%	
Missing data					8		
Checking BP regularly helps identify early stages of hypertension.					958		<0.038
Disagree	25	3%	1	1%	26	3%	
Agree	743	97%	189	99%	932	97%	
Missing data					5		
Good BP control helps reduce medical expenditure.					957		N.S.
Disagree	39	5%	8	4%	47	5%	
Agree	727	95%	183	96%	910	95%	
Missing data					6		
Good BP control helps improve work efficiency.					958		N.S.
Disagree	51	7%	9	5%	60	6%	
Agree	717	93%	182	95%	899	94%	
Missing data					5		
Perceived Barriers							
You do not know the causes of hypertension.					953		0.000
Disagree	347	45%	120	63%	467	49%	
Agree	416	55%	70	37%	486	51%	
Missing data					10		
You do not know how to take BP.					947		<0.001
Disagree	516	68%	154	81%	670	71%	
Agree	242	32%	37	19%	279	29%	
Missing data					16		
No BP measuring instrument is available in the place you live.					948		<0.041
Disagree	525	69%	145	77%	670	71%	
Agree	234	31%	44	23%	278	29%	
Missing data					15		
You think BP control is a lot of trouble.					951		N.S.
Disagree	522	69%	134	71%	656	69%	
Agree	240	32%	55	29%	295	31%	
Missing data					12		
Company policies and environment							
You agree that your company places emphasis on employee's health.					953		<0.045
Disagree	116	15%	18	10%	134	14%	
Agree	648	85%	171	90%	819	86%	
Missing data					10		
You agree that health benefits provided by your company meet your need					956		N.S.
Disagree	145	19%	28	15%	173	18%	
Agree	622	81%	161	85%	783	82%	
Missing data					7		



Research and Best Practice

You agree that your company provides diversified health care					954	N.S.
Disagree	159	21%	36	19%	195	20%
Agree	605	79%	154	81%	759	80%
Missing data					9	
Perceived Severity						
You will be mentally disturbed if you develop high BP					959	0.000
Disagree	102	13%	57	30%	159	17%
Agree	666	87%	134	70%	800	83%
Missing data					4	
Your physical condition will be seriously affected if you develop high BP					959	0.000
Disagree	166	22%	77	40%	243	25%
Agree	602	78%	114	60%	716	75%
Missing data					4	
Your social life will be seriously affected if you develop high BP					958	0.000
Disagree	297	39%	112	59%	409	43%
Agree	470	61%	79	41%	549	57%
Missing data					5	
Your family's livelihood will be seriously affected if you develop high BP					959	0.000
Disagree	204	27%	91	48%	295	31%
Agree	564	73%	100	52%	664	69%
Missing data					4	
Your career prospects will be seriously affected if you develop high BP					958	0.000
Disagree	165	22%	81	42%	246	26%
Agree	602	78%	110	58%	712	74%
Missing data					5	
Perceived Susceptibility						
How likely do you feel you may develop hypertension?					960	0.000
Disagree	542	71%	31	16%	573	60%
Agree	226	29%	161	84%	387	40%
Missing data					3	
How likely do you feel you may develop cerebral vascular disease due to poor BP control?					960	0.000
Disagree	538	70%	88	46%	626	65%
Agree	230	30%	104	54%	334	35%
Missing data					5	
How likely do you feel you may develop cardiovascular disease due to poor BP control?					956	0.000
Disagree	513	67%	80	42%	593	62%
Agree	251	33%	112	58%	363	38%
Missing data					5	
How likely do you feel you may develop kidney disease due to poor BP control?					958	0.000
Disagree	534	70%	96	50%	630	66%
Agree	232	30%	96	50%	328	34%
Missing data					5	
How likely do you feel you may develop eye complications due to poor BP control?					958	0.000
Disagree	507	66%	98	51%	605	63%
Agree	259	34%	94	49%	353	37%
Missing data					5	



Research and Best Practice

Taking Action Intension

In the next month you will check BP every day before driving.					960	N.S.
Disagree	186	24%	44	23%	230	24%
Agree	582	76%	148	77%	730	76%
Missing data					3	
At home, you will remember to check BP without others reminding.					960	N.S.
Disagree	215	28%	49	26%	264	28%
Agree	553	72%	143	74%	696	73%
Missing data					3	
At home, you will remember to check BP even without presence of other physical abnormalities.					958	N.S.
Disagree	111	14%	21	11%	132	14%
Agree	655	86%	170	89%	825	86%
Missing data					5	
You will choose low-salt diet to prevent BP from elevating.					956	N.S.
Disagree	250	33%	56	29%	306	32%
Agree	517	67%	134	71%	651	68%
Missing data					7	
You will exercise 5 times a week for at least 30 minutes to prevent BP from elevating.					958	N.S.
Disagree	414	54%	106	56%	520	54%
Agree	353	46%	85	45%	438	46%
Missing data					5	
You will actively participate in company's health programs.					956	N.S.
Disagree	264	35%	67	35%	331	35%
Agree	501	65%	124	65%	625	65%
Missing data					7	
You will relay hypertension control messages to people in need.					960	N.S.
Disagree	248	32%	55	29%	303	32%
Agree	520	68%	137	71%	657	68%
Missing data					3	

The sum of items does not equal the total number of items because of missing values. When test assumptions were violated, Fisher's exact test was used. And the Bonferroni correction was used in this study.