



HOW PERCEIVED THREATS OF AIR POLLUTION AFFECT THE RESIDENT'S PURCHASING BEHAVIOR OF FUNCTIONAL FOODS



Ching-Hsiang Wu¹
Po-Chuen Hsieh²
Frank Pan^{3*}

¹Pharmacist, Department of Pharmacy, Tajen University, Taiwan.

²Professor, Department of Pharmacy, Tajen University, Taiwan.

³Associate Professor, Department of Hospitality Management Tajen University, Pingtung, Taiwan.

Email: frankpan@tajen.edu.tw



(+ Corresponding author)

Article History

Received: 5 December 2017

Revised: 22 December 2017

Accepted: 11 January 2018

Published: 26 January 2018

Keywords

Functional foods
Health belief model
Respiratory diseases
Air pollution.

ABSTRACT

Air pollution jeopardized human's health, in particular the respiratory diseases. Along with the industrial development, air pollution had extended effects to the surrounding areas. Plenty of evidence had shown that some functional foods were developed to strengthen the lung health. Based on the health belief model (HBM), this research explored the effects of each contributor on purchasing functional foods. There are 90 valid responses gather from the highly air polluted area, Hsio-Kang district of Kaohsiung. Statistical results indicated that the HBM significantly explained the functional food purchasing behavior for the designated area ($R^2=22.6$). The perceived susceptibility is the strongest predictor ($\beta= 0.42$) for the behavior, followed by perceived benefits ($\beta= 0.19$), and perceived barriers ($\beta= -0.10$). Some implications and suggestions based on the discussion and conclusion were offered for reference.

Contribution/ Originality: This research explored the effects of each contributor on purchasing functional foods.

1. INTRODUCTION

Air pollution is a problem of growing national and international interest. It is particular severe during the autumn seasons, and thus tremendous public awareness and concern are thus rise. Evidence has shown that exposure to PM_{2.5} increases the risk for cardiovascular and respiratory diseases (Dominici *et al.*, 2006).

Major concerns toward such pollution stem from the worries regarding the relationship between air pollution and morbidity or mortality due to respiratory diseases. Severe respiratory diseases no matter acute or chronic, such as pneumonia and lung cancer, need major medical treatment. However, certain preventive measures including free from smoking (first and second or third), intake fresh air, regular exercise, and functional foods, can be helpful to reduce the possibility of

incurrence. The aim of this study was twofold: first, to investigate the levels of perceived threats of such pollution, particularly in the high pollution area, and secondly, to study the effects of threats perception on their purchasing behavior of OTC drugs, in particular the functional foods to enhance the lung function against possible respiratory diseases.

This investigation focuses primarily on the residents in the Hsio-Kang District of Kaohsiung, in which the headquarters of many steel and shipbuilding plants including the China Steel, China Ship, and a plenty of factories that contribute major air pollution to the city and the entire metropolitan area.

2. LITERATURE REVIEW

2.1. Respiratory illness

Respiratory illness is a one of common health problems in the world. The World Health Organization (WHO) reported the global leading causes of death in the past decade were ischaemic heart disease (7.4 million), stroke (6.7 million), lower respiratory infections (3.1 million) and chronic obstructive lung disease (3.1 million), of which most of them badly affected by the air pollution. The major killer diseases in the world are related to the lungs (8 million) which statistically makes it the top cause of death.

Millions of people suffer from genetic or environmentally developed respiratory conditions. Respiratory disease is a medical term that encompasses pathological conditions affecting the organs and tissues that make gas exchange possible in higher organisms, and includes conditions of the upper respiratory tract, trachea, bronchi, bronchioles, alveoli, pleura and pleural cavity, and the nerves and muscles of breathing (Sengupta *et al.*, 2016). Respiratory diseases range from mild and self-limiting such as the common cold, to life-threatening entities like bacterial pneumonia, pulmonary embolism, acute asthma and lung cancer (Sengupta *et al.*, 2016). In general, the top eight respiratory diseases are asthma, chronic obstructive pulmonary disease (COPD), chronic and acute bronchitis, emphysema, lung cancer, cystic fibrosis (75 % were diagnosed two years old), pneumonia (caused by bacteria), and allergies (together with immune system problem) (UnityPoint at Home, 2014).

2.2. Functional foods

A functional food is a food given an additional function (often related to health-promotion or disease prevention) by adding bioactive ingredients or more of existing ingredients (Agriculture and Agri-Food Canada, 2017) that aid specific bodily functions in addition to being nutritious.

In contrast to conventional foods, functional foods, however, have demonstrated physiological benefits and can reduce the risk of chronic disease beyond basic nutritional functions, including maintenance of gut health.

Some of the best foods for lung health include pumpkin, papayas, spinach, kale, yellow peppers, guava, black beans, lentils, wild salmon and russet potatoes were recommended to be included in the daily diet for lung health (Martinac, 2017). Functional foods, such as those use of plant extracts as a complementary therapy or dietary supplement for lung health and their underlying mechanisms (Lim and Mohamed, 2016).

2.3. Health belief model

The Health Belief Model (HBM) is a psychological model that was first developed in the 1950s by social psychologists Hochbaum, Rosenstock and Kegels to explain and predict health behaviors (Rosenstock, 1974), and then was widely used in explain a wide variety of health-related behaviors (Janz and Becker, 1984).

The theoretical basis of this study is health belief model. The main framework is based on the assumption that the consumers will proceed to purchase functional foods specific for lung health when perceived the threats of respiratory diseases. This study is derived from the literature, and hypothesized that the consumer's buying behavior of functional foods, in terms of purchasing amount and frequency, is concurrently affected by both of the perceived benefits and barriers, as well as the action cues.

HBM has four main constructs of perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. The first two constructs represent the perceived threats, and the last two are the net benefits of an action the individuals perceived for risk prevention. Research framework of the current research is thus shown as [Figure 1](#).

Hypothesis of this research is to test the predictability of perceived threats and perceived benefits and barriers of functional food.

Hypothesis: The perceive susceptibility and severity of air pollution toward respiratory diseases as well as the perceived benefits of functional food to strengthen the lung health will positively affect the purchasing behavior, whereas the perceived barrier of obtaining the functional food will affect the purchasing behavior in a negative direction.

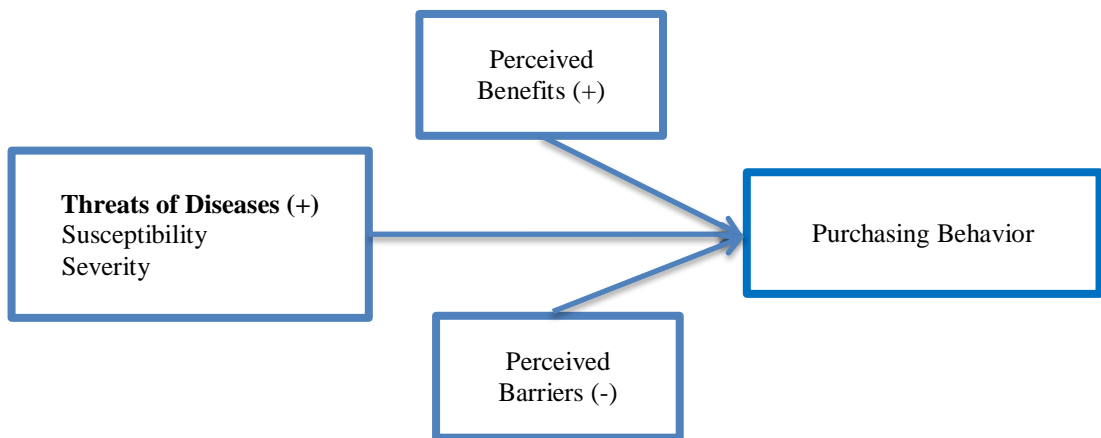


Figure-1. Research framework

3. METHODOLOGY

This study is a survey investigation to be conducted with a structured questionnaire as the measuring instrument ([Champion, 1984](#)). Samples are collected through the borough chiefs of Hsio-Kang district of Kaohsiung. There are 90 valid responses in total. Statistical analyses applied in this research are descriptive, independent t-test, regression analysis. Test results are shown in the next section with concise discussions.

4. RESULTS AND DISCUSSION

Sample's profile is illustrated in [Table 1](#). There are 90 valid responses from the designated area which was highly air polluted. Men is the majority of the respondents (57.78%), more than 80 percent are aged at least 35, most of them are married (55.56%), and more than 92 percent are educated with at least high school diploma.

We examine the initial scores for the major constructs in the model and summarized in [Table 2](#). The statistical results indicate that respondents are highly aware the possibility of suffering

respiratory diseases with air pollution (mean=4.07, SD=0.69 in a 5- point scale), and believe that the functional foods would be helpful in preventing the captioned disease at high to moderate levels (mean=3.94, SD=0.63). The barriers of getting functional foods are perceived low, of which means the accessibility is high.

Table-1. Profile of respondents

Var.	Cat.	n	%	Var.	Cat.	n	%
Gender	Men	52	57.78	Marital	Single	40	44.44
	Women	38	42.22		Married	50	55.56
Age	34- yo	16	17.78	Education	Jr. High	7	7.78
	35-44 yo	27	30.00		High school	33	36.67
	45-54 yo	27	30.00		College	26	28.89
	55+ yo	21	23.33		Bachelor +	33	36.67

N=90

The area where we conducted this research is part of the city of Kaohsiung and was developed even earlier than the industrial park was settled up in the neighborhood. Functional foods are sold in large number of drugstores or even supermarkets in this area. Accordingly, the score of buying behavior for functional foods is moderate to high (mean=3.56, SD=0.79).

Table-2. Regression analysis for functional foods purchasing behavior

Var.	Mean	SD	Non standardized		β	t	p
			B	SE			
(constant)	4.07	0.69	1.65	0.31		5.33***	0.00
Susceptibility	3.82	0.93	0.21	0.06	0.19	2.16*	0.04
Severity	3.94	0.63	0.03	0.04	0.04	0.71	0.48
Benefits	2.96	0.85	0.53	0.06	0.42	8.78***	0.00
Barriers	3.56	0.79	-0.09	0.04	-0.10	-2.22*	0.03

DV: behavior; R=.475; R²=.226; Adjusted R²=.207; F=24.754***; df=4/385

n=90; **p*<0.05; ***p*<0.01; ****p*<0.001

This research conducts a multiple regression analysis to examine how each of the variables contributes to the purchasing behavior of functional foods. Test results are shown in Table 2, of which shows that the model can explain 22.6% variance of purchasing behavior. Perceived benefits of a functional food appears to be the strongest predictor for the purchasing behavior ($\beta= 0.42$), followed by the perceived susceptibility ($\beta= 0.19$), and perceived barrier in a negative way ($\beta= -0.10$).

Although the perceived severity is not statistically significant, it will become apparent when act with perceived susceptibility to produce perceived threats in the entire model. Hence, the hypothesis regarding the predictability of HBM constructs is supported by the test results.

5. CONCLUSION

We conclude that the HBM can be useful in understanding the purchasing behavior of functional foods for lung health that were affected by the threats of air pollution as well as the benefits of the products. The perceived benefit is the strongest contributor to the customer's buying decision on functional food for lung diseases. As far as the marketing concerns, suppliers of functional foods have already claimed some noticeable features, such as the material origin, production process, quality assurance and control, as well as the manufacturer's reputation among others. In response to the customer's demands, all campaigns of these kinds shall be directed to create a consumer's

trust on the product's function and benefits. Since the barrier is low and insignificant, factors such as service forms, promotion campaigns, display for easy access may not be critical for this product.

Funding: This study received no specific financial support.

Competing Interests: The authors declare that they have no competing interests.

Contributors/Acknowledgement: All authors contributed equally to the conception and design of the study.

REFERENCES

- Agriculture and Agri-Food Canada (2017). Functional foods and natural health products sector. <http://www.agr.gc.ca/eng/industry-markets-and-trade/market-information-by-sector/functional-foods-and-natural-health-products/?id=1170856376710>.
- Champion, V. L. (1984). Instrument development for health belief model constructs. *Advances in Nursing Science*, 6(3), 73-85.
- Dominici, F., Peng, R. D., Bell, M. L., Pham, L., McDermott, A., Zeger, S. L., & Samet, J. M. (2006). Fine particulate air pollution and hospital admission for cardiovascular and respiratory diseases. *JAMA*, 295(10), 1127-1134.
- Janz, N. K., & Becker, M. H. (1984). The health belief model: A decade later. *Health Education & Behavior*, 11(1), 1-47.
- Lim, S. L., & Mohamed, S. (2016). Functional food and dietary supplements for lung health. *Trends in Food Science & Technology*, 57, 74-82.
- Martinac, P. (2017). 10 foods for healthy lungs. <https://www.livestrong.com/article/341529-10-foods-for-healthy-lungs/>.
- Rosenstock, I. M. (1974). The health belief model and preventive health behavior. *Health Education Monographs*, 2(4), 354-386.
- Sengupta, N., Sahidullah, M., & Saha, G. (2016). Lung sound classification using cepstral-based statistical features. *Computers in Biology and Medicine*, 75, 118-129.
- UnityPoint at Home (2016). The top 8 respiratory illnesses and diseases. <https://www.unitypoint.org/desmoines/article.aspx?id=2448b930-1451-43e4-8634-c0c16707c749>.

Views and opinions expressed in this article are the views and opinions of the author(s). Journal of Asian Business Strategy shall not be responsible or answerable for any loss, damage or liability etc. caused in relation to/arising out of the use of the content.