

Predicting Sustainable Personal Protective Equipment (PPE) Purchase Intention after the Pandemic: An Application of Health Belief Model

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Abstract

This study aims to investigate the antecedent of consumer personal preventive equipment purchase behaviour by extending the HBM model after the pandemic. Pandemic related studies have focused on the effect of perceived susceptibility and perceived severity on consumer preventive behaviour, little studies have investigated the antecedents of consumer perceived risk. This study filled the gaps in the previous studies. This study tested all proposed hypotheses among users who have purchase the self-preventive behaviour. In final 253 valid data were collected through online survey for statistics analysis. This study found that consumer's health consciousness significantly impacted consumer's perceived severity of COVID-19 and perceived risk. Perceived risk positively impacted consumer self-preventive equipment purchase intention. In contrast, perceived susceptibility did not significantly consumer perceived risk. Based on these results, the theoretical implication will be offered on the study of health-related studies and will be given insight for disease control center to effectively manage consumer self-preventive behaviour.

Key words: Health Consciousness, Perceived Susceptibility, Perceived Severity, Perceived Risk, Personal Preventive Equipment Purchase Intention

1. Introduction

Due to the COVID-19 has strong infection through air-borne and contagious, COVID-19 rapidly transmitted worldwide [1]. Depending on this situation, self-preventive behavior, such as wearing mask and alcohol-tissue, is important and necessary for reducing COVID-19 outbreak. Meanwhile consumer with health consciousness are actively to searching COVID-19 related news and self-preventive way to prevent COVID-19 affected [2, 3]. Therefore, understanding consumer self-preventive equipment purchase behavior could effectively control COVID-19 spreading.

Health belief model is proposed by (Rosenstock, 1966) [4]. This theory is applied in health research area to

understand consumer self-preventive behavior [5, 6]. Following HBM related previous studies, it is argued that HBM is the most widely used model to predict health-related behavior [7]. HBM model has been applied to illustrate people's preventive behavior while facing a pandemic [6, 8]. This theory illustrated that consumer perceived susceptibility and severity toward the pandemic, it influences consumer's perceived risk or threat, which impact their behavior [8]. Based on this perspective, HBM is an essential model to understand people's health behavior.

According to previous studies, consumer with health-conscious characteristics represent high awareness and concern about their health, which motivates them to maintain and improve their health through self-consciousness about health or engaging in health behavior [3]. And consumers with health conscious characteristics always presented different effect on perceived susceptibility and severity toward the pandemic [2, 9]. However, health related studies have drawn on the effect of perceived risk on consumer self-preventive behavior, little studies reveal the effect of health-conscious on consumer perceived risk and preventive behavior.

After viewing the health-related studies, there are several limitations in previous studies. First, pandemic related previous study draws on explaining consumer self-preventive behavior [1, 10], a few studies have determined the consumer's antecedents perceived risk and behavior. Second, HBM illustrated the effect of consumer's perceived risk on consumer self-preventive behavior [5,6]. However, little study has exactly investigated the influence of perceived susceptibility and perceived severity of pandemic factors on consumer-perceived risk and the results of previous studies are not consistent. Third, little studies illustrated the effect of consumer health consciousness on consumer's perceived susceptibility and severity factors [2, 9].

This study fills the gaps in the previous studies. It intends to extend the HBM model to determine the antecedent of the HBM model at the post period of COVID-19. Moreover, it attempts to explicitly illustrate the effect of perceived susceptibility and perceived severity of COVID-19 on consumer-perceived risk and preventive behavior. Moreover, it investigates the effect of health consciousness on consumer's perceived susceptibility and severity of COVID-19. The results of this study intend to give a more explicit understanding of consumer self-preventive equipment behavior at the post period of COVID-19 outbreak.

2. Theoretical Background and Hypotheses Development

2.1 Health Conscious and Perceived Susceptibility, Perceived Severity, Perceived Risk

Health-consciousness means a person's readiness to do something to his/her own health [11]. Health-consciousness refers to a critical component of the conceptual model of health behavior and has been used to explain consumer health-related behavior [12]. Hong (2011) [13] has investigated that health-consciousness is positively related to consumer perceived susceptibility and severity. Also, another study determined that individual self-health consciousness differently impact individual perceived susceptibility and perceived severity of health [14]. In this way, consumers with health-consciousness may impact consumer perceived susceptibility and severity toward COVID-19. Kim (2020) [15] perceived threat of coronavirus and consumer personal preventive behavior explained that general health-consciousness could signification influence consumer-perceived risk and consumer preventive stockpiling behavior. Health-conscious consumers are highly concerned about their health, which may influence their high perceived risk toward pandemic. Thus, we could argue that health-consciousness positively impacts consumer's perceived risk. We therefore formulate the following hypotheses:

Hypothesis 1: Health conscious positively influences consumer's perceived susceptibility

Hypothesis 2: Health-consciousness positively influences consumer's perceived severity

Hypothesis 3: Health-consciousness positively influences consumer's perceived risk

2.2 Perceived Susceptibility, Perceived Severity and Perceived Risk

Based on the HBM model, consumer cognitive factors positively related to perceived risk and consumer health promotion behavior. 2009 the first wave of the 2009 H1N1 pandemic investigated that consumer who represented lower perceived severity toward H1N1 shower lower risk perception [16]. Moreover, other studies

have used a social-cognitive model to assess consumer H1N1 risk perception and recommended behavior, which illustrated that consumer cognitive factor perceived severity toward H1N1 was positively related to consumer risk perception [17]. Thus, perceived severity toward COVID-19 may positively impact consumer-perceived risk of COVID-19.

On the other hand, perceived susceptibility means people will be more motivated to act in health if they believe they are susceptible to a particular negative health outcome [18]. Dube et al., (2014) [19] in their H1N1 research, illustrated that perceived susceptibility toward influenza results in high risk perception, which impacts their personal protective behavior. Thus, the following hypotheses could be developed.

Hypothesis 4: Consumer perceived susceptibility positively influences perceived risk

Hypothesis 5: Consumer perceived severity positively influence perceived risk

2.3 Perceived Risk and Personal Preventive Equipment Purchase Intention

Consumer perceived risk is a critical predictor to explication consumer personal health promotion behavior. Many studies have investigated the relationship between risk perception and consumer personal preventive behavior [20]. In their 2009 H1N1 influenza pandemic research, Kim et al., (2015) [21] focused on the period of influenza outbreaks and determined that perceived risk positively correlated with consumer preventive behavior. Moreover, several COVID-19 related studies have illustrated consumer personal preventive behavior and the results revealed that consumer perceived risk, vulnerability and fear can significantly increase consumer self-preventive behavior engagement during the outbreak of COVID-19 [22]. Following this perspective, perceived risk positively correlated with consumer preventive behavior. The hypotheses could be developed as followed:

Hypothesis 6: Perceived risk positively impacts personal preventive equipment purchase intention

2.4 Proposed Conceptual Model

Our proposed research model is presented in Figure 1. This study main interest was in comprehending the consumer health conscious positively related to consumer perceived susceptibility of COVID-19 and perceived severity of COVID-19, the influence their perceived COVID-19 risk. And the perceived COVID-19 risk in generating consumer personal preventive equipment purchase intention. A total of six research hypotheses relating to the relationships among these variables were formulated.

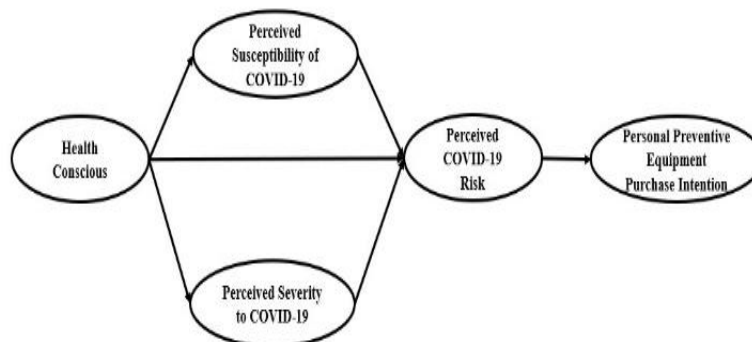


Figure 1. Research Model

3. Statistical Technique and Methodology

3.1 Statistical Technique

This study chose SPSS 25 and Smart PLS for data analysis. SPSS 25 is used for descriptive statistics and exploratory factor analysis. And confirmatory factor analysis, reliability, validity, and path analysis are

conducted through Smart PLS.

3.2 Measurement Development

This questionnaire included questions regarding health conscious, perceived susceptibility, perceived severity, perceived COVID-19 risk. Health conscious refers to people health concern and was measured by three items from [13]. Perceived susceptibility was measured with four items from [23] and defined as the extent the person feels susceptible to COVID-19 breakdown. Perceived severity could be defined as the severity felt about the consequence of that COVID-19 breakdown, which measured with three items from [23]. Perceived COVID-19 risk refers to consumer's perceived COVID-19 risk and was measured with five items from [24]. Self-preventive equipment purchase intention means a consumer intention to purchase personal preventive equipment and was measured with four items from [25]. All of the questionnaire items were measured using 7-likert scale. The Chinese survey has been sent to 30 graduated school to finish pretest and check whether the meaning could be understood.

3.3 Data Collection and Sample Characteristics

This study aimed to investigate the effect on consumer personal preventive behavior, while they are at the post period of COVID-19. The reasons for this study select China to collect data for several reasons. China was the first country where announced that COVID-19 was pandemic. And Chinese government has found that masks, gloves and self-protective equipment was an effective way to prevent COVID-19 infection. Center for Disease Control and Prevention or public number continue to throw up the latest and real-time COVID-19 information on Weibo and WeChat. Also, eastern and western people have a different perception regard personal preventive equipment. Following this way, China is a suitable country to collect data.

The main data collection was conducted from internet-based survey link. Because of the outbreak of COVID-19 everyone should keep social distance and avoid meeting each other for reducing the inflection of COVID-19. And we considered the stabilization of respondents and concluded that an internet-based survey was more suitable than offline. All the participants were voluntarily to join this survey. And this survey excluded any questions that may violate the human right. The survey completion time was restricted to 20 min. The main survey was conducted from 20 May to June 02, 2022. 253 valid respondents' data were used to finish the statistical analysis.

4. Statistical Technique and Methodology

4.1 Measurement Model

This study used SPSS and Smart PLS to conduct exploratory factor analysis and confirmatory factor analysis to assess construct reliability, convergent validity and discriminant validity. Cronbach's and composite reliability (CR) are calculated to check reliability. According to Fornell & Larcker (1981) [26], CR and Cronbach's a value above 0.70 mean high reliability. As the Table 1 showed that all the variable CR and Cronbach value higher than the 0.7, which illustrated high reliability.

Then this study analysis the convergent validity and discriminant validity. Convergent validity can be assessed by determining whether the items loadings of the questionnaire on the respective constructs are higher than 0.60. Two criteria of convergent validity were proposed, namely, the averaged variance extracted (AVE) should be higher than 0.50. Table 1 shows that the AVE of each construct greater than 0.5, which revealed high convergent validity. Discriminant validity is examined by comparing the square root of AVE for each construct and correlations. As a previous study suggested that the square value of root of AVE has to higher than the correlations between each construct. All of the value on the diagonal are higher than the value of correlation, which showed accepted discriminant validity.

Table 2. Results of the Reliability, Convergent Validity and Discriminant Validity

	Cronbach's Alpha	Rho_A	Composite Reliability	Average Variance Extracted	
PR	.927	.947	.946	.777	
HC	.882	.910	.926	.806	
PSE	.830	.836	.898	.746	
PSU	.814	.921	.874	.638	
PPE	.949	.960	.963	.867	
	PR	HC	PSE	PSU	PPT
PR	.882²				
HC	.474	.898			
PSE	.504	.306	.864		
PSU	.051	.080	.182	.799	
PPT	.389	.509	.349	.101	.931

Note¹: Health Conscious (HC); Perceived Susceptibility to COVID-19 (PSU); Perceived Severity of COVID-19 (PSE); Perceived COVID-19 Risk (PR); Personal Protective Equipment Purchase Intention (PPE)

Note²: Square Root of the AVE

4.2 Structural Model

The structural model was tested. As Table 2 shows that the research model is largely supported by the data, expect for perceived susceptibility to COVID-19. Health conscious positively impact consumer perceived severity of COVID-19 ($\beta = 0.306, t = 4.366$). But the influence of health conscious on perceived susceptibility to COVID-19 was not significant ($\beta = 0.080, t = .791$). The results also determined that perceived severity of COVID-19 ($\beta = 0.405, t = 6.590$) and health conscious ($\beta = 0.354, t = 5.470$) significantly impact consumer-perceived COVID-19 risk and consumer-perceived COVID-19 risk positively related to consumer self-preventive behavior ($\beta = 0.389, t = 5.194$). However, perceived susceptibility to COVID-19 was not significant influence consumer-perceived COVID-19 risk ($\beta = -.051, t = .441$). Based on these results, all perceived susceptibility to COVID-19 related paths were not significant.

Table 2. Results of the Structural Equation Modeling

Path	Original Sample	Sample Mean	Standard Deviation	T-value	P-value
HC → PSU	.080	.086	.101	.791	.429
HC → PSE	.306***	.311	.070	4.366	.000
PSU → PR	-.051	-.056	.117	.441	.659
PSE → PR	.405***	.401	.062	6.590	.000
HC → PR	.354***	.366	.065	5.470	.000
PF → PPT	.389***	.391	.075	5.194	.000

Note¹: Health Conscious (HC); Perceived Susceptibility to COVID-19 (PSU); Perceived Severity of COVID-19 (PSE); Perceived COVID-19 Risk (PR); Personal Protective Equipment Purchase Intention (PPE)

Note²: *** p < 0.001; ** p < 0.01; * p < 0.05

5. Discussion

This study aimed to investigate the antecedent of consumer personal preventive equipment purchase behavior by extending the HBM model. The research revealed that the antecedent of consumer perceived risk toward COVID-19 and preventive equipment behavior, which are accordance with the previous studies [13]. And perceived risk positively influenced consumer preventive equipment purchase behavior. Kim et al., (2015) [21] also found the same results for the H1N1 breaking out. According to these results, theoretical implication could be offered for further study and the managerial implication could be offered to disease control center for managing the outbreak of post COVID-19 period.

This study provides theoretical implication for health-related studies. First, this study confirmed the health conscious, perceived severity, perceived risk, personal preventive equipment purchases intention relationship, which are consist with previous studies. Second, this study extended the HBM model to determine the antecedent of the HBM model at the post period of COVID-19, when consumers face huge pandemic outbreak.

The managerial implications are as followed. Following these results, there are several managerial

implications could be offered for government to managerial consumer self-preventive behavior. First, public media or disease control center must pay attention to notice the severity of pandemic. Health conscious would make consumer to search for related news, information or preventive way to keep their health. Such as, public news could announce the speed of spreading than exactly number of infected people and died people. For example, title the news as “today’s number of confirmed cases of human infection with pandemic has doubled and redoubled!,” which will make consumer perceived more severity of the pandemic than only title the news as “today’s number of confirmed cases of human infection with pandemic is 100!” Because the exact number would make consumer less perceived severity than the words with doubled and redoubled. Also, disease control center must announce the news through mass and social media, such as weibo and wechat. The more channel announces the pandemic situation, which may influence consumer perceived this pandemic. More channel announces will let consumer contact the pandemic news to notice the severity of the pandemic to influence them applying preventive equipment and purchasing the equipment.

6. Conclusion

This study investigated the effect of health conscious on consumer perceived risk, which then affect consumer preventive behavior. In order to indicate the relationship among health conscious, perceived susceptibility, perceived severity, perceived risk, personal preventive equipment purchase intention, this study collected 253 valid data for data analysis. It revealed that health conscious positively related to perceived severity, perceived risk. And perceived risk significantly enhanced consumer preventive equipment purchase intention. Based on these results, this study has provided several implications. For theoretical implication, this study confirmed the variables relationship and extend the HBM model during the post pandemic period. This study also offered guideline for disease control center to manage consumer preventive behavior during the post pandemic period. This study still had several limitations. First, this study only focused on the Chinese consumer. According to the previous studies, difference country consumer present different perception about the pandemic, which will make them show different attitude and behavior. Therefore, further study should pay attention to compare the demographic difference. Second, this study could not collect more data to explain this model, further study should try collecting more data to illustrate this model.

References

- [1] Zhao, X., & Tsang, S. J. Self-protection by fact-checking: How pandemic information seeking and verifying affect preventive behaviours. *Journal of Contingencies and Crisis Management*, Vol. 30, No. 2, pp. 171-184, 2021. DOI: <https://doi.org/10.1111/1468-5973.12372>
- [2] Ahadzadeh, A. S., Pahlevan Sharif, S., & Sim Ong, F. Online health information seeking among women: the moderating role of health consciousness. *Online Information Review*, Vol. 42, No. 1, pp. 58-72, 2018. DOI: <https://doi.org/10.1108/oir-02-2016-0066>
- [3] Newsom, J. T., McFarland, B. H., Kaplan, M. S., Huguette, N., & Zani, B. The health consciousness myth: implications of the near independence of major health behaviors in the North American population. *Social Science & Medicine*, Vol. 60, No. 2, pp. 433-437, 2005. DOI: <https://doi.org/10.1016/j.socscimed.2004.05.015>
- [4] Rosenstock, I. M. Why people use health services. *The milbank memorial fund quarterly*, Vol. 44, No. 3, pp. 94-127, 1966.
- [5] Abdollahzadeh, G., & Sharifzadeh, M. S. Predicting farmers' intention to use PPE for prevent pesticide adverse effects: An examination of the Health Belief Model (HBM). *Journal of the Saudi Society of Agricultural Sciences*, Vol. 20, No. 1, pp. 40-47, 2021. DOI: <https://doi.org/10.1016/j.jssas.2020.11.001>
- [6] Nowak, B., Brzoska, P., Piotrowski, J., Sedikides, C., Zemojtel-Piotrowska, M., & Jonason, P. K. Adaptive and maladaptive behavior during the COVID-19 pandemic: The roles of Dark Triad traits, collective narcissism, and health beliefs. *Personality and Individual Differences*, Vol. 167, No. 2, pp.110232, 2020. DOI: <https://doi.org/10.1016/j.paid.2020.110232>
- [7] Bish, A., Sutton, S., & Golombok, S. Predicting uptake of a routine cervical smear test: A comparison of the health belief model and the theory of planned behaviour. *Psychology & Health*, Vol. 15, No. 1, pp. 35-50, 2000. DOI: <https://doi.org/10.1080/08870440008400287>
- [8] Courtney, C., Dutta, S., & Li, Y. Resolving Information Asymmetries: Influence of Media and Crowd Sentiment on Crowdfunding Success. *Academy of Management Proceedings*, Vol. 2016, No. 1, pp. 2151-6561, 2016. DOI:

<https://doi.org/10.5465/ambpp.2016.14663abstract>

- [9] Ahadzadeh, A. S., Pahlevan Sharif, S., Ong, F. S., & Khong, K. W. Integrating health belief model and technology acceptance model: an investigation of health-related internet use. *Journal of Medical Internet Research*, Vol. 17, No. 2, pp. e45. DOI: <https://doi.org/10.2196/jmir.3564>
- [10] Ahmad, M., Iram, K., & Jabeen, G. Perception-based influence factors of intention to adopt COVID-19 epidemic prevention in China. *Environmental Research*, Vol. 190, pp. 109995, 2020. DOI: <https://doi.org/10.1016/j.envres.2020.109995>
- [11] Chen, M. F. The joint moderating effect of health consciousness and healthy lifestyle on consumers' willingness to use functional foods in Taiwan. *Appetite*, Vol. 57, No. 1, pp. 253-262, 2011. DOI: <https://doi.org/10.1016/j.appet.2011.05.305>
- [12] Jin, N., Line, N. D., & Lee, S.-M. The health conscious restaurant consumer. *International Journal of Contemporary Hospitality Management*, Vol. 29, No. 8, pp. 2103-2120, 2017. DOI: <https://doi.org/10.1108/ijchm-03-2016-0170>
- [13] Hong, H. An extension of the extended parallel process model (EPPM) in television health news: the influence of health consciousness on individual message processing and acceptance. *Health Communication*, Vol. 26, No. 4, pp. 343-353, 2011. DOI: <https://doi.org/10.1080/10410236.2010.551580>
- [14] El-Toukhy, S. Parsing susceptibility and severity dimensions of health risk perceptions. *Health Communication*, Vol. 20, No. 5, pp. 499-511, 2015. DOI: <https://doi.org/10.1080/10810730.2014.989342>
- [15] Kim, J., Giroux, M., Gonzalez-Jimenez, H., Jang, S., Kim, S., Park, J., Kim, J.-E., Lee, J. C., & Choi, Y. K. Nudging to Reduce the Perceived Threat of Coronavirus and Stockpiling Intention. *Journal of Advertising*, Vol. 49, No. 5, pp. 633-647, 2020. DOI: <https://doi.org/10.1080/00913367.2020.1806154>
- [16] Cowling, B. J., Ng, D. M., Ip, D. K., Liao, Q., Lam, W. W., Wu, J. T., Lau, J. T., Griffiths, S. M., & Fielding, R. Community psychological and behavioral responses through the first wave of the 2009 influenza A(H1N1) pandemic in Hong Kong. *The Journal of Infectious Diseases*, Vol. 202, No. 6, pp. 867-876, 2010. DOI: <https://doi.org/10.1086/655811>
- [17] Prati, G., Pietrantoni, L., & Zani, B. A social-cognitive model of pandemic influenza H1N1 risk perception and recommended behaviors in Italy. *Risk Analysis*, Vol. 31, No. 4, pp. 645-656, 2011. DOI: <https://doi.org/10.1111/j.1539-6924.2010.01529.x>
- [18] Carpenter, C. J. A meta-analysis of the effectiveness of health belief model variables in predicting behavior. *Health Communication*, Vol. 25, No. 8, pp. 661-669, 2010. DOI: <https://doi.org/10.1080/10410236.2010.521906>
- [19] Dube, E., Gagnon, D., Kiely, M., Defay, F., Guay, M., Boulianne, N., Sauvageau, C., Landry, M., Turmel, B., Markowski, F., & Hudon, N. Seasonal influenza vaccination uptake in Quebec, Canada, 2 years after the influenza A(H1N1) pandemic. *American Journal Infection Control*, Vol. 42, No. 5, pp.55-59, 2014. DOI: <https://doi.org/10.1016/j.ajic.2014.01.006>
- [20] Liao, Q., Cowling, B. J., Lam, W. W., & Fielding, R. The influence of social-cognitive factors on personal hygiene practices to protect against influenzas: using modelling to compare avian A/H5N1 and 2009 pandemic A/H1N1 influenzas in Hong Kong. *International Journal of Behavioral Medicine*, Vol. 18, No. 2, pp. 93-104, 2011. DOI: <https://doi.org/10.1007/s12529-010-9123-8>
- [21] Kim, Y., Zhong, W., Jehn, M., & Walsh, L. Public risk perceptions and preventive behaviors during the 2009 H1N1 influenza pandemic. *Disaster Med Public Health Prep*, Vol. 9, No. 2, pp. 145-154, 2015. DOI: <https://doi.org/10.1017/dmp.2014.87>
- [22] Yıldırım, M., Geçer, E., & Akgül, Ö. The impacts of vulnerability, perceived risk, and fear on preventive behaviours against COVID-19. *Psychology, Health & Medicine*, Vol. 26, No. 1, pp. 35-43, 2021. DOI: <https://doi.org/10.1080/13548506.ci2020.1776891>
- [23] Ranjit, Y. S., Snyder, L. B., Hamilton, M. A., & Rimal, R. N. Self-Determination Theory and Risk Behavior in a Collectivistic Society: Preventing Reckless Driving in Urban Nepal. *Journal of Health Communication*, Vol. 22, No. 8, pp. 672-681, 2017. DOI: <https://doi.org/10.1080/10810730.2017.1341569>
- [24] Kim, S., & Kim, S. Exploring the Determinants of Perceived Risk of Middle East Respiratory Syndrome (MERS) in Korea. *International Journal of Environmental Research and Public Health*, Vol. 15, No. 6, pp. 6151-6167, 2018. DOI: <https://doi.org/10.3390/ijerph15061168>
- [25] Paul, J., Modi, A., & Patel, J. Predicting green product consumption using theory of planned behavior and reasoned action. *Journal of Retailing and Consumer Services*, Vol. 29, pp. 123-134, 2016. <https://doi.org/10.1016/j.jretconser.2015.11.006>
- [26] Fornell, C., & Larcker, D. F. Structural Equation Models with Unobservable Variables and Measurement Error: Algebra and statistics, 1981.