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Original Article

Assessing COVID-19 preventive behaviours using the health belief model: A Sri Lankan study

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الملخص

أهداف البحث: يعد مرض فيروس كورونا الجديد (كوفيد-١٩) من بين أشد أزمات الصحة العامة التي يعاني منها الجنس البشري. إن تعزيز السلوكيات الوقائية للجمهور أمر بالغ الأهمية لاحتواء هذه الأمراض بشكل فاعل. لذا يحاول هذا البحث تحديد العوامل التي يمكن أن تؤثر على السلوك الوقائي للجمهور ضد كوفيد-١٩.

طرق البحث: تم استخدام نموذج الاعتقاد الصحي كأساس نظري لدراستنا. يشرح نموذج الاعتقاد الصحي آليات إدراك تأثير القابلية للتأثر والخطورة والفوائد والحواجز والدوافع الصحية على السلوك الصحي للفرد. وبالتالي، كان مقياس نتائج هذه الدراسة هو الإشارات إلى العمل ضد كوفيد-١٩، وكيف يمكن أن تؤثر تركيبات نموذج الاعتقاد الصحي على إشارات العمل باستخدام تحليل الانحدار. تم جمع البيانات باستخدام استطلاع عبر الإنترنت واستجاب ما مجموعه ٣٠٧ مشاركا للمسح.

النتائج: أظهرت النتائج أن الفوائد المتصورة، والكفاءة الذاتية، والدوافع الصحية العامة كان لها تأثير إيجابي كبير على إشارات العمل التي كانت اتخذت لمنع كوفيد-١٩. في المقابل، أظهرت الحواجز المتصورة تأثيرا سلبيا بشكل ملحوظ. كشف التحليل الإحصائي كذلك أن الإشارات إلى الإجراءات المتخذة للوقاية من كوفيد-١٩ لم تتأثر بشكل كبير بالحساسية والشدة الملحوظة.

الاستنتاجات: تعيد الدراسة إمكانية استخدام نموذج الاعتقاد الصحي في استكشاف السلوكيات الصحية. علاوة على ذلك، تشير نتائج هذه الدراسة إلى أنه من خلال التأكيد على فوائد الوقاية والدوافع الصحية العامة، وإقناع الكفاءة الذاتية وإزالة العوائق التي تحول دون الوقاية، يمكن تعزيز الإجراءات الوقائية ضد كوفيد-١٩.

الكلمات المفتاحية: كوفيد-١٩؛ السلوك الصحي الوقائي؛ نموذج الاعتقاد الصحي؛ الإجراءات الوقائية لكوفيد-١٩؛ سيريلانكا

Abstract

Objective: The novel coronavirus (COVID-19) is turning out to be one of the most severe public health crises in recent history. Promoting preventive behaviour among the public is of paramount importance to effectively contain the disease. Hence, this research attempts to identify factors that affect preventive behaviour against COVID-19.

Methods: The Health Belief Model (HBM), which outlines how perceived susceptibility, severity, benefits, barriers, and health motivation affect individuals' health behaviour, served as the theoretical basis of the study. As the outcome measure of the study was cues to action against COVID-19, a regression analysis was conducted to explore how the aforementioned HBM constructs influence the cues to action. The data were collected using an online survey with a total of 307 respondents.

Results: The results revealed that perceived benefits (0.395, $p < 0.001$), self-efficacy (0.405, $p < 0.001$), and general health motivation (0.313, $p < 0.001$) had significant positive impacts on the cues to action taken to prevent COVID-19, whereas perceived barriers (−0.097, $p < 0.05$) had a significant negative impact. The statistical analysis further revealed that the cues to action taken to prevent COVID-19 were not significantly influenced by perceived susceptibility and perceived severity.

Conclusion: The study reinstates the usability of the HBM in exploring health behaviour. Importantly, the study findings suggest that by informing the public of the benefits of prevention and general health motivation, and by encouraging self-efficacy and eliminating the barriers to prevention, preventive actions against COVID-19 can be effectively promoted.

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Keywords: COVID-19; COVID-19 preventive actions; Health belief model (HBM); Preventive health behaviour; Sri Lanka

Introduction

The novel coronavirus (COVID-19) was first detected in the city of Wuhan in China's Hubei Province on December 31, 2019.[1] Following this, COVID-19 rapidly spread across the world, causing the World Health Organization (WHO) to declare it a pandemic on March 11, 2020.[2] By November 08, 2020, COVID-19 was present in 210 countries, and there was a total of 61,866,635 positive cases and 1,448,990 reported deaths.[3] Therefore, the COVID-19 pandemic is considered the most serious global threat to human existence since the second world war. As the fight against COVID-19 continues, it has become increasingly clear that the global impact on lives and livelihoods is immeasurable.[4]

In Sri Lanka, the first COVID-19 case was reported on January 27, 2020; the patient was a Chinese woman from Hubei province who was touring Sri Lanka.[5] That incident drew the attention of the Health Ministry and other relevant authorities because even though the country had a plan in place for the ongoing pandemic, no actual incident had yet been reported. The first Sri Lankan patient, who was a tour guide working with a group of Italian tourists, tested positive for COVID-19 on March 11, 2020.[6] To combat this emerging threat, the Sri Lankan government initiated a series of actions including the establishment of a COVID-19 presidential task force, the development and implementation of health guidelines, the deployment of public awareness programs, restrictions on immigration and emigration, local travel restrictions, temporary closure of government and private institutions, PCR testing, dedicated quarantine centres and hospitals, tracing and quarantining of first and second contacts, area isolation, a curfew, enacting circulars and policy documents for a variety of activities, and disbursing government handouts to people in need. Consequently, the country successfully contained the situation and reported very few cases (only 189 positive cases and a single death, while the spread of the disease in 184 countries reached 1.496 million reported cases and 89,435 deaths) until the first real outbreak on April 22, 2020, when a group of naval personnel and their close associates and family members (a total of 936 people) contracted the disease. However, the country was still able to effectively contain the situation. A few isolated cases were reported thereafter and the first COVID-19 death occurred on March 22, 2020. In the second wave, two clusters were identified in October 2020; one was garment factory workers and vendors and the other was a group of customers in a fish market. As a result, by December 01, 2020, a total of 23,987 confirmed cases, 17,817 recoveries, and 118 deaths had been reported in the country.[7]

Based on this data, Sri Lanka has been able to successfully manage the COVID-19 pandemic compared to other countries. However, stringent control measures including restrictions on mobility and gathering, social distancing, and other measures have had a big impact on the country's economy. Given that there is limited access to vaccines and other medications to cure COVID-19, the greatest challenge faced by the country is to lessen restrictions while still adhering to strict preventive measures. If the country is to continue successfully mitigating COVID-19, it will be of critical importance to have effective health communication and to reinforce health behaviours. As such, it is necessary to gain a comprehensive understanding of public behaviour in response to COVID-19 in order to create effective health communication programs and reinforce health behaviours.

Health behaviour has been defined by Gochman (1997) as overt behavioural patterns, actions, and habits that relate to health maintenance, health restoration, and health improvement.[8] Studying such health behaviours has been an important area in health psychology and can make important contributions to improving health.[9] Numerous models have been developed and a large number of studies have been conducted to this end. Out of the number of general models that have been developed to investigate health behaviours, the most popular and widely used models include the health belief model (HBM),[10] social cognitive theory,[11] theory of reasoned action/theory of planned behaviour,[12,13] Johnson's comprehensive model of information seeking,[14] protection motivation theory,[15] self-determination theory,[16] quality of life (QOL) approach,[16] and the wellbeing approach.[17] Among the aforementioned models, the HBM has been the most widely used to investigate a wide range of health behaviours over the years.

The HBM was one of the first models (1950s) to adapt the theory from behavioural sciences to health problems, and it remains one of the most widely recognized conceptual frameworks of health behaviour.[10] The HBM has provided a useful framework for investigating health behaviours and identifying key health beliefs, and it has shown moderate success in predicting a range of health behaviours.[18–22] The four key constructs of the HBM are perceived susceptibility and perceived severity, which are related to the dimensions of threat, and perceived benefits and perceived barriers, which are related to the dimensions of net benefits.[9] Recognizing some weaknesses in the HBM, recent adaptations have added the concepts "cue to action," a stimulus to undertake behaviour, and self-efficacy, or confidence in one's ability to perform an action.[9] This version is referred to as the extended model of HBM.

Since its development, the HBM has been widely used in numerous empirical studies, including a recent study conducted by Teitler-Regev et al.[23] to study factors affecting intention among students to be vaccinated against A/H1N1 Influenza. Saunders et al.[24] also applied it to study hearing health behaviours, and Soleymanian et al.[25] applied it to developing an instrument to measure the factors influencing exercise behaviours to prevent osteoporosis in pre-menopausal women (HOPE). Furthermore, Bahramian et al.[26] used it to assess the factors that affect oral health behaviour during pregnancy; Karimy et al.[27] used it to study the adherence of Iranian women to pap recommendations; Chou and Shih[28] used it to study the treatment seeking of hypoactive sexual desire disorder

among premenopausal women, and Wu et al.[29] used it to develop an evaluation of the HBM scale for exercise.

Having understood this knowledge gap and the absence of relevant studies conducted in the country, this study was designed to assess COVID-19 preventive behaviour. The findings of this study will be important for health communication professionals, health educationists, public health officers and practitioners, policymakers, researchers, and students in terms of their responsibility to curb this public health crisis.

Materials and Methods

Research design

The aim of the study was to assess how people intend to act in preventing COVID-19 and what factors influenced their actions. Hence, the extended HBM was adopted as the baseline theoretical framework of the study as it categorically identifies the threats (perceived susceptibility and perceived severity), the net-benefits (perceived benefits and perceived barriers), the impact of one's ability to take an action (self-efficacy), and the impact of enthusiasm (general health motivation) towards the prevention (cues to action) of COVID-19. Additionally, the HBM approach has been used in several recent studies related to the COVID-19 pandemic, including to assess the challenges for community pharmacists and communication in the time of COVID-19,[30] for coronavirus infection risk determination,[31] and for preventive health behaviour among Egyptians using the HBM.[32]

Data collection instrument development

To develop a data collection instrument for the study, the HBM constructs were operationalized based on previous studies[29–34] and the researcher's input. A five-point Likert scale was used to evaluate the model constructs. Then, a structured questionnaire (a Google form) was prepared with two major sections. The first section was devoted to gathering the respondents' demographic information, and the second section comprised 55 statements developed to evaluate the HBM constructs (7 statements evaluated perceived susceptibility, 11 statements evaluated perceived severity, 6 statements evaluated perceived benefits, 5 statements evaluated perceived self-efficacy, 9 statements evaluated perceived barriers, 6 statements evaluated general health motivation, and 11 statements evaluated the cues to action). A pre-test was conducted whereby the prepared google form was sent to 20 randomly selected respondents to assess its efficacy. Considering the responses received in the pre-test, a couple of questions were reworded and some terminology was changed to improve comprehensibility.

Data collection and analysis

A cross sectional online survey was conducted using the final version of the Google form. Data were collected from February to April 2020. A total of 780 Google forms were sent to randomly selected email addresses and posted on two popular social media platforms (Facebook and WhatsApp). Recipients were requested to fill the Google form and to share it within their networks. Accordingly, 319 completed google forms were returned; out of them, 307 Google forms qualified for analysis. The collected data were tabulated using Microsoft Excel and were analysed using descriptive and regression analyses with the aid of SPSS version 23.

Cronbach alpha test and multicollinearity test

A five-point Likert scale was used to estimate the model constructs; the scale ranged from "strongly agree = 5" to "strongly disagree = 1". A Cronbach's alpha test was conducted to evaluate the internal consistency of the items used to estimate the model constructs. The Cronbach alpha test values were 0.70 for perceived susceptibility, 0.64 for perceived severity, 0.67 for perceived benefits, 0.68 for self-efficacy, 0.66 for perceived barriers, 0.65 for general health motivation, and 0.69 for cues to action. Therefore, all the value were within the desirable range of 0.6—0.7. Furthermore, multicollinearity was tested using collinearity statistics, where the resulting VIF values for all independent variables were well below the cut off value of 10 (between 1.37 and 1.98). Thus, no observable multicollinearity existed.

A descriptive analysis was conducted to explain the demographic profile of the survey respondents. Then, a linear regression analysis was employed to determine how the independent variables (namely, the HBM constructs of perceived susceptibility, perceived severity, perceived benefits, self-efficacy, perceived barriers, and general health motivation) would influence the outcome variable of cues to action taken to prevent COVID-19.

Results

Demographic data

About 60% of the participants were female. The age distribution of the participants reveals that about half of the respondents were between 20 and 30 years old, a quarter between 31 and 40 years, a sixth between 41 and 50 years, and only about 5% were above 51 years old. This may be because the data collection was done using a google form (due to the COVID-19 related restrictions in place), which invariably means that participants were younger. The educational qualifications of the survey respondents seem quite high as the majority were degree holders (96%). About half of the participants reside in semi-urban areas (54%), about one-third in urban areas, and only about one-sixth live in rural areas. Most of them (90%) live in individual housing units and a few of them live in housing schemes and apartment flats. (see Table 1)

Table 2 summarizes the Likert scores obtained for the seven HBM constructs considered in the study.

The regression results summarized in Table 3 show that perceived benefits (0.395, $p = 0.001$), self-efficacy (0.405, $p = 0.001$), and general health motivation (0.313, $p = 0.001$) positively affect the cues to action taken to prevent COVID-19, whereas perceived barriers (−0.097, $p = 0.05$) have a significant negative relationship with cues to action to prevent COVID-19. Additionally, the regression results reveal that perceived susceptibility ($p = 0.483$) and perceived

Table 1: Demographic characteristics of sample respondents (N = 307).

	Number	(%)
Gender		
Male	123	40.1
Female	184	59.9
Age Group		
20-30	165	53.7
31-40	77	25.1
41-50	47	15.3
51-60	14	04.6
Above 60	4	01.3
Education		
Up to Advance Level	5	1.6
Diploma	6	2.0
Degree	158	51.4
Postgraduate	138	45.0
Residence		
Urban	93	30.3
Semi Urban	167	54.4
Rural	47	15.3
House type		
Individual unit	274	89.3
Housing Scheme	14	04.6
Apartment Flat	19	06.2

Table 2: Likert scores obtained for model constructs.

Model Construct	Mean Score	Standard Deviation
Cue of Action	4.41	0.34
Perceived Barriers	2.63	0.55
Perceived Benefits	4.36	0.46
Self-efficacy	3.30	0.39
Perceived Susceptibility	3.07	0.62
Perceived Severity	3.76	0.42
General Motivation	3.89	0.62

severity ($p = 0.382$) have no significant influence on the cues to action taken to prevent COVID-19. Accordingly, the regression model suggests that when all the other factors are controlled, an increased level of COVID-19 preventive actions can be expected by increasing the perceived benefits, self-efficacy, and general health motivation, as well as by decreasing the perceived barriers. Furthermore, the study found that perceived susceptibility and perceived severity has no significant relationship with cues to action taken to prevent COVID-19.

Table 3: Results of the regression analysis of the dependent variable: cues to action to prevent COVID-19.

Explanatory Variables	B	Std. Err.	Sig.
(Constant)	22.566	1.960	0.000
Perceived susceptibility	0.031	0.036	0.483
Perceived severity	0.040	0.046	0.382
Self-efficacy	0.405	0.074	0.000***
General health motivation	0.313	0.267	0.000***
Perceived benefits	0.395	0.079	0.000***
Perceived barriers	−0.097	0.037	0.008**
N	*307*		
R Square	*0.497*		
Adjusted R Square	*0.487*		

** Significant at $\alpha < 0.05$, *** Significant at $\alpha < 0.001$.

Discussion

The study findings revealed that perceived benefits have a significant positive relationship with COVID-19 preventive behaviour. This relationship is plausible because when a person perceives more benefits from avoiding COVID-19, they tend to adopt all possible measures to prevent infection. Shahnazi et al.[35] and Karimy et al.[27] also reported a similar relationship in their study of COVID-19 preventive health behaviours and the adherence to Pap test recommendations using the HBM. Therefore, the COVID-19 preventive program should pay more attention to educating the public on the benefits of not contracting COVID-19; in turn, this is expected to encourage them to adopt more preventive measures. The study also found that self-efficacy has a significant positive relationship with COVID-19 preventive behaviour. A similar relationship was found by Zetu et al.,[34] Shahnazi et al.,[35] Chou and Shih,[28] and Karimy et al.[27] in studying preventive health behaviours using the extended HBM. Accordingly, when an individual identifies his or her strengths and potential (self-efficacy) of combating COVID-19, that person will feel more confident and optimistic about preventing COVID-19. Therefore, convincing the public of their strengths and potential to prevent COVID-19 is an effective strategy to convince the public to adopt preventative measures. The study further revealed that general health motivation has a significant positive relationship with the cues to action for preventing COVID-19. This relationship suggests that apart from educating the public on preventing COVID-19 specifically, it is also important to sensitize them about their health and well-being in more general terms. This elevated awareness and motivation regarding general health and well-being will not only inspire the public to act to prevent COVID-19, but it will also help to prevent other communicable and non-communicable diseases from spreading, which is in agreement with previous studies.[36] The study further revealed that perceived barriers have a significant negative impact on COVID-19 preventive behaviour. This finding implies that when an individual encounters more barriers, he or she will become less likely to adopt COVID-19 preventive actions. This finding is in accordance with the findings of Zetu et al.,[34] Shahnazi et al.,[35] Teitler-Regev,[23] and Chou and Shih,[28] which indicated that barriers conceivably hinder the preventive health behaviours of the public. Hence, in an attempt to persuade the public to adopt full measures of COVID-19 prevention, it will be essential to identify the common barriers faced by the public in adopting preventive measures, and to facilitate overcoming such barriers effectively.

Another interesting finding was the insignificant influence of perceived susceptibility and perceived severity on COVID-19 preventive actions. This contrasts the findings of Teitler-Regev,[23] Karimy et al.,[27] and Deshpande et al.,[37] who showed that perceived susceptibility and perceived severity were significant determinants of health behaviours. The technical reason could be that the low variation of perceived susceptibility and perceived severity prevailed in

the sample population. In other words, the respondents in the sample population might have perceived a more or less similar level of susceptibility and severity towards COVID-19. However, studying perceived susceptibility and perceived severity is very important as they are significant constructs of the HBM, and these variables may exhibit significant impacts in different social contexts.

Conclusion

The study concludes that the public commitment towards adopting measures to prevent COVID-19 can be promoted by informing the public about the benefits of preventing COVID-19, bolstering individuals' strengths and abilities to combat the disease and elevating the general health motivation of the public, while also eliminating the socio-cultural, economic, or technical barriers that hinder the public. Regarding methodological implications, this study reiterates the applicability of the HBM to explore public behaviour in responding to a public health crisis such as the COVID-19 pandemic. In general, the findings suggest that when studying preventive health behaviours of the public, it is vital to consider self-efficacy, general health motivation, barriers, and benefits as they relate to the health issue under investigation.

However, this study also has some limitations that should be considered when referring to its results or for future studies. Due to the prevailing lockdown situation of the country, the data collection was conducted using a google form. However, this data collection method did not create a representative sample, as there is often a significant digital divide in developing countries including Sri Lanka. Furthermore, this study uses a cross-sectional research design in which data were collected at a particular point in time. However, the prevalence and impact of COVID-19 are changing dramatically over time; thus, better results might be possible using a longitudinal study.

Recommendations

The HBM could provide a useful and appropriate theoretical framework to examine the preventive behaviour of the public against COVID-19. Studying the public's preventive behaviour would generate very useful and pragmatic input to design an effective COVID-19 preventive program. Given the restrictions imposed due to the rapid spread of COVID-19 in the country, the data collection was carried out through an online survey (Google form). As such, it was not possible to obtain a representative sample. Therefore, to improve the precision and generalizability of the findings, the study should be expanded to cover all sections of society using multiple modes of data collection.

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Conflict of interest

The author has no conflicts of interest to declare.

Ethical approval

The authors confirm that this study had been prepared in accordance with COPE roles and regulations. Given the nature of the study, the IRB review was not required.

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