Post-Pandemic Community Perception of COVID-19 Vaccination and Preventive Measures, and Health Beliefs Model approach

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Abstract

Background: By May 31, 2021, COVID-19 had infected more than 174 million people and the death cases reached more than 3 million. Adopting prevention methods such as quarantine and physical distancing was the first line of defense against the coronavirus (Covid-19). **The aim of the study:** was to assess individuals' perception of the COVID-19 preventive measures and Corona vaccine by using the Health Beliefs Model. **Design:** A cross-sectional descriptive design the most appropriate design was used to assess the perception of COVID-19 precautions measures and its vaccination. **Subjects:** The sample was purposive with two hundred and five participants who meet the inclusion criteria. **Setting:** Different cities in Saudi Arabia. **Tools**: The data was collected through a 28-item survey questionnaire based on the health belief model theory of Hochbaum, Rosenstock, and Kegels. **Data Collection** the questionnaire was distributed to the participants through social media from different cities in Saudi Arabia. The participants were able to take part in an interview by scanning bar codes on their smartphones. **Results:** Most of the respondents are aged between 15 and 44 years old. 85.9% believe that the coronavirus is very severe and that they are at risk of getting infected; the mean scores being respectively 3.61 and 3.17. A significant correlation was found between the severity of the disease and the adherence to selected preventive measures (handwashing with soap and water and the use of hand sanitizers (r= 0.214& r=0.202 respectively). Vaccination is also perceived to be beneficial in relation to the severity of the disease (r=.175, P= 0.042). **Conclusion**: the participants still perceived Covid-19 as a severe disease with a high susceptibility for an infection that was correlated with their adherence to the preventive measures. Their adherence was influenced by different factors in addition there is no significant barriers hindering their adherence to the preventive measures. Additionally, the participants' perception toward Covid- 19 vaccine benefits was related to their perception of the disease severity **Recommendation**: the current study suggested that governments and ministries of health should consider factors such as, perception regarding the severity of the disease, probability of infection, and personal experiences when they establish awareness campaigns regarding Covid-19 infection and vaccination campaigns.

Keywords: COVID-19; Perception; Pandemic; Health Belief Model; preventive measures; Vaccination

Introduction

In December 2019, the first case of COVID-19 was discovered in Wuhan (China), and the disease spread globally within days, which made the World Health Organization announcing the Corona pandemic and taking out precautionary measures against COVID-19. The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was reported in 2002 and 2003 and announced the outbreaks in China. Moreover, MER-COV, Middle East Respiratory Syndrome Coronavirus was reported in the Middle East in 2012 **(Li, Guan et.al., 2020).** These are the most common respiratory disorders which have serious effects on the health and the community. The most common complications caused by the Coronaviruses especially among chronically ill elderly patients with respiratory or cardiovascular conditions are severe pneumonia, acute respiratory distress syndrome, multiple organ failure, and in some cases, death

(**Grein et.al., 2020**). By May 31, 2021, COVID-19 had infected more than 174 million people and the death cases reached more than 3 million worldwide (**WHO, 2021**). Adopting prevention methods such as quarantine and physical distance were the first line of defence against coronavirus (Covid-19) until effective methods of treatment and vaccinations are found (**Gudbjartsson et al., 2020**). Effective vaccines against COVID-19 are believed to be an urgent need to reduce the enormous burden of mortality and morbidity associated with disease infections (**Amanat & Krammer, 2020**).

Until a vaccine is found, the World Health Organization has called for some precautionary measures, such as all people staying at home and holding off all activities including education, trading, industries, shopping, and entertainment. The World Health Organization, along with the different governments, unanimously imposed adaptive behavioural precautions to eliminate the spread of COVID-19 (**WHO, April, 2020**) that include frequent hand washing with soap; wearing facemask outdoors when in contact with the public; avoiding unnecessary touching of face, nose, and eyes; social distancing by keeping not less than one-meter distance from others and avoiding crowded places; using hand sanitizer especially when going out (**Maier & Brockmann, 2020**). Adherence to all these healthy habits may rely on an individual's beliefs about the virus. It is considered that several factors influence the actions of prevention. Hence, variances among individuals about adherence to preventive measures have been observed (**Harper et al., 2020**). To control the spread of Coronavirus, one must understand the individual variances at a personal level (**Betsch, 2020**) and explore how personal factors such as individual's beliefs and generalized social beliefs toward health are related to one's adherence to COVID-19 protective measures (**Tong et al., 2020**).

This study focuses on the perception of susceptibility and severity of COVID-19, and on perceived benefits of taking preventive measures and their barriers toward COVID-19. These elements were guided by the Health Beliefs Model (HBM) as a framework. The HBM is a theory which explains the behaviour of an individual when exposed to a disease or the risk of getting this disease (**Darvishpour et al., 2018**). In 1950, the Health Belief Model (HBM) was created by **Hochbaum, Rosenstock, & Kegels 1952,** their model concentrated on individual's attitude and beliefs. It provides a framework to describe the individuals' perceptions and attitudes to illness and the negative consequences of certain actions. HBM explains that individuals' beliefs about the risk of a health problem or a disease, their perception of the effectiveness of the planned preventive actions (behaviours), and cues to action identify the probability that the individuals will have the behaviour (**Yoshitake et al., 2019**). It is reflected that positive factors stimulate pro-health behaviours while negative factors decline or inhibit them. Therefore, to embrace health care behaviour and avoidance exposure to diseases, the patient must: (1) believe the high risk for Covid-19 (perceived susceptibility); (2) believe the serious effects of Covid-19 on daily living activities and physical condition (perceived severity); (3) follow Covid-19 precautions will be effective in reducing the exposure for disease or its severity (perceived benefits); (4) realize the obstacles or behaviours for complying with the precautionary measures against COVID-19 (perceived barriers) for example the side effects of wearing a face mask over a long period of time; (5) know what are the stimulating cues to action for following COVID-19 preventive measures (Cue to action) for example internal cues

(the negative effects of COVID-19 on health) and external effects (social media, TV, newspaper and family members exposed to the disease) as showed in figure 1. In summary the HBM deals with a person's belief in a personal threat of the disease (COVID-19). The following model is created by the author to reflect the application of HBM for COVID-19 disease perception. The present study aims to apply the health beliefs model to assess (1) the participants' perception toward the coronavirus outbreak (COVID-19 Susceptibility & Severity); (2) their adherence to COVID – 19 precaution measures (benefits, barriers & cues actions toward COVID-19); (3) and their perception toward the Corona vaccine effectiveness. As COVID-19 vaccines become more available and widespread around the globe, the need to assess the public's openness to them increases. Even before the release of the first effective COVID-19 vaccine, misinformation and unsubstantiated hearsay about COVID-19 vaccines had been widely circulating on all social media platforms (**Puri, Coomes, Haghbayan, & Gunaratne, 2020**). The rumours both continued and were added upon after the roll-out of different effective vaccines; one such example is the false claim that mRNA vaccines can alter human DNA (**Mohamed, et al, 2021).**

Significance of the Study:

A solid grasp of people's perceptions and attitudes regarding preventative measures and vaccination is necessary when countering pandemics, including COVID-19 (**Graffigna, Palamenghi, Boccia, & Barello, 2020, Reiter, Pennell, & Katz, 2020, & Rhodes, Hoq, Measey, & Danchin, 2021).** There is a need to know the Barriers for Taking Preventive Measures.In Saudi Arabia, there is little knowledge about people's acceptance of the various COVID-19 vaccines. Such information is pivotal in predicting the future rates of vaccinations and in constructing strategies to deal with the pandemic **(Kishore, Venkatesh, & Ghai, 2021**). Therefore, question like "Are the citizens of KSA willing to be vaccinated against COVID-19?" need to be answered. Our study was designed to answer this necessary question in order to assist the Ministry of Health in its efforts to counter the COVID-19 pandemic. At this important time, the outcomes of this study are likely to provide useful information to Kingdome healthcare officials about the individuals perception' regarding precaution measures and vaccine. The findings could also help in the plan future actions, raise awareness, and enhance policy in the COVID-19 outbreak (**Al-Hanawi, et al. 2020**)

The aim of the study:

To assess individual's perception toward the COVID-19 preventive measures and Corona vaccine by using Health Beliefs Model. Sub objectives were: (1) to assesses the perception toward the adherence for COVID–19 preventive measures (2) to assess the perception toward the Corona vaccine (benefit and harm). (3) to assess the motivating actions and the barriers that affect the adherence to the preventive measures.

Research Questions:

1- What is the individuals' perception toward COVID-19 severity and susceptibility and severity?

2- What are the motivating actions that increase the individuals' adherence to COVID-19 preventive measures?

3- What are the barriers that hinder the individuals' adherence to COVID-19 preventive measures?

4- What is the individuals' perception toward the Corona vaccine benefits and harms?

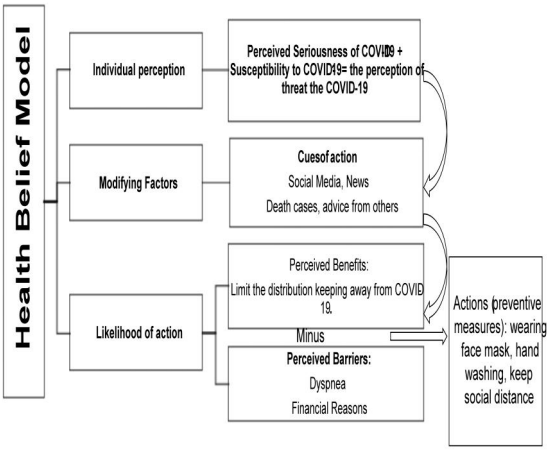

Figure (1): the application of Health Belief Model for COVID-19

Subjects and Methods

Design: A descriptive cross-sectional design was used to achieve the aim of the study which focused on describing the frequency at a specific point in time.

Subjects:

The sample size was calculated using G*Power **software (Faul, Erdfelder, Lang, & Buchner, 2007).** A priori power analysis for correlation indicated that a sample size of 140 would be sufficient to detect a significant moderate effect size (.3) using the conventional power of .80 and an alpha of .05 with an estimated population medium effect size of 0.5. The number of respondents who completed the survey correctly was 205. As a result of the restriction on gathering and traveling during the pandemic, the participants were recruited by two methods: Snowball sampling, where the survey link was distributed to well-known participants from different universities in KSA **(Riyadh, Shaqra, Dammam, and Al-Ahsa).** Those well-known participants re-distributed it to their students, colleagues, employees, friends, relatives through social media groups such as WhatsApp, Messenger. Another technique was a purposive sample face to face where the researchers met randomly with people from public places (such as mall and supermarket) in Dammam and asked for their participation in the research.

The inclusion criteria included participants who were 15 years and above and were able to read and fill the questionnaire and agree to be a part of the study. In addition, the participants had smartphones and can scan the QR code and welling to participate in a face-to-face meeting. Exclusion criteria excluded all participants who were under 15 years of age, illiterate, or can't access QR codes on their phones.

Setting

The data was collected from four different cities in the Kingdom of Saudi Arabia. The survey link was sent to some faculties from three public universities in Riyadh, Shaqra, Dammam, in addition, two private colleges in Dammam and Al-Ahsa, then re-distributed the link to the social groups in their universities. Moreover, the link was sent to a social group for a private higher school in Dammam. Permission was received from one mall and one supermarket in Dammam to collect the data from their visitors face to face through a QR code.

Tools and data collection

The data was collected through a 28-item questionnaire. This tool was built based on the health belief model theory of Hochbaum, Rosenstock, and Kegels, 1952. The questionnaire determines beliefs towards the perceived susceptibility and severity of COVID-19 disease, the perception towards the barriers and benefits of adherence to precautionary measures against COVID-19 disease, and also the perception towards the vaccine. It was composed of six major parts, (1) demographic data and comorbidity including, age, gender, educational level, occupation, smoking status, and chronic conditions, (2) the perceived susceptibility toward Covid-19 contained two items that have Cronbach's alpha of 0.62, (3) the perceived severity of Covid- 19 also contained two items with Cronbach's alpha of 0.62, (4) Follow up certain precautions and perceived benefits and the importance of adherence to precaution measures were covered by ten items with Cronbach's alpha of 0.72, (5) the perceived barrier to adherence to precautions assessed by five items with Cronbach's alpha of 0.72, (6) Cue-to-action for Obedience to Precautionary Measures of COVID-19 involved seven items with Cronbach's alpha of 0.72, and lastly (7) the perceived effectiveness of the Covid-19 vaccination with two items that have Cronbach's alpha of 0.72.

Scoring System: The questionnaire was answered through a 5-point Likert scale where 1= don't know, 2= strongly disagree, 3= disagree, 4= agree, 5= strongly agree.

Validity and Reliability

The face validity of the questionnaire was ensured by experts' opinions in the field as well as by a literary review. Three experts in the field of research were asked to check the relevance of the questions in addition ethical committee members checked the questionnaire's validity. Cronbach' alpha was used for assessing internal consistency reliability (Cronbach's alpha = 0.72).

Pilot Study

A pilot study was done on 10 participants (their responses were excluded from the study sample) to assess the clarity and effectiveness of the questionnaire as well as the technique of data collection.

Data Collection

Data collection was taken from November 2020 to February 2021. The survey was developed using 'Google survey'. A link was then sent online through various forms of social media, using 'WhatsApp's groups', 'Messenger' etc. In addition to social media, the researchers received permission from the mall and supermarket in Dammam to meet the visitors face-to-face and then asked participants to participate and complete the survey, by using the QR code that is scanned onto the participants' smartphones to access the survey.

Ethical consideration

The study was reviewed and approved by the ethics committee at Mohamed Al-Mana college for medical science at Dammam (reference number SR/RP/45). A briefing on the study was given and informed consent was taken before the completion of the electronic survey form. The participants' responses to the survey were anonymous, to ensure they answered the survey freely and safely. Additionally, the participants had the right to leave and not finish the survey at any time during the survey.

Data analysis

The respondent rate; the percentage of cases; computed the average score for all responses using SPSS statistics version 25.0. Initially, 'demographic data; chronic conditions; prevalence and degree of adherence to each of the precautionary actions' were computed and subsequently stated as 'frequency; percentages; mean and standard deviation'. Then, 'Pearson's r' for bivariate correlation was used to measure the associations among adherence and the health belief model. Then, the compliance to precaution measures with perceived severity and susceptibility to the coronavirus infection and the Covid-19 vaccination were tested.

Results

The study result revealed that majority of respondents were female. They perceived that Covid-19 is sever and they were moderately susceptible for it. They were motivated by several factors, but the most common factors are elevating number of infected and dead cases as well as the social media and newspaper. Moreover, there was a significant relationship between susceptibility and preventive measures of Covid-19 and no barriers observed except the wearing of the mask among 25.8% of respondents. Most of the study respondents approved that corona vaccination are beneficial.

Demographic Profile

The majority of the participants (85.9%) ranged in ages between 15–44 years old and 80.9% of the participants were female. The majority of the participants at 66.3%, were employees and 64.9% had bachelor's degrees (Table 1).

Perceived susceptibility and severity of COVID-19 Disease

The respondents perceived themselves to be moderately susceptible to the Covid-19 virus as shown by the mean score of 3.16. On the other hand, the respondents perceived that the severity of coronavirus was high at a mean score of 3.61(Table 2).

Motivating action cues to Take COVID- 19 preventive measures

Moreover, the respondents were motivated in varying degrees by several factors to practice preventive measures against coronavirus. There were two main motivations: the increasing number of infected and fatal cases and the media and newspapers influence with a mean average of 4.06 and 4.03 respectively (Table 2).

Barriers for the adherence to COVID-19 preventive measures

Table 3 displayed that there were no strong barriers to taking preventive precautions among study subjects. Although around 73% of the participants (42.9 % strongly disagree & 29.8 % disagree) opposed the idea that they could not wear the mask because of dyspnoea, but it is noted that 25.8% of the study subjects (7.8% strongly agree & 18% agree) agreed that wearing a face mask can cause dyspnoea for them. While 9.8% thought that the measures cannot prevent coronavirus infection and should only be practiced by people infected.

Correlation between adherence to COVID-19 preventive measures and perceived severity

The severity of the coronavirus increased the practice of preventive measures. This was demonstrated by a significantly high correlation observable between the severity of Covid-19 and handwashing with soap and water (r= 0.214); hand sanitizers (r=0.202); sterilizing surfaces and tools with disinfectant (r= 0.222); maintaining social distance (r=0.348) and avoiding kissing, hugging, and shaking hands (r=0.279). On the other hand, there was seen no significant correlation between the severity of Covid-19 and wearing of a protective mask (r= 0.122). (Table 4)

Correlation between adherence to COVID-19 preventive measures and perceived susceptibility

Table 5 indicated a significant correlation between the susceptibility for Covid-19 and sterilizing surfaces and tools in addition to, avoiding kissing, hugging, and shaking hands (r=.140, r=.159 respectively). There is a weak to negligible linear correlation between the respondents' perceived susceptibility to the preventive measures for coronavirus as shown by handwashing r=.079, hand sanitizers r= .072, wearing masks r= .093, keeping social distance r=.100.

Perception of perceive benefits and harms for Covid-19 vaccine and its relationship with perceived susceptibility, severity and motivating factors.

The study findings indicated that there is a significantly high relationship between the perceived severity of Covid-19 and the motivating factors for taking the preventive measures (r= .259, P= 0.000). Moreover, the study results revealed that there is a significant relationship between the perceived benefit of vaccination to the perceived severity of the disease (r=.175, P= 0.042). On the other hand, there is no relationship between the high risk of Covid-19 infection (Susceptibility), the benefits and harmful side effects of the coronavirus vaccination, and the motivating factors for taking the preventive measures (r=-.100, r= -.127, r= 0.093 respectively) (Table 6).

Table 1: The Frequency and Percentage of Demographic Data & Comorbidity among the studied subjects (N= 205)

Variables	Frequency (N)	Percent (%)
Age		
15 – <25 years	60	29.3
25 – <35 years	71	34.6
35 – <45years	45	22.0
45 – <55 years	20	9.8
>55 + years	9	4.4
Gender		
Male	39	19.1
Female	166	80.9
Educational Level		
PhD	17	8.3
Master	27	13.2
Bachelor	133	64.9
High school	26	12.7
Diploma	2	0.9
Are you an employee?		
Yes	136	66.3
No	69	33.7
Do your work:		
Daily	80	39.0
Day by Day	19	9.3
Online	32	15.6
Vacation	5	2.4
Don't work	69	33.7
Do you have any chronic health condition?		
Yes	41	20
No	164	80
Chronic illness		
Asthma	17	41.4
Diabetes	5	12.2
Heart/ liver/ neurologic Disease	7	17.1
Immune disease	7	17.1
On Steroid medications	5	12.2

Table 2: The Perceived susceptibility and Severity of COVID-19 Disease and Motivating Action Cues: adherence to COVID-19 Preventive Measures. (N= 205)

Questions	M	SD
Perceived Susceptibility		
Do you think that you are at high risk for Coronavirus infection?	3.40	1.05
Do you extremely worry that you are at high risk for getting Corona infection?	2.91	1.32
General Mean	3.16	0.959
Perceived Severity		
Do you think Corona is a dangerous infection with serious complications?	3.83	1.11
Do you think that more people will die from Corona?	3.39	1.18
General Mean	3.61	0.952
Motivating actions Cues: adherence to Preventive Measures		
I was infected by Corona Virus.	2.88	1.22
My colleagues, friends, and family members died from a virus infection.	3.51	1.33
Increasing the number of infected and dead cases all over the world.	4.06	1.13
My colleagues, friends, and family members encourage me to follow the preventive measures.	3.99	1.04
The media and newspapers regularly announce preventative measures, and they led me to follow them.	4.03	1.11
There is a fine for those who do not follow the instructions that forced me to wear the mask	3.21	1.46
Mask, Sanitizers, and gloves are available in my work setting.	3.87	1.19
General Mean	3.65	0.733

Table 3: The Barriers for the Adherence to COVID-19 Preventive measure (N= 205).

Barriers	Frequencies & Percentages	Answering Strongly agree	agree	Do not know	Disagree	Strongly Disagree
I cannot wear the mask and use sanitizers because it is cost-effective.	F	4	8	3	69	121
	%	2	3.9	1.5	33.7	59
I cannot wear the mask because I feel dyspnoea.	F	16	37	3	61	88
	%	7.8	18	1.5	29.8	42.9
I think all of these precautions cannot prevent Corona infection and must be practiced by infected personnel.	F	10	10	4	62	119
	%	4.9	4.9	2	30.2	58
Coronavirus is transmitted by air so only wearing a mask will be effective rather than the remaining precautions.	F	7	9	7	76	106
	%	3.4	4.4	3.4	37.1	51.7

Table 4: Correlations Between Adherence to COVID-19 Preventive Measures and Perceived Severity (N= 205)

Item	1	2	3	4	5	6
1. Perceived severity (Corona))	--					
2. Hand Washing	.214**	--				
3. Hand Sanitizers	.202**	.448**	--			
4. Sterilizing surfaces & tools	.222**	.372**	.696**	--		
5. Wearing Mask	.122	.427**	.571**	.406**	--	
6. Keeping Social Distance	.348**	.519**	.404**	.327**	.480**	--
7. Avoid kissing, hugging, and shaking hands	.279**	.454**	.355**	.285**	.551**	.610**

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

Table 5: Correlations between Adherence to COVID-19 Preventive Measures and Perceived Susceptibility (N= 205)

Item	1	2	3	4	5	6
1- Perceived susceptibility (Corona)	--					
2- Hand Washing	.079	--				
3- Hand Sanitizers	.072	.448**	--			
4- Sterilizing surfaces & tools	.140*	.372**	.696**	--		
5- Wearing Mask	.093	.427**	.571**	.406**	--	
6- Keeping Social Distance	.100	.519**	.404**	.327**	.480**	
7- Avoid kissing, hugging, and shaking hands	.159*	.454**	.355**	.285**	.551**	.610**

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

Table 6: Perception of Covid-19 vaccination's benefits and harms and its correlation with coronavirus severity and susceptibility and motivating factors.

		Perceived Susceptibility (Corona)	**Perceived Severity (Corona)**
Corona Vaccination Benefits	Pearson Correlation	.100	.175*
	Sig. (2-tailed)	.155	.012
	N	205	205
Corona Vaccination Harmful	Pearson Correlation	-.127	-.250**
	Sig. (2-tailed)	.069	.000
	N	205	205
Motivated factors for taking preventive measures	Pearson Correlation	.093	.259**
	Sig. (2-tailed)	.184	.000
	N	205	205

**. Correlation is significant at the 0.01 level (2-tailed).

Discussion

This study was anchored on the health belief model (HBM) developed from psychological and behavioural theory. HBM conceptualized that the behaviour of individuals towards health or the desire to avoid illness will prevent / cure illness depends on their perception on the benefits

and hindrances of the health-related course of action **(Wayne & LaMorte, 2019).** This study explored the perceptions of the respondents anchored on the four constructs of the HBM which include perceived severity, perceived susceptibility, perceived benefits, and perceived barriers to the preventive measures for coronavirus.

Perceived Susceptibility and Severity for Coronavirus

The findings showed that the respondents perceived coronavirus as a high-risk infection with severe consequences and the participants believed they are highly susceptible to become infected. That belief can be attributed to increasing the global death toll due to Covid-19. The escalating mortality toll was discovered to have a clear proportional link with people's perceptions of coronavirus severity and susceptibility to become infected. This finding was supported with Chen and Yang (2018), who found that a person's fear of the disease's effects was linked to their perception of the danger. Many studies were published during the pandemic along with our research results which confirmed that the majority of participants continued to believe that coronavirus is a life-threatening danger and there is a high risk of COVID-19 infection (**Li et al., 2020**).

Adherence to COVID-19 preventive measures (Health-related behaviour) and its correlation with the coronavirus severity and susceptibility

The results discovered that there is a correlation between the severity and susceptibility of Covid-19 and both preventive measures and the motivating factors for taking the preventive measures and the benefit of vaccination. With the rapid spread of COVID-19, health-related authorities, such as the 'WHO' Centres for Disease Control and Prevention (CDC) and other health agencies, reacted quickly by issuing regulations requiring people to take preventive measures to limit the spread and effects of the disease such as, wearing a mask, covering one's mouth with a sleeve while coughing, washing hands with soap and water, observing social and physical distancing, and avoiding kissing, hugging and handshakes are some examples of prevention. Many people complied with these recommendations (**Kim & Kim, 2020**).

According to the findings of this study, the majority of participants believe that these preventive actions are important in preventing the spread of the Covid-19. The result is consistent with the empirical research during the SARS and H1N1 pandemics that focused on Health Believe Model which looked at changes in people's health behaviour toward a health crisis. According to these studies, people are more likely to follow precautionary health actions when they are persuaded of the seriousness of the disease; believe they are highly vulnerable and susceptible to it; are assured that a preventive behaviour is effective and believe the expense of doing so are minimal (**Durham et al., 2012**). These conform to the results of our study, that high adherence to health-related behaviour in coronavirus prevention is driven by their perception of the severity of the virus and their susceptibility.

Additionally, the results of this study indicated that the majority of the participants think about the importance of these preventive measures in eliminating the spread of Covid-19. Social distancing; washing hands; and wearing face masks were more likely to be adhered to by participants during the pandemic. Our findings correlated to similar studies done in Asia (**Lee & You, 2020; Tong et al., 2020**), these results indicated that almost

all their subjects wore face masks when outdoors during the pandemic. The high percentage at which the participants were convinced of the importance of the preventive measures may be attributed to the clarity of information published by the government. That is in line with Lee and his colleagues' research results that concluded misinformation belief was linked to Coronavirus misinformation exposure, while misinformation belief led to fewer preventive measures practices (**Lee & Kang, et al., 2020**).

Motivating Action Cues to Take Preventive Measures

The results indicated that there were several factors that has a great influence on the adherence of the participants to the COVID-19 preventive measures such as increasing number of infected cases, mortality rate, media. Having colleagues, friends, and family members who died from coronavirus; increasing number of coronavirus-related deaths all over the world; regular announcement from media about preventive measures and reminder to follow these; encouragement from colleagues and friends to follow preventive measures, are all the factors that strongly motivated the participants to practice the health preventive measures. The health belief model proposed that individuals' behaviour is affected by both internal and external cues to action (**Shmueli, 2021**). These finding are compatible with Hayden's line, he stated that events, individuals, media, health care providers, and any other external influence that can cause people to alter their habits are examples of external cues (**Hayden, 2014**). Psychological cues, such as pain and symptoms, are examples of internal cues that cause people to change their behaviour (**Hayden, 2014**). In fact, during the curfew that was imposed in Saudi Arabia from March to June 2020, people were isolated and the only way to communicate with one another was via social media platforms such as Facebook, Twitter, Instagram, WhatsApp, and Snapchat. At that time, the majority of people got their health information by visiting both official and non-official websites. This finding confirms with other study results, which reported that 93.5 % of their respondents had obtained health information about Covid-19 from the internet (**Wang, et.al., 2020**). Similar findings from other studies found that teenagers are influenced by social media to conform to social norms and peer groups as they spent a lot of time on social media and become well-informed about protective measures from various media (**Fathian-Dastgerdi et al., 2021; Wang et al., 2020)**. Regarding internal cues, the current results showed that increasing the announcements of new deaths nationally and globally appeared to act as a psychological cue that triggered the participants to adapt their behaviour. An increasing mortality rate was found to have a directly proportional relationship with how strictly Covid-19 preventive measures were adhered to. This agrees with another study in which the person's perception of danger is linked to their fear of the disease's consequences and affect the individual behaviour (**Chen & Yang, 2018).**

Barriers for the adherence to COVID-19 preventive measures

The results revealed that there are no strong barriers for the adherence to the COVID -19 preventive precautions. Additionally, the results also discovered that the availability of masks, sanitizers, and gloves in work settings strongly motivated the participants to follow the preventive measures. After removing the curfew in June 2020, the KSA government recommended all workplaces to impose on their employee's compliance with the health precaution measures especially of

mask-wearing and social distancing (**Nurunnabi, 2020**) in addition, encouraging workplaces to offer masks and hand sanitizers to their employees as much as is possible. On the other hand, the respondents' adherence to the preventive measures may also be credited to the strict implementation of the coronavirus precautions by the government. In a similar vein, **Chan, Zhang and Weman-Josefsson, (2021)** citied that the legislative actions are samples of the external factors that support the formation of controlled motivation. Following imposing the lockdown, the government enforced a pecuniary penalty for those who did not wear a mask when going out and did not abide by social distancing (**Al-Arabiya news, 2021**). Adherence to the preventive measures for Covid-19 nevertheless had not been completely achieved without the enforcements by the government. Despite the aggressive move in educating the public by the 'WHO' and other health-related agencies, noncompliance to the preventive measures is a reality along with increasing the number of Covid-19 confirmed cases. At the end of 2020 after the re-opening of Saudi Arabia, there was an increase in Covid-19 infections which led the Saudi government to push stricter and tighter measures along with more penalties for those who do not abide by the preventive measures. By implementing the following measures: closing all social entertainment places and restaurants; closing all land, water, air borders from entry and exit at the end of 2020. The explanation for people's compliance with the initial precautionary measures could be that there would be fines attached with non-compliance behaviour. According to the integrated model, people who are motivated by controlled motivation such as legislative decision may stick to the recommended behaviour as soon as external stimuli are existing, but they are more susceptible to non-compliance in the long term than those who are motivated by self-directed motivation (**Chan, Zhang, & Weman-Josefsson, 2021**).

Perception of Covid - 19 Vaccinee' benefit and harms and its correlation with coronavirus severity and susceptibility

The findings of this study also illustrated a significant relationship between the perceived severity of coronavirus infection and the benefits of Covid vaccination. As people perceived Covid-19 as a potential danger, demand for a vaccine against it is likely to be strong (**Karlsson et al., 2021**). A recently published study found that confidence in the vaccine's safety was the best predictor of Covid-19 vaccination uptake motivations. Individuals who perceived Covid-19 as a serious disease were also more likely to want to get vaccinated against it. They have reported that the majority of subjects stated they would agree to take a future Covid-19 vaccine (**Dodd, et al.,2021; Neumann-B ohme et al., 2020**). However, there are contradictory findings that, many studies reported 6–25% of subjects mentioned they would not take the vaccines (Karlsson et al., 2021; Ward, et al.,2020), and that they did not 'trust' a vaccine. Other studies from seven European countries found that the majority of people who were undecided on whether or not they would approve of a Covid-19 vaccine, including those who opposed it, cited the cause of their hesitancy as overall fear of the vaccine side effects (**Neumann-Böhme et al.,2020**). In reality, people's perception toward Covid-19 vaccines might be affected by mistrust in the government about Covid-19 responses or policies, as well as disinformation spread by anti-vaccine campaigns and even conspiracy theories referring to the pandemic as a hoax (**Limaye et al., 2020**).

The Saudi Arabia government has implemented decisions to encourage people to take Covid-19 vaccines through creating vaccination campaigns covering all provinces providing free Covid-19 vaccinations to all citizens and residents. Additionally, the Saudi health ministry has put in place different Mobile applications such as 'Sehhaty' and 'Tawakkalna' to encourage people to sign up to receive Covid-19 vaccines. These applications also track peoples' health condition in addition to tracking coronavirus patients and their contacts (**Al-Arabiya, 22 December ,2020**). Furthermore, the ministry released an informative video about the vaccines and urged citizens and residents not to spread "medical lies" online. Additionally, the Saudi king and the higher royal princes took the vaccine to encourage the citizens and residents to take it (**Arab News, 2021**). Following that, in June 2021 with an increasing curve of infected cases again, the Saudi government issued legislation to allow only vaccinated citizens and residents to access government places, educational and recreational facilities and domestic flights (**Public Health Authority, 2021**). All these strategies led to increase in the number of vaccinated people.

Even though, the results revealed a significant correlation between perceived benefits of vaccination and the perceived severity of the disease but the results also indicated that there was no relation between the high risk of Covid-19 disease (Susceptibility) and, the benefits, harm from the Covid-19 vaccines, and the motivating factors for taking the preventive measures. This is coherent with a recent published study in 2020 which reported that perceived self as susceptible and apparent seriousness of getting Covid-19, in addition to confidence in government were of generally of little significance to predict the individual's voluntary compliance to health behaviour (**Clark, Davila, Regis, & Kraus, 2020**).

Conclusion

This study concluded that, after more than a year from declaring the Covid-19 pandemic, the participants still perceived Covid-19 as a severe disease with a high susceptibility for infection and these perceptions were correlated with the participants' adherence to COVID-19 preventive measures. Furthermore, the participants adherence to the preventive measures were influenced by their personal experiences, the infection, death of relatives or friends, and regular announcement from the media. In addition, the there is no strong barriers hinder their adherence. Additionally, the participants' perception toward Covid- 19 vaccine benefits was related to their perception of the disease severity.

Implication

Our study confirms that the individual's behaviours are affected by many factors; such as their perception regarding the severity of the disease and their high probability of infection, and also their personal experiences taken from themselves or their family infection or death. This suggests that governments and ministries of health should consider these factors when they establish awareness campaigns regarding Covid-19 infection and Covid-19 vaccination campaigns.

Furthermore, this study also emphasizes that punishment, penalties, maintaining restriction rules, forces people to become more committed to follow health precautions. This could be suggested as a strategy to be used by the government to urge all sectors' institutions throughout society, to strictly comply with the health precautions and adherence to the vaccination campaign.

Moreover, institutions should encourage and commit their employees and customers to follow Covid-19 precautions and get vaccinated. These institutions can issue tickets to violators (reporting), and they can prevent customers accessing services if they are not adhering to Covid-19 measures. If all community institutions adhere to Covid-19 instructions and measures, this could potentially, reduce the spread of the virus.

Limitations

The first limitation refers to the nature of the descriptive design, where this type of research offered data on people's experiences of Covid-19 and it also relied on self-reported results. Additionally, the results might have been affected by the participants' subjective evaluation of their experience.

The second limitation relates to sampling, non-randomly assigned participants made it impossible to draw firm conclusions about causality and generalization. The selection of participants was only based on those who have internet access; and are active on social media since it was only distributed through the internet or they were able to participate in the survey by using mobile QR codes.

The third limitation of this study was the likelihood that participants would react in a socially acceptable manner.

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