Antecedents of individual safety behavior during the pandemic times

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Research

Abstract

Background

This study aims to measure the safety behavior of individuals' during the pandemic of COVID-19 by integrating Health Belief Model (HBM) and behavioral theories i.e. Theory of Reasoned Action (TRA), Social Cognitive Theory (SCT) and Information-Motivation Behavioral Skills (IMB).

Methods

The research was conducted in education sector; data was collected from students and staff (teaching and nonteaching) of universities. Mono method was used with deductive approach. Data was collected from 780 respondents and analyzed using Smart PLS3.

Results

A scenario-based survey conducted online, and data was collected from 780 respondents to test the model. Data analysis was conducted by using SPSS and Smart PLS3.The results highlighted the factors that leads towards behavioral change during the pandemic times. The results highlighted the factors that leads towards behavioral change during pandemic times.

Conclusions

This study not only contributes into the existing literature on social marketing but also will bring the betterment in the society by measuring the safety behavior of individuals. This research may also help the health policy makers and contributes as communication guideline for individuals to follow safety behaviors which will limit the spread of COVID-19.

Trial Registration:

Not applicable

1. Introduction

The outbreak of COVID-19 pandemic has become a global apprehension for every individual. Coronavirus has affected almost every aspect of life globally specially in USA, China, Italy and Pakistan. The end of the year 2019 brought a big global challenge when World Health Organization (WHO) declared China as a cluster of Coronavirus. This outbreak was named 2019-nCOV and the disease associated with Novel Coronavirus named as COVID-19 (Wong, 2020). In the meantime, on January 11, 2020, China has declared the first death of an old man 61-year, because of COVID-19 (WHO, 2020a). By passage of time, this outbreak spread across the worldwide, WHO announced it a Public Health Emergency of International Concern on January 30th, 2020 (WHO, 2020b, 2020c). On February 02, 2020, the first death outside China was announced in Philippines. WHO declared COVID-19 –a pandemic as 114 countries were affected by it, on March 11, 2020 (WHO, 2020). In Pakistan, the first case was announced by the Ministry of Health, Government of Pakistan in Karachi, on 26th February. The confirmed cases in Pakistan reached like 20 out of 471 suspected cases within 15 days. Government of Pakistan has taken different measures to control the pandemic. The first step they took was the lock down and closure of educational institutes as the educational institutes are the main hub of social interaction and to control the spread of COVID, WHO suggested maximum social distancing. Public awareness massages for safety measures such as washing hands for 20 seconds, social distancing, use of mask and gloves and use of hand sanitizers were suggested (Waris et al., 2020). This pandemic brought physiological challenges for individuals, these psychological changes effected the attitudes and behaviors of individuals.

The current situation formed with COVID-19 pandemic, has great impact on life of an individual and the society as a whole. The changes in an individual's life routine might lead to psychological effects such as distress, mental discomfort & anxiety (Arënliu and Bërxulli, 2020). Disease outbreak such as COVID-19 is unpredictable and uncertain event which have great impact on the attitude of an individual which may lead to the behavioral changes (Qazi et al., 2020). There are researches on awareness, knowledge of health service providers, pharmacy services, economic challenges and psychological distress of COVID-19(Arënliu and Bërxulli; Carico et al., 2020; Pareek et al., 2020; Qazi et al., 2020; Roy et al., 2020; Waris et al., 2020; Wise et 24 al., 2020; E. L. Wong, 2020), but the behavioral perspective is hardly considered. This study is an attempt to address this Literature gap and tried to measure safety behavior of individuals towards COVID-19. This is the first attempt in the field of safety behavior to study the worst psychological effects such as threats, stress, mental discomfort resulting from diseases which may leads to behavioral changes and to investigate how global pandemic of COVID-19 impacts individual's behavioral aspects.

2. Literature Review And Hypotheses Development

There are few psychological theories which provides theoretically useful tool to measure attitude, behaviors and beliefs. Martin Fishbein and Icek Ajzen developed Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). TRA propose that the most essential element of an individual's behavior is that individual's intention to perform the behavior. TRA have four constructs, Intentions refers to the predictions of attitude and subjective norms, and it represents an individual's motivation in sense of individual's conscious decision which leads to make efforts to perform behavior (Taylor et al., 2006; Glanz et al., 2002). Subjective norms refer to the normative belief of an individual that people around oneself will and will not approve performing health behavior. An individual's perception whether the important people like family, peers approve or disapprove engagement in health behavior (Wang et al., 2019).

Secondly, the Health Belief Model is the conceptual framework which is widely used in behavioral researches in health since 1950s. This model is used to explain improvement, maintenance and change in health-related behaviors and also provides better guidelines for the intervention of health behavior. From the last two decades, Health Belief Model has been expended, integrated with other theories, compared to different frameworks and used to help maintaining changes in health behavior (Sulat et al., 2018). In the HBM, the prospect of individual performing health behavior is elucidated in to four perceptions such as perceived severity and susceptibility, perceived benefits and barriers.

Third theory incorporated was the Social Cognitive Theory (SCT) that was proposed by Rotter (1954; 1966) and Bandura (1986). SCT is a subcategory of cognitive psychology. Social Cognitive Theory suggests that the learning of individuals is based on the interaction with their environment with their personal experiences which leads towards the specific behavior (Rotter, 1990). It forms the foundations of the model to measure health behavior (Abraham et al., 1998). According to this approach individual's motivation is based on social support, self-regulation and self-efficacy. Self-regulation and social support constructs of SCT has been taken in this study (Silveira & Motl, 2019).

Fourthly, the IMB model was also added as it is a detailed and comprehensive model to measure and predict changes in behavior with the explanation of environmental and interpersonal roles. IMB Skills differentiate three factors of performance of health behavior: 1. Health related knowledge and information which could be interpreted into behavior, 2. Social motivation which translate changes in health behavior, 3. Behavioral skills to enable in engagement and commitment to behavior. (Fisher et al., 2003). The IMB model suggests that, the degree of knowledge and information an individual have related to health and motivation to apply that knowledge with the behavioral skills to execute behavior will measure their behavioral engagement (Cornman et al., 2007; Rivet Amico, 2011; Zarani et al., 2012)).

2.1. Subjective Norms and Intention

In Theory of Reasoned Action (TRA) social norm is a determinant of behavioral intention. Subjective norms deal with the feeling of an individual about social perspective and pressure they sense for performing behavior. Furthermore, individual who is having positive subjective norms towards performing certain behavior most likely having the positive intention (Han et al.,

2009). In the health behavior context, previous studies have measured subject norms key measure of intention (Cooke & French, 2008). Many studies using TRA and TPA suggested the validation of positive influence of subjective norms on the health behavioral intention to follow the prevention and safety measures (Conner, M., & Norman, 2006; Cooke & French, 2008; Glanz et al., 2002; Nelson et al., 2018)

Hypothesis 1

subjective norms have a positive influence on intention towards safety behavior.

2.2. Attitude and Intention

The construct of attitude in Theory of Reasoned Action (TRA) defined as an individual's overall valuation of performing behavior (Wang et al., 2019). Attitude measures through individual's beliefs about the aspects and outcomes of executing behavior weighted by valuation of these aspects (Glanz et al., 2002). Furthermore, attitude leads to measure whether the individual's behavior is good or bad (Davis et al., 2015). Previous studies about health behavior pointed that attitude also include the consequences related to the perceived behavior (Wang et al., 2019). Chen and Tung (2014) illustrated attitude as a psychological emotion transmitted through individual's valuation and if it is positive that leads to more positive behavioral intention.

Hypothesis 2

attitude has a positive influence on intention towards safety behavior.

2.3. Perceived susceptibility and Intention

Perceived susceptibility is defined as a perceived subjective perception about risk an individual have to a health state or condition (Sulat et al., 2018). Glanz et al., (2002) defined perceived susceptibility as a belief about getting chances of health risks. Perceived susceptibility is the belief of experiencing health risk it's a threat of getting sick or having a bad health condition (Taylor et al., 2006; Rahman et al., 2018). The health belief model predicts the perceived threat of health behavior intention. It shows high usefulness, when perceived, the perceived vulnerability and seriousness positively affects health behavior. Moreover, few researches suggested that perceived susceptibility of a health issue is positively related to performing safety behavior for the health threats. (Mou et al., 2016).

Hypothesis 3

Perceived Susceptibility have a positive influence on intention towards safety behavior.

2.4. Perceived Severity and Intention

Perceived severity denotes subjective valuation of severity of the consequences which are allied with the specific health condition (Taylor et al., 2006). Sulat et al., (2018) defined perceived severity as the belief of an individual about seriousness of a health condition. Perceived severity is a belief that how serious is the health state and condition (Glanz et al., 2002). Individuals are appraising the severity and seriousness of COVID-19 and the circumstances associated with it which leads them towards safety measure (washing hands, use of face Mask, sanitizers & goloves) (Carico et al., 2020; Qazi et al., 2020; E. L. Wong, 2020). Consciousness about health condition may influence individual's positive intention towards safety behavior. Therefore, the current study propose hypothesis as below:

Hypothesis 4

Perceived Severity have a positive influence on intention towards safety behavior.

2.5. Perceived Barriers and Intention

Perceived barriers refer to the perception of negative aspects towards specific action (Sulat et al., 2018). Glanz et al. (2002) defined perceived barriers as a belief of perceptible and psychological cost an individual have to pay for performing an advised

action related to health condition. According to Taylor et al. (2006), perceived barriers are all the negative aspects an individual have to face in response to an action or overcoming predictive barriers to take an action. In HBM perceived barriers are the factors an individual has to deal with may stop them to perform advised behavior (Chin & Mansori, 2018; Karimi et al., 2016; Stutts, 2002; Sulat et al., 2018; Talsma et al., 2013; Tshuma et al., 2017) As the barriers would be low the individual's intention to perform advised behavior would be increased.

Hypothesis 5

Perceived Barriers are positively related to intention towards safety behavior

2.6. Perceived Benefit and Intention

Perceived benefit means a perception and belief about the efficiency of an advised action to be taken to get the health benefit and reduce the risk associated with the seriousness of health problem (Glanz et al., 2002). Previous studies suggested and clarified that if an individual is confident about the positive returns and benefit, they will get by performing advised behavior the intention to have recommended behavior will be high and the individual will be engaged into that advised behavior (Darvishpour et al., 2018). An advised action is not adoptable until that have some advantages (Maiman & Becker, 1977).

Hypothesis 6

Perceived Benefits are positively related to intention towards safety behavior

2.7. Social Support and Intention

Social support refers to the assistance of other people for an individual. This also refers to the individuals believe on the respect and love receive from the other individuals in the society to have social networks (Jeihooni et al., 2016). In the SCT, social support considered a strong predictor to measure the behavior. Social support is associated with emotional reassurance. Researchers have linked social support with the social well-being and positive and significant health. Some researchers relate social support with stress and fewer related social support with intention for example intention to leave job and origination (Lee, 2004).

Hypothesis 7

social support is positively related to intention towards safety behavior.

2.8. Self-regulation and Intention

Self-regulation antecedent refers emotional and cognitive behavioral strategies for change in behavior based on the important goals of individuals. Few studies have suggested that adoption of self-regulation leads to high the chance of adopting recommended health behavior (Hofmann et al., 2008). Previous studies suggested the relationship between self-regulation and intention is significant, Ahn et al. (2016) suggested that self-regulation is highly linked with exercise adherence intention.

Hypothesis 8

Self-regulation is positively related to intention towards safety behavior.

2.9. Knowledge and Self-efficacy

Knowledge refers to the facts about health-related issues such as HIV preventing knowledge, pandemic prevention (Cornman et al., 2007; Rivet Amico, 2011; Zarani et al., 2012). Information is measured through knowledge, previous studies suggested that knowledge about the health issues help individual to belief oneself for executing suggestive behavior. (Cornman et al., 2007; Osborn & Egede, 2010; Rivet Amico, 2011; Zarani et al., 2012). In the context of pandemic of COVID19 if an individual has knowledge about the health risks and benefit involve with this pandemic, that person will have belief on oneself to perform safety behavior.

Hypothesis 9

knowledge is positively related to self-efficacy.

2.10. Self-efficacy and Behavior

Self-efficacy refers to the individual's belief of executing required behavior (Bandura, 2005). Previously self-efficacy was a construct of Theory of Planned behavior, but it is argued that perceived behavioral control and self-efficacy is exchangeable and directly influenced to behavior (Anderson et al., 2007). Moreover, some researchers suggested that the more powerful predictor of behavior is selfefficacy (Cornman et al., 2007; Esperat et al., 2008; Fleary et al., 2020; Qazi et al., 2020; Sulat et al., 2018; Zarani et al., 2012). In HBM self-efficacy has been recently added. Scholar suggested positive influence of self-efficacy on safety behavior. In COVID-19 context if an individual has belief on oneself for taking all safety measures that individual will intent to have safety behavior.

Hypothesis 10

Self-efficacy is positively related to individual's safety behavior

2.11. Cue to Action and Behavior

Cue to action defined as the different strategies to get ready for taking health action. This includes approaches to accelerate willingness to take action (Glanz et al., 2002). The information and knowledge received from different sources such as news report, friends and family to follow health measures to overcome the risk of health and the strategies to be followed as advised by different resources defines cue of action (Sulat et al., 2018). Previous studies support positive relation of cue to action and health behavior in different context (Chin & Mansori, 2019; Conner, M., & Norman, 2006; Glanz et al., 2002; Maiman & Becker, 1977).

Hypothesis 11

Cues to action is positively related to individual's safety behavior.

2.12. Intention and Behavior

An individual's behavior is measured by the intention. Theory of reasoned action suggests that behavior of an individual is predictable through intention (S. Huang & Chang, 2017). TRA proposed significant relationship between intention and behavior. Rayan & Bonfield (1980) suggested intentions as a predictor and validator to measure actual behavior. It is proposed that if the intention of an individual is stronger to perform behavior, the more likely that individual will execute that behavior (Chin & Mansori, 2018, 2019; Cooke & French, 2008; Shang & Zuo, 2020; Sunmola et al., 2007).

Hypothesis 12

Intention is positively related to individual's safety behavior.

2.13. Mediating role of Intention

Theory of Reasoned Action (TRA) by Martin Fishbein and Icek Ajzen (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) propose that the most essential element of an individual's behavior is that individual's intention to perform the behavior. Most researches suggested that the intention play a mediating role in the relationship of constructs of TRA that are; subjective norms, attitude and behavior (X. Huang et al., 2020; Taylor et al., 2006). The literature showed the mediating role of intention between predictors of HBM, SCT, TRA and behavior. Several studies elucidated the partial and full mediation of intention with construct of these theories and behavior (Abraham et al., 1998; Banerjee & Ho, 2019; Chin & Mansori, 2019; Mafabi et al., 2017)

In the present study we have integrated four behavioral theories: Health Belief Model, Social Cognitive Theory, Theory of reasoned Action and Information Motivation-Behavioral Skills to study the safety behavior. In the relationship of predictors of HBM, TRA & SCT, behavior intention is taken as mediator to predict actual behavior in COVID-19(X. Huang et al., 2020; Sulat et al., 2018; Taylor et al., 2006). Thus, we allied the constructs of HBM (Perceived susceptibility, perceived severity, perceived barrier and perceived benefits), constructs of TRA (Subjective norms, attitude), and predictors of SCT (Social support, self-regulation) to intention towards safety behavior to investigate individual's safety behavior. Thus, we propose following hypothesis to study mediating role of intention to study individual's safety behavior.

2.14. Perceived susceptibility-intention towards safety behavior individuals' safety behavior.

The integration of HBM and TRA suggested the indirect relation between perceived susceptibility and individual's behavior. Perceived susceptibility refers to the perception of the risk associated with the health condition (Sulat et al., 2018). Previous studies have suggested the positive associate of perceived susceptibility and behavior for example if an individual knows the risk of getting flu, this perception of risk will motivate him/her to perform specific behavior (Taylor et al., 2006).

Hypothesis 13

Intention towards safety behavior mediates the relationship between perceived susceptibility and individual's safety behavior.

2.15. Perceived Severity-intention towards safety behavior individuals' safety behavior.

The integration of HBM and TRA suggested the indirect relation between perceived severity and individual's behavior. Perceived severity defined as the seriousness associated with the specific health condition, it's the perception of an individual about the seriousness of a health issue (Sulat et al., 2018). Earlier researches proposed the positive relationship of perceived severity and behavior (Taylor et al., 2006). Scholars suggested that the seriousness stimulus the individual to perform a preventive behavior and intention is a direct dominator of behavior. (Chin & Mansori, 2018; Shang & Zuo, 2020).

Hypothesis 14

Intention towards safety behavior mediates the relationship between perceived severity and individual's safety behavior.

2.16. Perceived Barriers-intention towards safety behavior individuals' safety behavior.

An integration of health belief model and theory of reasoned action proposed the direct connotation of perceived barriers and behavior. Perceived barriers are the obstacle an individual have to face while performing specific behavior (Sulat et al., 2018). In the current study we intent to find out the mediating role of intention in the relationship between perceived barriers and individual's safety behavior.

Hypothesis 15

Intention towards safety behavior mediates the relationship between perceived barriers and individual's safety behavior.

2.17. Perceived Benefits-intention towards safety behavior individuals' safety behavior

Perceived benefits are the outcomes which an individual gets after performing the advised behavior it's the predictor of health belief model, an integration of health belief model and theory of reasoned action suggests conformist association of perceived benefits and behavior (Sulat et al., 2018). Previous researchers suggested that benefits related to the specific behavior supports individual to perform actual behavior which is advised and recommended for the prevention of health issue(Chin & Mansori, 2018; Sulat et al., 2018).

Hypothesis 16

Intention towards safety behavior mediates the relationship between perceived benefits and individual's safety behavior.

2.18. Attitude-intention towards safety behavior-individuals' safety behavior

According to TRA, intention towards behavior links individual's attitude to perform certain behavior (Taylor et al., 2006). This suggests that the association between attitude and behavior may be linked direct or indirect (Torre et al., 2012). The positive valuation of performing preventative behavior makes individual more willing to perform actual safety behavior (Jeihooni et al., 2016) This willingness is a kind of intention towards safety behavior this is also linked with actual safety behavior (Mafabi et al., 2017).

Hypothesis 17

Intention towards safety behavior mediates the relationship between attitude and individual's safety behavior.

2.19. Subjective norms –intention towards safety behavior individuals' safety behavior.

The theory of reasoned action postulates that the normative perceptions and beliefs of individual are connected with the willingness to perform actual behavior. (Cooke & French, 2008; Taylor et al., 2006). Subjective norms are the belief of an individual to perform a certain behavior. Previous researchers prosed that the subject norms act like a pressure for the experts and professionals to espouse the behavior of the peers (Witherspoon et al., 2013). Studies proved that the relationship of subjective norms is strong with the intention (Wu and Zhu's (2012). These researchers further suggested that the normative beliefs are associated with the behavioral intention, which leads to actual behavior. (Cooke & French, 2008; Oni et al., 2017; Taylor et al., 2006).

Hypothesis 18

Intention towards safety behavior mediates the relationship between subjective norms and individual's safety behavior.

2.20. Social Support –intention towards safety behavior individuals' safety behavior

Social support is a strong predictor of behavior in social cognitive theory. Social support is a motivation from friend, family and other social circle to perform behavior. Prior studies determined direct relation of social support and behavior. There are a few researches in relationship of social support and intention in the field of communication and health (Lee, 2004).

Hypothesis 19

Intention towards safety behavior mediates the relationship between social support and individual's safety behavior.

2.21. Self-Regulation –intention towards safety behavior individuals' safety behavior

Self-regulation is also found with the name of self-evaluation and self-monitoring in the prior studies and is a very important indicator of behavior in social cognitive theory. Previous studies suggested the relationship between self-regulation and intention is significant, for example, a study was conducted on the relationship of self-regulation and exercise adherence intention in 2016, that study suggested that self-regulation is highly linked with exercise adherence intention (Ahn et al., 2016).

Hypothesis 20

Intention towards safety behavior mediates the relationship between self-regulation and individual's safety behavior.

2.22. Mediating role of self-efficacy

As the current study is intended to integrate behavioral theories the fourth theory we used, is information-motivation-behavioral skills. In IMB theory information and motivation predict behavior to be adopted. Information apprehends knowledge about COVID-19. Motivation is incorporating the core predictors of TRA (attitude & subjective norms) and behavioral skills denotes self-efficacy. Therefore, the knowledge has the direct relation with behavior and indirect relation with mediation of self-efficacy (Cornman et al., 2007; Fisher et al., 2014).

Hypothesis 21

self-efficacy mediates the relationship between knowledge and individual's safety behavior

3. Theoretical Framework

Figure no.1 illustrates the theoretical framework of the study that is based on integration of theory of reasoned action, IMB, SCT, and HBM.

4. Material And Methods

The data were collected from the students and employees (teaching and non-teaching) of universities. The data was collected from 780 participants out of them 51.5% were male and 48.5% were females. 47.5 % were the students and remaining were teachers. The survey questionnaire was structured in accordance with the constructs itemized in the research hypothesis. It incorporated into two segments; first one has been designed to gather demographic responses from the participants and the second one proposed to measure the variables. The items for this purpose adapted from the extant literature and previously validated empirical studies. A five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree) has been used for all items. The items have been prudently revised in terms of wording in order to ensure its comprehension by the targeted respondents. In order to certify the internal consistency of the scale, Nunnally's (1978) rule of thumb was followed which conditions the cut off value of scale alpha to be at least 0.70.

5. Data Analysis And Results

Data was analyzed by PLS-SEM, this analysis consist of two approaches first is measurement model and the second is structural model. For the assessment of measurement model, internal consistency, convergent validity and discriminant validity was measured. Internal consistency was measured through Cronbach alpha and composite reliability. The threshold for Cronbach alpha is value > 0.70 and not 0.70(Charter, 2000). Convergent validity is the extent to which measures corelates positively with the alterative measures of the same construct. Convergent validity is measured through Average variance extracted (AVE) values. The threshold of AVE values should be > 0.50. The discriminant validity is measured through HTMT criterion, the cutoff value of HTMT is 0.90(Franke & Sarstedt, 2019). If the HTMT ratio is lower than the cutoff value, the

discriminant validity is established. For assessing structural model, five steps assessment was measured, i. collinearity, ii. significance and relevance, iii. coefficient of determination (R2), iv. effect size (f2), v. Predictive relevance Q2 effect size.

5.1. Assessment of measurement model

Reliability and validity analysis were performed for all latent variables. The results of the current study showed that the composite reliability of all the variables are in range between 0.799 to 0.937. This Showed that the internal consistency of all the latent variables is high as the composite reliability acceptable rage is greater than 0.70 as per recommendations of Arnols and Reynolds (2003). Next, the convergent Validity of all latent variables was measure. Convergent validity can be used to test the correlation between observed variables of same variable. To find the convergent validity, Average Variance Extracted (AVE) is used. The findings showed that the AVE values between 0.579−0.876. This showed that the Convergent validity is in range that is higher than 0.50 threshold (Fornell & Larcker, 1981).

Table 1
Reliability and validity analysis

Variables	Cronbach Alpha	Composite Reliability	Average Variance Extracted (AVE)
Attitude	0.862	0.906	0.707
Cue to Action	0.645	0.799	0.579
Intention towards safety behavior	0.884	0.928	0.812
Knowledge	0.871	0.901	0.645
Perceived Barriers	0.908	0.932	0.734
Perceived Benefits	0.872	0.904	0.616
Perceived Severity	0.865	0.908	0.712
Perceived Susceptibility	0.924	0.937	0.653
Safety Behavior	0.907	0.931	0.730
Self-regulation	0.883	0.914	0.680
Self-Efficacy	0.859	0.934	0.876
Subjective norms	0.872	0.912	0.723
Social Support	0.838	0.903	0.756

Discriminant Validity was measured using Hetero-Trait Mono-Trait (HTMT) ratio. Franke and Sarstedt (2019) recommended two cutoff values which are HTMT 0.90, the more lenient criteria and HTMT 0.85, this is stricter criteria. This study used the first criteria i.e. HTMT 0.90, if the HTMT rations of all latent variables are less than 0.90 than we can deem that the discriminant validity was established. The results showed that the all the ratios are lower than 0.90 thus, confirming our measures were distinct.

Table 2
HTMT ratio

	Att	CTA	INT	KNW	PBr	PBe	PSe	PSU	Beh	SR	SE	SN	SS
Att	0.841												
CTA	0.620	0.761											
INT	0.733	0.591	0.880										
KNW	0.100	0.107	0.106	0.803									
PBr	0.082	0.063	0.048	0.055	0.857								
PBe	0.684	0.623	0.652	0.096	0.059	0.785							
PSe	0.621	0.601	0.607	0.165	0.043	0.682	0.844						
PSU	0.071	0.111	0.155	0.192	0.059	0.076	0.089	0.808					
Beh	0.751	0.640	0.839	0.129	0.043	0.693	0.634	0.160	0.854				
SR	0.474	0.389	0.577	0.127	0.040	0.404	0.393	0.184	0.574	0.825			
SE	0.667	0.644	0.613	0.095	0.055	0.700	0.557	0.081	0.656	0.386	0.889		
SN	0.734	0.663	0.726	0.098	0.042	0.718	0.644	0.112	0.762	0.456	0.683	0.850	
SS	0.665	0.536	0.658	0.050	0.062	0.613	0.548	0.067	0.697	0.388	0.588	0.694	0.869

5.2. Assessment of structural model

After completing the measurement model assessment by establishing reliability and validity, the next step is to assess the structural model. For assessing structural model, five steps assessment was measured. Collinearity is checked before moving to test the hypothesis. For the purpose of checking collinearity Variance Inflation Factor (VIF) was calculated for all items of each variable. The results showed that there is no collinearity issues exits, all the VIF values are below the threshold 5 (Hair et al., 2014), the results are shown in the below Table 3.

Table 3
VIF values

Behavior	INT	Beh	SE
Att	2.785		
CTA		1.911	
INT		1.790	
KNW			1.000
PBr	1.012		
PBe	2.677		
PSe	2.143		
PPSU	1.043		
SR	1.379		
SE		1.989	
SN	3.132		
SS	2.200		

The f2 effect size was measured to predict change in R2, it is the quantitative degree to measure a particular effect. The larger effect size denotes the stronger relation of two variables. Values of effect size 0.02, 0.15,0.35 are defined as small, medium and large effect size respectively (Hair et al., 2014). The results showed small to large effect size i.e.0.035 to o.944. The small effect size was observed in the relationship of social support and intention towards safety behavior. The large effect size is in the relation between intention towards safety behavior and safety behavior that is 0.944.

The results showed that the variation in intention towards safety behavior is 0.684 (R2) due to the independent variables (i.e. perceived susceptibility, perceived severity, perceived barrier, perceived benefits, subject norms, attitude, self-regulation, social support). The variation in Safety behavior is 0.749 (R2) and self-efficacy variation is 0.090(R2) due to knowledge. Therefore, the value of R2 of intention towards safety behavior is moderate, the value of R2 of self-efficacy is weak and the value of R2 of safety behavior is stronger. R2 values are shown in Table 4.

Table 4
coefficient of determination

Constructs	coefficient of determination (R^2)
Intention towards safety behavior	0.684
Safety Behavior	0.749
Self-Efficacy	0.090

5.3. Hypothesis testing

For the assessment of measurement model, outer loading, internal consistency, convergent validity and discriminant validity were checked. Concomitantly, structural model assessment was calculated through five steps i.e. collinearity analysis, hypothesis testing, R2, f2 and Q2 test. The results showed that direct relationships of H1, H2, H3, H4, H6, H7, H8, H9, H10, H11, H12 are significant positive and direct relationship of H5 (perceived barriers and intention towards safety behavior) is insignificant negative thus, H1, H2, H3, H4, H6, H7, H8, H9, H10, H11, H12 are supported while, H5 is not supported. The indirect

effect of H11, H12, H13, H14, H16, H17, H18, H19, H20 and H21 were significant while the H15 was insignificant. Thus, the mediating effect is existing in H11, H12, H13, H14, H16, H17, H18, H19, H20 and H21 so, these hypotheses are supported while, H15 is not supported.

Table 5
Hypotheses testing

Hypotheses	βValue	T Value	P Values	f-square	LLCI	UPCI
Subjective norms → Intention towards safety behavior	0.213	4.255	0.000	0.288	0.227	0.35
Attitude → Intention towards safety behavior	0.261	6.337	0.000	0.153	0.101	0.207
Perceived Susceptibility → Intention towards safety behavior	0.052	2.640	0.004	0.652	0.6	0.701
Perceived Severity → Intention towards safety behavior	0.077	2.115	0.017	0.095	0.081	0.128
Perceived Barriers→ Intention towards safety behavior	-0.020	0.862	0.195	0.085	0.027	0.158
Perceived Benefits → Intention towards safety behavior	0.079	2.049	0.021	0.015	0.07	0.011
Social Support → Intention towards safety behavior	0.157	4.164	0.000	0.07	0.007	0.138
Self-regulation → Intention towards safety behavior	0.225	6.846	0.000	0.158	0.104	0.205
Knowledge→ Self-Efficacy	0.095	2.440	0.008	0.204	0.123	0.284
Self-Efficacy → Safety Behavior	0.158	4.870	0.000	0.226	0.178	0.289
Cue to Action → Safety Behavior	0.153	4.498	0.000	0.151	0.085	0.21
Intention towards safety behavior → Safety Behavior	0.652	2.024	0.000	0.188	0.146	0.228
Perceived Susceptibility → Intention towards safety behavior → Safety behavior	0.034	2.603	0.005	0.055	0.019	0.1
Perceived Severity → Intention towards safety behavior→ Safety behavior	0.050	2.056	0.020	0.01	0.045	0.007
Perceived Barriers→ Intention towards safety behavior→ Safety behavior	-0.013	0.864	0.194	0.046	0.004	0.091
Perceived Benefits → Intention towards safety behavior→ Safety behavior	0.051	2.091	0.019	0.133	0.079	0.188
Attitude → Intention towards safety behavior→ Safety behavior	0.170	6.271	0.000	0.147	0.116	0.189
Subjective norms → Intention towards safety behavior→ Safety behavior	0.139	4.100	0.000	0.098	0.055	0.137
Social Support → Intention towards safety behavior→ Safety behavior	0.102	4.035	0.000	0.03	0.009	0.052
Self-regulation → Intention towards safety behavior→ Safety behavior	0.147	6.629	0.000	0.015	0.006	0.023
Knowledge→ Self-Efficacy→ Safety behavior	0.015	2.180	0.018	0.188	0.146	0.228

5.4. PLS Predict

Shmueli et al. (2019) proposed PLS predict, to measure the out of sample prediction power of a model by using PLS Predict with a 10-fold procedure to check for predictive relevance. The Q2 value less than zero or zero suggests no prediction power. Table 6 given below suggests the high predation power as PLS errors < LM and Q2 values are higher than zero suggesting good out of sample prediction power of model.

Table 6
PLS predict

	PLS			LM			PLS-LM		
	RMSE	MAE	Q²_predict	RMSE	MAE	Q²_predict	RMSE	MAE	Q²_predict
INT2	0.524	0.401	0.645	0.557	0.432	0.599	-0.033	-0.031	0.046
INT1	0.613	0.483	0.538	0.642	0.501	0.493	-0.029	-0.018	0.045
INT3	0.577	0.438	0.591	0.611	0.472	0.542	-0.034	-0.035	0.049
Beh2	0.536	0.412	0.674	0.618	0.495	0.566	-0.083	-0.082	0.108
Beh 1	0.655	0.490	0.552	0.752	0.578	0.409	-0.097	-0.088	0.143
Beh 4	0.582	0.464	0.566	0.600	0.482	0.539	-0.018	-0.019	0.027
Beh5	0.631	0.502	0.499	0.646	0.522	0.474	-0.016	-0.021	0.025
Beh3	0.607	0.453	0.609	0.684	0.527	0.503	-0.077	-0.073	0.106
SE 1	0.696	0.519	0.456	0.942	0.780	0.002	-0.246	-0.261	0.453
SE2	0.659	0.495	0.566	0.997	0.815	0.006	-0.339	-0.320	0.560

6. Discussion

The aim of the current study is to analyze the individuals' safety behavior during the global pandemic of COVID-19 by integrating health belief model (HBM) and other behavioral theories i.e. Theory of reasoned action (TRA), social cognitive theory (SCT) and information-motivation-behavioral skills (IMB). The previous studies show the health behavior by integrating one theory with the Health belief model such as, Cochran & Mays (1993), study health behavior by using TRA with HBM. Similarly, scholars studied behaviors by using SCT & HBM, IMB with HBM (Fisher et al., 2014; Jeihooni et al., 2016). The outcomes results for SN are directly supporting the outcomes of previous studies (Chin & Mansori, 2018, 2019; Cooke & French, 2008; Mafabi et al., 2017; Saqlain et al., n.d.; Wang et al., 2019) which had suggested that attitude as a psychological emotion transmitted through individual's valuation and if it is positive that leads to more positive behavioral intention. Prior researches also suggested that on health behavior there is significant influence of attitude and intention towards health behavior(Banerjee & Ho, 2019; Chin & Mansori, 2018; Cooke & French, 2008; Hardeman et al., 2005). Perceived susceptibility was explored to be positively related to intention towards safety behavior (Darvishpour et al., 2018). The studies also support the indirect link of perceived susceptibility, intention and behaviors (Carico et al., 2020; X. Huang et al., 2020; Sulat et al., 2018). The health behavior intention and perceived susceptibility are highly linked with each other and perceived susceptibility positively influence behavioral intention. (Rahman et al., 2018).

The prior researches suggested the positive relation of perceived severity and intention and mediation of intention in the relationship between perceived severity and safety behavior (X. Huang et al., 2020; Jeihooni et al., 2016; Karimi et al., 2016; Sulat et al., 2018). Previous studies suggested that health behavior intention and perceived severity are significantly related with each other and perceived severity positively influence behavioral intention (Rahman et al., 2018; Dodel & Mesch 2017) proposed that belief in the health seriousness of any health, help an individual to increase tendency towards safety behavior to minimize the risk of negative health conditions (Carico et al., 2020; Darvishpour et al., 2018; Qazi et al., 2020; Rahman et al., 2018). The negative relationship between perceived barriers and intention was observed which may be the outcome of obstructions in performing in a certain way (Tweneboah-Koduah, 2018). In COVID-19 pandemic preventing behavior such as following the SOPs has created stress and anxiety among the students and staff (teaching and non-teaching), mental stress and distress created obstacle to follow the safety behaviors (Karimi et al., 2016; Kleczkowski et al., 2015; Talsma et al., 2013).

Perceived benefits are positively related to intentions towards safety behavior. The results revealed the same as aligned with the previous studies (Alves & Wagner Mainardes, 2017; Karimi et al., 2016; Shang & Zuo, 2020; Stutts, 2002; Sulat et al., 2018; Carico et al., 2020). Accordingly, these benefits motivate individuals positively due to which their intention to follow safety behavior would increase. As demonstrated by the results of the current study. Social support has a positive direct relation with intention towards safety behavior and intention towards safety behavior mediates the relationship of social support and safety behavior. The findings are in line with the prior studies (Anderson et al., 2006, 2007; Chen & Wang, 2002; Keller et al., 1999; Osborn & Egede, 2010; van der Heijden et al., 2010).

As self-regulation is linked with adoption intention, present study also proved these results. Indirect relationship through individual's intentions to adopt between self-regulation and actual safety behaviour was tested and results revealed that intention to adopt significantly mediates this relation. Individuals with higher intentions are more likely to involved in actual behaviour. These results are in line with prior study results (Ahn et al., 2016). The results for knowledge indicate that knowledge play important role in individual safety behavior adoption. If an individual has knowledge about the health risks and benefit involve with this pandemic, that person will have belief on oneself to perform safety behavior. These results are also proved by previous scholars (Cornman et al., 2007; Osborn & Egede, 2010; Rivet Amico, 2011; Zarani et al., 2012).

Upshot of study revealed that self-efficacy has significant influence on safety behavior which indicates that In, COVID-19 context if an individual has belief on oneself for taking all safety measures that individual will intent to have safety behavior. These results are also proved by previous scholars (Cornman et al., 2007; Esperat et al., 2008; Fleary et al., 2020; Qazi et al., 2020; Sulat et al., 2018; Zarani et al., 2012). A positive relation between cues to action and individual's safety behaviour is proved by previous study (Chin & Mansori, 2019). Present study further signifies and verified these results. Intentions of safety behaviour leads to individual's safety behaviour. Behaviour is measured by intentions as suggested by theory of reasoned action (Huang & Chang, 2017). These results are signifies by present study and confirmed by previous scholars (Chin & Mansori, 2018, 2019; Cooke & French, 2008; Shang & Zuo, 2020; Sunmola et al., 2007). Indirect relation of knowledge with individual's safety behaviour through self-efficacy was also supported by previous scholars (Cornman et al., 2007; Fisher et al., 2014) and also supported by present study.

7. Theoretical And Practical Implications

Initially, the study contributes to the theory by postulating the structural integration of different theories. It will add up to the existing literature by providing new acumens into the research arena. Through addition and elimination of theories and constructs different aspects of COVID-19 can be studied. It will contribute to the literature by understanding about the pandemic outbreak in fields of marketing. The theoretical integration will make additions in the academia by identifying the importance of health belief model in combination of different social theories. Generally, the HBM used in the study was found to be obliging in envisaging the safety behavior of people in the pandemic situation further enhancing the existing literature by providing fresh acumens into the investigation arena, showing that how different theories can be collectively studied with health belief model.

Practically this study highlights the individual's behavior related to COVID-19 pandemic. It indicates change in behavior that is adopted by individuals to avoid the viral disease. It helps to understand the Government and policy makers that how to influence and motivate the individuals to adopt safety behavior Communities collectively can defeat the virus by observing the safety behavior, therefore, policies and strategies can be designed to overcome the worst effects of COVID-19 pandemic. Moreover, the study can be helpful for the marketers as it aids in recognizing motivators and deterrence of intentions to adopt safety behavior. It will assist them to design their marketing plans in a way that it motivates individuals towards safety behavior. Study evaluates the role of safety behavior including personal hygiene, quarantine and social distancing. Furthermore, it contributes as communication guideline for individuals to follow safety behaviors which will limit the spread of COVID-19.

8. Limitations And Future Directions

Firstly, the study lacks in generalizability and it undertakes only one country i.e. Pakistan, therefore, in future studies can be conducted on different countries, even though comparative studies can also be conducted. Secondly, data was collected through cross sectional and online survey method, therefore longitudinal study can be applied for analyzing constructs in more detail. Furthermore, for detailed analyses study should be divided on bases of demographic segmentation i.e. segments with higher education level, age etc. Future researches might be conducted by adding other powerful moderating factors e.g. environmental concern etc. as nowadays, people are more concerned about environmental changes caused by COVID-19. Similarly, some of variables or theories can be eliminated so that behavioral aspect can be studied in different contexts. Knowledge, social norms, culture, and values can be added as mediators that can develop Intention toward safety behavior. In addition, future researchers may collect data by using different sources of data collection e.g. mall intercepts, self-administered questionnaires.

9. Conclusion

Integration of different theories enhances the novelty of the study, as it proposes to study the behavioral aspect of global pandemic of COVID-19. The study incorporated a mix of five behavioral theories i.e. Health Belief Model (HBM), Theory of Reasoned Action (TRA), Social Cognitive Theory (SCT), and Information-Motivation-Behavioral Skill Model (IMB). In general terms, the growing impact of corona virus in terms of different forms of crises, behavioral aspect is evidenced in the changing lifestyles of people, therefore the thesis studies the drivers of intention and behavioral change. On the other hand, it studies the direct impact of cues to action and perceived self-efficacy on the actual safety behavior. However, it can clearly be observed that the study is the need of time and it contributes to both research and practice as discussed earlier.

Declarations

Statement of Ethics

It is stated that for the manuscript titled "Antecedents of individual safety behavior during the pandemic times" we assure that:
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1) This material is the authors' own original work, which has not been previously published elsewhere.

2) The paper is not currently being considered for publication elsewhere.

3) The paper reflects the authors' own research and analysis in a truthful and complete manner.

4) The paper properly credits the meaningful contributions of co-authors and co-researchers.

5) The results are appropriately placed in the context of prior and existing research.

6) All sources used are properly disclosed (correct citation). Literally copying of text must be indicated as such by using quotation marks and giving proper reference.

7) All authors have been personally and actively involved in substantial work leading to the paper and will take public responsibility for its content.

Consent for publication

Not applicable

Availability of data and material

The datasets during and/or analysed during the current study available from the corresponding author on reasonable request.

Competing interests

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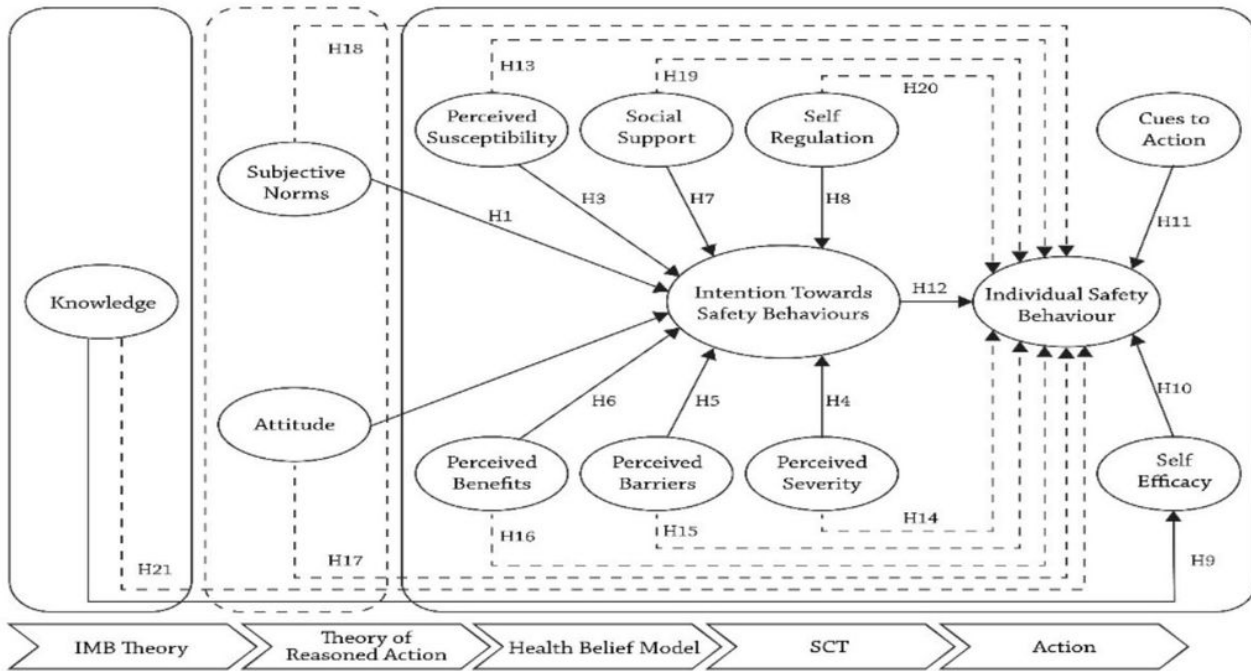
Figures

Figure 1

Figure 1

Figure no.1 illustrates the theoretical framework of the study that is based on integration of theory of reasoned action, IMB, SCT, and HBM.