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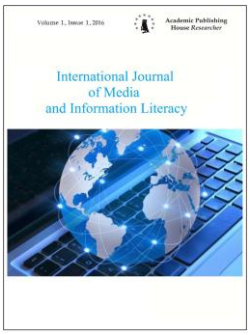

Susceptibility Awareness Via Media Platforms is the Key for Curbing the Spread of COVID-19 Infections: Evidence from the Health Belief Model Perspective

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Abstract

Since the outbreak of Covid-19 in Nigeria, efforts are made by the government, especially the Nigeria Center for Disease Control (NCDC) towards curbing its spread. Daily updates on new cases and deaths are proving that the efforts so far made toward curtailing the virus have not been effective. Employing the Health Belief Model approach, the study through the quantitative method evaluated the impact of perceived susceptibility on self-efficacy and perceived severity toward cues to action in curbing the spread of Covid-19 infections in Nigeria. Key findings showed that only 12.4 % of the respondents had a high level of Covid-19 susceptibility. Moreover, the two independent variables were able to contribute small and medium variance effect sizes on perceived susceptibility and cues to action. Perceived susceptibility also had partial mediation effects on the relationships between self-efficacy, perceived severity, and cues to action respectively. Therefore, it is recommended that the levels of Nigerians' Covid-19 perceived susceptibilities need to be raised to strengthen the effectiveness of self-efficacy and perceived severity for cues to action toward curbing the spread of the Covid-19 infections in the country. This study further contributed to the domain of cognitive behaviors and health information literacy strategies for curbing infectious diseases.

Keywords: COVID-19, Nigeria, health information literacy, mediating effect, self-efficacy, media health literacy.

1. Introduction

Health literacy is vital in curbing transmittable diseases, especially in this critical moment the world is facing the menace of Covid-19. Therefore, there is a need to enlighten the public through salient social media platforms to embrace behavioral factors that may reduce the spread of Covid-19 infections. Covid-19 is a coronavirus disease that began in 2019. It is one of the novel pneumonia contagious diseases belonging to a bigger family of positive-strand of Ribonucleic Acid (RNA) viruses, namely Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) (Raoult et al., 2020). Evidence showed that the virus emanated from Wuhan city in the Hubei Province of China from December 2019 and subsequently spread within the whole of Hubei Province and other China's provinces as an epidemic (Zhue et al., 2020). It was later declared a pandemic by the World Health Organization (WHO) on March 11, 2020, because of the rapid and continuous escalation of the cases of COVID-19 in 114 countries (then) and across all the continents (Star Health Report, 2020).

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Evidence shows that the etymology of COVID-19 began in late December 2019, when some of China's local health services reported a group of patients who had pneumonia cases of unfamiliar causes that were later attributed to a seafood and pet animal public market in the city of Wuhan, Hubei Province, China (Mackenzie, Smith, 2020). Consequently, a collaboration of the Chinese Center for Disease Control and Prevention (China CDC), Hubei Provincial authority, and Wuhan health authority was deployed to conduct epidemiologic and etiologic investigations. Their study eventually identified the roots of the pneumonia-like infection to a new strain of Coronavirus, which was named Coronavirus Disease in 2019 and medically termed COVID-19 (Clustering..., 2019). As of the time of this study, COVID-19 has spread across 215 countries and territories and has so far infected 17,498,822 and universally caused 677,165 deaths, with 10,956,381 recoveries (Worldometers 30th of July, 2020).

However, since the outbreak of the novel Coronavirus in China in late December 2019 and other parts of the world from January 2020, the impact of the virus infection was never felt in Africa until in early February 2020 when it was first identified in Egypt and, subsequently, the second case was recorded in Algeria on February 17, 2020 (WHO, 2020). At present, statistics have shown that Africa has 874,638 confirmed COVID-19 cases, 18,512 deaths, and 524,835 recoveries (Coronavirus African Summary, 30th, July 2020).

Nigeria, the location of this study, witnessed its first case on February 27, 2020, from an Italian man who returned to the country from his trip to his home country (Nigerian..., 2020) and has currently recorded 42, 689 confirmed cases, 19,270 recovered cases and 878 deaths (Nigeria Center for Disease Control, 30th July 2020). Since then, the country's health sectors and the Nigeria Center for Disease Control (NCDC) have been emphasizing the need for observing the universally approved preventive measures to curtail the spread of the virus. Some of these measures include frequently washing hands with soap, wearing face masks, the use of hand sanitizers, restrictions on public gatherings and social events, etc. (Nkengasong, Mankoula, 2020).

Because Covid-19 is a novel disease, available literature from the Nigerian context appeared to focus on descriptive studies. Hence, there is a theoretical gap that needs to be filled. Besides, since the efforts made by NCDC and other international aid agencies and non-governmental organizations toward curtailing the spread of the virus have failed to yield the expected results within the shortest possible time as achieved in some African countries (e.g., Madagascar and Senegal) (African Arguments, 30th August 2020). Thus, this study aims to explore the Health Belief Model (HBM) theoretical perspective to evaluate the applicability of the model's variables toward explaining health behaviors capable of helping in minimizing a further spread of COVID-19 infection. Hence, the study was guided by the following objectives:

1. To determine the levels of perceived susceptibility to COVID-19 among Nigerians.
2. To determine the individual contributions of self-efficacy and perceived severity on perceived susceptibility and cues to action toward curbing the spread of Covid-19 among Nigerians.
3. To determine the mediating effect of perceived susceptibility on the relationship between self-efficacy and cues to action toward curbing the spread of COVID-19 among Nigerians.
4. To determine the mediating effect of perceived on the relationship between perceived severity and cues to action toward curbing the spread of COVID-19 among Nigerians.

2. Materials and methods

The key materials for this study were the previously published media studies and health-related articles and archives. This study employed the health belief model to ascertain the behavioral health factors that would induce the public to embrace health literacy for curbing the spread of Covid-19 infections. The quantitative method was applied for the aim of hypothesizing the impact of the health behaviors in curbing the spread of Covid-19 infections. Consequently, Statistical Package for the Social Sciences (SPSS) was used and analyzed the descriptive studies' part while Structural Equation Modeling (SEM-AMOS) and parametric statistics were applied in the inferential analyses part because the data was found to be normally distributed. However, the 3 stages of (SEM-AMOS) analyses which comprised Confirmatory Factory Analysis (CFA), measurement, and structural model analyses were previously run to ascertain if the models fulfilled the goodness of fit indices criteria. Thus, the outcomes of the analyses proved they all satisfied the criteria. In terms of the sample size used for the study, R.V. Krejcie and D.W. Morgan (Krejcie, Morgan, 1970) sampling technique was utilized to determine the sample size of the study from the

targeted population of 205, 649,180 Nigerian estimated population (Nigerian population, May 2020). Thus, the 384 sample size was determined out of the targeted population. The sample was subsequently increased by 17 % with the addition of 66 respondents, thus yielding a larger sample of 450 to comply with the statistical principle which requires a larger sample size to decrease errors and enhances results (Maleske, 1995). The research instrument was administered to 450 respondents online. However, only 388 were filled and returned. Accidental/convenience sampling was used to share the link to the e-questionnaire through social media contacts. Regarding the survey used in measuring the study's variables, the questions were adapted from (Mohamed et al., 2019; Soleymanianet al., 2014; Wang et al., 2016). Nonetheless, self-efficacy and perceived severity were the independent variables, perceived susceptibility was the mediating variable while cues to action were the dependent variable.

3. Discussion

Media platforms are indispensable for disseminating health research findings, especially in this digital age that people easily get across to any content uploaded on social media. Therefore, to curtail the spread of Covid-19 infections, social media platforms such as twitter, need to be maximized for propagating the scientific health-related-findings across to the targeted audience; because the medium has been identified as one of the populated media for such information (Kimmons, et al. 2018). Similarly, Social media is deemed as one of the valuable sources for promoting health literacy awareness, this is because social media users tend to quickly dispatch a piece of important health information to their acquaintances who do not have access to social media. Therefore, social media also enhances social interactions outside the media (Hall, 2018). R. Fletcher and R.K Nielsen (Fletcher, Nielsen, 2018) further augmented the impact of media by establishing that, it provides opportunities for the users to accidentally get exposed to news, especially the young ones who were not inclined to read news through social media. Thus, dispatching health research findings on Covid-19 relate-issues through social media may accidentally instigate the users to embrace behavioral factors that might help to reduce the spread of the virus.

A subsequent study by K. Quinn (Quinn, 2018) also conceptualized a correlation between social media usage and inhibitory regulation. Consequently, the study demonstrated that the use of social media did not only have an influence on cognitive functioning but also helps older adults on information regarding preventive control. Therefore, spreading health literacy information that may assist in curbing the spread of Covid-19 infections, could help to inspire older adults' social media users to adopt the factors. A. Oeldorf-Hirsch (Oeldorf-Hirsch, 2018) also identified that the aim of establishing social media was not just for knowledge gain but for the capability of engaging users who will passively consume news content without the intention of doing so. The scholar similarly demonstrated that social media such as Facebook and twitter were greater avenues for getting people engaged in current affairs. Therefore, it is expected that engaging the masses on health research findings through these two platforms would make a great impact in curbing the spread of Covid-19 infections.

However, embracing datafication on social media calls for deconstructing of the contents since numerous data on the Covid-19 pandemic are flaunted on the web. Thus, absorbing data on health literacy from social media requires ascertaining the ethical justification of the source (Couldry, Yu, 2018). Hence, news literacy is a prerequisite to engrossing information through media (Vraga, Tully, 2019). This could also be extended to other internet users who are not familiar with media literacy (Tully, Vraga, 2017). In line with this, G. Dworznik (Dworznik, 2016) emphasized the need to examine the contents of social media and waiting for the information to be fully divulged before ascertaining the authenticity.

Furthermore, enlightenment on how to curb the spread of Covid-19 infections cannot be limited to the social media domain. It is also essential to get the targeted audience engaged in health related-research findings through television. This is because the audience dynamism to media data could be influenced by the media culture, the statuesque of the platforms, and the particular media companies' strategies (Moe et al., 2016). G. Doyle (Doyle, 2018) also proposed that television could serve as a better avenue for reaching a larger audience if it is configured and res-structured in such a way that it could be used for propagating health related-findings for socio-cultural behavioral changes in curbing the spread of Covid-19 virus.

Thus, to intensify the curb of Covid-19 infections, this study conceptualizes health behavioral factors that could help in curbing the spread of Covid-19 infections by adopting the Health Belief Model's concepts. However, before reviewing the literature on studies that applied these HBM's concepts, it is essential to define them. Perceived susceptibility is the possibility of believing that one could contract contagious diseases that are perceived detriment to ones' health. In other words, it implies perceiving first that contracting contagious disease will endanger one's health and that requires the need to take all precautionary actions to control it. Whilst perceived severity is the belief of how dreadful contagious diseases are and the effects of contracting them. Self-efficacy is the belief of one's ability to effectively implement all the necessary actions that would prevent one from contracting the diseases. Cues to action, the last concept, is engaging in the event, programs, and experience that will propel one into taking actions. Therefore, cues to action are when individuals see the need of taking essential actions after believing that they are capable of doing so (Groenewold et al, 2006; Resource Center, 2007).

About these behavioral concepts, A.K. Jeihooni et al. (Jeihooni et al., 2019) found that perceived susceptibility, perceived severity, and self-efficacy had significant effects on cues to action toward encouraging precautionary behaviors for nosocomial contagions. Contrarily, A.K. Jeihooni et al (Jeihooni et al., 2018) through a quasi-experimental study, found no significant influence of perceived susceptibility, severity, self-efficacy, and cues to action toward applying oral cancer preventive measures after having controlled the respondents. Whilst B. Yu (Yu et al., 2020) established that self-efficacy mediated the effects of perceived benefits and barriers toward sticking to heroin-dependence among patients undertaking methadone addiction treatments. However M. Kamal et al. *(*Kamal et al., 2017) found positive significant effects of knowledge, self-efficacy, perceived susceptibility, severity, and benefits on hygienic cues to action among the mothers of hospitalized children; nonetheless, the perceived barrier had a negative significant effect on cues to hygienic actions.

A study has shown that self-efficacy and perceived risk jointly mediated the relationships between predicted intentions, planning and action controls toward wearing of face mask for health behavioral changes and that women that have ever been screened for cervical cancer showed greater significant perceive benefits, self-efficacies, perceived threats, and net benefits which made them engaged in preventive actions than women who have never had cervical cancer screening before (Zhou, 2015). In other words, prior screening experience motivated more women into taking preventative actions than women that have never undergone screening.

A. Gamma (Gamma, 2019) reported from the doctoral thesis that risky perceptions, perceived severities, factual knowledge, response beliefs, and self-efficacy were the main predictors that prevented the respondents from touching people who were suffering from the Ebola outbreak. Furthermore, research has also shown that risk perceptions had mediating effects on the relationships between mass media exposure and the intentions to partake in social and economic events at the time of the Middle East Respiratory Syndrome (MERS) outbreak in South Korean, which implies that public health vulnerability perceptions made the public to dissociate from all social and economic activities (Choi et al. 2018).

Based on the previous discussions, the current study derived the following hypotheses:

H1: Perceived susceptibility has a mediating effect on the relationships between self-efficacy and cues to action in curbing the spread of COVID-19 among Nigerians.

H2: Perceived susceptibility has a mediating effect on the relationships between perceived severity and cues to action in curbing the spread of COVID-19 among Nigerians.

In line with the previous Health belief Model related studies' reviews, the conceptual framework in Figure 1 was developed.

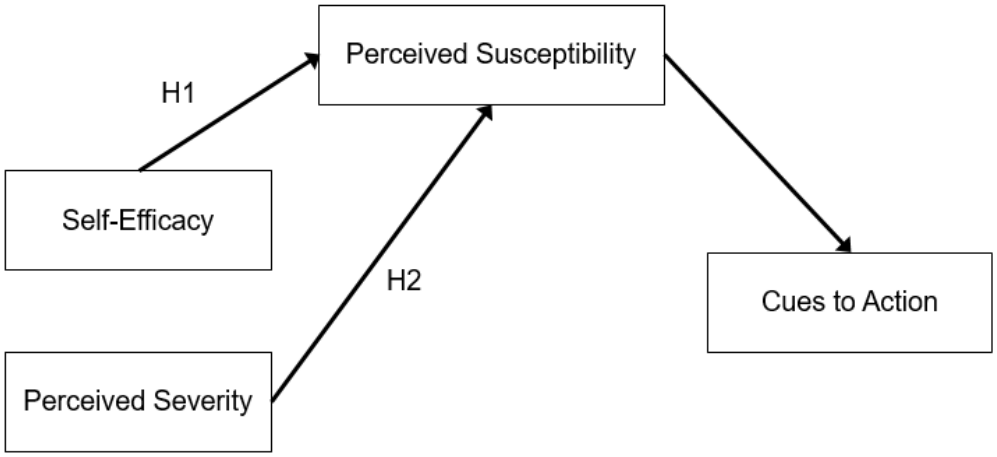

Fig. 1. Conceptual Framework

4. Results

The findings of the four objectives of the study and the demographic factors of 388 respondents were discussed here. Table 1 on the profile analyses of respondents showed that that (57.2 %) of them were men and this represented more than half of the respondents that participated in the study. Regarding their age bracket, (45.4 %) of the respondents' age fell between 31 and 40 years and this amounted to less than half of the study's respondents. The profile analyses also illustrated that (28.6 %) of the respondents' ethnicity was from Igbo and this represented less than the one-third of the respondents. In terms of the marital status of the respondents, it presented that (57.2 %) of them were married. In other words, more than half of them that participated in the study were married. Finally, the respondents' highest academic qualification demonstrated that (36.6 %) of them had a bachelor's degree and this represented more one-third of them.

Table 1. Academic Staff Descriptive Profile (n=388)

Profile	Frequency	Percentage (%)
Gender		
Male	222	57.2
Female	166	42.8
Age		
<20	10	2.6
20-30	95	24.5
31-40	176	45.4
41-50	81	20.9
>51	26	6.6
Ethnicity		
Hausa	89	22.9
Igbo	111	28.6
Yoruba	83	21.4
Others	105	27.1
Marital Status		
Married	222	57.2
Single	166	42.8
Highest Academic Qualification		
Bachelors	142	36.6
Masters	124	32.0
PhD	86	22.2
Others	36	9.2

Objective 1: Levels of Covid-19 Perceived Susceptibility among Nigerians.

Table 2 on the levels of the respondents' Covid-19 perceived susceptibility showed that (46.6 %) of the respondents' Covid-19 infection perceived susceptibility level was moderate and this indicated more than half of them. It also presented (41.0 %) of them had a low Covid-19 perceived susceptibility and this represented more than one one-third of them. While only (12.4 %) of them had a high level of Covid-19 perceived susceptibility. In other words, the majority of the respondents were not having a high level of Covid-19 infection perceived susceptibility. Therefore, this paper suggests that Nigerians' levels of Covid-19 infection perceived susceptibility need to be enhanced toward minimizing the spread of the virus in the country. These findings, however, contradicted V.O Dunleavy et al. (Dunleavy et al., 2019), who established that the respondents have a high level of perceived susceptibility toward preventing the spread of HIV as one of the contagious viruses. Nonetheless, the context of the study differed from ours.

Table 2. Descriptive Results of the Respondents' Levels of the Perceived

Susceptibility to COVID-19 (n=388)

Levels of COVID-19 Perceived Susceptibility	Frequency	Percentage (%)
Low (3-6)	159	41.0
Moderate (7-10)	181	46.6
High (11 and above)	48	12.4

Objective 2: The individual contributions of self-efficacy and perceived severity on the perceived susceptibility and cues to action.

Objective 2 was realized from the structural equation model in SEM-AMOS. Before this, the researchers ascertained that both the measurement and structural models fitted the data by ensuring that their outcomes respectively met up with at least one goodness of fit index from absolute, incremental, and parsimonious fit indices as showed in Figure 2. The findings on the individual contributions of the two independent variables on the perceived susceptibility and cues to action were subsequently presented in two tables. However, Figure 2 below was the analysis of the fit indices where the further findings were generated.

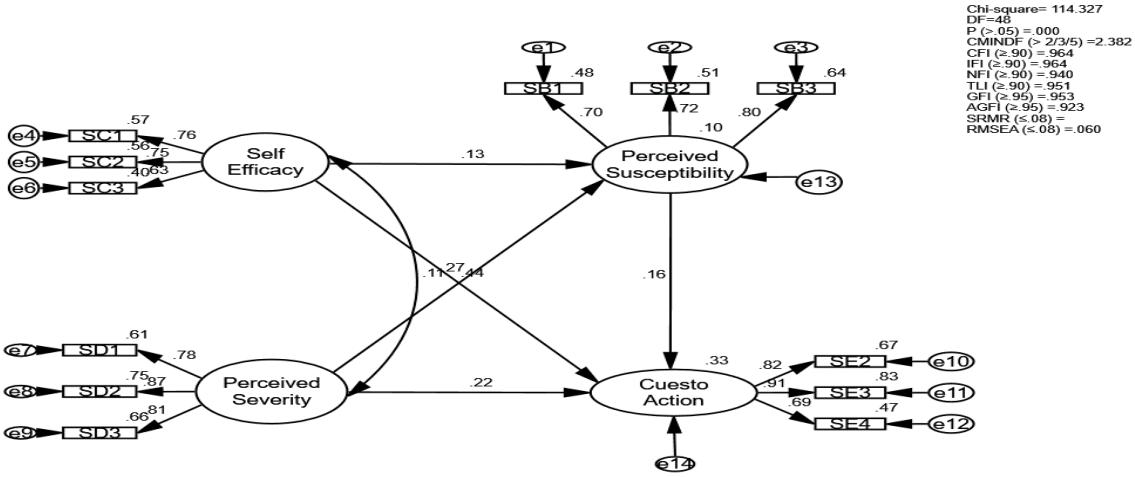

Fig. 2. SEM-AMOS Structural Model

Consequently, Tables 3 and 4 showed the individual causal paths' contributions of self-efficacy, and perceived severity on perceived susceptibility; and cues to action. The outcomes in table 3 showed that self-efficacy and perceived severity were able to explain (9.5 %) of the variance in perceived susceptibility (as the mediating variable). However, perceived severity contributed

most to perceived susceptibility. Whilst, Table 4 established that the two independent variables were able to explain (32.9 %) of the variance in cues to action (as the dependent variable). Nevertheless, self-efficacy contributed most to cues to action. Regarding their effect sizes, the two independent variables contributed a small effect size on the mediator while they contributed a medium effect size on the dependent variable as J. Cohen (Cohen, 1988) effect size rule of thumb stated. This paper, therefore, recommends that the combination of the models should be adopted towards predicting the impact of these behavioral health factors in curbing the spread of Covid-19 infection in Nigeria.

Table 3. Causal paths Contributions on Perceived Susceptibility

Causal Paths	b	Beta	CR	P
Self-efficacy-Perceived Susceptibility	.134	.126	1.953	.051
Perceived Severity – Perceived Susceptibility	.234	.268	4.264	.000
$R^{2=}$·095				

Table 4. Results of the Contributions of the Causal Paths on Cues to Action

Causal Path	b	Beta	CR	P
Self-efficacy-Cues to action	.452	.438	6.984	.000
Perceived Severity- Cues to action	.189	.225	4.040	.000
$R^{2=}$·329				

Objective 3: The mediation effect of perceived susceptibility on the relationships between self-efficacy and cues to action in curbing the spread of COVID-19 among Nigerians.

Regarding Objectives 3 and 4, the bootstrap mediation test analyses were first conducted to identify if perceived susceptibility had mediating effects on the independent and dependent variables as shown in Figure 3.

Therefore, regarding objective 3, the study hypothesized that:

H1: Perceived susceptibility has a mediating effect on the relationship between self-efficacy and cues to action in curbing the spread of COVID-19.

The data in table 5 implied that perceived susceptibility had a partial mediation effect on the relationship between self-efficacy and cues to action. This was because the direct model outcome was (β=.457, $p<.05$), the result of the mediation model was also (β=.438, $p<.05$), and the standardized indirect effect (SIE), which mostly determines the mediation effect decision in SEM-AMOS were (β=.020, $p<.05$). Hence, H1 was supported. The Kappa squared (K^{2}= 0.008) indicated that the mediating effect was a small-sized one (Preacher, Kelley, 2011). The finding somewhat supported D.H. Choi et al. (Choi et al., 2018) who found that perceived risk has a mediation effect in preventing infectious disease. Therefore, this paper recommends that Nigerians should first, perceive they could be susceptible to Covid-19 infection, which could help them to strengthen their self-efficacies toward cues to action in curbing the spread of Covid-19 infections in the country.

Objective 4: The mediation effect of perceived susceptibility on the relationship between perceived severity and cues to action in curbing the spread of COVID-19. Regarding this objective, the study hypothesized that:

H2: Perceived susceptibility has a mediating effect on the relationship between perceived severity and cues to action toward minimizing the spread of COVID-19.

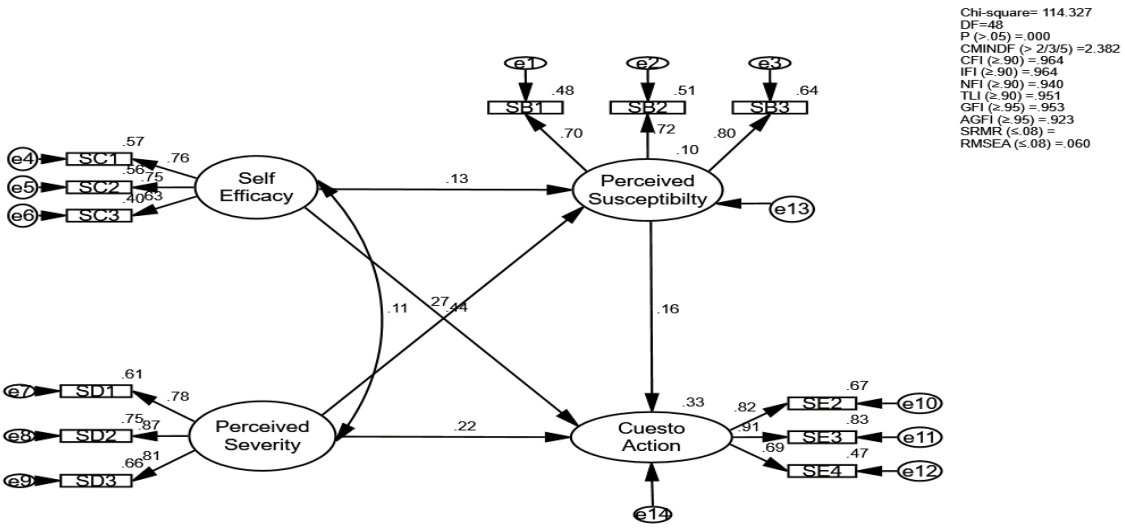

Fig. 3. SEM-AMOS Bootstrap Mediation Model

Table 5. Mediating Effect of Perceived Susceptibility on Self-efficacy and Cues to Action

			95 % Bootstrap BC CI	
Hypothesized Path	Beta	*p*	LB	UB
Direct Model Self-efficacy-Cues to action	.457	.000		
Mediation Model Self-efficacy-Cues to action	.438	.000		
Standardized Indirect Effect (SIE)	.020	.044	.000	.055

The data in Table indicated that perceived susceptibility had a partial mediating effect on the relationship between perceived severity and cues to action. This was because the direct model result was (β=.265, p<.05), the mediation model result (β=.225, p<.05), and the standardized indirect effect (SIE), which mostly determines the mediation effect decision in SEM-AMOS was (β=.042, p<.05). Hence, H2 was supported. However, the Kappa squared (K^2= 0.052) specified that the effect was a small-sized one as K.J. Preacher and K. Kelley (Preacher, Kelley, 2011) stated. Therefore, this paper recommends that Nigerians should first, perceive that they are susceptible to Covid-19 infection; by first perceiving it, it can help them to understand the severity of the virus towards engaging on the necessary cues to action to curb the spread of the virus. This finding is somewhat in line with M. Tavakol and R. Dennick (Tavakol, Dennick, 2011) who established that enhanced perceived susceptibility instigated a significant effect on perceived severity toward diabetic patients' adoption of self-care behaviors. However, their study did not evaluate the mediating effect of perceived susceptibility on perceived severity and cues to action toward curbing an infectious sickness.

Table 6. Mediating Effect of Perceived Susceptibility on Perceived Severity and Cues to Action

			95 % Bootstrap BC CI	
Hypothesized Path	Beta	*p*	LB	UB
Direct Model				
Perceived severity – Cues to action	.265	.000		
Mediation Model				
Perceived severity – Cues to action	.225	.000		
Standardized Indirect Effect (SIE)	.042	.004	.013	.090

5. Conclusion

This study examined the levels of perceived susceptibility of Covid-19 infection and the contributions of self-efficacy and perceived severity on perceived susceptibility and cues to action in curbing the spread of Covid-19 infection among Nigerians. The study also evaluated the mediating effect of perceived susceptibility on the relationship between self-efficacy and cues to action. The mediating effect of perceived susceptibility on the relationship between perceived severity and cues to action in curbing the spread of Covid-19 infection was also examined. Regarding Objective 1 of this study, it was found that only (12.4 %) of the respondents had a high level of Covid-19 perceived susceptibility. Hence, this paper recommends that Nigerians' Covid-19 infection perceived susceptibilities levels need to be improved toward curbing the spread of the virus. Regarding Objective 2, the study found that self-efficacy and perceived severity contributed to a small-sized effect on perceived susceptibility as the mediating variable. We also found that self-efficacy and perceived severity contributed to a medium-size effect on cues to action as the dependent variable. Hence, this paper recommends that the combination of the models should be adopted toward minimizing the spread of Covid-19 infections and in curbing the outbreak of similar contagious diseases. Thus, the outcomes of the study have helped and expanded the existing Health Belief Model (HBM) from the Covid-19 study's perspective since this study was guided by the model.

Objective 3 demonstrated that perceived susceptibility had a partial mediating effect on the relationship between self-efficacy and cues to action in curbing the spread of Covid-19 infection. Hence, it is recommended that Nigerians should first, perceive that they can be vulnerable to Covid-19 infection; once they can do that, it is expected that it could strengthen their self-efficacies to embrace cues to action that are capable of minimizing the spread of the virus.

Furthermore, in Objective 4, we found that perceived susceptibility also had a partial mediating effect on the relationship between perceived severity and cues to action toward minimizing the spread of Covid-19 infection. Once again, Nigerians need to increase their perceived susceptibilities to Covid-19 infection toward strengthening their awareness of the severity of the virus for more cues to action in curbing the further spread. The need to do so could be enhanced through organizing health campaigns and using various media platforms such as Facebook, Whatsapp, Twitter, and television for enlightening the public to embrace these health behavioral factors towards reducing the spread of the virus. Additionally, propagating the outcomes of this study through various media platforms might make a great impact in curbing the spread of the virus in Nigeria. Moreover, various media studies that were explored in the discussion part of the study emphasized on the efficacies of media platforms in getting current affairs across to the targeted audience. Therefore, they would be valuable means to dispatch the findings of this study to a larger audience.

Conclusively, our study has some study limitations. One of the limitations of our study was that we only evaluated four Health Belief model variables out of the numerous factors. Perhaps that was why self-efficacy and perceived severity contributed only small and medium effect sizes on the perceived susceptibility and cues to action. Thus, we recommend that future scholars should consider integrating other Health Belief model's variables in the prospective studies towards enhancing the contributions' effect sizes. We also recommend that prospective scholars should

consider conducting a qualitative or mixed-method study in subsequent studies towards improvising the preventive measures since Covid-19 is still a novel disease.

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