

Self-Care Behavior Prevention of Covid-19 in the General Population Based on Pender Health Promotion Model

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Abstract

Background

Coronavirus with sudden and widespread outbreak has obviously imposed devastating consequences in various aspects of human life. The purpose of this study was to determine the predictive value of Pender's health promotion model (HPM) structures in self-care preventive behavior against COVID-19 among the general population of Ardabil, Iran.

Methods

The present retrospective descriptive-correlational study was conducted on 200 citizens of Ardabil aged 18 and over in 2020, who were selected by convenience sampling through social media. Data collection tools included demographic profile, perceived self-efficacy scale, perceived emotions questionnaire, perceived social support questionnaire, perceived benefits and barriers questionnaire, researcher-made COVID-19 self-care questionnaire and commitment to action questionnaire based on Pender's HPM structures in an online manner. Data were analyzed by Amos 22 software and using structural equation modeling (SEM).

Results

According to the results, direct path analysis to COVID-19 self-care behavior indicated that the variables of perceived self-efficacy, interpersonal effects, positive emotion and perceived benefits are able to significantly predict self-care behaviors. Moreover, the bootstrapping test results in the indirect path analysis demonstrated that the variables of perceived self-efficacy, perceived social support, and perceived barriers and benefits through the mediator variable of commitment to action are able to significantly predict COVID-19 self-care behavior.

Conclusions

Based on the findings of the present study, it can be claimed that the proposed model of COVID-19 self-care behavior has an acceptable fitness in the general population. It seems that this model can be employed in developing educational programs and intervention techniques to modify people's attitudes and behaviors.

Background

Coronavirus disease 2019 (COVID-19) is an emerging infectious disease developed by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) from coronavirus family, and spreads through saliva droplets or nasal secretions during coughing or sneezing [1, 2]. Following the onset of the disease from December 2019, it spread rapidly throughout the world due to the very high rate of spread of the causative agent of the disease, and became a global crisis in almost a short time, in less than four months [3]. In January 2020, the World Health Organization (WHO) issued a statement declaring the

novel coronavirus to be the sixth leading cause of public health emergency worldwide [4]. After the announcement of the COVID-19 pandemic, the virus control approach in all countries was seriously included in the agenda of governments and international health officials [5]. When scientific investigations and surveys documented that serious and strict measures taken in countries such as South Korea and China have been significantly effective in changing the nature of the spread of the disease in the country and consequently reducing the incidence of infection and death, these countries were adhered as a pattern and thus public efforts to control the outbreak of virus were increased as effectively as possible [6].

Adherence to self-care behaviors and hygiene protocols (including the use of face masks and gloves, social distancing, avoidance of unnecessary travel, and hand washing with soap and water) were critical to controlling COVID-19 pandemic. Research has also confirmed the need to follow health tips and the importance of self-care in reducing the risk of COVID-19 [4]. Appropriate preventive measures along with some biopharmaceutical solutions have increased the hope of reducing the number of patients and the rate of disease transmission until the discovery of vaccines and definitive treatments [7]. In this regard, limiting the number and duration of hospitalization, banning direct visits, providing physical care and psychological assistance [8], encouraging citizens to engage in self-care behaviors, such as working at home, staying at home and canceling unnecessary meetings are some of the effective prevention and treatment strategies used to control the spread of the disease [9].

Various studies revealed that self-care behaviors improve people's quality of life [10]. One of the theories based on the promotion of human physical and mental status is the theory of "empowerment". Empowerment theory is based on the fact that human beings must have the necessary capacity to make independent decisions and accept responsibility for the consequences of their own decisions [11]. According to this theory, the most important component that can lead to empowerment is self-care behavior. Self-care includes performing some aspects of physical care and actively participating in the patient's self-care process, such as adhering treatment progress, monitoring symptoms, evaluating side effects, following up positive health-related behaviors such as a healthy diet, regular exercise, and improving general health of the patient, ultimately, improving health and quality of life, increasing patient satisfaction, making services more rational, and reducing health costs [12].

Health promotion model is one of the influential factors in choosing self-care behaviors and thus improving quality of life, which affects a person's behaviors. Pender's health promotion model (HPM) is one of the most comprehensive and defining patterns of health promotion behaviors in the general population. This model was introduced in 1996 as a framework for identifying and modifying unhealthy behaviors and promoting health. The reason for emphasizing the use of the constructs of this model is its comprehensiveness and application in recognizing the determinants of behavior. Predicting factors and explanatory constructs of health behavior in the Pender's model include perceived benefits, perceived barriers, perceived self-efficacy, behavioral emotions, interpersonal influencers, situational influencers, and commitment to action. Pender introduces this model as a framework for complex psychological processes that motivate individuals to modify health-promoting behaviors. Pender believes that these

psychological processes examine the factors affecting a person's behavior, including the interpersonal relationship and the effects of situational and previous experiences of individuals related to this behavior [13]. Self-care must be learned and performed intentionally and permanently. Learning self-care activities can lead a person to stay healthy and well, increase a person's adaptation to illness, increase self-care capacity, and reduce patients' disability and treatment costs.

Due to widespread and rapid outbreak of COVID-19 in the world, including Iran, and given that currently there is no definitive vaccine and preventive and curative drug for the use of general population for this disease in our country Iran, it can be said that self-care behaviors and adherence to health protocols are key elements in preventing the risk of this disease, which are unfortunately ignored by some people in the community. In this regard, the researchers in the present study decided to identify the causes and factors affecting the degree of adherence or non-adherence of people to self-care behaviors and with emphasis on empowerment structures in order to highlight the need to pay more attention to education, publicity and awareness of general population to improve health-promoting behaviors. In other words, it can be argued that the examination and identification of appropriate models and determinants of self-care behaviors can be useful to prevent the disease and also design, plan and implement comprehensive and appropriate educational interventions to promote the self-care behaviors. Therefore, the present study employed the Pender's HPM framework to determine and identify the factors affecting preventive self-care measures against COVID-19 among the general population of Ardabil in 2020.

Methods

Study design, setting and participants

The current retrospective descriptive-correlational study was conducted on the statistical population of the study, including the general population over 18 years of age in Ardabil, Iran. According to Hoelter (1983) [14] the sample size must be bigger than the covariate matrix, and it must be at least a 5:1 ratio for the number of subjects to the number of model parameters, but a 10:1 ratio is recommended. If the observed variables are 12 or less, then a minimum of 200 samples are necessary. In the hypothetical model of this study, the number of observed variables is 9.

In this regard, 200 people were selected by convenience sampling method. Due to the limitations of COVID-19 epidemic, data were collected by electronic questionnaire and in cyberspace from the research units who met inclusion criteria, including living in Ardabil, being at least 18 years old, having at least eighth-grade educational level, willingness to cooperate in the study, not being treated due to serious physical and mental illness and also no history of cognitive disorders or specific physical limitations. In the present study, the questionnaires were completed by observing ethical considerations and informed consent was filled out to participate in the study. The confidentiality of information, the study methodology and objectives, the method of self-report answering the questions were explained to the participants. Data collection tools included demographic profile, perceived self-efficacy scale, perceived emotions questionnaire, perceived social support questionnaire, perceived benefits and barriers

questionnaire, researcher-made COVID-19 self-care questionnaire and commitment to action questionnaire based on Pender's HPM structures in an online manner.

Data Collection Tools

Demographic questionnaire

the required information included gender, age, marital status, educational level, occupational status and number of family members.

Covid-19 self-care questionnaire

This researcher-made questionnaire contains 17 questions designed by qualitative interview based on an extensive review of the theoretical literature. In this questionnaire, we have focused on personal care and social responsibility. The items were scored from always (score 5) to never (score 1). Face validity and construct validity were performed to evaluate the validity of the tool. After collecting the experts' opinions and analyzing the results, the Content Validity Ratio (CVR) of all questions of the self-care questionnaire was calculated, the results of which indicated the internal consistency of the measurement tool and the research objectives. Exploratory factor analysis (EFA) was used to assess the construct validity of the self-care questionnaire, which showed that the two factors together account for 53% of the total variance, with the share of the first factor being 29% and the second factor being 24% of the variances. In addition, reliability was obtained with Cronbach's alpha coefficient for the first factor (personal care = 71) and the second factor (social responsibility = 83).

Perceived Self-Efficacy Scale

This questionnaire was according to Smith et al. In this questionnaire, 8 questions were designed based on the 5-point Likert scale from "strongly agree" to "strongly disagree". A higher score indicated that the individual had a higher ability to control the results and outcomes of health-related programs. The Cronbach's alpha coefficient reported by Smith et al. [15] for this instrument was 0.84. In the present study, Cronbach's alpha coefficient to evaluate the reliability of the test was estimated at 0.87.

Perceived Emotions Questionnaire

This questionnaire was adapted from the tools of Watson et al. [16]. There are 20 questions scored on the 5-point Likert scale from "almost never" to "almost always". This tool measures the two subscales of positive emotion and negative emotion and each subscale has 10 items. Cronbach's alpha coefficient reported by Watson et al. was 0.94 for positive emotions and 0.91 for negative emotions. In the present study, Cronbach's alpha coefficient for positive and negative emotions was 0.79 and 0.83, respectively.

Perceived social support questionnaire

This questionnaire was adapted from Kanti et al. [17]. In this questionnaire, 12 questions were designed based on the 7-point Likert scale from "strongly agree" to "strongly disagree". Higher scores indicate more support from friends, family and other important people. The Cronbach's alpha coefficient reported by Kant et al. was 0.91 for this instrument. In the present study, Cronbach's alpha coefficient was estimated at 0.90 to evaluate the reliability of the test.

Perceived Barriers Questionnaire

This scale was adapted from Becker et al. [18]. In this questionnaire, 18 questions were designed based on the 4-point Likert scale from "never" to "always". A higher score indicated that the respondent faced more barriers to performing health-promoting behaviors. Cronbach's alpha coefficient reported by Becker et al. was 0.80 and test-retest coefficient was 0.75 for this instrument. Cronbach's alpha coefficient for test reliability was 0.76.

Perceived Benefits

The perceived benefits construct was evaluated using an assessment tool adapted by Mohammadian et al, which consisted of 20 items scored based on a 4-point Likert scale. This tool assesses the anticipated positive outcomes that will occur from health behavior. The score obtained ranges from 20 to 80 and higher scores indicate more benefits perceived for health-promoting behaviors. Internal consistency reported by Mohammadian et al [19] for this instrument was good. Internal consistency for the current study was 0.79.

Situational Influences

To evaluate the situational influences, we designed a questionnaire based on Pender's model [13] which included seven items. This instrument assesses the personal perceptions and cognitions of any given situation or context that can facilitate or impede behavior. The items were rated in a four-choice Likert scale ranging from "never (1)" to "always (4)". The total scores ranged from 7 to 28. The higher score indicates higher level in situational influences. In the current research, Cronbach's alpha for this tool was 0.78.

Commitment To Action

To assess the 'commitment to action' we developed a tool, based on Pender's theory, that evaluates the intention and identification of a planned strategy leads to the implementation of health behavior [13]. This assessment tool contains 12 items, and is scored based on a 5-point Likert scale, ranging from strongly agree (5) to strongly disagree (1). The score obtained for each items range from 10 to 50. Higher scores indicate better reported commitment to action. In the present research, Cronbach's alpha for this tool was 0.86.

Data analysis

Data were analyzed by Amos 22 software and using direct and indirect path analysis with structural equation modeling (SEM).

Result

Table 1
Socio-Demographic Characteristics of the
Sample (n = 200)

Variable	N	%
Sex		
Female	80	40
Male	120	60
Age (in years)		
18–25	72	36
26–33	68	34
34–41	38	19
42–49	14	7
50 or over	8	4
Marital Status		
Married	102	51
Single/divorced/widowed	95	47.5
Did not answer	3	1.5
Education		
Up to grade 12	35	17.5
Bachelor's degree	86	43
Master's / Doctoral degree	75	37.5
Did not answer	4	2
Employment		
Non-governmental	72	36
Governmental	69	34.5
Student	5	2.5
Homemaker	20	10
Retired/Unemployed	34	17
Family members		
1–3	78	39

Variable	N	%
4-6	107	53.5
>6	15	7.5

Table 2

Mean (M), Standard Deviation (SD) and Pearson correlation coefficients among the variable (n = 200)

Variables	1	2	3	4	5	6	7	8	9
Covid-19 Self-care behaviors	1								
Commitment to action	0.34**	1							
Perceived self-efficacy	0.28**	0.24**	1						
Interpersonal influences	0.29**	0.17*	0.13	1					
Perceived social support	0.21**	0.25**	0.00	0.29**	1				
positive affect	0.30**	0.11	0.10	0.32**	0.23**	1			
Negative affect	0.02	-0.02	0.10	-0.19**	-0.15*	-0.05	1		
Perceived barriers	-0.12	-0.17*	0.15*	-0.33**	-0.24**	-0.22**	0.38**	1	
Perceived benefits	0.32**	0.22**	0.02	0.37**	0.36**	0.40**	-0.37**	-0.32**	1
Mean	61.10	53.16	29.76	21.91	52.70	34.31	20.50	30.10	50.33
SD	4.14	4.17	3.03	3.54	6.71	8.85	5.70	9.00	10.29

Note: M = means. SD = standard deviation. **Correlation is significant at the 0.01 level (2-tailed).

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

Correlational analysis

Commitment to action ($r = 0.34$, $p < 0.01$), perceived self-efficacy ($r = 0.28$, $p < 0.01$), interpersonal influences ($r = 0.29$, $p < 0.01$), perceived social support ($r = 0.21$, $p < 0.01$), positive affect ($r = 0.30$, $p < 0.01$), and perceived benefits ($r = 0.32$, $p < 0.01$), have positive relationship with Covid-19 Self-care behaviors, Therefore, with an elevation of Commitment to action, perceived self-efficacy, interpersonal influences, Perceived social support, positive affect and Perceived benefits, Covid-19 Self-care behaviors increases.

Model fitness

Table 3 shows fit indices. According to the results, the modified model had sufficient goodness-of-fit: CMIN/DF = 1.33, GFI = 0.99, AGFI = 0.92, IFI = 0.99, TLI = 0.96; CFI = 0.99, RMSEA = 0.04.

Table 3
Fit indices of modified model

Modification indexes	CMIN/DF	GFI	AGFI	IFI	TLI	CFI	RMSEA
Suggested Value	1–5	> 0.90	> 0.80	> 0.90	> 0.90	> 0.90	< 0.08
Modified Model	1.33	0.99	0.92	0.99	0.96	0.99	0.041

Abbreviations: CMIN/DF = Normed Chi-Square; GFI = Goodness of Fit Index; AGFI = Adjusted Goodness of Fit Index; IFI = Incremental Fit Index; TLI = Tucker-Lewis Index; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation.

variables and self-care covid-19

Paths coefficients

The standard coefficients of direct pathway in Fig. 1 indicate that direct Perceived self-efficacy pathway to covid-19 Self-care ($\beta = 0.18, P < 0.01$), interpersonal in influences pathway to covid-19 Self-care ($\beta = 0.19, P < 0.01$), positive affect pathway to covid-19 Self-care ($\beta = 0.15, P < 0.05$), Perceived benefits pathway to covid-19 Self-care ($\beta = 0.20, P < 0.01$), Perceived self-efficacy pathway to commitment to action ($\beta = 0.26, P < 0.01$), perceived social support pathway to commitment to action ($\beta = 0.18, P < 0.01$), Perceived barriers pathway to commitment to action ($\beta = -0.17, P < 0.05$), pathway of Perceived benefits to commitment to action ($\beta = 0.16, P < 0.05$), and the pathway of commitment to action to covid-19 Self-care ($\beta = 0.22, P < 0.01$), was significant.

To study the indirect effects, the Bootstrap test was used which its results presented in Table 3.

Table 4
Bootstrap results for indirect effects

Independent Variable	Mediator	Dependent Variable	Number of Bootstrap Samples	Lower	Upper	Confidence Interval
Perceived self-efficacy	Commitment to action	covid-19 Self-care	1000	0.012	0.066	0.95
Interpersonal influences	Commitment to action	covid-19 Self-care	1000	-0.016	0.019	0.95
Perceived social support	Commitment to action	covid-19 Self-care	1000	0.002	0.026	0.95
positive affect	Commitment to action	covid-19 Self-care	1000	-0.012	0.002	0.95
Negative affect	Commitment to action	covid-19 Self-care	1000	-0.001	0.020	0.95
Perceived barriers	Commitment to action	covid-19 Self-care	1000	-0.019	-0.002	0.95
Perceived benefits	Commitment to action	covid-19 Self-care	1000	0.001	0.015	0.95

Indirect effects

Results of bootstrapping analysis showed that, commitment to action had a partial mediated the relationship between perceived self-efficacy and covid-19 Self-care (95% CI, [0.012, 0.066]), since zero is outside the confidence interval of 0.95, so this path is significant. The indirect path from Perceived social support to covid-19 Self-care through commitment to action was significant (95% CI, [0.002, 0.026]). Commitment to action fully mediated this relation. Commitment to action had a fully mediation effect on the relationship between Perceived barriers and covid-19 Self-care (95% CI, [-0.019, -0.002]). And, indirect path form Perceived benefits to covid-19 Self-care through commitment to action was partial significant (95% CI, [0.001, 0.015]).

As well, the results showed that, Indirect effect of interpersonal influences, positive affect and Negative affect on covid-19 Self-care via commitment to action is not significant, since zero is not outside the confidence interval of 0.95.

Discussion

The present study aimed to determine the predictive value of Pender's health promotion model (HPM) structures in performing COVID-19 self-care behaviors in the general population. The results of this study showed that the Pender's HPM has a reasonable fit for predicting COVID-19 self-care behavior in the Iranian population. According to direct path analysis to COVID-19 self-care behavior, the variables of

perceived self-efficacy, interpersonal effects, positive emotions, and perceived benefits were able to significantly predict the self-care behaviors. Moreover, the bootstrapping test results in the indirect path analysis demonstrated that the variables of perceived self-efficacy, perceived social support, and perceived barriers and benefits through the mediator variable of commitment to action are able to significantly predict COVID-19 self-care behavior.

Our results revealed that the perceived self-efficacy was both directly and indirectly able to predict the COVID-19 self-care behavior through commitment to action. It should be noted that 86% of studies on health-promoting model supported the importance of self-efficacy as a determinant of health-promoting behavior [20]. The self-efficacy has been emphasized as a significant precondition for self-management to improve health-promoting behaviors [21].

In this regard, a study in China stated that perceived self-efficacy was significantly higher in the group exploiting social media than in others [22]. Thus, social media can be said to be a useful tool for transferring health messages, and contributing to COVID-19 self-care behaviors. In other words, understanding the importance of self-care behaviors and knowing the consequences of non-adherence increases individual self-efficacy and reinforces a positive belief in COVID-19 self-care behaviors, leading to the adoption of preventive behaviors [23]. Other studies found that perceived self-efficacy influences a person's ability to perform a particular level of action, and commitment to action is affected by variables such as perceived self-efficacy [13]. Perception of abilities and skills in a particular area leads a person to a behavior in which one is superior. A sense of efficiency, effectiveness, and skill in performing an action strengthens one's commitment to that action compared to when one has no self-confidence. Therefore, it can be said that the perceived self-efficacy enhances commitment to action, and the commitment to action reinforces COVID-19 self-care behavior.

Based on the results, interpersonal communication is directly able to significantly explain self-care against COVID-19. In other words, people with effective interpersonal communication skills have a high level of self-care during COVID-19 outbreak. The ability to communicate effectively is one of the ten skills emphasized by the WHO and a prerequisite for mental health in individual and social life. This skill is important in human life as some experts have stated that the communication process is the basis of all human development, personal injury and human progress [24]. Hence, it can be said that such a skill can lead a person to take care of him/her and others, while developing mental health.

The results also showed that perceived social support could not directly predict COVID-19 self-care behavior but indirectly significantly predicted COVID-19 self-care behavior through commitment to action. According to the results of several studies on the effect of social and family support in reducing stress levels and improving skills in controlling the prevalence of diseases such as influenza [25], Ebola (26), SARS [27] and COVID-19 (28 and 29), our findings also emphasized the role of social support and commitment to action in the individual as components promoting COVID-19 self-care behaviors. In other words, a central function of commitment to action in COVID-19 self-care behavior is an acceptable

approach to health promotion in which people in the community are empowered to take responsibility for their own health and the health of others and to adopt a healthy lifestyle.

Based on the results, positive emotion is directly able to significantly predict COVID-19 self-care behavior. Positive emotion has been shown to be a key component of emotion control skills, and plays an important role in people's adaptation to stressful life events [30]. People who have experienced negative life events but focus on the positive aspects of life report greater life satisfaction [31]. Therefore, positive emotions and high mood can enhance people's hope and quality of life. In such cases, positive emotions will lead to the adoption of effective control strategies and self-care behaviors of COVID-19. The results on the role of negative emotion in COVID-19 self-care are not significant because this component is unable to directly or indirectly predict COVID-19 self-care behavior.

Another finding of the present study is the absence of directly predicting self-care behaviors by the variable of perceived barriers. On the other hand, the results of this study also revealed that commitment to action is indirectly able to predict COVID-19 self-care behavior. Most studies testing the health promotion model have expressed empirical support for the importance of barriers as a determinant of health-promoting behavior [32]. In such cases, perceived barriers can be imaginatively related to the inaccessibility, inappropriateness, costliness, dissatisfaction, difficulty, or time-consuming nature of a particular action, which acts as a barrier to behavior [13].

Contrary to previous findings, this study found no inverse correlation between perceived barriers and self-care behaviors. In other words, barriers to self-care practices and behaviors (such as lack of financial resources, apathy, and shortage of time) do not prevent self-care behaviors. Such a result is not unexpected given the serious and deadly nature of COVID-19, and it seems that when it comes to one's life, people endure deficiencies and barriers to save their lives. On the other hand, the mediating role of commitment to action in the relationship between perceived barriers and self-care behaviors shows that although barriers alone cannot affect individuals' self-care and preventive behaviors at COVID-19 risk, they can influence self-care behaviors of people by reducing their motivation and commitment. In other words, barriers have no effect on the onset of COVID-19 self-care behaviors but can reduce individuals' motivation to pursue self-care behaviors by affecting their commitment.

Based on the results of the present study, the perceived benefits of individuals can directly explain self-care behavior and are indirectly able to predict COVID-19 self-care behavior through commitment to action. This result is consistent with other findings in this field [33].

People's perception of the positive outcomes and benefits of self-care can increase people's motivation to increase such behaviors. Perceived benefits refer to a person's beliefs consistent with the usefulness of health-promoting behaviors in preventing a health threat or disease. According to the definition of this structure, an individual chooses the behavior that involves the most benefit and is accessible to society [13]. Studies show that if perceived barriers outweigh the benefits of prediction, behavior is less likely to occur. In other words, the individual's action directs the self-care behavior through the balance and imbalance between perceived positive and negative forces [33]. Given the widespread and deadly

consequences of COVID-19, mass media and cyber advertising and the WHO emphasize the positive aspects and benefits of health-promoting behaviors. In addition, politicians and statesmen in different societies emphasize the benefits of self-care behaviors due to their economic consequences and downplay the role of barriers. These increase people's knowledge of perceived benefits among individuals and increase commitment to self-care practices and behaviors.

Finally, it is recommended that the dimensions with the strongest predictive value should be integrated to design and implement a comprehensive model for health planning and appropriate interventions for COVID-19 self-care behavior. The limitations of the present study are the self-report nature and Internet completion of the designed questionnaire, which reduce the reliability of the data. To reduce these problems, an attempt was made to consider an option when designing an online questionnaire so that a user could complete the online form only once with an ID. In addition, the online form was tried to be sent through various communication channels to provide the ability to respond with smartphones as well as the operating system. However, one of the major problems with online questionnaires is the need for the Internet to complete the relevant form, which eliminates the chances of people without these facilities participating in such studies.

Conclusion

According to the findings of the present study, it can be proposed that the model of COVID-19 self-care that was put forward has an acceptable fitness in the general population. It seems that this model can be employed in developing educational programs and intervention techniques to modify people's attitudes and behavior. It is suggested to examine other models and theories of education and behavior change such as the theory of planned behavior and the protection motivation theory regarding the adoption of COVID-19 self-care behaviors.

Abbreviations

COVID-19

Coronavirus disease 2019

SARS-CoV-2

Severe acute respiratory syndrome coronavirus 2

WHO

World Health Organization

HPM

Pender's health promotion model

Declarations

Ethics approval and consent to participate

This article has been adapted from a research project approved by Ardabil University of Medical Sciences, with code of ethics of IR.ARUMS.REC.1399.040.

Consent for publication

All participants were assured of confidentiality and anonymity.

Authors' contributions

All the authors contributed to the conception and design of the study. AP, JAG and BM drafted the first version of the manuscript. MAV and DF revised the manuscript. AP, JAG and BM critically reviewed the manuscript. All authors approved the final version.

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Availability of data and materials

The datasets generated and/or analysed during the current research are not publicly available as individual privacy could be compromised but are available from the corresponding author on reasonable request.

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Conflict of interest

It is worth noting that the authors have no conflict of interest in this study.

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Figures

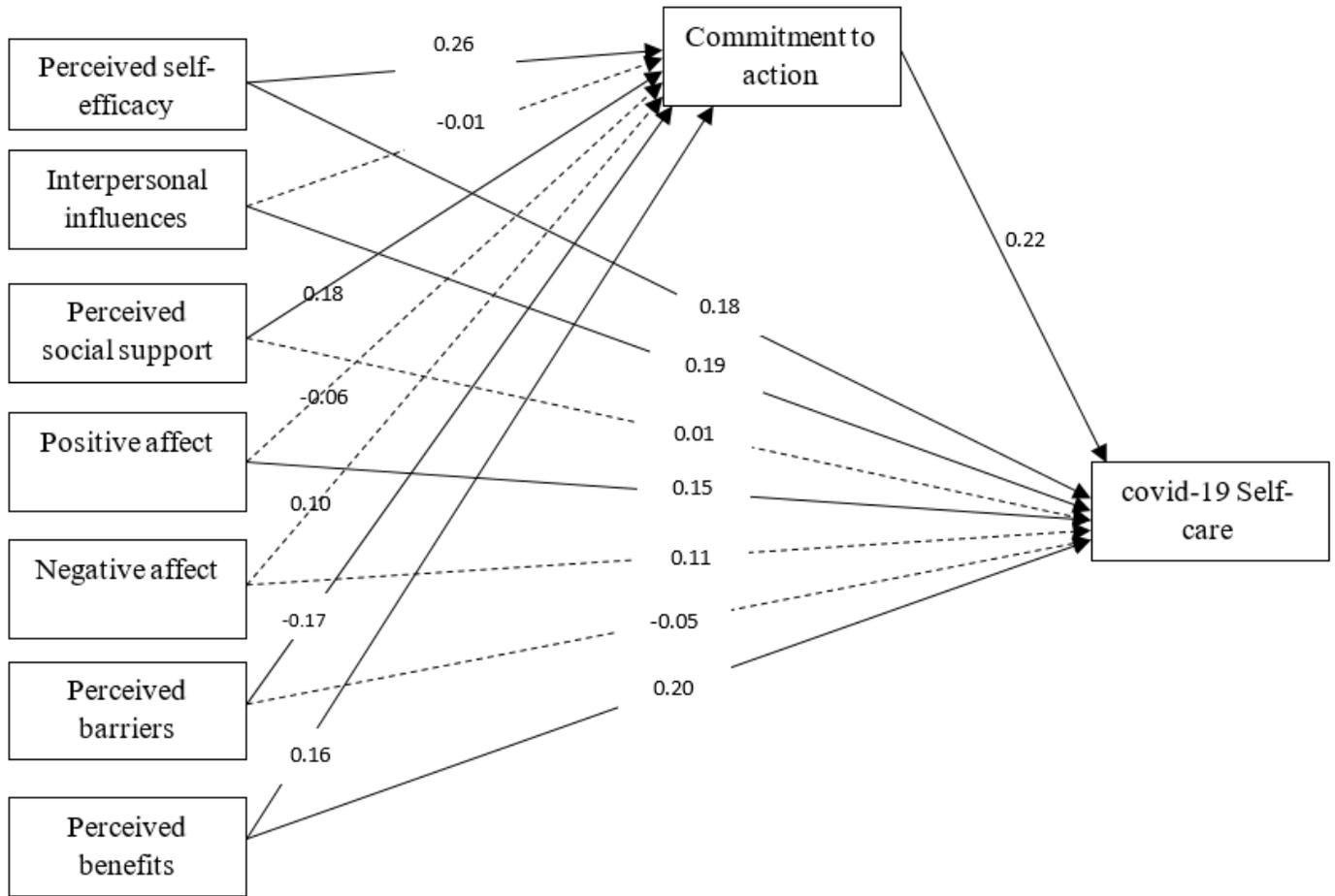


Figure 1

Standard Regression Coefficients (betas) of Mediation of commitment to action between predictive variables and self-care covid-19