

# Coping strategies during the COVID-19 pandemic and compliance with precautionary health behaviors: An online study among the Saudi adult population

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## ABSTRACT

**Background:** The COVID-19 pandemic has caused major morbidity and mortality internationally. Most governments worldwide have enforced precautionary health measures such as social distancing, hand hygiene, and wearing gloves to limit the spread of this disease. In response to major health and economic stressors, individuals exhibit a range of different coping styles. **Aim:** The aim of this study is to identify coping strategies that are predictive of compliance with pandemic-related precautionary health behaviors in Saudi Arabia. **Settings:** A cross-sectional study was conducted online with a total of 1029 Saudi adult participants. **Materials and Methods:** The Brief Coping Orientation to Problems Experienced (COPE) questionnaire was administered as well as appraising the level of compliance with the Saudi Ministry of Health precautionary measures. Multiple regression analyses explored the associations between coping styles and precautionary health behavior compliance. **Statistical Analysis:** Multivariate multiple regression and linear regression analyses were used to analyze the data. **Results:** The active coping and religion Brief COPE subscales as well as age predicted compliance with all precautionary measures. The behavioral disengagement Brief COPE subscale predicted hand washing and social distancing while the substance use Brief COPE subscale and sex predicted wearing gloves. **Conclusion:** Compliance with COVID-19-related precautionary health behaviors is driven by different coping styles. Active coping and religion appeared to influence all three health behaviors which might guide public health officials in their efforts to develop effective public health campaigns, which further suggests the importance of involving the religious institutions in Saudi Arabia.

**Key words:** Compliance, coping strategies, COVID-19, hand washing, physical distancing

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## INTRODUCTION


Since the beginning of 2020, there has been an exponential increase in the COVID-19 pandemic-related morbidity and mortality.<sup>[1]</sup> The negative impact on physical and mental health as well as economic impact is being felt by the billions of people globally.<sup>[2]</sup> In response to this major pandemic, precautionary health behaviors, including lockdown, social

distancing, hand hygiene, and wearing gloves, have been implemented by more than 195 governments.<sup>[3]</sup> Precautionary measures are considered health behaviors as they share the purpose of maintaining health.<sup>[4]</sup> Health behaviors are defined as "actions taken by individuals that affect health or mortality."<sup>[5,p 79]</sup> The use of different coping strategies may influence how people engage in following public health

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precautionary measures.<sup>[6]</sup> Adding to the stress caused by the COVID-19 is the stress associated with complying with these introduced restrictive precautionary health measures.<sup>[1]</sup> However, research in this area is limited.<sup>[7]</sup> Various coping strategies used during stressful times have been shown to have an impact on the individual's health-related behaviors.<sup>[8]</sup>

In response to stress, people adopt a range of different coping strategies in order to survive.<sup>[9]</sup> Coping is the process of how stress is detected, appraised, and dealt with using behavioral and psychological efforts.<sup>[10]</sup> Therefore, the same stressful situation facing two people at the same place could trigger two different coping strategies due to two different appraisals of the same stressor. Engagement or disengagement in following COVID-19 government implemented precautionary health measures could be considered part of how people cope with this stressful pandemic. A recent study found a link between coping strategies and mental health in relation to COVID-19.<sup>[7]</sup> In this study, people with more emotion-focused coping efforts were more likely to suffer from mental health issues than those with problem-focused coping or practical coping.<sup>[7]</sup> While the examples of emotion-focused coping behaviors include crying and smoking, problem-focused coping include problem-solving and help-seeking behaviors. The concept of coping goes beyond behavioral change to cognitive changes.<sup>[9]</sup> This could be through improving knowledge about precautionary health measures and following them.<sup>[7]</sup>

In this cross-sectional study, the aim was to examine which coping strategies predict compliance with the precautionary health behaviors recommended by the World Health Organization (WHO) and the Saudi government during the COVID-19 pandemic including social distancing, hand hygiene, and wearing gloves. At the time of conducting this study, wearing masks were not recommended by the Saudi Ministry of Health; hence, data were not gathered in this regard.

## MATERIALS AND METHODS

### Participants and procedure

Participants were Saudi adults recruited through an anonymous online survey. A link to the study was shared

through E-mail and posted on social media platforms (Twitter, Facebook, and LinkedIn). Eligible participants had to be 18 years or older and have access to the internet. Data were collected in April and May 2020. Participation was completely voluntary, and participants received no compensation. All participants provided electronic informed consent. The study was conducted in accordance with the declaration of Helsinki and was approved by the appropriate research ethics committee (blinded) (IRB 41-00155).

### Measures

Participants provided information about their age, sex, marital status, education status, employment status, monthly income, and region of residence.

### Coping strategies

Coping strategies were assessed using the abbreviated version of the Coping Orientation to Problems Experienced Inventory (Brief COPE).<sup>[11]</sup> The Brief COPE is a 28-item multidimensional scale that measures adaptive and maladaptive coping strategies to deal with stressful events. Items are scored on a 4-point scale, ranging from 0 (I haven't been doing this at all) to 3 (I've been doing this a lot). The Brief COPE includes 14 subscales, with each subscale consisting of two items. These subscales are self-distraction, active coping, denial, substance use, emotional support, instrumental support, behavioral disengagement, venting, positive reframing, planning, humor, acceptance, religion, and self-blame. A sample of the Brief COPE items is shown in Table 1.

Validity and reliability of the scale have been demonstrated in the original study;<sup>[11]</sup> however, since its development, research have shown a diversity in the factorial structure of the scale.<sup>[12-15]</sup> The Arabic version of the Brief COPE has been found to be reliable and valid measure of coping strategies (internal consistency for individual subscales ranged between  $\alpha = 0.63$  and  $0.94$ ).<sup>[16]</sup> Internal consistency in the present study was 0.87 for the total scale and between 0.52 and 0.91 for individual subscales.

### Compliance with precautionary health behaviors

Levels of compliance with the precautionary health behaviors

**Table 1: The four coping scales predictive for health behaviors and their included items**

Brief cope predictive subscales	Items per scale*
Active coping	I've been concentrating my efforts on doing something about the situation I'm in I've been taking action to try to make the situation better
Religion	I've been trying to find comfort in my religion or spiritual beliefs I've been praying or meditating
Behavioral disengagement	I've been giving up trying to deal with it I've been giving up the attempt to cope
Substance use	I've been using alcohol or other drugs to make myself feel better I've been using alcohol or other drugs to help me get through it

\*Items were scored on a four-point Likert scale: 1=I haven't been doing this at all, 2=I've been doing this a little bit, 3=I've been doing this a medium amount, 4=I've been doing this a lot

recommended by the WHO and the Saudi government were assessed using a questionnaire devised for the purpose of this study. Specifically, compliance with physical distancing, hand hygiene, wearing gloves, staying home, and avoiding social gatherings and crowded places were assessed using a single item each. These questions read (To what extent do you practice washing with soap and water for at least 20 seconds?); (To what extent do you practice physical distancing, at least 2 meters, when you leave your safe bubble?); (To what extent do you practice wearing gloves when you leave your safe bubble?); (To what extent do you avoid going outside your home unless for essentials?); and (To what extent do you avoid social gatherings and crowded places?). Each of these questions was scored on a 5-point scale, where 0 (not applicable) 1 (never), 2 (rarely), 3 (sometimes), and 4 (most of the time). Social distancing was a composite of three facets, physical distancing, avoidance of social gatherings, and crowded places and staying at home.

### Data analysis

First, we assessed demographic data to provide an overview of the sample characteristics. Second, to conduct a multivariate multiple regression we entered the salient precautionary health behaviors sanctioned by the Government as dependent variables in separate analyses and four coping measures as the explanatory variables along with two potential confounding variables, age, and sex. Upon preliminary inspection of the complete model incorporating all the coping and precautionary health behavior variables using a multivariate regression model in SPSS,<sup>[17]</sup> it became obvious that a parsimonious statistical model would include four coping variables (active coping, substance use, behavioral disengagement, and religion) as the predictors of three health behaviors (hand washing, wearing gloves, and physical distancing) with age and sex as covariates. For each precautionary health behavior variable, a separate linear regression analysis was performed using the IBM SPSS version 26 (IBM Corporation, Chicago, IL, USA) resulting in three models, as shown in Table 2.

## RESULTS

The sample comprised 1029 participants who consented and completed all questionnaires. As shown in Table 3, our sample comprised a cross-section of the adult Saudi

population. The mean age was 33.7 years (standard deviation 11.5). The majority of the participants were male (52.7%), married (54.3%), employed (47.2%), had a university education (50.7%), and earned 9.999 or less Saudi Riyal a month. More detailed sample characteristics are shown in Table 3.

As shown in Table 2, four coping strategies were able to predict compliance with the three precautionary health behaviors. First, hand washing is significantly predicted by active coping, behavioral disengagement, religion, and age. Second, wearing gloves is significantly predicted by active coping, substance use, religion, age, and sex. Finally, social distancing is significantly predicted by active coping, behavioral disengagement, religion, age, and sex.

The overall coping strategies and their relationship to compliance with precautionary health behaviors are shown in Table 4.

## DISCUSSION

This study aimed to identify the coping strategies that predict compliance with the precautionary health behaviors recommended by the WHO and the Saudi government during the COVID-19 pandemic including. Of the Brief COPE 14 subscales administered, only active coping, substance use, behavioral disengagement, and religion predicted compliance.

### Active coping and religion

Active coping strategy involves actively and gradually managing a stressor and its effects.<sup>[18]</sup> This study finding of active coping being predictive of engaging in all precautionary health behaviors was consistent with the results of a meta-analytic review which found that actively managing a health-related stressor was associated with better health outcomes.<sup>[8]</sup> An active coping strategy was found to be one of the most common strategies used in an American sample in dealing with COVID-19.<sup>[19]</sup> Possible explanations for this could be that people engage in active cognitive problem-solving which is part of an adaptive strategy referred to as active coping.<sup>[18]</sup> This, in the context of COVID-19 pandemic, involves learning about precautionary health behaviors and adopting them. Furthermore, knowledge of sufficient coping

**Table 2: Regression model with hand washing, wearing gloves, and social distancing as dependent variables**

Explanatory variables	Model 1 - Hand washing		Model 2 - Wearing gloves		Model 3 - Social distancing	
	$\beta$	<i>t</i>	$\beta$	<i>t</i>	$\beta$	<i>t</i>
Age	0.15	4.85*	0.06	2.10*	0.06	2.02*
Sex	0.02	0.56	0.23	7.29*	0.14	4.56*
Active coping	0.11	3.27*	0.07	2.30*	0.12	3.64*
Substance use	-0.05	-1.60	0.07	2.05*	-0.04	-1.09
Behavioral disengagement	-0.15	-4.81*	-0.05	-1.42	-0.12	-3.84*
Religion	0.09	2.89*	0.07	2.29*	0.08	2.34*

\* $P < 0.05$ ; explanatory variable sex was denoted. Male=1, Female=2

Table 3: Sample characteristics (n=1029)	
Characteristics	Frequency, n (%)
Sex	
Male	542 (52.7)
Female	487 (47.3)
Marital status	
Single	430 (41.8)
Married	559 (54.3)
Divorced	34 (3.3)
Widowed	6 (0.6)
Education	
High school or less	214 (20.8)
Diploma	94 (9.1)
Bachelor	522 (50.7)
Master/PhD	199 (19.3)
Employment	
Student	311 (30.2)
Employed	486 (47.2)
Unemployed	169 (16.4)
Retired	63 (6.1)
Income*	
9,999 or less	589 (57.2)
10,000-15,999	208 (20.2)
16,000 or more	232 (22.5)
Region	
Central region	227 (22.0)
Northern region	77 (7.5)
Southern region	241 (23.4)
Eastern region	114 (11.1)
Western region	370 (36.0)

\*Saudi Riyal

behaviors such as the precautionary health behaviors may help reappraise COVID-19 as less stressful.<sup>[18]</sup> According to the Yerkes-Dodson Law, if stress/arousal is reduced optimally, performance could be enhanced.<sup>[20]</sup> In COVID-19 context, knowledge of effective means of infection minimization could reduce associated arousal/stress levels thus improving performance in complying with all precautionary health behaviors. A recent study found that people who believed health precautions were effective predicted their compliance with such precautions.<sup>[4]</sup>

In terms of the religion coping strategy being predictive for compliance with precautionary health behaviors, it is well established that religion positively influences health-related behaviors.<sup>[21-23]</sup> One explanation offered in the literature is that religion demands a healthy lifestyle, and this is evident in a number of religions where the body needs to be nurtured.<sup>[23,24]</sup> This could increase the individual's concern for their own health which has been found to increase compliance with COVID-19 precautionary measures.<sup>[4]</sup> In Saudi Arabia, the religious institution advised following a healthy lifestyle through compliance with health precautionary measures.<sup>[25,26]</sup> These included temporarily ceasing prayers at mosques, delaying pilgrimage for overseas pilgrims, and encouraging

people to comply with all the recommended precautions including social distancing even after prayers at mosques were resumed. The fact that some religious groups, with anti-health precautionary measures messages, contributed to spikes in COVID-19 transmission which testifies to the importance of religion as a coping strategy that influences behavioral change.<sup>[27]</sup> Another explanation is that a belief in a higher power might reduce COVID-19-related stress which in turn could improve compliance with the advised health behaviors.<sup>[28]</sup>

### Behavioral disengagement

Behavioral disengagement predicted complying with social distancing and hand washing. The themes for this coping style center on evasion and it is generally considered as one of the less adaptive avoidance-oriented coping strategies.<sup>[29]</sup> Our finding was consistent with the findings of a recent study where this coping strategy was more common among younger individuals.<sup>[19]</sup> However, participants with this coping style often feel they are giving up on adherence, such as engaging in social distancing and hand hygiene. One explanation is that there is a difference between disengagement represented by "giving up" and disengagement as part of adaptive behavior<sup>[30]</sup> such as social distancing. For example, individuals who perceive certain interventions to be effective implement them more readily which might have counteracted feelings of wanting to abandoning engagement with a certain behavior like social distancing.<sup>[31]</sup> As behavioral disengagement coping style has been found to be related to reduced perceived self-control over stressful situations,<sup>[32]</sup> it could be argued that participants had less self-control over this pandemic and therefore resorted to the "giving up" type of disengagement.

### Substance use

Substance use (e.g., "I've been using alcohol or other drugs to help me get through it." or "I've been using alcohol or other drugs to make myself feel better") as a coping mechanism is another maladaptive form of avoidance-oriented coping. In this study, substance use predicted wearing gloves which was an unexpected finding. A possible explanation is to do with social desirability bias. Overall, substance use strategy has been reported to be used in coping with COVID-19 stress, especially among younger participants.<sup>[19]</sup> Another study found that COVID-19 stress was associated with new substance use behaviors and exacerbating current substance use.<sup>[33]</sup> One explanation offered in one study is that individuals self-medicate with alcohol, for example, to cope with the precautionary measures enforced.<sup>[29]</sup> One potential cause for using this coping mechanism is social isolation as part of the imposed lockdown as evident by the rise of liquor shop sales in Australia which increased by 86% in March of 2020.<sup>[34]</sup> Clearly, no studies to date have found a link between substance use and wearing gloves, indicating that the nature of compliance is more of an issue with greater substance use likely linked to less compliance.

### Age and sex

Age was also a positive predictor of complying with all

**Table 4: The overall coping strategies and their relationships with health behaviors (Pearson correlations)**

Coping strategies	Mean (SD)	Correlation		
		Handwashing	Wearing gloves	Social distancing
Self-distraction	3.13 (1.76)	0.03	0.06*	0.08**
Active coping	3.82 (1.68)	0.11**	0.11**	0.14**
Denial	2.06 (1.89)	-0.05	0.06	-0.07*
Substance use	0.40 (1.20)	-0.11**	0.02	-0.10**
Emotional support	2.63 (1.84)	-0.03	0.02	0.01
Informational support	2.43 (1.91)	-0.07*	0.02	-0.02
Behavioral disengagement	1.92 (1.74)	-0.14**	-0.01	-0.11**
Venting	2.35 (1.69)	-0.07*	0.03	-0.02
Positive reframing	3.71 (1.77)	0.05	0.05	0.13**
Planning	3.73 (1.75)	0.07*	0.07*	0.10**
Humor	1.84 (1.81)	-0.13**	-0.05	-0.07*
Acceptance	4.41 (1.65)	0.04	0.05	0.15**
Religion	4.58 (1.73)	0.13**	0.12**	0.13**
Self-blame	1.95 (1.88)	-0.05	0.02	-0.06*
Compliance				
Hand washing	3.63 (0.75)			
Wearing gloves	3.12 (1.24)			
Social distancing	3.70 (0.59)			

\* $P < 0.05$ , \*\* $P < 0.01$ . SD: Standard deviation

precautionary health measures. This is consistent with the literature as age was predictive of engaging in general health behaviors.<sup>[35,36]</sup> However, a recent study found no relationship between age and following COVID-19 precautionary health behaviors.<sup>[4]</sup> A possible explanation for this discrepancy is that the mean age of the included participants in Clark *et al.* study was 5 years younger than our sample. It is evident in the literature that younger participants are less likely to follow positive health behaviors.<sup>[37]</sup> Another recent study conducted in the USA found that young age was associated with less compliance with precautionary health behaviors.<sup>[19]</sup>

Sex was predictive of two behaviors, namely wearing gloves and social distancing, indicating that women are more likely to be compliant than men. A systematic review found that female sex was more likely to engage in precautionary health behaviors than their male counterparts.<sup>[38]</sup> Furthermore, males tended to engage in negative health behaviors more than females.<sup>[39]</sup> This was supported by the finding of a US study which found that males adhered less to social distancing and hand washing than females.<sup>[19]</sup> A possible explanation for this in context of COVID-19 is that males had less risk perception of being infected than females.<sup>[40]</sup> This is concerning as current evidence is clear about the risk being higher for males than females.<sup>[31]</sup>

### Limitations and future directions

Our sample was over 1000 participants, which may not be representative of the general the Saudi population. It included well-education participants which makes the results less likely to be generalizable to the wider population. Another limitation to this work is the self-reporting of compliance with

precautionary health behaviors which may introduce social desirability bias. In addition, at the time of conducting the study, wearing masks was not advised by the Saudi Ministry of Health; hence, such data were not collected. Although precautionary health behaviors were significantly predicted by four coping strategies, we acknowledge that the size of the effects indicate further research needs to be conducted. However, the strength of the study is that it has identified four key coping strategies that could enhance compliance during the COVID-19 pandemic.

### CONCLUSION

Certain coping strategies such as active coping, religion, behavioral disengagement as well as sex and age are influential in complying with health precautionary measures. Active coping and religion in particular positively predicted such compliance which heightens the need for further collaboration between the government and religious institutions. This work is relevant to researchers as well as policy- and decision-makers to further streamline their efforts in targeting productive coping strategies that are relevant to the Saudi population.

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### Conflicts of interest

There are no conflicts of interest.

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