



## **Perceptual and Behavioral Response to COVID-19 Pandemic among Sri Lankan Undergraduates**

**Asanka Bulathwatta <sup>a\*</sup>, Gunendra Dissanayake <sup>a</sup>, Tehani Gunawardena <sup>a</sup>,  
Uthpala Nirmani <sup>a</sup>, Oshada Perera <sup>a</sup>, Ruvinika Rathnayake <sup>a</sup>  
and Nalanga Hettiarachchi <sup>a</sup>**

<sup>a</sup> *Department of Psychology, Faculty of Arts, University of Peradeniya, Sri Lanka.*

### **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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### **ABSTRACT**

COVID-19 has emerged as the most impactful pandemic after the Spanish flu. As communities adjust to a life with COVID-19 it has become essential to employ different behavioral mechanisms of prevention to curtail community transmission. Perceptual factors such as risk perception and locus of control play a role in the level of stress experienced and the likelihood of employing behavioral methods for the prevention of the spread of the virus. The present cross sectional study utilized four questionnaires measuring COVID-19 related risk perception, COVID-19 related stress, locus of control and adherence to safety measures. The sample consisted of 371 undergraduate students representing all academic years in the Faculty of Arts in the University of Peradeniya, Sri Lanka. A significant relationship was found between COVID-19 risk perception and COVID-19 stress. Increase in internal locus of control was reflective of lower levels of risk perception and COVID-19 related stress. However adherence to safety measures did not have a significant association with COVID-19 risk perception, COVID-19 related stress or their level of internal locus of control. COVID-19 risk perception was also predictive of COVID-19 stress while increasing internal locus of control and adherence to safety measures were not. This suggests perception of risk to be the key predictive factor for the psychological wellbeing of undergraduate students in this study during the COVID-19 pandemic.

*Keywords: Covid-19; risk perception; stress; locus of control; adherence.*

## 1. INTRODUCTION

'Along with the pandemic, fear spreads and grows' [1]. Fear, worry, and stress are normal responses to perceived or real threats, and at times when we are faced with uncertainty or the unknown (WHO, 2020).

The new coronavirus (SARS-CoV-2) is a highly infectious disease that caused an epidemic of acute respiratory syndrome (COVID-19) (Dryhurst et al., 2020). COVID19 started in Wuhan, China and now has impacted a majority of countries around the world. As of April fourteenth, 2020, over hundred and twenty six thousand people have died from COVID-19 globally. Men are at higher risk of dying than women (Caramelo, Ferreira & Oliveios 2020; Jin et al. 2020 as cited in Dryhurst et al., [2]). According to WHO (2020) the novel coronavirus or COVID 19 has presently been reported in two hundred and thirteen countries, areas or territories with cases around the world and three million confirmed cases and more than two hundred thousand deaths has been reported. A pandemic of this magnitude will inevitably have many psychological repercussions.

COVID-19 is now considered as a global pandemic as almost all the countries around the world have been affected by it. A vaccine is still in testing stages in some countries and even the produced one effectiveness can be doubtful due to the highly mutative nature of the virus. Perception about the COVID-19 pandemic differs cross-culturally [3,4]. This is largely due to differences in people's perceptions and behavioral dimensions based on the culture they are operating in .Therefore exploring how experiences and responses relating to the pandemic might change cross culturally is essential.

Students in tertiary educational settings have been impacted in a negative manner by the COVID-19 pandemic due to the changes caused in the methods of instruction and also the pacing of the completion of courses. These changes along with the general psychological and behavioral adaptations that are required in a pandemic situation has caused many university students to experience extreme levels of stress. In a study done by Mustafa (2020) it was found that among a student sample of thousand one hundred and thirty in Turkey, 52.7% of

respondents reported moderate or severe psychological impact due to the outbreak.

Risk perception is a crucial factor that has to be explored in relation to a pandemic situation. Risk perception refers to people's intuitive evaluations of hazards that they are or might be exposed to, including a multitude of undesirable effects that people associate with specific causes (Rohrmann, 2008; as cited in Cori et al.,[1]). A meta-analytic review conducted by Ferrer and Klein [5] points out risk perception has three variations: Deliberative, affective and experiential risk perception. Those who are having deliberate risk perception tend to seek information and they are curious to find out data related to the pandemic situation. However if affective risk perception is higher this might lead people to perceive only certain amounts of risk. Some people intuitively perceive risk within the pandemic situation.

An interdisciplinary research carried out by Cori and colleagues in 2020 points out that risk perception in the environment related to the health domain will form the core of this issue in progress. Therefore it is a situation that needs to be examined further. Taking a step in this direction the current research focuses on how risk perception relating to COVID19 can influence COVID 19 related stress among undergraduates.

Most of the countries have been subjected to a nationwide isolation due the COVID-19 pandemic. Kowalski and colleagues [6] have conducted research in order to explore adherence to safety and self-isolation guidelines, conspiracy and paranoia-like beliefs during COVID-19 pandemic in Poland. They have explored associations between the main variables as well as moderators in this research. With a sample of 840 participants the results indicate that coronavirus conspiracy beliefs such as believing that the COVID-19 virus was man made, the government is hiding actual information about the virus, COVID-19 was created to eliminate the weakest individuals in a population etc [7,8], are negatively related to safety guidelines. Mixed results of this research points out that, prevalence of firmly held corona virus conspiracy beliefs is rare. However, a number of participants in this research displayed partial susceptibility to conspiracy beliefs. Considering COVID-19 related anxiety, their trust level toward media,

and their inner motivation towards isolation were found to play a moderating role in the relationship between conspiracy beliefs and adherence to safety guidelines. Furthermore paranoia like beliefs partially mediated boredom and conspiracy beliefs. Perceptual and behavioral factors are important to explore when it comes to responses that people shows towards the COVID-19 pandemic. Risk perception also plays a significant role in the reactions or behaviors employed by individuals when it comes to prevention or health promotion based behaviors.

The present study aimed to assess the impact of risk perception related to COVID-19 stress and also to explore the possible mediator/moderator roles played by locus of control and adherence to safety measures in the relationship between COVID-19 related risk perception and COVID-19 related stress.

Many researches have been conducted looking at COVID-19 as a fear and anxiety provoking situation. However the impact of the pandemic situation can be much more far reaching in terms of psychological health and well-being.

COVID-19 related psychological impacts involve feeling high levels of stress, anxiety, loneliness and hostility [9]. When it comes to COVID-19 related stress the level of risk perception, internal locus of control, level of government imposed restrictions in terms of mild, moderate and severe, impact the level of stress experienced. There are different sub populations among us who have been affected by the COVID-19 pandemic. University students are one such sub population who is showing many psycho social impacts due to the pandemic situation. Islam and colleagues [10] conducted a study looking at depression and anxiety levels among university students during the COVID-19 pandemic in Bangladesh. The results revealed that 82.4% of students had mild to severe depressive symptoms, and 87.7% of students had mild to severe anxiety symptoms. More than 60% of the students were male. One in three students lived in rural areas (35.1%). Less than a quarter percent of students (24.8%) believed that they were not academically lagging, and just over 30% reportedly have exercise regularly during the lockdown at home. The impact of the academic activities has largely contributed to the stress that students feel [11] and this might also differ based on the academic year the student is in. As final year students generally have more work load the general academic stress they

experience is higher (Kumar et al., 2019) and this could be further increased due to the pandemic situation. Taghrir and colleagues in 2020 conducted a study in order to assess COVID-19 related knowledge, self-reported preventive behaviors and risk perception among Iranian medical students within the first week after the onset of the outbreak in Iran. The results revealed that 94.47% were practicing preventive behaviors amid 94.2% had high levels of performance in preventive behaviors. Furthermore, they found that risk perception was significantly different between stagers and interns and between those being trained in emergency room (ER) and non-ER wards. In addition to the fact that it was indicated a significant negative correlation between self-reported preventive behaviors and risk perception.

Several studies have found a clear link between risk perception relating to COVID-19 and preventive behaviors [12,13,14], (Zbozinek et al, 2020). Engagement in protective behaviors such as hand washing and social distancing are employed as methods of safeguarding oneself rather than ways of preventing community transmission [14], (Zbosinek et al., 2020). Moreover the type of behavioral prevention method employed is influenced by the health threat experienced by the individual. Social distancing is more employed when there is higher level of assessed personal health threat [9]. Engagement of and changing risk perception has also been seen as a possible means through which healthy behaviors can be encouraged among individuals [5,14].

Studies have also found individual variability in risk perception. Factors such as exposure to COVID-19 positive patients due to current job context among medical students [13], personal and pro-social values, personal responsibility, social media based information, self-efficacy in carrying out behavioral prevention strategies, belief in the effectiveness of government policies when it comes to preventing the spread of the virus influence the perception of Risk relating to COVID-19 [2].

Locus of control is often used as a predictor for health behavior. Those individuals with health related internal locus of control attribute greater responsibility to themselves when it comes to maintaining health and wellbeing [15]. Locus of control has been found to have a key impact on COVID-19 related psychological correlates with

external locus of control contributing to higher levels of stress [16,17]. This has been true in the case of university students as well where a study conducted among Italian university students found that students who were higher in internal locus of control showed better psychological adjustment to the pandemic situation [18]. Those who believe in external factors such as the will of God to protect themselves from the virus show the social reaction of fatalism and this largely led to them employing a lesser number of preventive behaviors (Ahmad, 2020).

Locus of control has been found to influence risk perception relating to life threatening situations [19]. In terms of the direction of the correlation between locus of control and risk perception there are contradictory findings with some concluding that in studies conducted with the general population there was a positive correlation between internal locus of control and perceived general risk [20]. However when it comes to life threatening situations there is a positive relationship between external locus of control and risk perception [19].

Adherence to the safety measures plays a significant role in managing pandemic situations. Individual perception about hygienic factors and prevention capacities and employment of difference prevention behaviors the level of adherence displayed play a key role in this circumstance. Park and colleagues in 2010 looked at perceptions, motivating factors, and behaviors associated with the use of hand washing to prevent H1N1 influenza transmission during the peak pandemic period in Korea [4]. Key results indicated in comparison with the situation one year prior, 30.3% of participants reported an enhancement of their hand washing level. There was a reported gender differences in this behavior among the participants in which female students were more likely to practice such behaviors more compared to the male participants (males: 91.2%, females: 94.6%). When comparing whether males and females viewed personal susceptibility to the HINI infection as higher and the severity of the illness as higher it was seen that women considered personal susceptibility to the illness and the severity of the illness also to be higher. However women also perceived the effectiveness of using hand hygiene method to reduce susceptibility to the illness as lower.

Government related regulations also play a key role in determining the level of risk perception

and adherence to safety measures shown by the general public. Weerd [8] and colleagues in 2011 points out high level of trust in the government, fear/worry and perceived vulnerability were positively related to an intention to accept vaccination among a population in Netherlands. Furthermore only fear/worry was positively linked to an intention to adopt protective measures during the entire pandemic.

The study aimed to explore the influence of Covid-19 related risk perception, locus of control and adherence to safety measures on Covid-19 related stress by employing a cross sectional survey research design. The study used a convenient sampling method where undergraduate students were required to answer a set of online questionnaires.

## 2. METHODS

### 2.1 Participants

The study sample consisted of 371 respondents representing the four different study years from the Faculty of Arts, University of Peradeniya, Sri Lanka. First year undergraduates were 64.4% of the total sample while the second, third- and fourth-year undergraduates represented 14.3%, 12.9% and 8.4% respectively of the total sample. The majority of the sample consisted of females (90.6%) and was representative of all socioeconomic groups and provinces in Sri Lanka except for the Northern Province. The majority of students were aged between 20-26 years ( $M= 21.7$ ,  $SD=1.27$ ).

### 2.2 Materials and Procedure

Risk perception: COVID-19 related personal risk perception was measured using an eight item scale adapted and developed by Yildirim and Guler (2020). This was a scale adapted and developed based on a scale developed for SARS (Brug et al., 2004). This scale mainly measures two elements related to personal risk tailor made to suit the context of COVID-19: Cognitive (e.g: Perceived likelihood of acquiring COVID-19) and emotional dimensions (e.g: worry about a family member contracting COVID-19). Each item is rated on a Likert scale ranging between one (*negligible*) and five (*very large*). Higher scores on each dimension is reflective of higher personal risk related to COVID-19.

Covid Stress Scale: COVID-19 related stress was measured by using a 36 item five point

Likert type scale developed by Taylor et al (2020). This comprised of five main dimensions that were assessed: (1) danger and contamination, (2) fears about economic consequences, (3) xenophobia, (4) compulsive checking and reassurance seeking, and (5) traumatic stress symptoms about COVID-19.

Locus of Control: Internal and external locus of control was measured by using a nine item scale developed by Fritzenberg, Mena, Nimczik and Sunde (2019). This seven point Likert scale measures internal locus of control using six items and external locus of control using three items. In addition to this a total score could be calculated by reverse scoring the values in the external locus of control items to indicate increasing internal locus of control.

Adherence to safety measures: The level at which participants adhere to COVID-19 related safety measures was measured by a six item scale developed for the current research based on the COVID-19 related safety guidelines issued by the Government of Sri Lanka. This is a six item scale which requires participants to indicate whether they agree or disagree with statements relating to COVID-19 related hygiene habits (e.g.: "I wear a mask in the proper manner (covering nose and mouth) when necessary").

In the first stage of this study the three questionnaires measuring COVID-19 risk perception, locus of control and COVID-19 related stress was translated to Sinhala and then back translated to English to ensure the conceptual meaning of the questionnaire remains intact. Thereafter the three main questionnaires along with developed questionnaire to measure adherence to COVID-19 related safety measures was taken through a process of content and consensual validation using the Delphi method. Five experts in the Psychology academia in Sri Lanka were requested to take part in the Delphi process. Changes were made to the translated questionnaire based on rating and feedback given by the Delphi panel. Following the finalizing of the questionnaires the second stage of the study commenced.

In the second stage of the study the questionnaires were compiled into one Google form of which the Sinhala and English version were circulated via email to the undergraduate students of the Faculty of Arts. The online method was used as the students were not accessible through face to face means due to the

lockdown which was imposed during the first wave of COVID-19 in Sri Lanka. Participating in the online survey was entirely voluntary and participants were given the right to withdraw at any point during the study and were also given information on accessible services in case of distress experienced during the study.

### 3. RESULTS

Descriptive statistics displayed lower levels of COVID-19 related stress ( $M=53.94$ ,  $SD=25.48$ ). Overall risk perception scores were at the moderate level ( $M=19.35$ ,  $SD=6.524$ ). Emotional risk perception was at a higher rate ( $M=12.30$ ,  $SD=4.69$ ) than cognitive risk perception ( $M=7.04$ ,  $SD=3.166$ ). Increasing internal locus of control was at a moderately high level in the present sample ( $M=46.92$ ,  $SD=7.012$ ). Adherence to safety measures was at a higher level ( $M=25.04$ ,  $SD=3.573$ ).

COVID-19 risk perception and COVID-19 stress was moderately correlated ( $r=.431$ ,  $p=.001$ ). Increase in internal locus of control has a negative significant relationship with both COVID-19 related risk perception and COVID-19 related stress ( $r=-.177$ ,  $p=0.02$ ). Adherence to safety measures did not have a significant correlational relationship with COVID-19 related risk perception, COVID-19 related stress or increase in internal locus of control.

A hierarchical linear regression analysis revealed COVID-19 related risk perception to be a significant predictor of COVID-19 related stress ( $R^2=.186$ ,  $\beta=.431$ ,  $p<0.05$ ) while increase in internal locus of control ( $R^2=.191$ ,  $\beta=.437$ ,  $p<0.05$ ) and adherence to safety measures ( $R^2=.191$ ,  $\beta=.437$ ,  $p<0.05$ ) were not predictive of COVID-19 stress (see Table 1 for a summary of the hierarchical regression).

Fig. 1 shows the mediator and moderator analysis tested in this research. Based on previous research findings locus of control was hypothesized to play a mediator role when it comes to the association between COVID-19 risk perception and COVID-19 related stress. Adherence to safety measures was considered in the context of a mediator and tested.

#### 3.1 Mediation Variable Analysis

In this section the results for the following hypothesis have been presented.

H1: Risk perception has an indirect impact on COVID-19 related stress mediated by external locus of control.

H2: Risk perception has an indirect impact on COVID-19 related stress mediated by internal locus of control.

H3: Risk perception has an indirect impact on COVID-19 related stress mediated by adherence to safety measures.

When we consider the results of the mediation analysis the indirect effect size (0.131) of external locus of control to determining COVID-19 related stress in the present sample the direct effect of COVID-19 related risk perception and COVID-19 related stress was highly significant ( $p < 0.001$ ) and the power of the impact ( $\beta = 0.43$ ) represent a higher value (Table 2). In contrast the indirect impact of COVID-19 related risk perception on COVID-19 related stress mediated by external locus of control is not significant ( $p > 0.05$ ) and the power has decreased ( $\beta = 0.06$ ). Therefore we can assume that the mediation effect of external locus of control with COVID-19 related risk perception to determine COVID-19 related stress is relatively low in the present undergraduate sample. COVID-19 related risk perception and external locus of control individually have a significant predictive ability on each other as well as on COVID-19 related risk perception.

When we consider the results of the mediation analysis the indirect effect size (0.019) of internal locus of control to determining COVID-19 related stress, the indirect impact of COVID-19 related risk perception on COVID 19 related stress mediated by internal locus of control is not significant ( $p > 0.05$ ) and power of the initial power has decreased ( $\beta = -0.007$ ). Therefore we can assume that the mediation of internal locus of control with COVID-19 related risk perception to determine COVID-19 related stress is relatively low in the present undergraduate sample. Internal locus of control does not have a significant predictive influence on either COVID-19 related risk perception or COVID-19 related stress levels.

When we explore the results of the mediation analysis the indirect effect size (0.273) of adherence to COVID-19 related risk perception and COVID-19 related stress, the indirect impact of COVID-19 related risk perception on COVID-19 related stress mediated by internal locus of control is not significant ( $p > 0.05$ ) and power of the initial power has decreased ( $\beta = -0.025$ ) as

depicted in Table 3. Therefore we can assume that the mediation of adherence to COVID-19 related safety measures with COVID-19 related risk perception to determine COVID-19 related stress is relatively low in the present undergraduate sample. Adherence to COVID-19 related safety measures does not have a significant predictive influence on either COVID-19 related risk perception or COVID-19 related stress levels (Table 4).

### 3.2 Moderation Analysis

Hypothesis 4: External locus of control will moderate the relationship between COVID-19 related risk perception and COVID-19 related stress.

Hypothesis 5: Internal locus of control will moderate the relationship between COVID-19 related risk perception and COVID-19 related stress.

Hypothesis 6: Adherence to COVID-19 related safety measures moderate the relationship between COVID-19 related risk perception and COVID-19 related stress.

### 3.3 Testing the Hypothesis of External Locus of Control will Moderate the Relation between COVID-19 Related Risk Perception and COVID-19 Related Stress

To demonstrate that external locus of control acts as a moderator, the relationship between COVID-19 related risk perception and COVID-19 related stress should differ based on the participant's levels of external locus of control. Specifically the moderation effect should be represented by an interaction effect between COVID-19 related risk perception and external locus of control. However in the present sample the interaction terms were not significant indicating that external locus of control does not moderate association between COVID-19 related risk perception and COVID-19 related stress ( $B = -0.038$ ,  $t(367) = -1.493$ ,  $p > .05$ ).

### 3.4 Testing the Hypothesis of Internal Locus of Control will moderate the Relation between COVID-19 Related Risk Perception and COVID-19 Related Stress

To conclude that internal locus of control acts as a moderator, the relationship between COVID-19

related risk perception and COVID-19 related stress should differ based on the participant's levels of internal locus of control. Specifically the moderation effect was should be represented by an interaction effect between COVID-19 related risk perception and internal locus of control.

However in the present sample the interaction terms were not significant indicating that internal locus of control does not moderate association between COVID-19 related risk perception and COVID-19 related stress (B =- 0.020, t(367)=-.420, p>.05).

**Table 1. Summary of hierarchical multiple regression analysis for Main predictors and their effect on COVID-19 related stress**

Model	R	R Square	Adjusted R Square	Std. Error	R square change	Change Statistics			
						F change	df1	df2	Sig. F change
1	.431	.186	.184	23.030	.186	84.172	1	369	.000
2	.437	.191	.186	22.989	.005	2.301	1	368	.130
3	.437	.191	.184	23.016	.000	.139	1	367	.709

**Table 2. COVID-19 related risk perception and COVID-19 related stress mediated by external locus of control**

	Path	Beta (unstand)	SE	Beta (Stand)	Significance
Step 1	c	1.684	0.184	0.431	0.000
Step 2	a	0.164	0.056	0.151	0.004
Step 3	b	0.471	0.186	0.131	0.012
Step 4	C <sup>1</sup>	0.243	0.171	0.067	0.156

Note: unstand-unstandardized; Stand: standardized

**Table 3. COVID-19 related risk perception and COVID-19 related stress mediated by internal locus of control**

	Path	Beta (unstand)	SE	Beta (Stand)	Significance
Step 1	C	1.684	0.184	0.431	0.000
Step 2	A	0.038	0.033	0.060	0.250
Step 3	B	0.117	0.323	0.019	0.718
Step 4	C <sup>1</sup>	-0.044	0.292	-0.007	0.882

**Table 4. COVID-19 related Risk perception and COVID-19 related stress mediated by adherence to safety measures**

	Path	Beta (Unstand)	SE	Beta (Stand)	Significance
Step 1	C	1.684	0.184	0.431	0.000
Step 2	a	-0.009	-0.0290	-0.016	0.758
Step 3	b	-0.225	0.371	-0.031	0.545
Step 4	C <sup>1</sup>	-0.0175	0.335	-0.025	0.602

**Table 5. Moderating effect of external locus of control on Covid-19 related Risk Perception**

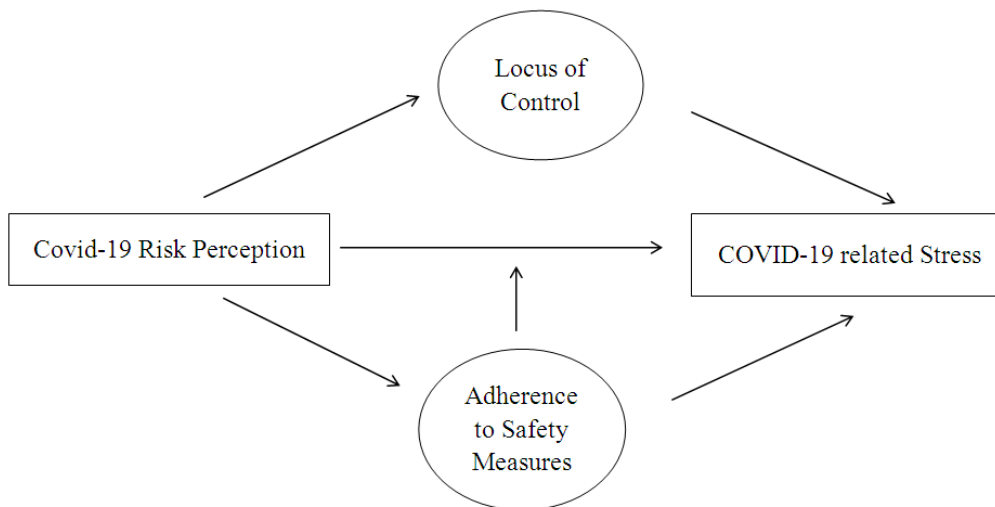
Model	Unstandardized Coefficients		T	Sig.
	B	Std.Error		
Covid-19 Risk Perception	2.260	.452	4.997	.000
External locus of control	.965	.513	1.881	.061
Covid-19 Risk perception x External locus of control	-.038	.025	-1.493	.136

**Table 6. Moderating effect of internal locus of control on Covid-19 related risk perception**

Model	Unstandardized coefficients		T	Sig.
	B	Std.Error		
Covid-19 Risk Perception	1.982	.731	2.713	.007
Internal locus of control	.311	.894	.348	.728
Covid-19 Risk perception x Internal locus of control	.020	.047	-.420	.675

**Table 7. Moderating effect of adherence to Covid-19 related safety measures on Covid-19 related risk perception**

Model	Unstandardized Coefficients		T	Sig.
	B	Std.Error		
Covid-19 Risk Perception	1.874	1.248	1.501	.134
Adherence to safety measures	-.029	1.003	-.029	.977
Covid-19 Risk perception x Adherence to safety measures	-.008	.049	-.155	.877



**Fig. 1. Mediator and moderator mode based on COVID-19 risk perception, locus of control, adherence to safety measures and COVID-19 related stress**

**3.5 Testing the Hypothesis of Adherence to COVID-19 Related Safety Measures will Moderate the Relation between COVID-19 RELATED RISK Perception and COVID-19 Related Stress**

To demonstrate that adherence to COVID-19 related safety measures acts as a moderator, the relationship between COVID-19 related risk perception and COVID-19 related stress should differ based on the participant’s levels of adherence to COVID-19 related safety measures. Specifically the moderation effect should be represented by an interaction effect between COVID-19 related risk perception and adherence to COVID-19 related safety measures. However as shown in Table 7, in the present sample the

interaction terms were not significant indicating that adherence to COVID-19 related safety measures does not moderate association between COVID-19 related risk perception and COVID-19 related stress (B = - 0.020, t(367)=-.420, p>.05).

**4. DISCUSSION AND CONCLUSION**

Based on the aforementioned and discussed studies on psychological phenomena related to people’s risk perception and COVID-19 related stress, there is a dearth in available research that looks at perceptual and behavioral responses to the COVID-19 pandemic. Moreover there are a less to no research conducted specifically considering COVID-19 related risk perception



and COVID-19 stress considering the mediator and moderator effects of locus of control and adherence to safety measures.

The present study wanted to explore (a) the correlation between risk perception and COVID-19 related stress. (b) Impact of risk perception on COVID-19 related stress (c) Mediator effect of locus of control and adherence to the safety measures between risk perception and COVID-19 stress. Based on the findings the following can be concluded: The students' sample we considered showed a lower level of COVID-19 related stress and a moderate level of risk perception. Moreover emotional risk perception was observed to be at a higher level compared to cognitive risk perception. Internal locus of control was at a moderately high level compared to adherence to safety measures which was at a higher level.

- (a) COVID-19 related risk perception was found to be predictive of COVID-19 stress. This finding is similar to the findings of previous research (Seale et al, 2020; Taghirr, Borazjani&Shirlay, 2020; Wise et al, 2020; Zbozinek et al, 2020). The individual correlations between locus of control and COVID-19 risk perception and COVID-19 related risk perception and COVID-19 related stress was found to be significant. In the current sample higher levels of internal locus of control led to lesser levels of experienced risk perception and COVID-19 stress levels. This association could be due to them relying on themselves to control the susceptibility factor relating to COVID-19 which in turn will lead to the lesser experience of stress.

The significant negative relationship between COVID-19 related risk perception and internal locus of control found in this research stands in contradiction to other research findings where internal locus of control was seen to be a factor that increases risk perception and thereby increasing adherence to safety precautions (Zeno, Cretu & Lonescu, 2017). However previous studies conducted have found when individuals have higher external locus of control then their risk perception is higher as they rely on the health system of the country more to protect them from the health crisis rather than depending on themselves (Macaden & Clarke, 2009). This could be interpreted in the opposite direction when it comes to internal locus of control as individuals with internal locus of control will

perceive lesser levels of risk as they hold themselves responsible for carrying out activities to protect themselves.

- (b) Among the variables which had low predictive values between the predictor variables and outcome variables, the risk perception had somewhat high predictability in determining COVID-19 related stress. People are requested and informed of method of prevention against COVID-19 via mass media as well as social media and a variety of other information sources as well. We can assume that consistent exposure to such information sources as causing an increase in perceived risk levels and thereby also COVID-19 related stress.
- (c) When it comes to the mediator effect played by locus of control and adherence to safety measures internal locus of control and external locus of control had a low mediator effect on COVID-19 stress. Even though internal locus of control was negatively correlated with risk perception and COVID-19 related stress, its role as a mediator was limited. The mediation of adherence to safety measures also had low mediation between considered predictor variable and outcome variable.

Since there was no mediation of locus of control and adherence to the safety measure the moderator analysis was carried out. That also indicated that locus of control and adherence to safety measures had no moderator effect between the relationship that can be seen between the risk perception and COVID-19 stress.

The effect of predictor variable on the outcome variable can be considered as the most significant finding of this study. However the impact value is comparatively lower than we expected.

Even though there is a significant positive correlation between risk perception and adherence to safety measures its predictive value of risk perception on adherence to the safety measures was not indicated in this research. Future researches can be carried out in this array of not having an impact amid having a relationship between particular variables.

Though the mediator and moderator model did now show adequate fit to the current population

the direct independent association of COVID-19 risk perception, locus of control and adherence to safety measures is clear from this study. Situational and cultural pattern we can see in the Sri Lankan setting might also play a role to determine the way of reacting to a stress emerged in pandemic situations.

## CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the authors.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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