MEDIATING EFFECT OF AUTISTIC TRAITS BETWEEN THE EMOTIONAL IMPACT OF PANDEMIC AND DEPRESSIVE SYMPTOMS

EFECTO MEDIADOR DE LOS RASGOS AUTISTAS ENTRE EL IMPACTO EMOCIONAL DE LA PANDEMIA Y LOS SÍNTOMAS DEPRESIVOS

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Abstract

Background. The pandemic is having a significant impact on mental health, especially in vulnerable groups. Method. A conditional analysis was carried out with a population of 185 people. The study population did not have any psychiatric diagnosis, they are people without autism. The age of the participants ranges between 18 and 72 years (M = 31.43; SD = 16.26). The mediating role of autistic traits and the moderating role of age between the emotional impact of the pan-demic and depressive symptoms are analyzed. Results. The results demonstrate a significant influence of age and emo-tional impact of the pandemic on the depressive symptoms. The mediating variable autistic traits was also significant. Conclusions. These results point to the younger population with autistic traits as particularly vulnerable.

Keywords: Autism traits; COVID-19; depressive symptoms; pandemic.

Resumen

Antecedentes. La pandemia está teniendo un impacto significativo en la salud mental, especialmente en los grupos vulnerables. Método. Se realizó un análisis condicional con una población de 185 personas. La población de estudio no tuvo ningún diagnóstico psiquiátrico, son personas sin autismo. La edad de los participantes oscila entre 18 y 72 años (M = 31.43;

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DT = 16.26). Se analiza el papel mediador de los rasgos autistas y el papel moderador de la edad entre el impacto emocional de la pandemia y los síntomas depresivos

Resultados. Los resultados demuestran una influencia significativa de la edad y del impacto emocional de la pandemia sobre los síntomas depresivos. La variable mediadora rasgos autistas también fue significativa. Conclusiones. Estos resultados señalan que la población más joven con rasgos autistas es especialmente vulnerable.

Palabras clave: Rasgos autistas; COVID-19; síntomas depresivos; pandemia.

Introduction

The impact of the COVID 19 Coronavirus pandemic is being very significant at health, and psychological levels. Some studies have detected a significant psychopatho-logical impact on the general population (Chen et al., 2020; Duan & Zhu, 2020; Li et al., 2020; Yang et al., 2020) and population with previous psychiatric diagnoses where this impact was greatest (Colizzi et al., 2020; Kwong et al., 2021; Varma et al., 2021).

During this period the prevalence of anxiety and stress have increased significant-ly, reaching 35% in a study with 52,730 people, being more common in women and the population between 18-30 years (Kwong et al., 2021). One of the factors that most influ-ence the increase in psychological stress is the use of social networks to inform about the evolution of the pandemic (Qiu et al., 2020; Roy et al., 2020; Sandín et al., 2020). Roy et al. (2020) studied 662 people in India and observed concern in 72 %, 40 % were paranoid about the possible infection and 12 % had sleep problems. Regarding the psychological impact of the pandemic on university students, severe anxiety symptoms are reported in 0.9 %, moderate in 2.7 % and mild in 21.3 % (Cao et al., 2020). In addition, this study demonstrated that the most significant protective factors against anxiety were to reside in an urban area, to have economic stability and living with parents.

Regarding depressive symptoms during the pandemic, the prevalence ranges from 7.45 % to 48.30 %, depending on the studies. In a recent meta-analysis, Bueno-Notivol et al. (2021) reported a 25 % prevalence of depression during the COVID-19, which is 7.5 % higher than the prevalence of 3.44 % observed in 2017.

Factors contributing to this increase in prevalence include lower economic income, poor health status, sleep disturbances, lack of physical activity, hypertension, respiratory problems, fear of COVID-19 reinfection, and persistent COVID-19 symptoms (Islam et al., 2021; Varma et al., 2021). In addition, the increase of depressive and anxiety symptoms observed during large periods of con-finement (Tang et al., 2021) was associated to age, with younger people being the most vulnerable (Jung et al., 2020; McGinty et al., 2020; Pierce et al., 2020; Rossell et al., 2021; Shah et al., 2021; Varma et al., 2021).

Sandín et al. (2020) reported during the initial phase the COVID-19 the most common fears are related with disease, contagion, and death, in addition to employment, income and social isolation issues. Emotional symptoms such as depression, anxiety, worry or restlessness and sleep problems were also reported. Intolerance to uncertainty and exposure to the media were pointed out as impact enhancing factors.

Cybercondria is a form of anxiety about one's own health status, because of excessive reviews of online health information. This disorder may lead to increase of unnecessary medical expenses, worry, distress, etc. (Starcevic et al., 2020). In addition, cyberchondria is related to health anxiety (Durak-Batigun et al., 2018; Fergus & Spada, 2017, 2018; Mc Mullan et al., 2019), associated a problematic use of the internet (Fergus & Spada, 2017; Selvi et al., 2018) and with obsessive compulsive disorders (Bajcar & Babiak, 2019; Bajcar et al., 2019; Fergus, 2012). People who use frequently the media as an information source increase cyberchondria COVID-19 and in-formation overload (Farooq et al., 2020). Cybercondria increase the anxiety to COVID disease (Jungmann & Witthöft, 2020), due to increased exposure to the fear of contagion and a distorted symptoms of the disease in the media (Farooq et al., 2020; Kouzy et al., 2020).

Regarding the impact of the pandemic on people with disabilities and chronic illnesses, a close link between stress and coping strategies such as the ability to distract one-self, denial, religion, or blame has also been observed (Umucu & Lee, 2020). Within the population especially vulnerable to pandemic (Baweja, Brown, Edwards & Murray, 2021) and anxiety, there are people with Autism Spectrum Disorders (ASD), who show higher levels of stress associated with the severity of the characteristic symptoms of the disorder (i.e., Hallett et al., 2013; Mayes et al., 2011). More autistic traits have also been seen in people with depressive and anxiety disorders (Hollocks et al., 2019; Pine et al. 2008; van Steensel et al., 2013) and a significant relationship between autistic and anxious or depressive traits in people without psychiatric disorders (Kanne et al. 2009; Rai et al., 2018; Scherff et al. 2014).

Additionally, one of the enhanced variables of the impact of the pandemic on men-tal health is exposure to the media (Qiu et al., 2020; Roy et al., 2020; Sandin et al., 2020), and this exposure it is significantly higher among people with ASD, reaching a higher risk of internet addiction (García et al., 2020; Kawabe et al., 2019). One of the signs that show the increase in anxiety and discomfort in people with ASD are behavioral problems, which have increased during confinement (Colizzi et al., 2020). Other effects the pandemic has had on people with ASD and intellectual disa-bilities are a significant decrease in balance, along with a deterioration of well-being and ASD symptoms in the period of confinement and an improvement in executive functions after return to normal life (Jodra & García-Villamisar, 2022).

There is a close relationship between autistic traits and anxiety or depression in the clinical and non-clinical population (Hollocks et al., 2019), so it is expected that there will be greater vulnerability to anxiety and depression during the pandemic in people with a higher level of autistic traits. The primary aim of this study is to explore the mediating capacity of autistic traits and the moderating capacity of age in the relationship between the emotional impact of COVID-19 and depressive symptoms in the general population. The hypotheses of this study were, first, that autistic traits would significantly mediate between the emotional impact of the pandemic and depressive symptoms, and second, that the moderating role of age would also prove significant.

Method

Participants

A total of 185 people residing in the Community of Madrid (Spain) participated. The study population did not have any psychiatric diagnosis, they are people without autism. The age of the participants ranges between 18 and 72 years (M = 31.43; SD = 16.26), and 159 are women (85.9 %). Although 1.9 % have not received a positive for COVID 19 until the completion of the questionnaires, however 8.1 % have received a positive result. Regarding the employment situation, 32.4 % were active people, 1.6 % unemployed, 7 % re-tired, and 58.9 % university students. T4.9 % of the participants live alone, 18.9 % with 1 person, 22.2 % with 2, 31.4 % with 3, 18.9 % with 4 and 3.6 % with more than 5 (Table 1).

Table 1.

Participant demographic characteristics (N = 185)

	n	%
Gender		
Male	26	14.1
Female	159	85.9
Diagnosed with COVID-19		
Yes	15	8.1
No	170	91.9
Number of cohabitants		
1-2	76	41.1
3-4	93	50.3
+ 5	7	3.7
Professional status		
Student	109	58.9
Active	60	32.4
Unemployed	3	1.6
Retired	13	7.0
Autism Traits		
Low (Scores 0-2)	97	52.4
Moderate (Scores 3-4)	58	31.4
High (Scores over 5)	30	16.2

Note. Age = Min: 18.00, Max: 72.00, M: 31.432, SD: 16.269.

Participants were informed of the characteristics and objectives of the study and gave informed consent, then completed online questionnaires between January 15 and February 15, 2021. The study was reviewed and approved by the Ethics Committee of the Psychopathological Unit at Faculty of Education (Complutense University of Madrid, Spain).

Assessment instruments

Coronavirus Psychological Impact Questionnaire-Media Exposure (CPIQ-ME; Sandín et al., 2020)

CPIQ-ME is a 4-item scale designed to assess media exposure, including televi-sion, internet, social media, and newspapers. The scale includes three possible answers ranged from 1 («Little to nothing» to 3 («The main part of the day»). The psychometric proprieties are acceptables (Sandín et al., 2020).

Cyberchondria Severity Scale (CSS; McElroy & Shevlin, 2014)

The CSS is a 33-item self-report questionnaire assessing anxiety and behaviors associated with online health information seeking (McElroy & Shevlin, 2014). It is made up of 5 subscales: compulsion (interference with other activities), distress, excessiveness, reassurance, and mistrust of medical professionals. The CSS total score demonstrated ex-cellent internal consistency (α = .95). In addition, the CSS subscale scores demonstrated good to excellent internal consistency ($\alpha's$ = .81 to .95; McElroy & Shevlin, 2014).

Fear of COVID-19 Scale (FC-19S; Kwasi Ahorsu et al., 2020)

Fear of COVID-19 Scale is a seven-item unidimensional scale with robust psy-chometric properties. Moreover, total scores on the FCV- 19S are comparable across both genders and all ages which suggest that it is a good psychometric instrument to be used in assessing and allaying fears of COVID-19 among individuals. the internal consistency was good (α = .82), composite reliability (0.88) and AVE (0.51) were acceptable (Kwasi Ahorsu et al., 2020).

COVID-19 Peritraumatic Distress Index (CPDI; Qiu et al., 2020)

The original questionnaire was published in Chinese by Qiu et al. and translated into English by the same authors (2020). It consists of 4 dimensions and 24 items in total. The objective is to measure the emotional impact (EI) caused by COVID; the frequency of anxiety, depression, specific phobias, cognitive change, avoidance and compulsive behav-iour, physical symptoms and loss of social functioning in the past week, ranging from 0 to 100. A score between 28 and 51 indicates mild to moderate distress. A score $\geq$ 52 indi-cates severe distress. The Cronbach's alpha of CPDI is 0.95 ($p < .001$; Qiu et al., 2020).

Coronavirus Anxiety Scale (CAS; Lee, 2020)

The CAS is made up of five items that allow identifying the frequency of physio-logical symptoms generated by thoughts and information related to COVID-19 during the last two weeks. How often the anxiety symptoms were experienced is answered from a scale with five response options (0 = not at all to 4 = almost every day). The CAS score ranges from 0 to 20, where a higher value expresses a higher frequency of anxiety symp-toms due to COVID-19. The original English version of the CAS had a Cronbach's alpha coefficient value of .93. (Lee, 2020).

The Autism Spectrum Quotient (AQ-10; Allison et al., 2012)

The 10-item AQ (AQ10; Allison et al., 2012), is a short-ened version of the AQ (Baron-Cohen et al., 2001). Is a standardised self-report ques-tionnaire designed to measure the degree to which adults with normal intelligence have the traits associated with the autism spectrum. Internal consistency was > 0.85. (Allison et al., 2012).

Patient Health Questionnaire (PHQ-9; Spitzer et al., 1999)

The Spanish version of the depression scale PHQ-9 (Baader et al., 2012) was used, which consists of 9 items that assess the presence of depressive symptoms present in

the last 2 weeks. Each item has a severity index corresponding to: 0 = "never", 1 = "some days", 2 = "more than half of the days" and 3 = "almost every day". It shows adequate internal consistency, with a Cronbach's alpha of .83. (Spizer et al., 1999).

Sociodemographic variables

Finally, data were collected on age, gender, number of people with whom they live, employment status and health status in relation to COVID.

Statistical Analysis

All analyses were performed using SPSS Statistics Base 25 (IBM Corp., 2018). Pearson's bivariate correlations were calculated to assess the relationships between the variables included in the study (autistic traits, anxiety symptoms, emotional impact of the pandemic, cyberchondria, media exposure, fear of COVID-19 and depressive symptoms).

Given the above results, a moderated mediation or conditional process analysis was conducted for the emotional impact of pandemic (X) and depressive symptomatology (Y), following Hayes' (2018) model 7. The variable introduced as mediator was ASD traits (M1) and the variable proposed to moderate this relationship was age.

Results

Descriptive Statistics

Table 1 shows the descriptive statistics of the sample studied. Age, gender, num-ber of cohabitants, previous diagnosis of COVID-19, professional situation and autistic traits are included.

Correlations

First, a bivariate correlation analysis was performed among autism traits, corona-virus anxiety symptoms, emotional impact of the pandemic, cyberchondria, media expo-sure, fear of COVID-19 and depressive symptoms.

Autistic traits positively correlated with depression symptoms, (r = .273; p < .01), emotional impact of the pandemic (r = .207) and with fear of COVID-19 (r = .20), all *ps* < .05 (Table 2).

Table 2.

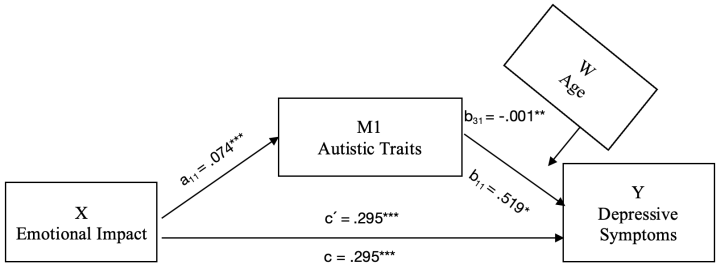
Descriptive statistics and intercorrelations among all measured variables.

	1	2	3	4	5	6	7
1. Autistic Traits (AQ-10)	1						
2. Coronavirus Anxiety symptoms (CAS)	.071	1					
3. Emotional impact of the pandemic (CPDI)	.207**	.648**	1				
4. Cyberchondria (CSS)	.128	.381**	.405**	1			
5. Media Exposure (ME)	.030	.173*	.214**	.251**	1		
6. Fear of COVID-19 (FC-19S)	.150*	.444**	.608**	.498**	.210**	1	
7. Depressive Symtoms (PHQ 9)	.273**	.434**	.716**	.415**	.065	.371**	1

Note. *** p < .001, (two-tailed). ** p < .01(two-tailed)., * p < .05 (two-tailed).

Figure 1.

Graphical representation of conditional analysis.



Note. a_{11} = direct effect of emotional impact on autistic traits; b_{11} = direct effect of autistic traits on depressive symptoms; b_{31} = Interaction effect of the age variable on the relationship between autistic traits and depressive symptoms; c´= direct effect of the emotional impact of the pandemic on depressive symptoms; ** $p < .010$; *** $p < .001$.

Conditional analysis

The main objective of this study is to explore the mediating capacity of autistic traits and the moderating capacity of age in the relationship between the emotional impact of COVID-19 and depressive symptoms in the general population. To achieve this, a moderated mediation or conditional processes analysis (Hayes & Rockwood, 2020) was conducted for the emotional impact of COVID-19 (X) and depressive symptoms (Y), following Hayes' (2018) model 7. This replicated in 10,000 bootstrapping samples. The variable introduced as mediator was autistic traits (M1) and the variable proposed to moderate this relationship was age (W) (see Figure 1).

The direct effect of the variable W -age- on depressive symptoms was significant ($b_2 = .037$, SE = .013; $p < .050$), as well as the interaction effect of the age variable, that is, the moderating effect ($b_{31} = -.001$, SE = .000; $p < .050$). Similarly, the direct effect between the emotional impact of the pandemic and depressive symptoms was significant ($c´ = .295$, SE = .022; $p = .000$). The conditioned effect of the age, that is, the moderate mediation index, was also significant for the relationship between the mediating variable autistic traits, since the confidence interval does not contain 0 ($b_{11}b_{31} = -.000$, SE = .000, [-.001, .000]).

Table 3.

Model of conditional analysis.

					Constant			
		M_1 (Autistic Traits)				***Y (Depressive Symptoms)***		
Antecedents		*Coef.*	*SE*	*p*		*Coef.*	*SE*	*p*
X (Emotional Impact)	a_{11}	.074	.018	<.001	c´	.295	.022	<.001
M_1 (Autistic traits)	-	-	-	-	b_{11}	.519	.206	<.050
W (Age)	-	-	-	-	b_2	.037	.013	<.050
M_1*W	-	-	-	-	b_{31}	-.001	.000	<.050
Constant	i_{M1}	.695	.556	>.050	i_Y	-1.338	.809	>.050
		$R^2 = .090$				$R^2 = .529$		
		F (3,181) = 5.964, $p < .001$				F (2,182) = 102.386, $p = .001$		

Note. i_{M1}, i_{M2} and i_Y are intercepts of the regression.

The differences in each of the levels of the moderating variable in its indirect con-ditional effects show that this relationship was significant for younger people. That is, the relationship mediated by autistic traits between the emotional impact of the pandemic and depressive symptoms is significant in people under 23 years of age (.005, .033).

Discussion

The results obtained in the correlation analysis agree with those obtained in other investigations confirming a relationship between depressive symptoms and autistic traits ($r = 273$, $p < .05$). These investigations have observed more ASD traits in people with anxiety and depressive disorders (van Steensel et al., 2013) and a significant relationship between autistic and depressive traits in people without psychiatric disorders (Rai et al., 2018; Scherff et al., 2014).

On the contrary, it has not been possible to demonstrate a relationship between au-tistic traits and exposure to the media ($r = .030$, $p > .05$), as expected based on previous findings regarding exposure to the media significantly higher in people with ASD and, therefore, a higher risk of internet addiction (García et al., 2020; Kawabe et al., 2019). Also, nor could we observe a significant relationship with cybercondria ($r = 0.128$) or with anxiety symptoms or traits ($r = 0.071$). These findings can be explained by the characteristics of the study population, as they do not have a diagnosis of ASD, so we are assessing ASD traits in general population and previous findings about autism, media and cyberchondria, correspond to people with a diagnosis of autism. In addition, many of the studies on this topic address it in a normalized context, not in a pandemic.

During the pandemic, symptoms related to anxiety and depression have increased. The prevalence of depression ranges from 7.45 % to 48.30 %, depending on the studies. As for depression, the prevalence ranges from 7.45 % to 48.30 % depending on the stud-ies, with an average of 25 %, which is 7 times higher than the incidence before the pan-demic. (Bueno-Notivol et al., 2021).

In order to develop intervention and prevention programs, it is important to know the variables that are related to its appearance, which make a person more vulnerable. Some variables such as the level of restrictive measures (Tang et al., 2021), the number of days of confinement (Shah et al., 2021), lower economic income, poor health status, sleep disturbances, lack of physical activity, hypertension, respiratory problems, fear of COVID-19 reinfection, persistent COVID-19 symptoms (Islam et al., 2021; Varma et al., 2021) or age (Jung et al., 2020; McGinty et al., 2020; Pierce et al., 2020; Rossell et al., 2020; Shah et al., 2021; Varma et al., 2021) could be confirmed. The results achieved in this study also demonstrate a significant influence of age on depressive symptoms ($b_2 = .037$, SE = .013; $p < .050$). And additionally, a significant influence of the emotional impact of the pandem-ic on the occurrence of these symptoms is observed: ($c' = .295$, SE = .022; $p = .000$). The moderate mediation index was also significant for the relationship between the mediating variable autistic traits, since the confidence interval does not contain 0 ($b_{11}b_{31} = -.000$, SE = .000, [-.001, .000]).

Limitations

There are some limitations that should be considered when interpreting the results of this study. First, all the outcomes were self-reported, which might lead to bi-ased data. However, using self-reported scales is very common because of its utility and low cost. In addition, the household surveys were not considered opportune in order to satisfy the WHO recommended "social distance" during the COVID-19 pandemic; Second, this is a cross-sectional study, so the trajectory of the mental health of the participants could not be analyzed and we cannot draw long-term conclusions; Third, we do not have data about the possible previous diagnosis of the mental health of the participants, so we were not be able for them in our analysis. Fourth, the individuals without internet could not include in this study.

Future Directions

The results achieved point to the population with autistic symptomatology and younger age as a priority target for intervention within the framework of mental health.

Previous research points to the existence of a close link between depression and anxiety with ASD. This study has been able to confirm the mediating capacity of autistic traits between the emotional impact of the pandemic and depressive symptomatology, sig-nificantly moderated by age. In this sense, it is necessary to take into account the development of preventive interventions for this population.

Conclusion

Autistic traits influence the relationship between pandemic impact and depressive symptoms, with age being a significant moderating variable. These results again demon-strate a significant relationship between autism and depressive symptoms in a particularly complicated situation, such as an international pandemic.

In recent months many clinicians are warning about a significant increase in men-tal health-related disorders caused by the pandemic. Identifying those who are vulnerable to intervene in a preventive manner is extremely important. This study identifies two variables as causing increased vulnerability: autistic traits and age.

Declarations

Conflict of Interest

The authors confirm they have no financial or nonfinancial conflicts of interest.

Ethical Approval

The study was approved by the Ethics Committee of the Psychopathological Unit at Faculty of Educa-tion (Complutense University of Madrid, Spain).

Informed Consent Informed consent was obtained from all individual participants included in the study.

Data Availability

The datasets generated during and/or analysed during the current study are available from the correspond-ing author on reasonable request.

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