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ARTICLE

Stress, anxiety, and depression levels in the initial stage of the COVID-19 outbreak in a population sample in the northern Spain

Niveles de estrés, ansiedad y depresión en la primera fase del brote del COVID-19 en una muestra recogida en el norte de España

Níveis de estresse, ansiedade e depressão na primeira fase do surto de COVID-19 em uma amostra no norte da Espanha

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Abstract

The SARS-CoV-2 virus reached Spain in March 2020, and a nationwide state of alert was declared on March 14th, leading to the confinement of the entire population. The current study was conducted in the Basque Autonomous Community in northern Spain. The authors analyzed stress, anxiety, and depression with the arrival of the virus and the levels of symptoms according to age, comorbidity, and confinement. Levels of anxiety, stress, and depression were measured in a sample of 976 adults, using the DASS scale (Depression Anxiety, and Stress Scale)*. Although levels of symptoms were generally low at the start of the alert, younger individuals with chronic diseases reported more symptoms than the rest of the population. The study also detected higher levels of symptoms after the stay-at-home order was issued. Such symptoms are predicted to increase as the confinement continues. The authors propose psychological interventions for prevention and treatment in order to mitigate the pandemic's psychological impacts.*

COVID-19; Traumatic Stress Disorders; Anxiety Disorders; Controlled Confinement; Chronic Disease

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Introduction

An outbreak of a new coronavirus pneumonia occurred in December 2019 in Wuhan, Hubei Province, China [1]. The new coronavirus disease (COVID-19) began to spread throughout China in early 2020. This rapid increase in confirmed cases and deaths has created problems such as stress, anxiety, and depression both in medical personnel and in the general population [2]. The disease has also spread worldwide, and Europe in general and Spain in particular have become important hotspots of the pandemic.

In the Basque Autonomous Community, located in northern Spain, a COVID-19 alert was declared in March 2020. In this region, with 2,167,707 inhabitants, the first case was reported on February 28th, and cases increased quickly. On March 10th, the Basque Health Council requested the population's collaboration in complying with the prevention guidelines. On March 12th, the Basque Government temporarily closed classes in the entire school system, from daycare centers through universities. On March 13th, the Basque Government Council declared a health emergency. On March 14th, the Spanish Government declared a nationwide state of alert and stay-at-home order, creating an unpreceded situation [3].

Beyond the medical risk, the pandemic is having enormous psychological and social impacts. Various lines of research had focused previously on understanding how societies define the origin and impact of epidemics and how they deal with them, with emotional coping as a key to the process [4].

In the current unprecedented situation, it is difficult to accurately predict (and thus estimate) the psychological and emotional consequences of COVID-19. Studies from China, the first country affected, indicate that fear of the unknown and uncertainty can lead to the development of mental disorders such as stress, anxiety, depression, somatization, and adverse behaviors such as increased alcohol and tobacco consumption [5].

A study from January 31 to February 2, 2020, with 1,210 individuals in 194 cities of China administered the *Depression, Anxiety, and Stress Scale* (DASS-21). The study aimed to conduct a online survey with snowball sampling techniques to better understand the levels of psychological impact, anxiety, depression, and stress, among other variables, in the initial stage of the COVID-19 outbreak. 16.5% of the participants showed moderate-to-severe depressive symptoms; 28.8% had moderate-to-severe symptoms of anxiety; and 8.1% reported to moderate-to-severe stress levels [6]. Poor health status was significantly associated with greater psychological impact, as measured by levels of stress, anxiety, and depression [6].

A study of 1,354 Canadian adults in early February 2020 showed that one-third of the individuals interviewed were worried about the virus and that 7% were "very worried" [7]. At the time of the survey, there were only 4 Canadians infected, indicating very low risk for a country of 37 million inhabitants. Nonetheless, 7% of the population, or 2.6 million individuals, were very worried. Likewise, at the global level, fear of COVID-19 is much greater than that of seasonal flu outbreaks, although the latter have killed considerably more individuals [7].

Fear, uncertainty, and stigmatization are common in any biological disaster, and it is thus essential to implement appropriate clinical and mental health interventions [8]. It is equally important to know the actual psychological status of the groups potentially targeted for such interventions, since each group can perceive the risk differently [9]. For example, in the H1N1 influenza epidemic in 2009, the university population was not worried about the pandemic situation and did not even consider it serious. In fact, the younger individuals interviewed (20-34 years of age) were the ones that most believed they were not susceptible to H1N1 influenza, although their own age group had been the one most affected by previous flu pandemics [10].

In short, in an international public health emergency like the one we are now experiencing, it is important to investigate the pandemic's psychological impact on actual populations in order to develop strategies to reduce symptoms during the crisis [6]. The current study thus measured levels of stress, anxiety and depression in a sample of adults in the Basque Autonomous Community at the precise moment when the outbreak struck, in order to analyze the psychological needs of those coping with the pandemic and possible predictive factors.

Higher levels of stress, anxiety, and depression are predicted in the wake of the stay-at-home order [11], since confinement may tend to produce or exacerbate such psychological problems [12].

It is also expected that individuals with chronic illnesses will present higher levels of psychological symptoms [13], since COVID-19 tends to present more severely in individuals with multiple comorbidities [14].

As for age range, older adults are expected to be more psychologically vulnerable to the pandemic, while younger adults are expected to self-protect through an optimistic bias, or self-perceived invulnerability [15].

Methodology

This is a cross-sectional exploratory-descriptive study. For the sample collection techniques, given the unfolding situation with the COVID-19 outbreak, the choice was made to use a Google Forms (https://www.google.com/forms/about) questionnaire, which was sent to individuals via online platforms, social networks, and emails to different associations. Questionnaires were sent to a total of approximately 2,400 individuals, of whom 1,003 replied. After analyzing the database in Microsoft Excel (https://products.office.com/), the questionnaires showed a pattern of lack of answers in more than 50% in various items on various subjects. Accordingly, we opted to exclude all questionnaires with fewer than 50% of the items completed, and 27 questionnaires were thus removed from the sample. The study complied with all the provisions of *Law 15/1999* on Protection of Personal Data, and the questionnaires informed the voluntary nature of the individuals' participation and the need for their consent before answering the questionnaire.

The DASS-21 [16,17] was the scale used by the research team on the items related to the participants' sociodemographic variables. The answers were collected via email and exported to Excel for analysis with the SPSS statistical package, version 25 (https://www.ibm.com/).

DASS-21 consists of 21 Likert-type items and presents 3 factors: Depression (items: 3, 5, 10, 13, 16, 17, and 21), Anxiety (items: 2, 4, 7, 9, 15, 19, and 20), and Stress (items: 1, 6, 8, 11, 12, 14, and 18). This categorization of the different dimensions is obtained via the sum of the scores on the answers to the items corresponding to each of the factors. The available options for answering this scale were: 0: did not apply to me at all; 1: applied to me to some degree, or some of the time; 2: applied to me to a considerable degree or a good part of the time; and 3: applied to me very much or most of the time. Example of answers to the questions were: "I tended to overreact to certain situations" or "I found myself getting agitated". The answers were categorized with the cutoffs adopted by Antony et al. [16] to classify depression, anxiety, and stress and thus the level of symptoms (no symptoms, mild, moderate, severe, and extremely severe). The scale's reliability was analyzed with Cronbach's alpha (α), varying according to the factor: for depression it was $\alpha = 0.076$, anxiety $\alpha = 0.82$, and stress $\alpha = 0.75$. To guarantee the questionnaire's validity, the reference used the indices for the relationship between variables: anxiety and stress ($r = 0.713$), depression and stress ($r = 0.698$), and depression and anxiety ($r = 0.681$), from the same scale, proving the close, positive, and strong relationship between the factors. In addition, as for the correlation between the target factors, we considered previous studies on the scale's convergent and discriminant validity to guarantee its reliability and validity in this study with a normative population.

The ad hoc procedure to collect the participants' sociodemographic data, designed with closed questions, asked their age, sex, province, date of completion of the questionnaire, and presence or absence of chronic disease. Age was later categorized in three brackets (18-25, 26-60, and 61 years and older). The youngest age bracket comprised the largest share of the sample, with 551 participants, followed by 347 individuals 26 to 60 years of age and 78 individuals 61 years or older (the oldest individual that answered the questionnaire was 78). Sex was categorized as male, female, or other (although everyone in the study self-identified as male or female). Province was divided into three categories: 1 = Bizkaia (n = 700); 2 = Araba (n = 93), and 3 = Gipuzkoa (n = 183). Finally, chronic disease was classified dichotomously as yes or no, that is, whether the individual currently had any chronic disease.

The data obtained with the two questionnaires were used for descriptive analyses to study the rates of depression, anxiety, and stress symptoms stratified by sex, age bracket, province, date of completion of the questionnaire (before or after March 14), and chronic disease.

Results

A total of 976 individuals from the Basque Autonomous Community participated in the study. Participants were recruited from March 11 to 15, 2020, from the three provinces of the Basque Autonomous Community. Women constituted 81.1% (n = 792) of the sample, with men comprising the other 18.9% (n = 184). The 18-to-25-year age group constituted 56.5% of the sample (n = 551), followed by 35.6% (n = 347) from 26 to 60 years and 8% (n = 78) 61 years or older (the oldest participant was 78). Of all the participants, 14.9% (n = 145) reported at least one chronic disease, while the other 85.1% (n = 831) reported no such diseases.

Tables 1, 2, and 3 shows the numbers and rates of different levels of depression, anxiety, and stress, respectively, stratified by different sociodemographic variables. The numbers and rates of participants that did not present any symptoms are not shown, but each category indicates the total numbers per category to provide a more detailed view of the participants that were not classified in these degrees of symptoms and thus presented no symptoms. The tables also show the means and standard deviations between groups.

Table 1

Numbers and rates of different levels of depression according to various factors at the start of the COVID-19 outbreak in the Basque Autonomous Community, northern Spain, 2020.

	Depression levels [n (%)]			
	Mild	**Moderate**	**Severe**	**Extremely severe**
Sex				
Male (n = 184; M = 0.32; SD = 0.83)	19 (8.7)	9 (4.0)	5 (2.9)	3 (1.7)
Female (n = 551; M = 0.41; SD = 0.91)	78 (8.6)	16 (7.1)	20 (2.3)	34 (3.0)
Age (years)				
18-25 (n = 551; M = 0.41; SD = 0.91)	58 (9.1)	48 (7.2)	12 (2.8)	12 (2.3)
26-60 (n = 347; M = 0.39; SD = 0.91)	36 (9.4)	21 (5.6)	7 (2.1)	12 (2.9)
< 61 (n = 78; M = 0.23; SD = 0.65)	3 (3.9)	6 (7.8)	1 (1.3)	-
Province				
Bizkaia (n = 700; M = 0.40; SD = 0.92)	69 (8.9)	55 (6.6)	17 (2.5)	18 (2.6)
Araba (n = 93; M = 0.28; SD = 0.67)	11 (8.8)	7 (7.4)	3 (1.5)	-
Gipuzkoa (n = 183; M = 0.34; SD = 0.81)	16 (8.2)	12 (6.6)	5 (2.7)	2 (1.1)
Date of completion of questionnaire				
> March 14 (n = 735; M = 0.37; SD = 0.86)	63 (8.6)	48 (6.5)	18 (2.4)	14 (1.9)
< March 14 (n = 241; M = 0.46; SD = 1.00)	30 (9.5)	25 (7.1)	9 (2.4)	14 (3.8)
Chronic disease				
Yes (n = 145; M = 0.60; SD = 1.09)	22 (13.6)	13 (7.9)	6 (4.3)	6 (4.3)
No (n = 831; M = 0.35; SD = 0.85)	74 (7.9)	62 (6.5)	20 (2.1)	19 (2.0)

M: mean; SD: standard deviation.

Table 2

Numbers and rates of different levels of anxiety according to various factors at the start of the COVID-19 outbreak in the Basque Autonomous Community, northern Spain, 2020.

	Anxiety levels [n (%)]			
	Mild	**Moderate**	**Severe**	**Extremely severe**
Sexo				
Male (n = 184; M = 0.32; SD = 0.90)	9 (4.0)	12 (5.2)	3 (1.2)	7 (3.5)
Female (n = 792; M = 0.55; SD = 1.06)	64 (7.0)	102 (12.0)	29 (3.3)	28 (3.6)
Age (years)				
18-25 (n = 551; M = 0.51; SD = 0.01)	48 (7.2)	61 (9.6)	16 (3.0)	22 (3.8)
26-60 (n = 347; M = 0.60; SD = 1.10)	27 (6.2)	49 (3.9)	11 (3.2)	14 (4.1)
< 61 (n = 78; M = 0.11; SD = 0.42)	2 (2.6)	3 (3.9)	-	-
Province				
Bizkaia (n = 700; M = 0.52; SD = 1.04)	58 (6.9)	78 (10.7)	22 (3.1)	27 (3.5)
Araba (n = 93; M = 0,60; SD = 1.19)	9 (8.8)	9 (8.8)	2 (1.5)	7 (7.4)
Gipuzkoa (n = 183; M = 0.43; SD = 0.94)	8 (4.4)	22 (11.5)	4 (2.2)	4 (2.2)
Date of completion of questionnaire				
> March 14 (n = 735; M = 0.71; SD = 1.21)	44 (6.0)	74 (10.1)	22 (3.0)	22 (3.0)
< March 14 (n = 241; M = 0.47; SD = 1.00)	11 (8.1)	23 (12.8)	6 (2.4)	8 (5.7)
Chronic disease				
Yes (n = 145; M = 0.60; SD = 1.09)	22 (5.7)	13 (15.0)	6 (4.3)	6 (5.7)
No (n = 831; M = 0.35; SD = 0.85)	63 (6.6)	95 (9.9)	21 (2.6)	26 (3.2)

M: mean; SD: standard deviation.

Table 3

Numbers and rates of different levels of stress according to various factors at the start of the COVID-19 outbreak in the Basque Autonomous Community, northern Spain, 2020.

	Stress levels [n (%)]			
	Mild	**Moderate**	**Severe**	**Extremely severe**
Sex				
Male (n = 184; M = 0.31; SD = 0.75)	20 (9.2)	11 (5.2)	5 (2.9)	1 (0.6)
Female (n = 792; M = 0.41; SD = 0.87	78 (8.9)	79 (9.0)	28 (3.1)	9 (1.2)
Age (years)				
18-25 (n = 551; M = 0.35; SD = 0.81)	58 (9.1)	45 (6.6)	18 (3.0)	5 (0.9)
26-60 (n = 347; M = 0.49; SD = 0.92)	38 (10.0)	40 (11.2)	15 (3.8)	4 (1.2)
< 61 (n = 78; M = 0.22; SD = 0.67)	3 (3.9)	5 (6.5)	-	1 (1.3)
Province				
Bizkaia (n = 700; M = 0.38; SD = 0.84)	73 (9.2)	54 (7.3)	27 (3.4)	7 (1.0)
Araba (n = 93; M = 0.41; SD = 0.80)	14 (11.8)	9 (10.3)	2 (2.9)	-
Gipuzkoa (n = 183; M = 0.41; SD = 0.85)	15 (7.7)	20 (11.0)	4 (2.2)	2 (1.1)
Date of completion of questionnaire				
> March 14 (n = 735; M = 0.34; SD = 0.80)	61 (8.3)	54 (7.3)	20 (2.7)	6 (0.8)
< March 14 (n = 241; M = 0.55; SD = 0.98)	34 (11.4)	34 (11.4)	15 (4.3)	8 (1.9)
Chronic disease				
Yes (n = 145; M = 0.52; SD = 0.98)	15 (9.3)	15 (9.3)	11 (7.1)	1 (0.7)
No (n = 831; M = 0.37; SD = 0.82)	82 (8.9)	75 (8.1)	22 (2.4)	11 (1.1)

M: mean; SD: standard deviation.

Discussion

Severe and extremely severe levels of stress, anxiety, and depression in the sample in the Basque Autonomous Community in Spain were lower than in the study in China [6]. This is noteworthy, considering that the questionnaire was applied in the initial phase of the COVID-19 outbreak in Spain. There could be various explanations. There may have been more information on the virus in the Basque Autonomous Community, since it arrived there a month and a half after China, and such knowledge of the pandemic might explain the lower levels of stress, anxiety, and depression. Meanwhile, when the sample was taken, in the first few days of the epidemic in Spain, the Spanish people had still not realized the pandemic's scope in their own territory, since they could still associate the epidemic with a distant problem affecting others, China for example [4,18].

In fact, the Basque sample showed higher mean levels of symptoms (stress, anxiety, and depression) after March 14, when the population began to feel the effects of the stay-at-home order. Thus, people still have lacked time to assimilate and process the crisis they were facing. In addition, these levels can be expected to increase further as confinement and isolation are extended, so it would also be useful to analyze this trend over time [11].

Besides, as expected, the results show that individuals reporting chronic diseases had higher mean levels of stress, anxiety, and depression compared to participants not reporting such diseases. These results corroborate studies showing that individuals with serious diseases or multiple comorbidities present higher levels of psychological symptoms in the face of this crisis situation [14]. Thus, any psychological containment plan should take these individuals into account and provide specially adapted tools and strategies for them to cope psychologically with the COVID-19 crisis.

Unexpectedly, according to the results, there were higher mean levels of stress, anxiety, and depression in the 18-25-year age bracket, followed by the 26-60-year bracket. Finally, the mean levels of symptoms in the three dimensions were lowest in individuals 61 years and older. Since the youngest part of the sample in this study was mostly university students, these symptoms may have been due to the additional stress experienced by young students during the need to adapt to the new online educational environment, without face-to-face classes [19,20,21]. In this sense, and although schools promptly implemented online educational activities, they were apparently insufficient to ease young people's minds in such uncertain times. Thus, if these young people also consider themselves vulnerable to developing emotional disorders, teaching institutions will need to implement prevention and intervention programs to mitigate the stress levels [22,23,24].

Given this situation, as highlighted by Liu et al. [24], early strategies are needed for the prevention and treatment of the psychological effects created by the COVID-19 pandemic. The various social, health, administrative, and educational institutions, including academia, could thus design plans and programs to help mitigate stress, as was done in Beijing (China). Peking University prepared a mental health handbook to provide instructions on how to cope with stress and other psychological problems produced by the COVID-19 pandemic [25]. Numerous psychiatric hospitals, psychological counseling centers, and psychology departments at the universities implemented specialized telephone hotlines to provide psychological counseling [25].

This same study also reported that another important aspect requiring attention is the unfiltered information broadcast by the news media and social media [25]. In fact, in Spain, alarming videos on COVID-19 circulate freely, accessible to virtually everyone, especially to young people, and this could explain their psychological vulnerability.

It is important to inform the population adequately, since the virus is new, spreading rapidly, with a case-fatality rate of around 2%, and there is great uncertainty as to its origin, nature, and course. But there is much misinformation: for example, lay people often wear surgical masks and gloves, although health authorities such as the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC) caution that they are not useful or necessary to avoid infection in healthy individuals [7]. For all these reasons, it is important to ensure effective public health risk communication, and both physicians and authorities should be prepared to report information to the public effectively and directly in emergency situations like the one we are now experiencing [4,26,27].

This study can serve as a point of departure in an unprecedented situation and in a key historical moment, but we should point out several limitations. First, due to the current changing situation,

these data may not be valid at the national level, but considering the global nature of the risk in the crisis [2,28] we believe that these data provide highly useful information to be extrapolated to other countries or to future epidemics. Statistically speaking, the R^2 values are small but significant. It would thus be useful to conduct follow-up studies, since the statistical significance is expected to increase as the weeks of confinement continue.

Conclusions

The current study shows that psychological well-being is key for confronting COVID-19 and preventing mental disorders and coping with emotions. This means that individuals should prepare psychologically and feel secure in the face of possible adverse situations that may still emerge. It also means preventing and handling the crisis with effective social and health measures.

In addition, given the stay-at-home orders by government authorities and the threat of falling ill, the levels of stress, anxiety, and depression increase in the population, but especially in so-called risk groups. It is thus important to develop programs to support these groups. Meanwhile, it was noteworthy that young people showed higher levels of stress than older individuals in this sample. This is due to multiple factors that need to be investigated, but given the situation, it is crucial to create programs for both academic support and psychological support for those receiving information on the pandemic. It would also be useful to analyze the content that people are receiving from social networks and help them develop the necessary skills to be able to filter such information.

In short, in this situation of unpreceded confinement for the Spanish population, it is highly important to deal with the psychological factors. It is key to analyze the effects produced by the COVID-19 crisis on individuals' mental health. We therefore believe that this type of research can help generate social and health initiatives to prevent and mitigate the pandemic's psychosocial effects. This is essential for society to move forward and emerge from the crisis strengthened. The study provides an interesting point of departure to be followed over the course of this long and unfolding process.

Contributors

N. Ozamiz-Etxebarria contributed in the study conception and project, writing of the article, and approval of the final version for publication. M. Dosil-Santamaria contributed in the data analysis and interpretation, writing of the article, and approval of the final version for publication. M. Picaza-Gorrochategui and N. Idoiaga-Mondragon contributed in the writing of the article, relevant critical revision of the intellectual content, and approval of the final version for publication.

Additional informations

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Resumen

En marzo de 2020, el virus SARS-CoV-2 procedente de China ha llegado a España y desde el 14 de marzo se ha declarado el estado de alarma en todo el Estado español, llevando al confinamiento a toda la población. La presente investigación se contextualiza en la Comunidad Autónoma Vasca (situada al norte de España). Se han analizado los niveles de estrés, ansiedad y depresión a la llegada del virus y se han estudiado los niveles de sintomatología psicológica según edad, cronicidad y confinamiento. Se ha recogido una muestra de 976 personas y la medición de las variables ansiedad, estrés y depresión se ha hecho mediante la escala DASS (Escala de Depresión, Ansiedad y Estrés)*. Los resultados demuestran que, aunque los niveles de sintomatología han sido bajos en general al principio de la alarma, la población más joven y con enfermedades crónicas ha referido sintomatología más alta que el resto de población. También se ha detectado un mayor nivel de sintomatología a partir del confinamiento, donde las personas tienen prohibido salir de sus casas. Se prevé que la sintomatología aumentará según vaya transcurriendo el confinamiento. Se defienden intervenciones psicológicas de prevención y tratamiento para bajar el impacto psicológico que pueda crear esta pandemia.*

COVID-19; Trastorno de Estrés Traumático; Trastornos de Ansiedad; Confinamiento Controlado; Enfermedad Crónica

Resumo

Em março de 2020, o vírus SARS-CoV-2, procedente da China, chegou à Espanha e desde 14 de março está declarado estado de emergência em todo o país, forçando toda a população ao confinamento. O presente estudo foi conduzido no País Basco (norte da Espanha). Foram analisados os níveis de estresse, ansiedade e depressão desde a introdução do vírus e os níveis de sintomas psicológicos segundo idade, comorbidades e confinamento. A amostra foi composta de 976 indivíduos e a medição das variáveis ansiedade, estresse e depressão foi realizada a partir do intrumento DASS (Escala de Depressão, Ansiedade e Estresse)*. Os resultados mostram que, ainda que os níveis de sintomas tenham sido baixos no início do confinamento, os indivíduos mais jovens e com comorbidades referiram mais sintomas que o restante da população. Também se detectou maior nível de sintomas desde o confinamento, quando a população foi proibida de sair de suas casas. Se prevê aumento dos sintomas conforme o confimaneto continuar. Intervenções psicológicas de prevenção e tratamento são necessárias para diminuir o impacto psicológico causado pela pandemia.*

COVID-19; Transtornos de Estresse Traumático; Transtornos de Ansiedade; Confinamento Controlado; Doença Crônica

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