ANXIETY AND PERCEPTION OF RISK OF CONTAGION AMONG SOCIALLY DISTANCED MEXICANS RESIDENTS DURING THE NATIONAL HEALTHY DISTANCE CAMPAIGN RELATED TO THE COVID-19 EPIDEMIC

ANSIEDAD Y PERCEPCIÓN DE RIESGO DE CONTAGIO ENTRE MEXICANOS SOCIALMENTE DISTANIADOS DURANTE LA PANDEMIA POR COVID-19

ISAAC MALDONADO-CASTELLANOS E IGNACIO MORA-MAGAÑA

Abstract

In January 2020, Chinese scientists isolated a novel virus that causes coronavirus disease 2019 (COVID-19). On January 30th, The World Health Organization declared a Public Health Emergency. In March, Mexican Health Authorities announced the National Healthy Distance Campaign. This novel policy encourages residents of Mexico to stay at home during the social distancing stage to prevent the spread of the virus. The aim of this study was to evaluate the anxiety and the perception of risk of contagion through six weeks of follow-up during the National Healthy Distance Campaign in Mexico related to the COVID-19 epidemic. This study was empirical, exploratory and longitudinal. 27 Mexican people participated in the study, aged 18-59 years (M = 35.4,

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SD = 11.6). Two contextualized instruments were sent by email to participants to evaluate the anxiety levels and perception of risk of contagion for six weeks. Results indicate that anxiety levels were mild through six weeks of follow-up. Likewise, results in the second survey indicate that perception of risk of contagion levels were moderate. Both results presented a positive moderate correlation (r = 72). Six hypotheses that may explain the results were developed regarding the following topics: content information and information overload, adaptation process, social perception of risk, preventive behaviors, and positive and negative effects of being social distanced.

**Keywords:** anxiety; perception of risk of contagion; COVID-19; social distancing.

**Resumen**

En enero de 2020, los científicos en China lograron aislar un nuevo virus que causa la enfermedad por coronavirus 2019 (COVID-19). El 30 de enero, la Organización Mundial de la Salud, declaró una emergencia pública. En marzo, las autoridades sanitarias mexicanas anunciaron la Jornada Nacional de Sana Distancia (JNSD). Esta nueva campaña, pide que los residentes en México se queden en casa durante esta etapa para detener los contagios. El objetivo del estudio fue evaluar los niveles de ansiedad y percepción de riesgo de contagio durante seis semanas de seguimiento durante la JNSD relacionada a la epidemia de COVID-19 entre mexicanos. El estudio fue empírico, exploratorio y longitudinal. Veintisiete participantes entre 18 y 59 años respondieron dos instrumentos (M = 35.4, SD = 11.6). Se enviaron dos instrumentos por email para evaluar los niveles de ansiedad y percepción de riesgo de contagio durante seis semanas. Los resultados indicaron que los niveles de ansiedad fueron leves durante las seis semanas. Asimismo, los resultados en la segunda encuesta indicaron que la percepción de riesgo de contagio fue moderada. Los dos resultados en promedio presentaron una correlación positiva moderada (r = 72). Se desarrollaron seis hipótesis que pueden explicar los resultados de acuerdo con los siguientes temas: contenido sobre carga de la información, proceso de adaptación, percepción social de riesgo, conductas preventivas y efectos positivos y negativos de estar socialmente distanciado.

**Palabras clave:** ansiedad; percepción de riesgo de contagio; COVID-19; distanciamiento social.

**Introduction**

In December 2019, 27 cases of atypical pneumonia were reported in Wuhan, China. Chinese scientists isolated the novel virus and identified the causative agent, Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), which causes the coronavirus disease of 2019 [COVID-19] (Elifky, 2020; Mousavizadeh & Ghasemi, 2021; Zhang et al., 2020). People infected with this novel virus exhibit symptoms of a mild-to-severe respiratory illness. Main symptoms include fever, dry cough, shortness of breath, muscle ache, confusion, ache, sore throat, rhinorrhea and chest pain. The virus has been described as highly contagious (Chen et al., 2020).

Since January 30th, 2020, The World Health Organization (WHO) declared a Public Health Emergency of International Concern requesting countries to join efforts in order to avoid massive COVID-19 infections (Sohrabi et al., 2020). In the press conference held on March 14th, Mexican Health Authorities announced a policy called the National Healthy Distance Campaign (Jornada Nacional de Sana Distancia) to last initially from March 23rd to April 30th to promote social distancing (Gobierno de México, 2020a, 2020b, 2020c, 2020d).

Among the four main measures taken by the government during this period is the suspension of non-essential activities, encouraging people to stay home voluntarily. The public slogan Stay at home (¡Quédate en casa!), meaning to self-quarantine, is a summarized Mexican government response to a public health challenge coordinated and implemented by the Secretary of Health in Mexico (Secretaría de Salud, 2020).

Historically, a viral outbreak always presents numerous challenges to health authorities and society in general (Buseh, 2015; Glasser et al., 2011; Jones, 2020; Lai et al.,
2020). For instance, the first influenza pandemic caused by the virus A(H1N1) 2009 represented a threat for health security forcing Mexican health authorities to notify the WHO of an outbreak and to implement measures regarding social distancing – workplace and school closures, quarantine– (Cordova-Villalobos et al., 2017). Additionally, public emergencies like the 2009 influenza, affect psychological well-being among other health repercussions (Douglas et al., 2009; Perrin et al., 2009; Pfafferbaum et al., 2012). In this regard, this ongoing COVID-19 epidemic may lead individuals to display behavioral and emotional reactions that are currently being studied around the world (Ahmed et al., 2020; Brooks, 2020; Preti et al., 2020; Shalev & Shapiro, 2020).

Two emotional reactions might appear during a pandemic such as anxiety and fear. They are understood as a threat response for survival, and they are related to perception of risk, that is, the ability to perceive, evaluate and avoid harmful conditions (Slovic, 2000). Anxiety is a complex behavioral, hormonal and physiological reaction that may appear as an anticipatory response when a threat could occur in the future and is associated to muscular tension and vigilance for the future danger, whereas fear is an emotional reaction to a real, imminent or imaginary perceived threat that elicits flight or fight responses related to survival (American Psychiatric Association, 2013; Sarigiannidis, 2020; Toyote et al., 2015).

Additionally, physical and social distancing is an unpleasant experience that urges scientists to understand the psychology of confined people and their behavior as a result of the COVID-19 outbreak. Works on isolated people have been done in different contexts such as people in polar expeditions (Palinkas, 1992), in submarines (Burr & Palinkas, 1987; Chabal et al., 2018) or among astronauts (Law et al., 2020). It is noteworthy that these particular situations are considered as extreme. These specific personnel have to adapt to and survive sudden challenging circumstances (Nicolas et al., 2019). In this regard, studies have shown the environmental influence when displaying either positive (Burmeister et al., 2018; Forgays & Forgays, 1992; Mocellin et al., 1991; Rosnet et al., 1998; Wangberg & Banas, 2000) or negative behavioral responses (James & Glaze, 2006; Knez et al., 2018; Nicolas et al., 2015; Palinkas, 2001).

New studies have highlighted the mental health implications among different populations during the COVID-19 pandemic (Mora-Magaña et al., 2020; Preti et al., 2020). Mental health problems due to the outbreak reported in the literature include depression, anxiety, stress, panic attacks, impulsivity, somatization, emotional disturbance and suicidal behavior (Hossain et al., 2020; Kavoor et al., 2020; Motta-Zanin et al., 2020; Shi et al., 2020). Nevertheless, to date no prior work has been done specifically on psychological responses such as anxiety and perception of risk of contagion during social distancing with regards to the COVID-19 epidemic among Mexican society. Despite the fact that persons have been isolated or confined in the past in different contexts (including the Influenza pandemic in 2009), being forced to social distancing to limit the spread of an emergent virus is an unprecedented experience for the current Mexican population. Based on the previous works, the present study was designed with the aim of evaluating the anxiety levels and level of perception of risk of contagion among a sample of Mexicans residents through six weeks of follow-up, during the National Healthy Distance Campaign.

Materials and Methods

Participants

This study was empirical, exploratory and longitudinal. Initially, it was sent 150 emails to researcher’s contacts with the invitation to the study. The recruitment process had 6 stages (one per week). In each of one, we sent and receive each of the participant’s responses. By the final phase, 27 questionnaires were returned (Figure 1).

At the end, a sample of 27 Mexican people participated in the study, aged 18-59 years (M = 35.4, SD = 11.6). 21 participants identified themselves as women. At the time of data collection, 15 of them lived in Mexico City while the rest lived in the State of Mexico. 6 persons reported an income between $0-135 per month, 5 participants between $136-$349, 8 persons between $350-$578, 5 persons between $580-$1,749 and 3 respondents more than $1,750 per month. Additionally, 13 persons declared they have a
permanent job contract, 6 persons have a temporary job contract, and 8 subjects were unemployed. Moreover, 21 persons informed they were single while 6 reported being married. Finally, 13 persons reported they are currently in school while 13 among them reported having a bachelor’s degree.

**Materials**

**Sociodemographic-data questionnaire.** We created a questionnaire to collect sociodemographic information such as age, sex, occupation, income, type of employment, marital status, currently schooling (in case), maximum level of study and current residency.

**Beck Anxiety Inventory.** This scale is a self-reported measure of anxiety. It consists of 21 items; it has a good internal consistency (Cronbach’s $\alpha = .92$) and a test-retest reliability ($= .75$). The test was also recently validated (Padrós et al., 2020). For the purpose of this study, we adapted the Beck Anxiety Inventory (BAI) to the context of the COVID-19 epidemic. We modified the instructions as follows: “You will find a list of common anxiety symptoms applied to the National Healthy Distance Campaign. Indicate how much you have been bothered by these symptoms during the last week, including today. Mark the intensity in the column next to each symptom”.

Also, to contextualize this study to the COVID-19 epidemic, we adjusted the following items: 5 (“I am afraid that worst things could happen during this quarantine”), 8 (“I am unsteady for this situation during this quarantine”), 9 (“I am terrified by the current situation”), 14 (“I am afraid of losing control during this quarantine”) and 16 (I am afraid of dying by Coronavirus”) to be contextualized to the COVID-19 epidemic. Finally, we maintained the original scoring options: not at all, mildly, moderately, and severely.

**Mexico City Landslide Risk Perception Scale.** We did not find any specific instrument, questionnaire or scale related to the risk perception of pandemic transmission. Therefore, based on the Mexico City Landslide Risk Perception Scale (MLRPS; Salvador-Ginez et al., 2017), which is a self-reported measure of landslide risk perception, we rephrased its instructions as follows: “You will find nine sentences related to the COVID-19 epidemic.
Table 1.

Anxiety scores per participant through the six weeks of follow-up

<table>
<thead>
<tr>
<th>Date</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<td>2</td>
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<td>7</td>
<td>7</td>
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<td>21</td>
<td>12</td>
<td>5</td>
<td>0</td>
<td>4</td>
<td>12</td>
<td>21</td>
<td>0</td>
<td>6</td>
<td>16</td>
<td>15</td>
<td>7</td>
</tr>
<tr>
<td>April, 13</td>
<td>13</td>
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<td>10</td>
<td>35</td>
<td>1</td>
<td>3</td>
<td>6</td>
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<td>9</td>
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<td>14</td>
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<td>1</td>
<td>19</td>
<td>15</td>
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<tr>
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<td>13.8</td>
<td>11</td>
<td>10.7</td>
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</tbody>
</table>

Note: APP= Average score per participant

Read each sentence carefully and mark with an X the corresponding answer by asking yourself ‘In this week including today’.

Also, we reworded the 9 items as follows: I have been worried by the COVID-19 epidemic (1), I think we are in danger for the COVID-19 epidemic (2), I think it is true that a massive contagion could happen (3), I have been thinking that the COVID-19 contagion is a real risk (4), I am sure that a massive contagion of COVID-19 could occur (5), I have been worried that I have to be admitted into a hospital for a COVID-19 infection (6), I am afraid my health could be compromised if I get infected (7), I think during the epidemic I could be infected (8) and I feel insecure because I could be infected (9). Additionally, we kept the original 5 Likert scale scoring options: 1= never, 2= rarely, 3= sometimes, 4= almost always and 5= always.

Content validity was performed by experts. In the case of the second instrument, it is noteworthy to say that the rearrangement of items and instructions ended up as a survey and not as a psychometrical valid instrument.

Procedures

The authors decided to invite contacts of the investigators by email to participate in the study from March 21st to 22nd. 150 emails were sent, containing an Informed Consent that disclosed the purpose and procedures of the study.

As clearly explained in the Informed Consent, the data collection began when each participant returned the demographic-data questionnaire. We sent the six sets of instruments in the following days: March 23, March 30, April 6, April 13, April 13, April 20 and April 27, 2020. Each instrument had to be answered and returned to the main researcher’s (IMC) email address.

The project was submitted to the Centro de Investigación Clínica Acelerada, SC Institutional Review Board. Likewise, the study was performed in line with the Universal Declaration of Human Rights, the Declaration of Helsinki, the Nuremberg Code, the Code of Ethical Conduct by the National Institute of Psychiatry in Mexico and
the Universal Declaration on Bioethics and Human Rights. Participation was voluntary and the research process involved minimal risk.

**Analysis**

We used SPSS software version 25 to obtain statistical results and analysis.

**Results**

Based on the BAI, the average score of anxiety through the six weeks of follow-up was 10.28, which represents a mild level among respondents. The average score of anxiety amidst participants was relatively stagnant during the six weeks of follow-up as shown in Table 1 and Figure 2.

*Figure 2.

Average Anxiety Scores per Week*  
![Average Anxiety Scores per Week](image)

Based on the perception of risk of contagion adapted scale, the average score was 28.48 which represents a mild level amidst participants (see Figure 3).

*Figure 3.

Average perception of risk of contagion scores per week*  
![Average perception of risk of contagion scores per week](image)

Participants who responded to the adapted survey of risk perception of contagion, showed a score of 3.16 as an average level through the six weeks of follow-up. The item with the highest score was number 4 (I have been thinking that the COVID-19 contagion is a real risk) with an average of 4.07. On the other hand, the lower scores were found in the 6th, 7th, 8th, and 9th items as shown in Table 2 (average = 2.66).

*Table 2.

Average scores per item on the survey of risk perception of contagion*

<table>
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<tr>
<th>Weeks</th>
<th>W 1</th>
<th>W 2</th>
<th>W 3</th>
<th>W 4</th>
<th>W 5</th>
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</table>

*Note: I: Item; W: Week.*

Based on statistical analysis, we found a positive moderate correlation ($r = .72$) between anxiety and perception of risk of contagion average scores during the six weeks of follow-up as shown in Figure 4.

*Figure 4.

Correlation between anxiety and perception of risk of contagion average scores during the six-week follow-up*  
![Correlation between anxiety and perception of risk of contagion average scores during the six-week follow-up](image)
Discussion

Given the paucity of data on anxiety and on perception of risk of contagion during the COVID-19 outbreak, the present study was set out to evaluate and monitor the levels of anxiety and perception of risk of contagion during the National Healthy Distance Campaign for 6 weeks in Mexico. This study represents a unique contribution to the understanding of the mental health problems regarding the COVID-19 epidemic.

Results showed that the anxiety levels and perception of risk of contagion did not augment through time significantly. Results also revealed a mild level of anxiety on average during the six weeks of follow-up and moderate levels in perception of risk of contagion. We did not test the following conjectures due to the current international emergency. Nevertheless, these results could raise various hypotheses to study in the future.

Firstly, anxiety and fear are two reactions associated to perception of risk, that is, the ability to perceive, evaluate and avoid harmful conditions (Slovic, 2000). The pandemic related to COVID-19 might raise behavioral, hormonal or physiological responses due to this biological threat. Based on previous works, six different hypotheses will be discussed.

As shown in graphic 1, levels of anxiety increased 2.96 points through the six weeks of follow-up. Mild levels of anxiety could be related to the news as reported in other studies (Huynh, 2020; Smith, 2006; Wang, et al., 2013). COVID-19 is a highly contagious disease, and it got most of the media coverage, as there was no other social or entertainment activities that could be broadcasted. Due to social distancing programs implemented in many countries, people were exposed to news to get advice and updates through radio, television or social media, aiming social empowerment (Heldman et al., 2013).

In Mexico, a plethora of official information on this outbreak was made readily available across numerous platforms beginning March 6th, after WHO declared a public health emergency. The Mexican government started evening press conferences at 7 pm to keep the population updated and to announce different policies (Gobierno de México, 2020a, 2020b, 2020c).

Based on the first hypothesis people may have experienced mild levels of anxiety due to the content of information they have been exposed to. The increase of deaths, uncertainty on the duration of the social distancing campaign, the unavailability of vaccines/treatments for COVID-19 and the increase of infection cases could have raised the perception of a future potential risk as the days passed by (Poletti et al., 2012). The national lockdown in Mexico and the current exposition of negative information may have triggered worry, confusion and fear of the worst happening. These are key cognitive features of anxiety. As a result, people may have experienced other physical symptoms such as: palpitations, trembling, shortness of breath, chest pain or an all-around unsteady feeling (American Psychiatric Association, 2013).

Despite these findings, results did not indicate a clinical anxiety levels among respondents. We should not ignore that a mild level of anxiety was maintained among participants, regardless the 2.96 points increase (average score = 10.28). In this regard, this score could raise a second hypothesis associated with an adaptation process. Individuals may have used a variety of coping strategies, such as self-distraction, active coping, social support, disengagement or humor while being isolated as previous studies have revealed (Nicolas et al., 2015; Nicolas et al., 2019).

For the survey of perception of risk of contagion, the highest score was obtained in item 4: I have been thinking that the COVID-19 contagion is a real risk, which is related to an expected fear response in this context of the pandemic. Thus, the third hypothesis could have been related to a real social perception of risk where media content may have led people to consider COVID-19 as a real threat (Slovic, 2000; Smith, 2006). Therefore, Government and mass media’s balance of information broadcasted to communicate risk effectively may have played an important role on the perception of risk of contagion and on the information overload (Jacobs & Mettler, 2011; Khaleel et al., 2020; Matthes et al., 2020; UNESCO, 2020).
On other hand, most people were not directly exposed to infected environments. Thus, the fourth hypothesis is that people may have perceived this novel illness as a real hazard and eventually express it in a preventative behavior such as the use of masks, sanitization conducts or by avoiding physical interaction with others. This reaction coincides with a natural fear response, once gradual de-confinement started (Griffiths et al., 2010; Lau et al., 2010; Slovic, 2000; Tavote et al., 2015; Yang et al., 2011).

Scores in items 1, 2, 3 and 5 of the Risk Perception of Contagion adapted survey were 3.42. These results show that participants sometimes ‘felt worried’, ‘thought the population was in danger’, ‘thought that probably a massive contagion could happen’ or ‘were sure that a massive contagion related to COVID-19 could occur’ during the 6 weeks of follow-up during the National Healthy Distance Campaign in Mexico. As previously mentioned, this moderate level of concern could have had an impact on social hygiene and prevention responses which are associated with a reasonable fear and risk perception of contagion (Schumm et al., 2013; Slovic, 2000).

In summary, based on the four hypotheses previously stated, it seems plausible that levels of anxiety and perception of risk of contagion, could have been related to the information people are exposed to, resulting in a change of behaviors (Kan & Zhang, 2017; Wang et al., 2013). Respondents may have considered COVID-19 as a real public health concern from what they hear or see in the media but in order to avoid information overload, they may have spent less time watching the news. Therefore, distraction could have been an effective strategy to cope with the number of negative reports related to the epidemic, preventing the rise of anxiety levels. Finally, this combination of mild levels of anxiety and perception of risk of contagion may have resulted in a display of prevention and hygiene responses in the future as a survival tactic in the face of a perceived hazard (Carro & Hernández, 2016; Glasser et al., 2011; Griffiths et al., 2010; Kan & Zhang, 2017; Peters et al., 2020; Slovic, 2000; Smith 2006; Tavote et al., 2015; Yang et al., 2011; Schumm; 2013).

In addition to this, another key point to consider is the physical environment that raised two more hypotheses. Firstly, despite the fact of being at home in a well-known surrounding, normally perceived as calm and casual, results from some studies show that being in the same place -not specifically at home- for long periods of time may have become monotonous. Social and physical mobility were restricted, forcing individuals to partake in fewer activities (Nicolas et al., 2015).

Secondly, although staying at home may have been challenging, it is not considered an isolated-confined-extreme environment. Responses may have been a result of a natural adaptation, which could be seen in the nearly un-varying scores in both instruments during the six weeks of follow-up. In regard to the anxiety and the perception of risk of contagion, the fifth hypothesis is related to the positive outcomes, whereas the sixth to the negatives effects of being socially distanced.

In other words, adjustment to stressful situations have been studied concluding that we must look at how individuals experience the environment and not at the physical environment itself (Forgays & Belinson, 1986; Nicolas et al., 2019). Based on these findings, coping strategies may have been associated with mild and moderate scores of the perception of risk of contagion and anxiety during self-isolation related to the pandemic. Participants may have switched the focus from the flood of news to valuable activities such as reading a book, drawing, painting or playing music among other things that lead to a better adaptation in this prolonged condition. As reported in other studies, people could strengthen relationships, find means to express creativity or get a better sense of personal growth during adverse situations (Burmeister et al., 2018; Forfgays & Forfgays, 1992; Mocellin et al., 1991; Rosnet et al., 1998; Wanberg & Banas, 2000).

Conversely, people in this monotonous environment due to social distancing might feel alone, preoccupied, stressed or bored. They may have increased their alcohol consumption or experience insomnia and lower their mental well-being (Ahmed et al., 2020; James & Glaze, 2006; Knez et al., 2018; Nicolas et al., 2015; Palinkas, 2001).

Finally, this present work is one of the first studies aiming to monitor anxiety and perception of risk of contagion during the National Healthy Distance Campaign in Mex-
Although prevention behaviors and strategies during the Influenza A epidemic have been formerly studied in Mexico (i.e., Carro & Hernandez, 2016) and in other countries (Smith, 2006), future studies with different methodologies may be performed to better understand the discussed hypotheses on protective attitudes and behaviors associated to social attenuation of risk when lockdown restrictions are eased.

**Limitations and future directions**

The following limitations should be taken into consideration while evaluating the results of the present study. First, we specifically measured two variables using two adapted instruments that could lack appropriate validity due to the rearrangement of the items (Clark & Watson, 1995; Kazdin, 2016). Also, due to the small size of the sample, we cannot generalize the results to a wider population. Despite this, in the context of a public health emergency, gathered data were unique, rare and new. We must consider a self-selection bias among individuals that returned the six sets of questionnaires. This study was only exploratory, for this reason further studies should test the relationship between coping strategies and psychological-behavioral outcomes when people are socially distanced, along with the long-term psychological consequences after lockdown. More research with different methodologies may contribute to better understand results from the current study.

Finally, standard methodologies in emergency situations are rare, so, in the recent COVID-19 epidemic context, a newfangled situation has been raised. Due to limitations, authors had to adapt procedures and instruments which resulted in an original methodological design that could be improved in future studies and enrich the understanding of mental health problems related to the COVID-19 outbreak.

**Conclusions**

The purpose of this study was to monitor and evaluate the level of risk perception of contagion and anxiety level among a sample of Mexicans residents through six weeks of follow-up during the National Healthy Distance Campaign in Mexico related to the COVID-19 epidemic. The present study revealed that anxiety levels among respondents were mild through six weeks of follow-up. In addition, results in the second survey indicate that perception of risk of contagion levels were moderate, 3.16.

Another contribution of the present study was that six hypotheses were developed regarding (1) content information and information overload, (2) adaptation process during the pandemic, (3) social perception of risk, (4) preventive behaviors due to the biological unforeseeable hazard and (5 and 6) positive and negative effects of being socially distanced based on previous works. More research with different methodologies may contribute to better understand results from the current study.

**Acknowledgements**

To all the people who suffer from being isolated at home and live in anxiety.

**Conflict of Interest**

Both researchers stated that have no interest in any way in nothing, but Mexicans mental health.

**References**


https://www.youtube.com/watch?v=wX4AUZZ84U


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