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Worry related to climate change in Brazilian adults

Short Title: Worry with climate change among Brazilian adults

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ABSTRACT

Introduction: Climate change is happening, and feeling anxiety can be seen as a natural response to it. Climate anxiety is the worry about the climate crisis and could be related to specific emotions and thoughts. The aim of this study was to assess the prevalence of worry about climate change, and to describe the emotions and thoughts associated to it in Brazilian adults.

Method: Cross-sectional study with participants aged between 18-42 years (n=323). Data were collected online using the questionnaire developed by Hickman and colleagues, which assesses the worry, thoughts and feelings about climate change.

Results: 88.5% were worried about climate change. The feelings of sadness, powerlessness, fear and anxiety were reported more often among those who were worried. The most frequent thoughts were: “People have failed to take care of the planet”, “The future is frightening”, “My family's security will be threatened” and “Humanity is doomed”.

Discussion: In this sample, the majority of the individuals were concerned about climate change, and they showed more negative emotions and thoughts when compared to individuals that were not concerned. Future studies should take care to not understand natural worries and anxiety responses to climate change as pathological.

Keywords: climate anxiety; eco-anxiety; climate change; climate crisis; adult.

INTRODUCTION

There is scientific consensus that global warming is happening¹. Anyone with access to information about climate change is potentially susceptible to experiencing an anxiety response². Such reactions should not be immediately seen as pathological, as they can serve as motivation to find solutions to mitigate climate change². However, when anxiety is dysregulated, it can lead to psychological suffering and maladaptive behaviors.

Climate anxiety is an emerging construct, and has been understood as the distress and worry related to climate change. It can be connected to emotions such as fear, anger, grief, despair, guilt and shame³. Substantial levels of distress related to climate change have been reported globally²⁻⁵.

Since only one study was found that included Brazilians as part of the sample³, this study aimed to fill the gap in the literature (both local and international) by assessing the prevalence of worry about climate change and describing the emotions and thoughts related to it in Brazilian adults.

METHODS

Cross-sectional study with participants aged between 18-42 years, Brazilians, living in Brazil. Data were collected online, through self-report, from July to August of 2022. The Research Ethics Committee of the Catholic University of Pelotas approved the study, under the protocol number 5.412.278. All participants included in the study have provided written consent.

The questionnaire used was developed by Hickman and colleagues (2021)³, which assesses the worry, thoughts and feelings about climate change in five questions. The answers available were yes/no/prefer not to say. Only the first question was collected using a Likert scale ranging from "Not worried" to

“Extremely”. This variable was dichotomized into no (not worried/a little) and yes (moderately/very/extremely).

Exposure variables were obtained through a questionnaire that assessed gender, race/ethnicity, age, education, Brazil’s region of residence, income, information source about climate change (social media, TV and radio, scientific articles), frequency of receiving climate change information (very often, often, sometimes, rarely) and perception of knowledge about climate crisis (obtained through a questionnaire created by the authors). There were 10 questions that assessed how much the respondent thought they knew about climate change and its causes and consequences. The answers were collected using a four-point Likert scale that goes from “I’m sure” to “I’m not sure”. The questions were as follows: 1) I think human action is the main cause of the climate crisis; 2) I know what the greenhouse effect is; 3) I know why the glaciers are melting; 4) I know why it is important that there is less plastic production; 5) I think there is a link between deforestation and the climate crisis; 6) I know why sea level rise poses a risk to continents/islands; 7) I realize that every year it gets warmer and I understand the connection with the climate crisis; 8) I think the waste production influences the climate crisis; 9) I know there is a link between pollution and global warming; 10) I think big polluting companies are partly responsible for the climate crisis.

The statistical analysis was performed with the SPSS 26 software. The variables were described by absolute and relative frequencies. Analytical hypotheses were tested by Chi-square and *t* test, considering $p < 0.05$.

RESULTS

In total, 323 subjects were eligible to participate in the study. Most of the sample were women (68.7%), between 18 and 26 years old (60.5%), from the South (75.2%), undergraduate (47.1%), with income from one to five minimum wages (81.7%) and self-declared white (83.2%).

In this sample, 88.5% were worried about climate change (69.0% very or extremely; 19.5% moderately worried), and 11.5% were not worried (or a little worried).

Worry was more prevalent among subjects who most frequently received or read news related to climate change ($p = 0.001$), with no statistically significant

difference between the sources of such news. Moreover, people worried about climate change showed greater knowledge about the climate crisis (27.25 ± 3.03) when compared to people who were not worried (23.92 ± 5.13 ; $p < 0.001$).

No sociodemographic variables were statistically associated with a higher prevalence of worry about climate change.

Feelings of sadness (85.0%), powerlessness (79.7%), fear (78.3%) and anxiety (67.4%) were reported more often among those worried about climate change. Comparing the two groups, all the feelings were reported more often among those who were worried with climate change, except indifference and optimism, that were reported by 17.6% and 16.7% of the not worried and for 7.2% and 4% of the worried, respectively. Comparing the two groups, all the feelings had statistically significant difference, except grief ($p = 0.073$) (Table 1).

Table 1: Frequency of thoughts and feelings/emotions reported by people who are worried about climate change.

Thoughts	Frequency among people worried about climate change n (%)	Frequency among people not worried about climate change n (%)	P value
I'm hesitant to have children	152 (55.9)	10 (27.8)	0,002*
Humanity is doomed	207 (76.7)	17 (45,9)	0,001*
The future is frightening	256 (91.8)	24 (66.7)	0,001*
I won't have access to the same opportunities my parents had	162 (58.5)	16 (43.2)	0,079
My family's security will be threatened (economic, social, physical)	218 (78.1)	20 (54.1)	0,001*
The things I most value will be destroyed	186 (68.4)	16 (44.4)	0,004*
People have failed to take care of the planet	271 (97.5)	29 (80.6)	0,001*
Feelings/Emotions			
Sadness	238 (85.8)	16 (43.2)	0,001*
Powerlessness	224 (79.7)	17 (47.2)	0,001*
Fear	220 (78.3)	15 (40.5)	0,001*
Anxiety	190 (67.4)	11 (29.7)	0,001*
Anger	177 (63.0)	8 (21.6)	0,001*
Helplessness	157 (56.5)	9 (24.3)	0,001*
Guilt	150 (54.2)	6 (16.2)	0,001*
Shame	127 (45.5)	10 (27.0)	0,033*
Depression	91 (33.3)	3 (8.3)	0,002*
Despair	89 (32.1)	2 (5.4)	0,001*

Grief	68 (24.5)	4 (11.1)	0,073
Hurt	52 (19.0)	1 (2.7)	0,013*
Indifference	20 (7.2)	6 (17.6)	0.037*
Optimism	11 (4.0)	6 (16.7)	0,002*
Total*	286 (100)	37 (100)	

* n = 323. In the analysis were excluded those who responded "Prefer not to say"

P value with an * = statistically significant results

The most frequent thoughts among the people who were worried with climate change were: "People have failed to take care of the planet" (97.5%), "The future is frightening" (91.8%), "My family's security will be threatened (economic, social, physical)" (78.1%) and "Humanity is doomed" (76.7%). Comparing the two groups, all the thoughts had statistically significant difference, except "I won't have access to the same opportunities my parents had" (p=0,079) (Table 1).

Finally, among people who reported worry, 34.6% said they believe that their feelings about climate change negatively affect their daily life.

DISCUSSION

In this study, 88.5% of the sample reported worry about climate change, which is aligned with previous findings of worry being reported in more than 50% of their samples^{3,6}.

People who were worried reported a higher frequency of access to climate crisis-related news as had already been suggested⁴, although in this study there was no statistically significant difference between the information sources, unlike the findings that suggest that coverage of the media about climate change directly affects the level of public concern⁷.

Those who are worried also showed a greater perception of knowledge related to it, when compared to people who are not worried about the climate crisis, aligned with findings of other studies^{8,9}. However, it should be noted that both studies mentioned were about educational level, and this study analyzed the

person's perception of knowledge regarding the climate crisis, and not their academic level.

All feelings and thoughts (except grief and "I won't have access to the same opportunities my parents had") had a statistically significant difference between the worried and the not worried ones, meaning that, in this sample, there was an association between being worried and having those feelings and thoughts.

Feelings of sadness, powerlessness, fear and anxiety were reported more frequently among those worried about climate change, which differs a little from other results where the more frequently reported feelings were fear, sadness, anxiety and anger³.

The most frequent thoughts were: "People have failed to take care of the planet", "The future is frightening", "My family's security will be threatened" and "Humanity is doomed". The first and second most frequent thoughts found are the same as previous findings³. There are differences, however: here, the thought about family security appears in third and in the other study is not one of the most frequent³; and the idea of not having "access to the same opportunities that my parents had" in this results had non statistically difference among groups, showing that, perhaps, there is no association between this kind of thought and worry about climate change, it happens independently of climate crisis, where in the other study with a North-American and European sample, this thought appears as fourth more frequent³. It raises the question on cultural differences between developed and developing countries and its relation with climate change, worry, access to opportunities and thoughts about the future.

No sociodemographic variable was statistically associated with a higher prevalence of worry about climate change. In one study, older people were more likely to have skeptical views, perceived climate change impacts as less negative and had lower levels of worry about climate change than younger respondents⁸.

The finding of negative impact on daily life in 34.6% of the sample was lower than some results found⁹ and higher than others¹⁰.

The results of this study indicate that, in Brazil, there is worry about climate change, as well as thoughts and emotions associated with it. However, the findings should be taken with caution, once this study has limitations. Non-probability sampling and the use of a non-standardized and not properly validated

assessment instrument may have generated an overestimation of the outcome. The survey title may also have biased responses, as there is a possibility that only people already concerned about the climate crisis were interested in participating in the survey when they found it online. However, given the absence of Brazilian studies on the subject, the data presented here serve as a preliminary finding and, even with the limitations and possible cultural differences, fills a gap in the literature and contributes to the general understanding of the impacts of climate change on the mental health of populations.

Since studies on climate anxiety are still scarce and what is pathological or not is not yet well defined¹¹, more studies are needed on the subject to enable this distinction between natural worries and anxiety responses in the face of climate change and a perhaps pathological and paralyzing response. This distinction is also important to enable the creation of interventions to address climate change anxiety.

It is also worth mentioning that since the climate crisis is a global issue, it is urgent that Governments take real actions to mitigate and prevent the impacts of climate change, not only on people's mental health, but also in the environment as a whole.

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