Journal of Affective Disorders Reports 16 (2024) 100740

Contents lists available at ScienceDirect

Journal of Affective Disorders Reports

journal homepage: www.sciencedirect.com/journal/journal-of-affective-disorders-reports

Research Paper

Association between emotional stability and suicidality in a Brazilian sample of the general population during the COVID-19 pandemic and the moderation role of financial hardship

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ARTICLE INFO

Keywords:
suicide
financial hardship
emotional stability
Covid-19
risk factors

ABSTRACT

Background: Emotional stability is considered a protective factor for suicidal behavior. Nonetheless, suicidality is the result of a complex interaction of protective and risk factors, a key one being financial difficulties. We aimed to investigate the association between emotional stability and suicidality in Brazilian individuals during the COVID-19 pandemic, and the moderation role of financial hardship

Methods: A total of 2140 participants, 79.4% women, answered an online survey from November 2020 to January 2021, containing questions about suicidality as well as concerning economic hardship. We conducted multiple regression and moderation analysis using SPSS PROCESS v3.5 Macro model 1

Results: The participants who reported not having presented suicidal ideation or suicide attempt in the previous month showed a significantly higher level of emotional stability. There was a significant interaction with financial hardship (p=0,006) for suicide attempt as the outcome, with significant association between emotional stability and suicide attempts only in the absence of financial hardship

Limitations: The limitations of this study include the lack of control for distinct mental disorders and levels of financial problems

Conclusion: The presence of financial hardship may suppress the protective role of emotional stability in suicidal behavior.

Introduction

The increased economic turmoil and social isolation due to the COVID-19 pandemic are both risk factors of suicidal behavior (Turecki and Brent, 2016). In addition, the increased prevalence of psychiatric symptoms and worse health-related quality of life reported for some populations are, per se, additional risk factors for suicidality with repercussions in the mental health care system (Ambrosetti et al., 2021;

The authors have no conflicts of interest to disclose.

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https://doi.org/10.1016/j.jadr.2024.100740
Received 3 May 2023; Received in revised form 22 November 2023; Accepted 19 January 2024
Available online 20 January 2024

Amerio et al., 2021; Nobari et al., 2021). Accordingly, much attention has been directed toward investigating the variation in suicide rates during the pandemic. However, the data so far did not show significant changes in the number of suicides during the COVID-19 pandemic (Pirkis et al., 2021), although they may vary according to specific populations (Liang and Nestadt S, 2021; Tanaka and Okamoto, 2021), which reinforces the role of protective factors in this dynamic. Among them, some personality traits have been identified as protective factors of suicidal behavior (Giner et al., 2016; Na et al., 2020). Individuals with high scores on emotional stability, for instance, tend to react less strongly when facing negative events, in addition to remaining calmer and more likely to have longevity (Terracciano et al., 2008). Therefore, the emotional stability personality trait (i.e., how likely a person is to interpret events as less threatening or difficult) can function as a protective factor in terms of differential susceptibility to environmental challenges related to suicide (Boyce, 2016). Evidence from analysis of bivariate logistic regressions demonstrates that higher scores on these protective factors predicted non-suicide attempt status (Meadows et al., 2005).

Regarding environmental risk factors of suicidality, according to data from the economic crisis of 2008, the increase in suicides preceded the actual rise in the unemployment rate (Nordt et al., 2015). Recently, using the same model of analysis as the 2015 study, researchers sought to estimate the forecast of an expected rising effect on the unemployment rate on suicide rates. According to estimates, there is a prediction of the potential increase in the unemployment rate associated with the increase in suicide rates (Kawohl and Nordt, 2020). A study carried out by Elbogen et al. (2020) has yet presented evidence that economic hardship tends to considerably increase the risk of suicidal ideation and attempt (Elbogen et al., 2020). A nationwide survey conducted in the United States investigated symptoms of mental illness, social isolation, and financial stress revealing that financial stress was associated with suicidal ideation and self-harm, in addition to mental illness symptoms (Elbogen et al., 2021). In Brazil, the coronavirus crisis negatively impacted the economy, causing unemployment, inflation, leading the Brazilian government to adopt measures of economic and social support such as an "emergency financial assistance" (Alvarenga et al., 2020), a financial aid from the Federal Government to provide help to informal and self-employed workers (Federal., 2021).

Suicide as an outcome has been understood as the product of a complex interaction of biological, environmental, and psychological risk and protective factors (Franklin et al., 2017; Joaquim et al., 2021). Thus, it is important not only to identify protective and risk factors, but also the interactions between them. Here, we explore the association of emotional stability personality trait and suicidality. Additionally, we sought to investigate how financial hardship can influence this relationship. In this context, we hypothesize that although there may be an inverse association between emotional stability and suicidality, this relationship is moderated by a specific contingency, financial hardship. Our hypothesis is that financial hardship moderates the relationship between emotional stability and suicidality, such that its presence will decrease the expected relationship between emotional stability and suicidal ideation and behavior.

Method

This is a cross sectional study with a convenience sample that derives from an online repeated cross-sectional survey for evaluating the quality of life and the mental health of the general population during the COVID-19 pandemic in Brazil. The project was approved by the National Research Ethics Committee, Registration Number 30. 823.620.6.0000.5.149. All participants were adults informed about the survey content, and all included gave an informed consent to participate. The dataset was exported from and imported into Knime, and comprises 2140 participants from all regions of Brazil. Data was collected from November 2020 to January 2021, based on an online questionnaire developed by the researchers. Suicidality (suicidal ideation or suicide attempt) was measured with two questions using a Likert scale model (Sullivan and Artino, 2013): “I wish I was dead at some point during the last month” (suicidal ideation) and “I tried to kill myself at some point during the last month” (suicide attempt). Answers varied from “1-strongly disagree” to “7-strongly agree”. Scores were individually dichotomized as “yes” from “2-moderately disagree” to “7-strongly agree” and only the response “1-strongly disagree” was computed as a “no” suicidality related response. Thus, if the answer did not clearly deny the statement (that is, “strongly disagree”), we considered the participant as having a potential suicidal ideation or suicide attempt.

The personality of the participants was evaluated based on the Brazilian Portuguese version of the Ten-Item Personality Inventory, the TIPI (Gosling et al., 2003; Nunes et al., 2018). The TIPI is a brief measurement instrument that has adequate levels in terms of (a) convergence with Big-Five measures widely used in self-report scales, peer observation, (b) test-retest reliability, (c) patterns of correlates external forecasts, and (d) convergence between the observer’s own assessments. Based on these tests, a 10-item measure of the Big Five is offered for situations where quick measures are needed. Each item is measured from 1-“disagree strongly” to 7-“agree strongly”. We analyzed the “emotional stability” trait composed of items 4 (Anxious, easily upset – reversed scored item) and 9 (Calm, emotionally stable) from TIPI. The measure provides a total score that can range from 2 to 14. The test-retest reliability for this specific measure at approximately 6 weeks in the study of Gosling et al. (2003) was 0.70 (N=180) (Gosling et al., 2003).

Last, we asked participants whether they had faced financial hardship more severely than usual in the last six months (“yes” or “no”). Besides sociodemographic characteristics, participants were also asked if they ever have had a professional diagnosis of any mental disorder.

Statistical analysis

We described categorical variables in terms of relative and absolute frequency, and continuous variables in mean and standard deviation. We used Pearson chi-square to compare categorical variables and Student t-test to compare continuous variables. In an attempt to investigate the total direct effect of financial hardship on the relationship between emotional stability and suicide risk, we conducted multiple regression analysis using SPSS PROCESS v3.5 Macro model 1 described by Hayes (Hayes, 2017). PROCESS is a computational tool for path analysis–based moderation and mediation analysis as well as for their combination (Hayes, 2017). The analysis was controlled for age, sex, and the presence of mental disorders. A statistically significant interaction indicates that the moderator variable (financial hardship) changes the strength or trend (positive/negative) of the association between the dependent variable (suicidality questions) and the independent variable (emotional stability).

Results

The sample encompasses 2,140 individuals from all federative units of Brazil that answered the study’s protocol between November 2020 and January 2021. During this period, Brazil presented between 5.55 million and 9.20 million confirmed COVID-19 cases, between 160,074 and 224,504 confirmed deaths, and less than 1% of the population vaccinated (Ritchie et al., 2020). The unemployment rate was between 14.1% (November 2020) and 14.2%, January 2021, (IBGE, 2021). The sample was mainly female (79.4%) and 40 years old on average. Half of the participants reported at least one mental disorder and around one-quarter reported the presence of financial hardship. About 5% of the participants were categorized as having had a potential a suicide attempt during the last month and 40.9% suicidal ideation (Table 1).

As stated in the Methods section, the outcome was considered potentially present for all participants that did not answer “strongly

Table 1
Socio-demographic characteristics of the sample

Variables	Total n= 2140
Age mean (SD)	40.5 (13.7)
Sex n (%)	
Female	1700 (79.4)
Male	440 (20.6)
Financial hardship[a] n (%)	
Yes	512 (23.9)
Mental disorders[b] n (%)	
Yes	1069 (50)
Emotional stability[c] mean (SD)	7.3 (3.3)
Suicidal ideation[d] n (%)	
Yes	876 (40.9)
Suicide attempt[e] n (%)	
Yes	112 (5.2)

[a] Considered positive if the subject answered "yes" to the following statement: "Faced more severe than usual financial difficulties" related to the past six months

[b] A diagnosis of psychiatric disorder was considered present if the participant answered positively to the question, "Have you ever received a diagnosis of a mental disorder by a healthcare professional (e.g., depression, anxiety, ADHD)?"

[c] Emotional stability measure of the Ten-Item Personality Inventory (TIPI) (Gosling et al., 2003; Nunes et al., 2018)

[d] , [e]Suicidal ideation and suicidal behavior were each measured by one question that had seven response options: "I wish I was dead at some point during the last month" (suicidal ideation)" and "I tried to kill myself, in some point within the last month" (suicide attempt). Potential answers for these questions included: "1: strongly disagree; 2: moderately disagree; 3: disagree; 4: neither agree nor disagree; 5: agree; 6: moderately agree; 7: strongly agree". For each question, any response that indicated any possibility (i.e., elevated risk) of suicidal ideation or behavior was considered, from 2: moderately disagree to 7: strongly agree, as a positive answer for each outcome.

disagree" for the questions related to suicide wish to die and attempt.

The participants who reported not having presented suicidal ideation or suicide attempt in the previous month presented a significantly higher level of emotional stability, suggesting a protective role of this personality trait. On the other hand, the two suicidality outcomes were significantly associated with a higher frequency of mental disorders and financial hardship (Table 2).

Regarding the moderation analysis, financial hardship presented a significant moderation role in the association between emotional stability and suicide attempt (p=0.006) (Table 3).

The conditional effect of emotional stability on the potential history of suicide attempts depending on financial hardship shows that the presence of the latter abolishes the protective role of emotional stability on suicide attempts after controlling for age, sex, and the presence of mental disorders (Table 4 and Fig. 1).

Discussion

In this study, we found that individuals who did not report suicidal ideation or suicide attempt in the previous month of the assessment presented a significantly higher level of emotional stability, suggesting a protective role of this clinical characteristic in suicidality outcomes. In addition, financial hardship exhibited a moderation role in the association of emotional stability and suicide attempt. More precisely, in the absence of financial hardship, higher emotional stability seems to present a protective role against suicide attempts; however, this relationship was no longer significant in the presence of financial hardship, suggesting that economic restraints can be a risk factor of suicidality that overcomes the known benefits of personality characteristics as emotional stability.

Emotional stability can be defined as "a property to label whether or not a complex emotional system can automatically maintain its equilibrium efficiently" (Chaturvedi and Chander, 2010; Yan, 2005). This property includes the sensitivity of emotional response and how fast the person can recover from the negative emotions (Chaturvedi and

Table 2
Participants' comparison according to the suicide risk question[a]

	Suicidal ideation[b]			Suicide attempt[b]		
	Yes 876 (40.9)	No 1264 (59.1)	p value	Yes 112 (5.2)	No 2028 (94.8)	p value
Age mean (SD)	36.6 (12.8)	43.3 (13.7)	<0.001	33.7 (12.9)	40.9 (13.6)	<0.001
Female n (%)	692 (79)	1008 (79.7)	0.67	87 (77.7)	1613 (79.5)	0.64
Mental disorders n (%)	558 (63.7)	511 (40.4)	<0.001	89 (79.5)	980 (48.3)	<0.001
Emotional stability[c] mean (SD)	5.9 (2.9)	8.3 (3.2)	<0.001	5.1 (2.7)	7.4 (3.3)	<0.001
Financial hardship n (%)	272 (31.1)	240 (19)	<0.001	56 (50)	456 (22.5)	<0.001

[a] We used Pearson chi-square to compare categorical variables (sex, mental disorders, and financial hardship) and Student t-test to compare continuous variables (age and emotional stability)

[b] Suicidal ideation was considered if there was any response from moderately disagree to strongly agree to the question "I wish I was dead at some point during the last month"; Suicide attempt was considered if there was any response from moderately disagree to strongly agree to the question "I tried to kill myself, in some point within the last month"

[c] A trait composed of items 4 (Anxious, easily upset) and 9 (Calm, emotionally stable) from the Ten-Item Personality Inventory.

Table 3
Model summary for the association between emotional stability and suicidality moderated by financial hardship

	se	z	coeff	95% CI	p value
Suicidal ideation					
Emotional stability	0.019	-10.756	-0.209	-0.247 to -0.171	<0.001
Financial hardship	0.267	0.485	0.130	-0.394 to 0.654	0.63
Int_l	0.036	1.608	0.058	-0.013 to 0.129	0.11
Age	0.004	-7.256	-0.027	-0.035 to -0.020	<0.001
Sex	0.123	-2.684	-0.329	-0.569 to -0.089	0.007
Mental disorders	0.100	6.113	0.613	0.416 to 0.809	<0.001
X*W Chi-sq 2.54; P=0.11					
Model p<0.001; McFadden 0.14; CoxSnell 0.17; Nagelkerke 0.23					
Suicide attempt					
Emotional stability	0.056	-4.651	-0.259	-0.368 to -0.150	<0.001
Financial hardship	0.432	0.065	0.028	-0.819 to 0.875	0.94
Int_l	0.073	2.740	0.201	0.057 to 0.345	0.006
Age	0.009	-3.916	-0.035	-0.052 to -0.017	<0.001
Sex	0.248	-1.186	-0.294	-0.779 to 0.192	0.23
Mental disorders	0.250	4.317	1.080	0.590 to 1.571	<0.001
X*W Chi-sq 7.614; P=0.006					
Model p<0.001; McFadden 0.15; CoxSnell 0.06; Nagelkerke 0.18					

W = financial hardship; X = emotional stability; Y = outcome (suicidal ideation or suicide attempt).

Table 4
Conditional effects of emotional stability on the potential history of suicide attempts depending on financial hardship

Outcome	Financial hardship	z scores	Effect	95% CI	p value
Suicide attempt	Presence	-1.138	-0.058	-0.157 to 0.042	0.25
	Absence	-4.651	-0.259	-0.368 to -0.150	<0.001

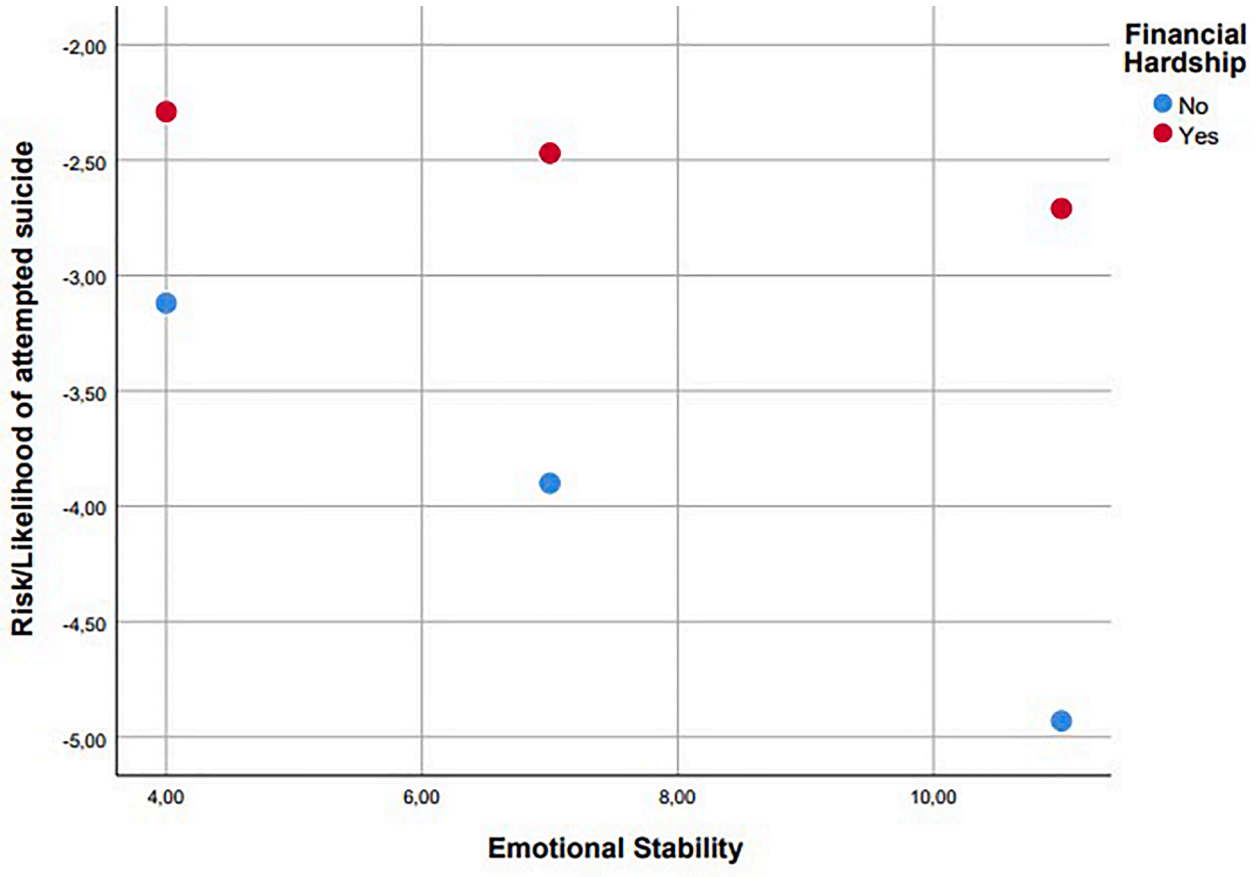

Figure 1. Moderation effect of financial hardship on emotional stability and suicide attempt.

Chander, 2010; Yan, 2005). Sánchez-Teruel et al. developed and validated an instrument to assess resilience for predicting suicide reattempt (Sanchez-Teruel et al., 2021). The investigators found that, among 18 items, the item with the greatest weight in an analysis that included participants who reattempt suicide was emotional stability (Sanchez-Teruel et al., 2021). High levels of emotional stability seems to also protect individuals from depressive and anxiety symptoms after exposure to non-fatal suicidal behavior (Bottomley et al., 2017). Our findings go in the same direction of the studies discussed above insofar participants that denied suicidal ideation or suicide attempt in the previous month presented significantly higher levels of emotional stability. However, although our interpretation is that a higher emotional stability trait is associated with lower suicidality, as this is a cross-sectional study, it is not possible to rule out the possibility that higher suicide risk would generate states of more increased emotional instability.

Regarding risk factors of suicide, those as economic turmoil, social isolation, high anxiety, and poor access to mental health care (Turecki and Brent, 2016) were potentially intensified by the COVID-19 pandemics (da Silva et al., 2020). According to the International Labour Organization, about 25 million jobs could be lost due to the COVID-19 pandemic worldwide (International Labour Organization). Particularly in Brazil, the unemployment rate that was 11.2% in January 2020 reached 14.2% one year later, with a decrease in the real average income of the Brazilian considering all types of work between July 2020 and January 2021 (IBGE, 2021). A longitudinal study with a representative sample of the U.S population investigated whether financial strain predicts suicidality, including suicidal ideation and attempts, controlling for age, sex, mental disorders, race and history of suicidality. The results showed that cumulative financial strain predicted increase odds of suicide attempts by 53% (Elbogen et al., 2020). Another study with the U.S Army Personnel, however, did not find a significant association between financial distress and suicide attempts. The authors found a strong association between relationship problems and substance abuse with suicidal behavior, and the authors concluded that the link between financial problems and suicide attempts would be probably indirect (Goodin et al., 2019). In our study, financial hardship was significantly associated with the two measures of suicidality. However, the lack of control for relevant potential confounders as interpersonal problems and substance use disorder is a limitation. Regarding the interaction of factors determining suicidal behavior, Ntountoulak et al. (2017) reported that the perceived impact of the Greek recession influenced suicidality only in the individuals with mental illness (Ntountoulaki et al., 2017). Kleiman et al. (2012) evaluated if social support moderates the association between impulsivity and suicide risk in 169 college students and found that in the presence of high social support, those individuals with higher impulsivity presented lower suicide risk (Kleiman et al., 2012).

The limitations of this study include the lack of control for distinct mental disorders and levels of economic problems. Although we have used financial hardship, financial distress, and financial strain as they have the same meaning, they may not be related to equivalent concepts. Also, the way we framed the question related to financial hardship "financial hardship more severely than usual in the last six months," can inadvertently classify someone who has remained in a difficult economic situation during the last six months, for instance, unemployed, as "no", and a wealthy person, who has faced financial problems in the last six months, although still in a much better economic situation compared to the majority of population, as "yes." In our sample, despite 20.3% of the subjects disclosed unemployment, only 6.8% of the sample declared that they had lost a job in the last six months (Table S1); within those who were unemployed, only 18% lost a job in the previous six months. Also, 4.9% of our sample declared a monthly household income higher than 5,112 USD (Table S1), while in the Brazilian population, according to

the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística, IBGE), only 1% have a monthly household income higher than 3,259 USD (Belandi, 2022). Thus, it is possible that part of the subjects who remained unemployed in the last six months answered "no" for the financial hardship question (because it was not different than usual). In fact, from the 356 subjects who were unemployed but did not loss a job in the last six months, 27.5% reported financial hardship, a higher frequency than for the whole sample (23.9%). On the other hand, those who, for example, faced economic problems and saw a change in the monthly household income from 5, 112 USD to 3,259 USD (still within the top 1% of the Brazilian population for 2021), could have answered "yes" for financial hardship (different than usual in the last six months). However, our data shows that from those who declare monthly household income higher than 2, 045 USD (n=486, 22.7%), only 10.7% (n=52) disclosed financial hardship (Table S2). Another limitation is that we considered the presence of suicidality outcomes more broadly, including all participants that did not answer the questions with a definite disagreement ("strongly disagree"). This may have increased the number of false positives. However, analysis considering a different categorization of the outcomes (considering any response from 5: agree to 7: strongly agree, as a positive answer for the outcomes) showed similar findings, that is, the association between emotional stability and suicide attempt was found only in the absence of financial hardship (Table S3 and Table S4). While suicidal behavior may include interrupted attempts, aborted attempts, and preparatory acts or behavior, our measure possibly did not capture all these potential possibilities accurately. As this is a cross-sectional study, we also can't determine the directionality of the association between suicidality and emotional stability. Thus, clinical situations of higher suicide risk can determine states of emotional instability. Finally, this is a convenience sample and our findings may not reflect what would be found for the entire Brazilian population.

Despite the worldwide economic problems due the COVID-19 pandemics, besides the increased frequency of other risk factors, as social isolation and mental health problems (Joaquim et al., 2021; Moutier, 2020; Zalsman et al., 2020), the evidence suggests no significant impact on suicide rates (Pirkis et al., 2021), although some studies have shown increased rates in specific populations (Bray et al., 2021; Tanaka and Okamoto, 2021). In a study with data from 21 countries, the rates actually significantly decreased compared to what would be expected for 12 countries or areas (Pirkis et al., 2021). Moutier (2021) suggests as mitigating strategies of suicide risk during COVID-19 pandemics financial safety net and ensure longer-term measures by governments (Moutier, 2020). Several countries have been provided economic incentives for their population during the COVID-19 pandemics. The International Monetary Fund summarized policy responses of 197 economies worldwide to deal with the economic impact of COVID-19 pandemic (International Monetary Fund, 2020). Whether these financial incentives have minimized the potential negative consequences of the economic restraints on mental health outcomes during the COVID-19 pandemic is not clear and deserves investigation. Thus, considering that suicidal behavior is probably the result of an undetermined and complex interaction of known (and unknown) risk and protective factors, the investigation of these interactions can provide information on critical targets for intervention. In the present study, although we expect that emotional stability can help an individual interpret events as less threatening or challenging, protecting a person from potential negative consequences of the additional stress related to economic constraints, financial hardship seems to hamper this protective role. This reinforces the understanding that measures for suicide prevention should be broad, including those that address social risk factors.

Longitudinal studies able to assess suicidality outcomes in different moments of the COVID-19 pandemic in Brazil, considering the receipt of government financial incentives, may help clarify the moderation role of financial hardship in the relationship of risk and protective factors and suicide outcomes.

Conclusion

Suicidal behavior is highly prevalent in low-middle income countries and its etiology is complex, probably involving the interactions of biological, environmental, and psychological risk and protective factors. Financial problem is a risk factor of suicide risk and the investigation of its role in times of economic challenges is even more necessary. In this study, the presence of financial hardship abolished the protective role of emotional stability on suicide attempts, suggesting that this is an important aspect to address to prevent suicidality outcomes in the general population.

CRediT authorship contribution statement

Alexandre Paim Diaz: Conceptualization, Formal analysis, Investigation, Methodology, Writing – original draft, Writing – review & editing. **Rui Mateus Joaquim:** Conceptualization, Investigation, Methodology, Writing – review & editing. **Danielle de Souza Costa:** Formal analysis, Investigation, Methodology, Writing – review & editing. **André Luíz de Carvalho Braule Pinto:** Formal analysis, Investigation, Methodology, Writing – review & editing. **Alexandre Luiz de Oliveira Serpa:** Data curation, Investigation, Methodology, Project administration, Validation, Writing – review & editing. **Ana Luiza Silva Teles:** Investigation, Methodology, Writing – review & editing. **Rafaela F. Guatimosim:** Investigation, Methodology, Writing – review & editing. **Débora Marques de Miranda:** Funding acquisition, Investigation, Methodology, Supervision, Writing – review & editing. **Antônio Geraldo da Silva:** Funding acquisition, Investigation, Methodology, Supervision, Writing – review & editing. **Leandro Fernandes Malloy-Diniz:** Funding acquisition, Investigation, Methodology, Supervision, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

We acknowledge the Brazilian Health Ministry which distributed the survey. We acknowledge the OPAS, which has created conditions for this study to happen. This publication was made possible by a NIMH-funded Postdoctoral Training Program in Suicide Prevention Research to APD (T32 MH20061) at the University of Rochester's (UR) Center for the Study and Prevention of Suicide (CSPS). APD is supported by a 2020 NARSAD Young Investigator Grant from the Brain & Behavior Research Foundation.

Funding

This study was funded by Pan American Health Organization (PAHO/WHO) in Brazil [grant number SCON2020-00202] and CNPQ—Conselho Nacional de Desenvolvimento Científico e Tecnológico [National Council for Scientific and Technological Development] [grant number 401542/2020-3].

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jadr.2024.100740.

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