

THE THIRD WAVE OF MENTAL HEALTH IN COVID-19: POST-PANDEMIC EFFECTS



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ABSTRACT

Pandemics, such as COVID-19, constitute global events with profound and long-term psychological impacts. This study investigated the effects of the pandemic on mental health, focusing on the stages before, during, and after the crisis, with emphasis on the so-called "third wave" of mental health in the post-pandemic period. Using a qualitative questionnaire applied to 95 participants, mental health perceptions were analyzed, categorizing feelings as positive, negative and neutral.

The results revealed that words with negative connotations, such as "anxiety" and "fear", predominate in self-assessments, reflecting the lasting impact of the pandemic. Positive terms, such as "resilience" and "balance", appeared less frequently, but indicate signs of overcoming in some participants. The data also showed that vulnerable populations, including children, adolescents and the elderly, suffered more intense impacts, exacerbated by factors such as social isolation and socioeconomic insecurity. Pandemics leave emotional scars that persist for years, reinforcing the need for continuous psychological support strategies. This study highlights the importance of personalized interventions, inclusive public policies, and the promotion of collective resilience. The research contributes to understanding the prolonged impacts of COVID-19 and points out ways to mitigate future damage to mental health.

Keywords: Public Health. Mental health. Pandemic. COVID-19.

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INTRODUCTION

The trajectory of mental health during the pandemic can be analyzed under the metaphor of sea waves, each symbolizing different stages of psychological impact. The first wave can be compared to a sudden tide, characterized by the unexpected emergence of anxiety and fear, a reflection of the unknown and the abrupt arrival of the pandemic. This initial moment was marked by intense emotional reactions, such as anxiety, depression, and the fear of contagion, evidencing the shock and uncertainties that accompanied the beginning of the health crisis. The second wave, more intense and prolonged, corresponds to the moment when the "sea" of mental health becomes more agitated, translating into the weight of social isolation and emotional exhaustion. These factors impacted not only the general population but also, significantly, healthcare workers, who faced unique challenges in dealing with the overburdened demands of the healthcare system. During this period, symptoms such as emotional fatigue, depression, and feelings of hopelessness became more prevalent (Honorato et al, (2020). In turn, the third wave represents a slower, but deeper and lasting movement, analogous to the marks left on the sand after the passage of the waves. This article reflects the persistent psychological effects of the post-pandemic period, including the emergence of disorders such as post-traumatic stress disorder and the need to adapt to new social and psychological norms. This phase highlights the relevance of continuous psychological support strategies, which are essential to mitigate the lasting impacts of the pandemic.

The evolution of these "waves" illustrates how emotional impacts have changed over time, providing an essential reference for planning future mental health interventions. In addition, a significant increase in symptoms of anxiety, depression, and insomnia was observed, as highlighted by Honorato (2020, 2023). (1,2) This scenario has posed a substantial challenge for public health on a global scale, affecting not only the general population but also frontline professionals, who have experienced extreme levels of stress and burnout (Soares et al., 2023)(3)

Considering the epistemological point of the three emotional waves, we observe three main moments: the first wave, characterized by ignorance and its symptoms; the second wave, when the effects of the virus manifest themselves and we experience pandemic chaos; and the post-pandemic, called the Third Wave. In the context of COVID-19, the psychological manifestations of the first wave were identified in 2020, while

interventions occurred in the second wave (Honorato, 2020). This article seeks to describe participants' perceptions of their own mental health in the post-pandemic third wave period.

The systematic review by Gianfredi (4) highlights that the prevalence of depression increased significantly during the pandemic, from 7.2% to values between 14.6% and 48.3% in several populations. This increase was compounded by factors such as gender, chronic illness, unemployment, and especially frequent and prolonged exposure to information about COVID-19, which proved to be a critical factor in the development of depression. In addition, Pierce et al. point out that pre-existing inequalities in mental health were amplified during the pandemic, evidencing disparities in living conditions, such as access to resources and exposure to domestic violence (5).

The pandemic has had especially serious consequences on the population considered vulnerable, especially children and adolescents. The systematic review by Elharake et al. indicates that socioeconomic status is related to increased psychological distress during the pandemic, as a result of job loss or instability experienced by many families (5). These results can be corroborated by the conclusions of Samji et al., which highlight the negative implications of remote teaching for low-income students in special schools (6). In addition, Guessoum et al. report that adolescents had an increase in the number of psychiatric disorders, such as anxiety/depression because of prolonged confinement and excessive use of social networks (7).

Seniors have also faced significant challenges related to mental well-being during the pandemic. Aryaie et al. report that problems such as anxiety, depression, and sleep disturbances have become more prevalent among older populations, exacerbated by feelings of loneliness and fear associated with COVID-19 (8). These observations agree with the findings of Boland and Gale, which indicate that older individuals with pre-existing mental health conditions are at higher risk of suffering severe consequences, both physical and psychological, due to the pandemic (9).

Additionally, the pandemic's impact on mental health has been documented in various media, including social media platforms. An analysis by Zhang et al. illustrates how Twitter debates reflected widespread concerns about mental health and dissatisfaction with government responses during the pandemic (10). These findings highlight the role of social media as a reflection of public sentiment, as well as its potential utility as a tool for monitoring mental health trends in real-time (10).

The COVID-19 pandemic has caused a significant deterioration in the mental health of different populations, with a special impact on vulnerable groups, such as children, adolescents, and the elderly. The combination of socioeconomic factors, pre-existing mental health conditions, and the influence of the media has strengthened these impacts, requiring urgent attention from mental health support systems.

This research is descriptive, exploratory and qualitatively oriented, with participants answering an online form. It seeks to understand the emotional implications of the COVID-19 pandemic in the different phases – first, second and third waves. Contextualization is crucial to understanding how psychological reactions have evolved over time, providing useful information about mental health in the post-pandemic period. This context underpins the analysis of the psychological symptoms of the third wave, allowing a more accurate and complete description of the emotional challenges faced by the population.

The main objective of the study was to identify the psychological manifestations perceived after the COVID-19 pandemic, focusing on the third wave of mental health. The study is justified by the long-lasting effects of pandemics on human emotions, as well as the need to properly understand and address these symptoms. In addition, the study seeks to fill gaps in knowledge about the prolonged consequences of the pandemic, offering valuable subsidies for interventions and effective psychological support.

METHODOLOGY

This survey was conducted through a questionnaire hosted on Google Forms, from December 2023 to December 2024. The dissemination took place through social networks, with a link to a website with information and signature of the ICF. The questionnaire consisted of closed/open-ended questions, which included sociodemographic information, perceptions of their mental health at 3 different times (before the pandemic, during, and after), and a qualitative self-assessment of no more than 3 words. We obtained 97 participants, but 2 were excluded from the study due to lack of complete data for analysis, forming a total of 95 participants.

The questionnaire used in the investigation was divided into 4 main sections, including the following questions:

1. Sociodemographic Profile: Collected general information from the participants, such as male/female gender (age), education, place of residence.

2. Mental Health in Three Moments: Perceptions of mental health before, during or after the pandemic using a Likert scale where categories ranged from "Very Bad" to "Great".
3. Qualitative Self-Assessment: They described their mental health in a maximum of 3 words, in order to have a more subjective individualized analysis.
4. Other Reference Questions: Included topics on external/personal factors that could have contributed to an improvement in mental condition during pandemics.

The data obtained were stored anonymously in spreadsheets for later analysis, maintaining the integrity and confidentiality of the information.

DATA PREPARATION AND REFINEMENT

After collection, the data went through a refinement process. Initially, database cleanups were performed to eliminate inconsistencies such as duplicate entries or typos. Qualitative responses were standardized to avoid redundancies, grouping similar words such as "anxiety" and "anxious."

ANALYSES PERFORMED

The data analyses were divided into two main axes: quantitative and qualitative.

1. Quantitative Analysis:

- **Demographic Distribution:** Frequencies and percentages were calculated for variables such as gender, age, education, and place of residence.
- **Mental Health at Three Moments:** The responses categorized on the Likert scale were analyzed in absolute and relative frequencies to identify changes and patterns of perception throughout the three periods.
- **Mental Health Trajectories:** Frequent combinations of responses at three different times were analyzed, associating them with demographic variables, such as mean age and predominant level of education.

2. Qualitative Analysis:

- **Word Frequency:** The descriptive words provided by the participants were separated, standardized and analyzed to calculate the frequency of occurrence of each term.

- **Sentiment Analysis:** Words were categorized into positive, negative, or neutral, using predefined lists of sentiments, allowing for a more detailed understanding of the participants' emotional state.
- **Word Cloud:** A visual representation of the most frequent words was generated, highlighting the predominant trends in the qualitative responses.

TOOLS AND COMPUTATIONAL AIDS

Artificial intelligence played an essential role in several stages of the research:

1. **Data Refinement:** Open-ended responses were standardized and typographical errors were automatically corrected.
2. **Statistical Analysis:** Frequencies, percentages, and means were calculated to identify statistical patterns in the data.
3. **Qualitative Analysis:** AI tools assisted in the categorization of words and the creation of the word cloud.

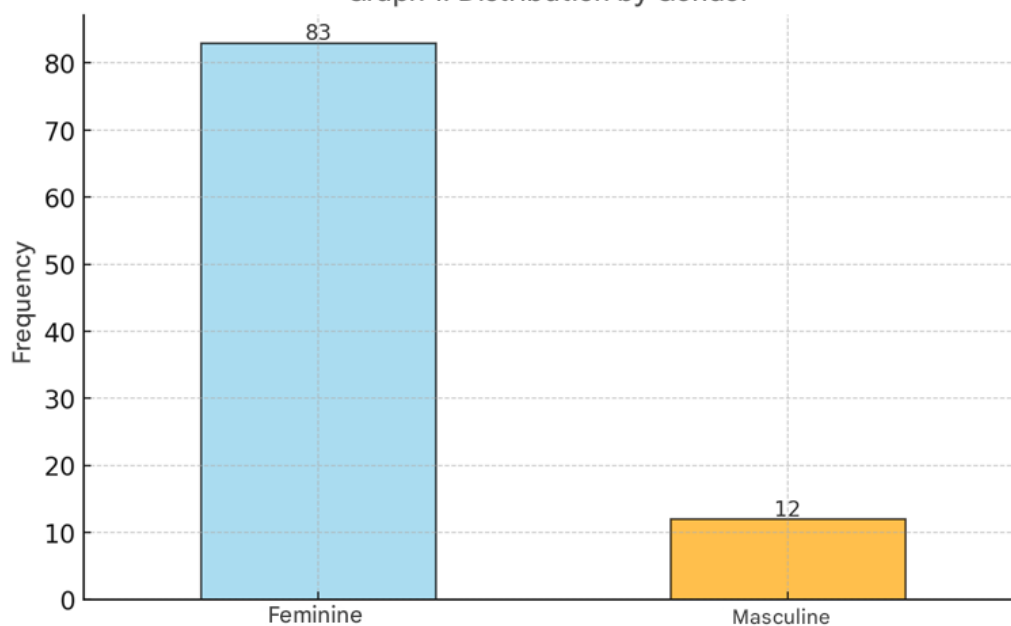
ETHICAL ASPECTS AND FINAL CONSIDERATIONS

The research was conducted in accordance with the norms of Resolutions 466/2012 and 510/2016 of the CNS, ensuring the ethical protection of the participants. The use of data was strictly limited to the scope of this study, and the procedures adopted ensured scientific rigor in the analysis of the results. These practices enabled a detailed understanding of the psychological impact of the pandemic, providing a solid foundation for future mental health interventions. The research was approved by the Research Ethics Committee of the University of the State of Amazonas. CAAE 68592123.9.0000.5016 and opinion 6.070.040

RESULTS AND DISCUSSION

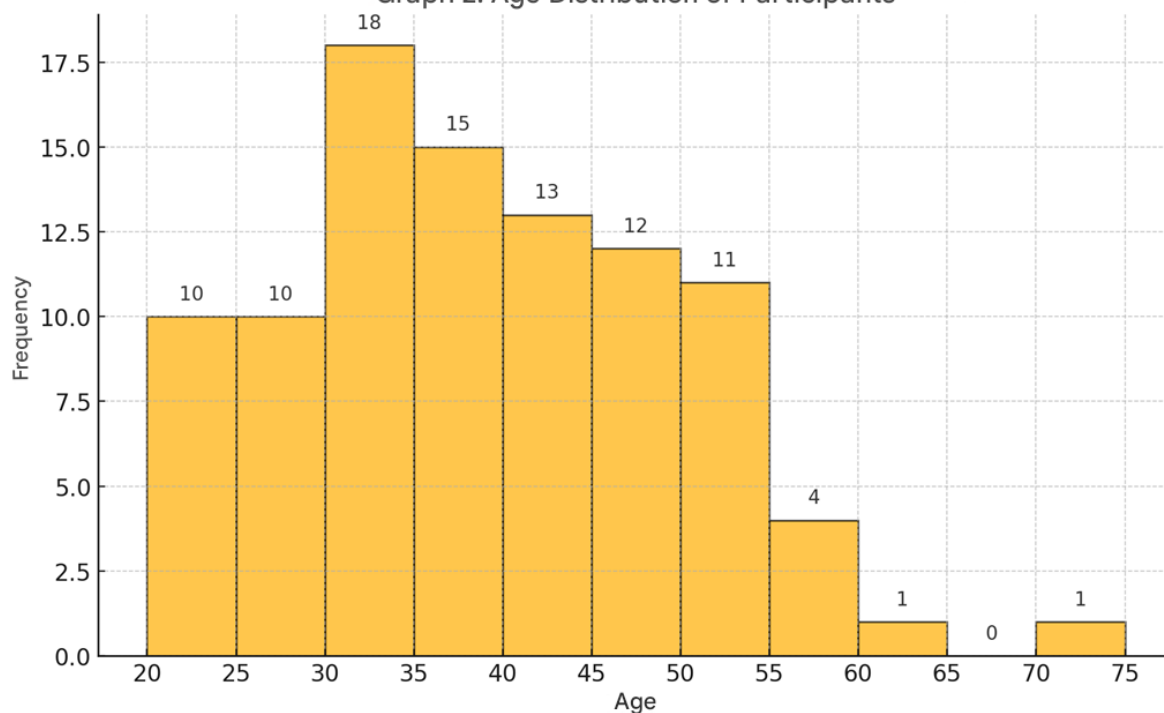
The first analysis revealed that female participants were the majority of 83 participants (87.4%) of the total, while male participants were 12 (12.6%).

Graph 1. Gender Distribution
Graph 1: Distribution by Gender

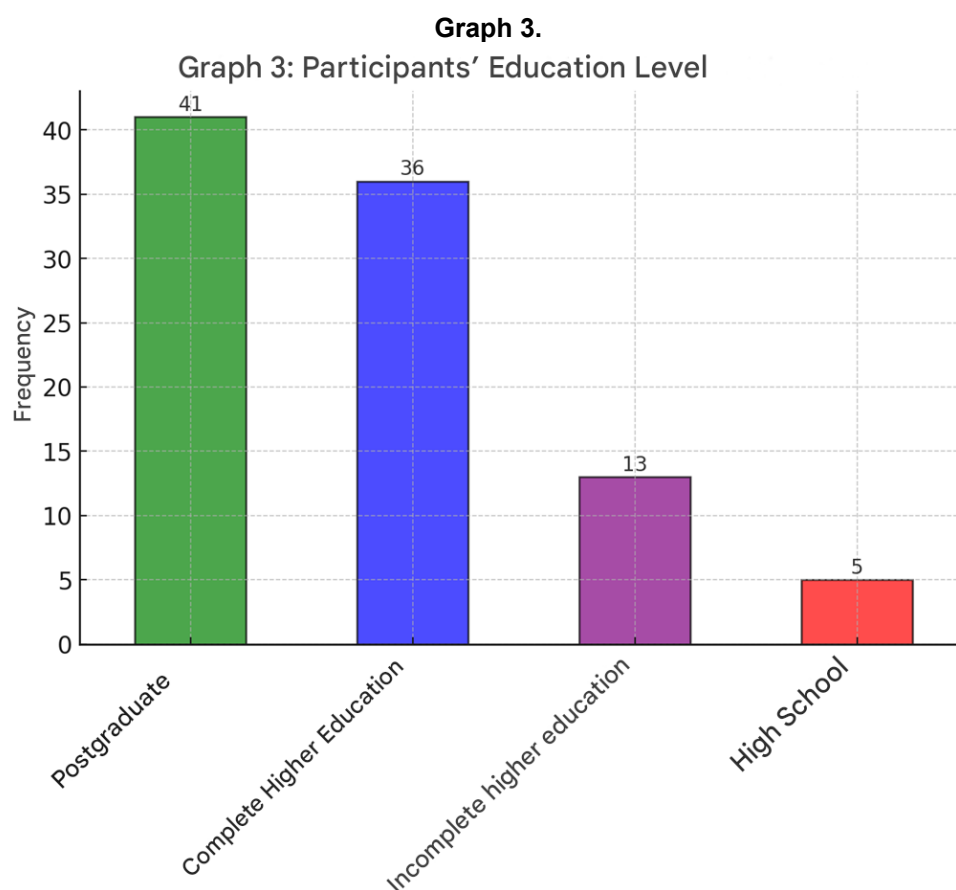


In the distribution by age group, the participants are aged between 20 and 71 years, most present among them in the range of 20 to 50 years.

Graph 2.
Graph 2: Age Distribution of Participants



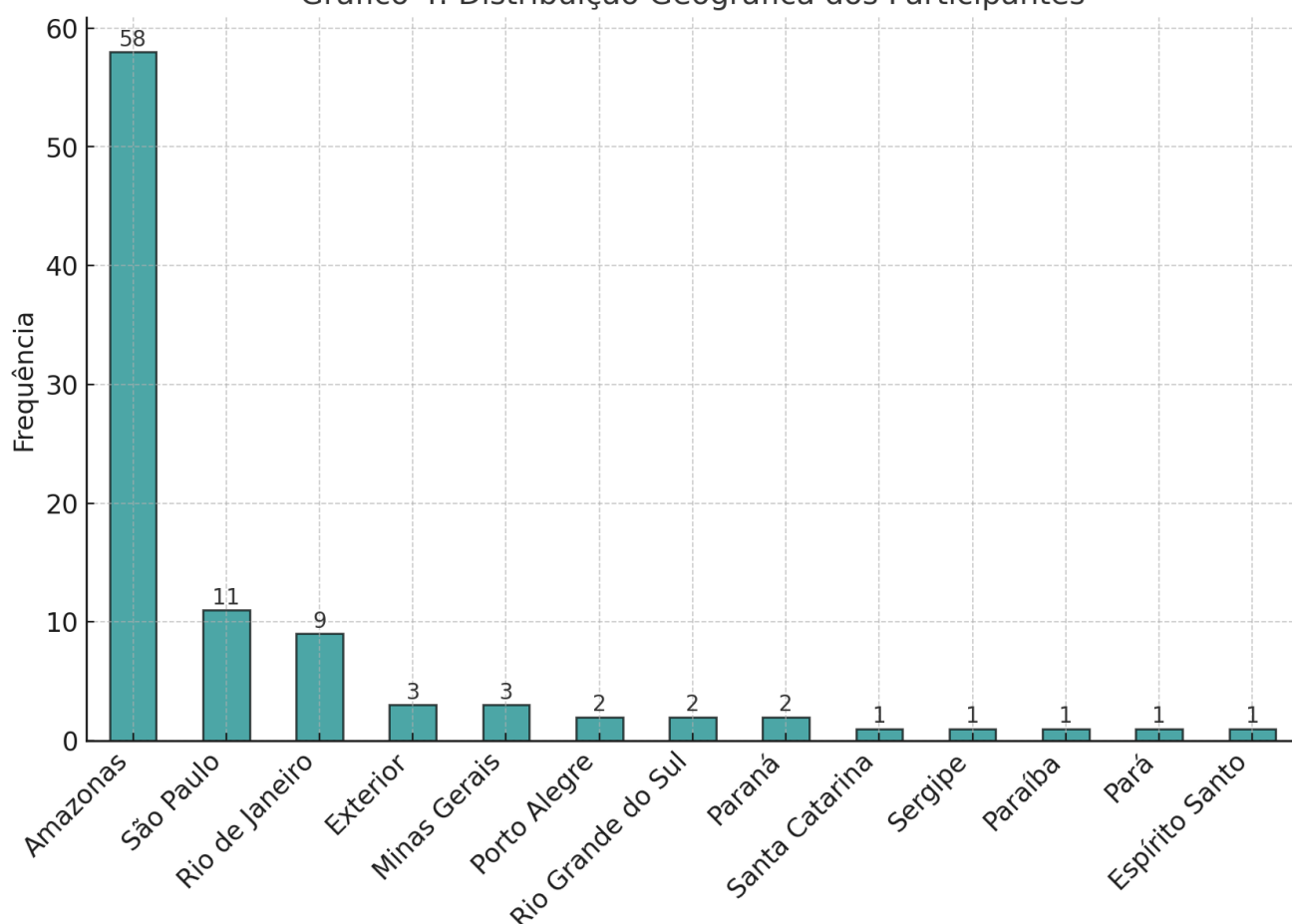
In terms of education, 43.2% (41) of the participants have completed a postgraduate course, followed by 37.9% complete higher education (36). These numbers reveal a high standard of education among people, which may have implications for their perception/evaluation of mental health. This distribution is shown in Graph 3.



The geographic distribution of the participants shows a predominance in the state of Amazonas, which represents 61.1% of the population (58). On the other hand, São Paulo plus Rio de Janeiro concentrate 21.1% of the participants. The study also includes a portion of overseas residents. This information is found in Graph 4.

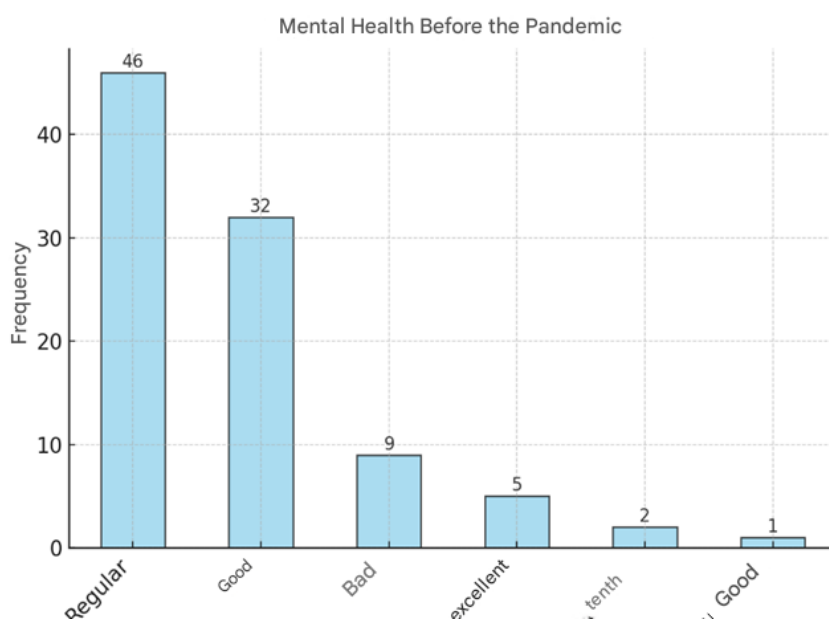
Graph 4.

Gráfico 4: Distribuição Geográfica dos Participantes



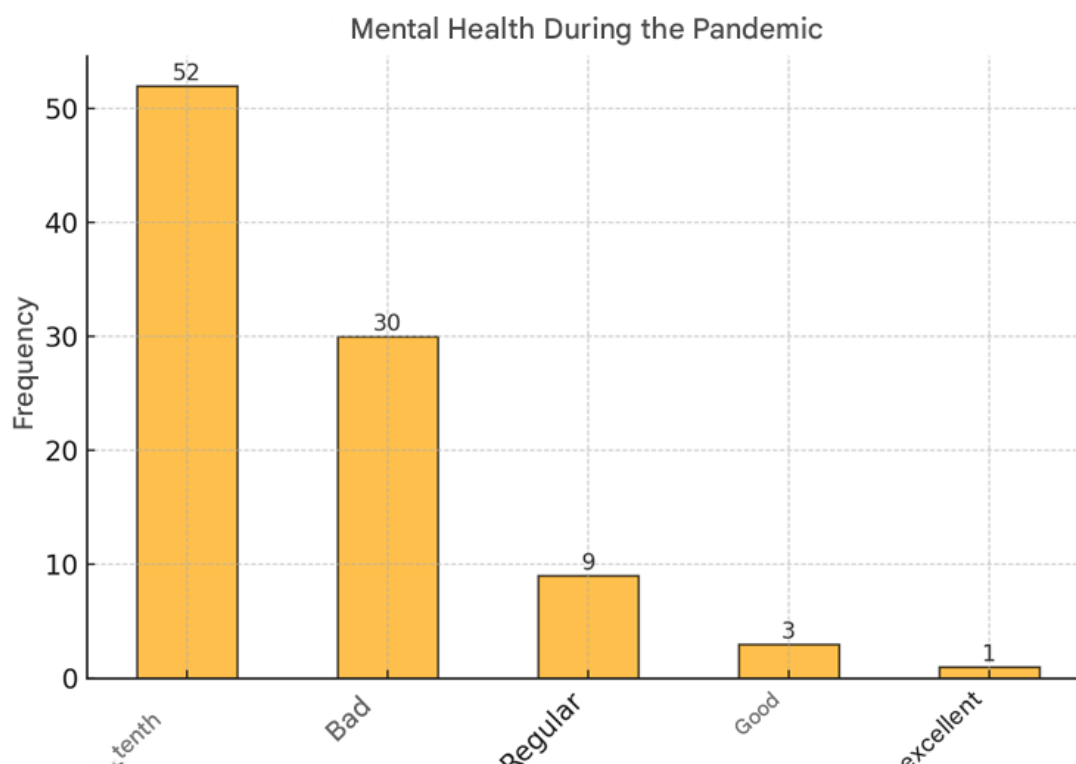
When asked about their perception of mental health BEFORE the pandemic, among the participants, 46 (48.4%) defined their mental health as "Fair" or 32 (33.7%) as "Good". Only 9 (9.5%) reported a "Poor" evaluation, with 5 (5.3%) pointing to their perceptions of Health as "Excellent". "Terrible" and "Very Good" were scored by 2 3 1 participants, respectively. These results indicate a global sense of emotional stability in the face of the consequences of the pandemic, as shown in Graph 5: Mental Health Before COVID-19.

Graph 5.



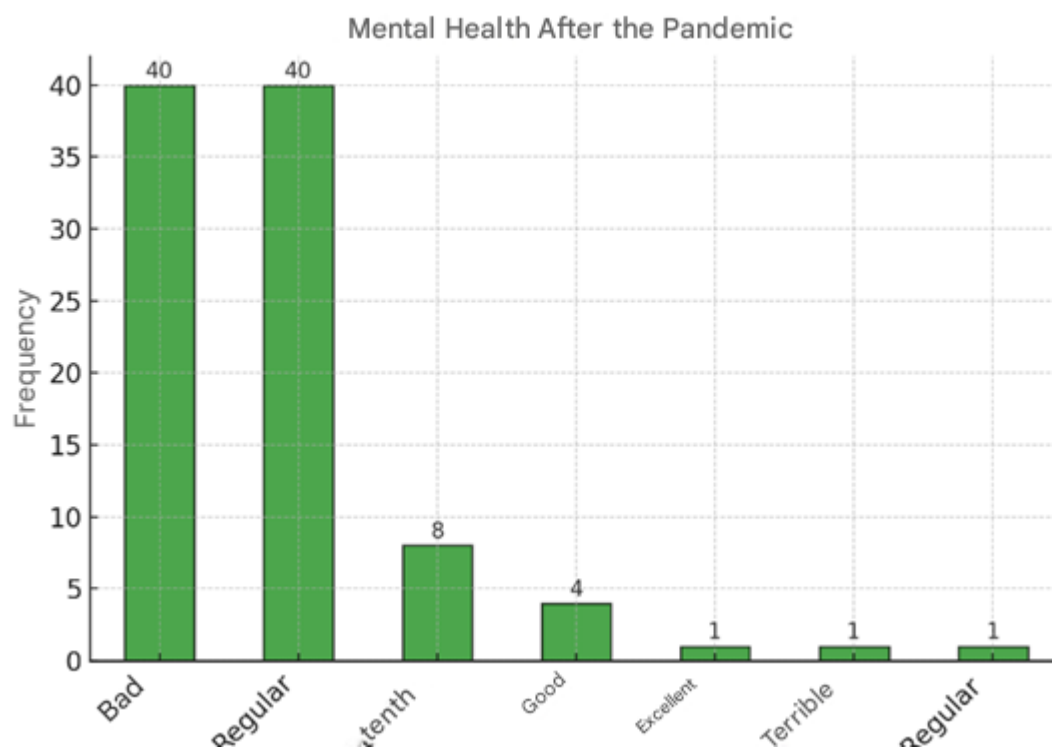
From the beginning of the pandemic, there was a significantly deeper decline in the perception of psychological conditions. When asked about their perception of mental health DURING the pandemic, the majority of participants (52 people, 54.7%) rated their mental situation as "Very Bad", while 30 (31.6%) rated it as "Poor". Only 9 participants (9.5%) reported a "Fair" status, with the categories "Good" or "Excellent" representing less than 4% of the responses in Graph 6.

Graph 6.



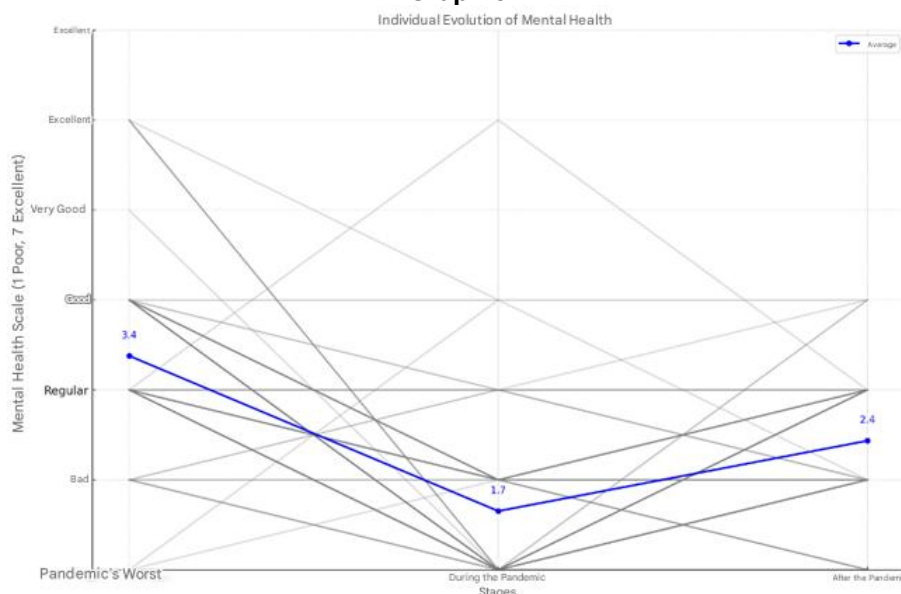
The results indicate signs of partial recovery in the post-pandemic period, although the impacts remain significant. The majority of participants defined their mental health as "Poor" (40), 42.1% or "Fair", 40 (42.2%). 4 (4.2%) participants mentioned "Good" or "Excellent" health, 1 (1%) considered it "Excellent". On the other hand, 8 participants (8.4%) consider their mental health "Terrible" describing the emotional consequences. These results are represented in Graph 7: Mental Health After the Pandemic.

Graph 7.



Graph 8 summarizes the transformations in the quality of the participants' mental life in 3 important moments: Before COVID-19, during a pandemic period and after. Each gray line represents a participant, recording individual perceptions of their own mental health over time, while each blue line represents the total average across all of them.

Graph 8.



The graph shows a drastic transformation in perceptions during the pandemic. The gray lines descend strongly to the lower scales, suggesting when they start to consider their mental health as mostly bad or very bad on the part of the participants. The blue line of the average also decreased, as reflected in the general psychological impact of the period. This period was marked by difficulties such as social isolation, fear of contamination, personal regrets and economic uncertainty that contributed to a worsening of emotional conditions. The results after the pandemic show a partial recovery, but not complete.

ANALYSIS OF THE RESULTS

The analysis of the participants' mental health trajectories, associated with the demographic variables of education and age, provides a comprehensive and detailed view of the psychological dynamics throughout the three stages evaluated: before, during, and after the pandemic. The results highlight patterns of decline, partial recovery, and persistence of impacts, while also revealing significant associations with factors such as educational level and age group.

For this analysis, the responses of 95 participants were used, assessing their perceptions of mental health at three different moments. Each answer was categorized according to the Likert scale adopted in the study, with values converted for quantitative analyses. The most frequent trajectories were identified by grouping specific combinations of responses to the three stages. The variables schooling and age were integrated to analyze how these demographic characteristics influenced the trajectories.

The most frequent trajectory was **"Regular → Very Bad → Bad"**, reported by 13 participants, representing 13.7% of the sample. These participants started with regular mental health perceptions before the pandemic, declined to "Very Poor" during the pandemic period, and showed a slight recovery to "Poor" in the post-pandemic period. Regarding education, 46.2% of the participants in this trajectory had completed higher education, 38.5% had a postgraduate degree and 15.3% had a high school education. These data suggest that, even among individuals with high education, the pandemic had a severe impact, although with some partial recovery. As for age, the average was 38 years, with a higher concentration in the 30 to 45 age group. This age group may have faced multiple stressors, such as professional and family demands, and economic uncertainties.

The second most common trajectory was **"Fair → Very Bad → Regular"**, reported by 9 participants (9.5% of the sample). This pattern reflects an initial decline during the pandemic, followed by a full recovery to the initial mental health status. Regarding education, 55.6% of the participants had a postgraduate degree, while 33.3% had completed higher education and 11.1% had lower education. The mean age was 34 years, predominantly young adults. This inherent flexibility of the age group, combined with greater access to educational resources, may have facilitated recovery.

The trajectory **"Good → Very Bad → Regular"** was followed by 8 participants, representing 8.4% of the sample. This pattern reflects the severe impact of the pandemic, even among individuals who started with positive perceptions of mental health ("Good"). Although there was partial recovery, these participants did not return to the initial level. The median age was 42, a range in which factors such as family responsibilities and work demands can amplify the psychological impact.

The trajectory **"Regular → Bad → Bad"**, reported by 6 participants (6.3% of the sample), reflects an initial decline and the maintenance of a negative state after the pandemic. These participants showed no signs of recovery, which may be related to external factors or lack of access to psychological support. In terms of education, 50% had incomplete high school or higher education, 33.3% had completed higher education and only 16.7% had a postgraduate degree. The median age was 47 years, indicating that middle-aged individuals may have faced cumulative challenges during and after the pandemic.

Another trajectory reported by 6 participants (6.3% of the sample) was **"Fair → Poor → Regular"**, which reflects a complete recovery to the initial state, after a temporary decline during the pandemic. In this group, 66.7% of the participants had a postgraduate degree, while the others had completed higher education. High schooling seems to have played a significant role in the recovery. The mean age was 36 years, indicating greater resilience among young adults.

These results show that both education and age significantly influence participants' mental health trajectories. Individuals with higher education demonstrated greater recovery capacity, while those with lower education were more likely to be in critical states and to maintain negative conditions. Similarly, young and middle-aged adults showed greater variability in trajectories, while older participants often remained in negative states. These

analyses highlight the importance of tailored interventions that consider both demographic factors and specific stressors faced by different groups.

DISCUSSION

The COVID-19 pandemic has had profound, multifaceted implications on the condition of mental health in different populations. Gianfredi et al. highlight that the prevalence of MPD was significantly high during the pandemic period, from 7.2% to 14.6% or 48.3% in various populations (3). This increase was compounded by factors such as gender, chronic illness, unemployment, and especially often chronic exposure to COVID-19 information, which proved to be a critically responsible factor for their depression (3). At the same time, Pierce et al. point out that previous inequalities in terms of Mental Health have become amplified by the pandemic, showing significant differences in the individual's personal patterns such as general conditions for things (such as material availability and exposure to domestic violence) (4).

The mental health implications of the pandemic were particularly marked in vulnerable populations, such as children/adolescents. Elharake et al. indicate that socioeconomic status below normal was associated with more psychological distress in the pandemic, as many families experienced losses in their work or insecurity (5). The latter is strengthened by the findings of Samji et al., who highlight the negative implications of online teaching for underprivileged students in the specialty, emphasizing the danger of advancing factors related to mental health due to lack of basic equipment (6). In addition, Guessoum et al. evidence that children were admitted to psychiatric disorders, including anxiety/depression because of the lack of prolonged confinement in the family environment and excessive abuse of social networks (7).

Seniors have faced significant mental wellness difficulties during this pandemic. Aryaie et al. report that everyday problems such as anxiety, depression, and sleep disorders have become more common among older populations, weakened by feelings of solidarity in relation to the pandemic (8). These observations agree with the conclusions of Boland and Gale, who indicate that older individuals whose prior mental life conditions are in a better position to experience serious medical and psychological consequences from COVID-19 (9).

In addition, the impact of the pandemic on mental living conditions was recorded through various media such as social apps. An analysis by Zhang et al. shows how Twitter

debates reflected general concerns about mental health conditions, as well as dissatisfaction with the reactions of power during the pandemic (10). This emphasizes the importance of social media as a reflector of public sentiment, as well as a potential tool for tracking behavioral trends in real time. It is society in the fastest form of access to information (10).

In summary, the COVID-19 pandemic has caused a serious deterioration in the mental health of different populations, with a special incidence on vulnerable groups such as children, adolescents, and the elderly.

The presentation of the most common trajectories shows that educational and age variables play an important role in interpreting the psychological impact of the pandemic. Regarding the age group, older adults had a less variable life trajectory while sick women were often in negative states. These patterns indicate that targeted interventions should consider the specific needs of different groups, taking into account not only organizational barriers but also resource availability.

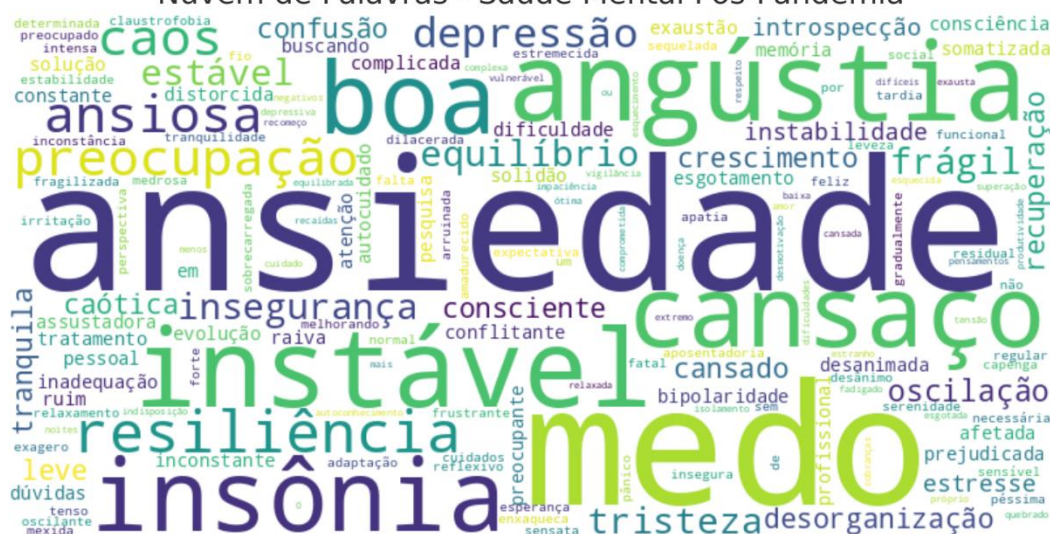
In the last question of the questionnaire, they were asked to describe their mental health in up to 3 words. To study this information, we applied word frequency, sentiment analysis in addition to visual representation through the use of a word cloud. The first phase was to detect the most common words used by the participant. After standardizing all the words, the frequencies started to be counted showing evident trends. The most common words were "anxiety", 25 mentions, followed by "fear" 21 mentions. These words express a predominantly negative emotional state, reflecting the constant difficulties that participants are facing during the post-pandemic phase. Other words such as "distress," "unstable," and "insomnia" have frequently appeared, indicating concrete symptoms of their relation to a certain quality of the mental.

Although terms with negative connotations predominate in the analysis, words such as "resilience", "good" and "balance" were also identified, indicating that some participants demonstrated the ability to overcome or have emotional stability. However, the low relative frequency of these positive terms, compared to negative ones, reinforces the prevalence of unfavorable psychological influences. Categorizing the words into positive, negative, and neutral feelings allowed for a clearer view of the dominant emotions expressed by the participants.

Terms such as "resilience", "balance" and "stable" were classified as positive, while expressions such as "anxiety", "fear" and "distress" were assigned to the category with

The results of this analysis confirm the predominance of negative words, suggesting that a significant portion of the participants are still in an emotionally challenging state. The presence of neutral words reflects an ambiguous or unstable perception, possibly indicating a transitional period for many.

Nuvem de Palavras - Saúde Mental Pós-Pandemia



Source: Prepared by the Authors

The predominance of negative terms indicates the need for regular interventions and psychological support. This information is important to guide future mental health policies, as well as interventional approaches.

Based on the results of the qualitative analysis of the words used by the participants to characterize their Mental Health condition in the post-pandemic phase, approaches

aimed at the psychological difficulties detected can be suggested. These approaches seek to address the most common emotional needs, promote resilience, and improve quality of life broadly from an inclusive perspective. The overuse of words such as "anxiety" or "fear" indicates that there is a need for interventions aimed at decreasing negative emotional states. For example, psycho-education intervention programs can be implemented to help people identify and overcome non-rational thoughts resulting from these feelings. Also, the organization of community groups of psychological support would be a valid solution to provide help in the field of emotions, as well as sharing the options of coping methods. Specialized symptoms such as insomnia and tiredness suggest that several participants are suffering from difficulties not only in the physiological field but in many cases interrelated. Although negative terms predominate, expressions such as "resilience" or "balance" show that certain participants found ways to overcome the difficulties of the pandemic.

The information also indicates the vulnerability of groups that reported remaining in critical condition, such as "bad" or "very bad" mental conditions even during the following periods of the pandemic. It is necessary to create mechanisms for identifying and referencing these people to the psychosocial support networks existing in the SUS. This network already exists, but in some places it is still incipient.

Psychoeducation actions for mental health can be organized in schools, communities and workplaces containing information about mental health and/or where to seek help. Opening digital channels to disseminate such information would be an easier way to reach a larger audience. The solution to these obstacles, however, requires a systemic approach that includes public policies and institutional support on how to universally guarantee this type of mental health services. It is necessary to increase investments in this field, expanding access to mental health, as a universal right. Public-private sector partnerships can also be explored to finance projects aimed at recovering the emotional conditions resulting from this pandemic, which allow reaching as many people as possible. These strategies must be developed together, monitored regularly to assess their effectiveness, as every public policy should have.

These measures, based on epidemiological surveys, can help mitigate the most distant consequences of the pandemic, favoring a recovery of individual and collective mental health. These strategies need to be personalized, broadly sized to meet the needs of individuals who have different histories in terms of mental health.

One of the first solutions would be to develop a skills training program primarily to work on the emotional states such as anxiety or fear that have become the most frequently cited words. These programs may include group skills training sessions, where coping techniques can be learned. In addition to these, it is important to encourage the creation of workshops, teaching materials to teach skills in regulation, stress controls and practices that improve interpersonal relationships. These materials should be released in easy-to-access formats such as short films, digital video, or interactive apps so that they reach the widest possible audience.

Approaches to prevention should be incorporated into mental health care planning. The implementation of mental health demand tracking instruments, such as digital diaries or questionnaires, can help a continuous monitoring of the mental health of populations, which could be used for early interventions adapted to emerging needs.

These strategies, when adjusted based on consistent information and applied to concrete cases, can be used to address the complexities identified in the participants, providing effective and sustainable psychological support. Such an approach not only contributes to mitigating the consequences of the post-pandemic period, but also promotes resilience in the face of future emotional and social adversities.

Pandemics are true catastrophes for mental health, not only because of the immediate intensity of their impacts, but also because of the extent of their effects over time. While the pandemic itself has an epidemiological end point, its emotional and psychological legacy persists insidiously, leaving a trail of challenges that can linger for years, or even decades, after the event ends. The waves of anxiety, fear, isolation and emotional exhaustion, initially experienced acutely, turn into chronic consequences, such as post-traumatic stress disorders, depression and difficulties in social reintegration, which affect both individuals and communities as a whole.

This scenario highlights the need for comprehensive and continuous psychological support strategies, capable of not only meeting immediate demands, but also preparing society to face the long-term repercussions. Resilience does not arise spontaneously; It is built through planned interventions, effective public policies, and the promotion of an environment of welcome and understanding.

Pandemics reveal the fragility of mental well-being in the face of global crises and underscore the urgency of integrating mental health as a fundamental component in responses to health emergencies. Recognizing that the psychic consequences of a

pandemic transcend its biological end is essential to mitigate the cumulative damage and prepare society to face future challenges with greater emotional preparedness and resilience. The learning obtained in this context is an invitation to prioritize mental health as an indispensable pillar in planning a more resilient and humanized future.

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