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Original Article

Psychiatry/Mental Health Section

Assessment of Stress and Resilience in the General Population during COVID-19: A Cross-sectional Study

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ABSTRACT

Introduction: The Coronavirus Disease-2019 (COVID-19) pandemic, which began in Wuhan, China, in December 2019, has quickly spread worldwide, causing numerous challenges for people, such as lockdowns, isolation, and subsequent mental stress. Developing mental resilience is crucial for handling stress effectively. Understanding the impact of the COVID-19 pandemic on stress and the resilience of the Indian population enables insight and facilitates thoughtful reformation in aiding the community.

Aim: To assess the stress and resilience among the general population during the COVID-19 pandemic and to find the association between demographic variables and stress and resilience. Additionally, the study aimed to evaluate the correlation between stress and resilience among these subjects.

Materials and Methods: A cross-sectional study was conducted Department of Psychiatry, Sree Balaji Medical College and Hospital, Chennai, Tamil Nadu, India, from February 2021 to April 2021. A total of 740 willing respondents affected by the COVID-19 pandemic participated in the study. A snowball sampling method was used in which participants were approached via a Google form circulated through their known contacts. The study encompassed those who had experienced either direct or indirect effects of the COVID-19 pandemic. The user-friendly Google form collected essential demographic information such as gender, marital status, and employment type. The stress and resilience levels were measured using the Perceived Stress Scale (PSS) and Resilience Scale. The statistical analysis of sample characteristics with frequency distributions and categorical variables was done with the application of Chi-square tests. Correlation analysis was done using the Spearman's test. A p-value of <0.05 was considered statistically significant.

Results: The research demonstrated remarkably low resilience levels and heightened stress levels among female participants ($p<0.001$, $p<0.001$) as well as single individuals ($p=0.001$, $p<0.001$). Conversely, a significant number of married men exhibited greater resilience ($p=0.013$) and reduced stress levels ($p<0.001$) compared to the rest of the population. Individuals in formal employment experienced less stress compared to those in informal employment ($p=0.008$). Notably, there was a moderate negative correlation between perceived stress and resilience which was significant ($r=-0.562$, $p<0.001$).

Conclusion: The COVID-19 pandemic has greatly affected mental health and coping mechanisms; factors such as gender, social connections, and financial stability play significant roles. The study found that women, single individuals, and those working in informal sectors faced increased stress during these challenging times. Hence, psychological interventions targeting the pandemic crisis need to be planned considering the highlighted biological, socio-economic, and occupational factors.

Keywords: Coronavirus disease-2019, Employment, Pandemic, Perceived stress scale, Resilience scale

INTRODUCTION

The COVID-19 pandemic, caused by Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2), began in China's Wuhan region in December 2019 and rapidly spread across the globe [1]. This unprecedented crisis caught the world off guard, as countries grappled with a severe health emergency and individuals faced lockdowns, isolation, and resulting mental health challenges [2]. Studies consistently show that people experienced significantly higher levels of stress during this period of uncertainty [3,4]. Common reactions to this heightened stress include anxiety, irritability, insomnia, difficulty concentrating, decreased productivity, and relationship conflicts. A systematic review by Mahmud S et al., found a markedly increased prevalence of stress, anxiety, insomnia, and depression [5], with reported rates of depression ranging from 24.4% to 64.1% and anxiety ranging from 12.9% to 72.7% [6,7].

Limited coping flexibility leaves individuals more vulnerable to serious psychological issues such as stress, anxiety, and depression [8]. Meanwhile, mental resilience serves as a mediator between stigma and mental health for COVID-19 survivors [9] and is crucial in dealing with the widespread repercussions of the pandemic [10,11]. Resilience encompasses the ability to effectively navigate, manage, and adapt to significant stressors or traumatic events. This adaptive capacity is shaped by an individual's personal assets and resources found within their life and environment, enabling them to recover and rebound in the face of adversity [12]. Evaluating and strengthening mental resilience is vital for effective resource distribution and the development of targeted interventions to address the mental health consequences of this global crisis [13].

The intensity of mental symptoms is influenced by factors such as social isolation, feelings of loneliness, societal stigma, and employment status [14]. This became particularly evident when the unemployment rate in India soared to 23.5%, more than double the rate of the previous year's same quarter (7.2%), according to a report by the Centre for Monitoring Indian Economy Pvt. Ltd. (CMIE), due to the nationwide lockdown from late March to May 2020 [15]. Despite cultural differences and varying levels of social support, the present research provides fresh insights and enhances the current body of knowledge.

The present study stands out because it focuses on assessing the relationship between stress and mental resilience among the general population amidst the COVID-19 pandemic and evaluates the impact of employment type alongside other socio-demographic factors that have been thoroughly examined.

The aim of the study was to assess stress and resilience among the general population.

The objectives of the study were:

- To assess the association between demographic variables and stress and resilience.
- To assess the correlation between stress and resilience among the general population.

MATERIALS AND METHODS

This cross-sectional study took place at Department of Psychiatry, Sree Balaji Medical College and Hospital, Chennai, Tamil Nadu, India during the second wave of the pandemic, from February 2021 to April 2021. The study was conducted in accordance with the principles of the Declaration of Helsinki, 2013.

Sample size calculation: The sample size was calculated using the previously reported 82.6% population proportion of perceived stress (moderate and high) during the COVID-19 pandemic [16]. The snowball sampling method was employed to select the participants.

The formula used to calculate the sample size is:

$n=\{z^2 * p*(1-p)\}/\varepsilon^2$

$n=(1.962 * 0.826 * (1-0.826))/0.0272$

$n=740$

Therefore, 740 participants who were impacted by the COVID-19 pandemic and willing to participate in the study were included, in order to achieve a 95% confidence level with a margin of error within ±2.73% of the measured value. These individuals willingly provided their informed consent, displayed at the beginning of a Google form, before submitting their responses.

Inclusion criteria: The study encompassed those who experienced either direct or indirect effects of the COVID-19 pandemic. The direct impacts of COVID-19 encompass a diverse range of disease severities, while indirect consequences involve elements such as social distancing, apprehension associated with the pandemic, and concerns related to employment and finances stemming from lockdowns or societal restrictions imposed due to the global health crisis.

Exclusion criteria: Individuals unable to read or write in English and those under 18 years of age were excluded from the research.

Study Procedure

The principal investigator, a psychiatry resident, drafted a semi-structured Google form-based questionnaire that underwent review by all co-authors. After obtaining agreement from all investigators, the Google form was disseminated online to compile crucial information such as gender, marital status, religion, income, and employment type.

In 2003, the 17th International Conference of Labour Statisticians at the International Labour Organisation (ILO) introduced informal employment as any paid work without registration, regulation, or protection from legal frameworks. Additionally, unpaid work in income-generating businesses is seen as informal. Unfortunately, informal workers don't receive stable contracts, benefits, social security, or representation [17]. The research categorised jobs into two types: formal and informal employment. Formal employment referred to jobs in the government and private sectors that were registered and had established rules for their employees. Informal employment, on the other hand, referred to jobs in the unorganised sector, which lacked proper registration and regulations for its workers.

The authors evaluated stress and resilience levels using the self-reported Perceived Stress Scale (PSS) and Resilience Scale, respectively, which were included in the Google form. According to Cohen S et al., the PSS serves as a prevalent tool for assessing stress levels [18].

The study employed the 10 item Perceived Stress Scale (PSS-10) due to its clear-cut inquiries and easily understandable replies. Participants shared their emotions and thoughts from the past month through a 10-question survey, marked on a 5-point Likert scale ranging from 0 (never) to 4 (very often). PSS scores can range from 0 to 40, with elevated scores signifying increased perceived stress. In their 1988 study, Cohen S et al., revealed that the PSS-10 scores exhibited satisfactory internal consistency reliability (α=0.78), alongside moderate concurrent criterion validity and an acceptable level of convergent validity [18]. Scores ranging from 0 to 13, 14 to 26, and 27 to 40 were taken as low, moderate, and high perceived stress, respectively, for analysis [19].

The PSS holds unique value as it underscores an individual's interpretation of their experiences. Differing perceptions of stress may arise among two individuals exposed to the same events, resulting in variations in their accumulated scores and PSS categorisation.

The Brief Resilience Scale (BRS), crafted by the expert team of Smith BW et al., stands as a highly acclaimed resilience scale and was diligently utilised in the research [20]. This innovative scale delves into an individual's subjective ability to rebound and recuperate from stress, thoroughly examining a singular resilience construct which consists of both affirming and opposing statements. The BRS scores range from 6 (depicting low resilience) to 30 (indicating high resilience) on an intricate 6-question scale. This scale offers five distinct response options: strongly disagree, disagree, neutral, agree, and strongly agree, uniformly presented across all six thought-provoking questions.

STATISTICAL ANALYSIS

The statistical analysis was conducted utilising the epi.info 7.2 software. To showcase the characteristics of the sample, frequency distribution was employed. Associations between categorical variables were analysed through the Chi-square (χ^2) test. As the variables didn't follow a normal distribution, the Spearman's test was applied to assess the correlation. A p-value below 0.05 signifies a noteworthy statistical significance.

RESULTS

The frequency distribution of the sample characteristics is displayed in [Table/Fig-1]. The investigation uncovered a substantial link between perceived stress and independent variables such as gender, marital status, and employment type, as depicted in [Table/Fig-2]. A larger proportion of women 62 (16.58%) and single individuals 60 (16.35%) experienced significantly more stress compared to men 28 (7.65%) and married individuals 30 (8.04%) (χ^2=20.291, p<0.001; χ^2=20.753, p<0.001), respectively. Likewise, formally employed individuals 105 (17.8%) tended to perceive less stress than those informally employed 15 (10%), which was statistically significant (χ^2=9.759, p=0.008).

Upon further examination of marital status and its impact on gender regarding perceived stress, the authors found that single men 22 (12.4%) were more inclined to feel higher stress levels than married men 6 (3.2%), displaying a statistically significant connection (χ^2=23.390, p<0.001) as shown in [Table/Fig-3].

As portrayed in [Table/Fig-4], a significant relationship between mental resilience and independent factors such as gender and marital status was observed. A substantial percentage of women 138 (36.9%) and single individuals 124 (33.8%) exhibited significantly lower resilience compared to men 77 (21.04%) and married individuals 91 (24.4%) (χ^2=25.260, p<0.001; χ^2=14.027, p=0.001), respectively. Nonetheless, the authors found no association between employment type and a person's resilience (p=0.191). Similarly, when analysing the influence of marital status on gender in terms of mental resilience, married men 20 (10.6%) demonstrated a higher likelihood of possessing strong

Socio-demographic variables		n	Percentage (%)
Gender	Male	366	49.50
	Female	374	50.50
Marital status	Single	367	49.60
	Married	373	50.40
Religion	Hindu	518	70.00
	Christian	128	17.30
	Muslim	67	9.05
	Others	27	3.65
Type of employment	Formal	590	79.73
	Informal	150	20.27
Income	< 1 Lac p.a.	253	34.19
	1-5 Lacs p.a.	234	31.62
	5-10 Lacs p.a.	214	28.92
	> 10 Lacs p.a.	39	5.27
Resilience	Low	215	29.10
	Normal	485	65.50
	High	40	5.40
Perceived stress	Low	120	16.20
	Moderate	530	71.60
	High	90	12.20

[Table/Fig-1]: Frequency distribution of sample characteristics (N=740).
p.a.: Per annum

Socio-demographic profile		Low perceived stress n (%)	Moderate perceived stress n (%)	High perceived stress n (%)	χ^2	p-value
Sex	Male	75 (20.49)	263 (71.86)	28 (7.65)	20.291	≤**0.001***
	Female	45 (12.03)	267 (71.39)	62 (16.58)		
Marital status	Single	42 (11.44)	265 (72.21)	60 (16.35)	20.753	≤**0.001***
	Married	78 (20.91)	265 (71.05)	30 (8.04)		
Type of employment	Formal	105 (17.8)	422 (71.5)	63 (10.7)	9.759	**0.008***
	Informal	15 (10.0)	108 (72.0)	27 (18.0)		

[Table/Fig-2]: Association of socio-demographic variables with perceived stress (N=740).
Chi-square test, *p-value <0.05

Socio-demographic profile		Low perceived stress n (%)	Moderate perceived stress n (%)	High perceived stress n (%)	χ^2	p-value
Female	Married	24 (13%)	136 (73.9%)	24 (13%)	3.360	0.186
	Single	21 (11.1%)	131 (68.9%)	38 (20%)		
Male	Married	54 (28.6%)	129 (68.3%)	6 (3.2%)	23.390	≤**0.001***
	Single	21 (11.9%)	134 (75.7%)	22 (12.4%)		

[Table/Fig-3]: Association of marital status and perceived stress based on gender (N=740).
Chi-square test, *p-value <0.05

Socio-demographic profile		Low resilience n (%)	Normal resilience n (%)	High resilience n (%)	χ^2	p-value
Sex	Male	77 (21.04)	262 (71.58)	27 (7.38)	25.260	≤**0.001***
	Female	138 (36.9)	223 (59.6)	13 (3.5)		
Marital status	Single	124 (33.8)	232 (63.2)	11 (3.0)	14.027	**0.001***
	Married	91 (24.4)	253 (67.8)	29 (7.8)		
Type of employment	Formal	164 (27.8)	391 (66.3)	35 (5.9)	3.315	0.191
	Informal	51 (34.0)	94 (62.7)	5 (3.3)		

[Table/Fig-4]: Association of socio-demographic variables with resilience (N=740).
Chi-square test, *p-value <0.05

resilience compared to single men 7 (4%), which was statistically significant (χ^2=8.620, p=0.013), as presented in [Table/Fig-5].

Socio-demographic profile		Low resilience n (%)	Normal resilience n (%)	High resilience n (%)	χ^2	p-value
Female	Married	59 (32.1%)	116 (63%)	9 (4.9%)	5.090	0.078
	Single	79 (41.6%)	107 (56.3%)	4 (2.1%)		
Male	Married	32 (16.9%)	137 (72.5%)	20 (10.6%)	8.620	**0.013***
	Single	45 (25.4%)	125 (70.6%)	7 (4%)		

[Table/Fig-5]: Association between marital status, gender and resilience (N=740).
Chi-square test, *p-value <0.05

During the examination of the correlation between perceived stress and mental resilience, a moderate negative relationship (r=-0.562, p<0.001) was uncovered, which was significant as depicted in [Table/Fig-6]. This finding suggests that individuals experiencing high levels of stress tend to exhibit lower resilience capacities.

PSS / BRS	Low perceived stress n (%)	Moderate perceived stress n (%)	High perceived stress n (%)	Correlation coefficient (r)	p-value
Low resilience	11 (5.1)	139 (64.7)	65 (30.2)	-0.562	**<0.001***
Normal resilience	80 (16.5)	380 (78.4)	25 (5.2)		
High resilience	29 (72.5)	11 (27.5)	0 (0.0)		

[Table/Fig-6]: Correlation between perceived stress and mental resilience (N=740).
Spearman's test of correlation, *p-value <0.05 (PSS: Perceived stress scale, BRS: Brief resilience scale)

DISCUSSION

During the COVID-19 outbreak, a study involving 740 participants was conducted amid the chaos of the pandemic's second wave. At this time, knowledge about the virus was limited, and the global population grappled with its detrimental effects. Overwhelmed by increasing patient numbers, hospitals faced bed and oxygen shortages, resulting in substantial death rates. Vaccinations were scarce, and a prevailing atmosphere of uncertainty led to widespread stress [21]. The interruption of everyday life and mounting concerns over individual safety and economic stability exacerbated psychosocial stress. Moreover, travel restrictions and limited physical contact separated friends and family, contributing to even greater stress levels [22].

The study reaffirms that females tend to experience higher stress levels than males, a finding consistent with earlier studies [23,24]. Consequently, gender is a key factor in the psychological impact of the COVID-19 pandemic, with women facing greater risks than men [23].

During pandemic crises, stress-related responses are expected. A person's mental resilience is of utmost importance in managing the sudden, unprecedented stress brought on by the COVID-19 pandemic and adjusting to new norms. The present study emphasises that gender significantly influences resilience, as evidenced by lower resilience levels among females compared to males, which, in turn, makes them more susceptible to stress. Despite earlier studies yielding mixed results, the study presents substantial evidence supporting the notion that women report low resilience and encounter greater psychological turmoil than men. Additionally, psychological resilience has been found to exhibit negative correlations with depression, anxiety, and stress symptoms [24].

The research uncovered a notable connection between marital status and its impact on stress and resilience. A significant portion of single individuals, who may have limited social and emotional support, demonstrated lower resilience and perceived higher

stress compared to their married counterparts. Contemporary international studies endorse the notion that the positive facets of marriage, such as collaboration in everyday tasks and a supportive partnership, contribute to reduced perceived stress [25-29].

As a result, the present study signifies that gender, mental resilience, and social support serve as reliable predictors of stress and other psychological disorders [30]. Enhanced baseline resilience, coupled with increased social support, can effectively reduce perceived stress during COVID-19 [31]. The pandemic has indisputably reshaped the work environment for all. This research unveiled a fascinating observation: those employed in formal sectors experienced reduced stress levels in comparison to their counterparts in informal sectors. The latter faced heightened stress owing to job and income uncertainties during lockdown [32]. Conversely, individuals with formal employment tended to enjoy steadier income and livelihoods. Basyouni SS et al., identified a robust connection between financial worry and job insecurity among workers in both the formal and informal sectors [33]. Intriguingly, work-related flow exhibited an adverse association with fiscal unease, serving as a bridge between job uncertainty and financial concerns [33]. Additionally, the investigation highlighted an opposite relationship between resilience and stress- greater resilience enables people to endure lower stress levels. This discovery is consistent with prior research conducted by Barzilay R et al., on the correlation between resilience and pandemic-induced stress [34]. Prolonged pandemic-induced stress can negatively impact one's well-being, potentially leading to physical and mental health complications [35].

Limitation(s)

Though an extensive sample size was utilised, which is a definite advantage, the absence of direct interaction with participants and an examination of specific confounding variables constitutes notable limitations of the investigation.

CONCLUSION(S)

In summary, stress levels tend to be higher among women, single individuals, those in informal employment, and people with lower resilience. It is crucial to note the inverse connection between perceived stress and a person's resilience. The importance of promoting mental well-being through physical activity and proper nutrition is increasingly recognised. Besides maintaining healthy habits, the present study suggests that empowering individuals with effective adaptive stress coping techniques can be incredibly beneficial. There is an underlying need for a comprehensive approach to building resilience, not only focusing on managing stress but also encompassing sufficient social and financial support for optimal outcomes.

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