Prevalence and Impact of Stress in the Indian Population: A Retrospective Survey Analysis

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ABSTRACT
Post-COVID-19 pandemic, individuals are experiencing various forms of stress. This study assessed the prevalence of stress among Indian adults, examined its physical and psychological impacts, and investigated stress management strategies, aiming to fill existing gaps in research. This retrospective observational study utilized an online survey from March 16, 2023, to July 30, 2023, using snowball sampling to target the Indian population. Respondents aged ≥18 years participated in the study. The survey collected data on demographic information, self-reported stress levels, and Perceived Stress Scale (PSS) scores. The chi-square test was applied for statistical analysis, and results with a p-value under 0.05 were considered significant. Among 1,479 respondents (638 males, 841 females; mean age: 23.7±7.7 years), 76.0% of respondents resided in Karnataka. Out of 1,479 respondents, 9.6% experienced mild stress, 84.9% experienced moderate stress, and 5.5% experienced severe stress according to the PSS. Females experienced significantly higher stress levels when compared with males (p=0.047), but both experienced moderate stress levels. Financial problems (20.7%) and studies (36.4%) were the most common stressors among respondents. They most frequently manage stress through personal strategies, such as sleeping and listening to music. The present study's findings indicate that, following the COVID-19 health crisis, moderate levels of stress are significantly prevalent in the Indian population, primarily due to academic and job-related pressures.

1. Introduction

Stress is an undesirable event caused due to increased expectancy rather than the individual's capacity to cope.[i] The physiological events that occur during stress include the release of cortisol through the hypothalamic–pituitary–adrenal pathway and immune system activation.[1,ii] Long-term stress results in adverse effects, including cognitive impairment, anxiety, and depression.[iii,iv] Apart from these consequences, there can be other effects such as fatigue, decline in immunity, conflicts with partner/spouse, and decreased work standards.[v] It is noteworthy that stress can influence the well-being of individuals, and the nature of these effects may be influenced by factors such as individuals' coping mechanisms and the duration of their exposure to stress.

As per previous literature, 84% of people in India reported having moderate to severe stress levels in 2021.[vi] Approximately 42% of Indian youths (aged 15-24 years) expressed experiencing heightened levels of stress during the lockdown.[vii] Employees in India were found to be stressed because of their work, and it would lead to work-related illnesses.[viii,ix]

Considering the youths, mainly students, are burdened with educational stress. College students are often confronted with the responsibility of meeting the demanding requirements of university life. This requires them to handle pressure and adapt to the phase from adolescence to adulthood that occurs during their college years.[x]

These youths at a later stage in their life may encounter stress such as work-related stress. It refers to the emotional reactions that occur when an individual's job demands surpass his or her capabilities, resources, and personal needs.[xi] This type of stress can arise from factors such as work organization, inadequate job design, subpar management practices, poor working conditions, insufficient support from colleagues and supervisors, and excessive demands and pressures beyond an employee's knowledge and abilities.[xii] Furthermore, when the requirements of a job exceed an employee's ability and aptitude to manage and handle, it can lead to poor health, burnout, and absenteeism.[10,xiii]

The response to stress is also markedly affected by gender differences. Working women tend to experience more stress than men because of conflict between office and household work, and lack of social support.[5] A study found that women frequently express both emotional and job-related stress. Furthermore, they are more inclined to mention that their stress levels have increased over time.[xiv] Married and single women might encounter stress in distinct ways from one another.[5]

After the coronavirus disease-19 (COVID-19) pandemic, individuals are experiencing various types of stress. Recognizing the extent of stress and its impact on our physical well-being is of utmost importance. Currently, there is a lack of research on stress levels in the population, the associated changes caused by stress, and effective ways to manage stress. Therefore, the present research aimed to establish the prevalence of stress, comprehend the physical and psychological effects experienced, and explore the approaches taken to manage stress by the general population.

2. Materials and Methods

This observational, retrospective study collected data from March 16, 2023 to July 30, 2023, using Google Forms distributed across India. Respondents aged ≥18 years, provided written consent and were involved in the study.

Data Acquisition

The data for the survey were obtained through a questionnaire incorporating items from the Perceived Stress Scale (PSS) and drew upon previously published research in the field.[xv,xvi] The questionnaire was shared via various social media channels, including WhatsApp, Facebook, LinkedIn, and Telegram. Data was collected using the snowball technique, where respondents were encouraged to distribute the survey link to as many of their contacts as possible.[16,xvii] Additionally, to qualify for participation, individuals had to possess a smartphone device and understand the English language.[17,xviii] To ensure the privacy of the individuals, no personal identifiers such as IP addresses or email addresses were collected.[xix]

Before distributing, the questionnaire was tested with volunteers to ensure easy understandability.[18] The questionnaire starts with a consent form, followed by three sections: demographics, individuals' perception of their stress levels, and the 10-item PSS.

Perceived Stress Scale

The total score, ranging from 0 to 40, is calculated by summing the responses and reversing the scores for questions four, five, seven, and eight (where a score of zero corresponds to a value of four; a score of one corresponds to a value of three and a score of two corresponds to a value of two). Based on the obtained scores, this study categorized respondents as having low (0-13), moderate (14-26), or high stress (27-40).[xx]

Ethical Approval

The members of the Institutional Ethical Committee confirmed that no ethical approval is required for this survey study, as it does not deal with the treatment/sample collection/experimental procedure. The participants who consented to take part in the study were included.

Statistical Analysis

Data were analysed using the Statistical Package for Social Sciences (SPSS, version 25.0, SPSS Inc., Chicago, IL, USA). Continuous variables were summarized using means and standard deviations, while categorical variables were expressed as frequencies and percentages. The chi-square test was used for variable analysis, with a p-value of ≤0.05 indicating statistical significance.

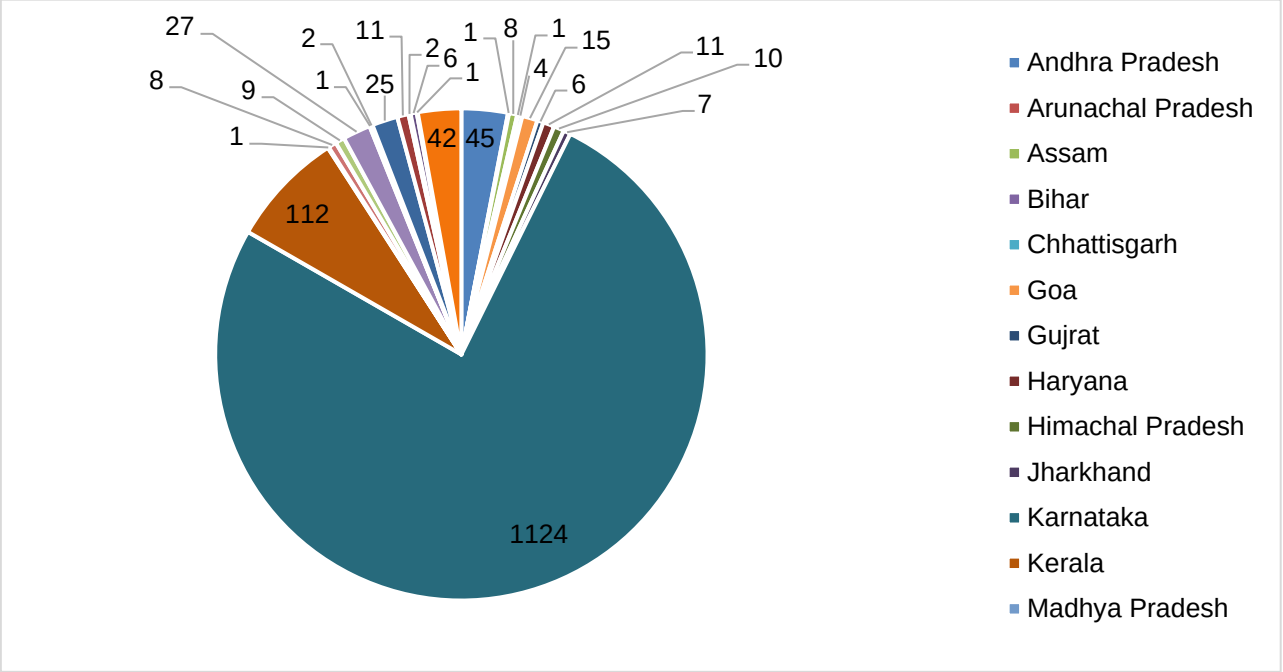
3. Results

The study initially included 1,502 participants; however, those who opted not to share their information were excluded. The final dataset consisted of 1,479 individuals, with an average age of 23.7±7.7 years. The majority of respondents were female (56.8%), unmarried (82.0%), students (59.6%) with studies issues (36.4%), and resided in Karnataka state (76.0%). Table 1 displays the respondents' baseline demographic characteristics, while Supplement Figure 1 details their state of residence.

Table 1: Demographic characteristics of study participants at baseline

Characteristics, n (%)	Total respondents N=1,479	Characteristics, n (%)	Total respondents N=1,479
Gender		Occupation	
Male	638 (43.1)	Business management consultant	4 (0.3)
Female	841 (56.9)	Doctor	23 (1.6)
Age, y		Engineer	46 (3.1)
21-30	1,285 (86.9)	Government office	13 (0.9)
31-40	112 (7.6)	Homemaker	18 (1.2)
41-50	48 (3.2)	IT professional	83 (5.6)
51-60	27 (1.8)	Lawyer	8 (0.5)
>60	7 (0.5)	Nurse	71 (4.8)
Marital status		Pharmacist	202 (13.7)
Single	1,213 (82.0)	Retired	6 (0.4)
Married	217 (14.6)	Self-employed	27 (1.8)
Divorced	11 (0.7)	Student	882 (59.6)
In a relationship	38 (2.6)	Teaching	52 (3.5)
		Others	44 (3.0)

IT, information technology.



Supplement Figure 1: State of residence of the respondents

Majority of respondents indicated experiencing moderate stress levels (n=1,255; 84.9%), with a mean PSS score of 19.2±4.8. A smaller proportion of respondents reported low stress levels (n=142; 9.6%) and severe stress levels (n=82; 5.5%). The study analysis revealed that females had significantly higher stress levels than males (males: 18.8±4.8 vs females: 19.1±4.8; p=0.047). Both males and females predominantly reported moderate stress levels. Table 2 depicts the usual causes of stress in the respondents.

Table 2: Usual causes of stress in the respondents

Characteristics, n (%)	Total respondents N=1,479
Family and friends' issues	174 (11.8)
Financial issues	306 (20.7)
Health issues	94 (6.4)
Job-related issues	195 (13.2)
Studies issues	538 (36.4)
Other	172 (11.6)

The study included respondents across a range of ages, and a significant association was found between PSS scores and age (χ^2=13.7; p=0.008). Among respondents ≤30 years of age (n=1,285), 84.8% reported moderate

stress levels. Similarly, moderate stress levels were observed in 78.0% of respondents >40 years of age (n=82) and 90.2% of those aged 31-40 years (n=112).

Marital status was significantly correlated with PSS scores (χ^2=18.9; p=0.004). All respondents who were divorced reported moderate levels of stress. Among other respondents, 78.9% were in a relationship, 82.9% were married, and 85.2% of single respondents reported moderate stress levels. Severe levels of stress were reported in 18.4% of those in a relationship, 4.1% of the married respondents, and 5.4% of the single respondents.

Occupation was significantly correlated with the PSS scores (χ^2=60.3; p<0.001). The majority of individuals across various occupations, such as business management consultants (n=4), doctors (n=23), engineers (n=46), government officials (n=13), IT professionals (n=83), lawyers (n=8), nurses (n=71), pharmacists (n=202), retirees (n=6), students (n=882), and teachers (n=52) reported moderate levels of stress.

Various physical, psychological, and behavioural effects were observed during stress. Common behavioural effects, such as avoidance of activities or places (n=59), change in activity levels (n=223), modifications in sleep cycles (n=172), crying (n=77), struggles with communication (n=224), trouble relaxing (n=196), increased consumption of beverages or alcohol (n=37), change in eating habits (n=81), irritability/anger/arguments (n=383), were observed (Figure 1).

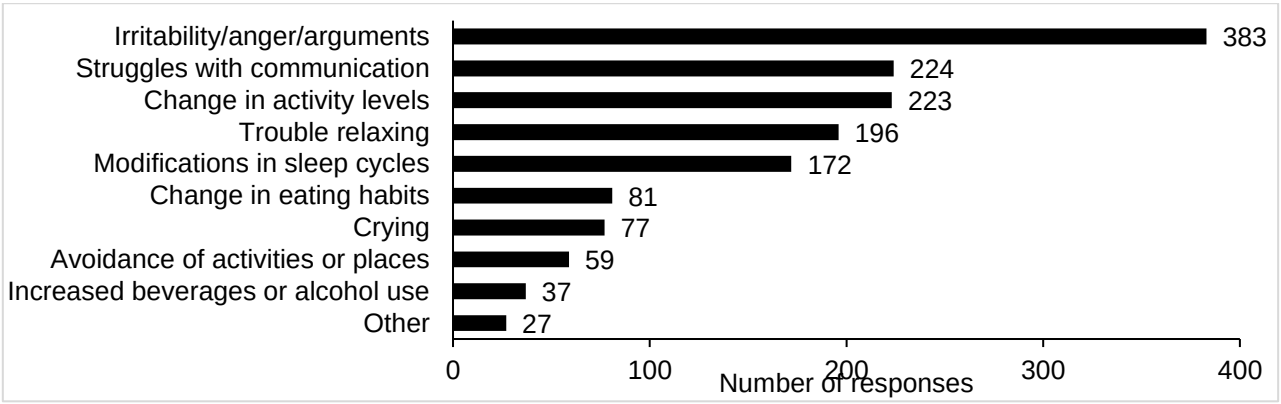


Figure 1: Usual behavioural responses to stress

Common psychological effects observed included anxiety/fear (n=368), bad dreams (n=108), depression (n=217), feeling incapable (n=143), feeling isolated/lonely (n=201), feeling misunderstood/unappreciated (n=136), and restlessness (n=279) (Figure 2).

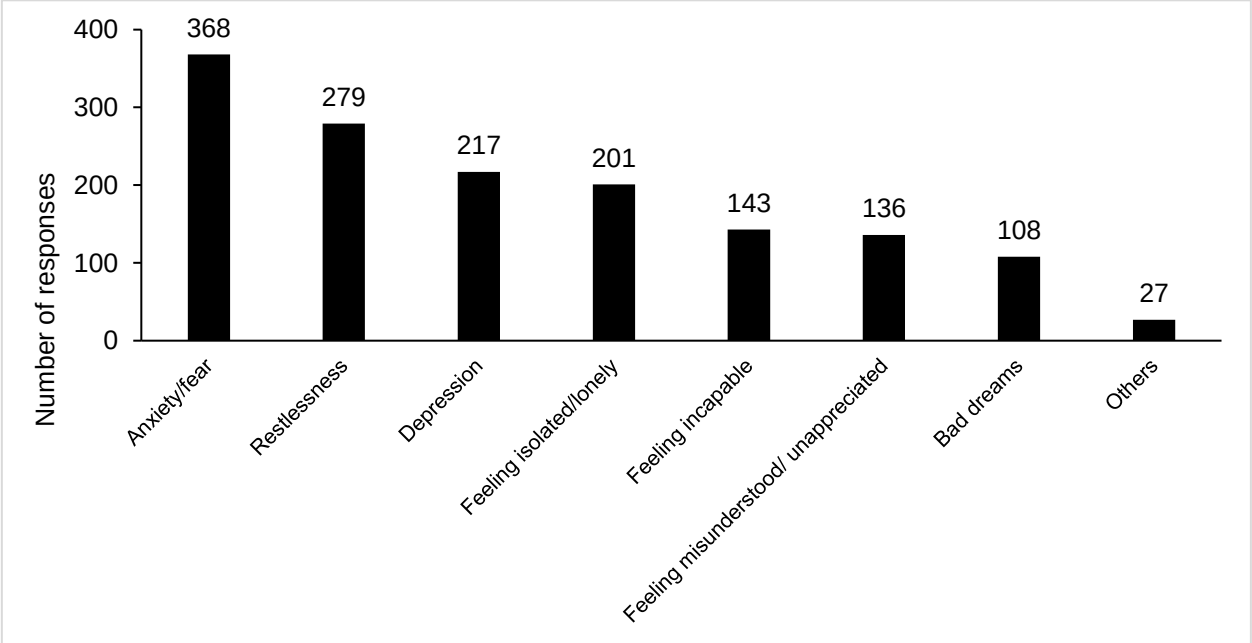
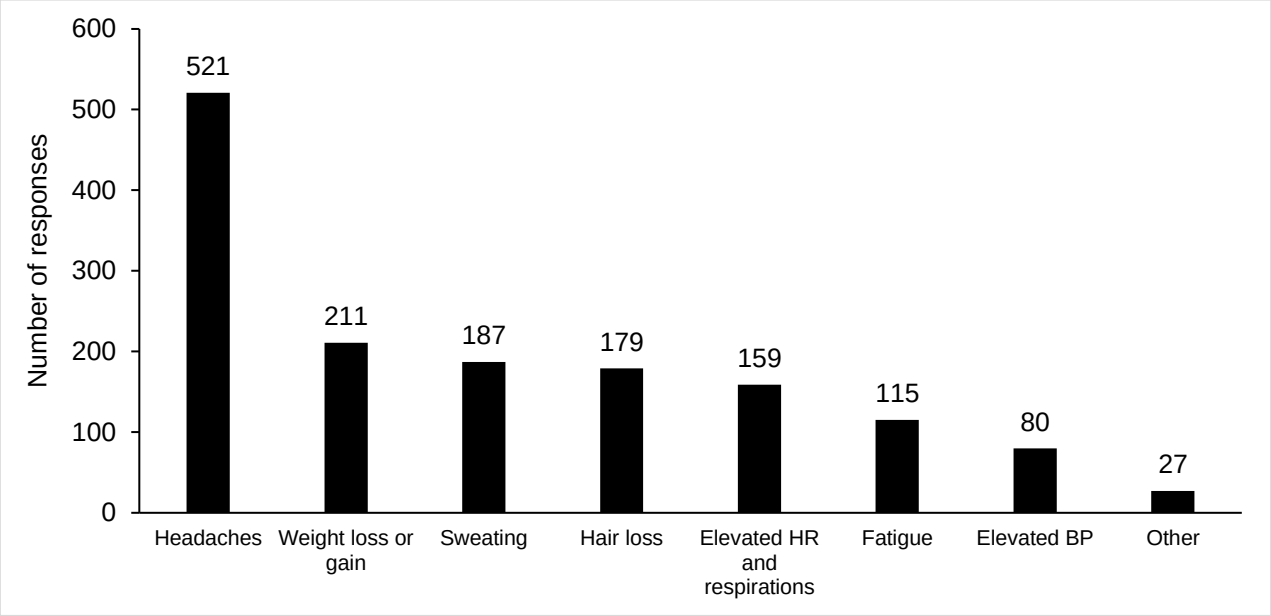


Figure 2: Usual psychological or emotional responses to stress

Common physical responses, such as fatigue (n=115), hair loss (n=179), headache (n=521), elevated blood pressure (n=80), elevated heart rate and respiration (n=159), sweating (n=187), and weight loss or gain (n=211) were observed (Figure 3).



BP, blood pressure; HR, heart rate.

Figure 3: Usual physical responses to stress

Cognitive responses commonly reported were confusion (n=306), difficulty concentrating (n=461), forgetfulness (n=153), uncontrollable thoughts about the event (n=279), and lack of mental clarity and decision efficiency (n=246) (Figure 4).

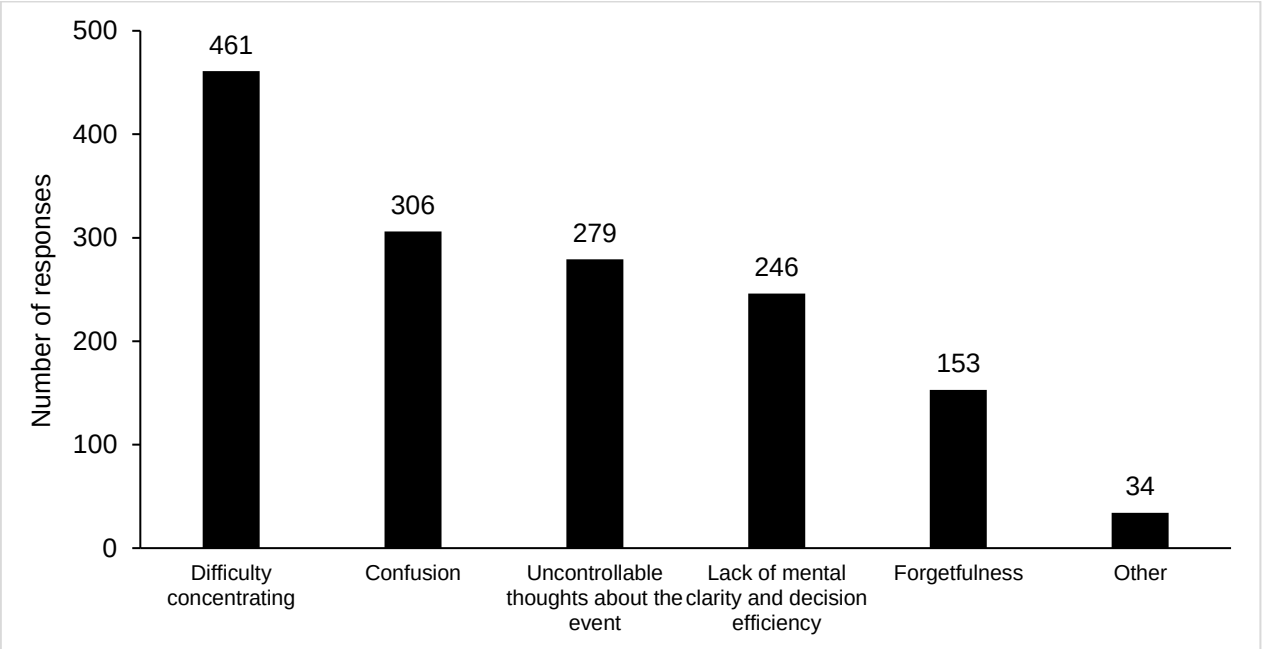


Figure 4: Usual cognitive effects of stress

Social responses, such as blaming or criticizing (n=248), hesitation in giving or accepting help (n=359), struggles with attentive listening (n=539), and irritable or dismissive behaviour towards others (n=286) were observed (Figure 5).

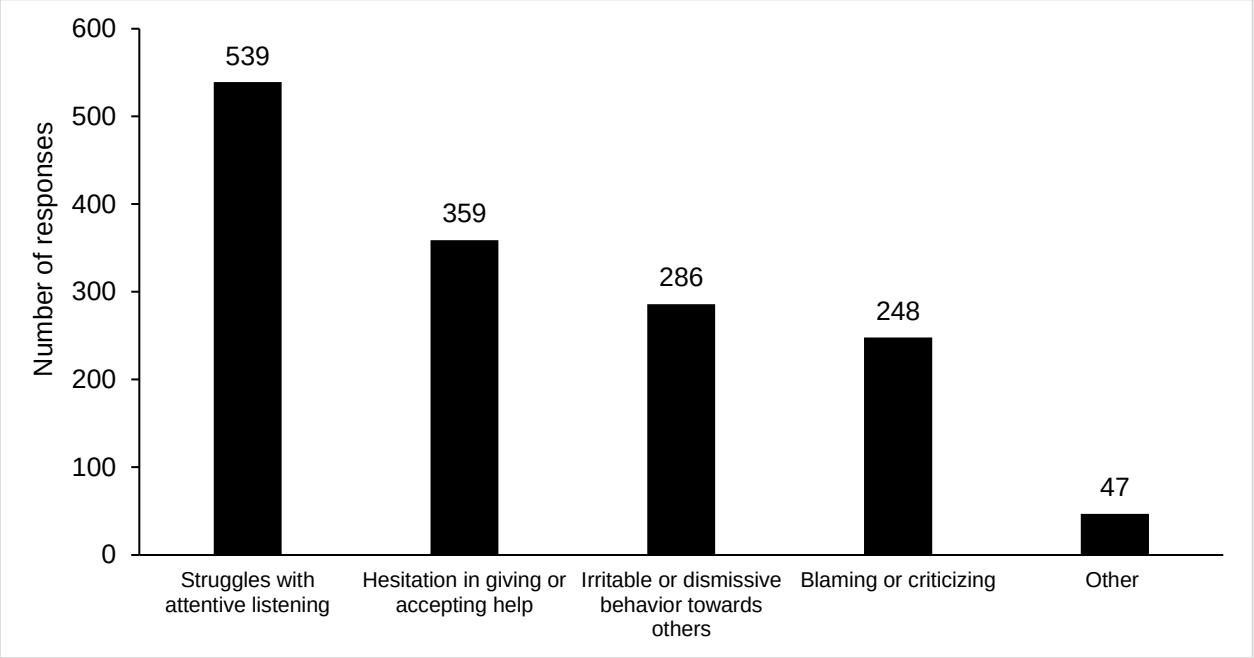


Figure 5: Usual social effects of stress

Various stress-relieving methods were employed by the respondents. The common methods are summarized in Figure 6. These methods included the use of computer or mobile games (n=38), drinking/smoking/drugs (n=70), physical activity like exercise/meditation (n=138), listening to music (n=328), shopping (n=44), sleeping (n=434), using social media (n=97), talking with someone (n=244), and other methods (n=25). Additionally, few of the respondents were on medications for stress (n=133), and most of these respondents (n=120) were experiencing moderate levels of stress.

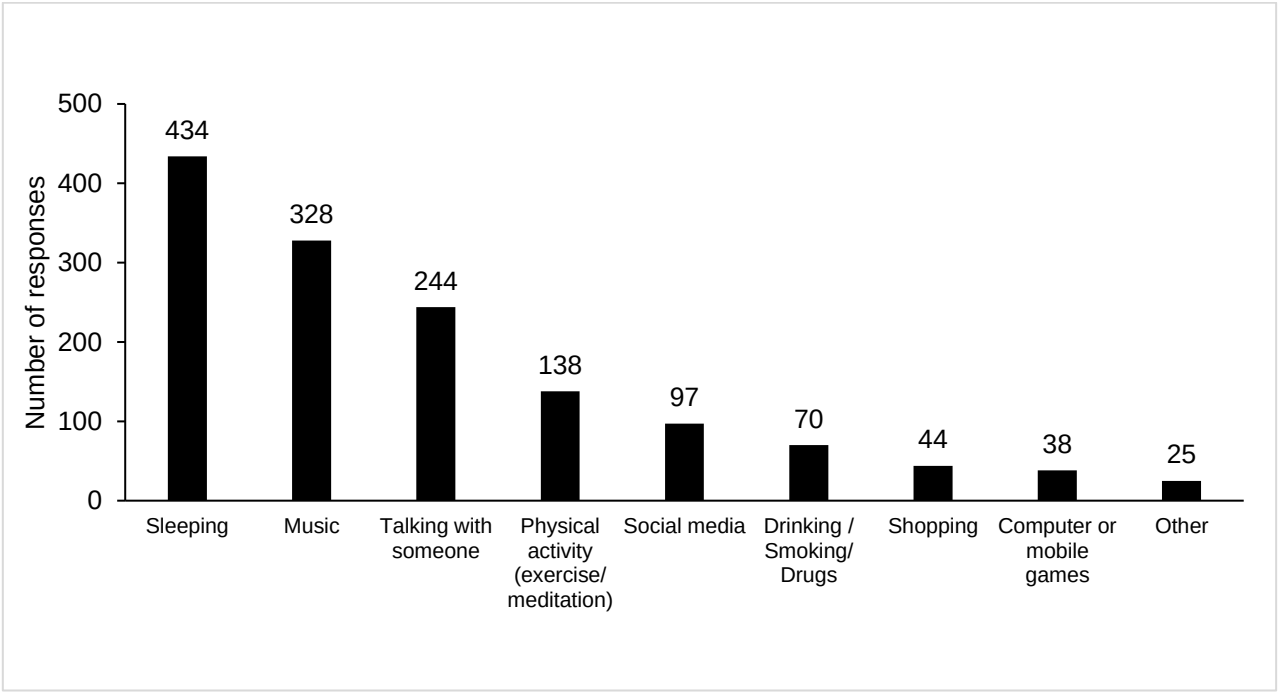


Figure 6: Personal methods to relieve stress

4. Discussion

Stress is ubiquitous in human experience, yet individual responses to stress exhibit considerable variability within the population.[xxi] Following the outbreak of the COVID-19 pandemic, there was an elevation in unemployment stats, social isolation, and a decrease in financial stability. As a result of these factors, there is a

surge in psychological stress and various medical conditions, including cognitive impairment, heart disease, anxiety, and depression, in young adults.[xxii,xxiii] Therefore, this study was carried out to investigate stress levels, identify observed adverse effects, and explore strategies for managing stress.

Prior research has shown that stress response patterns differ between males and females. Notably, females reported higher stress levels than males.[10] Interestingly, in this study, a vast proportion of the respondents with moderate stress levels were women. This observation could be explained by the fact that women might hesitate to discuss their stress levels with their partners or colleagues, and this survey could provide them with a platform to express their stress. The increased responsibilities of managing households and commitments contribute to higher stress levels among women. Additionally, the physical discomfort experienced during menstruation and pregnancy can intensify the existing levels of stress. These findings are in line with recent studies that have documented elevated stress levels among women.[1,10,xxiv] As per previous research, women who grapple with family-work conflict, feelings of loneliness, and job dissatisfaction face the highest risk of developing psychological stress.[24] In addition to employed women, college-going females have also reported experiencing moderate levels of stress. Notably, they tend to inculcate more emotion-focused coping strategies when compared to their male counterparts.[10]

Throughout the COVID-19 pandemic, people of all ages experienced a decline in physical and mental well-being, which led to elevated stress levels.[xxv] Experts predict that the impact of stress on health will persist for many years despite following successful treatments. Recent reports have indicated that younger individuals have seen a rise in psychological distress during these challenging times.[xxvi,xxvii] Similarly, the present study findings demonstrated that many younger adults experienced a moderate level of stress. This indicates that young adults have been facing stress since the onset of COVID-19 and may be at risk of developing cognitive impairment or other mental health issues.

When examining the impact of relationship status on stress levels, previous studies have indicated that being married is associated with stability, lower rates of substance abuse and abusive behaviours, and reduced risk of depression. As a result, married individuals tend to experience lower stress levels than single individuals.[xxviii] In the ongoing study, many single individuals experienced moderate stress levels, which could be attributed to feelings of loneliness, challenges in sharing emotions, or experiences of depression.

Academic pressure impacts students of all backgrounds, and how they manage this stress can vary and influence their perception of it.[xxix] Regardless of gender, race/ethnicity, or academic year, students face stress that can affect their well-being. This could be attributed to factors such as taking extra classes, increased homework, time management, competition with peers, career planning, and trying to excel in various subjects.[29,xxx,xxxi] According to a study conducted by *Barbayannis et al.*, a link between increased stress from academic responsibilities and decreased psychological wellness was observed among students. Additionally, the study revealed that women generally deal with heightened academic stress than men.[29] *McLean et al.* discovered that students reported moderate stress levels, with those receiving more social support generally experiencing reduced stress.[xxxii] The results of this study are consistent with prior research, which shows that most students experience moderate stress levels. It might be beneficial to develop tailored stress management programs for each gender to provide support as they begin their journey[xxxiii].

Stress can trigger a range of emotions, including anger, fear, and anxiety.[xxxiv] While a moderate amount of stress or anxiety can sometimes be helpful and even boost productivity and effectiveness, excessive levels of stress and anxiety can negatively impact performance and capability.[xxxv] In the present study, respondents reported increased irritation/anger/arguments, anxiety/fear, headaches, and difficulty concentrating and listening. Effective management of this elevated stress is essential. To decrease these stressors, various methods are available such as social media[xxxvi], computer or mobile games[xxxvii], physical activity[xxxviii], music[xxxix], sleeping[xl], shopping[xli], and social media[xlii]. Moreover, in the present study, respondents reported sleeping as the most preferred method for stress reduction. Since a greater number of students responded to the survey, we can assume that students are not getting enough sleep in pursuit of their studies, and this can gradually lead to a loss in productivity.

5. Conclusion

The study's findings demonstrated that, after the COVID-19 health crisis, moderate stress levels within the general population are notable due to academic and job-related pressures. Sustaining levels of stress can potentially result in difficulties for individuals. The study also highlighted various measures, such as reducing

workload for students and lightening job responsibilities for employees, that could be implemented to alleviate stress. Moreover, engaging in activities like meditation, physical exercise, or community involvement outside of work may enhance overall well-being among the population.

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