Original article

Stress, internet use, substance use and coping among adolescents, young-adults and middle-age adults amid the 'new normal' pandemic era

Shweta Singh^{a,*}, Nisha Mani Pandey^b, Manjistha Datta^a, Saakshi Batra^a^a Department of Psychiatry, King George's Medical University, Lucknow, India^b Department of Geriatric Mental Health, Department of Psychiatry, King George's Medical University, Lucknow, India

ARTICLE INFO

Keywords:

Stress
Internet use
Substance use
Coping
COVID -19 pandemic

ABSTRACT

Background: Globally, there is a constant state of flux amid the 'new normal' period of the COVID-19 pandemic. People try to accommodate to uncertainty, stress, and the threat of facing subsequent waves. It is crucial to explore and compare the psychological and behavioral processes of adolescents, young adults, and middle-aged adults amid such an era in a developing country like India.

Aim: The present study compared the stress, internet use, substance use, and coping among adolescents, young adults, and middle-aged adults amid India's 'new normal' era.

Methods: A cross-sectional design was used on an online platform. The sample included 1027 participants [456 adolescents; 347 young adults, and 224 middle age-adults] using Perceived

Stress Scale, Internet Gaming Disorders-9, DSM-5 Self-Rated Level-1, and Brief-COPE scale.

Results: Results showed moderate stress among all participants across all ages. Adolescent females perceived the highest stress (20.91, SD = 8.65); Adolescents reported higher internet use (Females: M = 3.59, S.D. = 2.44; Males: M = 3.40, S.D. = 2.30); Young and middle-aged adults Males reported significantly higher substance use (M = 1.60, S.D. = 2.96; M = 1.17, S.D. = 2.21). Maladaptive coping was used more by Young Adult Males (M = 10.83, S.D. = 4.66). Internet use was positively correlated with perceived stress (0.40) and maladaptive coping (0.40). Substance Use was also moderately positively correlated with maladaptive coping (0.38).

Discussion: The study reveals significant variations in perceived stress, internet use, substance use, and coping based on gender and age variations. Adolescent females were the most affected and reported high perceived stress, whereas middle-aged adults were the least affected.

Conclusion: The study provides further avenues to understand the stress and coping in different sections of society amid the 'new normal' era. It also gives an idea about resilience and identifies the sections of society which require focused interventions.

1. Introduction

Stress has repercussions on global health, including the biological, psychological, and behavioral processes of an individual¹. Coronavirus Disease-2019 (COVID -19) pandemic has spawned significant stress for humankind. Globally, a constant state of flux has been prevalent in most parts of the world, even after the first wave (second/third, in some countries) has subsided, as people are trying to adapt to the 'New Normal' era. The factors responsible include but are not limited to the potential fatality of new strains of the virus and uncertainty regarding the breakout of subsequent 'COVID-19 waves'. Most importantly, there

are innumerable psychosocial implications for all sections of society, be it children, adolescents, adults, or the elderly.^{2,3}

With the entire society grappling with the same virus, the perception and phenomenological experience of stress and its impact on the behavior of adolescents and adults is expected to be different. For instance, a study conducted by Qui et al. (2020), showed high stress among young people.³ However, another study by Pedrozo-Pupo et al. (2020) showed the stress to be similar among all age groups.² The younger population has been struggling with stressors like the absence of in-person academics, physical, and social activities, disruption in routine, and boredom.⁴ The adults have been battling their way through

* Corresponding author.

E-mail addresses: shwetasingh@kgmcindia.edu, shwetabhanu3@gmail.com (S. Singh), nishamani@kgmcindia.edu (N. Mani Pandey), manjistha6datta@gmail.com (M. Datta), saakshibatra08@gmail.com (S. Batra).<https://doi.org/10.1016/j.cegh.2021.100885>

Received 27 May 2021; Received in revised form 20 September 2021; Accepted 26 October 2021

Available online 5 November 2021

2213-3984/© 2021 Published by Elsevier B.V. on behalf of INDIACLEN. This is an open access article under the CC BY-NC-ND license

[\(http://creativecommons.org/licenses/by-nc-nd/4.0/\)](http://creativecommons.org/licenses/by-nc-nd/4.0/).

particular problems like financial burdens, social isolation, the unpredictability of life events, and increased responsibilities of child care due to school closure.^{5,6}

Additionally, gender-related differences have also been noted. The systemic differences and gender roles created specific stressors for females during the pandemic. The gender affected the stress where females experienced higher stress than men.⁷ Moreover, amid the pandemic, 'habit forming' behaviours like internet use and substance use have been reported to increase in adolescents and adults.⁸

Owing to social restrictions laid out by the government to prevent the spread of infection, there has been a surge in internet use, both during and after the lockdown.⁹ For instance, in India, 87% of people reported increased usage, with 75% reporting a surge in time spent on Facebook, Twitter, and WhatsApp.¹⁰ Due to the 'social distancing' norms and self-isolation, it has become a 'psychological necessity' to over-engage to address the needs of human interaction and coping with the pandemic. There are high-risk behaviours reported in adolescents in various digital and internet-related activities, for instance, social networking, surfing, shopping, and gambling.¹¹ However, due to its psychological, social, and neurobiological basis, excessive internet usage can also be highly addictive.¹² Studies in the past have shown that compulsive usage of social media impacts physical and mental health, including cardio-metabolic health, sleep, affect, self-esteem, well-being, and everyday functioning.^{13,14}

Researchers found elevated levels of substance use, especially after lockdowns were relaxed and people returned to the new normal.^{8,15,16} It was observed that initiation of or increase in substance use to cope with COVID-19 – associated stress was most commonly reported, and prevalence decreased progressively with an increase in age.¹⁵ Further, it was vital to note that the overall rate of alcohol drinking and smoking increased only marginally during the COVID-19 pandemic. Addictive behaviours increased substantially in regular drinkers and regular smokers and relapse in ex-drinkers and ex-smokers.^{8,16} Some studies did suggest that confinement acted as a protective factor against the consumption of tobacco, toxins, and alcohol. However, in females, both prescription and non-prescription drug abuse worsened.¹⁷

Coping acts as stabilizing factor that may help an individual maintain bio-psycho-social adaptation during a stressful period. People are expected to vary in their manner of coping during stressful times, like the current pandemic. Broadly, coping can be divided into adaptive or maladaptive styles, where adaptive coping strategies generally involve: Confronting problems directly, making reasonably realistic appraisals of problems, recognizing and changing unhealthy emotional outbursts. In contrast, maladaptive strategies involve an excessive emotional response and avoidance-based behaviours. Individuals who actively delay or evade responses to stress may merely offer momentary diversion from the stress but do not provide long-term relief.^{7,18} It was also noted that such an avoidant coping style affected individuals' psychological distress more than an active coping style during the lockdown period.^{18,19} A study revealed that a positive attitude and trust in God were the most used adaptive coping strategies during the pandemic.²⁰ Further, given the collectivistic essence of Indian society, it was observed that seeking social support was the highest used coping strategy in India.⁷

There have been numerous studies on stress, internet use, substance use, and coping amongst people, especially during the COVID-19 wave and lockdowns throughout the world.^{2,3,7-9,17} In India, the first wave of COVID-19 began in March 2020 and the infections started receding from mid-September onwards. India went for strict lockdown (March 25th–May 31st, 2020) and a series of 'un-lockdowns'. This was followed by the 'New Normal' era, which includes the second wave, reported to have started in mid-February 2021. Towards the end of 2020, when the peak phase of the first wave subsided, people started getting accommodated to the new normal guidelines while experiencing the lurking threat of an outbreak of a subsequent wave. As health professionals, it is crucial to understand people's psychological and behavioral processes

during the COVID-19 surge and the lockdowns and behavior and coping of people during a 'new normal' phase, that is, the phase between the first and the second wave.

Moreover, the situational stressors make every individual's phenomenological experience different. The studies on age-wise impact have shown equivocal results regarding the perception of stress, internet consumption, substance usage, and adaptive and maladaptive coping strategies used among adolescents and adults amid pandemics. Hence the present study sought to explore and compare stress, internet use, substance use, and coping among adolescents, young adults, and middle-aged adults amid 'the new normal' pandemic era in India. It was hypothesized that adolescents, young adults, and middle-aged adults would differ in terms of the experience of stress, internet use, substance use, and coping. Also, it was hypothesized that there would be associations among the study variables.

2. Methodology

This study employed a cross-sectional design by using standardized tools through a web-based platform. The study was part of an institutional project on mental health aspects amid COVID-19 pandemic era.

2.1. Sample

All the participants were between 13 and 60 years of age and were categorized as [a] adolescents (13–19 years), [b] young adults (20–39 years), and [c] middle-age adults (40–60 years). Adult participants comprised of adult college students, teaching, and non teaching staff, and their family members. The adolescent participants were school students, and wards of adults participants.

Inclusion criteria for the participants were: a) aged 13 years–60 years, b) male, female and other gender c) access to the device and the internet to fill questionnaires (online); d) able to read and comprehend Hindi or English language; e) willing to participate in the survey. Exclusion criteria: a) not residing in India b) not able to complete assessment.

Total sample size (N) was estimated to be at least 1000 with assuming (precision = 5.00%, population size = infinite, 95% confidence interval specified limits [13%–23%] these limits equal prevalence plus or minus precision, 95% binomial exact confidence interval. Authors persistently pursued to get responses with a 95% confidence level and 0.05 confidence interval (CI) for each subgroup. A total of 1027 participants included 456 adolescents (M = 200; F = 256) (CI = 4.54); 347 adults (M = 124; F = 223) (CI = 5.22) and 224 mid adults (M = 103; F = 121) (CI = 6.51); with a 95% confidence level the margin of error for these subgroups was found to be 4.54%, 5.22% and 6.51%.

In the backdrop of COVID 19 and social restrictions, complete randomization was not feasible. Hence the sampling was done at three stages. The schools/colleges were randomly selected from the 'Department of higher secondary education' and 'Department of higher education' at the first stage. In the second stage, the consenting students and school/ college staff participated. The participants also shared the proforma with their family members.

2.2. Ethical considerations

Ethical approval for the study was obtained from the institutional ethics committee [ref code: 11th ECM COVID-19 1B/P7]. Formal permission was taken from the significant authorities (principals) of the selected schools/colleges. The study objectives were explained to all participants, and they were assured that their data and responses would be kept confidential. Informed consent was obtained from all participants.

2.3. Data collection tools

A web-based study proforma was used, which contained [1] Description of the study, along with selection criterion, informed consent form for adults (or parents)/assent form for adolescents approved by the institute ethics committee. [2] Semi-structured sociodemographic proforma. [3] Standardized questionnaires for the assessment of study variables. This proforma was linked to a unique web link. On clicking at the link, participants got a set of questions sequentially, which they had to answer by clicking on the given choices.

2.3.1. Tool 1: semi-structured sociodemographic proforma

A semi-structured sociodemographic proforma was developed for this study, and study inclusion-exclusion criteria were mentioned on the first sheet of this proforma. This proforma included information about the participant's age in years, date of birth, gender, education, current occupation, marital status, socioeconomic status, and domicile.

2.3.2. Tool 2: perceived stress scale (PSS)²¹

For the assessment of stress, Perceived Stress Scale (PSS)²¹ was used. This scale assesses the degree to which situations in one's life are appraised as stressful. It is a 10 item; 5-point Likert scale where responses are in terms of how often one feels a certain way (0 = never, 1 = almost never, 2 = sometimes, 3 = fairly often, 4 = very often). PSS was designed for use in community samples with at least a junior high school education. The scale possesses good reliability and validity with strong Cronbach's alpha = 0.84, with test-retest – reliability (ICC) after 3 weeks to be 0.935 and Kappa's Coefficient ranging from 0.74 to 0.89.^{22,23}

2.3.3. Tool 3: Internet Gaming Disorder Scale (IGDS-9)²⁴

For the present study, Internet Gaming Disorder Scale (IGDS-9)²⁴ the short (9-item) dichotomous (yes/no) scale was used for the assessment of internet use in the study. Internationally, researchers refer to nine IGD criteria of DSM- 5 for constructing diagnostic tools and assessing internet use and internet addiction.²⁵ Internationally, researchers refer to the nine IGD criteria of DSM- 5 for constructing diagnostic tools and assessing internet use and addiction²⁵. Hence, the term 'internet use' was used in all items for this study's purpose. The IGD criterion of DSM-5 covered in IGDS-9 are preoccupation, withdrawal, tolerance, persistence, displacement, problem, conflict, deception, and escape. This tool has good psychometric properties and is the most practical scale for diagnostic purposes. Confirmatory factor analysis demonstrated that the structural validity (i.e., the dimensional structure) was satisfactory, reliable (internally consistent), and showed good criterion-related validity, as indicated by positive correlations with time spent playing games, loneliness, and aggression and negative correlations with self-esteem, prosocial behavior, and life satisfaction. According to Lemmens, Valkenburg, and Gentile (2015),²⁴ the scale was highly reliable, with a Cronbach's alpha of 0.83 and was strongly correlated with the dichotomous 27-item scale ($r = 0.93$, $p < 0.001$).

2.3.4. Tool 4: DSM-5 Self-Rated Level 1 cross-cutting symptom measure – 9²⁹

This study used items [21, 22, 23] on substance use from DSM-5 Self-Rated Level 1 Cross- Cutting Symptom Measure—9²⁹, which was developed by the 'DSM-5 Task Force and Work Groups' to review the cognitive systems in each patient. The measure assesses the presence and severity of psychiatric symptom domains across diagnostic boundaries. The respondents are asked how much or how often they have been disturbing problems in the last two weeks (0 = none/never, 1 = slight/rare, 2 = mild/several days, 3 = moderate/more than half the days, 4 = severe/almost daily). Research evidence shows that the measure has good to excellent test retest reliability²⁷ and good validity.²⁸

2.3.5. Tool 5: brief COPE²⁹

For the assessment of Coping, Brief COPE²⁹ was used. It is a 28 item

self-report questionnaire designed to assess primary coping methods with stressful life events. To suit the COVID 19 scenario coping strategies were categorized as "adaptive" and "maladaptive" by the authors. Under adaptive strategies included strategies were: active coping, use of emotional support, use of instrumental support, positive reframing, planning, self-distraction, humour, acceptance, religion; whereas maladaptive strategies included: behavioral disengagement, venting, denial, substance use and self-blame. The scale was derived from the original 60-item COPE inventory.

Each item is answered on a four-point Likert scale (1 = I haven't been doing this at all, 2 = I have been doing this a little bit, 3 = I have been doing this a medium amount, 4 = I've been doing this a lot). The scores on all the items were added separately to get the individual scores for each subscale and two significant subscales. There is no such thing as an overall score on this measure. Research³⁰ has shown that both scales have high Cronbach's alpha values ranging from 0.69 to 0.8.³⁵

2.4. Procedure

Five higher secondary co-education schools and five undergraduate/postgraduate co-education colleges were randomly selected and contacted telephonically for their willingness to participate in the study. Among these, three schools and four colleges consented to participate. The consenting school and college authorities were contacted to obtain voluntary informed consent to conduct the study in their institute and implement data collection. The data collection was initiated on December 1st at 12:00 IST and concluded on December 31st at 12:00 IST.

For the recruitment of adolescents, a consent form was shared with parents of the 13–18 years old adolescents of 8th std and above through email. This consent form contained information about the study, confidentiality and invited them to consent for their adolescent ward(s) participation in the study. There was an option for parents to accept or decline their ward(s)'s recruitment in the study. After receiving the parents' consent, the assent form and study proforma were e-mailed to the adolescents. The adult participants were adult college students and school/ college staff. To increase the generalizability of study, they also shared the study proforma with their family members

2.5. Data analysis

The results were analysed using descriptive statistics and conducting comparisons among various groups. The analyses were performed using SPSS version 23.0 (SPSS Inc., Chicago, IL, USA). Categorical data were summarized as proportions and percentages (%) and discrete as mean and standard deviations (SD). While study variables (means) were compared within study groups by applying Kruskal Wallis Test and Chi-square. Further, the six-sigma quality control technique was used to sort groups of a significantly higher or lower level of study variables represented by three-sigma UL (upper limit) and three-sigma LL (lower limit). Associations were established using Person's coefficient of correlations. The p-value was taken significantly when less than 0.05 ($p < 0.05$).

3. Results

3.1. Sociodemographic characteristics

Although 1043 individuals responded to the questionnaire, 16 responses were excluded due to their incomplete data. The final sample comprised of 1027 participants with 456 adolescents (M = 200; F = 256); 347 young-adults (M = 124; F = 223) and 224 mid-adults (M = 103; F = 121). Among adults, 59.4% for males and 63.7% for females were married. The important sociodemographic characteristics and domicile of the participants are being provided in table- 1 and table- 2. All the participants belonged to urban domicile, with a majority from the state of Uttar Pradesh.

Table 1 and 2: Sociodemographic Characteristics and Domicile of the Study Participants. **Table 3:** Means and SD of stress, internet use, substance use, and coping among study participants.

Table 3 and Fig. 1a–e reveal that in most of the domains of average study score of adolescent females was comparatively high, almost for every aspect, except for substance use and maladaptive coping. Adolescent females scored the highest mean score (20.91) on the total perceived stress scale, followed by young adult females (19.03), adolescent males (18.02), young adult males (17.66), middle-aged females (14.55), and middle-aged males (13.95) (**Table 3, Fig. 1a**). Adolescent females' mean score was significantly higher than the upper limit, and middle-aged females and males were below the lower limit, which was a significant difference. Adolescent females, male and young age males mean scores on internet gaming were 3.59, 3.40 and 3.28 respectively, which were significantly higher (**Table 3, Fig. 1b**). In internet gaming, the mean score of adolescent females, males, and young adult males were significantly higher than upper control limit and young adult females, middle-aged males, and females scores were significantly below the lower control limit (**Fig. 1b**) (see **Table 3**).

In scores of adaptive coping, there were no significant variations in mean scores of male-female across all age groups (**Table 3**). The mean of middle-aged adult males reveals a little low score from the lower control limit, but that is non-significant (**Table 3; Fig. 1d**). However, significant variations are present in scores of maladaptive coping; young adult males scored higher than the upper control limit, whereas middle-aged females scored lower than control limit scores (**Table 3; Fig. 1e**).

Table 4 depicts significant positive correlations mostly of moderate strength among perceived stress, internet use, and maladaptive coping. Also, similar has been observed between substance use and maladaptive coping. The internet use was moderately positively correlated with stress (0.43) and maladaptive coping (0.40). Substance Use was also moderately positively correlated with Maladaptive coping (0.38); however, adaptive coping was not found to be significantly correlated with Stress, Internet Use, and Substance Use.

4. Discussion

This study aimed to compare stress, internet use, substance use, and coping among the adolescents, young adults, and middle age population of India. Findings indicate that all the participants across all age groups perceived a moderate level of stress. The participants reported using more adaptive coping strategies to combat stress. Consistent with the hypotheses, there are significant variations in stress, internet use, substance use, and coping based on gender and age group divisions.

4.1. Stress among adolescents, young adults, and middle-aged adults

In general, we found that a moderate amount of stress was perceived by all the participants. The pandemic has created a pervasive crisis for people where they face ongoing unexpected and unpredictable stress.

Table-2

Domicile of the study participants.

State/Union Territory	Number of Participants
Andhra Pradesh	6
Assam	22
Bihar	3
Delhi	30
Gujarat	5
Haryana	16
Jharkhand	3
Karnataka	10
Madhya Pradesh	7
Maharashtra	16
Meghalaya	2
Odisha	6
Punjab	4
Uttar Pradesh	870
Uttarakhand	11
Rajasthan	6
Telangana	5
West Bengal	5
Total-	1027

Amid such uncertainty, even after the first wave (second/third wave, in some countries) has subsided in most parts of the world, and people are trying to adapt to 'The New Normal' era. Even now, people are threatened regarding an outbreak of subsequent waves, its potential fatality, the rising number of new cases or inconsistent government strategies or the deadly effects of the virus itself, and psychosocial implications. All this information churned a stream of stress, panic, and fear across all sections of society.² Our findings are also in line with other studies carried out during the COVID-19.^{31,32} The level of stress reduced with the increase in age; the adolescent population perceived the highest amount of stress, and the middle-aged adults perceived the least amount of stress. Research has suggested that the adolescent population's significant disruptions in studies and personal lives would have contributed to higher levels of stress as they are less psychologically independent.^{31,33} Moreover, the uncertainty, potential adverse effect of a loss of academic advancement, and prospects could have a stressful impact on adolescents.³³ Middle-age adults experience lower stress as they may exhibit better emotion regulation, social support-seeking behavior, and resilience than their younger counterparts.³⁴

Prominent gender variations were found in our study as Adolescent Females ($M = 20.91$, $S.D. = 8.65$) and Young Adult Females ($M = 19.03$, $S.D. = 7.45$) experienced significantly higher stress than Middle age Adult Males ($M = 13.95$, $S.D. = 7.04$) and Middle age Adult Females ($M = 14.55$, $S.D. = 6.70$). This finding is consistent with previous studies. The higher levels of stress can be explained by the gender roles and increased demands on the female gender due to 'excessive care work' added during a pandemic.³⁵ Especially in India, many socio-cultural factors can explain higher perceived stress in females compared to men. Factors like lack of financial independence, occupational

Table-1

Socio demographic characteristics of the study participants.

Details	Adolescents up to 19 years. (n = 456)		Young-Adults 20–39 years. (n = 347)		Mid-Adults 40–60 years. (n = 224)	
	M (n = 200)	F (n = 256)	M (n = 124)	F (n = 223)	M (n = 103)	F (n = 121)
Mean age in years (SD)	15.10 (1.81)	15.18 (1.68)	28.93 (5.62)	27.59 (5.37)	48.40 (6.58)	48.19 (6.23)
Years of Education						
<10	76 (38.0)	103 (40.2)	0 -	1 (0.5)	0 -	0 -
10–12	119 (59.5)	141 (55.1)	12 (9.7)	11 (4.9)	2 (2.0)	1 (0.8)
12–15	3 (1.5)	12 (4.7)	45 (36.3)	66 (29.6)	34 (33.0)	12 (9.9)
>15	2 (1.0)	0	67 (54.0)	145 (65.0)	67 (65.0)	108 (89.3)
Occupation						
Students	200 (100)	256 (100)	34 (27.4)	96 (43)	0 (0)	0 (0)
Employed	0	0	73 (58.9)	101 (45.3)	93 (90.3)	87 (71.9)
Not employed	0	0	17 (13.7)	26 (11.7)	10 (9.7)	34 (28.2)

Table 3

Means and SD of Stress, internet use, substance use and coping among study participants.

Variables		Adolescents		Young adults		Middle-age adults		Chi square value
		M	F	M	F	M	F	
Stress	Mean	18.02	20.91	17.66	19.03	13.95	14.55	X ² = 76.68***
	SD	8.70	8.65	7.09	7.45	7.04	6.70	
	3 σ LL	17.3	17.3	17.3	17.3	17.3	17.3	
	3 σ UL	18.9	18.9	18.9	18.9	18.9	18.9	
Internet Use	Mean	3.40	3.59	3.28	2.67	2.35	2.29	X ² = 48.16***
	SD	2.30	2.44	2.57	2.18	2.24	2.11	
	3 σ LL	2.8	2.8	2.8	2.8	2.8	2.8	
	3 σ UL	3.3	3.3	3.3	3.3	3.3	3.3	
Substance Use	Mean	0.63	0.43	1.60	0.64	1.17	0.76	X ² = 54.14***
	SD	2.05	1.59	2.96	2.24	2.21	1.91	
	3 σ LL	0.6	0.6	0.6	0.6	0.6	0.6	
	3 σ UL	1.0	1.0	1.0	1.0	1.0	1.0	
Adaptive Coping	Mean	17.40	17.99	17.87	17.79	16.78	17.62	ns
	SD	4.98	4.90	4.83	4.22	4.58	4.70	
	3 σ LL	17.2	17.2	17.2	17.2	17.2	17.2	
	3 σ UL	18.1	18.1	18.1	18.1	18.1	18.1	
Maladaptive Coping	Mean	9.48	10.23	10.83	9.83	10.03	9.06	X ² = 15.92 ^a
	SD	3.09	3.40	4.66	3.58	3.52	3.13	
	3 σ LL	9.6	9.6	9.6	9.6	9.6	9.6	
	3 σ UL	10.2	10.2	10.2	10.2	10.2	10.2	

^a p=<0.01; ***p=<0.001; ns = not significant.

exhaustion, work-family conflict, and inequality in domestic labor combined with the biological vulnerability due to sex hormones could intensify the vulnerability to distress among women.³⁶ Sociologically, it has been noted that it is less likely that females have pervasive coping deficits. Instead, it's more likely that there is higher impingement of crisis events on their emotional lives, mainly because females could have larger networks and are approached for help more than their male counterparts.³⁷ Even the response pattern to stress can be affected by gender, which was observed on the Covid Stress Scale, where women report having experienced more stress than men.⁷ The systemic differences and gender roles create specific stressors for women. According to Power (2020), this care burden was highly gender-regressive, increasing the demands on women in the families.³⁶ Moreover, 20–30% increase in domestic violence was observed in just the first month of lockdown.³⁸ Hence, our study contradicts the research that indicates no difference in the level of perceived stress in various sub-sections of society.²

4.2. Internet use among adolescents, young adults, and middle-aged adults

In our study, significantly higher use of the internet was reported by adolescents, both Females (M = 3.59, S.D. = 2.44) and Males (M = 3.40, S.D. = 2.30), and Young Adult Males (M = 3.28, S.D. = 2.57) compared to Young Adult Females (M = 2.67, S.D. = 2.18), Middle age Adult Males (M = 2.35, S.D. = 2.24) and Middle age Adult Females (M = 2.29, S.D. = 2.11). This finding is in line with previous research suggesting that in the younger population, stress and anxiety were associated with more media use.³¹ For the younger population, excessive internet use behavior can serve as a coping strategy. During the pandemic, when the adolescents were restricted in their houses, had less control over their lives, and experienced high educational stress and uncertainty, higher internet use could have been an easy coping method.

Moreover, during a pandemic, when social interaction was severely restricted, the youth could use the internet to enhance the chance of meaningful relationships, self-confidence, social abilities, social support, and identity play.³⁹ Internet, during the pandemic, could also allow young individuals to form close social relationships with online friends which could help compensate for their real-life poor support

resources, and provide them with a sense of understanding and security, knowing that there is someone online to listen to them when needed.⁴⁰ The anonymity and dynamicity of online identity can relieve adolescents of their original identity, and controlling their online lives could help them cope with the helplessness in real life. Moreover, virtual success through gaming, posting, etc., may be utilized to cope with lower self-esteem and poor life satisfaction in the real world.⁴⁰

4.3. Substance abuse among adolescents, young adults, and middle-aged adults

In our study, substance use included alcohol, tobacco, and self-medication. Young and middle age Males (M = 1.60, S.D. = 2.96; M = 1.17, S.D. = 2.21) reported significantly higher levels of substance use. This is in concordance with the past research, which suggests that males have higher rates due to the existing cultural scripts than females on externalizing disorders such as substance use.⁴¹ This trend is similar to various studies, which suggest that the overall rate of alcohol drinking and smoking increased only marginally during the COVID-19 pandemic; however, the frequency of use increased substantially. Hence, substance use increased substantially in regular drinkers and regular smokers and relapse in ex-drinkers and ex-smokers.^{8,16} This explains the lower levels of substance use in adolescents who would have initiated the use of the substance. Studies have also explained higher levels of substance use as a form of coping in Asian men related to the Asian cultural value of masculinity. Masculine norms and masculine gender role stress both predict substance use.⁴²

4.4. Coping strategies among adolescents, young adults, and middle-aged adults

Coping was further measured as adaptive or maladaptive in our study using the Brief-COPE scale. The results indicate that participants, in general, used more adaptive coping than maladaptive coping. Taking the pandemic situation resulting into isolation and lack of control into cognizance, we divided the coping strategies. Adaptive coping included – Self distraction, active Coping, emotional support, instrumental support, acceptance, positive reframing, and religion. Whereas,

Figure-1. Stress, internet use, substance use and coping among study participants.

*AM, AF (Adolescent Male, Adolescent Female); YAM, YAF (Young adult male, young adult female); MAM, MAF (Middle adult male, Middle age adult female).

Maladaptive coping comprised denial, substance use, behavioral disengagement, venting, and self-blame. While there were no significant differences in the level of adaptive coping between the groups, the results indicated that more maladaptive coping was used in Young Adult Males ($M = 10.83$, $S.D. = 4.66$) compared to Middle age Adult Females

($M = 9.06$, $S.D. = 3.13$) and Adolescent Males ($M = 9.48$, $S.D. = 3.09$).

This result can be explained in view of the background that during the COVID-19 pandemic, females perceived COVID-19 related risks more than males and were more active in adopting coping mechanism strategies than males. Moreover, they used multiple emotion focused

Table 4

Correlations among stress, internet use, substance use and coping among study participants.

Variables	Stress	Internet Use	Substance Use	Adaptive coping	Mal-adaptive coping
Stress	1.00				
Internet use	0.43***	1.00			
Substance use	.096 ns	0.19	1.00		
Adaptive coping	-.061ns	.054ns	0.02ns	1.00	
Mal-adaptive coping	0.46***	0.40***	0.38***	0.21*	1.00

** $p < 0.01$; *** $p < 0.001$; ns = not significant.

coping strategies such as distraction, emotional and religious support.⁴³ There are times when emotion-focused strategies may be used as problem-focused solutions to a stressful dilemma, such as a pandemic. Women can purposefully use emotion-focused or avoidant strategies. They can cope creatively and effectively by choosing not to deal with the stress but instead focusing on something else.⁴⁴

On the other hand, in times of crisis, men, being socialized into their gender roles, are more likely to indulge in externalizing behaviours and hide vulnerability, ignore self-care, restrict seeking support or disclose feelings.⁴¹ Previous studies indicated that adults seemed to cope better with the pandemic than younger counterparts who opted for more avoidant coping. Adaptive coping and resilience were observed among most adults in staying busy and seeking social support.³⁴

4.5. Associations among stress, internet use, substance use, and coping

In our study, internet use was moderately positively related to maladaptive Coping ($r = 0.39$). Furthermore, based on our correlational study, maladaptive coping was positively related to stress ($r = 0.40$). During the pandemic, when individuals were isolated, and escapism could be used as an important, albeit inadequate coping strategy, our findings became vital. Escapism is significantly related to internet addiction. Gaming or internet use is associated with loneliness and can help escape and relieve stress for a short period to cope with the psychological distress of the pandemic. Literature also suggests that increased use of the internet is linked with poor psychological adjustment.⁴⁵ Research has also indicated that restrictions during COVID-19 increased the level of internet use globally.⁹

These behaviors can be explained through the problem behavior theory. Problematic internet and alcohol use may be a coping mechanism for dealing with stress, frustration, inadequacy, and failure—or the anticipation of failure, all of which were heightened during the pandemic. The psychosocial proneness, including the perceived environment, personality system, and behaviors, could develop the psychosocial framework for problem behavior.⁴⁰ It became pertinent to understand whether this surge indicates an increase in internet addiction or presents itself as a form of coping. It became pertinent to understand whether this surge indicates an increase in 'internet addiction' or presents itself as a coping mechanism.¹²

5. Conclusion

In our study, significant variations were observed in perceived stress, internet use, and coping based on gender and age variations. The participants reported moderate stress and usage of more adaptive coping strategies to combat stress. Adolescent females were the most affected and reported high perceived stress and internet use, whereas middle-aged adults were the least affected. Young adult males and adolescent males reported higher substance use, and young adult males and middle-aged adults reported higher maladaptive coping.

Our study shows that during the 'new normal' era, the older population experiences less psychologically detrimental effects than the younger population. It is important to note that adolescent females in India reported more perceived stress and poor mental health indicators. In contrast, women in their middle age perceived less stress. As an anomaly, it is interesting to understand how Indian adolescent males were less affected by the pandemic than young adults and adolescent females. During a pandemic, when there has been higher educational stress, frustration, and worry, such socio-cultural scripts can be a significant protective factor for adolescent males while perpetuating poorer mental health for adolescent females. Participants, in general, used more adaptive coping, but higher maladaptive coping was seen in young adult males who also used the internet significantly more. Hence our study provides further avenues to understand stress and coping in different subsections of society.

Recommendations

Our study highlights the age and gender variations in the effect of COVID-19 pandemic on individuals' perceived stress and their coping mechanism/strategy. It also identifies the sections which require focused interventions. While the pandemic demanded significant changes and adjustments in every individual's life, our study shows that it affected some individuals more than others. Based on the results, targeted interventions can be planned and developed for the vulnerable population (adolescent females and young adult males), focusing on coping strategies. Further research on factors that make these populations vulnerable can be carried out. Moreover, preventive measures for managing future crises may be done. And related research can be done by making a good plan for the future for better living.

Limitations

The study has certain limitations. Firstly, its cross-sectional design captures relevant data only at a single time frame, especially during a pandemic like the current one. Moreover, in the current backdrop of social distancing, it was beyond the scope and feasibility of this web-based study to separate precisely the persons who were already diagnosed cases of mental health disorders, from those who were not. The population representation, and weighting by age, sex, and region outweigh this limitation to a certain extent. There is a possibility of self-serving bias and social desirability while responding through self-reported perceptions and behaviors. The overall results may be affected by more significant numbers of respondents from Uttar Pradesh. The weighting ensures results accurately reflect the actual regional populations within India. Qualitative methodologies will further enrich understanding psychological and behavioral processes.

Declaration of competing interest

'No potential conflict of interest was reported by the authors'.

Acknowledgments

The authors would like to acknowledge the support and guidance of Dr. P.K. Dalal, Dr. Vivek Agarwal, Dr. Anil Nishchal, Dr. Bandana Gupta, Dr. Pooja Mahour, and Dr. Pawan Gupta Department of Psychiatry, KGMU, Lucknow. Also, we are grateful to all the participants for their active participation.

References

- Cohen S, Janicki-Deverts D, Miller GE. Psychological stress and disease. *JAMA Journal of the American Medical Association*. 2007;298(14):1685–1687. <https://doi.org/10.1001/jama.298.14.1685>.

- 2 Pedrozo-Pupo JC, Pedrozo-Cortés MJ, Campo-Arias. A Perceived stress associated with COVID-19 epidemic in Colombia: an online survey. *Cad Saúde Pública*. 2020;36(5), e00090520. <https://doi.org/10.1590/0102-311x00090520>.
- 3 Qiu J, Shen B, Zhao M, Wang Z, Xie B, Xu Y. A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: implications and policy recommendations. *General Psychiatry*. 2020;33(2), e100213. <https://doi.org/10.1136/gpsych-2020-100213>.
- 4 Singh S, Roy D, Sinha K, Parveen S, Sharma G, Joshi G. Impact of COVID-19 and lockdown on mental health of children and adolescents: a narrative review with recommendations. *Psychiatr Res*. 2020;293:113429. <https://doi.org/10.1016/j.psychres.2020.113429>.
- 5 Gallagher MW, Zvolensky MJ, Long LJ, Rogers AH, Garey L. The impact of covid-19 experiences and associated stress on anxiety, depression, and functional impairment in American adults. *Cognit Ther Res*. 2020;44(6):1043–1051. <https://doi.org/10.1007/s10608-020-10143-y>.
- 6 Shanahan L, Steinhoff A, Bechtiger L, et al. Emotional distress in young adults during the COVID-19 pandemic: evidence of risk and resilience from a longitudinal cohort study. *Psychol Med*. 2020;1–10. <https://doi.org/10.1017/S003329172000241X>.
- 7 Ahuja KK. Scanning the VIRUS: a study of dimensions of stress and coping with COVID-19. *Curr Psychol*. 2021. <https://doi.org/10.1007/s12144-021-01369-4>.
- 8 Dumas TM, Ellis W, Litt DM. What does adolescent substance use look like during the COVID-19 pandemic? Examining changes in frequency, social contexts, and pandemic-related predictors. *J Adolesc Health*. 2020;67(3):354–361. <https://doi.org/10.1016/j.jadohealth.2020.06.018>.
- 9 Mestre-Bach G, Blycker GR, Potenza MN. Pornography use in the setting of the COVID-19 pandemic. *Journal of Behavioral Addictions*. 2020;9(2):181–183. <https://doi.org/10.1556/2006.2020.00015>.
- 10 Coronavirus. 87% increase in social media usage amid lockdown; Indians spend 4 hours on Facebook, WhatsApp. Retrieved from <https://www.businesstoday.in/technology/news/coronavirus-87-percent-increase-in-social-media-usage-amid-lockdown-indians-spend-4-hours-on-facebook-whatapp/story/399571.html>; 2020, March 30.
- 11 Anderson EL, Steen E, Stavropoulos V. Internet use and Problematic Internet Use: a systematic review of longitudinal research trends in adolescence and emergent adulthood. *Int J Adolesc Youth*. 2017;22(4):430–454. <https://doi.org/10.1080/02673843.2016.1227716>.
- 12 Singh S, Dixit A, Joshi G. Is compulsive social media use amid COVID-19 pandemic addictive behavior or coping mechanism? *Asian Journal of Psychiatry*. 2020;54: 102290. <https://doi.org/10.1016/j.ajp.2020.102290>.
- 13 Cheng C, Li AY. Internet addiction prevalence and quality of (real) life: a meta-analysis of 31 nations across seven world regions. *Cyberpsychol, Behav Soc Netw*. 2014;17:755–760. <https://doi.org/10.1089/cyber.2014.0317>.
- 14 Turel O, Romashkin A, Morrison KM. Health outcomes of information system use lifestyles among adolescents: videogame addiction, sleep curtailment and cardiometabolic deficiencies. *PLoS One*. 2016;11(5), e0154764. <https://doi.org/10.1371/journal.pone.0154764>.
- 15 Czeisler ME, Lane RI, Petrosky E, et al. Mental health, substance use, and suicidal behavior during the COVID-19 pandemic—United States, June 24–30, 2020. *MMWR (Morb Mortal Wkly Rep)*. 2020;69(32):1049–1057. <https://doi.org/10.15585/mmwr.mm6932a1>.
- 16 Sun Y, Li Y, Bao Y, et al. Brief report: increased addictive internet and substance use behavior during the COVID-19 pandemic in China. *Am J Addict*. 2020. <https://doi.org/10.1111/ajad.13066>.
- 17 Rogers AH, Shepherd JM, Garey L, Zvolensky MJ. Psychological factors associated with substance use initiation during the COVID-19 pandemic. *Psychiatr Res*. 2020; 293:113407. <https://doi.org/10.1016/j.psychres.2020.113407>.
- 18 Folayan MO, Cáceres CF, Sam-Agudu NA, Odetoynbo M, Stockman JK, Harrison A. Psychological stressors and coping strategies used by adolescents living with and not living with hiv infection in Nigeria. *AIDS Behav*. 2017;21(9):2736–2745. <https://doi.org/10.1007/s10461-016-1534-3>. 2017.
- 19 Shi C, Guo Z, Luo C, Lei C, Li P. The psychological impact and associated factors of COVID-19 on the general public in hunan, China. *Risk Manag Healthc Pol*. 2020;13: 3187–3199. <https://doi.org/10.2147/RMHP.S280289>.
- 20 Javed Sarah, Parveen Heena. *Adaptive Coping Strategies Used by People during Coronavirus*. 2021. <https://doi.org/10.4103/jehp.jehp.522.20>.
- 21 Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav*. 1983;24:386–396.
- 22 Baik SH, Fox RS, Mills SD, et al. Reliability and validity of the perceived stress scale-10 in hispanic Americans with English or Spanish language preference. *J Health Psychol*. 2019;24(5):628–639. <https://doi.org/10.1177/1359105316684938>.
- 23 Lee E-H. Review of the psychometric evidence of the perceived stress scale. *Asian Nurs Res*. 2012;6(4):121–127. <https://doi.org/10.1016/j.anr.2012.08.004>.
- 24 Lemmens JS, Valkenburg PM, Gentile DA. The internet gaming disorder scale. *Psychol Assess*. 2015;27(2):567–582. <https://doi.org/10.1037/pas0000062>, 2015.
- 25 Lemmens JS, Valkenburg PM. The social media disorder scale. *Comput Hum Behav*. 2016;61:478–487. <https://doi.org/10.1016/j.chb.2016.03.038>.
- 27 Narrow WE, Clarke DE, Kuramoto SJ, et al. DSM-5 field trials in the United States and Canada, Part III: development and reliability testing of a cross-cutting symptom assessment for DSM-5. *Am J Psychiatr*. 2013;170(1):71–82. <https://doi.org/10.1176/appi.ajp.2012.12071000>.
- 28 Bravo A, Villarosa-Hurlocker M, Pearson M. undefined. College student mental health: an evaluation of the DSM-5 self-rated Level 1 cross-cutting symptom measure. *Psychol Assess*. 2018;30(10):1382–1389. <https://doi.org/10.1037/pas0000628>.
- 29 Carver CS. You want to measure coping but your protocol' too long: consider the brief cope. *Int J Behav Med*. 1997;4(1):92. https://doi.org/10.1207/s15327558ijbm0401_6.
- 30 García FE, Barraza-Peña CG, Włodarczyk A, Alvear-Carrasco M, Reyes-Reyes A. Psychometric properties of the Brief-COPE for the evaluation of coping strategies in the Chilean population. *Psicol Reflexão Crítica*. 2018;31(1):22. <https://doi.org/10.1186/s41155-018-0102-3>.
- 31 Eden AL, Johnson BK, Reinecke L, Grady SM. Media for coping during COVID-19 social distancing: stress, anxiety, and psychological well-being. *Front Psychol*. 2020; 11. <https://doi.org/10.3389/fpsyg.2020.577639>.
- 32 Patra S, Patro BK. COVID-19 and adolescent mental health in India. *The Lancet Psychiatry*. 2020;7(12):1015. [https://doi.org/10.1016/S2215-0366\(20\)30461-2](https://doi.org/10.1016/S2215-0366(20)30461-2).
- 33 Dong H, Yang F, Lu X, Hao W. Internet addiction and related psychological factors among children and adolescents in China during the coronavirus disease 2019 (COVID-19) epidemic. *Front Psychiatr*. 2020;11. <https://doi.org/10.3389/fpsyg.2020.00751>.
- 34 Fuller HR, Huseth-Zosel A. Lessons in resilience: initial coping among older adults during the COVID-19 pandemic. In: Bowers BJ, ed. *The Gerontologist*. 61. 2021: 114–125. <https://doi.org/10.1093/geront/gnaa170>.
- 35 Power K. The COVID-19 pandemic has increased the care burden of women and families. *Sustain Sci Pract Pol*. 2020;16(1):67–73. <https://doi.org/10.1080/15487733.2020.1776561>.
- 36 Simha A, Prasad R, Ahmed S, Rao NP. Effect of gender and clinical-financial vulnerability on mental distress due to COVID-19. *Arch Wom Ment Health*. 2020;23(6):775–777. <https://doi.org/10.1007/s00737-020-01097-x>.
- 37 Kessler RC, McLeod JD. Sex differences in vulnerability to undesirable life events. *Am Socio Rev*. 1984;620–631. Published online.
- 38 Kofman YB, Garfin DR. Home is not always a haven: the domestic violence crisis amid the COVID-19 pandemic. *Psychological Trauma: Theory, Research, Practice, and Policy*. 2020;12(S1):S199. <https://doi.org/10.1037/tra0000866>.
- 39 Weinstein A, Lejoyeux M. Internet addiction or excessive internet use. *Am J Drug Alcohol Abuse*. 2010;36(5):277–283. <https://doi.org/10.3109/00952990.2010.491880>.
- 40 Ko C, Yen J-Y, Yen C, Chen C, Weng C, Chen C. The association between internet addiction and problematic alcohol use in adolescents: the problem behavior model. *Cyberpsychol Behav*. 2008;11(5):571–576. <https://doi.org/10.1089/cpb.2007.0199>.
- 41 Williams DR. *The Health of Men: Structured Inequalities and Opportunities*. 2008:9.
- 42 Liu W, Iwamoto D. Conformity to masculine norms, Asian values, coping strategies, peer group influences and substance use among Asian American men. *Psychol Men Masc*. 2007;8:25–39. <https://doi.org/10.1037/1524-9220.8.1.25>.
- 43 Park CL, Russell BS, Fendrich M, Finkelstein-Fox L, Hutchison M, Becker J. Americans' COVID-19 stress, coping, and adherence to CDC guidelines. *J Gen Intern Med*. 2020;35(8):2296–2303. <https://doi.org/10.1007/s11606-020-05898-9>.
- 44 Banyard VL, Graham-Bermann RA. Can women cope? A gender analysis of theories of coping with stress. *Psychol Women Q*. 1993;303–318. Published online.
- 45 Fernandes B, Biswas U.N., Tan-Mansukhani R., Vallejo A., Essau C.A. The Impact of COVID-19 Lockdown on Internet Use and Escapism in Adolescents. :7.