

Stress and Dysfunctional Eating Behavior During COVID-19 Pandemic: A Gender Perspective

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ABSTRACT

The implications of Covid 19 pandemic on generic well-being and physical, psychological well-being in specific emerge as a global concern. The current research provides an overview of the relationship between stress and dysfunctional eating behavior during the challenging time of the COVID- 19 pandemic. The present paper also aims to highlight the gender-specific differences in perception of stress and its correlation with dysfunctional eating behavior in the COVID-19 pandemic. Perceived Stress Scale-10 (PSS) and Adult Eating Behavior Questionnaire (AEBQ) were used on a heterogeneous sample between 20-40 years. The research was conducted on 50 participants, 25 males, and 25 females. Quantitative analysis was done with SPSS 22.0. The results of the investigation revealed a significant difference in stress level, $t(48)=2.01, p<0.01$, with women ($M=22.24, SD=5.23$) having a higher stress level than men ($M=19.04, SD=4.89$). There was no significant difference in dysfunctional eating behavior between males and females. There was a significant positive correlation between stress and dysfunctional eating behavior in females whereas in males there was no significant positive correlation between stress and dysfunctional eating behavior. The research extrapolates that the pandemic led to elevated stress levels in both genders and gender differences existed and males & females responded differently on dysfunctional eating behavior. The research has also outlined intervention to help individuals cope with stress and dysfunctional eating behavior. The findings of the research propose execution of different intervention programs and psychological first aid to help individuals who are predisposed to develop eating disorders.

Keywords: *Stress, Dysfunctional eating behavior, Gender-specific differences, COVID-19*

The pandemic has brought us to a standpoint where stress as a physical, cognitive, and behavioral construct is inevitable. The fear and anxiety in lockdown, isolation, and quarantine further augmented the stress level. The present paper attempts to investigate and compare the gender specific differences of interrelationship between stress and dysfunctional eating behavior in the COVID-19 pandemic.

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Stress

Stress is used to describe the physical, emotional, cognitive, and behavioral responses to events that are perceived as threatening or challenging. Stress affects our health both directly and indirectly either through autonomic, neuroendocrine, and biological processes or through behavioral modifications, respectively (Jones & Bright, 2001; Oliver, Wardle, & Gibson, 2000). The reaction to stressful experiences differs in both males and females (APA, 2012). The females instead of "Fight or Flight" response to stressor indulges in tend and befriend (Taylor et al. 2000). Tend and befriend refers to involvement in nurturing activities to protect self and take the aid of social creation in the process. As per the American Psychological Association (2012) report, women reported more stress than men. Women are more vulnerable to stress, depression, and anxiety in comparison to men (Jarvis et al., 2020). This lines with the García (2020) study that stated women have a higher mean in anxiety, depression, and stress in comparison to men during a pandemic.

Eating behavior

Eating behavior is defined as a complex interplay of physiologic, psychological, social and genetic factors that influence meal timing, quantity of food intake, food preference, and food selection (Grimm & Steinle, 2012). The impact of COVID-19 led to the modification of our lifestyle and eating behavior. Two major changes in lifestyle that have been reported in a pandemic are staying at home, to maintain the social distancing & adapting to the new normal. The second one is a modification in eating behavior that includes stockpiling of food items and limited accessibility to fresh food & more reliability on processed food (Di Renzo, Gualtieri, Pivari, et al., 2020). Danish adults reported more eating and snacking less exercise, and more weight gain during the lockdown (Giacalone, Frøst, and Pérez, 2020). There was change in Satiety/ hunger perception and appetite during a pandemic (Renzo et al., 2020).

Relationship between stress and eating behavior

Food intake can increase (saturated fat consumption) or decrease (overall calories) in response to high levels of stress (Wardle et al., 2000). The change in eating behavior can be identified as an emotional coping strategy (Raspopow et al., 2010). The early researches focused on whether the stress increased, decreased, or produced no change in eating behavior. Kaplan and Kaplan (1957) argued that certain (obese) individuals did not learn to distinguish between hunger and anxiety and thus responded to stress as if it were hunger (i.e., an increase in eating under stress). Most recent studies have indicated that the effect of stress eating can be on a specific food item. This might include effects on more palatable or easily consumed foods (e.g., fast foods), foods with particular sensory or health characteristics (e.g., high-fat foods), or foods generally consumed between meals (e.g., snack foods) or at meals (Gibson, 2006). More effect of stress was noticed between meal consumption as compared to the food consumed during meals. The same can be because individuals have more control over snack foods in response to stress (Conner et al., 1999). Indeed several studies do show that the number of snacks consumed in response to stress. Conner et al. (1999) showed a linear relationship between the number of hassles experienced on a day and the number of snacks consumed the same day. Some stressors serve as essential moderators of eating behavior, whereas others have little or no effect (Conner & Armitage, 2002). Several researchers have found stressors of an ego-threatening nature (e.g., where there is a fear of failure) to have distinct effects from those that elicit physical fear (e.g., fear of an electric shock). It was noticed that potential ego threatening situations could lead to disinhibition (overeating) in restrained eaters or current dieters, whereas physically threatening situations will not.

Gender perspective in eating behaviour as a response to stress

Males and females depict different eating behaviors. They differ in food preferences, eating styles, and calorie intake. Women tend to intake fewer calories than men and are more concerned with their body weight and food choice (Glanz, et al., 1998). Women exhibit slowness in eating in comparison to men, this is because women take smaller bites thus increasing the interval rate and the number of bites (Hill & McCutcheon, 1984). Robertson et. al (2020) found that women reported more struggles with eating, preoccupation with food, and body image issues in comparison to men during the lockdown. Men respond to stress by reduced appetite whereas women are more susceptible to indulge in emotional eating (Clóvis et. al 2013). The number of meals and the time interval between the food consumption increased in women in response to stress in comparison to men (Laura, 2020).

METHODOLOGY

The current research was a correlational study that aimed to investigate the relationship between stress and dysfunctional eating behavior. The objectives of the research were to assess and compare gender differences of stress and dysfunctional eating behavior during the pandemic. To examine the gender differences of the interrelation of stress and dysfunctional eating behavior and to suggest an intervention module for the same.

Participants

The sample of the current study consisted of 50 participants. Among the sample of 50 participants, 25 were males, and 25 were females. The target population consisted of the Indian population between 20 to 40 years of age group and was a heterogeneous sample. The respondents in the target population were sampled by purposive sampling and snowball sampling. The confidentiality of the data was maintained.

Screening Tools

The study instrument comprised a structured questionnaire that inquired demographic information, including age, gender, city, occupational status and family type, perceived stress scale and adult eating behaviour questionnaire.

- 1. Perceived Stress Scale (PSS)-** The Perceived Stress Scale (PSS; Cohen, Kamarch, & Mermelstein, 1983) is a more popular tool for measuring psychological stress. It is a self-reported questionnaire designed to measure "the degree to which individuals appraise situations in their lives as stressful" (Cohen et al., 1983). The items in the PSS assess the degree to which individuals believe their life has been unpredictable, uncontrollable, and overloaded during the previous month. The assessed items are general in nature rather than focusing on specific events or experiences. The 10 item PSS version was used based on a 5 item Likert scale ranging from 0 (never) to 4 (Very often). The range of the total score is from 0 to 40. Cronbach's alpha of the PSS-10 was evaluated at $>.70$ (Eun-Hyung Lee).
- 2. Adult Eating Behavior Questionnaire (AEBQ)-** The AEBQ includes eight scales encompassing both food approach (Hunger, Food Responsiveness, Emotional Overeating and Enjoyment of Food) and avoidance appetitive traits (Satiety Responsiveness, Food Fussiness, Emotional Under-eating, and Slowness in Eating). It is a 35item scale based on a five Likert scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). AEBQ scales had good internal reliability (α : 0.76 – 0.88) and test-retest reliability (ICCs: 0.73 – 0.91) (Hunot et al., 2016).

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Procedure

The study aimed to investigate and compare the gender specific differences of interrelationship between stress and dysfunctional eating behavior in the COVID-19 pandemic. Purposive and snowball sampling was used to collect the data. All the participants voluntarily participated in the study after informing them of the purpose. The questionnaires and the informed consent were shared with the participants through email.

Data Analysis

Data was analysed with SPSS Version 22.0. An analysis of descriptive statistics was conducted to illustrate stress level and eating behavior. The mean and standard deviation was computed to measure the stress level and eating behavior among men and women. To compare the stress level and eating behavior between women and men an independent t-test with unequal variance was used. Pearson's correlation coefficient was used to measure the correlation between stress and eating behavior. A one-tailed $p < .05$ was considered statistically significant.

RESULTS

Table-1 Mean and Stand Deviation of stress level and eating behaviours

Measure	M	SD	N
Stress level	20.66	5.26	50
Enjoyment of Food	12.58	1.87	50
Emotional Overeating	12.68	4.55	50
Emotional Undereating	15.20	4.95	50
Food Responsiveness	11.24	2.59	50
Hunger	15.04	3.43	50
Satiety Responsiveness	10.94	2.79	50
Food Fussiness	11.32	3.98	50
Slowness in eating	11.12	3.60	50

Table-2 Independent t-test with unequal variance comparing the stress level between males and females.

Measure	Males			Females			t-crit	p
	N	M	SD	N	M	SD		
Stress level	25	19.04	4.89	25	22.24	5.23	2.01	0.03

Table-3 Independent t-test with unequal variance comparing the eating behaviour between males and females.

Measure	Males			Females			t-crit	p
	N	M	SD	N	M	SD		
EOF	25	12.2	1.87	25	12.96	1.83	2.01	0.15
EO	25	12.6	4.64	25	12.76	4.56	2.01	0.9
EU	25	15.12	4.91	25	15.28	5.08	2.01	0.91
FR	25	10.72	2.57	25	11.76	2.55	2.01	0.9
*HU	25	13.8	3.27	25	16.2	3.25	2.01	0.015
SR	25	10.52	2.29	25	11.36	3.21	2.01	0.29
FF	25	11.48	3.19	25	11.16	4.71	2.01	0.78
SE	25	10.56	3.40	25	11.68	3.77	2.01	0.27

EOF= Enjoyment of food, EO= Emotional overeating, EU= Emotional undereating, FR= Food responsiveness, HU= Hunger, SR= Satiety responsiveness, FF= Food Fussiness, SE= Slowness in eating.

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Table-4 Correlation between stress level and eating behaviour in males.

Measure	SL	EOF	EO	EU	FR	HU	SR	FF	SE
SL	1	-0.28	-0.45	-0.11	-0.11	-0.07*	0.05*	0.26*	-0.14
EOF	-0.28	1	0.43*	-0.27	0.52*	0.33*	-0.20	-0.42	-0.22
EO	-0.45	0.43*	1	-0.17	0.59*	0.16*	0.17*	-0.12	0.07*
EU	-0.11	-0.27	-0.17	1	0.06*	0.33*	0.63*	0.46*	0.40*
FR	-0.11	0.52*	0.59*	0.06*	1	0.56*	0.34*	-0.14	-0.66
HU	0.07*	0.33*	0.16*	0.33*	0.56*	1	0.48*	0.23*	0.08*
SR	0.05*	-0.20	0.17*	0.63*	0.34*	0.48*	1	0.25*	0.29*
FF	0.26*	-0.42	-0.12	0.46*	-0.14	0.23*	0.25*	1	0.38*
SE	-0.14	-0.22	0.07*	0.40*	-0.66	0.08*	0.29*	0.38*	1

SL= Stress level, EOF= Enjoyment of food, EO= Emotional overeating, EU= Emotional undereating, FR= Food responsiveness, HU= Hunger, SR= Satiety responsiveness, FF= Food Fussiness, SE= Slowness in eating.

* Correlation is significant at the 0.05 level (one tailed)

Table-5 Correlation between stress level and eating behaviour in females.

Measure	SL	EOF	EO	EU	FR	HU	SR	FF	SE
SL	1	-0.15	0.22*	0.24*	0.45*	0.30*	0.24*	0.42*	-0.04
EOF	-0.15	1	0.08*	-0.52	-0.02	0.30*	-0.57	-0.60	0.17*
EO	0.22*	0.08*	1	-0.02	0.28*	0.47*	0.01	-0.10	0.014
EU	0.24*	-0.52	-0.02	1	0.20*	0.06*	0.53*	0.43*	-0.11
FR	0.45*	-0.02	0.28*	0.20*	1	0.46*	0.30*	0.22*	0.42*
HU	0.30*	0.30*	0.47*	0.06*	0.46*	1	-0.11	-0.26	0.32*
SR	0.24*	-0.57	0.01	0.53*	0.30*	-0.11	1	0.41*	0.15*
FF	0.42*	-0.60	0.10	0.43*	0.22*	-0.26	0.41*	1	0.04
SE	-0.04	0.17*	0.014	-0.11	0.42*	0.32*	0.15*	0.04	1

SL= Stress level, EOF= Enjoyment of food, EO= Emotional overeating, EU= Emotional undereating, FR= Food responsiveness, HU= Hunger, SR= Satiety responsiveness, FF= Food Fussiness, SE= Slowness in eating.

** Correlation is significant at the 0.05 level (one tailed)

DISCUSSION

The pandemic has affected each of us differently and given a new dimension to our lifestyle. In this new normal, everyone is finding different ways to cope with these unprecedented times. In the initial phase of the lockdown, the social media platforms were flooded with new food recipes, diets, and fitness regimes. This current paper attempts to investigate and compare the gender-specific differences of interrelationship between stress and dysfunctional eating behavior in the COVID-19 pandemic. In this study, a structured questionnaire was administered to participants that consisted of demographic details, PSS and AEBQ. The results of the study revealed that a significant stress level was present among the participants ($M=20.66$, $SD=5.26$). The null hypothesis that stated there will be no significant gender differences in stress experience during the pandemic is rejected. There was a significant difference in stress level, $t(48)=2.01$, $p<0.01$, with females ($M=22.24$, $SD=5.23$) having a higher stress level than males ($M=19.04$, $SD=4.89$). This lines with the García (2020) study that stated women have a higher mean in anxiety, depression, and stress in comparison to men during the pandemic. The American Psychological report (2012) stated that females experience more stress than males. The pandemic stress and the environmental factors would have further elevated the stress level among females. The domestic violence cases against women rose to a hundred percent in the lockdown (National commission of women, India). Chauhan P. (2020) study revealed that the burden of unpaid work increased more on women in the pandemic in comparison to others. This extrapolates that the environmental factors along with the pandemic augmented the stress level among women.

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It can be inferred from results that hunger ($M=15.04$, $SD= 3.43$) and emotional undereating ($M=15.20$, $SD= 4.95$) dysfunctional eating behavior were highest among participants. It coincides with Renzo et.al (2020) study that stated participants reported a change in their Satiety/ hunger perception and appetite during a pandemic. The elevated hunger in the pandemic can be due to hedonic hunger, it is desire and preoccupation to eat for pleasure in the absence of energy deficit (Gramlich, 2010). This lines with the positive incentive theory of eating that individuals are motivated to eat not due to energy deficits but through anticipation of pleasure (Pinel, Assanand, & Lehman, 2000). The null hypothesis that stated there will be no significant gender differences in dysfunctional eating behavior (emotional overeating, emotional undereating, food responsiveness, hunger, and food fussiness) has been accepted. There is no significant difference in dysfunctional eating behavior between males and females..The dysfunctional eating behaviour in males was, emotional overeating ($M= 12.2$, $SD=4.64$), emotional undereating ($M=15.12$, $SD=4.91$), food responsiveness ($M=10.72$, $SD= 2.57$), Hunger ($M=13.8$, $SD=3.27$), and food fussiness ($M=11.48$, $SD=3.19$), whereas in females it was, emotional overeating ($M=12.76$, $SD= 4.56$), emotional undereating ($M=15.28$, $SD=5.08$), food responsiveness ($M=11.76$, $SD=2.55$), Hunger ($M=16.2$, $SD= 3.25$), and food fussiness ($M=11.16$, $SD= 4.71$). Though earlier research revealed that there is a difference in eating behavior between males and females, the present study did not find any significant difference between the dysfunctional eating behavior of males and females except for hunger. There is a possibility that there have been alterations in the eating behavior of males to adapt to the current pandemic situation. Brancaccio et. al (2021) reported that males showed more unfavorable behavioral changes and were more affected by isolation and quarantine in the pandemic.

The hypothesis that stated there will be a positive correlation between stress and dysfunctional eating behavior (emotional overeating, emotional undereating, food responsiveness, hunger, and food fussiness) has been accepted for females and rejected for males. The results show that in males stress and emotional overeating are strongly negatively correlated $r(23)= -0.45$, $p<0.05$, stress and emotional undereating are weakly negatively correlated $r(23)= -0.11$, $p<0.05$, stress and food responsiveness are weakly negatively correlated $r(23)= -0.11$, $p<0.05$, stress and hunger are weakly positively correlated $r(23)= 0.07$, $p<0.05$ and the stress and food fussiness are weakly positively correlated $r(23)= 0.26$, $p<0.05$ whereas for females it can be seen that stress and emotional overeating are weakly positively correlated $r(23)= 0.22$, $p<0.05$, stress and emotional undereating are weakly positively correlated $r(23)= 0.24$, $p<0.05$, stress and food responsiveness are strongly positively correlated $r(23)= 0.45$, $p<0.05$, stress and hunger are moderately positively correlated $r(23)= 0.30$, $p<0.05$ and stress and food fussiness are strongly positively correlated $r(23)= 0.42$, $p<0.05$. This lines up with Laura (2020) study that revealed the number of meals and the time interval between the food consumption increased in females in response to stress in comparison to males. The males resort to "fight or flight" in response to stressors and females use "tend and befriend" (Taylor 2000). Men use a more rational and detachment coping style to deal with stressors and show emotional inhibition whereas women use more emotional and avoidance coping styles to deal with stress (Matud, 2004). They differ in their food preferences in response to stress, men are more likely to indulge in alcohol whereas women indulge in comfort food (Galan, 2018). Women indulge in more emotional eating behavior as a function of their hormonal and menstrual phases (Klump, 2013).

The present research has attempted to propose an intervention module, suggesting an intervention to deal with stress and dysfunctional eating behavior.

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Target behaviour	Techniques and Strategy	Anticipated outcome
Stress level	Relaxation training-Diaphragmatic breathing and Progressive muscle relaxation, Mindfulness, Meditation	Improved healthy lifestyle and Enhancement in productivity.
Emotional Overeating	Mindful eating, Emotional eating journaling, Cognitive restructuring, Adequate coping resources, Strength and capacity building	Increase awareness of the food intake and less chance of indulgence in overeating
Emotional Undereating	Exercise, Body Scan Meditation, Identification of trigger, Awareness of emotional eating cycle, Psychoeducation, cognitive restructuring	Recognising the trigger behind the dysfunctional behaviour and increased metabolism.
Food Responsiveness	Response Prevention, Mindful eating	Perceiving the stressor and avoidance of the response
Hunger	Mindful food choices, Aware of difference between emotional hunger and physical hunger	Awareness of calories intake and healthy diet
Food Fussiness	Keeping a meal schedule, Meditation, Exploring food choices, Psychoeducation, Cognitive restructuring	Enhanced physical and mental health with less indulgence in high calorie food

The present study's strengths are that this study took into account eight constructs of eating behavior and investigated the gender differences between the stress level, dysfunctional eating behavior, and interrelationship between stress and dysfunctional eating behavior. The heterogeneous sample was taken and an intervention module has been proposed to cope with stress and dysfunctional eating behavior. On the other hand, there are some limitations as well associated with the present research, it was a self-report measurement, so participants may have given biased or socially desirable answers. In this research, food item preferences were not taken into account, which would have helped in a better understanding of their eating behavior.

The findings of the research imply that there are gender differences in the interrelationship between stress and dysfunctional eating behavior in males and females. Further research should be done so the generalizability of the findings could be improved through replication. The findings could help in the proposition of intervention strategies and psychological first aid for the general population and resilience can be developed to deal with unprecedented times like these.

CONCLUSION

The current study intended to investigate and compare the gender-specific differences of the interrelationship between stress and dysfunctional eating behavior in the COVID-19 pandemic. The findings of the study revealed a significant difference in stress level, $t(48)=2.01, p<0.01$, with females ($M=22.24, SD=5.23$) having a higher stress level than males ($M=19.04, SD=4.89$). There was no significant difference in dysfunctional eating behavior between males and females. The dysfunctional eating behaviour in males was, emotional overeating ($M= 12.2, SD=4.64$), emotional undereating ($M=15.12, SD=4.91$), food responsiveness ($M=10.72, SD= 2.57$), Hunger ($M=13.8, SD=3.27$), and food fussiness ($M=11.48, SD=3.19$), whereas in females it was, emotional overeating ($M=12.76, SD= 4.56$),

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emotional undereating ($M=15.28$, $SD=5.08$), food responsiveness ($M=11.76$, $SD=2.55$), Hunger ($M=16.2$, $SD= 3.25$), and food fussiness ($M=11.16$, $SD= 4.71$). There was a significant positive correlation between stress and dysfunctional eating behavior in females whereas in males there was no significant positive correlation between stress and dysfunctional eating behavior. The findings of the study show that in males stress and emotional overeating are strongly negatively correlated $r(23)= -0.45$, $p<0.05$, stress and emotional undereating are weakly negatively correlated $r(23)= -0.11$, $p<0.05$, stress and food responsiveness are weakly negatively correlated $r(23)= -0.11$, $p<0.05$, stress and hunger are weakly positively correlated $r(23)= 0.07$, $p<0.05$ and the stress and food fussiness are weakly positively correlated $r(23)= 0.26$, $p<0.05$ whereas for females it can be seen that stress and emotional overeating are weakly positively correlated $r(23)= 0.22$, $p<0.05$, stress and emotional undereating are weakly positively correlated $r(23)= 0.24$, $p<0.05$, stress and food responsiveness are strongly positively correlated $r(23)= 0.45$, $p<0.05$, stress and hunger are moderately positively correlated $r(23)= 0.30$, $p<0.05$ and stress and food fussiness are strongly positively correlated $r(23)= 0.42$, $p<0.05$. It is recommended that different intervention strategies and mental health programs should be proposed to help individuals cope with elevated stress levels and dysfunctional eating behavior in the COVID-19 pandemic.

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Conflict of Interest

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