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Acute stress disorder, generalized anxiety disorderand major depressive disorder during COVID-19 epidemic in India: online questionnaire-based cross-sectional survey

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Abstract
Background: *India has been severely affected by COVID-19 (Coronavirus Disease 2019) since March 2020.This study aimed to assess the population mental health burden during this epidemic and to explore the possible influencing factors.*
Methods: *Using online (Google forms) questionnaire-based cross-sectional survey, we collected data for 3 days from 9th April 2020 to 11th April 2020, from291volunteers from different cities and stratified them on the basis of their age, gender and occupational categories; Category(1) includes health care workers (doctors and nurses, technicians); Category(2) other front line workers like police, security guard, pharmacist and other essential services and Category (3) includes others, assessed their mental health and we also compared our city's that is Kurukshetra (Haryana) data by asking the same questionnaire to health care workers and others who witnessed the positive cases for COVID-19 in their respective cities. Questionnaire for acute stress reaction, GAD and depressive symptoms is based on The National Stressful Events Survey Acute Stress Disorder Short Scale (NSESSS), GAD-7 score and Patient Health Questionnaire-9 respectively.*
Result: *Of total sample analyzed, the overall prevalence of acute stress reaction, GAD and depressive symptoms were 1.37%, 11.34%, 42.61% respectively, out of which 187(64.26%) males having 13(6.95%) & 68(36.36%) GAD and depressive symptoms respectively without any stress reaction whereas 104(35.74%) females having 04(3.85%), 20(19.23%) &56(53.85%) acute stress reaction, GAD and depressive symptoms respectively, 224(76.98%) people aged<35years having 04(1.79%), 27(12.05%) & 103(45.98%) features of acute stress reaction, GAD and depressive symptoms respectively whereas 67(23.02%) people aged ≥35 years having 06(8.95%) & 21(31.34%) features of GAD and depressive symptoms without any stress reaction. People belong to Cat(1);123(42.27%), Cat(2);63(21.64%) and Cat(3);105(36.08%) having features of acute stress reaction, GAD and depressive symptoms 02(1.63%),15(12.20%) &46(37.39%) ; 00, 04(6.35%) & 23(36.50%); 02(1.91%),14(13.33%) & 55(52.38%) respectively. People belong to Kurukshetra 104(35.73%) and other cities 187(64.27%) having features of Acute stress reaction, GAD and depressive symptoms are 02(1.92%),03(2.88%),32(30.77%) & 02(1.07%),30(16.04%), 92(49.20%) respectively.*
Conclusions: *Our study explored the major mental health issues in public during COVID-19 epidemic in India. Health care workers and people who spent too much time on epidemic are at high risk for mental illness and people who witnessed positive cases in their respective cities are more prone for mental health issues than others which shows the impact of the ongoing epidemic. Continuous monitoring of the psychological outcomes for epidemic should be routinely assessed.*
Abbreviations- GAD (generalized anxiety disorder), Cat(Category).
Keywords: *Mental health, stress, anxiety, depressive symptoms, Corona virus infection.*

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I. Introduction

COVID-19, an acute respiratory illness caused by a novel Corona virus occurred in Wuhan (China) in the year December2019 [(1)]. On 11 March 2020 WHO declared novel Corona virus disease outbreak as a pandemic[(2)]. In India, the first case was reported in Kerala on 30th January 2020 who travelled from Wuhan ,after that cases were gradually increasing, as a result of that on 24th March 2020the Prime Minister of India announced a 21 day nationwide lockdown in order to prevent further spread of disease. COVID-19 has a serious impact on mental health besides physical illness. Because of this ongoing epidemic, front line workers are scared of getting infections from unknown flue cases and that too they transmit this infection to their families. Due to this sudden lockdown public showed anxiety-related behavior that they might catch an infection from

others and also they might short of grocery, vegetables, medicines, masks and sanitizers due to this sudden lockdown. As of 8 April 2020 according to the Ministry of Health and Family Welfare (MOHFW), a total of 5194 COVID-19 cases (including 70 foreign nationals) have been reported in 31 states/union territories. These include 401 who have been cured and 149 died. Hospital isolation of all confirmed cases, tracing and home quarantine of the contacts is ongoing[(3)].Therefore using an online based cross-sectional survey we aimed to assess the mental health burden of the population during this epidemic and to explore the potential influencing factors. We wish our study will provide data support for targeted interventions on psychological health in population during the epidemic.

II. Methods

In order to prevent further spread of infection, we collected data by online google forms and shared with them by Whatsapp. This cross-sectional survey was completely voluntary and non-commercial. We started our study on 9th April 2020 and collected data for 3 days, started from our own hospital that is Cygnus hospital, Kurukshetra (Haryana). Participants answered the questionnaires anonymously from 9th April to 11th April 2020. Finally we able to collect 291 participants in 3 days and assessed their answers for Acute stress reaction, GAD and depressive symptoms which were based on NSESSS (National Stressful Events Survey Acute Stress Disorder Short Scale), GAD-7 (Generalized Anxiety Disorder-7) and PHQ-9(Patient Health Questionnaire-9)respectively. For NSESSS we asked history for 1week, a 7 item measures that assess the severity of symptoms of acute stress disorder in individuals, each item on the measure is rated on 5 point scale (0=Not at all;1= A little bit;2= Moderately;3= Quite a bit; 4= Extremely), an average total score is calculated by dividing the raw total score by the number of items in the measure that is 7. For GAD-7, we took history for 2 weeks, a 7 item measures ,each item on the measure is rated on 4 point scale (0=Not at all;1= Several days; 2= More than half of days;3= Nearly Every day). For PHQ-9, we asked questions for past 2 weeks, a 9 item measure, each item on the measure is rated on 4 point scale (0=Not at all; 1= Several days; 2= More than half the days; 3=Nearly every day), with cut-off value $\geq$24, $\geq$10 and $\geq$5 respectively.

Demographic variables included gender (male or female), age, location and occupation. Occupation included three categories : (1) Health care workers like doctors, nurses and technicians,(2) Other front line workers like other hospital staff, security guards, police, pharmacist ,bankers ,shop keepers, milk suppliers and other important essential services and (3) includes others (not paying essential services). We compared our data from Kurukshetra (Haryana) with none positive COVID-19 patient vs other cites those facing COVID-19 patients in numbers and how it influences the mental health of individuals.

Statistical analysis

The prevalence of Acute Stress Reaction, GAD and Depressive symptoms stratified by gender, age, location and occupation were reported and Chi-square was used to compare the differences between groups. P-values of less than 0.05 were considered statistically significant. Software for statistical analysis was used SPSS ver. 24.

III. Results

Table 1 depicts the sample size of 291, out of which 187(64.26%) were males and 104(35.74%) females, aged from 15 to 70. Among these participants,123 (42.27%) belong to Cat 1, 63 (21.64%) belong to Cat 2 and 105 (36.08%) Cat 3. 104 (35.73%) participants are from Kurukshetra itself and rest 187 (64.27%) from other cities.

Variables	**N(%)**
Total	**291**
Gender	
Male	187 (64.26%)
Female	104 (35.74%)
Age	
<35 years	224 (76.98%)
$\geq$35 years	67(23.02%)
Occupation	
Cat1	123 (42.27%)
Cat2	63 (21.64%)
Cat3	105 (36.08%)

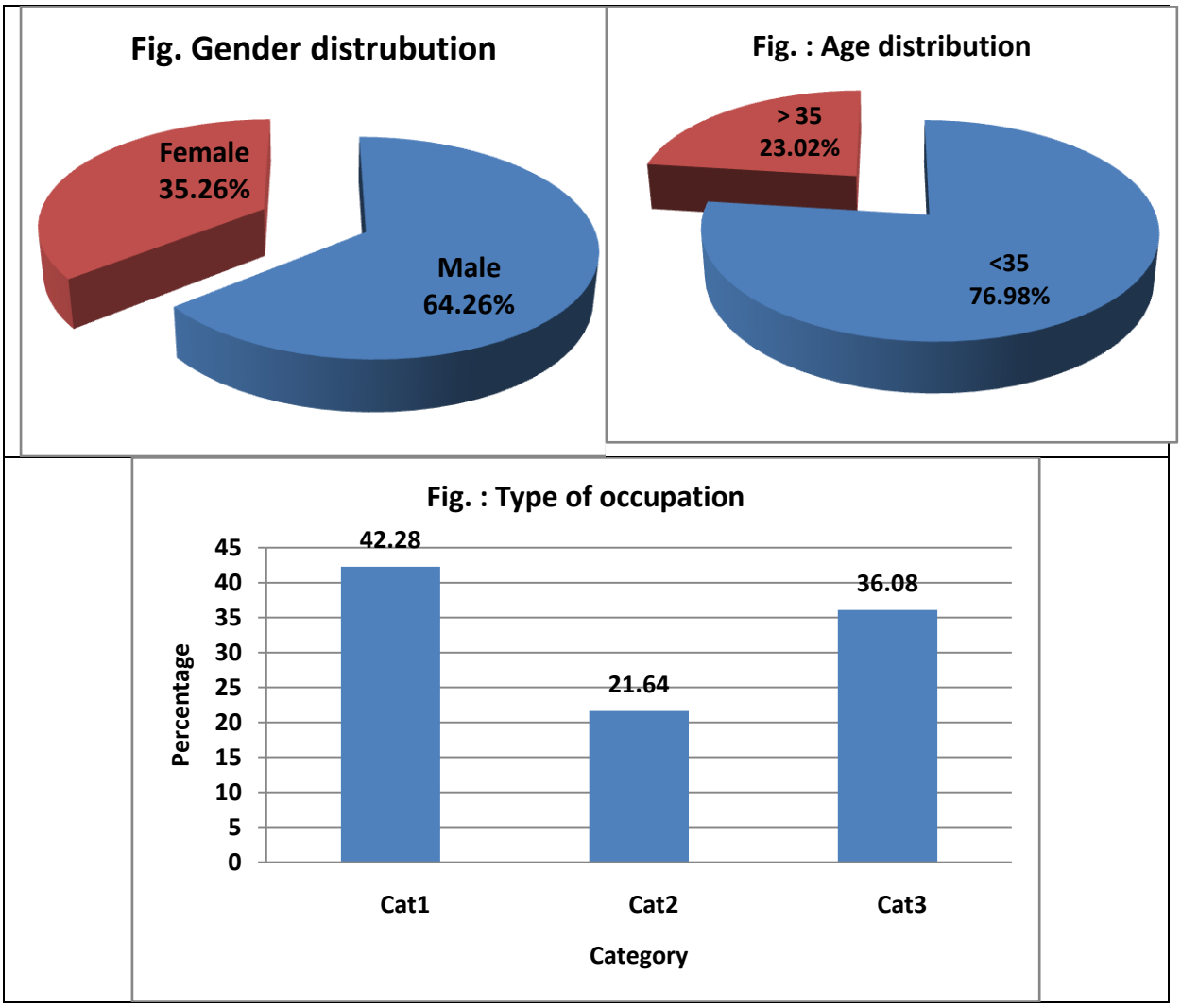


Table 2 depict prevalence of acute stress reaction, GAD and depressive symptoms during COVID-19 epidemic in Indian population stratified by gender (N=291).

Variables	Total(n=291 N(%)	Male(n=187) N(64.26%)	Female(n=104) N(35.74%)	Chi square	P-value
Acute stress reaction					
No	287(98.63%)	187(100%)	100(96.15%)	4.73	0.02
Yes	04(1.37%)	00	**04(3.85%)**		
GAD					
No	258(88.66%)	174(93.05%)	84(80.77%)	8.83	0.003
Yes	33(11.34%)	13(6.95%)	**20(19.23%)**		
Depressive symptoms					
No	167(57.39%)	119(63.64%)	48(46.15%)	7.65	0.005
Yes	124(42.61%)	68(36.36%)	56**(53.85%)**		

As per above findings, females having more prevalence of acute stress reaction, GAD and depressive symptoms during epidemic which is statistically significant.

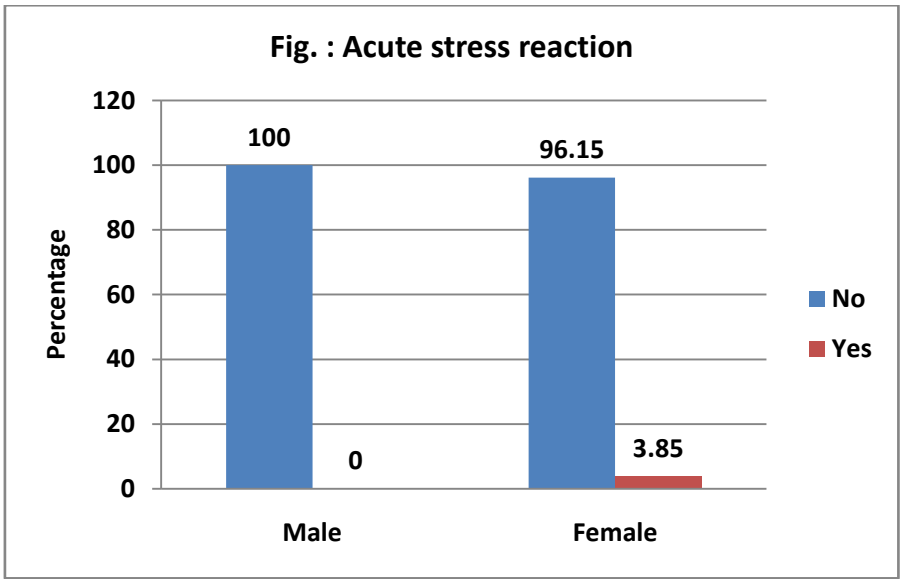


Fig. : Acute stress reaction
120
100
80
60
40
20
0
Percentage
100
0
96.15
3.85
Male
Female
No
Yes

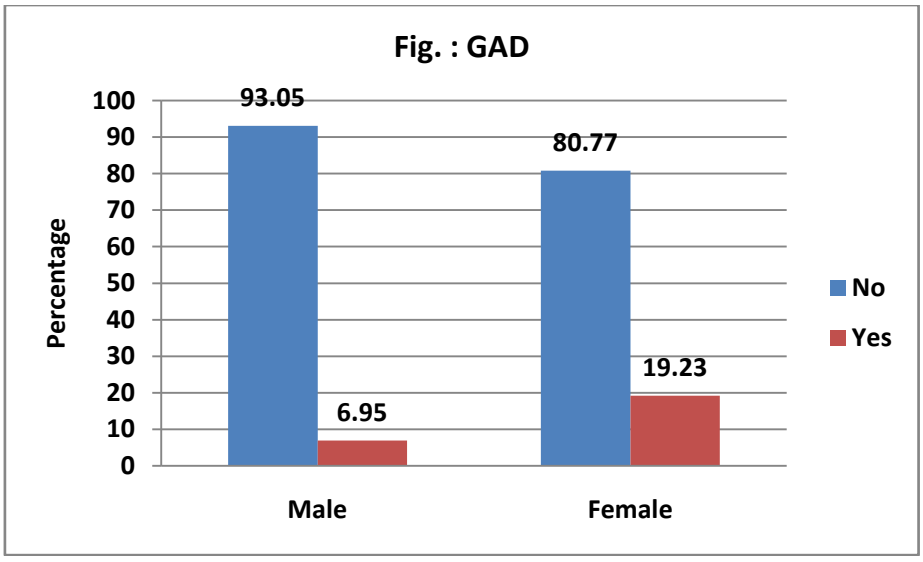


Fig. : GAD
100
90
80
70
60
50
40
30
20
10
0
Percentage
93.05
6.95
80.77
19.23
Male
Female
No
Yes

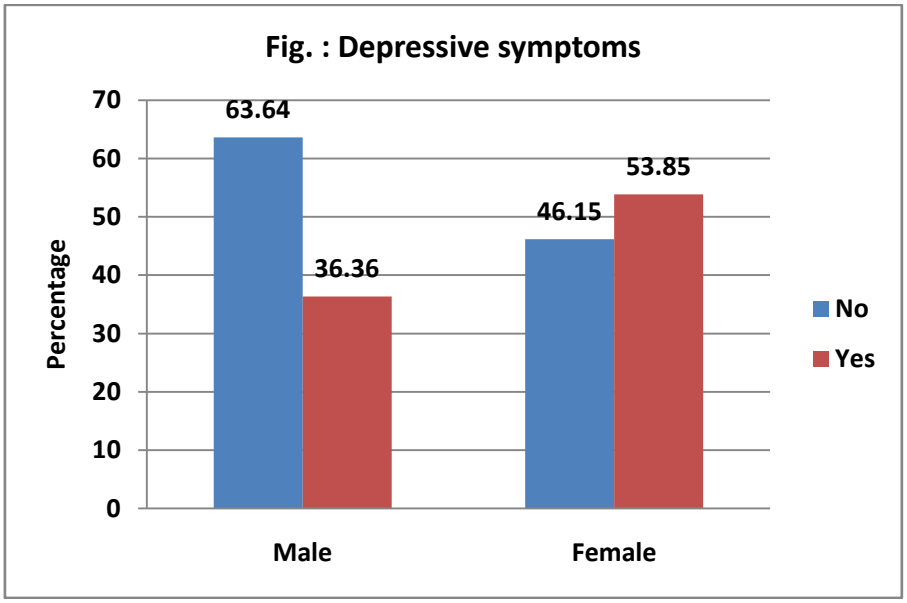
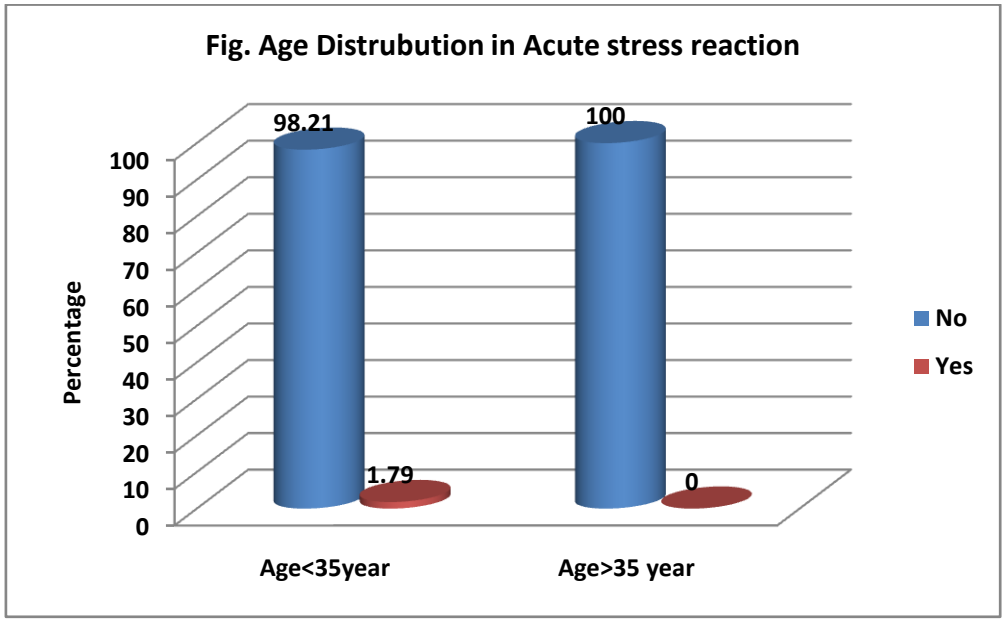


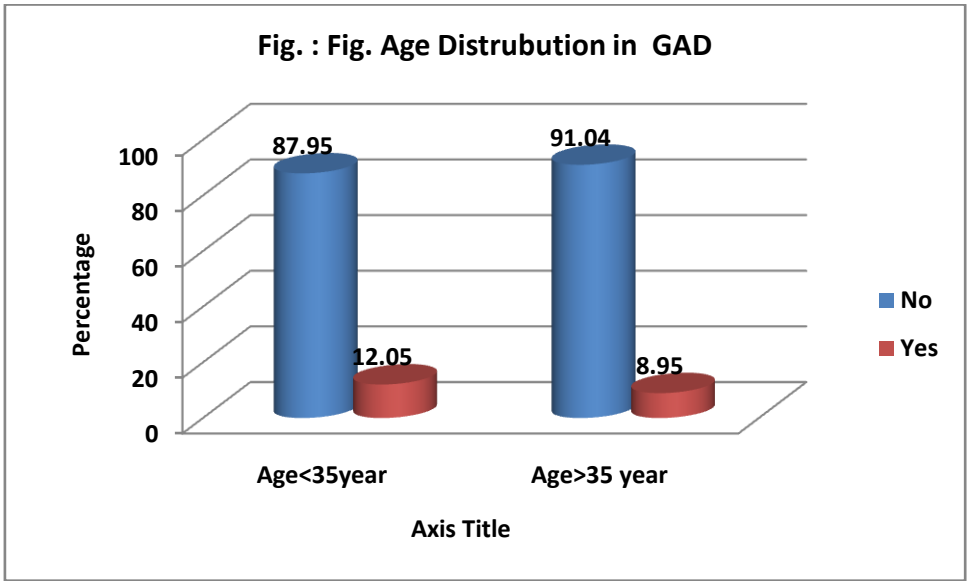
Fig. : Depressive symptoms
70
60
50
40
30
20
10
0
Percentage
63.64
36.36
46.15
53.85
Male
Female
No
Yes

Table 3 depict prevalence of Acute stress reaction, GAD and depressive symptoms during COVID-19 epidemic in Indian population stratified by occupation(N=291).

Variables	Total (N=291)	Age<35year (N=224) N(76.98%)	Age≥35 year(N=67) N(23.02%)	Chi square	P-value
Acute stress reaction					
No	287(98.63%)	220 (98.21%)	67(100%)		
Yes	04(1.37%)	**04(1.79%)**	00	0.253	0.614
GAD					
No	258(88.66%)	197(87.95%)	61(91.04%)		
Yes	33(11.34%)	**27 (12.05%)**	06 (8.95%)	0.232	0.629
Depressive symptoms					
No	167(57.39%)	121(54.02%)	46(68.66%)		
Yes	124(42.61%)	**103(45.98%)**	21(31.34%)	3.94	0.047

As per above findings, prevalence of acute stress reaction, GAD and depressive symptoms are higher in younger age group(<35years), only prevalence of depressive symptoms in individuals aged <35 years and >35years found statistically significant.





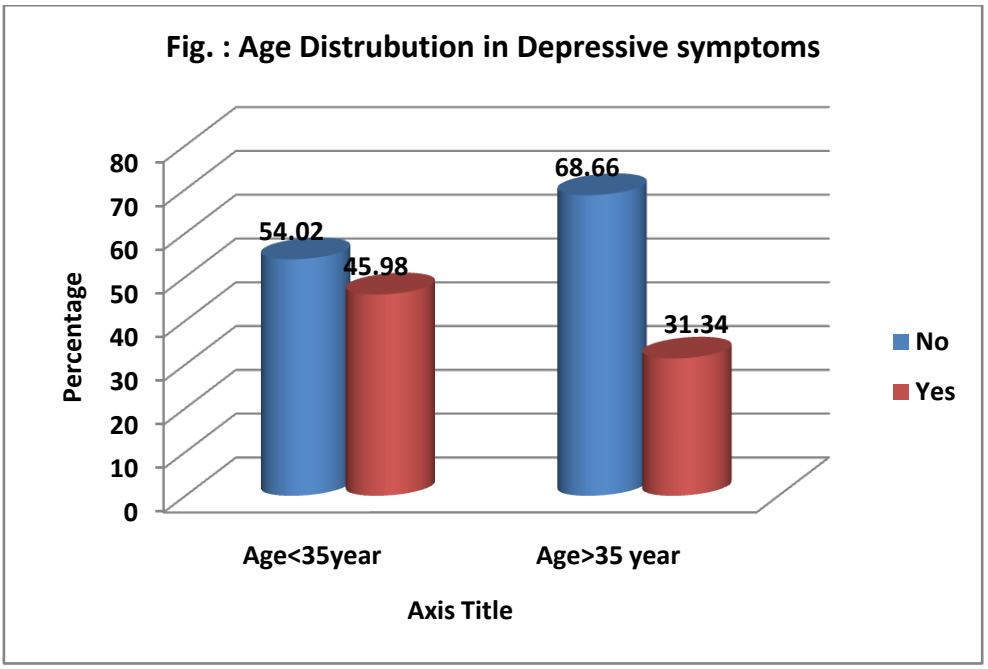
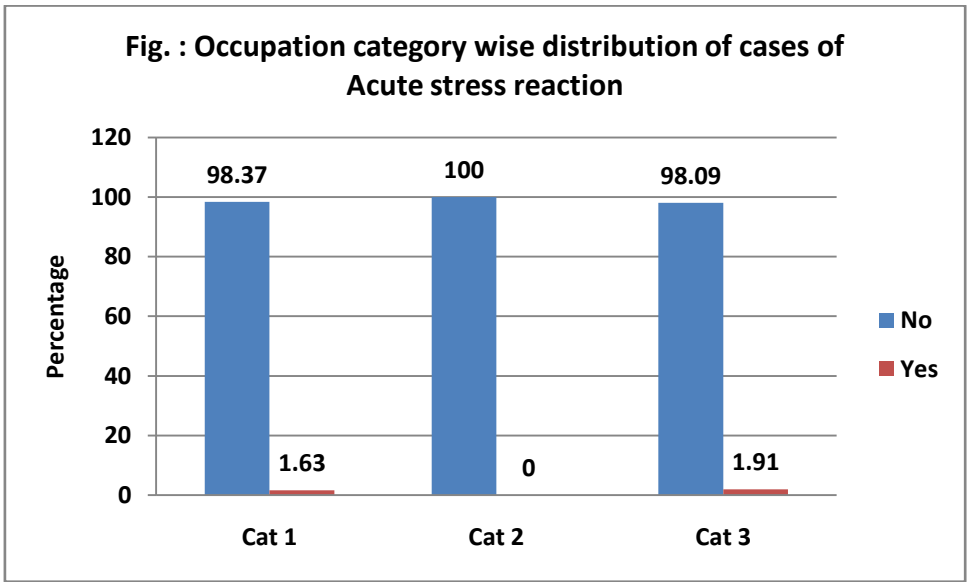
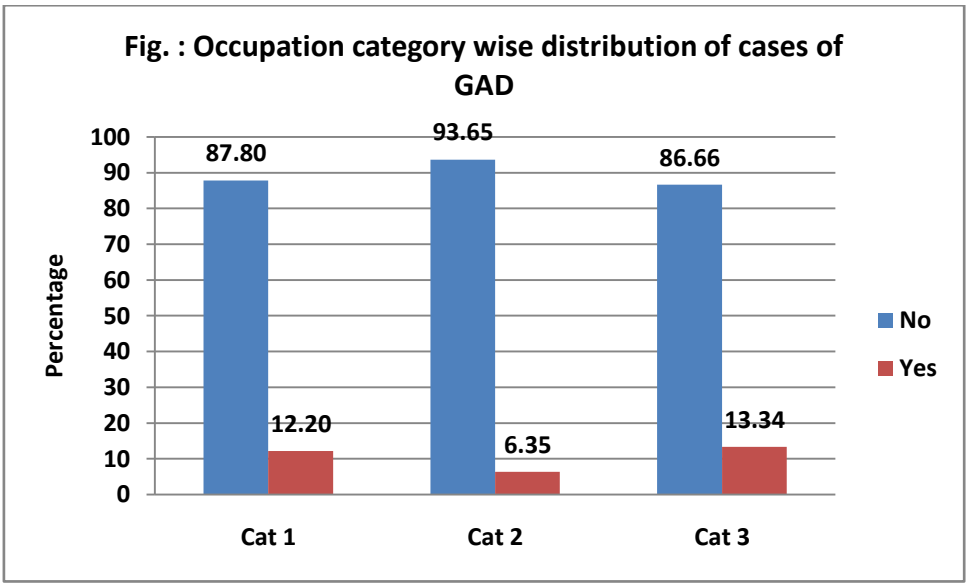


Table 4 depict prevalence of acute stress reaction,GAD and depressive symptoms during COVID-19 epidemic in Indian population stratified by occupation(n=291).

Variables	Total(n=291) N(%)	Cat1(n=123) N(42.27%)	Cat2(n=63) N(21.64%)	Cat3(n=105) N(36.08%)	Chi square	P-value
Acute stress reaction						
No	287(98.63%)	121(98.37%)	63(100%)	103(98.09%)	1.153	0.561
Yes	04(1.37%)	02(1.63%)	00	**02(1.91%)**		
GAD						
No	258(98.66%)	108(87.89%)	59(93.65%)	91(86.66%)	2.065	0.356
Yes	33(11.34%)	15(12.20%)	04(6.35%)	**14(13.33%)**		
Depressive symptoms						
No	167(57.39%)	77(62.60%)	40(63.49%)	50(47.62%)	6.425	0.040
Yes	124(42.61%)	46(37.39%)	23(36.50%)	**55(52.38%)**		

As per above data, there is high prevalence of acute stress reaction, GAD and depressive symptoms in individuals of category 3 than other categories but only prevalence of depressive symptoms among all categories found statistically significant.





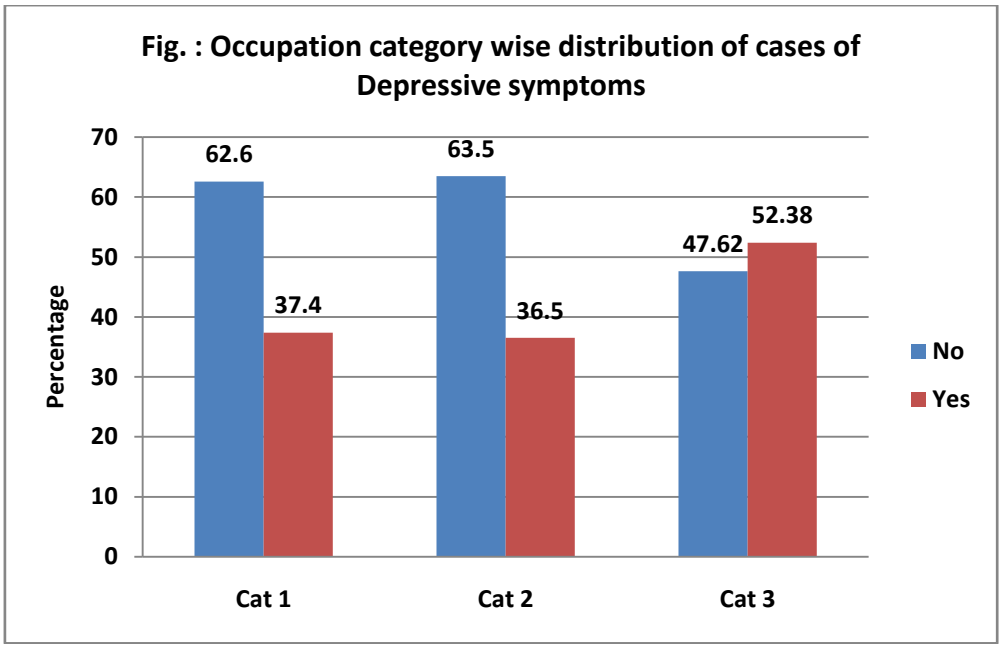


Table 5 depict prevalence of acute stress reaction, GAD and depressive symptoms during COVID-19 epidemic in Indian population stratified by location(N=291)

Variables	Total (N=291)n(%)	Kurukshetra (N=104) N(35.73%)	Other cities(N=187) N(64.27%)	Chi square	P-value
Acute stress reaction					
No	287(98.63%)	102(98.07%)	185(98.93%)	0.005	0.941
Yes	04(1.37%)	**02(1.92%)**	02(1.07%)		
GAD					
No	258(98.66%)	101(97.11%)	157(83.96%)	10.237	0.001
Yes	33(11.34%)	03(2.88%)	**30(16.04%)**		
Depressive symptoms					
No	167(57.39%)	72(69.23%)	95(50.80%)	8.543	0.003
Yes	124(42.61%)	32(30.77%)	**92(49.20%)**		

As per above findings, prevalence of acute stress reaction higher in Kurukshetra city than other cities but there is far difference in prevalence of GAD and depressive symptoms in population of other cities which two are also statistically significant.

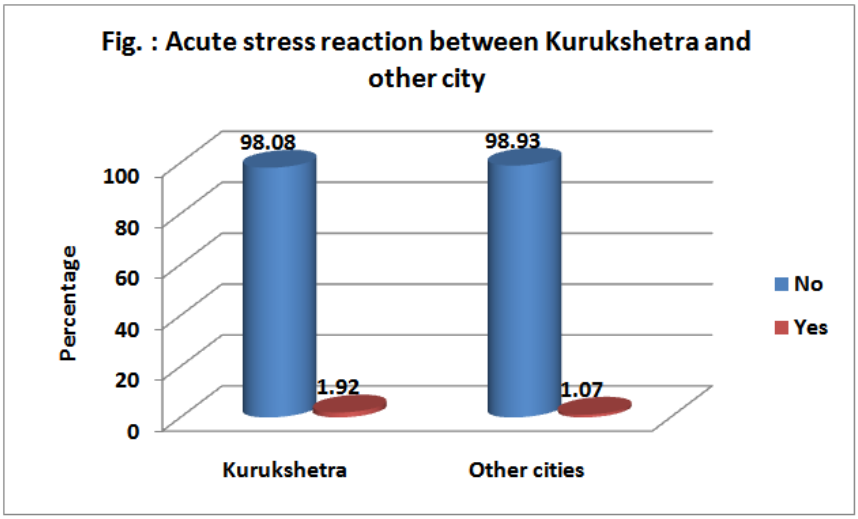


Fig. : Acute stress reaction between Kurukshetra and other city
98.08
98.93
1.92
1.07
100
80
60
40
20
0
Percentage
Kurukshetra
Other cities
No
Yes

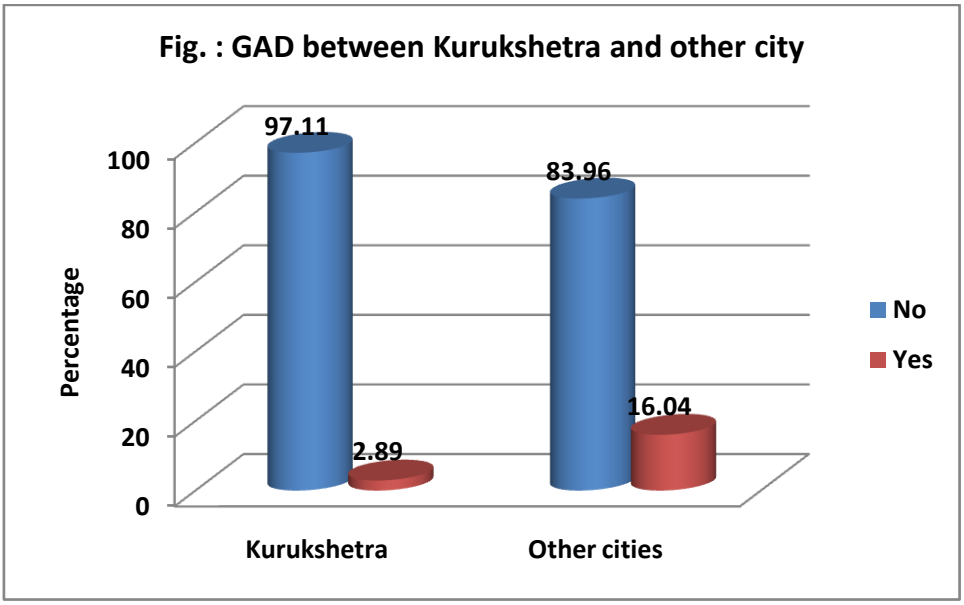


Fig. : GAD between Kurukshetra and other city
97.11
83.96
2.89
16.04
100
80
60
40
20
0
Percentage
Kurukshetra
Other cities
No
Yes

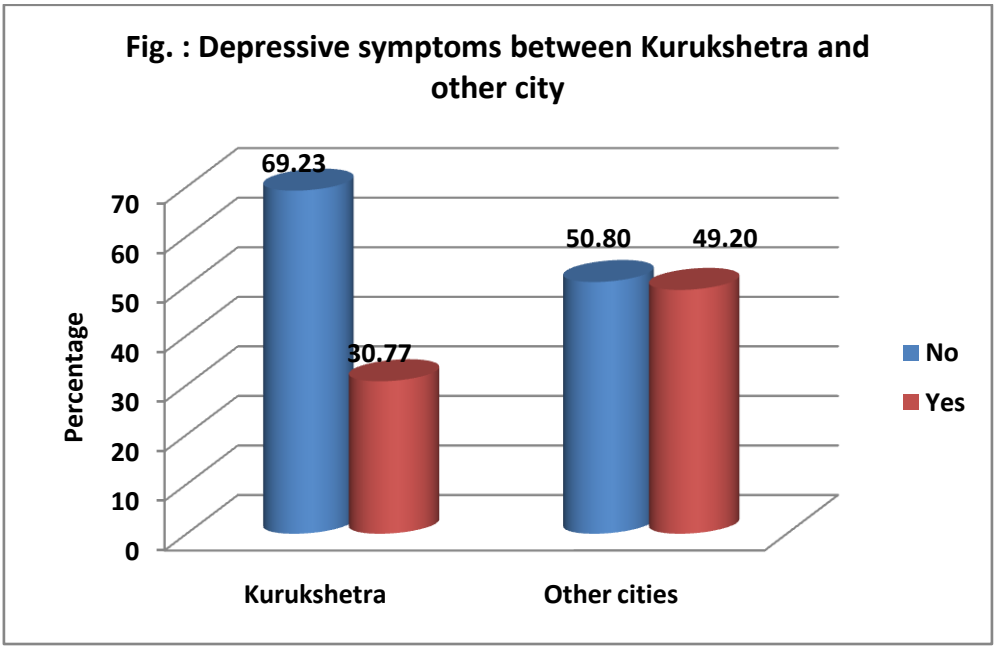
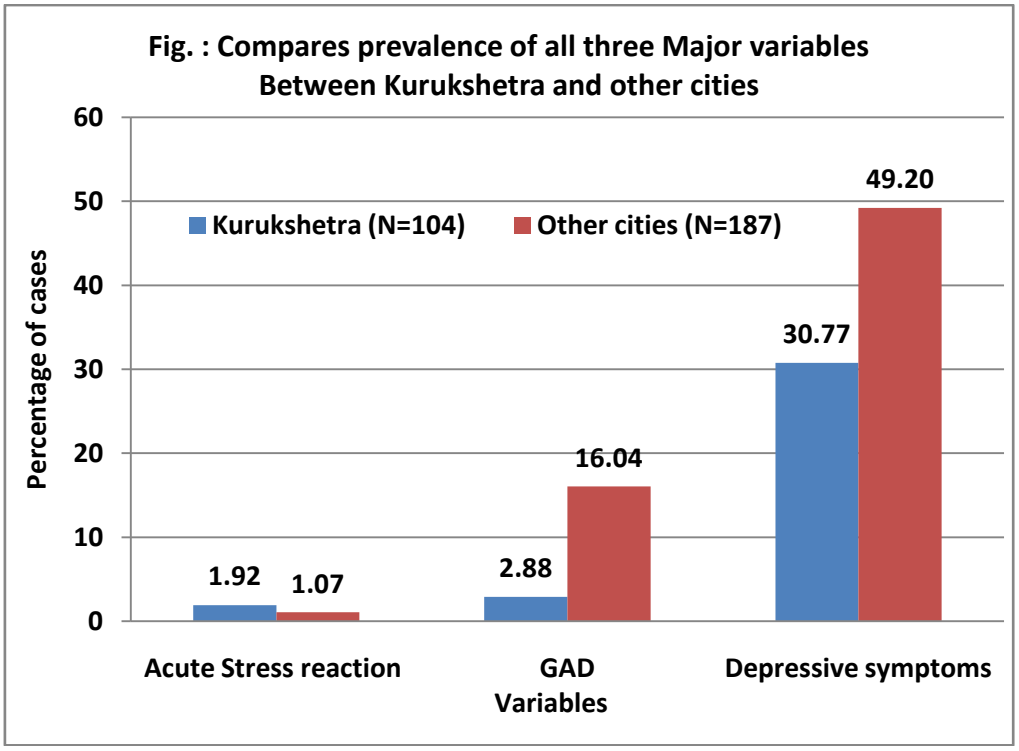


Fig. : Depressive symptoms between Kurukshetra and other city
69.23
50.80
49.20
30.77
70
60
50
40
30
20
10
0
Percentage
Kurukshetra
Other cities
No
Yes

Table 6 compares prevalence of acute stress reaction, GAD and depressive symptoms of people from Kurukshetra with people from other cities.

Variables	Kurukshetra(N=104)	Other cities(N=187)	P value	95% C.I.
Acute Stress reaction	1.92%	1.07%	0.552	-2.228% to 5.729%
GAD	2.88%	16.04%	0.0007	6.198% to 19.390%
Depressive symptoms	30.77%	49.20%	0.002	6.645% to 29.171%



IV. Discussion

Our study shows a high prevalence of an Acute stress reaction, GAD and depressive symptoms in the Indian population during COVID-19 epidemic. Nearly one in 5 participants had depressive symptoms and anxiety like problems, indicating that the uncertainty of epidemic progression would cause greater psychological pressure on the public and feared that the epidemic is hard to control. As per our study, psychological problems are more common in younger age group (<35years),which is **comparable** with other study[(4)].Our findings showed that prevalence of acute stress reaction, GAD and depressive symptoms are more common in people belong to category(3) which came opposite to what we had seen in other study[(4)],possibly they spent more time on collecting information on epidemic due to lockdown or having pre-existing mental illness. Fortunately,the Indian government has taken many strong measures in order to prevent further spread of the disease including nationwide lockdown, social distancing, pushing everyone to wear masks and take all sanitization measures. WHO-India has been working closely with MOHFW on preparedness and response measures for COVID-19, including surveillance and contact tracing ,laboratory diagnosis ,risk communications and community engagement ,hospital preparedness ,infection prevention, control and implementation of containment plan[(3)].Through our study we came to know that some cases going through severe depression and anxiety behavior with score more than 25 and 20 respectively, including health care worker and people from Cat 3. We advised them to take medical help so that they would not endanger their lives, and also advise rest those having high score to spend less time on epidemic related information and rather should do creative and self enlightening work so that they can distract themselves. Since when we started our study there were no single case of COVID-19 in our city Kurukshetra than other cities, so prevalence of psychological burden are significantly higher in people of other cities, this shows the impact of epidemic. This study has few limitations ,firstly it was a cross-sectional study, difficult to make causal inferences ,secondly due to sudden outbreak we were unable to assess an individual's psychiatric conditions before the outbreak and thirdly the small sample size may limit the generalization of the results.

V. Conclusion

In conclusion we identified a major mental health burden of the public during COVID-19 epidemic, people who spent too much time on gathering epidemic related information and health care workers are at a

higher risk of acquiring psychological issues. Thus, ongoing monitoring of psychological consequences for the outbreaks of epidemic potential life threatening diseases, demanding early targeted mental health interventions and should be routinely assessed.

Acknowledgement

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