ORIGINAL RESEARCH ARTICLE
pISSN 0976 3325 | eISSN 2229 6816
Open Access Article
www.njcmindia.org
DOI: 10.5455/njcm.20201118084229

# A Study of Psychological Impact of Recent Natural Disaster 'Nisarg' and Socio-Economic Factors Associated with It on People in Coastal Maharashtra

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**Financial Support:** None declared
**Conflict of Interest:** None declared


**How to cite this article:**
Jage P, Sangamnerkar S, Raje SS. A Study of Psychological Impact of Recent Natural Disaster 'Nisarg' and Socio Economic Factors Associated With It on People in Coastal Maharashtra. Natl J Community Med 2020; 11(11): 421-425

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**Date of Submission:** 19-11-2020
**Date of Acceptance:** 27-11-2020
**Date of Publication:** 30-11-2020

## ABSTRACT

**Background:** Natural disasters are known to have prolonged psychological impact on the people who face them. In India where 60% of population depends on agriculture, such natural calamities cause great psychological stress along with economic loss. Identifying the factors associated with psychological morbidities will help in planning preventive measures to mitigate the burden of disease in such disaster-prone areas.

**Objectives:** To assess prevalence of psychological stress, depression and anxiety among the individuals who faced 'Nisarga' cyclone and the socio-economic factors associated with it.

**Methods:** A cross sectional study was done among the people of costal Maharashtra 2 months after severe cyclone Nisarga had hit the area. Data was collected using a structured questionnaire from a stratified random sample of people from various occupations. Data was analysed using SPSS 26 software.

**Result:** It was observed that 75% of the study samples were extreme cases of anxiety, almost 60% had extremely severe depression and nearly half of the population had extremely severe stress Age severity of problem and financial loss were significantly associated with severity of depression anxiety and stress. In addition, Severity of Depression was associated with Gender, and severity of stress was significantly associated with type of family.

**Conclusion:** Quick assessment of economic damage and rehabilitation will help in reducing severity of psychological depression, anxiety and stress among people facing natural disaster.

**Key words:** Stress, Depression, anxiety, Natural Disaster

## INTRODUCTION

Natural disasters are inexorable. Although humans have evolved in a way to adapt and co-exist with these natural calamities, yet, they are vulnerable to the problems caused. Globally there's an alarming concern because of the increasing frequency of natural disasters. It is estimated that by 2050, one billion people will have to migrate because of the same.[1] Major Natural Disasters which India encounters are floods, cyclones, earthquakes and droughts. Other less common ones are landslides, forest fires, etc.[2]

India's coastline measures about 7000 kilometers and is susceptible to rise in the sea levels.[3] The Bay of Bengal and the Arabian Sea together are responsible for 7% of cyclones occurring around the globe.[4] Areas which are mostly affected by the tropical cyclones in India are Andhra Pradesh, Andaman and Nicobar Islands, Gujarat and Lakshadweep[5].

Such cyclones were less known in coastal Maharashtra which has a history with higher incidences of droughts, floods and earthquakes than cyclones. Nisarga a Category-1 tropical cyclone made land-

fall in Alibag (Western coast, Maharashtra) on 3rd June, 2020 with a speed of 102 km/h. It was categorized as a severe cyclonic storm on IMD scale and under SSHWS as. It caused 6 fatalities and an estimated economic loss of 665$ USD. It was the first cyclone to hit Mumbai after Cyclone Phyan, 2009. In India where 60% of population depends on agriculture, such natural calamities cause great psychological stress along with economic loss.[5]

According to WHO, disaster management can be studied by assessing the psychological and socio-economic coping mechanisms which a community exhibits to acclimatize with the conditions.[6] Though impact of drought, floods and earthquakes has been widely studied, only few have studied impact of cyclone specially in Maharashtra. Present study aims to assess the psychological and socio-economic impact of the natural disaster 'Nisarga' cyclone so as to improve the disaster resilience outlook for future natural calamities.

## AIMS AND OBJECTIVES

To assess prevalence of psychological stress, depression and anxiety among the individuals who faced 'Nisarg' cyclone and the socio-economic factors associated with it.

## MATERIALS AND METHODS

A cross-sectional study was carried out in and around Alibag taluka of coastal Maharashtra, India, among permanent of the area. Data collection was done using pre-structured questionnaire during august and September 2020 i.e. two months after the cyclone had hit the area. The questionnaire was validated with the help of local authorities to cover maximum factors which could be associated with psychological impact on the study population. DASS 21 questionnaire was used to assess prevalence of depression, anxiety and stress. Stratified random sampling based on census data of Alibag district with respect to occupation was used to ensure representation of all the economic classes. Data collection was done using on line forms where ever possible or by telephonic interviews due to limitations of social distancing due to COVID pandemic. Data was analysed using SPSS 26 software.

## RESULTS

Representatives of 580 households in costal part of Maharashtra participated in the study. There were 187 females and 393 males in the age group 16yr to 78 yr. Maximum 276 (47.6%) people were from Alibag which was worst hit area of Nisarg Cyclone. Geographical distribution of Study population is shown in fig 1.

**Socio economic variables:**

Most of the people were involved in multiple occupations as farming and service, or farming and business. The population was distributed normally with respect to income with maximum participants have annual income rs 100000-rs 300000. Only31 families had monthly family income less than Rs10000. Similarly only 31 families had family income more than Rs 12,00,000.

Comparing distribution of monthly family income and extent of loss, it can be concluded that extent of financial loss was more than annual family income. Only ten percent participants reported no financial loss, while 45% reported that their loss ranged from Rs 25000 to Rs 50000.

**Problems Faced**: Type of problems reported in the area included severe problems like Damage to infrastructure, Loss of crops, loss of permanent as well as immediate income, loss of assets and Death. The temporary problems reported were loss of electricity, water shortage, network problem, injuries, loss of vehicle and shortage of labor for restoration of infrastructure. Most of the study population reported more than one problem. Thus, a scoring system was developed to categorize the loss. Out of the 11 types of problems reported weightage of 2 was given to more severe problem like death, loss of crop, loss of income, loss of assets and damage to infrastructure, weightage of 1 was given to other problems. Thus, the total score of problems ranged from 0 to 16. While 5 families reported no loss, there was one family which reported all losses thus scoring 16. The problem scores thus obtained were further arbitrarily classified as follows <5 was termed as mild, 5-6 were categorized as moderate, 7-9 were categorized as severe and>9 were categorized as very severe. Accordingly, 39% people faced mild problems, 26% faced moderate problems, while 21% people faced severe problems. And 14% of study population reported very severe problems.

Distribution of population with also seen with reference to type of economic loss. It was observed that almost 59 % of the population reported damage of infrastructure as their major problem. Loss of permanent income was reported by 12% study population and 29% people reported temporary loss of income.

**Prevalence of depression anxiety and stress** as reported using DASS 21 scale is shown in fig 2. It was observed that three forth of the study sample was extreme cases of anxiety, almost 60% had extremely severe depression and nearly half of the population had extremely severe stress.

**Table 1: Association of severity of depression, stress and anxiety with respect to socio economic variables and type and severity of problems faced**

| Variable | Depression $\chi^2$ (p) | Anxiety $\chi^2$ (p) | Stress $\chi^2$ (p) |
|---|---|---|---|
| Gender | 18.0 (0.021)* | 10.248 (0.248) | 4.583 (0.801) |
| Age group | 65.479 (0.001) ** | 58.085 (0.001) ** | 78.755 (0.001) ** |
| Type of family | 7.177 (0.127) | 4.132 (0.388) | 14.805 (0.005)* |
| Problem Type | 14.803 (0.063) | 9.872 (0.274) | 12.192 (0.143) |
| Severity of Problem | 34.441 (0.001)** | 31.396 (0.002)* | 35.638 (0.001)* |
| Financial loss | 112.9 (0.001) ** | 119.65 (0.001)** | 123.73(0.001)** |

On the other hand, out of total study population only 10.7% were not depressed only7.6% were not anxious and 17.4% did not have stress.

Further analysis was done to find association of severity of depression, stress and anxiety with respect to socio economic variables and type and severity of problems faced (Table 1).

Association of severity of depression, stress and anxiety with Gender: It was observed that percentage of normal women with respect to depression was 13.9% in females which was more as compared to normal men 9.2%, however, the difference was not significant. On the other hand, percentage of severe cases of depression was comparable in females (58.3%) and in males (60.6%). Overall distribution of severity of depression differed with respect to gender and the difference was statistically significant (p<0.021). However, severity of anxiety and stress did not differ with respect to gender

**Association of severity of depression, stress and anxiety with Age:**

Average Age of the study participants was 39.12 yr ±13.9 yr. For further analysis participants were grouped as < 20 yr, 20 yr- 30 yr, 30 yr – 40 yr, 40 yr -50 yr and more than 50 Yrs. It was observed that maximum cases of severe depression were in middle age group which is 30yr- 40 yr. As compared to this prevalence of severe cases of depression were between 52% - 59%. Similarly, prevalence of normal cases of depression were more 16.5% in those who were less than 30 yr of age as compared to those who were above the age of 30yrs. The distribution of severity of depression was statistically significant with respect to age (p<0.001). Similarly, Prevalence of severe cases of anxiety was 81.4 % among those who were above the age of 30yrs as compared to Thus the distribution of severity of anxiety was statistically significant with respect to age (p<0.001).

**Association of severity of depression, stress and anxiety with Type of Family:** Prevalence of extremely severe cases of depression was more (66.2%) in joint families as compared that in nuclear families (56.2%), however the difference was not statistically significant. Similarly, distribution of severity of anxiety did not differ significantly with respect to type of family. As against this prevalence of extremely severe cases of stress was more (57.1%) in joint families as compared that in nuclear families (43.3%), and the difference was statistically significant (p = 0.005).

**Association of severity of depression, stress and anxiety with type of problem faced:** Extremely severe cases of depression were more in people who faced infrastructure damage (62.7%) as compared to those who faced immediate loss of income (57.45) or permanent loss of income (51.4%). As against this percentage of those who were normal with respect to depression were less in those who had immediate loss of income (7.1%) as compared to other two categories. However, the difference was not statistically significant. Similarly, extremely severe cases of stress were more in people who had loss of infrastructure (50.4%) as compared to those who had immediate loss of income (47.9%) or permanent loss of income (38.6%). However, the distribution of severity of stress was not statistically significant with respect to type of problem faces. Severity of anxiety did not differ significantly with respect to type of problem faced.

**Association of severity of depression, stress and anxiety with severity of problems faced:** It was observed that percentage of extremely severe cases of depression increased from 52.4% to 71.1% when severity of problems increased from mild to extremely severe. On the other hand, percentage of normal people with respect to depression was 16.7% in people who had mild problems as compared to 6.6% to 7.2% in other categories of severity of problem. similarly, extremely severe cases of anxiety were 66.1% in people having mild problems as compared to around 80% in other population, while people who were normal with respect to anxiety were 10% more (13.7%) in people with mild category of problems as compared to other population (4%). Gradual increase in extreme cases of stress was also noted with increase in severity of problems. Overall significant statistical associations were seen between severity of problems and severity of depression, anxiety and stress.

**Association of severity of depression, stress and anxiety with extent of financial loss**: It was observed that percentage of people having extreme depression were three times more (73.7%) in people who had loss of Rs 50.000 to Rs 10,00,000 as compared to those who had reported no loss (26.9%). Similarly that percentage of people having extreme anxiety was more than double (90.8%) in people who had loss of Rs 50.000 to Rs 10,00,000 as compared to those who had reported no loss (40.3%) and percentage of people having extreme stress was more than double (57.3%) in people who had loss of Rs 50.000 to Rs 10,00,000 as compared to those who had reported no loss (17.9%). Overall significant statistical associations were seen between extent of financial loss and severity of depression, anxiety and stress.

## DISCUSSION

Disasters are events that challenge the individual's ability to adapt. Several studies, in recent times, have underlined adverse public mental health outcomes of natural disasters for the suffering communities. Most commonly observed psychological symptoms after the disaster and other traumatic experiences are Emotional instability, stress reactions, anxiety, and trauma. [7]

Sharp increases in the prevalence of mental health symptoms ranging from 5.8% to 54.0% have been reported following various disasters.[8] However present study has reported very high prevalence of depression, anxiety and stress. Starac et al have reported that being hit by a combination of two major negative events might have a significantly increased negative effect on psychological health. They have also noted that the higher repercussion observed is not only attributable to the occurrence of a natural disaster but can be reasonably related to the additional effect of unemployment on psychological dimensions.[9] The situation is comparable to the present study as along with the cyclone Nisarga the population also faced major economic setback due to COVID 19 pandemic.

A number of reports also suggest that factors including age, extent of damages, time taken to return to normal life, ineffectiveness of help received are associated with the psychological impacts of disasters.[10] For Example EYYChan reported that men had a higher prevalence of depression, anxiety and somatic symptoms compared to women after natural disaster[11]. Similarly, poor health related quality of life of older adults was dependent on age as per a study done in Nepal[12]. Present study support these findings as severity of depression, anxiety and stress were significantly associated with age and gender, with less severe cases more prevalent among women as compared to that in men. Association of gender and anxiety and stress was not seen in the present study.

Disasters in developing countries and those associated with substantial community destruction may lead to worst psychological outcomes. Loss of farmland or agricultural work may be an indirect but distinct cause for distress among rural populations. loss of farmland or agricultural work may be an indirect but distinct cause for distress among rural populations.[13] However, in the present study loss of infrastructure had higher prevalence of severe cases of depression.

Studies have also suggested long term impact of disasters on psychiatric morbidity [14,15]. Thus it is essential to create awareness so that policy making can institutionalize mechanisms to provide psychological support to the populations affected by climate change, before it becomes a massive public health challenge [16]. It has been proven that promoting behavioral changes through interventions to raise awareness has the potential to reduce health risks in transitional post-disaster settings.[13]

## CONCLUSION

Severe depression, anxiety and stress was observed in the population which faced the cyclone Nisarg. Factors significantly associated with severity of depression were gender, age, severity of problem and extent of financial loss. Severity of anxiety differed significantly with respect to age group, severity of problem and extent of financial loss. Similarly, severity of stress differed significantly with respect to age group, type of family, severity of problem and extent of financial loss.

Quick assessment of the extent of damage will help in identifying people who need immediate help to overcome depression, anxiety and stress caused by such natural disasters, which in turn will help them to return to normal life early. Strengthening of infrastructure or developing the infrastructure which can sustain these calamities will prevent the extensive psychological damage to the population.

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