Sociodemographic Comparison and Impact of Aila: The Supercyclone in Gosaba of West Bengal

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Introduction

The South 24 Parganas district was one of the most affected areas of West Bengal when the recent cyclone Aila, which was a 250- to 350-km-wide beast with wind speeds exceeding 120 km/h, reached the east of India and Bangladesh on May 25, 2009. The cyclone affected an estimated 6.8 million people and left 138 individuals dead. Although, 18 of the 19 districts in West Bengal were affected, the situation was most precarious in South 24 Parganas and North 24 Parganas districts of the Sunderbans area. Sunderbans is one of the largest deltas of river Ganga with people of multiethnic background and pluralistic religious beliefs.¹ The people living here usually do not visit healthcare facility on its first opportunity and prefer to depend on religious faith-healers and local non-licensed village practitioners.² Gosaba, Basanti, Sagar, Patharpratima, and Namkhana were some of the most severely affected blocks. The Gosaba community development block consists of rural areas only with 14 gram panchayats (GPs). A huge unmet medical need in at-risk populations had been observed in the post-cyclone period as observed following cyclone Nargis and Rita.³ Considering the stress, the present study had been conducted.

Materials and Methods

This study was conducted in the four villages of Gosaba island: Rangabela, Gosaba, Chhota Mollakhali and Bally II, which were selected on the basis of geographical clustering. The systematic random sampling taking every 20th house had been done. A few severely damaged houses and unwilling family members had to be excluded. Individuals with intellectual or physical disability, those who were seriously ill were excluded from the study.

The following instruments were used in this study:

The socio-economic status scale, rural (SES-rural): The SES status scale (rural) comprises nine items. The possible range of score varies from 0 to 54. The scale was originally devised by Pareek and Trivedi in 1964 and standardized in a village near New Delhi.⁴

Trauma symptom checklist-40-item scale (TSC-40): The TSC-40 evaluates aspects of post-traumatic stress and other symptom clusters found in some traumatized individuals.⁵ Each symptom item is rated according to its frequency of occurrence using a four-point scale ranging from 0 (never) to 3 (often). The TSC-40 also appears to predict the perpetration of intimate violence and war zone violence in women.⁶

The clinician-administered dissociative states scale (CADSS): The scale measures dissociation in clinical observations at specific times. The scale measures 23 items in an interview.⁷

Results

One hundred and sixty-six individuals, 40, 39, 42, and 45 from the Gosaba, Rangabela, Bally II, and Chhota Mollakhali villages respectively, were interviewed. As shown in Table 1, there was no significant difference in the age of respondents across villages but a significant difference in terms of socio-economic status was found across the zones. The status was better in the main island (zone 1 Gosaba) than in the peripheral remote zones (zone 3 Bally II and zone 4 Chhota Mollakhali). The SES-rural total (SESr T) score also showed the mean SESr T score to be discrete (no overlapping) in regions of Bally II and Chhota Mollakhali. The most common variant of subitems of each individual item of the SES-rural score across the zones is shown in Table 2. The people of Gosaba primarily belong to dominant caste. They are high school educated, independent in occupation and live in pucca houses. Those of Chhota...
Mollakhal region is significant at the level of $10^{-3}$ except between the zone 3 (Bally II) and zone 4 (Chhota Mollakhali) where the $P$-value is 0.046. The TSC score in the four zones as reflected by the chi-square test and mean rank is significantly higher in an ascending order in Gosaba, Rangabelia, Bally II, and Chhota Mollakhali GPs [Table 4]. The TSC total mean score is lowest at the Gosaba GP and highest in the Chhota Mollakhali region [Table 5]. Applying Levene’s statistics, this difference is significant at the level of $<0.001$. After applying the Kruskal–Wallis test, the CADSS scale also showed significantly higher dissociative symptoms ($P<0.001$) in Bally II and Chhota Mollakhali regions than in other two regions [Table 6].

**Discussion**

The present study showed that there is an increase in psychological symptoms following a natural calamity or man-made disaster. The people having a low score in the SES-rural total score have a higher TSC total

### Table 1: Age and mean SES rural across the zones

| Variables          | Zone 1 (Gosaba) | Zone 2 (Rangabelia) | Zone 3 (Bally II) | Zone 4 (Chhota Mollakhali) | Chi-square test, significance |
|--------------------|-----------------|---------------------|-------------------|-----------------------------|-------------------------------|
| Age                |                 |                     |                   |                             |                               |
| 1                  | 40              | 30.65 (28.48–32.82) | 6.800             |                             |                               |
| 2                  | 39              | 32.15 (29.62–34.69) | 7.815             |                             |                               |
| 3                  | 42              | 32.43 (30.10–34.78) | 7.487             | 0.326                       |                               |
| 4                  | 45              | 30.00 (28.13–31.87) | 6.223             |                             |                               |
| Total              | 166             | 31.28 (30.19–32.36) | 7.093             |                             |                               |
| SESr T zone        |                 |                     |                   |                             |                               |
| 1                  | 40              | 30.10 (27.39–32.81) | 1.341             |                             |                               |
| 2                  | 39              | 27.85 (26.11–29.58) | 0.857             |                             |                               |
| 3                  | 42              | 20.98 (18.66–23.29) | 1.146             | $<0.001$                    |                               |
| 4                  | 45              | 17.40 (15.03–19.77) | 1.176             |                             |                               |
| Total              | 166             | 23.82 (22.44–25.19) | 0.697             |                             |                               |

SD=standard deviation; CI=confidence interval.

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### Table 2: Highest frequencies of items of the SES-rural score across the zones

| Variable            | Zone 1 (Gosaba) | Zone 2 (Rangabelia) | Zone 3 (Bally II) | Zone 4 (Chhota Mollakhali) | Chi-square test, significance |
|---------------------|-----------------|---------------------|-------------------|-----------------------------|-------------------------------|
| Caste (n=14, 35%)   |                 |                     |                   |                             |                               |
| 6 (dominant)        | 4 (agricultural) | 4 (agricultural)    | 2 (lower caste)   |                             | $\chi^2 = 43.71, <0.001$      |
| Occupation (n=21, 52.5%) |                     |                     |                   |                             |                               |
| 4 (independent)     | 4 (independent)  | 5 (cultivation)     | 5 (cultivation)   |                             | $\chi^2 = 43.68, <0.001$      |
| Education (n=16, 40.0%) |                     |                     |                   |                             |                               |
| 5 (high school)     | 4 (middle)       | 4 (middle)          | 1 (illiterate)    |                             | $\chi^2 = 62.43, <0.001$      |
| Social participation (n=13, 32.5%) |                 |                     |                   |                             |                               |
| 3 (office holder)   | 3 (office holder)| 2 (member >1)      | 1 (member <1)     |                             | $\chi^2 = 45.59, <0.001$      |
| Land (n=11, 27.5%)  |                 |                     |                   |                             |                               |
| 3 (<5-10 acres)     | 2 (1-5 acres)    | 2 (1-5 acres)       | 1 (<1 acre)       |                             | $\chi^2 = 67.66, <0.001$      |
| House (n=11, 27.5%) |                 |                     |                   |                             |                               |
| 4 (pucca)           | 3 (mixed)        | 3 (mixed)           | 2 (kutchha)       |                             | $\chi^2 = 87.69, <0.001$      |
| Farm power (n=21, 52.5%) |                 |                     |                   |                             |                               |
| 0 (no animal)       | 0 (no animal)    | 2 (1-2 animals)     | 2 (1-2 animals)   |                             | $\chi^2 = 41.87, 0.001$       |
| Material possession (n=16, 40.0%) |                 |                     |                   |                             |                               |
| 4 (chains)          | 3 (radio)        | 2 (cycle)           | 1 (bullock cart)  |                             | $\chi^2 = 74.99, <0.001$      |
| Family (n=17, 42.5%) |                 |                     |                   |                             |                               |
| 1 (<5)              | 1 (<5)           | 1 (<5)              | 2 (>5)            |                             | $\chi^2 = 37.58, <0.001$      |

### Table 3: Comparison between the TSC score total across the zones

| Zone and Zone | N1, N2 | Mean rank | Sum of ranks | Asymptotic sig. (two-tailed) | Monte carlo sig. (two-tailed) |
|--------------|--------|-----------|--------------|------------------------------|------------------------------|
| 1, 2         | 40, 39 | Z1, 24.25 | 944.00       | $<0.001$                     | $<0.001$                     |
|              |        | Z2, 30.56 | 1144.50      |                              |                              |
| 2, 3         | 39, 42 | Z1, 31.86 | 1242.50      | $0.001$                      | $0.001$                      |
|              |        | Z2, 49.49 | 2078.50      |                              |                              |
| 3, 4         | 42, 45 | Z1, 38.32 | 1609.50      | 0.043’                       | 0.046’                       |
|              |        | Z2, 49.30 | 2218.50      |                              |                              |
| 4, 1         | 45, 40 | Z1, 60.56 | 2725.00      | $<0.001$                     | $<0.001$                     |
|              |        | Z2, 23.25 | 930.00       |                              |                              |
| 1, 4         | 39, 45 | Z1, 29.68 | 1157.50      | $<0.001$                     | $<0.001$                     |
|              |        | Z2, 53.61 | 2412.50      |                              |                              |
| 2, 3         | 40, 42 | Z1, 24.65 | 968.00       | $<0.001$                     | $<0.001$                     |
|              |        | Z2, 57.55 | 2417.00      |                              |                              |

* $P<0.05$ and ** $P<0.01$
Table 4: Trauma symptom checklist findings across zones

| Zone | TSC score (95% CI) | Mean (95% CI) | Std error | Mean rank | Std rank | Sig. (Monte Carlo) |
|------|-------------------|---------------|-----------|-----------|----------|------------------|
| Z₁   | 40                | 6.90 (4.98–8.82) | 5.99      |           |          |                  |
| Z₂   | 39                | 14.712 (12.51–16.93) | 6.82      | 3         | <0.001   |                  |
| Z₃   | 42                | 20.81 (18.15–23.47) | 8.54      |           |          |                  |
| Z₄   | 45                | 25.71 (22.33–29.09) | 11.26     |           |          |                  |
| Total| 166               | 17.36 (15.67–19.04) | 11.02     |           |          |                  |

The Cronbach-α for the total TSC score was found to be 0.89 and 0.91 respectively. The Cronbach-α for the total CADSS scale was found to be 0.73 in previous studies.

The present study has several limitations. Only the Gosaba block and its surrounding villages had been surveyed. The sample size is only modest. The present study is only a cross-sectional survey. To avoid the interviewer bias, two researchers had collected data separately from each subject. The health status during the pre-cyclone period was not known so the comparison between the pre- and post-cyclone periods is only retrospective and recall bias cannot be ruled out.

The impact of psychological trauma following cyclone Aila across the various zones of the Gosaba island has been reflected in this study. A larger community-based longitudinal study is perhaps needed to explore the long-term impact of the cyclone Aila.

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