**Supplementary File 1: Disaster Questions in LASI data**

**HT106:** Now we are going to ask some questions about natural disasters, which may have affected your health as well. In the last five years, has your health been severely affected by disasters such as floods, landslides, extreme cold and hot weather, cyclone/typhoons, droughts, earthquakes, tsunamis, or any other natural calamities?

1. Yes 2.
2. No◊Go to HT107

**HT106a**. [Ask only if HT106=1] Which of these natural disasters affected your health? Please identify all natural disasters that affected you. [Multiple answers are allowed]

a. Floods

b. Landslides

c. Cyclone/Typhoon

d. Earthquakes, tremors

e. Tsunami

f. Droughts

g. Other, please specify: \_\_\_\_\_\_\_\_\_\_\_\_\_

**HT107.** In the last five years, has your health been severely affected by man-made incidents such as riots, terrorism, building collapses, fires, traffic accidents or any other man-made incidents?

1. Yes

2.No ◊Go to HT201

**HT107a.**[Ask only if HT107=1] Which of these man-made disasters affected your health? Please identify all man-made incidents that affected you. [Multiple answers are allowed]

a. Riots

b. Terrorism

c. Building collapses

d. Fires

e. Traffic accidents

f. Other, please specify: \_\_\_\_\_\_\_\_\_\_\_\_\_

**HT108.** [Ask if HT106=1 or HT107=1] What were the health consequences that you suffered as a result of these disasters or incidents? [Multiple answers are allowed]

a. Permanent physical disability

b. Psychological trauma and mental health problems

c. Chronic illness

d. Other, please specify\_\_\_\_\_\_\_\_\_\_

**Supplementary File 2: Description and Scale of measurements of predicter variables**

|  |  |  |  |
| --- | --- | --- | --- |
| **S. No** | **Variable Level** | **Description and Coding** | **Scale of measurements** |
| 1 | Age Groups | Age of the women in completed years and it is directedly associated with the life style persons and groups in four categories 18-44  45- 59, 60-69, 70-79 and 80 or above | Ordinal |
| 2 | Sex of the respondent | Sex of the respondent also play major role in life style and working condition. | Nominal |
| 3 | Education status | Educational status of the persons was grouped into No education  Primary, Secondary and Graduate & above | Ordinal |
| 4 | Economic status of the households | Similarly, household wealth was also calculated based on the monthly per capita consumption expenditure. Individuals were ranked on the basis of their household scores and divided into different quintiles, each representing 20 percent of the score, between 1 (poorest) and 5 (wealthiest). | Ordinal |
|  | Caste | For each household surveyed, the social group to which the head of the household belonged to was recorded irrespective of the actual social group to which the individual members belonged. Caste represents the social group in India. The information recorded in this regard was based entirely on the response of the informant and not based on any state or central level list of the social group and it’s grouped in four categories as a Scheduled tribe, Scheduled caste, Other backward caste and Others Caste for the present study. | Nominal |
|  | Religion of the households | Religious affiliation is another’s a contextual factor which have bearing on life styles of the patient’s religious brief/stigma and grouped into Hindu, Muslim and Others. | Nominal |
|  | Place of residence | This variable is derived from the question sector of the residence. It is dichotomous variables (Rural and urban) according the where the patients were living at the time of the survey. | Nominal |
| 4 | Region of residence | To examine the regional variation of disaster in India was divided into six regions based on geographical location and cultural settings and categorised as a North, Central, East, Northeast, West and South regions. | Nominal |

**Supplementary File 3: Explanation of different sample sizes**

|  |  |
| --- | --- |
| **Number** | **Explanation** |
| 1631 | Number of people who reported being affected by natural disasters, but they may also have been affected by human-induced as well |
| 823 | Number of people who reported being affected by natural disasters, but they may also have been affected by human-induced as well |
| 1,478 | Number of people who reported being affected only by natural disasters |
| 1,192 | Number of people who reported being affected only by natural disasters and only one type of natural disaster from the following  a. Floods  b. Landslides  c. Cyclone/Typhoon  d. Earthquakes, tremors  e. Tsunami  f. Droughts  g. Other, please specify: \_\_\_\_\_\_\_\_\_\_\_\_\_) |
| 286 | Number of people who reported being affected only by natural disasters and two or more than two type of natural disaster (multiple natural disaster) from the following  a. Floods  b. Landslides  c. Cyclone/Typhoon  d. Earthquakes, tremors  e. Tsunami  f. Droughts  g. Other, please specify: \_\_\_\_\_\_\_\_\_\_\_\_\_) |
| 670 | Number of people who reported being affected only by human-induced only one type of human-induced from the following  a. Riots  b. Terrorism  c. Building collapses  d. Fires  e. Traffic accidents  f. Other, please specify: \_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 47 | Number of people who reported being affected only by human-induced and two or more than two type of human-induced (multiple human-induced) from the following  a. Riots  b. Terrorism  c. Building collapses  d. Fires  e. Traffic accidents  f. Other, please specify: \_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 153 | Number of people who reported being affected by human-induced and natural disaster (Both) |

**Supplementary File 4: Descriptive statistics depicting individuals who were reported health impacts due to single or multiple exposures to natural disasters**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Background characteristics** | **Natural disasters** | | | | | | | |
| **Single** | | **Multiple** | | **Association** | | **Total** | |
| **n** | **%** | **n** | **%** | chi-square χ2  (p-value) | Cramer's V and φ | **n** | **%** |
| **Total** | 1,192 | 100 | 286 | 100.0 | - | - | 1,478 | 100.0 |
| **Age** | | | | | | | | |
| 18-44 | 127 | 9.3 | 23 | 8.2 | χ2= 10.466  (p= 0.033) | V=0.084 | 150 | 9.1 |
| 45- 59 | 508 | 43.7 | 135 | 45.7 | 643 | 44.1 |
| 60-69 | 349 | 28.0 | 80 | 26.8 | 429 | 27.8 |
| 70-79 | 162 | 15.6 | 28 | 10.2 | 190 | 14.5 |
| 80 or above | 46 | 3.3 | 20 | 9.1 | 66 | 4.5 |
| **Sex** | | | | | | | | |
| Male | 530 | 45.6 | 135 | 43.9 | χ2= 0.699  (p= 0.403) | φ = 0.022 | 665 | 45.2 |
| Female | 662 | 54.4 | 151 | 56.1 | 813 | 54.8 |
| **Education status** | | | | | | | | |
| No education | 685 | 60.3 | 169 | 63.0 | χ2= 1.142  (p= 0.767) | V= 0.028 | 854 | 60.9 |
| Primary | 352 | 28.8 | 76 | 26.4 | 428 | 28.3 |
| Secondary | 119 | 8.6 | 32 | 7.5 | 151 | 8.3 |
| Graduate & above | 36 | 2.3 | 9 | 3.1 | 45 | 2.5 |
| **Wealth quintile** | | | | | | | | |
| Poorest | 241 | 19.2 | 36 | 13.4 | χ2= 21.992  (p<0.001) | V= 0.122 | 277 | 18.0 |
| Poorer | 242 | 22.3 | 50 | 18.3 | 292 | 21.5 |
| Middle | 258 | 26.1 | 66 | 29.0 | 324 | 26.7 |
| Richer | 234 | 16.9 | 51 | 16.8 | 285 | 16.9 |
| Richest | 217 | 15.4 | 83 | 22.5 | 300 | 16.9 |
| **Caste** | | | | | | | | |
| Scheduled tribe | 187 | 10.0 | 13 | 4.6 | χ2= 33.422  (p<0.001) | V= 0.152 | 200 | 8.9 |
| Scheduled caste | 199 | 20.6 | 76 | 29.8 | 275 | 22.5 |
| Other backward caste | 571 | 53.6 | 140 | 45.3 | 711 | 51.9 |
| Others Caste | 204 | 15.8 | 55 | 20.3 | 259 | 16.7 |
| **Religion** | | | | | | | | |
| Hindu | 911 | 82.9 | 230 | 82.7 | χ2= 22.721  (p<0.001) | V= 0.124 | 1,141 | 82.9 |
| Muslim | 160 | 12.4 | 51 | 15.5 | 211 | 13.0 |
| Other | 121 | 4.7 | 5 | 1.8 | 126 | 4.1 |
| **Place of Residence** | | | | | | | | |
| Rural | 927 | 86.6 | 221 | 89.7 | χ2= 0.033  (p= 0.857) | φ = 0.005 | 1,148 | 87.3 |
| Urban | 265 | 13.4 | 65 | 10.3 | 330 | 12.8 |
| **Region** | | | | | | | | |
| North | 88 | 2.9 | 16 | 1.4 | χ2= 44.662  (p<0.001) | V= 0.174 | 104 | 2.6 |
| Central | 218 | 14.9 | 51 | 6.4 | 269 | 13.1 |
| East | 355 | 32.7 | 88 | 33.6 | 443 | 32.9 |
| Northeast | 92 | 6.4 | 6 | 1.9 | 98 | 5.5 |
| West | 323 | 40.9 | 119 | 56.6 | 442 | 44.2 |
| South | 116 | 2.1 | 6 | 0.2 | 122 | 1.7 |

**Supplementary File 5: Descriptive statistics and chi square tests depicting individuals who were reported health impacts due to single or multiple exposures to human-induced disasters**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Background characteristics** |  | | **Human-induced Disaster** | | | | | | |
| **Single** | | **Multiple** | | **Association** | | | **Total** | |
| **n** | **%** | **n** | **%** | chi-square χ2 (p-value) | | Cramer's V and φ | **n** | **%** |
| **Total** | 623 | 100 | 47 | 100 | - | - | | 670 | 100 |
| **Age** | | | | | | | | | |
| 18-44 | 55 | 6.8 | 3 | 7.7 | χ2= 2.767  (p= 0.597) | V= 0.064 | | 58 | 6.8 |
| 45- 59 | 312 | 48.5 | 29 | 57.9 | 341 | 48.9 |
| 60-69 | 165 | 29.4 | 11 | 18.4 | 176 | 28.9 |
| 70-79 | 67 | 12.7 | 3 | 12.8 | 70 | 12.7 |
| 80 or above | 24 | 2.6 | 1 | 3.2 | 25 | 2.7 |
| **Sex** | | | | | | | | | |
| Male | 364 | 56.4 | 27 | 58.7 | χ2= 0.017  (p= 0.895) | φ = 0.005 | | 391 | 56.5 |
| Female | 259 | 43.6 | 20 | 41.3 | 279 | 43.5 |
| **Education status** | | | | | | | | | |
| No education | 286 | 51.5 | 13 | 39.5 | χ2= 14.239  (p= 0.003) | V= 0.146 | | 299 | 51.0 |
| Primary | 215 | 31.7 | 16 | 35.9 | 231 | 31.9 |
| Secondary | 94 | 13.5 | 11 | 10.3 | 105 | 13.4 |
| Graduate & above | 28 | 3.3 | 7 | 14.9 | 35 | 3.7 |
| **Wealth quintile** | | | | | | | | | |
| Poorest | 108 | 19.8 | 5 | 16.4 | χ2= 15.971  (p= 0.003) | V= 0.154 | | 113 | 19.7 |
| Poorer | 116 | 21.2 | 8 | 14.5 | 124 | 20.9 |
| Middle | 113 | 18.2 | 4 | 14.4 | 117 | 18.0 |
| Richer | 130 | 18.4 | 6 | 9.7 | 136 | 18.0 |
| Richest | 156 | 22.4 | 24 | 45.1 | 180 | 23.4 |
| **Caste** | | | | | | | | | |
| Scheduled tribe | 67 | 7.1 | 7 | 10.7 | χ2= 6.529 (p= 0.089) | V= 0.100 | | 74 | 7.3 |
| Scheduled caste | 101 | 19.7 | 7 | 24.2 | 108 | 19.9 |
| Other backward caste | 298 | 51.2 | 14 | 29.8 | 312 | 50.3 |
| Others Caste | 139 | 22.0 | 16 | 35.3 | 155 | 22.5 |
| **Religion** | | | | | | | | | |
| Hindu | 472 | 81.0 | 31 | 83.9 | χ2= 2.699 (p= 0.259) | V= 0.064 | | 503 | 81.1 |
| Muslim | 87 | 13.4 | 8 | 11.8 | 95 | 13.3 |
| Other | 64 | 5.6 | 8 | 4.3 | 72 | 5.6 |
| **Place of Residence** | | | | | | | | | |
| Rural | 435 | 76.6 | 33 | 70.7 | χ2= 0.003 (p= 0.955) | φ = 0.002 | | 468 | 76.4 |
| Urban | 188 | 23.4 | 14 | 29.3 | 202 | 23.6 |
| **Region** | | | | | | | | | |
| North | 79 | 5.2 | 12 | 19.6 | χ2= 12.697 (p= 0.026) | V= 0.138 | | 91 | 5.8 |
| Central | 165 | 22.2 | 9 | 14.4 | 174 | 21.9 |
| East | 99 | 21.4 | 11 | 42.6 | 110 | 22.4 |
| Northeast | 84 | 17.0 | 7 | 9.5 | 91 | 16.6 |
| West | 134 | 31.3 | 3 | 9.4 | 137 | 30.4 |
| South | 62 | 2.8 | 5 | 4.6 | 67 | 2.9 |

**Supplementary File 6: Descriptive statistics depicting individuals who reported health impacts due to exposure to human-induced disasters, natural disasters or both**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Background characteristics** | **Only Human-induced Disaster** | | **Only Natural-Disaster** | | **Both** | |
| **n** | **%** | **n** | **%** | **n** | **%** |
| **Total** | 670 | 100 | 1,478 | 100 | 153 | 100 |
| **Age** | | | | | | |
| 18-44 | 58 | 6.8 | 150 | 9.1 | 26 | 17.4 |
| 45- 59 | 341 | 48.9 | 643 | 44.1 | 66 | 37.7 |
| 60-69 | 176 | 28.9 | 429 | 27.8 | 36 | 23.9 |
| 70-79 | 70 | 12.7 | 190 | 14.5 | 16 | 15.4 |
| 80 or above | 25 | 2.7 | 66 | 4.5 | 9 | 5.6 |
| **Sex** | | | | | | |
| Male | 391 | 56.5 | 665 | 45.2 | 64 | 40.7 |
| Female | 279 | 43.5 | 813 | 54.8 | 89 | 59.3 |
| **Education status** | | | | | | |
| No education | 299 | 51.0 | 854 | 60.9 | 93 | 61.7 |
| Primary | 231 | 31.9 | 428 | 28.3 | 39 | 25.2 |
| Secondary | 105 | 13.4 | 151 | 8.3 | 15 | 11.3 |
| Graduate & above | 35 | 3.7 | 45 | 2.5 | 6 | 1.8 |
| **Wealth quintile** | | | | | | |
| Poorest | 113 | 19.7 | 277 | 18.0 | 15 | 9.0 |
| Poorer | 124 | 20.9 | 292 | 21.5 | 36 | 26.6 |
| Middle | 117 | 18.0 | 324 | 26.7 | 25 | 13.8 |
| Richer | 136 | 18.0 | 285 | 16.9 | 33 | 25.8 |
| Richest | 180 | 23.4 | 300 | 16.9 | 44 | 24.8 |
| **Caste** | | | | | | |
| Scheduled tribe | 74 | 7.3 | 200 | 8.9 | 17 | 3.4 |
| Scheduled caste | 108 | 19.9 | 275 | 22.5 | 26 | 19.8 |
| Other backward caste | 312 | 50.3 | 711 | 51.9 | 65 | 50.1 |
| Others Caste | 155 | 22.5 | 259 | 16.7 | 41 | 26.8 |
| **Religion** | | | | | | |
| Hindu | 503 | 81.1 | 1,141 | 82.9 | 99 | 73.5 |
| Muslim | 95 | 13.3 | 211 | 13.0 | 38 | 22.3 |
| Other | 72 | 5.6 | 126 | 4.1 | 16 | 4.2 |
| **Place of Residence** | | | | | | |
| Rural | 468 | 76.4 | 1,148 | 87.3 | 133 | 95.2 |
| Urban | 202 | 23.6 | 330 | 12.8 | 20 | 4.8 |
| **Region** | | | | | | |
| North | 91 | 5.8 | 104 | 2.6 | 38 | 12.9 |
| Central | 174 | 21.9 | 269 | 13.1 | 8 | 4.2 |
| East | 110 | 22.4 | 443 | 32.9 | 40 | 31.6 |
| Northeast | 91 | 16.6 | 98 | 5.5 | 9 | 4.6 |
| West | 137 | 30.4 | 442 | 44.2 | 46 | 46.3 |
| South | 67 | 2.9 | 122 | 1.7 | 12 | 0.5 |

**Supplementary File 7: Multivariate logistic regression of having health affected by natural disasters and human-induced disasters in India, LASI, 2017-18**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Background characteristics** | Natural disasters | | | | **Human-induced disasters** | | | |
| **Adjusted Odds Ratio** | **[95% Confidence Interval]** | | **Significance** | **Adjusted Odds Ratio** | **[95% Confidence Interval]** | | **Significance** |
| **Lower** | **Upper** | **Lower** | **Upper** |
| **Age** | | | | |  |  |  |  |
| 18-44 *-* | Ref | - | - | - |  |  |  |  |
| 45- 59 | 1.142 | 0.960 | 1.360 |  | 1.196 | 0.935 | 1.529 |  |
| 60-69 | 1.182 | 0.983 | 1.421 |  | 0.971 | 0.744 | 1.267 |  |
| 70-79 | 1.078 | 0.870 | 1.335 |  | 0.808 | 0.589 | 1.108 |  |
| 80 or above | 1.002 | 0.755 | 1.331 |  | 0.848 | 0.560 | 1.284 |  |
| **Sex** | | | | |  |  |  |  |
| Male *-* | Ref | - | - | - |  |  |  |  |
| Female | 0.851 | 0.762 | 0.951 | \*\*\* | 0.563 | 0.483 | 0.657 | \*\*\* |
| **Education status** | | | | |  |  |  |  |
| No education | Ref | - | - | - |  |  |  |  |
| Primary | 0.727 | 0.643 | 0.823 | \*\*\* | 0.804 | 0.678 | 0.953 | \*\* |
| Secondary | 0.692 | 0.573 | 0.836 | \*\*\* | 0.838 | 0.662 | 1.060 |  |
| Graduate & above | 0.489 | 0.355 | 0.673 | \*\*\* | 0.680 | 0.475 | 0.974 | \*\* |
| **Wealth quintile** | | | | |  |  |  |  |
| Poorest | Ref | - | - | - |  |  |  |  |
| Poorer | 0.727 | 0.643 | 0.823 | \*\*\* | 1.214 | 0.958 | 1.538 |  |
| Middle | 0.692 | 0.573 | 0.836 | \*\*\* | 1.157 | 0.907 | 1.476 |  |
| Richer | 0.489 | 0.355 | 0.673 | \*\*\* | 1.314 | 1.033 | 1.672 | \*\* |
| Richest | 0.727 | 0.643 | 0.823 | \*\*\* | 1.948 | 1.541 | 2.462 | \*\*\* |
| **Caste** | | | | |  |  |  |  |
| Scheduled tribe | Ref | - | - | - |  |  |  |  |
| Scheduled caste | 1.178 | 0.970 | 1.430 |  | 1.442 | 1.077 | 1.931 | \*\* |
| Other backward caste | 1.356 | 1.138 | 1.616 | \*\*\* | 1.762 | 1.356 | 2.289 | \*\*\* |
| Others Caste | 0.927 | 0.756 | 1.135 |  | 1.410 | 1.057 | 1.881 | \*\* |
| **Religion** | | | | |  |  |  |  |
| Hindu | Ref | - | - | - |  |  |  |  |
| Muslim | 1.398 | 1.202 | 1.627 | \*\*\* | 1.529 | 1.245 | 1.877 | \*\*\* |
| Other | 0.941 | 0.760 | 1.166 |  | 0.980 | 0.751 | 1.279 |  |
| **Place of Residence** | | | | |  |  |  |  |
| Rural | Ref | - | - | - |  |  |  |  |
| Urban | 0.692 | 0.607 | 0.790 | \*\*\* | 0.758 | 0.639 | 0.900 | \*\*\* |
| **Region** | | | | |  |  |  |  |
| North | Ref | - | - | - |  |  |  |  |
| Central | 1.254 | 1.004 | 1.565 | \*\* | 0.884 | 0.691 | 1.131 |  |
| East | 3.195 | 2.599 | 3.927 | \*\*\* | 1.039 | 0.807 | 1.338 |  |
| Northeast | 0.783 | 0.600 | 1.021 |  | 0.805 | 0.611 | 1.060 |  |
| West | 4.054 | 3.288 | 4.999 | \*\*\* | 1.648 | 1.287 | 2.110 | \*\*\* |
| South | 1.252 | 0.953 | 1.644 |  | 0.855 | 0.617 | 1.186 |  |
|  |  |  |  |  |  |  |  |  |
| *\*\*\* p<.001, \*\* p<.05* | | | | | | | | |

**Supplementary File 8: Multivariate multilevel logistic regression analysis of socioeconomic characteristics factors associated disaster-related health impacts**

|  |  |  |
| --- | --- | --- |
| **Background characteristics** | **Model 1**  **Without explanatory variables (Null model)** | **Model 2** |
| **AOR (95% CI)** |
| **Age** |  |  |
| 18-45 |  |  |
| 45- 59 |  | 1.181\*\* [1.015-1.373] |
| 60-69 |  | 1.094[0.931-1.284] |
| 70-79 |  | 0.968[0.803-1.168] |
| 80 or above |  | 0.904[0.705-1.159] |
| **Sex** |  |  |
| Male |  |  |
| Female |  | 0.725\*\*\* [0.66-0.797] |
| **Education status** |  |  |
| No education |  |  |
| Primary |  | 0.800\*\*\* [0.718-0.891] |
| Secondary |  | 0.735\*\*\* [0.629-0.859] |
| Graduate & above |  | 0.544\*\*\* [0.424-0.699] |
| **Wealth quintile** |  |  |
| Poorest |  |  |
| Poorer |  | 1.170\*\* [1.018-1.345] |
| Middle |  | 1.336\*\*\* [1.162-1.537] |
| Richer |  | 1.361\*\*\* [1.178-1.573] |
| Richest |  | 1.864\*\*\* [1.612-2.157] |
| **Caste** |  |  |
| Scheduled tribe |  |  |
| Scheduled caste |  | 1.150 [0.953-1.387] |
| Other backward caste |  | 1.235\*\* [1.04-1.468] |
| Others Caste |  | 1.027[0.848-1.243] |
| **Religion** |  |  |
| Hindu |  |  |
| Muslim |  | 1.28\*\*\* [1.109-1.476] |
| Other |  | 1.039 [0.842-1.284] |
| **Place of residence** |  |  |
| Rural |  |  |
| Urban |  | 0.766 [0.578-1.016] |
| **Region** |  |  |
| North |  |  |
| Central |  | 1.048 [0.58-1.895] |
| East |  | 2.08\*\* [1.041-4.158] |
| Northeast |  | 0.992[0.526-1.87] |
| West |  | 3.194\*\* [1.507-6.773] |
| South |  | 1.351[0.722-2.526] |
| **Random effect** |  |  |
| Place of Residence (SE) | 0.340 [0.182-0.636] | 0.504 [0.361-0.703] |
| VPC% | 16.007 [8.228-38.047] | 21.040 [14.634-36.455] |
| State variance | 0.287 [0.113-0.728] | 0.378 [0.203-0.702] |
| VPC% | 7.327 [3.152-20.306] | 9.060 [5.267-18.214] |
| *AOR: Adjusted odds ratio; CI: Confidence interval; VPC: variance partition coefficient, \*\*\* p<.001, \*\* p<.05*  Model 1: Null/baseline model without any predictor variable.  Model 2: Adjusted for the all the predictor variables. | | |