

Severity of Mortality in the 2011 East Japan Earthquake (3) Examination of Age-dependency Part II

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1. Introduction

We started to expand our attention to age-dependency as the third paper of the series studies. It has been known that most probable one is a shape resembling U character in English, as rates are high both at the infant-child ages and the senior ages as 60 or over and low in the middle ages. But we are not yet certain whether such age-dependent characteristics are generally valid or not. So, in this point of view and in comparison with significant past inland and oceanic earthquakes we conducted a study focusing on this age-dependency problem.

2. Surveyed Earthquakes

There is no much available data even now in case when we desire somewhat deeper analysis good for age-dependent characteristics. After careful and in-depth retrievals we obtained 4 domestic earthquakes; the 1933 Sanriku, the 1993 Hokkaido-nansei-oki, the 1995 Kobe and the 2011 East Japan Tsunamigenic earthquakes, and the 3 overseas earthquakes as 2 Turkish earthquakes plus the 2004 Indian Ocean tsunamigenic earthquakes. Especially for the 2004 Indian Ocean earthquake, regarded and significant data were retrieved via papers from US PubMed Database. The dataset of 2 earthquakes in Turkey are based on our own field surveys on due years.

3. Analytical Comparison and Characterization of Age-dependency

After a careful data processing on age-dependent characteristics for each earthquake, we arrived at the conclusion that those are well classified into three principal types.

3.1) U type in English character Typical cases are earthquakes of the 1933 Sanriku-oki, the 1993 Hokkaido-nansei-oki, the 1970 Gediz and the 1976 East Turkey, and northern seaside areas of Indonesia due to the 2004 Indian Ocean Tsunami. In these earthquakes the mortality rate pattern shows typical U shaped type as is high for both of infants-children and senior people of 60 or more. And, this can naturally be accepted as the direct reflection of either humans undeveloped for infants-children or deteriorated for seniors of behavioral performance in case when no assistance by neighbors is expected.

3.2) J type in English character Another pattern we see often is the one expressed as J type in English character. This is somewhat simpler case as increasing age gives increasing rate of mortality; The 1995 Kobe, the 2011 East Japan earthquakes are typical cases. This J type age dependency can be interpreted as a variation when an earthquake occur during day time and then children were outdoors and/or under teachers control and/or they were under care by their parents etc. so, we should be keen to when the event comes. Those above two cases seem typical pattern in somewhat higher mortality rates, but in the initial case as in low mortality rate the pattern might be different and is likely to make age-independent characteristic; Let us call this as Flat type.

4. Results

For the change of age-dependency, we can therefore summarize as in the initial situation of low external force of either seismic shaking or tsunami inundation high, mortality rate seems low and age-independency is as F type and in case when the external force is strong enough the most probable

pattern would be U type, which means higher mortalities for the age-extremities of infants-children and the seniors as of 60 or older, giving a concave as a function of age. So, this pattern can be most probable, if no assistance is available by nearby people, nor recognition for protection is not prevailed.

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