

The aim of the proposed project is an estimation of effect of strong prenatal maternal stress, induced by a natural disaster, on growth and development of children. The aim will be realized by comparison of physical growth and psychomotor parameters between children at the same age, whose mothers were pregnant during the strike of tropical severe cyclone Aila in 25th May 2009, with those whose mothers were not affected during pregnancy by this disaster, in region of Sunderband (West Bengal, India). The study will cover about 1000 children born between June and December 2009: group of 500 children, whose mothers during pregnancy were directly affected by this weather phenomenon, and control group of 500 children, living in the neighboring area, whose mothers were not affected by Aila.

Research will include anthropological measurements of body size, legs and trunk length, level of fatness and its distribution, fingers length and shape of head. Additionally, a level of fluctuating asymmetry (FA) will be assessed based on bilateral face dimensions derived from digital face photography of children. Moreover, psychological and neuromuscular tests will be conducted among children. Parents will provide a questionnaire with the socio-economic and demographic status of the family, as well as child birth parameters, child morbidity history and history of trauma events. The research will be conducted with the cooperation with the Department of Anthropology Vidyasagar University in Midnapore (West Bengal, India).

Natural disasters provide excellent opportunities to examine the effects of prenatal stress on childhood outcomes because the stressors are independent of potentially confounding genetic and medical risk factors, and are relatively randomly distributed with regard to household and maternal characteristics. Furthermore, because the dates of the events are clearly known, we can identify the timing of stress exposure during pregnancy. Natural disasters by their nature tend to have sudden onsets and to be independent of the control of individuals. Using disasters as natural experiments provides an approximation of the randomization afforded by true experiments, and a relatively large potential subject pool following a disaster affecting a large community. To date, we have three such studies underway (Ice Storm – Canada; Iowa Flood – USA; and Queensland Flood – Australia). However, all these studies have utilized a limited number of subjects and concerned highly economically developed countries with highly efficient rescue and emergency services. Despite the direct danger of serious injury and even death, there were no reports of death directly caused by the above mentioned natural disasters.

To our knowledge, the proposed project will be the first attempt to estimate long-lasting effects of severe maternal during pregnancy, induced by a natural disaster in developing country, hence in much more poor living condition and lower civilization advancement, then in western countries, on growth and development of offspring. Such conditions might have modified the magnitude of experienced stress, especially in a face of insufficient rescue service support. Obtained results will allow us to deeply understand the effect of natural disasters on humans, especially on prenatal development of foetus and subsequent postnatal growth. Results will be also important in order to verify the concept of prenatal programming of development in humans. There are many research indicating the great importance of maternal stress during pregnancy on subsequent growth of children, induced by different factors. However, there is a lack of studies on influence of natural disasters, in poorly developed areas, on physical and psychomotor development of children, particularly on body length proportions and developmental stability.

Because of recently observed increase in intensity of extreme weather and natural phenomena, our results will enable in-depth understanding of their consequences within the context of human growth and development. They will also constitute an important and helpful condition for undertaking the prevention actions related to alleviation of maternal stress and prevention to its consequences.