Effect of Displacement on Growth of Children in Nigeria

Summary of published paper

A recent religious/ethnic conflict in northern Nigeria provided a rare opportunity to investigate the effects of displacement on the growth and body composition of the children of families that were forced to migrate. In September 2001, the Fulani population inhabiting the Jos Plateau of Nigeria was attacked, forcing most of those who had survived, including the children, to migrate to temporary camps located about 40 km east of the city of Jos. This study was possible as one month before the conflict, a team had conducted a comprehensive anthropometric analysis of the same Fulani children who were displaced by the crisis. The Fulani of northern Nigeria, and the Jos Plateau in particular, are semi-nomadic pastoralists whose culture and economy are centred around cattle. They are physically very active, consume a diet rich in dairy products and generally abstain from alcohol and tobacco.

In the pre-conflict study, bioelectrical impedance analysis, as well as standard anthropometric techniques, had been used to investigate the growth and body composition characteristics of 340 Fulani children aged 1-18 years. In April 2002, the study team located 30 of these same children, and re-measured height, weight, body fat and lean body tissue. In addition, the team used bioelectrical impedance analysis (BIA) to compare the phase angle of each child before displacement and after seven months of living in a displacement camp. The phase angle is foremost an indicator of an individual’s overall nutritional status, and is thought to provide information regarding the vitality and integrity of cellular membranes.

Seventeen males and 13 females, between the ages of 4-13 years, were included in the study. In terms of mean values and relative to growth curves established during the tranquil period immediately preceding the crisis, all but one of the girls grew taller and gained more weight than predicted - two-thirds of the weight gained by the girls was due to fat. While the male subjects, on average, grew taller, they gained 30 percent less in height than predicted. However, the boys did gain 50 percent more weight than predicted. Unexpectedly, fat accounted for one-half or more of the weight gain in both the boys and girls. An explanation for the unanticipated high proportion of fat in the weight gain may lie in the fact that caloric expenditure was reduced relative to what it had been pre-crisis, due to the confinement and reduced activity level. Another explanation is that the diet was adequate in terms of calories but unbalanced in terms of essential nutrients, such as protein.

In general, the boys did less well than the girls in the months following the crisis. This might be explained by the fact that girls spent more time close to their mothers, who were responsible for cooking and distribution of food in the camp. Also, the boys from ages 5-6 years onwards were more active and spent considerable time tending goats and cattle. The phase angle of all subjects did not decline significantly during the pre- and post-crisis interval.

In general, from the nutritional perspective, the Fulani children coped relatively well during the seven-month period of displacement. The fact that neither the growth nor body composition of the Fulani children deteriorated significantly following the crisis was attributed to the fact that during that period, they were receiving adequate and continuous supplies of food. Within 3 or 4 days of being displaced, the children were receiving food from several sources including grain from the federal government, as well as milk, cheese and butter fat from the cattle that had been recovered in the days and weeks following the crisis. Furthermore, the displacement camp into which the children and their families migrated was located in a secure region of the country and one that was controlled by people whose culture and ethnicity were similar to theirs. This minimised the psychological stress usually associated with displacement. Finally, at no time during their seven months as a displaced population were the children separated from their mothers. In conclusion, this study shows that displacement, in general, may not
necessarily lead to deleterious effects on the growth of children.


2The phase angle is calculated as the angular transformation of the arc-tangent of the ratio of reactance to resistance and is obtained by bioelectrical impedance analysis.

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