

ADOLESCENT HEALTH AND SEX-BIAS IN NUTRITION IN BANGLADESH:  
EVALUATING THE STANDARDS USED TO CLASSIFY MALNUTRITION\*

by Erin M. Trapp & Jane Menken

University of Colorado

September 23, 2004

\* Direct correspondence to Erin Trapp or Jane Menken, University of Colorado-Boulder Population Program, Campus Box 484, Boulder, CO 80309-0484; email: [trappe@colorado.edu](mailto:trappe@colorado.edu); [menken@colorado.edu](mailto:menken@colorado.edu).

## ABSTRACT

Bangladeshi children under the age of 10 have experienced significant improvements in nutrition and sex differences in child nutrition have declined significantly during the past decade regardless of family structure, a tremendous change from previous observations in Matlab. However, our attempts to understand adolescent nutrition and other longitudinal work that studies child nutrition in developing countries are hindered by the lack of an appropriate standard of comparison using a population in developing countries. The WHO endorsed standard population—based on U.S. children—misclassifies a large number of children in Bangladesh as malnourished, particularly in the adolescent years when rates of obesity in the U.S. begin to rise. We explore malnutrition in adolescents in Matlab, Bangladesh using the current and past standards, and test the standards for sensitivity to various thresholds to evaluate the current standards and begin a path toward a more appropriate comparison.

## ADOLESCENT HEALTH AND SEX-BIAS IN NUTRITION IN BANGLADESH: EVALUATING THE STANDARDS USED TO CLASSIFY MALNUTRITION

The health of children often is viewed as a mirror on the health of their parents. In the case of mothers in developing countries, child health also is found to reflect their social standing and household power (DeRose, Das and Millman 2000; Kahn 2002; Winikoff 1988). In some places, health disadvantage for girls has been documented based on gender preferences for sons and low maternal autonomy in the home. A recent study in India documents selective neglect of girls based on certain sex and birth-order combinations (Pande 2003). However, other recent studies (Madise, Matthews and Margetts 1999) report a diminishment or even reversal of this pattern, finding girls to be better nourished than boys in some African countries. Some of the changes in child health in the developing world might be attributed to health interventions, increased education of women, and increasing empowerment of females in the home (Kahn 2002). These conflicting reports suggest that sex-biases observed through selective neglect of girls' nutrition and health are shifting in many contexts, and we attempt to document such a shift using longitudinal data from Matlab, Bangladesh.

In our previous work, we find that the health status of Bangladeshi children under the age of 10 has improved markedly during the past decades, despite significant risks of both long-and short-term malnutrition that still exist. However, many Bangladeshi children still suffer from some degree of malnutrition, preventable disease, and high rates of child mortality, therefore continued study of at-risk populations is a crucial step in development work. Indeed, the United Nations (1998) reports that evidence from 52 countries supports the conclusion that while “systematic neglect of girls in terms of diet and domestic care is uncommon,” (8) girls are most severely disadvantaged in South-central Asia. This report also points out that female

disadvantage based on behavioral factors often is masked by biological factors that favor girls, particularly in adolescence, thus, there is no definitive understanding of sex-bias in nutrition, and extricating behavioral from genetic factors makes the proposition even more difficult.

Unfortunately, our understanding of the health status of adolescents is compromised by the lack of an appropriate standard of comparison. While we can compare rates of malnutrition to the World Health Organization (WHO) endorsed nutritional standard for developing countries that classifies a child as wasted if their weight-for-age is more than two standard deviations from the mean in the comparison standards, our analyses suggest that this standard misclassifies a large number of children aged 10-14. We theorize that the standardized weights based on children in the United States, where over-nutrition might be expected to positively skew weight and height data, yield an unrealistically high number of malnourished children in Bangladesh by comparison, creating fall-off from the standard that likely is the result not of poor nutrition in Bangladesh, but rather of an improper standard of comparison.

Weight-for-age data (a proxy for short-term malnutrition) is examined for 4,280 children aged 0-14 years of age. Children aged 0-9 in 1996 are far less likely to be considered severely malnourished than are those aged 10-14. Moderate malnutrition is more prevalent among children aged 5-9 than among the youngest children, making children aged 0-4 overall the least likely to experience malnutrition. The large proportion of malnourished children over age 10 is thought not to be a cohort effect; if this were the case high levels would likely reflect high levels of chronic deprivation (Waterlow 1972) in this cohort. Instead, this phenomenon is thought to result from “fall-out” from the U.S. median used in the comparison, since U.S. adolescents over the age of 10 are most likely to be obese (Cole, Bellizzi, Flegal, and Dietz 2000). In order to demonstrate the skewed nature of the comparison standard, we analyze this population for

malnutrition by classifying those children with a weight-for-age two standard deviations below the median in the standard population, using the *anthro* software developed by the CDC to calculate weight for age Z scores. According to this standard, 53% of the children studied qualify as malnourished. We consider this proportion to be unacceptably high, and in the final version of this paper will present analyses that use prior comparison standards and various thresholds to evaluate the standards and attempt to clarify our understanding of adolescent malnutrition. We hope to begin to construct comparison standards for developing countries in the absence of an appropriate standard population by which to judge the health of children in such nations.