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EXAMINING THE GENDER GAP IN NUTRITION: AN EXAMPLE FROM RURAL MEXICO

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Abstract—Gender differences in nutrient and food intake were examined in Mexican Nutrition CRSP (Collaborative Research Support Program) infants ($N = 75$), preschoolers ($N = 80$), and school children ($N = 91$). No significant gender differences in dietary quality or quantity were seen for infants and preschoolers. For school children, the contribution of various foods to total energy intake (dietary quality) was also quite similar for girls and boys. Equity in dietary quality remained even under conditions of economic and demographic stress. Nevertheless, school girls consumed significantly less energy per day than boys (~300 kcal/d or 1.3 mJ/d), and less of all micronutrients examined. Gender differences in estimated basal metabolic rates of school children were slight (~20 kcal/d), and body composition and size were similar. When energy intakes were expressed as a percent of estimated requirement (calculated from age, sex and weight using WHO/FAO/UNU equations), intakes were adequate and not significantly different between girls ($\bar{x} = 111\%$) and boys ($\bar{x} = 113\%$). Playground observations showed girls to be less active than boys, which may reflect both cultural and biological influences. Apparently due to this lower activity, school girls consumed less energy, and may have been at much higher risk than boys of micronutrient deficiency. The lower food intakes of girls did not appear to be due to purposeful dietary discrimination, but rather to culturally patterned sex roles involving lower activity. © 1997 Elsevier Science Ltd

Key words—gender differences, food intake, children, dietary quality, malnutrition, playground observations, Mexico

INTRODUCTION

In the Beijing Declaration, the Fourth World Conference on Women recently demanded the elimination of the world "gender gap" in nutritional status [1]. To accomplish this end, the Declaration called for the elimination of gender-based discrimination in diet and health, and emphasized the need for increased awareness of the nutritional needs of girls and women. Consequently, a need exists for research that documents the magnitude and prevalence of gender differences in nutrient and food intake, and explores with care the causes of gender differences in nutrition. The latter analyses are particularly important because public health solutions to the gender gap in nutrition will differ according to the origin of the gender inequalities. Because both social *and* biological factors affect gender-related nutritional differences, no analysis is complete without a consideration of both sets of influences.

Gender differences in nutritional status and diet are common in all populations, and these disparities will always have both social and biological components. Among adults, many nutritional and dietary differences are due to the varying biological needs of women and men. Iron deficiency, for instance, is much more common among women of childbearing age than among men because of iron loss during menstruation [2]. The demands of pregnancy and lactation also create higher risk of poor nutritional status [3]. Women often consume much less dietary energy than men, due to differences in body size, body composition, and activity [4]. When lower energy intakes are combined with higher nutrient needs, women may have difficulty consuming enough food to meet nutrient requirements. Iron deficiency in industrialized countries illustrates this situation, many affluent women being unable to meet iron needs despite diets that are often relatively rich in bioavailable iron.

Dietary discrimination is a more sinister cause of gender differences in diet and nutritional status. In all societies, gender inequalities exist in social status, economic resources, and power. This situation can lead to preferential feeding of males. The best documented cases of gender-based dietary and health discrimination come from parts of South Asia, where sex ratios markedly favor boys and

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mortality among girls is differentially high [5–8]. Disparities between the diets of girls and boys have also been reported in many other populations, boys usually being favored [9–13].

Dietary discrimination can be hypothesized to take either of two forms: reduced access to selected foods (differential *dietary quality*), or reduced access to all food (differential *dietary quantity*) [14]. In the former situation, special foods are channeled to boys, men, or other privileged members of the household. In Nepal, for example, Gittelsohn [14] observed that the channeling of specific foods to individuals often involved expensive or high status foods, rather than food in general.

Preferential *dietary quality* has been identified using observational techniques, the researcher meticulously recording food transactions at meals [14]. Food intake data can also provide strong evidence of differential dietary quality, if diets are analyzed as foods or food groups, and expressed as a percent of total energy intake (e.g. the proportion of total energy from meat). While gender differences in dietary quality are consistent with a diagnosis of gender discrimination, important gender differences in dietary quality can and do occur in the absence of dietary discrimination. For example, U.S. women and men have markedly different food intakes [15], but much of this is due to contrasting patterns of food selection, rather than dietary discrimination *per se*.

Preferential *dietary quantity*, the second possible form of dietary discrimination, is potentially much more difficult to identify than preferential *dietary quality*, due to the different energy requirements of females and males. In adolescents and adults, the energy requirements of females and males can differ by several hundred kilocalories [16]. Even in younger children, differences in the energy requirements of girls and boys can be substantial. The third U.S. National Health and Nutrition Examination Survey (NHANES III) found girls aged 6–11 years to consume 280 kcal/day less than boys the same age [17]. WHO/FAO/UNU analyses, using extensive observational data from both industrialized countries and affluent groups in developing countries, found boys to consume more energy than girls, whether the children were very young (1–2 years) or much older (9–10 years) [18]. This gender gap in energy intake exceeded 200 kcal/day (0.8 mJ/day) in 7–8 year olds, and approached 100 kcal/day (0.4 mJ/day) in 2–3 year olds. Recently, researchers used the doubly labeled water technique to investigate the energy expenditures of 81 English preschoolers aged 1.5–4.5 years [19]. Boys expended 3–7% more energy per kg than girls, which translated into a difference of approximately 100 kcal/day, depending on the age group.

Because girls and boys can have widely differing energy needs, depending on factors such as age and activity, researchers should consider non-discriminatory processes when assessing the causes of any gender gap in diet. In this paper, we examine gender differences in the food and nutrient intakes of rural Mexican children, using data from the Mexico NCRSP (Human Nutrition Collaborative Research Support Program). Because the Mexico NCRSP project collected a broad range of information, the data base provides a unique opportunity to examine carefully the social and biological causes of dietary differences between girls and boys. Information from three age cohorts (infants, preschoolers, and school-aged children) allows an investigation of possible age-related gender discrimination. Extensive dietary data permit an examination of gender differences in both dietary quantity and quality, while anthropometric data allow comparisons of child growth, energy stores, and energy requirements. Playground observation data document gender differences in activity, while social and economic data allow an investigation of factors that might potentially affect gender differences in diet.

RESEARCH METHODS

The Mexico Nutrition CRSP

Data were collected as a part of the Mexico NCRSP (Human Nutrition Collaborative Research and Support Program), a major prospective study of the functional consequences of marginal malnutrition [20, 21]. Funded by the U.S. Agency for International Development (USAID), the Mexico NCRSP was a collaboration of Mexico's *Instituto Nacional de la Nutrición Salvador Zubiran* (INNSZ) and the University of Connecticut. The research design was reviewed and approved by human subjects committees at both institutions.

The research setting

The Mexico NCRSP was conducted in six communities in the Solís Valley, a rural area approximately 100 km northwest of Mexico City. At the time of the fieldwork (1984–86), the most important economic activities of the valley were subsistence maize agriculture, local wage labor, and migration to wage labor opportunities elsewhere in Mexico [22]. Maize tortillas (a flatbread made from ground, lime-soaked maize) provided the bulk of dietary energy and many other nutrients [23]. Tortilla intakes were supplemented by varying amounts of other foods. Other than maize, home produced foods made minor contributions to local diets, and most foods were purchased [22].

Research subjects and households

The Mexico NCRSP was designed to investigate the functional effects of marginal malnutrition. The research design focused on: (i) pregnant women and their subsequent infants (up to 8 months), (ii) preschoolers (aged 18–30 months), (iii) school children (aged 7 and 8 years), and (iv) parents of subject