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Does living in slums or non-slums influence women's nutritional status? Evidence from Indian mega-cities

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ABSTRACT

This article examines the intra-city distribution of women's nutritional status across eight Indian mega-cities with a specific focus on slum–non-slum divide. The analysis is based on the National Family Health Survey (2005–06) of India and highlights the dual burden of malnutrition among urban women. The results show that one in every two women in mega-cities is malnourished (either undernourished or overnourished), but a biased, analytical focus on citywide averages conceals the nature of the problem. Overnutrition among women is notably higher in non-slum areas whereas underweight persists as a key concern among slum dwellers. Cities located in the Central India (Nagpur and Indore) have the highest proportion of underweight women whereas the cities in South India (Chennai and Hyderabad) show a high prevalence of overweight women across both slum and non-slum areas. The intensity of income-related inequalities in underweight outcome is much greater for non-slum areas, whereas inequalities in overweight outcomes are higher among slums. Furthermore, regression analysis indicates that place of residence as such has no significant impact on women's nutritional status and that this elementary association is primarily a ramification mediated through other key socioeconomic correlates. Results suggest that, it would be rational to develop a comprehensive urban nutritional plan that focuses on dietary planning and behaviour change to address both type of malnutrition at the same time.

Introduction

Increasing number of slums in mega-cities is a prominent feature of expanding developing economies such as India. According to the Census of India, 2011, around 31 percent of the Indian Population resides in urban areas (Registrar General of India, 2011). Importantly, much of the recent growth in urban population is lopsided with disproportionate increments among slums. For example, the Census of India, 2001 enumerated 11.9 million persons in Greater Mumbai and identified 54 percent as slum dwellers (Registrar General of India, 2005). These rapid proliferations are an outcome of both push and pull effects exerted on the population from backward regions of the country (DePaul, 2012; Government of India, 2010). Such heavy and continued in-migration has serious implications for urban health (Agarwal, Satyavarda, Kaushik, & Kumar, 2007). In this context, the interaction between disadvantaged socioeconomic characteristics and precarious slum environment is of particular interest (Brockerhoff & Brennan, 1998). For instance, individuals sharing illiteracy, poverty, and adverse water, sanitation and hygiene conditions are exceedingly vulnerable to undernutrition, whereas relatively better-off individuals with unhealthy diet and physical inactivity are at an elevated risk of obesity (FAO, 2006; Popkin, 1994; Prentice, 2006). Since these nutritional extremes (viz., undernutrition and obesity) are significantly associated with various communicable and non-communicable diseases, it is critical that policymaking considers the magnitude and varied dimensions of these intimidating concerns.

According to the anthropometric indicator of body mass index (BMI), 49 percent of the urban women in India (aged 15–49 years) are either underweight or overweight (IIPS & Macro International, 2007). This proportion is higher than the overall prevalence of malnutrition (both underweight and overweight) among urban men (42%). Although both men and women are equally affected by undernutrition (around 25%); the prevalence of overweight is relatively higher among urban women (24%) than among urban men (16%). With this motivation, we focus on gender-related disadvantages among urban women disproportionately affected by a simultaneous prevalence of undernutrition and obesity.

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It is argued that poor socioeconomic conditions disallow the reversal of undernutrition trends, whereas practical considerations such as lack of time, restrictive sociocultural outlook, social expectations, fear and shame and interwoven cultural norms constrain women from adopting a fitness regimen (Lawton, Ahmad, Hanna, Douglas, & Hallowell, 2006). Yet, unlike developed countries, where obesity is generally concentrated among low-income groups, elevated adiposity levels in developing countries are particularly associated with women from the richer sections of society (Cohen, Finch, Bower, & Sastry, 2006; Corsi, Kyu, & Subramanian, 2011; Ellaway, Anderson, & Macintyre, 1997; Khan & Kraemer, 2009; Mendez, Monteiro, & Popkin, 2005; Popkin, 2001; Pouliou & Elliot, 2010; Robert & Reither, 2004; Shafique et al., 2007; Tanumihardjo et al., 2007; Uthman, 2009). Clearly, socioeconomic status intermediates and reinforces the malnutrition–gender nexus. Nevertheless, further research is necessary to discern the nature of the problem within mega-cities, which is increasingly sub-divided into precarious slums.

Additionally, given the large intra-urban differentials, its categorisation as a homogenous entity warrants close scrutiny. This paper, therefore, epitomises this residential segregation to unravel the intra-city disparities in nutritional health of women. Specifically, we ask whether duality in women's nutritional status cuts across a mega-city or whether policy should treat slum areas differently from non-slum areas. With massive urban health investment in the policy agenda (NUHM, 2010; The Economic Times, 2012), it is expected that insights from this paper can be of some relevance while planning towards 'healthy cities' (WHO, 1995a, 2012).

Data and methods

The data for the analysis is obtained from the 2005–06 National Family Health Survey (NFHS) of India. The NFHS is a cross-sectional, multi-stage household survey and is similar to the Demographic Health Surveys in structure and format. It is critical to note that the NFHS (2005–06) covered sub-samples from eight mega-cities of India, namely Mumbai, Delhi, Kolkata, Chennai, Hyderabad, Indore, Meerut and Nagpur. These cities have significant slum populations and were sampled on the basis of an area classification scheme of the Census of India, 2001. To elaborate, the Census of India (2001) identified slums on the basis of three criteria: 1) all specified areas in a town or city notified as 'slums' by state/local government and union territory administration under any act including a 'slum act'; 2) all areas recognised as 'slum' by state/local government and union territory administration, housing and slum boards, which may have not been formally notified as slum under any act; and, 3) a compact area of at least 300 population or about 60–70 households living in poorly built, congested tenements in an unhygienic environment, usually with inadequate infrastructure and lacking in proper sanitary and drinking water facilities (Registrar General of India, 2005). From each mega-city, a representative sample was selected with more or less similar proportion of households surveyed from both slum and non-slum areas (IIPS & Macro International, 2007).

The NFHS (2005–06) collected information regarding the height and weight of women aged 15–49 years. This information was transformed into a widely accepted anthropometric indicator of adult nutritional status, viz., the BMI, which was defined as the ratio of weight (in kilogramme) to the square of height (in metre). Using BMI, an individual is classified as *underweight* if BMI $\leq$ 18.5 kg/m^2, *balanced* if 18.5 kg/m^2 $\leq$ BMI $\leq$ 25.0 kg/m^2 or *overweight* if BMI $\geq$ 25.0 kg/m^2 (WHO, 1995b). Due to possibility of weight fluctuations, we exclude cases where the respondent was either pregnant or had given birth in the two months preceding the survey. Therefore, the final sample available for analysis consists of 19,448 women. State sampling weights, corrected for oversampling, are used for city-wide analysis and while performing combined eight-city analysis national women's weight is used (Gupta, Arnold, & Lhungdim, 2009). A range of the theoretically pertinent demographic, socioeconomic, behavioural and dietary covariates is examined to comprehend their association with nutritional status. In addition to conventional variables such as age, education, caste and wealth status, we focus on place of dwelling as a critical correlate of women's health and social status in India.

Although the NFHS (2005–06) defined an all-India wealth index (Filmer & Pritchett, 2001; IIPS & Macro International, 2007), some scholars (for instance, Hazarika, 2009) have raised concerns regarding the sensitivity of the NFHS wealth index in identifying the true economic status of individuals in slum areas. Therefore, to ensure consistent intra-city ranking of households, we reconstruct the index based on city-specific asset profiles. The variables for wealth index construction (details available from authors on request) are selected on the basis of theoretical rationale and statistical significance suggested by Mohanty (2009).

Concentration curve (CC) and concentration index (CI) are employed to examine socioeconomic rank-related inequalities in the distribution of women's nutritional status (Wagstaff, Paci, & Doorslaer, 1991). The CC plots cumulative proportions of population ranked using socioeconomic ranks (low to high) on the *x*-axis against the cumulative proportions of ill health on *y*-axis. For interpretative purposes, if the burden of undernutrition (or overnutrition) is equally distributed across socioeconomic status, the CC coincides with the diagonal. If undernutrition (or overnutrition) is concentrated among poorer women, the CC lies above (or below) the diagonal; also, the farther the CC from the diagonal, the greater would be the degree of inequality. The CI captures the magnitude of income-related inequalities and is defined as twice the area between the CC and the diagonal and ranges between $+1$ and -1. While zero indicates absence of income-related inequality, a negative (or positive) value indicates greater concentration among the poor (or rich). Finally, a generalized form of logistic regression—the multinomial logit (MNL) model—is employed to understand the risk of nutritional imbalance associated with slums and non-slums. The analysis controls for basic socioeconomic and demographic correlates and the results are presented in the form of relative risk ratios (RRRs) with corresponding significance levels of correlates. These RRRs are used to interpret the expected risks of underweight or overweight associated with a unit change in a variable, given that other correlates in the model are held constant. All the statistical analysis has been performed using Stata 10 (Statacorp, 2007).

Results

Socioeconomic background and nutritional status

The socioeconomic and demographic characteristics presented in Table 1 inform us that around one-third of women (aged 15–49 years) from these mega-cities reside in slum areas. Also, over one-fifth of these women are illiterate and over 30 percent of them are placed in the lowest wealth quintile. The impact of the high fertility regime in rural areas is apparent in the form of high birth parities among slum dwellers. Additionally, the fact that a greater proportion of slum dwellers are affiliated with marginalized sub-groups such as Scheduled Castes (SCs) and Muslims, only intensifies their vulnerabilities (Government of India, 2006; Mainnuddin, 2011; Robinson, 2008).

A simultaneous prevalence of undernutrition and overnutrition in a given population can be referred to as malnutrition duality (FAO, 2006). What is immediately discernible from Fig. 1 is that