Short Report

Household food security in urban Tamil Nadu: A survey in Vellore

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ABSTRACT

Background. Food security has been a matter of concern in recent years due to the global food crisis and rising food prices. We aimed to study the level of food security in a densely populated urban area in southern India.

Methods. A door-to-door survey of 130 households in an urban area in Vellore district, Tamil Nadu was done and information on food security status was collected using the United States Department of Agriculture Household Food Security Scale, on socioeconomic status using the modified Kuppuswamy scale and demographic details.

Results. Of the 130 households surveyed, food insecurity with hunger was present in 61.5% (95% CI 52.98%–70.02%), food insecurity without hunger in 13.1% (95% CI 7.2%–19%) and food security in 25.4% (95% CI 17.8%–33%) of the households. Prevalence of any form of food insecurity was present in three-fourths of the households (74.6%; 95% CI 67%–82.2%). Only 76 (58.5%) households used the public distribution system for buying rice—the staple food, and 63 (82.9%) households in the lower socioeconomic strata used the public distribution system for buying rice.

Conclusions. Despite good penetration of the public distribution system in Tamil Nadu, the prevalence of food insecurity in urban areas is high. Nationwide and regional urban–rural food security data need to be studied to influence policy regarding the means to reduce food insecurity in India.

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INTRODUCTION

Food security is defined as physical and economic access to all people at all times to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.[1] Four important aspects of food security are sufficiency, access, security and time frame. Researchers in the 1990s understood that food security at the household level varies between different members and the response to a status of food insecurity also changes considerably.[2]

The WHO recognized the global food insecurity crisis and rising food prices as major problems. The main reasons reported for this were rapidly increasing cost of energy, decreasing investment in agriculture, economic growth and food demands disproportionate to availability, climate change and export restrictions.[3] While this is the scenario globally, India has a peculiar situation. As on 1 June 2009, the Government of India had a stock of 535 lakh tonnes (53.5 million tonnes) of foodgrains as against the required 496 lakh tonnes (49.6 million tonnes).[4] Despite this excess of foodgrain production, all Indians do not have food security. One of the reasons for this is failure of the public distribution system (PDS). The problem with the PDS seems to be that it does not reach the people who actually need it.[5] Much remains to be done in India to address this state of food insecurity.

According to the 2001 Census, about 30% of our population lives in urban areas.[6] Poverty among rural marginal farmers contributes to urban migration. This leads to formation of the unorganized work force and slum settlements in urban areas. The urban poor are worse off than the rural poor in terms of food security.[7] Data on food insecurity in urban slums of Delhi show that it is as high as 51%.[8]

One of the poverty alleviation measures taken in India is the PDS. Essential commodities such as rice, wheat, sugar, kerosene, etc. are supplied to the public at a low cost. In 1997, the Government of India introduced targeted PDS, where subsidies would be targeted to families below the poverty line (BPL).[9] Tamil Nadu has one of the best functioning PDS, which is non-targeted. The most important contributor to the success of the PDS in Tamil Nadu is the involvement of cooperative societies, with >93% of the fair price shops being run by these societies.[9] The PDS offers 2 types of cards which are colour-coded—green and white. The green cards offer 20 kg of rice at Rs 1 per kg and also offer sugar, wheat, kerosene, flour and pulses. The white card does not offer subsidized rice but offers sugar and other commodities. Despite these successes, some parts of Tamil Nadu remain unreached by the PDS.

This cross-sectional survey was done among a densely populated urban area in Tamil Nadu, inhabited by predominantly unorganized workers, to assess the level of food security in the context of widespread availability and dissemination of the PDS in the state.

METHODS

The survey was done in a densely populated urban location in the Corporation of Vellore district of Tamil Nadu. The population of this area is 42 121 living in 9147 houses with an average family size of 4.6. This area is served by the Urban Health Unit of the Department of Community Health, Christian Medical College (CMC), Vellore. The Department of Community Health Nursing, CMC, Vellore has trained public health nurses visiting these areas and providing preventive and primary care and referral services to secondary and tertiary care centres. There is also a weekly clinic run by a doctor for primary care services. The predominant occupation of the people in this area is rolling of hand-made cigarettes from unrefined tobacco, which are locally referred to as *beedis*. The average income from rolling a thousand *beedis* is Rs 40. The average time needed to roll a pack of thousand *beedis* is 2–3 days. In the organized sector the national average minimum wage is

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Rs 80 per day.[10] But here the work is unorganized and the wages are based on the work done per day. The work is also contract-based and entire families including children are involved in rolling *beedis*. The survey was conducted between May and June 2009.

All permanent residents of the area were eligible to participate in the survey. Data were collected using a standard questionnaire by a door-to-door personal interview of the head of the household or the housewife, whoever was available at the time of the interview. The questionnaire had 3 components: (i) the US Department of Agriculture—Household Food Security Scale;[11] (ii) the modified Kuppuswamy scale for measuring socioeconomic status;[12] and (iii) a demographic component.

Qualitative studies of people from low income areas in the USA showed that uncertainty and anxiety about food, perceived insufficient quality and quantity of food, reported reduced food intake, consequences of reduced food intake and a feeling of shame in resorting to socially unacceptable methods of procuring food, were all feelings which people experienced when they encountered food insecurity.[13] Using these findings, the US Department of Agriculture developed the 18-item questionnaire which was found to be a robust and reliable measure of household food security.[11] The questionnaire had items about anxiety, perception and recall of instances of reduced food intake or starvation over the past 12-month period. A pre-specified score was given to responses for each of the 18 questions. The household was assigned the highest score on the questionnaire, each question being considered individually. For example, if a household got a score of 4 for question 1 and a score of 9 on question 7, the household was assigned a score of 9, which is the highest score for any question for the household. Based on the score, the household was classified into one of 4 categories as food secure, food insecure without hunger, food insecure with hunger or food insecure with severe hunger. Though this scale was not specifically validated for the purpose of this study, construct and content validity were ensured after close scrutiny of the questionnaire.

The modified Kuppuswamy socioeconomic scale, including questions on income, education and occupation of the household, was used to perform socioeconomic stratification of this population.[12] The socioeconomic status was stratified as upper class, upper middle, lower middle class and upper lower and lower class based on the score.

The prevalence of food insecurity in urban India was reported to be 44%.[14] Using this prevalence and for a relative precision of 20%, the sample size required was calculated using the formula $N=4\times P\times(1-P)/D^2$ to be 127 rounded off to 130, where N is the sample size, P is the prevalence of food insecurity in India and D is relative precision of the estimate. A lenient relative precision of 20% was adopted because it would give the most efficient sample size to understand the larger picture of food insecurity in the population, though the estimates may have a wider confidence interval.

Sampling was done by a systematic random method. A random start was selected in the area and every tenth house in the street was interviewed from the random start towards the left. In case a locked house was encountered, the adjacent house was included and every tenth house from there was interviewed. This was continued till the required sample size was reached.

The data were entered in the Epi Info 2002 statistical software package and analysed. Prevalence of food insecurity and specific types of food insecurity were calculated with 95% confidence intervals. Chi-square test for trend of food insecurity in the various socioeconomic classes was done. Prevalence odds ratio and 95% confidence intervals were calculated for association between food insecurity and utilization of the PDS.

RESULTS

All the households contacted responded to the survey. It was notable that 7.8% of the households interviewed had more than 8 members. About 20% of the houses had ≥3 children. Among the 130 households, 67.7% belonged to the lower socioeconomic class (Table I).

Food insecurity with hunger was present in 80 households (61.5%; 95% CI 52.9%–70.0%), food insecurity without hunger in 17 households (13.1%; 95% CI 7.2%–19%) and food security in 33 households (25.4%; 95% CI 17.8%–33%). Prevalence of any form of food insecurity was 74.6% (95% CI 67%–82.2%).

There was a trend of increasing food insecurity as the socioeconomic class became lower (Fig. 1). The chi-square test for trend was 73.5 for 6 degrees of freedom ($p<0.0001$).

Only 76 households (58.5%) used the PDS for buying rice, the staple food. A total of 63 (82.9%) households in the lower socioeconomic strata used the PDS for buying rice. The odds of food insecurity among those using the PDS were 2.44 (95% CI 1.5–3.8) times the odds among those not using it.

TABLE I. Characteristics of the households surveyed

Characteristic	Frequency (%)
Number of household members	
<4	14 (10.7)
4–8	106 (81.5)
> 8	10 (7.8)
Number of children in the house	
0	21 (16.2)
1	24 (18.5)
2	57 (43.8)
3	16 (12.3)
> 3	12 (9.2)
Socioeconomic status	
Upper class	6 (4.6)
Upper middle class	8 (6.2)
Lower middle class	28 (21.5)
Lower class	88 (67.7)

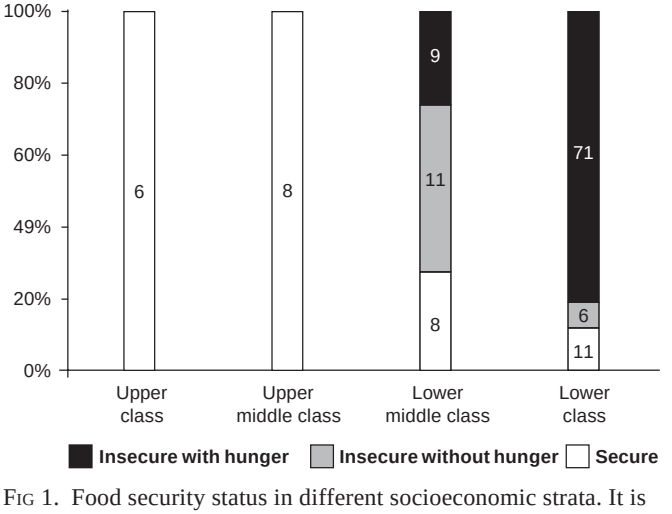

FIG 1. Food security status in different socioeconomic strata. It is seen that all people in the upper and upper middle class had food security. Food insecurity started in the lower middle class.

DISCUSSION

The prevalence of food insecurity of any form was 74.6% (95% CI 67%–82.2%). There was a high prevalence of food insecurity with hunger (61.5%; 95% CI 52.9%–70.0%), which was considerably higher than in other urban areas of India.[14] We also noticed that as the socioeconomic status reduced, the prevalence of any form of food insecurity increased. Close to 60% of the households surveyed used the PDS for purchasing rice. About 17% of the households belonging to the lower socioeconomic class did not buy rice from the PDS.

The population living in the urban area surveyed has a homogeneous lifestyle. Most of them are involved in making *beedis* for a living. There is a high likelihood that the sampled households represent the situation in the whole population of the area. We did not collect information on how many of the households had PDS cards. It has been reported that one of the reasons for failure of the PDS is because in some urban areas the really poor and needy people do not have a ration card.[9] It would have been useful to inform policy if the information was available of how many households have ration cards and how many do not. The study showed that the odds of food insecurity among households using the PDS for rice were 2.44-times that for households not using the PDS. This has to be interpreted keeping in mind that the estimated prevalence odds ratio does not give an indication of the temporal sequence between food insecurity and utilizing the PDS. While this might suggest that using the PDS system led to food insecurity, actually the PDS system has penetrated houses where there is income inadequacy and food insecurity. This interpretation is supported by the fact that about 82% of the houses in the lower socioeconomic class used the PDS for buying rice. However, despite the benefit of the social security system in the form of a PDS, low income households continued to be food insecure.

Food security measured in this survey is a direct measure of the household's ability to afford food. The food security scale does not consider other aspects of food security such as gender discrimination in food allotment, quality of the food consumed, food fads, beliefs and preferences. All these aspects could have a bearing on food security. Therefore, these aspects would have to be studied in a rigorous manner.

We observed that among the lower socioeconomic class 12.5% of households and among the lower middle class 28.5% of households were food secure. This has been noticed before while using the household food security questionnaire.[11] The exact reasons for this are not understood. The probable explanations for this are differing perceptions of people and differing prioritization of requirements in a situation of low resources, e.g. a low income household might prioritize education and housing over food and might be food insecure, while another household might prioritize food over the other two and might be food secure. While the food security scale gives a good indication of the dimension of well-being of a household, it is not comprehensive. There are many other dimensions such as general health, accessibility to resources and psychosocial health to a general well-being assessment, which cannot be captured by this scale.

The food security scale indicates the status of the household as a whole; it does not give an indication of what is happening to the individual. The items in the questionnaire are also considered independent of each other and a comprehensive picture is not obtained. For example, a household might have adult hunger, but the score for child hunger if present in that same house, dominates the picture. It is assumed that when there is child hunger there is also likely to be adult hunger. The exact dynamics of intra-familial food distribution were not studied.

The status of food insecurity in this urban population is higher than the previous reported prevalence of 40%–50% in other studies.[8,14] While the methodology of assessment of food security and the instruments used were different in previous studies, other possible reasons for the difference are dense population, average family size of 4.6, unorganized occupation and low socioeconomic status. State-wise and urban–rural comparisons need to be made to understand this situation in greater detail. This emphasizes the need for more such studies on food insecurity in the country.

In conclusion, there was a high prevalence of food insecurity in a densely populated urban area of Vellore. This is despite the good penetration of the PDS in the state and among the population studied. Factors leading to this high prevalence of food insecurity need to be studied in detail. Nationwide and regional urban–rural food security data needs to be studied to influence policy regarding the means to reduce this food insecurity problem in developing countries such as India.

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