Household food security in an urban slum: Determinants and trends

Nikitha Dharmaraju1, Sonam Shah Mauleshbhai1, Nirupama Arulappan1, Beeson Thomas1, D. Sam Marconi1, Sherin Susan Paul2, Venkat Raghava Mohan1

1Department of Community Medicine, Christian Medical College, Vellore, Tamil Nadu, 2Pushpagiri Institute of Medical Sciences and Research Centre, Thiruvalla, Kerala, India

ABSTRACT

Introduction: As we are moving from millennium development goals to sustainable development goals, food insecurity is imposing a formidable challenge to the policymakers, especially in developing countries such as India. A survey conducted in the urban slum areas of Vellore district, 6 years back, had reported food insecurity as high as 75%. The current study was a resurvey to assess the food security status in the aforementioned area. Materials and Methods: A community-based survey was conducted in which data were collected using a self-administered questionnaire from 150 households, selected through multistaged cluster sampling, who had given oral consent to be a part of the survey. The prevalence of food security calculated from this study was compared with the results from a previous survey to look for any significant improvement. Results: Nearly 42.7% of the households were food secure, while 26.7% were food insecure without hunger and 30.6% were food insecure with some degree of hunger. Low socioeconomic status (odds ratio [OR]: 3.25, 95% confidence interval [CI]: 1.29–8.16; P < 0.012) and presence of debt (OR: 3.84, 95% CI: 1.90–7.73; P < 0.001) were the major risk factors for food insecurity. A comparison with the findings from the previous study has shown a statistically significant improvement in food security from 25.4% to 42.7% (Chi-square: 27.072, df: 2, P < 0.0001). Conclusion: Although food security levels have shown marked improvement over the years, much needs to be done for India to be free from the shackles of hunger.

Keywords: Food security, nutrition, sustainable development goal

Access this article online

Website: www.jfmpc.com

DOI: 10.4103/jfmpc.jfmpc_185_17

How to cite this article: Dharmaraju N, Mauleshbhai SS, Arulappan N, Thomas B, Marconi DS, Paul SS, et al. Household food security in an urban slum: Determinants and trends. J Family Med Prim Care 2018;7:819-22.
the local vegetable market and also in the nearby construction sites. The unorganized nature of work makes these occupations vulnerable to exploitative practices followed by the business owners and, as a result, the wage levels are generally much below the minimum wages prescribed by the government.\[^4\]

A structured questionnaire was administered to 150 households who had given oral consent for being part of the survey and were randomly selected from five urban clusters, using multistage sampling technique. The house surgeons posted in the Department of Community Medicine collected the data. Sociodemographic and occupational characteristics of the family members were obtained. The socioeconomic status (SES) of the families was assessed using the modified Kuppuswamy scale 2012 which classifies households into “Upper,” “Upper middle,” “Lower middle,” “Upper lower,” and “Lower” socioeconomic strata.\[^5\] Food security status of the households was assessed using a Household Food Security Survey (HFSS) questionnaire which was developed by the United States Department of Agriculture. The validity of this survey instrument has been demonstrated worldwide and it classifies the household as “Food secure,” “Food insecure without hunger,” “Food insecure with hunger-moderate,” or “Food insecure with hunger-severe.”\[^6\]

The data entry and analysis was done using Epi-Info 7.0, a free software developed by the Centers for Disease Control and Prevention, Atlanta, USA. The prevalence of various categories of food security was calculated. To measure the association of food insecurity with factors such as socioeconomic class, utilization of public distribution system (PDS), family size, and family type, prevalence odds ratio (OR) with 95% confidence interval (CI) was also calculated. The prevalence of food security was compared with the data obtained from the previous survey conducted and published\[^6\] by the same department few years back. This was done for measuring any increase in prevalence and the significance of the observed difference was analyzed using Chi-square test for independence of two attributes.

### Results

A total of 150 households were contacted for the survey and all the households were willing to participate. Majority of the households (64%) were nuclear families and most (93.3%) of the participants were Hindus. Even though the survey was conducted in urban slums, the proportions of huts were relatively low (18%). The mean family size was 4.64, with maximum size being 9 and minimum being 1; 54.7% of the respondents had household size of 5 or more. Seventy-eight percentage of the households had head of the families being unemployed or employed as unskilled/semiskilled workers and only 6% of the head of families had been to college. Majority (73.3%) of the households belonged to upper lower socioeconomic class. Almost 80% of the households had a valid ration card and 81.3% received some form of ration through the PDS. Out of the 150 households, 45% reported to have household debts. The households were assessed for food security status using the HFSS questionnaire. Of the 150 surveyed, 64 (42.7%) were food secure households, while 26.7% were food insecure without hunger. A total of 30.6% of the households reported food insecurity with some degree of hunger [Table 1].

| Characteristics                      | Frequency (%) |
|--------------------------------------|---------------|
| **Type of family**                   |               |
| Nuclear                              | 96 (64)       |
| Joint                                | 54 (36)       |
| **Type of house**                    |               |
| Hut                                  | 27 (18)       |
| Mixed house                          | 44 (29.3)     |
| Pucca house                          | 76 (50.7)     |
| Mansion                              | 3 (2)         |
| **Religion**                         |               |
| Hindu                                | 140 (93.3)    |
| Christian                            | 5 (3.3)       |
| Muslim                               | 5 (3.3)       |
| **Household size**                   |               |
| Up to four members                   | 68 (45.3)     |
| Five or more members                 | 82 (54.7)     |
| **Occupation of head of household**  |               |
| Unemployed                           | 17 (11.3)     |
| Unskilled worker                     | 62 (41.3)     |
| Semi-skilled worker                  | 39 (26)       |
| Skilled worker                       | 13 (8.7)      |
| Farmer/clerk/shop-owner              | 16 (10.7)     |
| Semi-professional                    | 3 (2)         |
| Professional                         | 0             |
| **Education of head of household**   |               |
| Illiterate                           | 45 (30)       |
| Primary school                       | 31 (20.7)     |
| Middle school                        | 37 (24.7)     |
| High school                          | 28 (18.7)     |
| Posthigh school diploma              | 7 (4.7)       |
| Graduate or postgraduate             | 2 (1.3)       |
| Professional or honors               | 0             |
| **Socioeconomic status**             |               |
| Lower                                | 16 (10.7)     |
| Upper lower                          | 110 (73.3)    |
| Lower middle                         | 20 (13.3)     |
| Upper middle                         | 4 (2.7)       |
| Upper                                | 0             |
| **Ration card**                      |               |
| Yes                                  | 119 (79.3)    |
| No                                   | 31 (20.7)     |
| **PDS coverage**                     |               |
| Yes                                  | 122 (81.3)    |
| No                                   | 28 (18.7)     |
| **Household debt**                   |               |
| Yes                                  | 67 (44.7)     |
| No                                   | 83 (55.3)     |
| **Food security status**             |               |
| Food secure                          | 64 (42.7)     |
| Food insecure, without hunger        | 40 (26.7)     |
| Food insecure, with hunger-moderate  | 41 (27.3)     |
| Food insecure, with hunger-severe    | 5 (3.3)       |

**Note:** PDS: Public Distribution System

---

**Table 1: Baseline characteristics of the households surveyed**
Discussion

Prevalence of food security

The prevalence of food security was found to be 42.7% (95% CI: 34.6–50.7). This is lower than the percentage of food secure households found in studies conducted in other developing nations such as Iran (59.1%) and the Philippines (65%). The prevalence is better than the estimates of countries such as Bangladesh, Burkina Faso (27%), and Bolivia (30%), but the tools used in studies for measuring food security in each of these countries were different. A high degree of correlation has been found between the gross domestic product (GDP) per capita of a country and the level of food security. The Global Food Security Index, 2015, supports these findings and points out that the food security situation across regions is improving with the increase in GDP and other indices of economic productivity. India enjoys a relatively higher degree of food security among the low-middle income nations and this phenomenon can be explained partially through the rapid growth in economy witnessed in the late 1990s and 2000s. Even though the focus of economic reforms undertaken in the 1990s was on service sector, the primary and secondary sectors benefitted collaterally due to a very rapid growth in service sector. Furthermore, the impact of “Green Revolution” on agricultural productivity lasted for a very long time, propelling the food security status of the nation. The Food and Agricultural Organization also states that more progress could have been made if agricultural reforms and restructuring of the PDS were undertaken on time.

Comparison with the previous study

On comparison with a similar survey done in the same area 6 years back, the findings on household food security show significant improvement. The prevalence of any form of household food insecurity decreased from 74.6% to 57.3%. A more dramatic change was observed in households having food insecurity with hunger; the prevalence reduced from 61.5% to 30.6%. The PDS coverage in Tamil Nadu remained relatively unaltered for many years now; approximately 80% of the total population. Despite this, the significant improvement in figures may be attributed to the increase in the quality of Tamil Nadu PDS, in terms of the number of items available and the measures taken to bring down pilferage. The household food security figures obtained in the present study are similar to the findings of studies done elsewhere in the state. This shows that the PDS has performed consistently throughout the state.

![Figure 1: Food security status in different socioeconomic classes. *The numbers written on the stacks indicate the number of households with the respective food security status](image)

![Table 2: Factors associated with household food insecurity](table)

| Characteristics                  | Food secure (%) | Food insecure (%) | P    | OR (95% CI) |
|----------------------------------|----------------|-------------------|------|-------------|
| Family type                      |                |                   |      |             |
| Nuclear                          | 30 (55.6)      | 24 (44.4)         | 0.741| 0.89 (0.45-1.75) |
| Joint/extended                   | 56 (58.3)      | 40 (41.7)         |      |             |
| Family size                      |                |                   |      |             |
| Five or more members             | 51 (62.2)      | 31 (37.8)         | 0.186| 1.55 (0.81-2.98) |
| Up to four members               | 35 (51.5)      | 33 (48.5)         |      |             |
| PDS coverage                     |                |                   |      |             |
| Yes                              | 71 (58.2)      | 51 (41.8)         | 0.655| 1.20 (0.53-2.75) |
| No                               | 15 (53.6)      | 13 (46.8)         |      |             |
| Household debt                   |                |                   |      |             |
| Yes                              | 50 (74.6)      | 17 (25.4)         | <0.001| 3.84 (1.90-7.73) |
| No                               | 36 (43.4)      | 47 (56.6)         |      |             |
| Socioeconomic class              |                |                   |      |             |
| Higher                           | 78 (61.9)      | 48 (38.1)         | 0.012| 3.25 (1.29-8.16) |
| Lower                            | 8 (33.3)       | 16 (66.7)         |      |             |

OR: Odds ratio; CI: Confidence interval; PDS: Public Distribution System

![Table 3: Food security data in comparison with the previous study](table)

| Food security status                  | Current study Frequency (%) 95% CI | Previous study Frequency (%) 95% CI |
|--------------------------------------|-----------------------------------|------------------------------------|
| Food secure                          | 64 (42.7) 34.6-50.7               | 33 (25.4) 17.8-33                   |
| Food insecure, without hunger        | 40 (26.7) 19.5-33.9               | 17 (13.1) 7.2-19                    |
| Food insecure, with hunger           | 46 (30.6) 23.3-38                 | 80 (61.5) 52.9-70                   |

CI: Confidence interval
Influence of socioeconomic status and debt

As found in previous studies, household food insecurity has an inverse correlation with SES assessed using objective scoring systems. More than 50% of the lower SES households reported hunger associated with food insecurity while no household in upper middle class has any forms of hunger. Another important finding was the significant association between household debt and food insecurity. Those households with debts were at higher risk of household food insecurity (OR: 3.84, 95% CI: 1.90–7.73) when compared to household with no debts. The rise of a class of moneylenders who provide faster short-term loans to those outside the banking system at interest rates as high as 100% is a major concern. Even though the government has passed several legislations against their operations, there is a vast population still dependent on them for emergency finance.

Strength and limitations

The Department of Community Medicine has a strong rapport with the community where the survey was conducted. This gave us good physical access to the area to collect data, which increased the robustness of the data collected. The study was intended to find out only the prevalence of food security. It was not powered enough to find out any potential risk factors.

Conclusions

The household food security situation in urban slums of Vellore is still precarious, but rapid strides have been made in the recent times. The level of hunger associated with food insecurity has been halved over the period of last 6 years, but it is still at unacceptably high levels. More research is needed to find out the reasons behind the high levels of food insecurity and hunger in spite of a relatively high coverage of universal PDS.

Acknowledgment

We extend our sincere thanks to the Department of Community Health, Christian Medical College, Vellore, for all the logistics provided.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Millennium Development Goals and Beyond, United Nations Organisation. Available from: http://www.un.org/millenniumgoals/poverty.shtml. [Last accessed on 2016 Jan 14].
2. Mutisya M, Kandala NB, Ngware MW, Kabiru CW. Household food (in)security and nutritional status of urban poor children aged 6 to 23 months in Kenya. BMC Public Health 2015;13:1052.
3. Baig-Ansari N, Rahbar MH, Bhutta ZA, Badruddin SH. Child’s gender and household food insecurity are associated with stunting among young Pakistani children residing in urban squatter settlements. Food Nutr Bull 2006;27:114-27.
4. Gopichandran V, Claudius P, Baby LS, Felinda A, Mohan VR. Household food security in urban Tamil Nadu: A survey in Vellore. Natl Med J India 2010;23:278-80.
5. Sabale RV, Kowli SS, Chowdhary PH. Working condition and health hazards in beedi rollers residing in the urban slums of Mumbai. Indian J Occup Environ Med 2012;16:72-4.
6. Bairwa M, Rajput M, Sachdeva S. Modified Kuppuswamy’s socioeconomic scale: Social researcher should include updated income criteria, 2012. Indian J Community Med 2013;38:185-6.
7. Sharma R, Saini NK. A critical appraisal of Kuppuswamy’s socioeconomic status scale in the present scenario. J Family Med Prim Care 2014;3:3-4.
8. Gulliford MC, Nunes C, Roke B. The 18 household food security survey items provide valid food security classifications for adults and children in the Caribbean. BMC Public Health 2006;6:26.
9. Gholami A, Foroozanfar Z. Household food security status in the Northeast of Iran: A cross-sectional study. Med J Islam Repub Iran 2015;29:227.
10. Melgar-Quinonez HR, Zubieta AC, McNelly B, Nteziyaremye A, Gerardo MF, Dunford C, et al. Household food insecurity and food expenditure in Bolivia, Burkina Faso, and the Philippines. J Nutr 2006;136:1431S-1437S.
11. Hillbruner C, Egan R. Seasonality, household food security, and nutritional status in Dinajpur, Bangladesh. Food Nutr Bull 2008;29:221-31.
12. Global Food Security Index-overview. Available from: http://www.foodsecurityindex.eiu.com/Index/Overview. [Last accessed on 2016 Jan 21].
13. Food and Agricultural Organization. Rapid Growth of Selected Asian Economies: Lessons and Implications for Agriculture and Food Security. Bangkok: FAO Regional Office; 2006.
14. Nagavarapu S, Sekhri S. Plugging PDS pilferage: A Study of an SMS-based monitoring project. Econ Polit Wkly 2014;49:61-5.
15. Nnakwe N, Yegamma C. Prevalence of food insecurity among households with children in Coimbatore, India. Nutr Res 2002;22:1009-16.
16. Unsavory Past. Available from: http://www.frontline.in/static/html/fl2708/stories/20100423270810700.htm. [Last accessed on 2016 Jan 21].