Short Communication

Prevalence, influencing factors and control of food insecurity: a model in the northwest of Iran

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Food insecurity is frequent in both developed and developing countries, affecting from 5% to 25% of the general population. The aim of this study was to assess food insecurity, its influencing factors and control measures in the northwest of Iran. A total population of 15,070 (2,911 households) were studied. A short questionnaire was used for the screening of food insecurity and energy intake in this study. After the screening programme, those families identified as having food insecurity were recruited for the second part of the study which was a community trial. We organized small training campaigns (through peer education) for target households. Six months later, the same techniques were applied again to assess the impact of educational intervention in reducing the rate of food insecurity. Total prevalence of food insecurity in the study population was 59.3 percent (95% confidence interval: 57.4-61.3). Logistic regression showed that apart from the mother's age and smoking status of the head of the family, there was a significant association between household food insecurity and other variables in the model (mainly economic factors). The prevalence of food insecurity reduced by 7.3 percent after the intervention (p>0.10). The high prevalence of food insecurity in this study indicates that there is an urgent need for a close collaboration between governmental, international and local leadership to identify and implement the key interventional programmes to overcome this ever increasing health problem. According to our findings, a special attention should be paid on the economic improvement in the region.

Key Words: food insecurity, prevalence, causes, control, epidemiology

INTRODUCTION

Food security has been defined as access by all people at all times to enough food for an active and healthy life. In other words, food security is the availability of adequate and safe foods for everyone in the community through a socially acceptable way. It has considerable health impacts on the physical, social, and psychological status of individuals in communities suffering from food insecurity.[1-3] It is frequent in both developed and developing countries, affecting from 5% to 25% of the general population.[4-10]

Mothers living in food-insecure households are significantly more likely to report symptoms of depression, such as feeling of loneliness and sadness compared to those living in food-secure families. Food insecurity is also associated with less positive interaction between parents and their new babies. Research reports showed that parents in food-insecure households have less attention to infant behavior, its social and emotional growth compared to parents in food-secure households.[3,11] In addition to the effect of food insecurity on the households' quality of life, it can increase the risk of underweight in individuals.[12]

The main aim of this study was to assess food insecurity, its influencing factors and control measures in the northwest region of Iran, and to develop a public health model to reduce the rate of household food insecurity in the region.

MATERIALS AND METHODS

The total populations in the area (2,911 households with a total of 15,070 individuals) in three suburban districts in the northwest of Iran were recruited in this study. Of the study households, 2,442 were enrolled in the programme giving a response rate of 83.9 percent. The details of the study population and the area are presented in table 1.

A short questionnaire was used for the screening of food insecurity and energy intake in the study population. The questionnaire had six questions: 1) Did you ever cut the size of meals or skip meals because of lack of money for food in the last 12 months?; 2) If yes, how often? (Almost every month, some months but not every month, only 1 or 2 months); 3) Did you ever eat less than you felt you should because there was not enough money to buy food in the last 12 months?; 4) Were you ever hungry but didn't eat because you couldn't afford enough food in the last 12 months?; 5) Food didn't last, and didn't have

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Table 1. Basic characteristics of study sample

Characteristics	No	%
Children at home		
0	1518	62.2
1	785	32.1
2+	139	5.7
Elderly people at home		
Yes	603	24.7
No	1838	75.3
Education (head of family)		
Illiterate	1225	51.1
Primary	928	38.7
Higher	244	10.2
Car ownership		
With car	516	21.1
Without car	1925	78.9
House ownership		
Private house	2340	95.8
Tenant	102	4.2
Monthly income		
With monthly income	409	16.7
No monthly income	2043	83.3
Smoking status (head of family)		
Yes	996	40.8
No	1446	59.2
Parentship status		
Single parent	232	9.5
Two parents	2210	90.5

money to get more. (was that often, sometimes, or never true for you in the last 12 months?); 6) Couldn't afford to eat balanced meals (was that often, sometimes, or never true for you in the last 12 months?). This simple and rapid tool was validated before, in the area for household food insecurity. More details can be found elsewhere.[13]

This study included two parts: the first phase was a survey to collect base line data on the prevalence and its influencing factors. These data were essential for the second part of the study in which we carried out a "community self-controlled trial". After the screening programme (first part), 1,450 families were identified as having food insecurity in the study area. We then invited them to participate in the second part of the study. Despite many efforts, of those families with food insecurity screened in the first part, only 578 families accepted to take part in the second part of the programme, resulting in a response rate of 40 percent. For the families screened for the second part (578 households), we organized small training campaigns (in groups of 30's) together with community leaders and health care workers.

This took place through peer education programmes in the context of short term courses for target population. For this purpose, a group of trainers (n=30) were trained by university academic staff. The trainers were selected from health care workers or university students of public health, medicine or nutrition. They were supposed to teach in, discuss and coordinate the education sessions. They were provided with a pack of educational material. The pack contained with a booklet, some slides and pamphlets. Every individual of this group attended, in a local health centre or local mosque, a 45 minutes interactive workshop and training session to his/her group of 20-40 of the target households discussing the control and preventive strategies of household food insecurity. At the end of session, everyone in the workshop obtained a full pack for further information. This educational programme addressed the major elements of food insecurity control in the household.

Four major components of the educational intervention were addressed in this programme for target groups:
- Food availability and stability
- Economic and social accessibility to food
- Adequacy of food intake and utilization
- The specific and key role of women on the household food insecurity.

Six months after the intervention, the same questionnaire and techniques were applied again to assess the impact of educational intervention in reducing the rate of household food insecurity status. For this, we compared before and after the intervention to assess how effective the programme was in reducing the rate of household food insecurity.

Ethics approval of this programme was obtained from the Regional Ethics Committee of Tabriz University of Medical Sciences (no: tbzmed/87).

In this study, descriptive statistics, chi-square test, simple logistic regression, stepwise logistic regression, epidemiologic indices and 95% confidence intervals (CIs) were performed for the analysis of data.

RESULTS

The first part of this study was carried out to estimate the prevalence rate of the food insecurity, and to identify the influencing factors on the prevalence of this public health problem in the region. Total prevalence of food insecurity in the study population was 59.3 percent (95% CI: 57-61%). Thirty nine percent of the population suffered from mild food insecurity while 20 percent suffering from severe food insecurity. Table 2 shows the prevalence rate of food insecurity by district in the study subjects. The highest prevalence rate was observed in Khakmardan, in district 3, with a rate of 77.5% (95% CI: 71-84%) compared to the lowest rate in District 1 (Shirinkandye) with a prevalence of 39.7% (95% CI: 31-49%). A logistic regression analysis was performed to determine the influencing factors on the prevalence of food insecurity. Having monthly income, a house and a car had all significant impact on the household food insecurity status; where food secure families had a house, a car and monthly fix income compared to food insecure families ($p<0.005$). The size of house was significantly larger (86.7 meters) in secure families compared to those with food insecurity status (65.9 meters) ($p<0.005$). We investigated the impact of family members living at home (elderly people and children) on the household food insecurity. The greater the number of elderly people and children at home,

Table 2. Sampling details and prevalence of food insecurity (northwest of Iran, 2009-10)

Districts	study subjects	study households	prevalence (%)	95% CI
District 1				
Bolamaje	394	108	44.8	(31-50)
Fanayee	672	133	48.3	(39-57)
Mortazagolekandye	819	194	58.8	(52-66)
Shirinkandye	514	120	39.7	(31-49)
District 2				
Dizajdiz	8163	1375	56.1	(53-59)
District 3				
Agchagheshlag	445	80	47.1	(35-59)
Khakmardan	671	169	77.5	(71-84)
Mallajonod	821	140	76.3	(68-85)
Seedtajadden	2571	592	70.4	(66-74)

the higher the risk of food insecurity in the family ($p<0.005$). Illiteracy ($p<0.005$), single-parent status ($p=0.003$) had both negative impact on the food insecurity of household. Illiteracy increased the risk of food insecurity. Families with single parent status also had a greater risk of food insecurity. The distance of the house from a major town in secure families (13.3 km) was significantly less than that of food insecure households (15.3 km) ($p<0.005$). Maternal age ($p=0.548$) and smoking status of the head of the family ($p=0.254$) had no statistically significant ($p<0.01$) association with household food insecurity. The prevalence of food insecurity was 59.3 percent (95% CI: 57.4-61.3%) in the study population before intervention compared to 52 percent (95% CI: 48.0-56.1%) after the intervention, indicating a 7.3 percent reduction in the prevalence of food insecurity in the families. This reduction was not however statistically significant.

DISCUSSION

In this study we investigated the prevalence of food insecurity and its association with some demographic and socio-economic factors to provide baseline information to control and prevent food insecurity-related disorders in the area.

Our previous research validated a short six-item questionnaire to detect household food insecurity in a local population.[13] This questionnaire was used as a simple, low-cost and rapid tool for the screening of food insecurity and energy intake in the area. The total prevalence of food insecurity in the region was 59.3 percent. This is about three times more than that expected,[10,13] indicating that there is an urgent need for infrastructure improvement.

Analysis of influencing factors showed that socioeconomic situation had a remarkable and significant role on the high prevalence of food insecurity in the area. This was similar to the findings from previous studies in the areas with even low prevalence of food insecurity.[6,7,10,14,15] This indicates that there is an urgent need for a close collaboration between governmental, international and local leadership to identify and implement the key interventional programmes to overcome this ever increasing health problem. According to our findings, special attention should be paid on the economic improvement in the region.

Although our intervention was able to reduce the rate of food insecurity in the study households by more than 7 percent, it was not statistically significant. This may indicate that education alone is not enough to reduce food insecurity, and it may be affected by a range of various factors. Those factors should be taken carefully into account in building a public health model to control this health problem.

The implementation of sustainable techniques must necessarily vary from place to place depending on local ecology, culture, religion, traditions, political system, economic status, population growth rate etc.[16] To control the food insecurity in the region, those factors should be considered in creating any public health model.

AUTHOR DISCLOSURES
Authors declare that there has been no conflict of interest in this work.

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伊朗西北部糧食不安全盛行狀況及影響因素

糧食不安全常見於已開發及開發中國家，約有 5%至 25%的一般民眾受影響。本研究主要目的為評估伊朗西北部之糧食不安全及其影響因子。本研究共研究了 15,070 人(2,911 家戶)。首先使用簡易問卷篩出糧食不安全的家戶及其及能量攝取。第二階段進入社區試驗，對目標家戶實施小型訓練活動(藉由同儕教育)。於六個月後評估教育介入對於降低糧食危機盛行率之影響。結果發現，本研究族群糧食不安全盛行率為59.3% (95%信賴區間：57.4-61.3)。羅吉斯回歸分析發現，除了母親年齡及家長抽菸狀況以外，其他變項(主要為經濟因素)與家戶糧食不安全具顯著相關。經過教育介入後，糧食不安全盛行率下降7.3%(*p*>0.10)。本研究指出此區域的高糧食不安全盛行率亟需政府、國際與當地領導組織密切的合作，來鑑別及實施關鍵的介入計畫，克服這個不斷增加的衛生問題。根據我們的發現，此地區應特別關注經濟的改善。

關鍵字：糧食危機、盛行率、影響因子、控制因子、流行病學