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Original Article

Cost Estimating of Providing Desired Food Basket for the Iranian Society and Its Situation in the Last 3 Years

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Abstract

Background: Food security has always been emphasized as a primary goal of sustainable development policies. Events, such as the COVID-19 outbreak, climate change, wars, and unjust (cruel) sanctions against countries threaten global food security. Therefore, considering the importance of nutrition and food consumption in budget planning and household shopping, we indirectly examined the cost of providing an optimal food basket for the Iranian community, in total and by separating its components based on the average price of selected food items in urban areas from year 1399-1401 in the Solar Hijri calendar (2020 to 2022).

Methods: In this cross-sectional costing study, the country's desired food basket was used as a reference for cost measurement of an acceptable food basket, and information on food prices and household expenses was obtained from the Statistical Center of Iran and the Central Bank. The cost of providing an optimal food basket for the Iranian community, in total and for each component, was calculated for an individual and a family of four. After extracting the cost information of providing an optimal food basket in these three years, the data were compared and analyzed to study the trend.

Results: Based on the costs of providing an optimal household basket, the average food cost for a family of four in 1399 (2020-2021) was about 3.2 million Tomans, which increased by 27% to 4.365 million Tomans in 1400 (2021-2022), and in 1401 (October 2022), it reached 6.785 million Tomans, a 35% increase compared to 1400 (2021-2022).

Conclusion: It is suggested to support vulnerable groups and target subsidies according to different income levels. The salaries and wages should be revised in line with inflation food prices and household expenses, and also policymakers and planners are suggested to monitor the prices.

Keywords: Food security, Desired food basket, Food cost

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Introduction

Sustainable food security is currently a major concern for various countries, including Iran, particularly in light of global crises. As defined by the USDA Food and Nutrition Service (FNS), food security is attained when all individuals have consistent access to sufficient food (in terms of quantity, quality, safety, and socio-cultural acceptance) that meets their needs for a healthy and fulfilling life at all times. Food security focuses on the availability and accessibility of food, as well as the body's utilization of the food, while also emphasizing sustainability. Economic access to food is an integral component of food accessibility; hence, a household's purchasing power plays a crucial and determinative role in achieving sustainable food and nutrition security (1).

According to a joint report by the Food and Agriculture Organization of the United Nations, the United Nations Children's Fund, the World Food Programme, and the World Health Organization (1), 1.9 billion people were unable to afford a healthy diet even before the COVID-19 outbreak and its subsequent impact on the economy and people's livelihoods. The high prices of fruits, vegetables, and dairy products have made it nearly impossible for the poor in Asia and the Pacific to maintain healthy diets. The decision-making of households regarding the purchase of life necessities, especially food, is governed by food prices and income levels. The higher the proportion of food expenses in a household's budget, the more likely it is to be considered food insecure (2). The spread of COVID-19, coupled with the scarcity of decent work opportunities in many areas and significant fluctuations in food and market systems, has exacerbated inequalities. Poorer households with lower incomes have been forced to alter their diets toward more affordable but less nutritious options (3,4).

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The cost of a healthy diet far exceeds that of a diet providing merely sufficient calories, highlighting substantial deficiencies in the food system's ability to offer nutritious choices to all societal groups at an affordable price. These costs are particularly higher for women and children, who have additional nutritional needs. The importance of food systems in achieving food and nutritional security has grown significantly. Consequently, countries are seizing every opportunity to enhance sustainable food systems that can produce diverse, nutritious, and environmentally friendly foods (1-6).

The average cost of a diet providing sufficient energy across 26 countries in the Asia and Pacific region is 0.93 dollars per person per day. This figure breaks down to 0.4 dollars in Australia and New Zealand, 1.27 dollars in East Asia, 0.85 dollars in the Pacific Islands (with data available only for Fiji), 0.92 dollars in Southeast Asia, and 0.8 dollars in South Asia. Furthermore, the daily cost per person for a healthy diet in Asia and the Pacific is 2.34 and 4.15 dollars, respectively. When comparing the cost of diets providing sufficient energy and healthy diets in Asia and the Pacific to the global average, the costs are 0.79 and 3.75 dollars, respectively (1 and 4).

While a diet rich in energy is affordable for the majority, over 3 billion people worldwide cannot afford a healthy diet. Of these, nearly two-thirds (1.894 billion) reside in Asia and the Pacific: 1.3 billion in South Asia, 230 million in East Asia, 325.5 million in Southeast Asia, and 0.5 million in Oceania. In many countries, the economically disadvantaged must allocate most or even all of their income to secure adequate amounts of essential nutrients and a variety of food groups, and in several instances, even this spending is insufficient. Consequently, affordability becomes an insurmountable barrier to accessing a healthy diet (1). A crucial factor influencing the affordability of a healthy diet is the cost of fruits, vegetables, and protein-rich foods (both plant and animal-based). These items significantly elevate the cost beyond that of basic and starchy foods in compiling a healthy diet. In all Asian countries, except Japan (72%), dairy products, fruits, vegetables, and protein-rich foods constitute over 79% of the cost of a healthy diet (1, 4).

Iran has witnessed significant changes in dietary patterns due to price and income shocks. These price shocks and the rising costs of food items have impacted the food security of individuals across various income levels (3-6).

In 2012, the Ministry of Health in Iran established guidelines for an optimal household food basket tailored to Iranian households by age group. This guideline specifies the minimum food items (categorized by groups and available food items) recommended for purchase and inclusion in the household's shopping basket, based on the age and gender of its members. Adhering to this advised food basket is expected to guarantee that households receive the daily nutrients they need at an acceptable level (7).

The 2019 "Household Income and Expenditure Survey" conducted by the Statistics Center of Iran revealed that the primary expenses for Iranian households were allocated to meat, bread and cereals, dairy products, and eggs. These items alone accounted for 52 - 54% of the total "food & beverage" expenses. Regrettably, the Iranian Statistics Center's data on the consumption of staple goods indicates that from 2011 to 2021, meat and dairy product consumption decreased from 13 kg/year to 6 kg and from 127 kg to 110 kg/year, respectively. This reduction is attributed to households' inability to afford these items, prompting them to opt for cheaper protein sources (8, 9). When the price of a specific food item increases, households tend to substitute it with a less expensive alternative. For instance, a rise in the price of rice leads to its replacement with other grain products like bread, noodles, or pasta. Consequently, the frequent price hikes, sometimes exceeding households' financial capabilities in recent years, have led to a significant decrease or elimination of high-quality and often more costly items from families' food baskets, especially among poorer households. This trend has notably contributed to a decline in their food security (7,10).

Generally, every household allocates its income towards purchasing services, food, and non-food items. This expenditure is referred to as the household's consumption basket or shopping basket, encompassing essentials such as food, housing, energy, education, transportation, health care, and more. Typically, based on a country's income deciles, each component occupies a certain portion and percentage of the total household shopping basket. In the absence of changes to an individual's economic and social conditions, as well as market conditions and regulations, these proportions tend to remain relatively stable. However, any fluctuation in prices can have both short-term and long-term effects on a family's well-being.

Given the significant role of nutrition and food consumption in household budget planning and their direct correlation with price fluctuations, we have indirectly assessed the cost of providing the ideal food basket for the entire Iranian society and for different segments, based on the average price of food items in Iran's urban areas from 2020 to October 2021.

While the government is currently planning and implementing appropriate measures, it is anticipated that this information will enhance the decision-making effectiveness of managers and planners.

Methods

In this cross-sectional costing study, we derived optimal per capita consumption data from the ideal food basket for Iran, as determined by a group of experts and professors from the Tehran University of Medical Sciences at the

request of the Community Nutrition Improvement Office of the Ministry of Health in 2013 (8). Household cost information was collected from two sources: the Iran Statistics Center and the Central Bank. For food items priced within a range, the average price was used (11-13).

Upon calculating the average price of food items and gathering household cost data, we estimated the cost of providing the optimal food basket for the Iranian population as a whole and for its components, per individual and for a family of four. Following data collection, we compared and analyzed the cost of supplying the optimal food basket from 2020 to October 2022 to observe trends. To assess the situation regarding food purchase costs in Iran, we utilized reports from the Iran Statistics Center covering the period from 2020 to October 2022 (Tables 1-3). The tables display the daily and monthly cost per person of providing the desired food basket for Iranian society, along with its components based on the average price of selected food items in urban areas at the end of 1399 (March 2020), at the end of 1400 (March 2021), and in the middle of 1401 (October 2022). These tables also highlight the percentage increase in costs compared to the previous year. Additionally, we present the expenses for a family of four throughout the 3 years, calculated based on the minimum market prices. The food subgroups, their prices, and their contribution to the total cost were identified based on our prior study to determine the cost of providing the optimal food basket (8).

Table 1. The cost of providing the ideal food basket for Iranian society (person/day) in general and by its components in March 2020

Food items	Optimal Consumption per capita (gr/day)	Average market price (Rials/kg)	Price (Rials)
Bread	310	30,000	9,300
Rice	95	280,745	26,671
Macaroni (Pasta)	20	88,330	2,473
Beans	26	322,071	8,374
Potato	70	51,717	3,620
Vegetables	300	72,713	21,814
Fruits	280	239,729	68,102
Red Meat	38	1,231,176	46,785
White meat	64	258,549	16,547
Egg	35	222,474	7,787
Dairy products	250	132,813	33,203
Vegetable oils	35	200,131	7,005
Sugar	40	137,318	5,439
Tea	4	967,805	3,986
Total (Rials /day) (for one day)			261,142
Total amount (Rials/month) (for one month)			7,964,785
Total for a 4-member family (Rials/month)			31,859,140

Results

In 2019, the average cost of purchasing food for a family of four was approximately three million two hundred thousand Tomans, as shown in Table 1. This amount increased by 27% to four million three hundred and sixty-five thousand Tomans in 2021, according to Table 2, and saw a further increase of 35% to six million seven hundred and eighty-five thousand Tomans in October 2022, compared to March 2022 (Table 3).

Table 1 reveals that in March 2020, the three largest contributors to the cost of the desirable food basket for Iranian society were fruits, red meat, and dairy products, comprising more than half (56%) of its total cost. Similarly, Tables 2 and 3 show that fruits, dairy products, and red meat continued to have the largest share in the cost of the desired food basket for the Iranian society, accounting for over half (51%) of its expenses. It is important to note that the food groups identified in this study were categorized based on the household shopping basket and the groups within the desired household basket, differing from global definitions.

The most significant price increases among food items were observed with potatoes in March 2021 compared to March 2020, and with vegetable oils, tea, pasta, and white meat in October 2022 compared to march 2021, each showing an increase of more than 50%. Unfortunately, these changes are likely to diminish the quality of food available to households (9).

Discussion

The Iranian Statistics Center annually compiles and publicly releases data on household income costs. Unfortunately, the critical role this information plays in setting minimum wages and salaries— which should align with household purchasing costs— is often overlooked. As a result, minimum wages and salaries are determined each year without considering the financial burdens on households, leading to a mismatch between what is paid and the actual expenses incurred. Consequently, the country's poor and low-income groups face constraints in affording food, the quality of which is steadily declining. In Iran, food purchases, a vital component of the household shopping basket, accounted for 25% of the total household expenditure basket in 2016, a proportion that varies between urban and rural areas. This indicates that, on average, individuals dedicated 25% of their expenditures to food, a figure that increased to 28.7% by 2021 (10).

In some countries, such as Nigeria and Kenya, the share of food purchases exceeds 50% (10). This high percentage signifies that a majority of people's income is spent on food, making it difficult for households to cope with price increases. These countries are typically categorized as low-income and developing. In contrast, in

Table 2. The cost of providing the ideal food basket for Iranian society (person/day) in general and by its components at the end of 1400 (March 2021)

Food items	Optimal consumption per capita (g/d)	Average market price (Rials/kg)	Price (Rials)	The percentage of changes compared to 1399 (March 2020)
Bread	310	50000	15,500	40
Rice	95	536782	50,994	47.7
Macaroni (Pasta)	20	148359	2,967	16.6
Beans	26	488554	12,702	34.1
Potato	70	145073	10,155	64.4
Vegetables	300	106736	32,020	31.9
Fruits	280	231480	64,814	-5.1
Red Meat	38	1560649	59,305	21.1
White meat	64	310474	19,870	16.7
Egg	35	282852	9,900	21.3
Dairy products	250	237961	59,490	44.2
Vegetable oils	35	188208	6,930	-1.1
Sugar	40	206145	8,246	33.4
Tea	4	1202846	4,932	19.5
Total (Rials /day) (for one day)			357,826	
Total amount (Rials/month) (for one month)			10,913,702	
Total for a 4-member family (Rials/month)			43,654,808	27

Table 3. The cost of providing the ideal food basket for Iranian society (person/day) in total and by its components (October, 2022)

Food items	Optimal consumption per capita (g/d)	Average market price (Rials/kg)	Price (Rials)	The percentage of changes compared to 1400 (March 2021)
Bread	310	45,000	13,950	11
Rice	95	790,398	75,088	32
Macaroni (Pasta)	20	351,327	7,027	57
Beans	26	602,923	15,676	18
Potato	70	177,230	12,406	18
Vegetables	300	120,202	36,061	11
Fruits	280	231,164	92,726	30
Red Meat	38	1,992,827	75,727	21
White meat	64	650,545	41,635	52
Egg	35	485,981	17,008	41
Dairy products	250	472,221	118,055	49
Vegetable oils	35	770,529	26,969	75
Sugar	40	300,213	12,009	31
Tea	4	2,896,474	11,876	58
Total (Rials /day) (for one day)			556,211	
Total amount (Rials/month) (for one month)			16,964,446	
Total for a 4-member family (Rials/month)			67,857,784	35

developed countries like the United States, Canada, and Australia, the proportion of food purchasing costs within the household budget is relatively lower, sometimes even below 10% (10). The impact of rising food prices is more manageable in these countries, and inflation has a lesser effect on the availability of quality and necessary

food. Another critical aspect is that developed countries have established specific legal frameworks to ensure that the minimum food purchasing costs are affordable for households, enabling everyone to earn a minimum wage or income to cover their food expenses to an acceptable degree (11).

In this study, the cost of the optimal food basket was calculated based on minimum prices. If the salary determination system does not align with the costs of the household shopping basket, achieving the objectives of providing food and nutrition security in the country cannot be expected. A review of 136 studies from 162 countries has demonstrated that an increased proportion of food purchases within the total household expenditure leads to a higher risk of food insecurity due to price rises in these communities. (12).

The Iranian Students Polling Agency conducted a survey in August 2020, involving 1575 participants over 18 years of age from various towns and villages across Iran, through telephone interviews (13). A significant number of households reported that a decline in family income led to the complete removal of animal protein sources from their food basket. Additionally, many respondents indicated that job losses and a substantial decrease in income due to COVID-19 pandemic-related closures forced them to eliminate protein sources from their food basket entirely. Some mentioned that despite stable incomes, the rising prices of protein sources were not commensurate with their monthly income, leading them to exclude these sources from their food basket. A concerning trend highlighted in the survey responses was a significant decrease in fruit consumption coupled with an increased intake of energy sources, particularly cereals (bread and rice). Furthermore, there was a reported decrease in the daily consumption of milk and yogurt compared to the previous year.

According to our findings, fruits, red meat, and dairy products accounted for the largest share of the cost in the desirable food basket for Iranian society during 2020-2022, potentially reducing households' consumption of these items. Price significantly influences food choices (14). Market basket studies have shown that the cost of opting for healthier alternatives over standard food items (such as choosing whole grain breads over white bread, lean white meat, and fat-free dairy products over red meat) is 17% to 19% higher (15).

In a survey of nearly 800 low-income consumers, approximately one-third identified cost as a barrier to healthy eating (16). The increase in food item prices over the last three years may be influenced by the spread of COVID-19 (17).

Furthermore, in developed countries, the status of potatoes has transitioned from being considered a luxury item to a common good, and ultimately to a low-quality product or food for the poor. In underdeveloped or developing countries, low income combined with the relatively high price of potatoes poses a significant challenge to their broader utilization among the poor (18). In Iran, the significant rise in potato prices in 2021 might follow this trend.

When focusing on the working class, which represents the largest economically vulnerable decile, the minimum wage increase for 14 million formal and informal workers from 2018 to 2022 was as follows:

According to the Central Bank, despite a 31.2% inflation rate in 2018, the minimum wage for formal workers was increased by 19.5%. In 2019, with an inflation rate of 41.2%, it rose by 36.5%. In 2020, against a backdrop of 26.4% point-to-point inflation, the increase was 26%. In 2021, despite an inflation rate of 46.2%, the minimum wage for official workers went up by 26%, and in October 2022, facing a 42.9% inflation rate, the increase reached 38%. Reflecting all adjustments made by the Supreme Labor Council, the latest monthly income for a childless worker in 2022, whether single or married, amounts to about 5 million 679 thousand Tomans. For a worker with two children, supporting a family of four, the income is approximately 6 million and 725 thousand Tomans. Following the definition of a healthy food basket as per the ideal standards set by the Ministry of Health, every Iranian is recommended to consume daily: 320 g of bread, 100 g of rice, 20 g of pasta, 26 g of beans, 70 g of potatoes, 280 g of vegetables, 260 g of fruit, 48 g of red meat, 50 g of white meat, 24 g of eggs, 225-240 g of milk or dairy products, 35 to 40 g of oil, and 40 to 50 g of sugar. Over a 30-day month, this equates to approximately 9.5 kg of bread, 3 kg of rice, 2 kg of pasta, 780 g of beans, 2.1 kg of potatoes, 8.4 kg of vegetables, 7.8 kg of fruit, 1.44 kg of red meat, 1.5 kg of white meat, 720 g of eggs, around 6-7 kg of dairy products (milk, yogurt, cheese, and butter), about 1 kg of oil (various fats), and at most, 1.2 kg of sugar for every adult living in Iran. Assuming optimistically that one owns a residential house and does not need to spend money on treatment, transportation, recreation, education, clothing, and other essentials recognized as the legal rights of human beings and citizens, the monthly costs required to provide the contents of this "healthy" food basket amount to 16 964 446 and 67 857 784 Rials, respectively. Comparing this figure with this year's minimum income for workers with two children (6 725 000 Tomans) reveals that workers' wages do not align with the average cost of purchasing food items for a family of four. It is important to note that the expenses for housing, healthcare, energy, and the like significantly exceed these figures. The proportion of food purchasing costs in the household budget varies across different provinces; however, this study took into account the national average for its calculations. The rise in food prices leads to changes and substitutions in food choices, as households replace costlier items with more affordable

alternatives due to budget constraints.

To alleviate the pressures on household livelihoods, various countries implement careful planning and continuous coordination to mitigate the impacts of inflation and price increases. The fundamental role of governments is to support households and foster relative stability in the balance between household income and expenditures (19).

The findings of a comprehensive study examining the relationship between the inflationary impact of commodity price shocks across countries with diverse structural characteristics and policy frameworks during 2001-2010 revealed that economies with a higher proportion of food in the consumer price index (CPI) baskets, levels of fuel dependency, and chronic inflation are more susceptible to enduring inflationary effects resulting from commodity price shocks. The study also found that countries with more independent central banks and stronger governance measures have managed to better control the impact of these shocks. Additionally, factors such as trade openness, financial development, dollarization, and labor market flexibility do not significantly influence how domestic inflation responds to international commodity price shocks. (19)

Even after accounting for a 50% margin of error in calculations and considering other factors related to the poverty line for calorie intake in line with the WHO criteria through indirect methods, and assuming half of this amount for household food basket expenses combined with other household costs like housing, clothing, transportation, education, etc, it emerges that, given the inflation rates in recent years, the minimum salary needed to sustain household capabilities, especially for low-income families reliant on labor wages, should exceed twelve million Tomans. This requirement is not aligned with the current legal status of this demographic.

Limitations

1. This study calculated the average calorie intake in urban areas, noting that the amount of calories consumed varies significantly across the country, independent of poverty status, income deciles, and rural or urban residency, highlighting the necessity to tailor the components of the food basket to different regions. Additionally, a survey conducted by the Deputy of Economic Research of the Islamic Council, which assessed household expenditure and income data in 2018 alongside the average calorie requirement of Iranian households (20), utilized data from the World Health Organization and the Ministry of Health to determine the minimum required calorie intake. It found that the desired food basket defined by the Ministry of Health cannot serve as a basis for poverty studies and assessing the food security situation, as the calorie levels set (in both the desired and required baskets by the Ministry of Health) exceed the actual consumption levels of Iranians.
2. Furthermore, the optimal basket does not account for the additional caloric needs of pregnant and lactating women and teenage girls (21). This oversight can influence the cost and accessibility of an adequate diet, raising the risk of malnutrition and micronutrient deficiencies.
3. It should be noted that the optimal household basket recommended by the Ministry of Health, as used in this report, does not encompass all food items typically purchased by households. For instance, it excludes drinks, sauces, biscuits, and cookies, which, despite being classified as junk food, are often bought by parents at their children's request. Additionally, waste is not accounted for in this calculation. Moreover, white meat is represented solely by chicken, as fish is more costly, and the intention was to incorporate minimum prices. Thus, the table presented should be viewed as a baseline.
4. The optimal basket is constructed based on the comprehensive needs per capita (such as calories, protein, calcium, vitamin A, etc), with some items exceeding the necessary amounts.

Conclusion

Generally, the combination of high prices and reduced incomes forces households to either eliminate or reduce their consumption of primary nutrient sources such as meat, eggs, milk, and fruits, opting instead for alternative sources that typically lack a wide range of nutrients (in comparison to proteins, fruits, or vegetables). This shift is predictable, as people under economic strain often aim to sustain themselves and their families with the most accessible and affordable food options. However, the per capita dimension of the household and the financial constraints of the family head, when faced with rising prices for nutritious food items, compel the inclusion of cheaper food sources in the household's diet. This necessity to prioritize affordability over nutritional value leads to a worrying trend of reduced protein intake and increased consumption of sugars and "filling" foods, diminishing the household's nutritional well-being.

To address these concerns, it is recommended that policymakers and government officials consider the following strategies:

- Supporting vulnerable groups and targeting subsidies (taking into account geographic regions and age groups)
- Close monitoring of prices
- Revision of salaries and wages according to food prices and household expenses
- Improving the distribution of food among low-income deciles

- Distribution of food packages among low-income groups

Authors' Contribution

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Competing Interests

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Ethical Approval

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