Estimating the Cost and Ratio of the Optimal Food Basket by Iranians to the Minimum Wage

Sepideh Dolati*[1], Ali Imani[2]

1. Department of Community Nutrition, Faculty of Nutrition, Tabriz University of Medical Sciences, Tabriz, Iran.
2. Department of Health Economics, Faculty of Management and Medical Informatics, Tabriz Health Services Management Research Center, Tabriz University of Medical Sciences, Tabriz, Iran.

A R T I C L E I N F O	A B S T R A C T
Article type: Research Paper	**Introduction:** Estimating the food supply cost is one of the essential applications of optimal food baskets. This study aimed to calculate the cost of an optimal food basket for Iranians and the ratio of the cost of an optimal food basket to the minimum wage in 2020 and 2021.
	Methods: This cross-sectional study estimated the costs and ratio of the optimal food basket to the workers' minimum wage from the perspective of economically vulnerable groups. The cost approach was based on the research data, using forms and checklists prepared by the researcher and referring to information published by the Statistics Center, the Central Bank, and the Ministry of Welfare. Excel software was used to calculate and draw graphs.
	Results: This study showed the high cost of red meat, fruits, and dairy products. The lowest cost was for pasta, sugar, and potatoes. The per capita cost of an optimal food basket for one day in 2020 and 2021 was 223576 and 306833 Rials, respectively. The ratio of the cost of an optimal food basket of the minimum wage in 2020 and 2021 was 57% and 50%, respectively.
	Conclusion: The study's most crucial finding was the importance of purchasing power adequacy in providing the optimal food basket. This finding underscored the urgency of addressing wage issues, particularly in the lower-income and working classes, as a significant basis for determining wages and planning for sustainable development.

Introduction

Food security stands for people with physical and economic access to sufficient, healthy, and safe food to meet their needs and preferences and have a healthy and active life. Food security is a matter of satisfying the energy requirement and a concern with essential micronutrients to maintain healthy eating to ensure the well-being of individuals (1). Therefore, providing the ability to purchase items appropriate for the household plays a vital and decisive role in achieving sustainable food and nutrition security. Policymakers and decision-makers can plan for better and more sustainable development using the available detailed and in-depth information. Various methods have been used to estimate household food purchase costs, including information on the optimal household food basket (2). An optimal food basket is a translation of sufficient and balanced food, which can be considered a great goal in food security policies (3-5)

The second optimal food basket of the country was compiled by the Faculty of Health of Tehran University of Medical Sciences, the National Nutrition and Food Technology Research Institute of Iran, and the Community Nutrition Improvement Office in 2013 (Table 1) (6). According to the energy needs and key nutrients, the standards and international recommendations were compiled for the entire population of Iran, as well as the separation of different age and gender groups. The optimal food basket designed based on the order of the Deputy Health Minister of the Ministry of Health and Medical Education was used. The average requirement of the Iranian population for energy, protein, and key micronutrients (iron, calcium, vitamins, and riboflavin) was included in the tables of recommended daily amounts of energy and protein and micronutrients recommended by Recommended Dietary Intake (RDI), Recommended Dietary Allowances (RDA) and Word Health Organization (WHO). The key

* *Corresponding authors:* Sepideh Dolati, Department of Community Nutrition, School of Nutrition, Tabriz University of Medical Sciences, Tabriz, Iran. Tel: +98 21 81454977, Email:sd.dolati@gmail.com.

items in this optimal food basket were determined based on gender and age groups based on the ability to supply food in Iran and the climate and culture of the Iranian people, including rice, bread, pasta, legumes, vegetables, fruits, potatoes, white and red meat and eggs, dairy products, vegetable oil, and sugar. The compiled basket provides B2 with 100% energy, vitamins, and protein, 80% calcium, and 90% iron. Based on this food basket, the percentage of energy supplied from the carbohydrate group is 63%, protein 13%, and fat 23.8%. According to assumptions, 10% more consumption is acceptable. Currently, the food basket has improved due to increasing household income, easy access to food, improving the culture and nutritional literacy of the people, and enhancing access to health services (7).

The Iranian Ministry of Health and Medical Education (MoHME) reported the optimal food basket for the Iranians (2013).

The importance of maintaining economic stability and, most importantly, price stability, exchange rate stability, and the effect of changes on the general level of domestic prices cannot be overstated. The high share of food in households' consumption basket, especially in low-income groups, adds to the importance of food price stability (8). Increasing prices, which affect consumption differently across income groups, decreases purchasing power, resulting in smaller tables for households. Cost pressure caused by food inflation may change household food consumption habits, causing food insecurity and poverty, which will undoubtedly affect welfare, especially for low-income households. People who face food insecurity suffer many physical, mental, and financial damage. The issue of food security demands more than just filling the stomach or providing calories; it also requires macronutrients. The increase in inflation limits the lower deciles' access to the goods and consumption basket with minimal nutritional value, which should be evaluated. The symptoms can indicate a malnutrition crisis in these households as well as growth disorders, especially in children from lower income levels (9).

The purpose of compiling optimal food baskets is to provide energy and key nutrients, prevent common micronutrient deficiencies, and prevent overeating. However, the main point here is the use of these baskets. Estimating the minimum cost of providing them enables you to determine things such as the minimum salary, obtain the salary, and provide a reasonable estimate (10). The 2017 report of the World Food and Agriculture Organization shows an increase in food-insecure households in the world in 2016 compared to 2015 (10), which should be considered plan by the country's politicians. This study aims to estimate the cost of the optimal food basket for Iranians and the ratio to workers' minimum wage in 2020 and 2021.

Materials and Method

This cross-sectional study estimated the costs and ratio of the optimal food basket to workers' minimum wage from the perspective of economically vulnerable groups with a time horizon of two years using the top-down and prevalence-based costing approach. The data was created using forms made by the researcher and by referring to official information and documents published by official authorities such as the Iran Statistics Center, Central Bank, and the Ministry of Cooperation, Labor, and Social Welfare.

The data is related to 2020 and 2021, and Excel was used to calculate and draw the graph.

Based on the average price of selected food items in urban areas and the cost of providing them for one day and one month per household of one to four people, the cost of an optimal food basket for one individual, the share of each food subgroup, and their price were calculated for each year. The inclusion and exclusion criteria for the study were added in the text of the article as follows:

The selection of food items in each group was based on prices reported by official authorities, such as the National Statistics Center of Iran. Food items without official reports were excluded from the study.

In this study, the optimal food basket of the country compiled was used in 2013 by the Faculty of Health of Tehran University of Medical Sciences, the Institute of Nutritional Research and Food Industries of the country, and the Community Nutrition Improvement Office on the order of the Deputy Health Minister of the Ministry of Health, Treatment and Medical Education (6). The optimal food basket cost and share of each food subgroup for each person is determined by per capita consumption of food items, and then their prices are determined by analyzing the average prices of selected food

items in urban areas of the country that are available from the Iran Statistics Center until the end of December 2020 and 2021 (11). The cost of providing breakfast for one day and a month per household of one to four people was calculated each year. In addition, the ratio of each food item's cost to the basket's total cost was calculated. The selection of the two years 2020 and 2021 was due to the completeness of the prices of the food items in the desired food basket on the website of the Statistical Center.

Iran Statistics Center reports that the average is calculated by examining the prices of selected food items in urban areas of the country, based on the average price paid for a product of consistent quality, and then calculating the consumer price index from the collected prices. These prices include a wide range of products of different quality. The food items considered to calculate the costs were as follows: rice of the first-grade foreign type, dairy products including milk, yogurt, and cheese, oil only liquid oil, fruits including pomegranate, banana, apple, orange, watermelon, vegetables including zucchini, cucumber, eggplant, tomato, onion, legumes including peas, pinto beans, red beans, lentils, and cobs. The applied bread was traditional Lavash bread due to its higher consumption, and red meat, including veal and sheep meat, was

consumed at prices reported in Rials per kilogram. The average price of the items in the food groups was calculated for each year, and the amounts were calculated in the optimal food basket. The selection of food items in each group was based on prices reported by the Iranian Statistics Center. The food basket cost is calculated based on net food (without considering waste) and the average price of food products in the country's urban areas.

The workers' minimum wage was obtained from the official circulars of the country published by the Ministry of Cooperation, Labor, and Social Welfare. The ratio of the optimal food basket cost to the total wage of the workers per month was calculated for each year. Excel software was used to calculate and draw graphs.

Results

Table 2 reports the cost of optimal food basket items for 2020 and 2021. The highest cost is for red meat, fruit, and dairy products, and the lowest cost is for pasta, sugar, and potatoes based on the weight stated in the optimal food basket. The per capita cost of the optimal food basket for one day in 2020 and 2021 is 0.862 and 1.182 United States dollars (USD), respectively (a 37% increase).

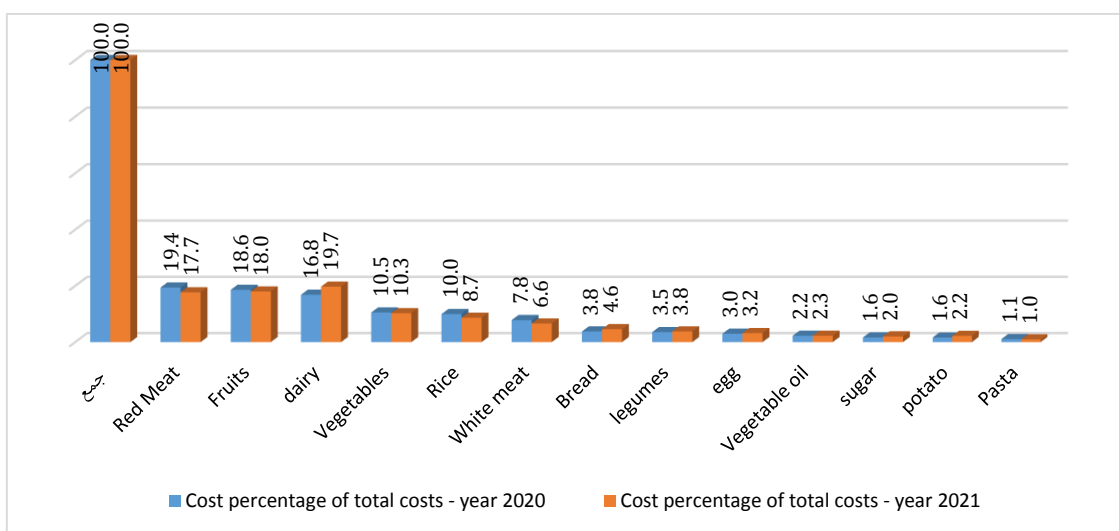**Figure 1.** Cost percentage of total costs in 2020 and 2021

Figure 1 shows the cost ratio of each item to the optimal food basket to the total cost. The highest price ratio is for red meat, fruits, dairy, and vegetables. The percentage of cost per item in

December 2021 for dairy items, bread, legumes, eggs, sugar, and potatoes increased compared to December 2020 for red meat, fruits, vegetables, rice, and white meat.

Table 1. Suggested optimal food basket per capita and the resulting energy and nutrients in Iran, 2013

Food	Per capita consumption (grams per day)	calories (kilocalories)	protein (grams)	Calcium (mg)	Iron (mg)	Vitamin A	Riboflavin (mg)
Bread	310	879	27.6	160.3	6.6	0.17	0.13
Rice	95	339	6.6	7.2	0.8	0.0009	0.03
pasta	20	72	2.5	5.4	0.3	0	0.01
legumes	26	91	5.9	37.4	1.8	0.47	0.06
potato	70	57	1.7	5.04	0.25	1.3	0.02
vegetable	300	85	4.3	124.3	2.5	514.4	0.18
Fruits	280	141	1.5	63.8	1.5	116.9	0.07
Red Meat	38	106	5.4	5.02	0.5	0.01	0.06
White meat	64	82	11.5	7.7	0.6	47.6	0.08
egg	35	45	3.7	14.7	0.4	57.7	0.1
dairy	250	207	13.1	371.3	0.3	111.1	0.5
Vegetable oil	35	315	0	0	0	0	0
sugar	40	155	0	1.6	0.07	0	0.002
Total	1563	2573	83.9	803.8	15.7	849.8	1.3

Table 2. Per capita consumption of optimal food basket and price and cost percentage of food items in the years 2020 and 2021

Food	Per capita consumption of optimal food basket (grams per day)	for the price of 2020 (USD)	for the price of 2021 (USD)
Bread	310	0.033	0.054
Rice	95	0.086	0.102
pasta	20	0.009	0.011
legumes	26	0.030	0.045
potato	70	0.014	0.026
vegetable	300	0.091	0.122
Fruits	280	0.160	0.213
Red Meat	38	0.167	0.209
White meat	64	0.067	0.078
egg	35	0.026	0.038
dairy	250	0.145	0.233
Vegetable oil	35	0.019	0.027
sugar	35	0.014	0.024
Total	1.563	0.862	1.182

The Statistical Centre of Iran (SCI).

The cost of the optimal food basket per household size is reported in Table 3. This cost for a 30-day month in December 2020 for a family of 1, 2, 3, and 4 people was 25.8, 51.7, 77.5, and 103.4 USD, respectively. In December 2021, it was 33.6, 67.2, 100.8, and 134.4 USD, respectively, which increased by 30% compared to the previous year.

Table 3. Optimal food basket cost per household size in 2020 and 2021

	Cost (USD per day)		Cost (USD per month)		Cost (USD per year)		The percentage of changes in 2020 and 2021
	2020	2021	2020	2021	2020	2021	
Per capita	0.9	1.1	25.8	33.6	310.2	403.1	
Family of 2 people	1.7	2.2	51.7	67.2	620.3	806.3	30
Family of 3 people	2.6	3.4	77.5	100.8	930.5	1,209.4	
Family of 4 people	3.4	4.5	103.4	134.4	1,240.7	1,612.6	

The Statistical Centre of Iran (SCI).

The optimal food basket cost ratio to the minimum wage in 2020 and 2021 was 57 and 50%, respectively. This ratio is 80 and 70% for workers with one child and 99 and 87% for workers with two children in the same year (Table 4).

Table 4. The ratio of the cost of the optimal food basket to the minimum wage of the worker in the years 2020 and 2021

	2020 (USD)	The cost of the optimal food basket to salary (percentage)	2021 (USD)	The cost of the optimal food basket to salary (percentage)
minimum wage	90.0	57	135.2	50
Minimum wage with one child	97.1	80	144.9	70
Minimum wage with two children	104.1	99	154.6	87

Discussion

The findings indicated that the cost of optimal food basket items for 2020 and 2021 is the highest cost of red meat, fruit, and dairy products and the lowest cost of pasta, sugar, and potatoes. The per capita cost of the optimal food basket for one day in 2020 and 2021 is 223,576 and 306,833 Rials, respectively (a 37% increase).

The cost of the optimal food basket per household size for a 30-day month in December 2020 for a family of one, two, three,, and four people is 6707289, 13414578, 20121566, and 26829155 Rials, respectively. In December 2021, the corresponding values of the the previous year were 18409980, 27614969 and 36819959, and 9204990 Rials, respectively. The corresponding values of the previous year were 18409980, 27614969, and 36819959, which increased by 37% compared to last year.

In addition, the cost of the optimal food basket to the minimum wage in 2020 and 2021 was 57 and 50%, respectively. This ratio is 80 and 70% for workers with one child and 99 and 87% for workers with two children in the same year.

Food security refers to the area where people have access to enough nutritious food according to their culture to lead a healthy and active lifestyle. The four main dimensions of food security include availability, access, the productivity of consumed food (health and nutrition), stability, and sustainability of the previous three dimensions. Access is one of the essential dimensions of establishing food security, along with two physical and economic dimensions. Economic access means that households or individuals can buy quality food items derived from the food price and income. As the price of food increases or household income decreases, the purchasing power of the household decreases, and their table becomes smaller in quantity and quality (elimination of food containing high-quality proteins and other micronutrients (12).

Many studies have shown that price increases cause a decrease in the consumption of some food items. For example, the study of victims, devoted to the study of the effect of price increases on food security in the rural society of Iran, has shown that the rise in food prices decreases food intake. Examples of high protein foods are meat and dairy products instead of "Protein is like meat and dairy products" (13). Ahmadi Javid showed that consuming meat, one of the essential protein sources in the food basket, in low-income households has low purchasing power for this food group (14).

Food items such as red meat, fruits, and dairy products account for a high percentage of expenses in the desired food basket, which is consistent with the findings of Jazayeri et al. (2). Reducing the consumption of this group could lead to a decrease in iron and calcium intake. Food items that contain calories and do not have valuable micronutrients, such as sugar and vegetable oil, have a lower cost than the optimal food basket, which is used in the low-income groups of society for abdominal satiety and does not cause cellular satiety. Therefore, it leads to obesity, overweight, and other non-communicable diseases such as diabetes and cardiovascular disease.

Price policies to provide food items with vitamins, minerals, and quality proteins to prevent non-communicable diseases and the resulting deaths are among the policy priorities in food, nutrition, and public health.

In a study in Brazil to analyze the role of the minimum wage policy in Brazil in ensuring food security among low-income people, the nutritional composition of the national basic food basket that was initially proposed to estimate the minimum wage, the content of calories, sodium, saturated fat and had high added sugar compared to adults' recommendations and insufficient amounts of essential nutrients (calcium, potassium, and vitamins) and food groups (fruits, vegetables, and grains) (15).

In addition to the above issue, policymakers should pay attention when determining the minimum wage, as assessing the level of this minimum wage with inflation can lead to a better quality of life and nutrition for low-income households. A study conducted in the United States in 2021 aimed to examine the extent to which an increase in the minimum wage would improve the quantity and quality of food purchased by low-income households and showed that households likely to receive the minimum wage increase their purchased calories in response to an increase in the minimum wage. In addition, families that used to buy less healthy foods buy more nutritious foods in response to the minimum wage increase (16).

Therefore, policymakers should consider all the individual needs for nutrients and micronutrients to have a healthy workforce when formulating the optimal food basket based on the minimum wage.

Specifically, the increase in prices causes a decrease in the purchasing power and, subsequently, the welfare of households. The current phenomenon becomes more critical in the case of essential goods such as food. In this regard, the calculation of welfare changes caused by the increase in food prices in Gahramanzadeh et al. shows that the rise in food prices reduced the welfare of all Iranian urban households, and the loss of welfare for poor households was far more significant than that of rich households(17). Liani and Esmaili also revealed that the amount of welfare lost by urban households due to the price of imported food, equivalent to the average annual growth in imported food from 1961 to 2011, is 4.20 of the average household income (18).

Based on the findings, the ratio of the optimal basket cost of the minimum wage increased. In other words, the increase in the size of the household caused a rise in food costs, and when the household income does not improve, the household's food security would be at risk. The minimum wage for households suggests that more than an increase in wages would be required to cover costs. Therefore, more support from the government seems necessary for families with more children. Rostami et al. showed a positive and significant relationship between the social and economic status of the household and the food security of the studied households in such a way that there is a significant relationship between the household's food security and the monthly income of the household, the job position of the father, the status of having living facilities and the number, there are household members (19). In a study on households in Shiraz, food insecurity was higher in households with more children and poor socio-economic levels, having children under 18 years old and a female head(20).

The findings showed that the ratio of the cost of the optimal food basket to the minimum wage of workers had not increased logically according to the household size. A family of four workers should spend more than 80% of their income to meet the minimum needs of protein and micronutrients in the year 2021. The household table, which has sufficient quality and quantity for a healthy and active life, spends what is impossible along with other expenses (housing, energy, and clothing) and leads to the elimination of quality foods in terms of nutrients and a vicious circle. Hunger and the lack of micronutrients cause non-communicable diseases, increasing the cost of treatment and poverty. Therefore, low-income households, due to the inability to buy food products with high nutritional value, consume foods with a higher energy content but at the same time have few nutrients and essential substances. Based on the current salaries and wages in the country, it is impossible to provide the minimum of an optimal food basket. Hence, reviewing the state of salaries and wages in the country seems necessary. One of the limitations of this study is the limited scope of the research, which discussed only two parameters (cost of food basket and minimum wage). Researchers interested in solving this problem are encouraged to use other relevant parameters if they can access the needed data. Another limitation of the current study is that it uses cross-sectional rather than panel data.

Conclusion

A household's purchasing power is one of the most critical factors in establishing food security, so paying attention to the extent to which it is sufficient to provide an optimal basket of food can be a necessary basis for determining salaries and wages, especially when the worker comes from lower income deciles. Supporting similar groups is effective in providing them with access to quality protein (red and white meat types) and

foods containing micronutrients (fruits, vegetables, and dairy products) and has an influential role in the prevention of health problems and increasing the productivity of the productive workforce through providing nutritional needs. Different strategies can be used to improve the food security of the weaker sections of society, such as allocating subsidies, increasing labor wages, empowering unemployed and unskilled young people and female heads of households to create employment, or providing employment loans with low-interest and repayments long and used to provide facilities for the provision of food to the workers.

Conflicts of Interest

The authors declare no conflicts of interest.

References

1. Mohsenzadeh Harris M, Karimzadeh H, Aghayarihir M. Comparison of food security situations of rural households in heris and bostanabad with emphasis on agricultural indicators using FGIS. Geography and Environmental Planning. 2022;33(4):1-26.

2. Pouraram H, Sharif S, Abtahi M, Djazayery A. Cost estimation of desirable food basket in Iran as an important component of sustainable development. Iranian Journal of Nutrition Sciences & Food Technology. 2018;13(1):147-52.

3. Asghari G, Rezazadeh A, Hosseini-Esfahani F, Mehrabi Y, Mirmiran P, Azizi F. Reliability, comparative validity and stability of dietary patterns derived from an FFQ in the Tehran Lipid and Glucose Study. British Journal of Nutrition. 2012;108(6):1109-17.

4. Hk H. Welfare effects of implementing food security policies targeted at vulnerable groups. Applied Economics. 2011;2(7):23-57.

5. National document for Nutrition and Food Security, 2012.

6. Optimal food basket for the Iranian society. Entesharat Mandegar. 2013.

7. Abdi F, Atarodi KZ, Mirmiran P, Esteki T. Surveying global and Iranian food consumption patterns: A review of the literature. 2015.

8. Vaez Mahdavi Z, Raghfar H, Emami Jeze K, Haji Nabi K. The effect of instability of bread price on household food security and mental health using agent-based simulation approach. Daneshvar Medicine. 2022;29(6):70-85.

9. Abdollahi F. Agricultural promotion and development in Iran. Journal of Social Sciences. 2003;1(21):31-65.

10. Resilience B. The State of food security and nutrition in the world. Rome: Building Resilience for Peace and Food Security. 2017.

11. Iran Statistics Center, statistical data and information, price indicators, average prices. Average price of selected food items in urban areas of the country. 2021.

12. Erokhin V, Diao L, Gao T, Andrei J-V, Ivolga A, Zong Y. The supply of calories, proteins, and fats in low-income countries: a four-decade retrospective study. International Journal of Environmental Research and Public Health. 2021;18(14):7356.

13. Ghorbanian A, Bakhshoodeh M. The Effect of Price Increases on Food Security in the Rural Society of Iran. Agricultural Economics and Development. 2016;24(2):165-89.

14. Ahmadi JM, Akbari A, Ziaei MB. Pattern of food products consumption in urban households of sistan and Baluchistan province with emphasis on food security. 2014.

15. Sarti F, Santana A. Minimum Wage and National Basic Food Basket: Analysis on the Evolution of Milestones in Brazilian Food Security Policy (OR21-02-19). Current Developments in Nutrition. 2019 Jun 1;3:nzz034-OR21.

16. Palazzolo M, Pattabhiramaiah A. The Minimum Wage and Consumer Nutrition. Journal of Marketing Research. 2021;58(5):845-69.

17. Measuring the effect of rising food prices on the welfare of Iranian urban households. Journal Agricultural Economics. 2015;9(4):97-119.

18. Loughrey J, O'Donoghue C. The welfare impact of price changes on household welfare and inequality 1999-2011. The Economic and Social Review. 2012;43(1, Spring):31-66.

19. Rostami F, Shahmoradi M, Baghaei S. Factors affecting on rural households food security (Case study: Karnachy Village in Kermanshah County). Iranian Journal of Agricultural Economics and Development Research. 2014;45(4):725-37.

20. Ramesh T, Dorosty Motlagh AR, Abdollahi M. Prevalence of household food insecurity in the City of Shiraz and its association with socio-economic and demographic factors, 2008. Iranian Journal of Nutrition Sciences and Food Technology. 2010;4(4):53-64.