

Socioeconomic factors determining fruit and vegetable consumption among urban households in Iran

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Original Article

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Abstract

Many factors influence the Fruit and Vegetable (F&V) intake. Numerous studies have shown the role of economic variables such as income, wealth, and employment as the main factors in the consumption of fruit and vegetables, while social variables seem also important. In this study, various aspects of economic and social factors affecting the consumption of fruits and vegetables among Iranian households were examined. In this study 9317 urban households from all the provinces of Iran were included. Given the nature of the data, Probit and Ordered Probit models were employed and the research model was evaluated using Stata software. The results revealed that by increasing the education level of father, mother, and children, the likelihood of fruit and vegetable consumption by household increases by 0.12, 0.07, and 0.054, respectively. Mother's employment is also likely to reduce the consumption of fruits and vegetables as much as 0.012. As well, income, family size, and the education level of children and parents have direct effects on the F&V intake. Nevertheless, working mothers and children are likely to have negative effects on F&V consumption. Father's education level is more likely to affect F&V intake in a family compared to mother's education level. Moreover, increasing the number of family members reduces per capita consumption of F&V among households.

Keywords: Employment, Fruit, Socioeconomic Factors, Vegetables

Introduction

Inadequate intake of fruits and vegetables (F&V) is one of the most important risk factors for non-communicable chronic diseases. A healthy diet rich in fruits and vegetables is very important, because fruits and vegetables contain vitamins, minerals, antioxidants, fibers, and small amounts of fat and calories and play a significant role in the prevention of diseases [1]. Reducing the risk of cardiovascular disease and cancer is of the benefits of antioxidants content of fruits and vegetables [2]. Gandini and Rashidkhani demonstrated the negative

relation of fruit and vegetable consumption to breast cancer [3] and to kidney cancer [4], respectively. Ezzati found that F&V consumption can reduce heart disease by 31%, esophageal cancer by 20%, strokes by 19%, gastric cancer by 19%, and lung cancer by 12% [5]. Bazzano and colleagues confirmed the negative relation of F&V consumption to diabetes [6]. as well, Utsugi and colleagues confirmed a negative correlation between the F&V consumption and high blood pressure [7]. Moreover, the relationship between F&V

consumption and obesity risk decrease has been observed which can be related to the low energy content and high levels of fibers and water in fruits and vegetables, [8]. There is also a significant reverse relationship between the consumption of F&V and the body mass index [9,10]. According to the World Health Organization, to be benefited from fruits and vegetables, they should be consumed at least 400 grams (in 5 servings) per capita a day, [11,12]. However, this diet has not been always met in Iran [13-15]. There are many factors influencing daily intake of fruit and vegetable such as low awareness about the consumption of F&V, high price, economic and social status, lack of time to buy, and accessibility to fresh fruits [11]. Additionally, psychological factors including some habits, beliefs, and lack of knowledge about F&V intake in the diet are among the barriers to the consumption. There are also several social and environmental factors leading to the insufficient F&V intake including impression of family on members, childhood habits, accessibility to fruits and vegetables and the high price as a result of decisional balance [16]. Education is correspondingly one of the factors influencing the consumption of fruits and vegetables. Education increases understanding of the benefits and drawbacks of a behavior. Higher education probably leads to the greater financial resources and higher socio-economic classes [17,18]. In addition, parents' education and occupation status, economic status, family size [15], mothers' education and household income have a statistically significant relationship with the intake of fruits and vegetables [14,19]. Although many studies have shown the effectiveness of economic variables such as income and wealth as the major factors affecting the consumption of fruits and vegetables [20-23]; social factors can also be equally effective. Education and employment of parents as well as their attitudes can affect the consumption [22,24,25]. Working parents, especially working mother is of great importance; because mother's employment can increase household income and allow more investments in family health which leads to

the improvement of household health and nutrition status. Accordingly, it increases fruit and vegetable intake as a healthy nutrition behavior [26,27]. On the other hand, working mothers have less time to prepare healthy food, healthy home environment, and to improve health and nutrition of families [28]. As a result, health and nutrition status of children may be adversely affected. Moreover, the number of family members and whether or not the family is faced with the phenomenon of child labor can have impacts on F&V consumption. Numerous studies have been conducted to examine the factors affecting fruit and vegetable intake, but what makes the present study different of the others is that this is a comprehensive study in which the factors affecting the fruit and vegetable consumption is examined all over in Iran. Studies conducted in Iran have been focused on particular cities and provinces, and sometimes for particular classes of individuals in the society; but in this comprehensive study, all parts of Iran have been included. Moreover; in the present study, various aspects of economic and social factors (based on recorded data) and their effects on the consumption of fruits and vegetables among Iranian households are measured.

Method

The present research was a cross-sectional study in which, the statistical population was composed of Iranian households from different provinces. The purpose of the study was to examine the fruits intake, vegetable intake, and fruit and vegetable total intake; and to identify the various social and economic factors affecting the consumption of F&V among Iranian households. To this end, the cost-income raw data for urban households in 2012 collected from the Statistical Center of Iran were employed. These data were gathered by administrating the household budget survey questionnaire. This questionnaire was filled out according to the declaration of the head of the family by direct reference of economic statisticians from the Central Bank

of Iran to the selected households. The sample size was determined according to the formula of $n = \frac{t^2 s^2}{d^2}$ with respect to the limitation of cost and administrative facilities in the study. In this formula, n is the number of sample households, t is the value obtained from the t-student table at 95% confidence level, s^2 is the variance of expenditures in sample households, and $d = h\bar{x}$, where \bar{x} is the average household expenditure and h is the mean percent error of sample. The sample households were selected on the basis of a three-step sampling. At the first step, 75 sample cities from all the provinces were chosen according to the final amendment of plans of the Economic Statistics Office. At the second step, some blocks were chosen among the listed blocks in the sample cities according to the systematic sampling method. At the third step, sample households were selected. For this purpose, according to the block size, numbers multiple of 4 were developed and used for determining magnitude of sample households. The sample households were chosen by systematic sampling in each selected block. Among all the urban households, only those families were selected that firstly had all the required data to study, and secondly; had at least one child. These inclusion criteria were defined in order to collect the relevant data on parents' age and education, children's education, as well as examination of whether households had working children. Considering these conditions, 9317 urban households were selected and the required data were extracted from household cost-income information and analyzed using the Excel software.

Results

The results of the study showed that households with child students expended averagely 493845 Rials in a month for fruits and vegetables. The magnitude of these families was 8026 with proportion of 84.14% in the sample population. The average expenditure of fruit and vegetable based on different variables are listed in Table 1. The obtained data showed that 3.27% of all the households were families with working children and they

pay for fruits and vegetables on average of 447,028 Rials a month, whereas the households without working children expend on average of 489,920 Rials. Households with children were found to consume less fruits and vegetables than the other families. The average consumption of fruits and vegetables for families in which the father has elementary education was 454106 Rials. The families having father with education level of under bachelor's degree, bachelor's degree, and upper bachelor's degree expended on average of 454106, 576196, and 591935 Rials, respectively, to pay for fruits and vegetables in a month. The data on the monthly average expenditure of fruits and vegetables corresponding to the education level of father indicate that the more educated father in households, the more consumption of fruits and vegetables. Households with working mothers comprised 10.45% of the sample population i.e. the magnitude of 974 households out of total 9317 households. The monthly average expenditure of fruits and vegetables for these households was 486,576 Rials. The households in which mothers were not employed comprised 89.55% of all the households (the magnitude of 8343) with an average expenditure of fruits and vegetables equal to 518,566 Rials in a month. It is obvious that fruit and vegetable intake by the households wherein mother is not employed was higher than the households with working mothers.

20.61% of households in sample population were families having illiterate mothers and 36.10% mothers with primary education. Mothers with secondary education level, diploma degree, bachelor's degree, and upper bachelor's degree constituted 15.87%, 19.09%, 8.36%, and 0.03% of households in the sample population, respectively. The monthly average expenditure of fruits and vegetables in households with illiterate mother was 450,940 Rials and in families having mothers with upper bachelor's degree was 738,833 Rials.

Therefore, it can be concluded that the consumption of fruits and vegetables among households increases with education level of mother. Based on the results illustrated in

Table 1, it is observed that households having mother with undergraduate or graduate degrees constituted 8.36% and 0.03% of the entire sample population, respectively.

Table 1 Monthly mean expenditure of fruit and vegetable at different levels of independent variables

Variables	Magnitude of households	Percent of households	Monthly mean of expenditures (Rials)			
			Fruit	Vegetable	Fruit & Vegetable	
Child Education	With child student	8026	86.14	258412	235432	493845
	Without child student	1291	13.86	236018	229499	465518
Child Employment	Employed	305	3.27	227130	219897	447028
	Not employed	9012	96.73	255309	234610	489920
Father Employment	Employed	7836	84.10	254255	232558	506359
	Not employed	1481	15.90	260887	245471	486813
Father Education	Illiterate	1272	13.65	211029	232434	443464
	Primary education	3093	33.20	229534	224571	454106
	Secondary education	1731	18.57	251334	228139	479474
	Diploma degree	1749	18.77	281955	242498	524454
	Bachelor's degree	1437	15.42	320201	255994	576196
Mother Employment	Upper bachelor's degree	35	0.38	343160	248775	591935
	Employed	974	10.45	252195	234380	486576
	Not employed	8343	89.55	281983	236582	518566
	Illiterate	1920	20.61	218110	232830	450940
	Primary education	3363	36.10	245850	233583	479434
Mother Education	Secondary education	1479	15.87	263365	226619	489985
	Diploma degree	1773	19.03	276525	238777	515303
	Bachelor's degree	779	8.36	323555	248855	572410
	Upper bachelor's degree	3	0.30	435333	303500	738833
Fruit And Vegetable expenditure	Above the mean	3749	40.24	423914	357197	781111
	Below the mean	5568	59.76	141786	152071	293858
Fruit expenditure	Above the mean	3538	37.98	331501	275361	606862
	Below the mean	5778	62.02	208678	209686	418364
Vegetable expenditure	Above the mean	3791	40.69	306599	295930	602529
	Below the mean	5525	59.31	220140	192565	412705

Source: Research findings

But, households in which the father was undergraduate or upper graduate comprised 15.42% and 0.38% of the total sample households, respectively, which means that the percentage of households wherein the father had academic education were far more than the

households wherein the mother has academic education. In addition, the percentage of households in which, mothers have education below the primary level, is more than households wherein the father has less than primary-level education. Hence, it can be said

that in households subject to the study, father’s education level is higher than mothers’. 40.24% of all the households consumed more fruits and vegetables than the average of sample and 59.76% of households had the consumption less than the average.

3.1. Probit Results for Fruit and Vegetable Intake

Table 2 represents Probit results and the marginal effects for the consumption of fruits and vegetables. The explanation of Probit model coefficients is complicated. These likelihood estimates are the product of a binary model which cannot be interpreted as the final impact on the dependent variable. Therefore, marginal effects are employed which show the impact of the independent variable on the occurrence likelihood of the dependent variable. The results revealed that the coefficients of all the variables; except age, labor children, and father’s employment are statistically significant. Education level of father, mother, and children

has a positive effect on fruit and vegetable consumption. That is, as the educational level of father increases, the likelihood of fruit and vegetable intake in a household increases by 0.12 more than the average of the sample. This value for the education level of mother and children is respectively 0.07 and 0.054. It is observed that fathers’ education level has the greatest impact on the likelihood of fruit and vegetable intake by households. Father’s age has a direct relationship with the consumption of fruits and vegetables, so that by increasing father’s age, the probability of fruit and vegetable consumption increases as much as 0.33. Maternal employment has a negative effect on fruit and vegetable consumption, that is, the employment of mother may reduce the likelihood of the fruit and vegetable consumption in households. Consequently, mothers’ employment may result in the probability of fruit and vegetable intake of 0.012 below the mean.

Table 2 Probit results for the consumption of fruit and vegetables

Dependent variable: consumption of fruit and vegetables			Marginal effects	
Variable	Coefficients	Probability	Coefficients	Probability
Family Size	0.068	0.000	0.320	0.000
Household’s income	0.002	0.000	0.148	0.000
Child’s education	0.065	0.012	0.054	0.012
Child’s employment	0.063	0.430	0.002	0.453
Father’s age	0.007	0.003	0.336	0.003
Father’s employment	0.035	0.357	0.029	0.356
Father’s education	0.070	0.000	0.129	0.000
Mother’s age	0.003	0.243	0.129	0.243
Mother’s employment	0.125	0.008	-0.012	0.013
Mother’s education	0.047	0.001	0.071	0.001

3.2. Probit Results for Fruit Intake

The Probit results for fruit intake are shown in Table 3. As can be seen, family size, income, education level of children, father, and mother; and mother’s age are directly related to the amount of fruit intake. Maternal employment and the working children in the household have negative impacts on fruit consumption,

although these effects are not statistically significant. The increase in the number of household members makes the likelihood of fruit consumption to increase by 0.123. As well, an increase in household income is likely to increase the consumption of fruit by 0.064. As fathers’ education level increases, the likelihood of fruit consumption reaches to

0.072. Mother's education level has a similar effect on the probability of consumption of fruit. Therefore, it can be argued that father and mother education level has the same effects on the probability of fruit consumption among the households sample to the study.

3.3. Probit Results for Vegetable Intake

The Probit results for vegetable intake are shown in Table 4. Family size, household income, and the education level of parents and children have positive effects on the likelihood of vegetable intake. Maternal age and employment as well as working children have negative impacts on fruit consumption. However, children employment effect was not statistically significant and justifiable. On the other hand,

the effects of mother's age and employment were statistically significant. As can be seen, the marginal effects of these variables are -0.060 and -0.012; respectively. That is, as mothers' age and employment increases, the probability of vegetable consumption is reduced up to 0.012. It is observed that the rate of decline in the probability of vegetable consumption as a result of increasing mother's age is higher than the increasing maternal employment. Another noticeable result is that father's education is more likely to affect the consumption of vegetables in comparison with mother's education. The marginal effects of father and mother education in households are 0.071 and 0.027, respectively.

Table 3 Probit results for fruit consumption

Dependent variable: consumption of fruit			Marginal effects	
Variable	Coefficients	Probability	Coefficients	Probability
Family Size	0.025	0.013	0.123	0.012
Household's income	0.0009	0.000	0.045	0.000
Child's education	0.118	0.006	0.101	0.005
Child's employment	-0.095	0.248	0.003	0.275
Father's age	0.0003	0.896	0.015	0.898
Father's employment	0.007	0.839	0.006	0.839
Father's education	0.037	0.001	0.072	0.001
Mother's age	0.003	0.202	0.148	0.201
Mother's employment	-0.030	0.512	-0.0030	0.519
Mother's education	0.046	0.001	0.0724	0.001

Source: Research findings

3.4. Ordered Probit Results

For a more detailed study of the factors influencing the consumption of fruits and vegetables, households were divided into 4 groups (categories) based on the monthly expenditure of fruits and vegetables, and then the factors affecting the consumption of fruits and vegetables in each group were tested. This test was conducted using Ordered Probit method in Stata software. The results are represented in Table 5. Since the coefficients obtained in the Probit model do not indicate the probability effect on the dependent variable, the marginal effects were used. These marginal effects

show the influence of independent variables on the dependent variable. Household size and income, education and employment of children, and parents' education in all 4 categories are statistically significant. But the age of the parents and their employment do not have significant effects on household consumption of fruit and vegetables in each category. Family size has a positive effect on the first and the second categories, and a negative effect on the third and the fourth categories. That is, households having higher consumption of fruits and vegetables tend to maintain their fruit and vegetable consumption

at higher levels in spite of family size increment. But families which have lower fruit and vegetable intake reduce their consumption as the family size increases. Household income and children's education have a positive effect on the likelihood of consumption of fruits and vegetables in the first and second groups. Employment of children in all 4 categories has a negative effect on the probability of consumption of fruits and vegetables, and parents' education has the greatest impact on the third category. In general, it can be said

that the fruit and vegetable consumption among the households of the third category is affected much more than the other groups of independent variables in the model. In other words, sensitivity and vulnerability of these households in terms of fruit and vegetable consumption is more than the other households; so that by increasing income, the probability of fruit and vegetable intake reduces among them. It means that fruit and vegetable consumption is considered to them as the inferior good and has no worthy place

Table 4 *Probit results for vegetable consumption*

Dependent variable: consumption of vegetable			Marginal effects	
Variable	Coefficients	Probability	Coefficients	Probability
Family Size	0.058	0.000	0.267	0.000
Household's income	0.007	0.003	0.050	0.003
Child's education	0.060	0.015	0.049	0.015
Child's employment	-0.084	0.295	-0.0029	0.318
Father's age	0.002	0.391	0.095	0.391
Father's employment	-0.0081	0.832	-0.006	0.832
Father's education	0.038	0.001	0.072	0.001
Mother's age	-0.0015	0.058	-0.060	0.581
Mother's employment	-0.123	0.009	-0.0012	0.014
Mother's education	0.017	0.195	0.027	0.192

Source: Research findings

in the consumption basket of these households.

Discussion

According to the results of the study, the majority of households expend for fruits and vegetables less than the mean. These findings are consistent with numerous studies conducted in this field. According to Amini, great magnitudes of teenagers in Zanjan Province consume fruits and vegetables less than the recommended and adequate amounts [13]. As well, fruit and vegetable consumption among Iranian elderly is lower than the minimum recommended amount [11]. About 28% of individuals have the average fruit and vegetable consumption lower than the amounts recommended by the World Health Organization [29]. Inadequate consumption of fruits among girls in the dormitories of Tehran

University of Medical Sciences has also been reported [9].

The mean family size in the present study was 4.86 ± 1.44 . A direct correlation between family size and the fruit intake, vegetable intake, and F&V total intake was observed in the Probit test. This finding is consistent with the obtained results by Freud on vegetable intake, but inconsistent with the data on fruit consumption [30]. However, Dehdari and Heshmati argued that an increase in household size increases perceived barriers [9,15]. Zamanian found that families with one or two children eat more fruits and vegetables than families without children [31]. However, according to the results of Ordered Probit test, family size has a positive effect on the first and

Table 5 *The results for ordered probit*

Variables	Marginal effects (1)	Marginal effects (2)	Marginal effects (3)	Marginal effects (4)
Family Size	0.009*	0.008*	-0.010*	-0.006*
Household's Income	0.002*	0.0001*	-0.0002*	-0.0001*
Child's Education	0.018*	0.017*	-0.020*	-0.014*
Child's Employment	-0.024*	-0.024*	-0.027*	-0.021**
Father's Age	-0.0006	0.0005	-0.0007	-0.0004
Father's Employment	0.0005	0.0005	-0.0006	-0.0004
Father's Education	0.003	0.002	0.003	0.002
Father's Education: Primary	0.036*	0.032*	0.041*	0.027*
Father's Education: Under Diploma	0.019*	0.018*	0.021*	0.015**
Father's Education: Upper Diploma	0.009	0.008	-0.011	0.006
Mother's Age	0.000	0.000	0.000	0.000
Mother's Employment	-0.008	-0.007	0.009	0.006
Mother's Education	0.017*	0.015*	0.019*	0.012*
Mother's Education: Primary	0.019	0.017	-0.022	-0.014
Mother's Education: Under Diploma	0.013	0.011	-0.015	-0.009
Mother's Education: Upper Diploma	0.026**	0.026	0.022**	0.022

Source: Research findings

* Significance at 0.05

** Significance at 0.01

the second categories, but a negative effect on the third and the fourth groups. Based on the results of the study, the per capita expenditure of fruits and vegetables is averagely 84108 Rials in a three-member family, 63906 Rials in a four-member family, 43777 Rials in a six-member family, and 17312 Rials in a twelve-member family. Therefore, it can be concluded that by increasing family size the per capita consumption of fruits and vegetables reduces. In other words, by addition of a new member to the family, the nutrition status of the households will worsen. The monthly average income of Iranian urban households, at a high level of significance, has a direct impact on the probability of fruits intake, vegetable intake, and F&V total intake among the households sample to the study. Dastgiri, Nadder, Zenk, Salehi, and Zamanian have obtained similar results [31-34,11]. As well, in a study by Middaugh, having a diet rich in fruits and vegetables is directly related to income [35]. Giskes also confirmed that low-income people are less likely to increase the consumption of fruits and vegetables and the variety of fruit

and vegetable consumed also has a significant positive relationship with income [36]. The results revealed that parents' education has the greatest impact on the likelihood of fruit and vegetable consumption in the household. Champion believed that education increases individuals' understanding of the benefits of and barriers to a behavior [37]. Salehi and colleagues and Zamanian and colleagues showed the positive effect of parents' education on fruit and vegetable intake [11, 31]. Heshmati and colleagues, Gholipour and colleagues, and Leganger pointed to the positive relation of maternal education to household consumption of fruits and vegetables [15,19,38]. In a previous study, it was demonstrated that in households with higher educational levels and employment grade for the father of the family, the consumption of high-energy food such as bread, cereals, and sugar decreases, and the intake of fruits and vegetables in the family increases [34].

Also, according to the findings of Raeesi and colleagues, people with higher health

literacy have a higher daily fruit and vegetable consumption [39]. However, findings of the study of Dehdari, unlike the other studies, did not show a significant difference between the consumption of fruits and variables with father's education level, mother's education level, father's occupation, and mother's job [9]. Since the statistical population of the latter study was composed of girls residing in dormitories, being away from the family might reduce the role of parents in the fruits and vegetables consumption behavior. This study also found a direct link between paternal age and the consumption of fruits and vegetables as aging parents increase the probability of fruit and vegetable consumption as much as 0.33. But mothers' age was not statistically significant on the probability of fruit and vegetable intake. Freud mentioned that age was not correlated with the consumption of fruits and vegetables [30]; but Salehi stated that the consumption decreases with age [11].

Fruit and vegetable consumption by households in which there are no working mothers is more than the households wherein the mother is employed. In the other words, mother's employment in households reduces the consumption of fruits and vegetables and adversely affects healthy nutrition of families. Also, according to the results of the Probit test; mothers' employment has a negative impact on the probability of fruits intake, vegetable intake, and F&V total intake. This trend may be due to the assumption that working mothers do not have enough time to plan for household's healthy nutrition and prepare healthy and appropriate foods. Also, it is likely that in household wherein the wife is working outside home, the charge of shopping for fruits and vegetables is not well defined between wife and husband. In addition, it was revealed that the education level of mother in households was averagely 1.42, which means that the education of mothers was lower than the secondary education level. Hence, it can be concluded that mothers' employment is not due to the high level of education and seeking for higher social status. But mother's employment is because of the poor economic situation of households. However, Dehdari showed that

housewife mothers and unemployed fathers lead to a reduction in the consumption of fruits and vegetables. They concluded that students with jobless fathers and housewife mothers should be considered as the target group [9]. Zamanian stated that although in univariate statistical tests there is a significant relationship between fruit and vegetable consumption and mothers' employment and father's employment position, this relationship is not significant anymore in multiple regressions [31]. In this study, the effect of father's employment on the consumption of fruits and vegetables was not statistically significant. In the Ordered Probit model, the employment of children in all 4 groups had a statistically negative significant effect on the likelihood of fruit and vegetable intake. That is, households with working children have lower consumption of fruits and vegetables in comparison with the other families. It means that even when children are working for money outside home, the nutrition and health status in family are not improved. According to the results of this study, since there is a direct relationship between household income and consumption of fruits and vegetable; we expected that fruit and vegetable intake increases by increasing household income as a result of working children. But we do not observed this trend in the present study. It is deduced that either the position of fruit and vegetable in daily diet is not worthy to the parents or they are so involved in economic problems and social issues that they have forgotten to consider the healthy nutrition of family members. Since the required data for the present study are extracted from the statistics of household income budget, other variables such as race and ethnicity, geographical region, and Gini coefficient which may affect fruit and vegetable consumption cannot be studied using these data.

Conclusion

Monthly average income of an Iranian urban household was 73.27 ± 7.39 ten thousand Rials in 2012. The household income had a direct significant effect on the likelihood of fruit

intake, vegetable intake, and F&V total intake. Although by increasing the number of household members the probability of consumption of fruits and vegetables increased, per capita daily consumption of fruits and vegetables reduced. In other words, by the addition of a new member to the family, household's nutrition and health situation gets worse. Parent's education had a positive effect on the consumption of fruits and vegetables, but father's educational level was more significant than mother's. Father's education was the most significant factor in the likelihood of fruit and vegetable intake. Employment of mother and children had a negative impact on the likelihood of fruits intake, vegetable intake, and F&V total intake. Households, who their fruit and vegetable expenditure was below the average, were the group that showed the greatest influence of independent variable on the model. In other words, the sensitivity and vulnerability of these households in changing the consumption of fruits and vegetables is much more than the other households. As a result, the factors that have a positive impact on the consumption of fruits and vegetables in these households should be strengthened and the factors with negative impacts should be minimized. The increase in the number of years of education of children and parents' education especially father's educational level had a positive effect on the consumption but children's employment had a negative impact. Therefore, economic and social infrastructures along with educational programs should be provided, organized, and set in a way that increase the number of educational years of children and reduce the magnitude of working children. The role of the education is inevitable on this sample and households should do their best in this regard. Improving health knowledge among parents through different techniques such as parent-teacher meetings at school as well as training workshops by healthcare centers for parents during children's growth period can increase household consumption of fruits and vegetables.

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Conflict of Interest

"The authors declare that they have no competing interests."

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