

Investigating poverty in rural Iran: The multidimensional poverty approach

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ABSTRACT

In this study, rural poverty in Iran is investigated applying a multidimensional approach, association rules mining technique, and Levine, F and Tukey tests to household data of 2008. The results indicate that poverty in its multi-dimensions is an epidemic problem in rural Iran. The results also exhibit that there are 11 patterns of poverty in the rural areas including four main patterns with 99.62% coverage and seven sub-patterns with nearly 0.38% coverage. In these patterns, housing and household education are the most important dimensions of poverty and income poverty is the least important dimension. Government income support policy to households, in enforcement the law of targeting subsidies, cannot be regarded as pro poor policy but it follows other political aspects.

Keywords: Multidimensional Poverty Approach; Rural Poverty; Data Mining; Iran

1. INTRODUCTION

Until the early 1990s, poverty definitions and its measuring methods were largely based on income approach where poverty was recognized as lack of minimum income. Accordingly, this approach only considers the welfare aspects of human life that can be expressed in terms of revenue [1-4]. Therefore, the income poverty approach cannot explain much of people capabilities and so cannot be a base for fully explanation of poverty phenomenon in society. Moreover, using the income approach in classifying individuals as poor and non-poor follows the basic abnormality. It is possible that in practice a poor be classified as a non-poor based on income approach [5]. So, focusing on this approach in studying poverty phenomenon and developing strategies and policies to support poor is a big risk [4]. With respect to these matters, moving from the income poverty approach to multidimensional poverty approach is an important pro-

gress in the poverty literature [1-3,6,7].

In the multidimensional approach, poverty concentration lies on the deprivation from resources and opportunities that entitle to each person in society, and poverty structure is expressed by reflecting the human failure in different dimensions of human welfare [3,8]. Human welfare has many dimensions such as housing, health, feeding, education, income, etc. Housing concept is not only constraint on the shelter as physical location but also involves the residential environment, all services and facilities that are necessary for better family life, and relatively right and safe occupation. Providing these services and facilities, facilitate inhabitants' activities, increases their efficiency and is a factor in establishing a stable life. Accordingly, efforts to achieve these quality criteria determine the ability of referring the term housing to buildings and structures [5,9-16]. Health poverty focuses on people who need health care. In absence of these cares, they suffer from health deprivation [17]. Someone who has low access to health services drop into disease trap and so disable to obtain suitable food, housing and job. Food poverty is the latest and the most unacceptable sign of frustration in people basic needs and is considered as the most important poverty dimension at the community and occurs when a person is unable to consume enough food according to acceptable society manner [18,19]. Education poverty causes to reduction in the individuals' human capital and so deprives them from suitable position of social opportunities [20-23] and ascending the training level trepanns more reduction in the poverty rate [21-25].

To sum up, income alone is not a strong criterion to describe poverty phenomenon and to determine welfare, and therefore paying attention to the other dimensions such as housing, health, food and education are essential in examining the phenomenon of poverty in communities. In investigating these dimensions through multidimensional poverty approach, it is important to note that each welfare dimensions concentrate on the clear and separable matters [4,26-29]. So, in order to calculate each dimension, its criteria should be separately and independently considered from calculation of the criteria of other di-

mensions [1-3].

Another issue in concerning to poverty phenomenon is related to poverty distribution. According to the literature, poverty distribution in worldwide is such that developing countries suffer more than developed countries. In developing countries, large portion of the population live in rural areas and most of them are poor. So, the rural area in developing countries is considered as poor habitat [30] and poor in developing countries often do not have access to adequate housing and related services [31,32]. In these countries, health inadequacy made health poverty as a feature of rural poverty, notwithstanding optimistic thoughts about health in rural communities [33]. In nourishment dimension, the persons suffer from food poverty belong to the poorest people in developing countries and most of them concentrate in rural areas [11]. Education poverty in these countries is a common matter among many segments of society, especially the villagers [20-23].

Thus, in order to further success in fighting with multidimensional poverty on a global scale, focusing on rural communities in developing countries is essentially and substantially attempt with high emergency.

Iran is one of the developing countries that suffers from most of welfare dimensions. For instance, in housing dimension, despite the ideals aspirations in providing housing and making different strategies to achieve these ideals, the gap of classes between minority groups with the best housing and groups without adequate housing has become deeper [34]. Health system is also poor and imposing heavy costs on households is the most inadequacy and insufficiency of this system [35,36]. In nourishment dimension, in spite of the extensive legal and executive power in order to combat poverty in the country, households are faced with shortages in energy and micronutrients and imbalances in food consumption are intense. Geographic distribution of food poverty is also such that poor are more concentrated in rural areas [37,38].

These collections formed footstone of this investigation and made it essential. Therefore, study of multidimensional poverty phenomenon in Iranian rural society is targeted.

2. METHODS

There are many dimensions to be considered in the multidimensional poverty approach that are restricted to data accessibility [10,39]. Accordingly, five rural poverty dimensions including housing, health, nutrition, education and income were examined in this study.

Following Ravallion [40], food poverty index was calculated based on food usage in the normal range (best nutritional status) considering food pyramid adjusted for age and gender [41,42]. Determining a normal diet based

household food poverty not only provides the body needed energy, but indicates the nature of households' food poverty and can be considered as a practical guideline in the household food management to reduce and eradicate food poverty [11].

The most common indicators of adequate housing, including security, the sewer system, ownership, and density indexes were considered as the housing dimension. Efforts to achieve these quality criteria determine the ability of referring the term housing to buildings and structures [5,9-11,13-16].

Quality of remedy financial management was considered as the indicator of health poverty [43,44]. The household health expenditure as proportion of income was used to identify rural households that suffer from health poverty and to determine their health poverty gap [40,45,46]:

$$x_i = \frac{HC_i}{I_i} \quad (1)$$

where x_i is the health expenditure to income ratio for i th household, and HC_i and I_i are respectively the health expenditure and income of i th household. It should be noted that in the above relationship, household health expenditure is perfectly unexpected and household income, in comparing with this expenditure, is constant [47].

In order to examine education poverty, the information literacy indexes including information admission criterion and indicators of literacy skills were used [48]. The former index focuses on receiving information from various sources, including publications (newspaper, magazine and journal, and books), variety of media-aural visuals (fixed and mobile telephones, radio, television, computer, video and similar devices), and internet [48,49]. Indicators of literacy skills show the status of formal training in households and are introduced as a prerequisite for implementing information literacy skills. Despite the availability of information, lack of these skills can make the usage of these information impossible [48]. In this study, literacy skills were assessed by net enrolment rate [48,49] that shows the percentage of family members gaining education opportunities and calculated as [48,50]:

$$NER_i = \frac{NSL_i}{PN_i} * 100 \quad (2)$$

where NER_i is net enrolment rate at i th level of education, NSL_i is all students in household at i th education level and PN_i represents all household members that potentially lie in the i th education level.

In the multidimensional approach to poverty, income dimension must be calculated independently from other dimensions of poverty [1-3,7] whereas it is the cumulative measure of the monetary needs of individuals in the in-

come poverty approach and so it is not independent of other dimensions of poverty. Therefore, the multidimensional approach to poverty cannot use the methods of calculation poverty line based on the income approach. Due to this, some studies have focused on the inability to earn appropriate income [16,51,52]. Combining information on household expenditure with income is an appropriate approach in order to complete the income criteria in the estimation of income poverty by use of household expenditure survey data [53-55]. In this study, the ratio of net expenditure (expenditure minus investment) to disposable income of household was used for this purpose [53,55,56] as expressed by [57]:

$$IP_i = \frac{TX_i}{TI_i} \quad (3)$$

where IP_i is the income poverty criteria for the i th household, TX_i and TI_i are respectively total expenditure and total disposable income of the i th household.

Following Grootaert, *et al.* [58] and Okunmadewa, *et al.* [59], in order to aggregate indicators and indexes and then to express household poverty status in an overall index, the values of each indicator and index are normalized by **Eq.4:**

$$p_{ij} = \frac{z_j - x_{ij}}{z_j} \times 100 \quad (4)$$

in which p_{ij} represents poverty status of the i th household taking the j th indicator or index, z_j is the acceptable value of j th index or indicator and x_{ij} is the amount of the i th household's owners from the j th indicator or index. Then, the overall index of poverty for each household (P) is expressed as [3,60]:

$$P = \frac{1}{n} \sum_j a_j p_j \quad (5)$$

where n is the number of indicators or indices, a_j indicated the weight of j th indicator or index, and p_j is the poverty rate for each household in the j th indicator or index. It should be noted that the entropy weighting method was used to determine appropriate weights of indicators and indices [61-64].

Furthermore, determining the overall poverty situation in rural society needs to assess the level of the headcount ratio and the poverty gap indexes for each poverty indicator or index. In this study, the *FGT* indices are utilized to measure poverty rate ($\alpha = 0$) that shows the frequency distribution of poor households and poverty gap ($\alpha = 1$) that expresses the depth of poverty in rural Iran [65]:

$$FGT = P(\alpha) = \frac{1}{n} \sum_{i=1}^q \left(\frac{z - x_i}{z} \right)^\alpha \quad (6)$$

where n and q are total and poor households respectively,

z is the acceptable poverty line and x_i is the owner level of i th household.

Moreover, the association rules mining technique, one of the most important non supervisory data mining techniques, was used for extracting poverty patterns in the society. This technique discovers and extracts patterns related to the nature of poverty without providing any previous hypothesis on the extraction of patterns in the society. The advantage of using the association rules mining technique, in comparison to pattern making based on specified hypothesizes, is that it allows the extraction of significant and unpredictable patterns without any information about them [66]. The mining association rules technique identifies those features that engage together. Accordingly, the general form of an association rule is as $X \Rightarrow Pov$ where X represents a set of characteristics of household and Pov represents the overall poverty situation of household and show antecedent and consequent of rule, respectively [66-70].

The discovery of association rules needs some criteria to express certainty degrees of discovered rules. These criteria allow for the rules with high certainty are selected and presented from the set of possible rules. These criteria are the most commonly and applicable criteria to evaluate and assess the accuracy and valuable of the discovered rules. The support criterion expresses as probability and shows the amount of protection of rule based on the individuals' communication level. Simply, this criterion represents the proportion of individuals with a set of features (X) occurring with the expected poverty (Pov), simultaneously. Mathematical expression of this criterion is as follows [67,68,70]:

$$\text{Support}(X \Rightarrow P) = P(X \cap Pov) \quad (7)$$

in which $P(X \cap Pov)$ is the occurrence probability of the features sets X and Pov , simultaneously.

Confidence criterion expresses the occurrence probability of two or more features together. Thus, this criterion shows the degree of dependence between two features sets, X and Pov . This affiliation is calculated as follows [67,68,70]:

$$\text{Confidence}(X \Rightarrow Pov) = P(Pov/X) = \frac{P(X \cap Pov)}{P(X)} \quad (8)$$

where $P(Pov/X)$ represents the occurrence probability of poverty with respect to occurrence attribute set X , and $P(X)$ represents the occurrence probability of features set X , regardless Pov . Other notations are defined previously. The more the confidence criterion, the higher the validation of pattern discovery would be.

Finally, lift rate criterion represents the ability level of pattern to provide the expected confidence. This criterion compares the pattern confidence with the expected confidence. The expected confidence is the confidence level

that obtain when antecedent part (X) cannot increase the probability of occurrence poverty. Mathematical expression of this criterion is as follows [70]:

$$\begin{aligned} \text{Lift}(X \Rightarrow Pov) &= \frac{\text{Confidence}(X \Rightarrow Pov)}{P(Pov)} \\ &= \frac{P(X \cap Pov)}{P(X) \cdot P(Pov)} \end{aligned} \quad (9)$$

where $P(Pov)$ represents the occurrence probability of poverty regardless of the features set X . Other notations are defined previously.

In the extract patterns of rural poverty, one-way ANOVA test were used in order to assess dispersion of poverty dimensions. With respect to the fact that the ANOVA test is possible in two state including variance homogeneity and variance heterogeneity, it is needed to check homoscedasticity and heteroscedasticity in the patterns of rural poverty before applying this test. For this, several tests including the Fisher's test, Bartlett's test and Levine test are referred. Contrary to other tests, Levine test is less sensitive to the normal distribution of the population and so is used in this study [71]. The F test is also used to examine differences between the patterns of rural poverty in each of poverty dimensions. The test is overall test in examining differences between the patterns of rural poverty [71]. Based on F test, if average difference between each of poverty dimensions in the patterns of rural poverty is more than inter group differences, it inferred that these patterns are totally different in that poverty dimension.

Following by F statistic calculation and overall comparison of the patterns of rural poverty, Tukey test, that is the honestly significant test of differences, was used to assess the signification of average difference between pair patterns in each of rural poverty dimension [71].

In the conventional definitions of poverty and determining its level, planners are often inclined to use concept of the household [11,13,72]. In this regard, the household survey data published by the Iranian Statistics Center (2008) run at the national level and covering data in housing, education, food, health and income dimensions of Iranian households were used in this study.

3. RESULTS AND DISCUSSION

Table 1 provides information on the various dimensions of poverty in Iranian rural society. According to the table, all rural households have been dominated under education poverty. Based on the poverty gap, the depth and quality of the education poverty of households is such that rural households, on average, do not have access to nearly 44% of education facilities. Poverty rate also indicates that the vast majority of rural households

Table 1. Poverty rate and gap indexes in each poverty dimensions, whether or not prevail other dimensions, in the sample of rural households.

Dimensions of rural poverty	Poverty indexes (%)	
	Headcount ratio	Poverty gap
Education poverty	100.00	43.89
Housing poverty	99.98	38.46
Food poverty	99.64	41.85
Income poverty	57.04	1.84
Health poverty	36.96	0.35
Overall poverty	100.00	37.43

(nearly 100%) experience housing poverty. The depth and quality of the housing poverty suggests that rural households, on average, deprived from 38.46% of the standard of housing indicators. In the food dimension, headcount ratio shows 99.64% of rural households suffer from food poverty. This situation, similar to the state of headcount ratios in education and housing poverties, represents a broad range of food poverty in Iranian rural society. Based on the poverty gap, the quality of food poverty in Iranian rural community is such that on average, rural households use foods 41.85% below the recommended levels. As far as the income dimension is concerned, more than half (57.04%) of rural households are recognized to be poor. The income poverty gap among rural households is equal to 1.84% on average. Finally, 36.96% of rural households are faced with health poverty and the quality and depth of health poverty gap index in rural areas is equal to 0.35%.

In comparison, the largest proportions of poverty in these areas are attributed to education poverty as well as housing and food poverties. Minimum coverage of poverty in Iranian rural community is also related to health poverty. From the perspective of depth and quality of domination of poverty dimensions, poverty gap indicates that education poverty has the greatest and health poverty has the lowest depth. Based on this, not only the housing poverty lies in warning status, but also this warning is in the other dimensions of Iranian rural poverty, including education and food poverties. In the field of education poverty, the alert status that exist in both outer (headcount ratio) and inner (poverty gap) layers is more severe than housing poverty. In the field of food poverty, warning status merely in the perspective of the depth of poverty is more severe than the housing poverty. These situations present poverty in its multi-dimensions as an epidemic problem in Iranian rural society. The amount of headcount ratio (100%) in overall poverty index corroborates this phenomenon. On the other hand,

overall overview of depth and quality of multidimensional poverty indicate that rural households deprive from 37.43% of welfare dimensions.

Table 2 presents patterns of rural poverty among rural households in the sample. As passed, five dimensions of poverty have been studied in this study. Accordingly, 32 rural poverty patterns could be derived independently, where each rural household merely lies in one of them. **Table 2** suggests that, 11 poverty patterns are merely visible in the Iranian rural community. The values obtained for the lift and confidence criteria in these 11 poverty patterns indicate that each of these patterns is able to earn the highest confidence level (100%) with the highest lift (100%). In the perspective of support criterion, first to fourth poverty patterns allocate the highest values of this criterion to themselves. The fourth poverty pattern that reflects merely prevail education, housing and food poverties in rural households, with 34.30% of all households have the highest proportion of rural households. After that, the third poverty pattern lay, where rural households are faced with income poverty in addition to poverty dimensions mentioned in the previous poverty pattern. This poverty pattern allocates 28.51% of rural households to itself. In continue, the first pattern of rural poverty with a share equal to 28.22% of rural households is located. This poverty pattern includes all rural poverty dimensions, and so, it is the most complete pattern of

rural poverty. In the perspective of proportion of rural households, the second poverty pattern is located after these three patterns. In this poverty pattern, all poverty dimensions, in the absence of income dimension, are prevailed and it covers 8.59% of rural households. These four patterns, totality, cover 99.62% of rural households. Accordingly, first to fourth poverty patterns are considered as the main patterns of rural poverty. Seven other patterns of rural poverty, totally, have taken 0.38% of rural households. So, these patterns are regarded as sub-patterns of rural poverty in Iranian rural society.

Table 3 shows mathematical structure of main patterns of poverty among the rural households. As can be seen, housing poverty is the most important dimension of rural poverty in the formation overall poverty in all main rural poverty patterns. So, by including the weights between 0.55 till 0.63 in rural poverty patterns, this dimension of rural poverty contributes over 50% in forming the overall poverty index. After the housing poverty, education poverty in the main rural poverty patterns with weights in the range of 0.37 until 0.42 is the most important dimension of rural poverty. Based on their importance, these dimensions are common in all main patterns of rural poverty to forming overall poverty. Other dimensions of rural poverty, including food, health and income poverties are devoted much lower weights than housing and education poverties weights in the rural poverty patterns,

Table 2. Poverty patterns of Iranian rural society and their evaluation criteria.

Patterns No.	Nature of rural poverty patterns	Support	Confidence	Lift	Observations	Aggregated frequency
1	Income Poverty = 1, Health Poverty = 1, Food Poverty = 1, Housing Poverty = 1, Education Poverty = 1 → Overall Poverty = 1	28.22	100	100	5561	28.22
2	Income Poverty = 0, Health Poverty = 1, Food Poverty = 1, Housing Poverty = 1, Education Poverty = 1 → Overall Poverty = 1	8.59	100	100	1692	36.81
3	Income Poverty = 1, Health Poverty = 0, Food Poverty = 1, Housing Poverty = 1, Education Poverty = 1 → Overall Poverty = 1	28.51	100	100	5619	65.32
4	Income Poverty = 0, Health Poverty = 0, Food Poverty = 1, Housing Poverty = 1, Education Poverty = 1 → Overall Poverty = 1	34.30	100	100	6759	99.62
5	Income Poverty = 1, Health Poverty = 0, Food Poverty = 0, Housing Poverty = 1, Education Poverty=1 → Overall Poverty=1	0.15	100	100	30	99.77
6	Income Poverty = 1, Health Poverty = 1, Food Poverty = 0, Housing Poverty = 1, Education Poverty = 1 → Overall Poverty = 1	0.14	100	100	28	99.91
7	Income Poverty = 0, Health Poverty = 0, Food Poverty = 0, Housing Poverty = 1, Education Poverty = 1 → Overall Poverty = 1	0.06	100	100	12	99.97
8	Income Poverty = 0, Health Poverty = 1, Food Poverty = 0, Housing Poverty = 1, Education Poverty = 1 → Overall Poverty = 1	0.01	100	100	2	99.98
9	Income Poverty = 1, Health Poverty = 0, Food Poverty = 1, Housing Poverty = 0, Education Poverty = 1 → Overall Poverty = 1	0.01	100	100	2	99.99
10	Income Poverty = 1, Health Poverty = 1, Food Poverty = 1, Housing Poverty = 0, Education Poverty = 1 → Overall Poverty = 1	5.07–E03	100	100	1	99.99
11	Income Poverty = 0, Health Poverty = 0, Food Poverty = 1, Housing Poverty = 0, Education Poverty = 1 → Overall Poverty = 1	5.07–E03	100	100	1	100
	Total patterns	100	-	-	19,707	-

Table 3. The mathematical structure of the main poverty patterns.

Main Patterns	Mathematical structure
First pattern	$1.12-E04 * \text{Income Poverty} + 0.04 * \text{Health Poverty} + 8.68-E04 * \text{Food Poverty} + 0.59 * \text{Housing Poverty} + 0.38 * \text{Education Poverty}$
Second pattern	$0.03 * \text{Health Poverty} + 1.75-E03 * \text{Food Poverty} + 0.55 * \text{Housing Poverty} + 0.42 * \text{Education Poverty}$
Third pattern	$3.54-E04 * \text{Income Poverty} + 1.53-E03 * \text{Food Poverty} + 0.63 * \text{Housing Poverty} + 0.37 * \text{Education Poverty}$
Fourth pattern	$3.22-E03 * \text{Food Poverty} + 0.62 * \text{Housing Poverty} + 0.37 * \text{Education Poverty}$

and thus they are at lower importance levels in the overall poverty. Among the recent three rural poverty dimensions, the food poverty is common among all main patterns of rural poverty. The health dimension has the highest weight in the pattern that include food, health and income poverty dimensions. Finally, income dimension, with the lowest weight is considered as the least important among all rural poverty dimensions.

As shown in **Table 2**, the frequency distribution of poor rural households in four main patterns are 28.22%, 8.59%, 28.51% and 34.30% of rural households, respectively. Accordingly, the fourth pattern is the most important pattern of rural poverty from the perspective of households' coverage. The third, first and second patterns are lie after the first one. Reviewing this issue from the perspective of poverty gap in overall poverty index and in each of poverty dimensions require procedures such as Levine test, F test and Tukey's test. **Table 4** indicates the results of Levin and F statistics. The Levine test results for all poverty dimensions and overall poverty index in the main patterns of rural poverty show that the variances of all dimensions are equal in all main patterns. Thus, the main patterns in different dimensions of rural poverty are homoscedastic and so, we can use one-way ANOVA test with assuming the existence of homogeneity of variance between them in order to comparing the poverty gap in the different dimensions of poverty in these patterns.

F test results in all poverty dimensions and in overall poverty index of mentioned rural poverty patterns suggests that rural poverty in all configurations are distinct in all patterns. So that, in the mentioned rural poverty patterns the differences of average poverty gaps in each of poverty dimensions are statistically significant and this situation exists in the average of overall poverty index (**Table 4**).

Table 5 provides more detail information related to main patterns of rural poverty and shows significantly differences between the averages of poverty gap in each poverty dimensions in each pair of these patterns. Reviewing this issue suggests that the first pattern, by including 1.13% and 3.77% of poverty gap, respectively in the fields of health and income poverty is the most important pattern of poverty in rural society. The third and fourth patterns with respected 39.40% and 47.07% of

Table 4. Levine and F statistics for each of dimensions in the main rural patterns.

Dimensions of rural poverty	Levine statistics	F statistics
Education Poverty	9.54***	5.96***
Housing Poverty	9.59***	5.06***
Food Poverty	23.50***	283.67***
Health Poverty	684.30***	415.76***
Income Poverty	1491.60***	1416.63***
Overall Poverty	22.67***	29.80***

***Significant at 1%.

poverty gap are the most important poverty patterns on housing poverty and perspective food poverty in Iranian rural society in. In the field of education poverty, although the fourth poverty pattern has the biggest poverty gap, this value is not statistically significant from the poverty gap values in the first and third patterns. Therefore, these three patterns are commonly the most important patterns of rural poverty in this perspective. The overall poverty outcome, in form of overall poverty index, indicates that the fourth poverty pattern has the highest value of poverty gap.

Also, according to **Table 5**, the first pattern, with 37.77% of poverty gap in field of food poverty, has the lowest poverty gap, whilst the second and fourth poverty patterns exclude health poverty the third and fourth patterns do income poverty dimension. The second poverty pattern has the lowest poverty gap in housing, not statistically significant different from the corresponding values for the first and fourth patterns and therefore the lowest rate of poverty gap is commonly devoted to these three patterns. Similarly, the second pattern has the lowest education poverty gap not statistically significant from that of the first pattern and so these two patterns are commonly categorized similar in this context. The overall poverty outcome, in form of overall poverty index, indicates that the first poverty pattern has the lowest value of poverty gap.

Important note with regard to **Table 5** is that rural households are close to each other in term of the overall poverty index. Accordingly, it seems that the same level

Table 5. Average poverty gap in dimensions of main rural poverty patterns and its comparisons.

The main patterns of rural poverty	Dimensions of rural poverty					
	Education poverty	Housing poverty	Foods poverty	Health poverty	Income poverty	Overall poverty
First pattern	43.91ab	38.46a	37.77a	1.13a	3.77a	39.18a
Second pattern	43.69a	38.02a	38.95b	0b	2.64b	40.10b
Third pattern	43.95b	39.40b	45.83c	0.36c	0c	40.03b
Fourth pattern	44.03b	38.65a	47.07d	0b	0c	40.69c

Note: In each column, common letters indicate no significant difference and non-shared letters indicate significant differences in the level of 10%.

of facilities and resources are needed and the same programs should be developed to combat poverty. But what lies behind this similarity suggests existence of different structures of poverty in the rural society, despite the similarity in the overall index of poverty. So, combating rural poverty requires different plans and different facilities and resources that cannot be provided merely by government income support.

4. CONSEQUENCE OF USING MERELY INCOME POVERTY IN IDENTIFICATION OF POOR HOUSEHOLDS

As previously revealed in **Table 1**, nearly 57% of rural households suffer from income poverty and the rest of them (43%) are free of it. According to enforcement process of targeting subsidies law in Iran, determining the poor and vulnerable households who need government support, is based on household per capita income. Thus, 43% of rural households who do not suffer from income poverty cannot receive the government support program. **Table 6** provides information regarding the number and frequency of rural households who do not suffer from income poverty, but suffer from poverty in other dimensions. According to this table, all households that are free of income poverty suffer from education poverty. The vast majority of these households also suffer from food and housing poverties. In addition, about 20% of such households suffer from health poverty. Reviewing these cases at all households in the sample are also noteworthy. According to the third column of **Table 6**, despite the lack of income poverty, 42.96%, 42.95%, 42.89% and 8.60% of all rural households suffer from education, housing, food and health poverties, respectively. So, it can be deduced that in Iranian rural society, not only households with income poverty need to be supported but also the vast majority of households without income poverty, need assistance and support to deal with education, housing, food and health poverties. If the support in the targeting subsidy scheme confine to households with income poverty, the mentioned groups of rural households will be ignored. Thus, income sup-

port in targeting subsidies program is not in favor of these groups of poor rural households and does not lead them to exit from poverty.

Reviewing this issue in the patterns of rural poverty is also considerable. According to **Table 2**, among the 11 patterns obtained for Iranian rural poverty, income poverty along with other poverty dimensions govern in six patterns. The rest of patterns are free of income poverty but prevail the other dimensions of poverty. With respect to that in enforcement the law of targeting subsidies, support of families developed based on their income level and in the early years of its implementation, support packages of targeting subsidies program is merely income. Therefore, enforcing the law of targeting subsidies will be last different effects on the mentioned patterns. Thus, Income support to poor households does not effect on income poverty in five poverty patterns that cover 42.96% of rural poor households, and merely affect on this dimension in six patterns that cover 57.04% of them (**Table 2**).

5. CONCLUSIONS AND RECOMMENDATIONS

The finding showed that education poverty in perspective headcount ratio, among the various dimensions of poverty in Iranian rural society, is the vastest and then with small differences housing and food poverties are located. Minimum coverage of poverty in Iranian rural society is also related to health poverty. From perspective of depth and quality of different poverty dimensions those dominated on rural society, the greatest and least depth of poverty are devoted to education and health poverties, respectively. Accordingly, not only the condition of housing poverty in Iranian rural society, similar to the situation of housing poverty in developing countries [31,32], is on alert status, but also this warning status are in the other dimensions of rural poverty, including education and food poverties. In the field of education poverty, alert state in the term of level and depth are much severer than housing poverty. In the food poverty field, alert status merely in the perspective of the depth of

Table 6. Frequency distribution of poverty dimensions amongst non income poor households in rural Iran.

Dimensions of multidimensional poverty	Suffered households	Frequency with respect to households that are not income poor	Frequency with respect to all households
Education poverty	8466	100.00	42.96
Housing poverty	8465	99.99	42.95
Foods poverty	8452	99.83	42.89
Health poverty	1694	20.01	8.60

poverty is much severer than housing poverty. These situations present poverty in its multi-dimensions as an epidemic problem in Iranian rural society. The high headcount ratio (100%) in overall poverty index corroborates this phenomenon. Important note in estimating poverty using the multidimensional approach in Iranian rural society is that the estimates indicated that whole Iranian rural society is suffering from poverty. This is confirmed in the literature of poverty. Bossert, *et al.* [73] expressed that the non deprivation of people in the real world so much rarely happens that it can be ignored. Therefore, all individuals in the society typically suffer from poverty. But in the Iranian rural society, the depth and quality of multidimensional poverty is such that, in total, the poor households are suffering from deprivation of 37.43% of welfare indexes.

With respect to investigated dimensions, merely 11 poverty patterns are visible in the Iranian rural community. These poverty patterns emphasizes that prevailed poverty on rural society in Iran is not merely income poverty. Rural households with respect to their situations are depriving from one or more dimensions which income poverty may be one of their poverty dimensions. From these 11 patterns, four patterns cover 99.62% of the rural households. Accordingly, these poverty patterns consider as main patterns of rural poverty. Seven other patterns of rural poverty, totally, have taken 0.38% of rural households. So, these patterns are regarded as sub-patterns of rural poverty in Iranian rural society.

Important note related to the Iranian rural poverty patterns is that the overall poverty index of these patterns is close to each other. Accordingly, it seems that the same level of facilities and resources are needed and the same program should be developed to combat poverty. But what lies behind this similarity suggests existence of different structures of poverty in the rural society, despite the similarity in the overall index of poverty. Therefore, combating rural poverty requires different plans and different facilities and resources that cannot be provided merely by government income support.

In this regard, the results showed that the inliers of poverty dimensions (quality and depth of poverty) in Iranian rural society made different orders in rural poverty patterns. Thus, in the perspective of health and income

poverties the first pattern, in the perspective of housing poverty the third pattern, in the perspective of food poverty the fourth pattern, in the perspective of education poverty, commonly, the first, third and fourth patterns, and in the perspective of overall poverty index the fourth pattern are the most important patterns in rural society, respectively. Similarly, in the perspective of food poverty the first pattern, in the perspective of health poverty, commonly, the second and fourth patterns, in the perspective of income poverty, commonly, the third and fourth patterns, in the perspective of housing poverty, commonly, the first, second and fourth patterns, in the perspective of education poverty, commonly, the first and second patterns, and in the perspective of overall poverty index the first pattern are the least important patterns in rural society, respectively.

In addition, study of structure of overall poverty in main patterns of Iranian rural poverty indicated that housing poverty is the most important dimension in the formation overall poverty in all poverty patterns. Moreover, educational poverty, after the housing poverty, is the most important dimension of rural poverty. Degree of importance of these rural poverty dimensions is such that these dimensions are common in all main patterns of rural poverty to forming overall poverty. Other dimensions of rural poverty, including food, health and income poverty have much lower importance than housing and educational poverties in the rural poverty patterns. Among the recent three rural poverty dimensions, the food poverty is common among all the main patterns of rural poverty. Finally, income poverty among all rural poverty dimensions is considered as the least important.

With respect to enforcement process of targeting subsidies law in Iran, determining the poor and vulnerable households those need government support, is based on household per capita income. Thus, 42.96% of rural households, those do not suffer from income poverty, cannot receive the government support program. The results showed that all households who are free of income poverty suffer from education poverty. The vast majority of these households also suffer from food and housing poverties. In addition, about 20% of such households suffer from health poverty. Accordingly, it can be deduced that in Iranian rural society, not only

households with income poverty need to be supported but also, the vast majority of households without income poverty, need assistance and support to deal with education, housing, food and health poverties. If the support in the targeting subsidy scheme confine to households with income poverty, the mentioned groups of rural households will be ignored. Thus, income support in targeting subsidies program is not in favor of these groups of poor rural households and does not lead them to exit from poverty.

Reviewing this issue in the patterns of rural poverty is also considerable. Among the 11 patterns obtained for Iranian rural poverty, in six patterns, income poverty along with other poverty dimensions govern on the rural households. The rest of patterns are free of income poverty but prevail the other dimensions of poverty. With respect to that in enforcement the law of targeting subsidies, support of families developed based on their income level and in the early years of its implementation, support packages of targeting subsidies program is merely income. Therefore, enforcement of the law of targeting subsidies may have different effects on the mentioned patterns. Thus, Income support to poor households does not influence income poverty in five poverty patterns that cover 42.96% of rural poor households, and merely affect on this dimension in six patterns that cover 57.04% of them. The government successful or unsuccessful in social support policy depends on ability to identifying deprived households in welfare dimensions [52], so government social support policy to households is inefficient and it is not pro poor policy but follows other political aspects.

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