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Managing Information and Planning for Health Charities' Participation

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ABSTRACT

This research aims to investigate managing information and planning for the participation of health charities. With the Covid-19 outbreak, it was important to use information systems to optimize health management. The correct processing of information is the basis for better use of health charities' participation. Using the snowball technique, and semi-structured interviews, 47 experts and non-experts in Fars province were asked for their opinions. Next, based on the fuzzy network analysis, important factors were prioritized. Four categories and 8 important criteria were identified. To prioritize the effective aspects of the participation of health charities in Fars province, a network analysis technique was used via MATLAB software. Strategy and programs with a normal weight of 0.34 showed the highest priority. Research and education with a normal weight of 0.26 received the second priority. Laws and regulations with a normal weight of 0.24 were placed as the third priority. Based on the obtained results, creating strategy and planning, training and building cultural in this field, ease of rules and regulations as well as planning of financial resources play an important role in managing the participation of health donors. With precise planning of health programs, donors see the transparency of decisions. They check the part that needs financing and equipment completion. Because the quality of plans and programs, effectiveness and efficiency of strategies, and the quality of results depend on the decisions made by donors.

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1. Introduction

Today, statistics is a major tool for planning for the future and evaluating past performance. It is also a main factor in decision-making and management (Paduraru et al., 2022). Statistical data planning as thefundamental principle for planning is one of the most basic indicators of management (Shameer, 2017). The three circles of statistics and information, planning, and management are among the development circles (Dash et al., 2019). Hence, the age of communication and information makes sense when the collection of information and data is up-to-date (Endriyas et al., 2019). A statistical system has a direct relationship with the data source, and the more accurate and correct this source is, the more valuable will be the statistical information and indicators obtained from that data. Accurate recording of information at the macro level of the country is very helpful for officials and planners (Doyle-Lindrud, 2015). But if the correct information is not recorded and reported, it will make difficult achieving the goals of health programs, including the prevention and care of diseases and ensuring people's health. Many studies on the role of information in treatment management have been conducted and are becoming more valuable day by day (Valikodath, 2017).

Meanwhile, statistics and information play an important role in the management of health charities. Health information data is essential to identify key actors among donors or implementing organizations (Agarwal et al., 2020). It shows how each of these donors allocates their donated resources to the treatment and health sectors (Vuong et al., 2022).

Most existing health resource data are collections of large amounts of information with varying levels of quality and reliability regarding data collection (Lucyk et al., 2017). The Organization for Economic Co-operation and Development (OECD) is one of the leading sources of health-related financial data. The data of this organization is collected from OECD member countries and organizations. The organization's database collects valuable data at the project level by providing a detailed description of the purpose of each project. The investment approach to health means the government's active effort to control people's health through positive economic and social changes. Investing in health was initially set as one of the five priorities of the 1997 Declaration of the Jakarta Conference on Health Promotion, and increasing investment in health was seen as requiring a sincere multisectoral effort (Alcalá-Albert et al., 2021). The investment for health approach seeks a new form of partnership, because in today's complicated world, actions to promote health cannot be done alone in the health sector (Shmueli et al., 2015).

Such an action requires creation of a strong inter-sectorial alliance, between the health sector and other active sectors to realize a just and sustainable social and economic development (Harbour et al., 2021).

The non-profit and charity sector, as the third largest economic sector after the government and commerce, have a significant contribution to the reduction of human problems around the world (Rossolatos, 2021). But trying to attract these donations has become a challenging activity. Without the government's attention to the charity sector, as well as the lack of appropriate rules and models for the optimal participation of charities and the lack of rich studies in this field, the activities of these two sectors are not aligned with each other and there are no overlapping of services (Shaw et al., 2018). Therefore, it is currently seen that executive managers with diverse tastes govern the fate of charitable institutions so the idea of competition and containment and even rejection of them has appeared in the thoughts and actions of some biased people (Shahri et al., 2017).

In summary, in a joint effort, executive directors and promoters should strive to spread the culture and knowledge of charitable thoughts and volunteer organizations ought to pay attention to the framework of laws and regulations (Jeffrey et al., 2020). In Iran's health system, the official statistical system is one of the main

components of health information management, during which, based on standard and uniform forms, it is collected at the level of the country from the units providing health services and after summarizing at the level of the city and province. Currently, the health statistical system produces data on the consequences of services provided in the public sector but does not pay attention to the people and the private sector (Dehnavieh et al., 2018). In this system, there is no data related to support and response processes. Also, people are aware of the purposefulness of aid given to the health sector and parallel activities lead to waste of money, energy, and time (Mosadeghrad et al., 2017). Instead of helping the government to meet the health needs of society, they have added problems to the problems of the health systems. Therefore, the main focus of this research is to answer how the necessary information is managed and planned to encourage participation of health donors.

2. Literature Review

Health statistics and information

Today, statistics is an important tool for planning the future and evaluating past performance and the main factor in decision-making and management (Gillum, 2013). The statistical system has a direct relationship with the source of data, and the more accurate and correct this source is, the more valuable will be the statistical information and indicators obtained from that data., Accurate recording of information at the macro level is very helpful for officials and planners in the country. (Adler-Milstein et al., 2017). But if the correct information is not recorded and reported, it will make it difficult to achieve the goals of health programs (Belay et al., 2013).

Today, in every organization management is one of the main elements of the activities, growth, and continuity of the existence of that organization, so any weakness and deficiency in this element creates harmful consequences for that group (Ledikwe et al., 2014). The three main duties of management are policymaking, planning, and decision-making. Realization of these three important tasks in management requires a wide range of statistics and information, so without having sufficient, accurate, and timely statistics, policy making, planning, determining goals, strategies, and activities, and finally evaluating the relevant results are not possible. With the development of information technology and the increasing growth of communication technology, access to information with high volume and speed helps health managers in the field of observing management principles and creating the necessary coordination as well as timely decision-making (Punnakitikashem et al., 2020).

The use of information and communication technology is one of the most important tools that is necessary at all levels today, and the use of information and communication technology is of particular importance for health and medicine organizations. (Sweileh, 2020). Due to the nature of statistics and information that facilitates cultural planning, managers can better respond to the needs and demands of their audience, and this is not possible without accurate, efficient, and centralized statistics and information. Information systems in health system, provide the basis for the use of information to improve and promote the health of society by collecting, analyzing, and disseminating the data (Kavukcu et al., 2019).

Health information system

The design of the health information system should be such that the use of health data in the management of related processes and programs becomes common and continuous. One of the suggested ways to use information is to use the information at the top of the organization. If the senior manager actively uses information, the importance of information is strengthened throughout the organization. When data is used and actively distributed by leaders, a motivating environment is created in which the use of information among middle managers and health workers is also developed. Harbor et al. (2021), presented research entitled how health charities can

improve access, quality, and social and behavioral changes for health. They showed that efforts to collect health information reduces duplication of efforts, improves support for implementers, and increases joint investment. Khan et al. (2020) consider policy-making to plan and process health information as essential for the proper management of health charities. Rezaei et al. (2021) in designing the financing model of the health system in the Ministry of Health, Treatment, and Medical Education with the approach of philanthropic social participation, identified the importance of the participation of various institutions and information sharing.

3. Methodology

This research is applied-developmental in terms of purpose, and uses both quantitative and qualitative data. In the first step, effective factors were identified using the Delphi technique. Then, using the fuzzy network analysis technique, the identified factors were ranked. The participants included: academic and organizational experts (who work in government organizations) identified and selected using a purposeful sampling method. They had at least 5 years of work experience. 47 people participated in this study.

These people were bachelor, masters, and PhD holders. Data were collected by reviewing the related literature, upstream documents, scientific and official reports, and through examining various internal and external models in the field of health donors' participation. EXCEL software was used in Delphi analysis and MATLAB software was used in fuzzy network analysis.

4. Findings

In Delphi analysis, 4 criteria and 8 sub-criteria were identified. The fuzzy Delphi method was used to screen and ensure the importance of the identified indicators and select the final indicators. Expert views were used to measure the importance of indicators.

Table 1. *f Research criteria and sub criteria*

Criterion symbol	Criterion	Sub criteria	Sub criteria symbol
C1	Strategy and plans	Documented program and road map preparation	S11
		Interaction with donors in policymaking	S12
C2	Terms and Conditions	Providing legal facilities to donors	S21
		Streamlining the rules for donors	S22
C3	Research and education	Aid to education in the health sector	S31
		Cultivation for health	S32
C4	Funds	The cost of prevention is proportional to the treatment	S41
		Cost of financial resources in priority sectors	S42

Table 2. *The spectrum of seven fuzzy degrees for valuing indicators*

Linguistic variable	Fuzzy value	Fuzzy number scale
Totally unimportant	$\tilde{1}$	(0, 0, 0.1)
very unimportant	$\tilde{2}$	(0, 0.1, 0.3)
unimportant	$\tilde{3}$	(0.1, 0.3, 0.5)
medium	$\tilde{4}$	(0.3, 0.5, 0.75)
Important	$\tilde{5}$	(0.5, 0.75, 0.9)
very important	$\tilde{6}$	(0.75, 0.9, 1)
Quite important	$\tilde{7}$	(0.9, 1, 1)

The first round of the Delphi technique
Opinions of the experts about each indicator are shown in Table 3:

Table 3. *Fuzzification of the opinion of the expert panel for each open coding*

Expert 47	...	Expert 3	Expert 2	Expert 1
(0.9, 1, 1)	...	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)
(0.9, 1, 1)	...	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)
(0.9, 1, 1)	...	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.9, 1, 1)
(0.9, 1, 1)	...	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)
(0.5, 0.75, 0.9)	...	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.1, 0.3, 0.5)
(0.9, 1, 1)	...	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)
(0.9, 1, 1)	...	(0.3, 0.5, 0.75)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)
(0.9, 1, 1)	...	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.9, 1, 1)

In the next step, the opinion of the experts should be gathered. Various methods have been proposed to aggregate the opinions of the respondents. In fact, these aggregation methods are experimental methods presented by different researchers. For example, a conventional method for aggregating a set of triangular fuzzy numbers is considered to be the minimum l, the geometric mean m, and the maximum u.

Relationship 1

$$F_{AGR} = \left(min\{\mathrm{l}\}, \prod\{m\}, max\{u\}\right)$$

De-fuzzification of values

It is usually possible to sum up the average of triangular and trapezoidal fuzzy numbers by a definite value which is the corresponding best average. This operation is called de-fuzzification. There are several methods for defuzzification. In most cases, the following simple method is used for this purpose:

Relationship 4

$$x_m^1 = \frac{L + M + U}{3}$$

The fuzzy average and the de-fuzzified output of the values related to the indicators are shown in the table. The de-fuzzified value greater than 0.7 is acceptable, and any index with a score lower than 7 is rejected (Wu and Fang, 2011).

Table3. *Results of the first round of the Delphi technique for open coding*

The result of round 1	Definite value	Fuzzy average	upper limit	probable value	lower limit	
the reception	0.904	(0.792,0.929,0.992)	0.992	0.929	0.792	S11
the reception	0.738	(0.604,0.754,0.854)	0.854	0.754	0.604	S12
the reception	0.928	(0.833,0.956,0.996)	0.996	0.956	0.833	S21
the reception	0.777	(0.623,0.796,0.913)	0.913	0.796	0.623	S22
the reception	0.803	(0.66,0.825,0.923)	0.923	0.825	0.660	S31
the reception	0.890	(0.771,0.917,0.983)	0.983	0.917	0.771	S32
the reception	0.918	(0.815,0.944,0.996)	0.996	0.944	0.815	S41
the reception	0.866	(0.733,0.894,0.971)	0.971	0.894	0.733	S42

At this stage, the definitive values of all factors above 0.7 were obtained. Therefore, no factor was excluded. In the second step, the main criteria confirmed in Delphi analysis were prioritized. The main criteria of the study are: Strategy and plans, rules and regulations, research and education and financial resources. The criteria and sub-criteria of the research were named with a numerical index in Table 15-4 so that it can be easily tracked and studied during the research.

Table 4. *Research criteria and sub-criteria*

symbol	Criteria
C1	Strategy and plans
C2	Terms and Conditions
C3	Research and education
C4	Funds

The pattern of criteria and sub-criteria of the model using the ANP technique is drawn in Figure 1. In this research, the network analysis technique (ANP) was used to determine the weight of the model indicators.

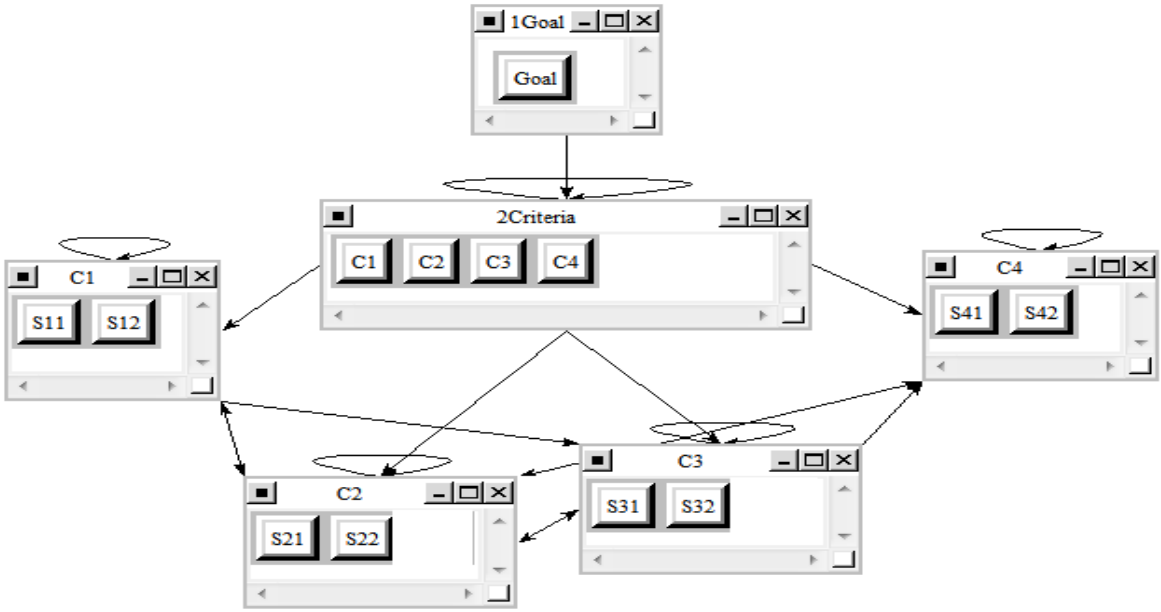

Figure 1. *ANP diagram of priority indicators and options in SuperDecisions software*

A nine-hour scale was used for pairwise comparison of elements. The nine-degree Saati scale was presented by Thomas Saati, the author of the theory of hierarchical analysis. Also, in this study, the fuzzy approach is used to quantify the values. Therefore, the hourly phase spectrum is used.

Table 5. *Pairwise comparison matrix of the main research criteria*

	Strategy and plans	Terms and Conditions	Research and education	Funds
Strategy and plans	(1, 1, 1)	(1.64, 1.93, 2.24)	(1.08, 1.47, 1.89)	(1.45, 1.83, 2.42)
Terms and Conditions	(0.45, 0.52, 0.61)	(1, 1, 1)	(0.64, 0.8, 1.06)	(1.62, 2.01, 2.42)
Research and education	(0.53, 0.68, 0.92)	(0.95, 1.24, 1.57)	(1, 1, 1)	(1.37, 1.78, 2.39)
Funds	(0.41, 0.55, 0.69)	(0.41, 0.5, 0.62)	(0.42, 0.56, 0.73)	(1, 1, 1)

After forming the matrix of pairwise comparisons, the eigenvector was calculated. First, the fuzzy expansion of each line was calculated. Each row of the pairwise comparison matrix $\tilde{X}$ is represented as $\tilde{x}_{ij}$. The fuzzy expansion of each row is also represented by the symbol $\tilde{S}_i$. Therefore, the fuzzy expansion of each line is calculated as follows:

Fuzzy expansion of line 1
(1, 1, 1) ⊕ (1.64, 1.93, 2.24) ⊕ (1.08, 1.47, 1.89) ⊕ (1.45, 1.83, 2.42) = (5.18, 6.22, 7.54)
Line 2 fuzzy expansion
(0.45, 0.52, 0.61) ⊕ (1, 1, 1) ⊕ (0.64, 0.8, 1.06) ⊕ (1.62, 2.01, 2.42) = (3.7, 4.34, 5.08)

Fuzzy expansion of line 3
(0.53, 0.68, 0.92) ⊕ (0.95, 1.24, 1.57) ⊕ (1, 1, 1) ⊕ (1.37, 1.78, 2.39) = (3.84, 4.71, 5.88)
Fuzzy expansion of line 4
(0.41, 0.55, 0.69) ⊕ (0.41, 0.5, 0.62) ⊕ (0.42, 0.56, 0.73) ⊕ (1, 1, 1) = (2.25, 2.6, 3.04)

Therefore, the fuzzy expansion of the preferences of each of the main criteria will be as follows:

$=\sum_{j=1}^{n} x_{1j}$ (7.54, , 6.22, 5.18)
$=\sum_{j=1}^{n} x_{2j}$ (5.08, 4.34, 3.7)
$=\sum_{j=1}^{n} x_{3j}$ (5.88, 4.71, 3.84)
$=\sum_{j=1}^{n} x_{4j}$ (3.04, 2.6, 2.25)

Then the fuzzy sum of the total elements of the preferences column is calculated:

$$\sum \tilde{S}_i = \sum_{i=1}^{n}\sum_{j=1}^{n} x_{ij}$$

The sum of the elements of the preferences column of the main criteria will be as follows:

$$\sum_{i=1}^{4}\sum_{j=1}^{4} x_{ij} = (14.97, 17.88, 21.55)$$

To normalize the preferences of each criterion, the sum of values of that criterion must be divided by the sum of all preferences (elements of the column). Because the values are fuzzy, the fuzzy sum of each row is multiplied by the inverse of the sum. The inverse of the sum must be calculated.

$$if\ \tilde{F} = (l, m, u)\ then\ \tilde{F}^{-1} = \left(\frac{1}{u}, \frac{1}{m}, \frac{1}{l}\right)$$

Therefore, based on relation 5, we will have:

$$(\sum_{i=1}^{n}\sum_{j=1}^{n} x_{ij})^{-1} = (0.05, 0.06, 0.07)$$

Therefore, the results of normalizing the obtained values will be as follows:

$\widetilde{W}_{C1}$ = (0.17, 0.24, 0.34)
$\widetilde{W}_{C2}$ = (0.18, 0.26, 0.39)
$\widetilde{W}_{C3}$ = (0.1, 0.15, 0.2)
$\widetilde{W}_{C4}$ = (0.17, 0.24, 0.34)

Each of the obtained fuzzy and normalized weight values are related to the main criteria.

Defuzzification of values: There are several methods such as Chang's degree of feasibility method, surface center method and Minkowski method for defuzzification. In this study, the center of gravity method proposed by Mary and George Bojadziev was used for debuzzing.

$$x_m^1 = \frac{L+M+U}{3}\ x_m^2 = \frac{L+2M+U}{4};\ x_m^3 = \frac{L+4M+U}{6}$$
$$\text{Crisp number} = Z* = \max(x_{max}^1, x_{max}^2, x_{max}^3)$$

It should be noted that the calculated weights are non-phase, but should be normalized.

Table 6. *Defuzzification of the calculated normal weights of the main variables of the study*

Crisp	X_{max}^1	X_{max}^2	X_{max}^3	***Defuzzified value***	***Normal value***
Strategy and plans	0.364	0.360	0.356	0.364	0.349
Terms and Conditions	0.251	0.249	0.247	0.251	0.241
Research and education	0.278	0.275	0.271	0.278	0.266
Funds	0.151	0.150	0.148	0.151	0.144

Based on the special vector obtained:

- Strategy and programs with a normal weight of 0.349 have the highest priority.
- Research and education with a normal weight of 0.266 is the second priority.
- Laws and regulations with a normal weight of 0.241 are in the third priority.
- Financial resources with a normal weight of 0.144 have the lowest priority.

Figure 2. *Graphic representation of the priority of the main research criteria*

The inconsistency rate of the comparisons made was found to be 0.019, which is

smaller than 0.1; therefore, the comparisons made can be trusted.

5. Discussion

As the results of the research showed, inter-organizational communication, such as the connection between the Association of Donors and hospitals, and the Ministry of Health and Medicine, can improve the direction and leadership of cooperation between donors in the health sector. Identification of equipment needs and correct use of financial resources are based on compassionate cooperation and transparent information between the organizations.

Participation in policy-making also increases the motivation and support of donors. Also, the import of medical equipment by the donors can be done easily. In addition, the control and monitoring of the cooperation of health charities can increase with participation in investment.

The results obtained in this section are consistent with the research of Harris et al. (2019). In the research conducted by Harris et al., the importance of policymaking and the participation of donors to increase aid and donations has been discussed. Inter-institutional cooperation and the improvement of international and national policies are also important in the effectiveness of financial participation. Mosadeghrad et al. (2019) have shown that promoters in Iran's health system provide health services in physical, psychological, and social dimensions at the levels of preventive, therapeutic, and rehabilitation services. Donors participate directly by providing various health services and indirectly by providing support services such as construction and repair of hospitals and health and treatment centers and repair of medical equipment.

To prioritize the effective dimensions of the participation of health donors in Fars province, a network analysis technique has been used. Strategy and programs with a normal weight of 0.349 have the highest priority. The first and a main goal in the participation of health donors is to promote health. The second is financial protection of the people so that they do not get poorer due to health care costs. The third goal is satisfaction of the people, and finally the efficiency of getting more health products with less costs. With proper planning, it is possible to expand the participation of donors by targeting the benefit of the deprived and the poor, so that together with the knowledge and management ability of colleagues, we can provide the desired services for the people.

Research and education with a normal weight of 0.266 is the second priority. The conclusion of a cooperation agreement between the Ministry of Health research and technology deputy and non-governmental organizations and health donors is an important step in organizing charitable activities and directing them towards investment in the field of health as well as health research. Encouraging participation in research and technological projects in the field of prevention, screening, and treatment, attracting cooperation and participation of donors in the construction and equipping of research laboratories/clean rooms and other research and technology infrastructures in the field of health are among the main objectives. Also, attracting the cooperation of donors in equipping and developing health growth and innovation centers, and health technology parks is an important goal of the health donors' participation model.

Laws and regulations with a normal weight of 0.241 held the third priority. The laws and regulations of the country emphasize the participation of charities in the health system. For example, in line with the implementation of general health policies, providing health services by service providers in impaired sectors have been emphasized. Also, Article 193 of the Third Plan and Article 89 of the Fourth Plan highlight society's access to healthcare and treatment services as well as improving the quality of health services, and compliance with the required capacity based the minimum standard of services. The health and treatment of the country are based on the leveling of services. In article 65 of the sixth five-year plan of economic, social, and cultural development of the county increasing financial provision through

charities in universities and higher education, research, and technology institutions has been mentioned. In Article 10 of the statute of the Ministry of Health, Treatment and Medical Education, the role of the Ministry of Health is to establish an institution, organization, or charitable health care foundation to coordinate and supervise the affairs of charitable health care units, to strengthen them and to facilitate the affairs by eliminating bureaucratic and unnecessary administrative procedures. It is also stressed to attract people's participation and donors' cooperation. In addition, reducing costs have been mentioned. The obtained results are in line with the research of Bowe et al. (2022).

Financial resources with a normal weight of 0.144 had the lowest priority. The financial provision system of the health system should provide the financial resources needed to provide health services in such a way that people have fair access to health services and not to suffer from poverty due to health expenses. Adequate, trained, experienced, responsive and responsible manpower should be distributed appropriately to provide health services in health and treatment organizations. Medicines, equipment, and supplies of the required quality should be given at the disposal of health and treatment organizations. These suggestions are in line with the recommendations made by Alcalá-Albert et al. (2021).

7. Conclusion

In order to investigate the current state of health donors' participation, based on authentic documents, the state of donors' participation in Iran and the world was first investigated. There are several indicators of insurance, financing, direct payments, indirect payments, and more in Fars province. In general, the goal of health donors' participation is to attract help to the health sector, by identifying the needs of the health sector, organizing charitable affairs and people's participation, and targeting the help in the right way for the benefit of needy people. But it is clear that this system, like other charity associations, needs to be modified, revised, and strengthened with regards to its current missions and activities. Experts believed that it is very effective to use the financial resources of donors in the planning of the medical field. Planning and research based on donor funding can increase the productivity, quality, and quantity of health and treatment techniques.

Donors' participation is offered at two individual and social or community levels. Individual services such as preventive, diagnostic, therapeutic and rehabilitation services should be provided in a consistent manner with respect and quality to the person who needs these services. On the other hand, community-oriented health services should be provided for people in public health education services, or for the environmental and occupational health services.

Based on the obtained results, the following suggestions were made:

- Creation of cultural values to strengthen the values, capabilities, needs, and mechanisms of donors' participation required by the health and treatment system.
- Passing appropriate rules and regulations for management, financing,
- providing services to charitable institutions and monitoring their operations
- Reduction of parallel work and cumbersome bureaucracies in setting regulations
- It is necessary for institutions and charity foundations to consider simplicity in the design of the aid process. This work leads to the redesign of forms, the structure of reports, notification methods, websites, mobile phone applications, and virtual networks.
- Health sector charities should consider reference groups for their advertisements. For example, they can increase the number of their contributions by participating in groups formed in virtual spaces and social networks; because these interactive spaces consist of people with similar motivations to be effective with each other. For charity organizations and foundations that operate in cities, the use of norms can be very helpful; because it is easier to find common points of reference and attract people's participation by relying on local culture and creating

motivation for the development of the region.

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