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Explaining Resource Allocation in Board of Trustees Hospitals: A Case Study of Afzalipour Medical Center in Kerman, Iran

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A R T I C L E I N F O

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A B S T R A C T

Background: The main resources of health care are allocated to hospitals. However, resource bottlenecks are a challenge faced by health systems around the world, especially in developing countries such as Iran. Inefficiencies in resource allocation can increase the constraints in double fold. Therefore, the present study was conducted to determine the allocation of financial resources in one of the hospitals of the board of trustees, Afzalipour Medical Center, Kerman, Iran in 2014.
Methods: Review of documents, two deep interviews and five focus group discussions with eleven experts were used to collect data in the present qualitative study. Participants were members of the board of trustees and representatives of the financial department of the hospital. Data were then analyzed using content analysis method.
Results: Based on the present study, four main themes and ten sub-themes were identified, with main themes including decision-making reference, process, criteria and factors influencing decision-making. In this regard, there was no clear process and criteria for allocating resources at this center, and allocation of resources was done based on a reactive approach, response to critical situations, political currents and financial bottlenecks. Contrary to the potential capacity of the structure of board of trustees, in practice, headship and management played a key role in allocating financial resources.
Conclusion: The process of allocating financial resources in the investigated hospital follows a less rational approach and coincided with the chaos theory and the garbage can model of decision-making in the governmental bureaucratic structure. The governmental bureaucratic structure and the board of trustees structure (decentralization) in contrast to each other have led to a disorder, where the lack of transparency in determining goals, criteria and document performance have also exacerbated this disorder. In this regard, the oil-related budget has stabilized the inappropriate allocation of resources.

Keywords: Resource Allocation, Board of Trustees, Chaos Theory, Garbage Can, Hospital

Citation

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Introduction

The health sector is one of the most significant service sectors in the development of a country, which is crucial from an economic point of view (1), and it accounts for on average, 8% of gross domestic product (2). In most developing countries, approximately 5-10% of government spending is allocated to this sector (3). However, funding constraints are a challenge to health systems around the world (4.5) because they are unable to respond to ever-increasing demands and health system problems. This is becoming increasingly significant in developing countries such as Iran, which face scarcity of resources in this sector (6).

The excessive sensitivity of the health sector has made international organizations and institutions, and governments to allocate resources to maintain and improve this sector (7). In this regard, hospitals are a significant component that provides health care services in the health system, and the dramatic increase of health care costs has turned them into costly organizations (8), such that more than 50% of current government spending in the health sector is allocated to these centers (9). In Iran, over the past two decades, various policies were adopted including self-regulation of hospitals, the new financial system of the hospital administration, and the board of trusteeship of hospitals, to improve the financing and independence of these centers, as well as reduce the financial burden incurred on governments (10).

Allocation of resources is the most significant tool in implementing long-term strategies and programs for any organizations. In other words, the policies and goals of each sector and organization's plans are reflected in the optimal allocation of resources to activities, and the extent of achieving goals depends on how resources are allocated and controlled (11). The need-based and fair allocation of resources is one of the concerns of hospital centers which is considered as the main focus of the decision-making and prioritization process in these centers (12, 13).

Evidence shows that using an appropriate model for optimal allocation of financial resources plays a key role in improving technical and allocative efficiency. In addition, allocation of financial resources is a complicated process, and in some cases, it is not transparent, such that decision makers at all levels of the health system are faced with it (14). The results of a study in Iran showed that the allocation of financial resources is not optimal and, despite the long history of this issue, traditional methods based on experience and subjective reasoning is still used (15).

Therefore, the present study aimed to explain how resources are allocated in one of the educational hospitals with board of trustees in Iran.

Iran Healthcare System

Iran is a middle-income country with an approximate population of 80 million. The total health cost as a percentage of GDP is estimated to be about 7%, and public health costs is estimated at 50% of total health costs in 2014 (16). At the national level, all decisions regarding goals, policies and resource allocation are centrally adopted at the Ministry of Health and Medical Education and with regard to the information provided by the Ministry of Welfare and Social Security and other key players in the health system. At the provincial level, Medical Sciences and Healthcare Services Universities are responsible for provision of health services, monitoring private sector activities as well as training and research in medicine and health sciences (17). The Afzalipour Medical Center (AMC) is a board of trusteeship center with 21 medical departments, 370 beds and 80% occupancy rate in 2013.

Materials and Methods

The present qualitative study is a case study conducted in only educational and therapeutic centers of the board of trustees of Kerman, southeast of Iran in 2014. The data were collected using two deep interviews and five focus group

discussions as well as review of the collected documents.

First, by studying the articles pertaining to the issue of prioritizing and allocating resources in the health system, key issues and dimensions of the topic were identified, then two deep interviews were conducted on the identification of these dimensions with representatives from the accounting and financial department of the hospital. Ultimately, the identified framework was approved by the researchers during group meetings. In the next step, five focus group discussions were purposively held in a sequential manner with representatives from the hospital's board of trustees, including: hospital management, hospital head, accounting head, revenue unit head, head of planning deputy and one member of the board of trustees, and eleven people participated in each group discussion. The mechanism for prioritizing and allocating financial resources was examined.

Focus group discussions were held on a relaxed and comfortable place at AMC, and on average, each focus group discussion lasted for 100 min. In these meetings, a member of the research team (M.H.M.) was a facilitator. All focus group discussion sessions were recorded and then implemented. Data were manually coded using Word 2010 software. This coding was conducted and reviewed by two members of the research team, and checked in the focus group discussion sessions.

The documents examined were selected based on four criteria: originality (authenticity and truth), validity, representativeness (representing the total documents of the class under study) and the meaning (what they say), presented by Jupp (1996) (18). The documents under study included the Bylaws and guidelines of the Ministry of Health related to board of trusteeship hospitals, the Bylaws for the manner of allocation of resources, the Bylaws for the new system of hospital administration and the financial and trading Bylaws of the university. Data were coded and analyzed using content analysis method.

The study was approved by the Medical Ethics Committee of KUMS with the code of ethics 1135.1393.

Results

In the present study, the results of the mechanism for allocating financial resources to the AMC based on the upstream documents (bylaws on the hospitals featuring board of trustees, the fee-for-service plan, the new system of hospital administration and the financial and trading bylaws) and the group discussion with the experts are as follows (Table 1):

In recent decades, the most significant issues in the hospital system in the public sector are the low satisfaction in quality of health services, high hospital costs and severe budget deficits. These issues led to the implementation of structural reform and management system, and decision making plans to increase accountability and transparency, as well as improve the performance of hospitals through expansion of authority and decentralization with board of trustees method in hospitals.

Previously, efforts were made to expand the authority of the hospital, improve the performance and quality of their services, most notably, the adoption of a fee-for-service plan to increase the motivation of hospital staff.

The new system plan of hospital administration was proposed to increase the authority of medical sciences universities of Iran in 1991, and reviews were made in the following years. Based on this plan, the scope of university authority and the board of trustees of hospitals will be increased in the specific income expenditure of these centers. It should be noted that the fee-for-service plan and the new system of hospital administration are closely related and complement each other in terms of content and objectives, in the sense that both projects emphasize performance-based payment, but in the fee-for-service plan, this issue has been discussed in general. However, in the plan of the new system of hospital administration, this amount is expressed per unit for each service. In

the new system of hospital administration plan, for all services, the percentage of paid contributions has been determined separately. For instance, in providing counseling services, the percentage of doctor's share is 40%, personnel's share 20%, the university 5%, and hospital 35%. For anesthesia service, these percentages are: doctor's share 35%, personnel's' share 20%, university 5% and hospital 40% (19).

With the authority given by the government to the universities and board of trustees, the financial and trading bylaws were introduced to create a unified procedure in administrative decisions and to harmonize the accounting records of the universities so that the performance of the universities can be easily compared.

The findings of the focus group discussions with key officials and experts of the AMC are presented in the form of four main themes and ten sub-themes related to the mechanism of allocation of financial resources in the center as follows:

1. Decision-making authority

Changing the decision-making system of the hospital in the form of board of trustees has led to considering the opinions of more individuals and authorities in the decisions of the hospital.

1.1. **The poor performance of the board of trustees in decision-making:** One of the key points in the structure of the board of trustees is the board of trustees of the hospital. Representatives of the hospital, the Medical Sciences University and urban management are members of this structure. Although, the board of trustees seems to play a central role in the macro-decision-making, in practice, this issue was not highly evaluated and played a more supervisory role, such that participants expressed that the board of trustees did not play a significant role in determining hospital policies and strategies, and is more a reference for report.

One participant stated that "the board of trustees is involved in the decisions related to hospital's expenditure, for example, that angiography device must be brought to the hospital." Another participant believed that "no particular decision is taken by the board of trustees, and mostly, the hospital's performance is reported to them." "The board of trustees, unlike what is expected, does not play a significant role in decision making, and it has a more supervisory role."

1.2. **The decisive role of the head in decision making:** In making decisions, the head of the center plays a decisive role; the participants stated that the head of the hospital, in co-operation with the manager, makes the main decisions that are particularly relevant to the allocation of financial resources.

A manager at the hospital's financial department stated: "When both head and manager have the financial power, they can do a lot of work either in coordination or independently, but if the expenses are high, they will work together, in particular, the manager will coordinate with the head unless the head leaves the job to the manager". Another participant held that "at the AMC, principally, most decisions were made by the head, but recently, the hospital formed a shopping committee and these decisions were left to the committee." (FGD1)

1.3. Moderating role of the manager in decision making: The manager has a moderating role in the decision making of the center. This role was played through consultation with the head of the hospital. Majority of the participants stated that most decisions in the hospital were taken by the manager and the head. Meanwhile, the manager, in consultation with the head and Deputy of the university's medical department, played a key role in regulating decisions.

A participant stated that "for example, in the decisions on development and construction, the manager consulted the head of the hospital and the decision is made, and in general, the manager, in consultation with the head, adopts internal decisions (FGD2).

1.4. The weak role of the council of managers in financial decision-making: The council of managers play a role in the internal affairs of the center, but in the area of resource allocation, the role of this council is weak as compared to other areas of decision-making. Majority of the participants stated that the council of managers, which had representatives from the managers, heads of administrative, financial, supporting and clinical departments, did not have a clear role in allocating financial resources and setting priorities for the hospital, and most of the decisions were already made and agreed upon by the Council.

A participant stated that "Although it seems that decisions are usually taken as a team in meetings of the board of managers, regarding the priorities and allocation of hospital funding, the council did not have a clear role, and it mostly dealt with executive and administrative affairs of the hospital" (FGD4).

1.5. The weak role of the Physicians Council in financial decision-making: The findings showed that majority of the participants believed that the Physicians' Council, while not playing a role in decision making at the center, was equally effective in determining the hospital's priorities. At the same time, the council's meetings were very irregular and limited.

One of the participants stated that "there were representatives of the Clinical Council and, after the change of presidency, they were no longer active like the past; the decisions were mainly made by this council, which led to a diminished decision-making role as the head was shifted. Well, they were not ineffective in making decisions, and not as active as before" (FGD3).

2. Decision-making processes

2.1. Low Transparency of Prioritization process: One of the most significant goals of board of trustees of Hospital is to allocate financial resources on the basis of transparent prioritization processes. But this goal was not yet achieved at the center under study, such that there was no systematic and well-defined mechanism with strong and expert manpower.

One of the participants stated that "Prioritizing in hospitals is not like what you see in other organizations." Because the budget of these centers is provided in two ways: part of this budget is as current budget, which is spent on a national basis for paying mainly staff salaries and wages. The other part is the realized and dedicated revenues of the hospital, which should be spent based on priorities, but there is no systematic mechanism for allocating it to hospital issues. "Another participant stated:" In fact, one of the goals of the board of trustees of hospitals is prioritizing system for the allocation of resources so that they can spend on a system based on a specific budget program. Practically, this is not possible as long as there are no proper forces for this issue. Usually, hospitals have a traditional and very basic system for this, and this hospital also considers such a system and pays accordingly"(FGD1).

2.2. Dominance of the traditional budgeting approach in the process of allocating financial resources: Although, it seems that board of trustees of hospitals have the greatest role and authority in the process of prioritizing and allocating their own financial resources, they actually have little ability to take advantage of their legal authority, and mostly, the traditional budgeting approach is dominated by the bureaucratic complexity in financial resources circulation, its allocation and absorbance.

One participant stated that "before the autonomy of hospitals, all the hospital's special revenues were transferred to the heads of the university, and later through the headquarters. These revenues were divided in the form of current budget, but recently, hospital revenues were divided by decades such that each month is divided into 3 decades and at the end of every ten days, the hospital interface refers to the bank and transfers the non-withdrawable money like patients' deposits and contractual insurance in the hospital treasure account, and at the end of the same day (the same decade), these amounts

are transferred from the treasury account of the hospital to the Treasury of the Province, then the hospital applies for grants through the university heads, and the unit's income is deducted from the percentages that are documented for each hospital, then financial resources are allocated to the hospitals in the form of pharmaceutical and medical revenues, which differs depending on the income of that decade, and the received budget is spent"

Another participant stated that "although the board of trusteeship of the center seems to provide more freedom of action, but in practice, traditional budgeting methods are still being used to allocate and absorb financial resources" (FGD2).

3. Decision-making criteria

Although, it is expected that there are various criteria in prioritizing and allocating financial resources to the health system and health care providers, in this center, the process of prioritizing and allocating more financial resources was based on the necessity of payments and had no transparency which was mentioned in the previous finding.

3.1. Payment based on necessity without specific criteria for allocation: There were no specific criteria for prioritizing and allocating financial resources at the center, and the allocation method was based on contingency conditions.

One of the participants stated that "we have no clear criteria for prioritizing and paying, but in this system, we determine payment priority for ourselves. In this hospital, medicines, food, water, electricity, gas etc. costs are among the first payment priority in order not to be subject to debt and discontinuation of these resources, second priority is for personnel payments and some consumer purchases, and the lowest priority is fee-for-service payment for doctors with two jobs" (FGD3).

4. Effective flows on decision-making

Factors such as political and economic issues play a significant role in the decisions of the center.

4.1. The effect of political flows on decision-makings: political pressures or, in other words, higher levels orders play a significant role in making some decisions.

One of the participants stated that "for the establishment of a special laboratory at the center, some pressures were asserted by influential groups, where, ultimately, the deputy manager of treatment, himself purchased the device from the hospital's credit and the device was never launched in the hospital."

Another participant stated that "launching the emergency medicine in the hospital is one of the examples of the effect of political pressure on making some decisions" (FGD5).

4.2. Effect of financial bottlenecks on decision-making: The economic issues and in general, the dominance of the financial bottlenecks on the decisions of the center were clearly evident.

One participant stated that "to control the cost of food in the hospital, it was determined that the patient does not pay for his/her stay on the discharge day, as a result, food should not be given to the patient on the discharge day, which was done at a certain time. But in practice, it was implemented with difficulties. As a result, on the first day, it was decided to take into account the food cost of the discharge day, and the food will be given to the patient on discharge day. The cost of the patient's bracelet is also calculated and taken from the patient. The difference between some expenses, such as consumables, is also taken from the patient "(FGD5).

Table 1. A review of documents related to the reform of the hospital system in the Iran

Document	Approach	Article	Features and Goals	Process
Bylaws of the board of trustees of public hospitals (Document 1) (20)	Management and policy-making	Article 88 of the Fourth Development Plan Act: Paragraph C Article 24 of the Budget Law, 2009	•Continuous improvement of health services quality • Excellence in Clinical Services Performance • Increase in productivity • Increase in the satisfaction of the community	Hospitals board of trustees are considered to lay an appropriate groundwork for reforming the decision-making and management system, which, through decentralization, has led to an increase in the scope of decision-making authority, greater accountability in decisions on spending resources and financial resources, and the mobility and dynamism of the hospital in providing the service will be followed by the improvement of the current situation and adaptation to the changing environmental conditions.
Plan of fee-for-service (Document 2) (21)	Economic-Management	Article 8 of the Act on the management of Health, Therapeutic and Educational Units of the Ministry of Health and Welfare Approved in 1358	•Increase in the motivation of physicians and medical staff • Increase in financial capacity of hospitals • Increase in the authority of hospitals for better management of issues.	Fee-for-service plan is one way of performance-based payment, according to which revenues from hospital staff and health centers are linked to their performance, and people receive more income from more activity. Based on this plan, the monetary performance of general and specialized physicians (planer and non-planer) is calculated on a monthly basis and they are paid after the legal deductions and allocating a share to the health centers and the employees involved in the plan.
The new system of hospital administration (Document 3) (19)	Economic - Management	Approved by the government in 1991 for the participation of the Ministry of Health in the special income of the public insurance law and paragraph B of Note 10 of the budget law of 1995 to allow hospitals to pay specially in the current affairs (self-sufficiency and autonomous plan of hospitals)	Since this plan is in line with the fee-for-service plan, they both pursue objectives, and the difference is that the bylaws of the new system are special to each university, and the components of the plan are stated in more detail.	The plan of the new system of hospital administration is known as hospital autonomy. Based on this plan, the hospital as a health, medical treatment, educational and research center should provide qualitative and quantitative standards of health care services and in return receive a service fee at the rate approved by the Ministry of Health and Medical Education from the client or the insurance company as the contracting party to earn money and spend it on purchasing medical and non-medical consumables and the services provided by the contracting companies (housekeeping, cooking, transportation service, etc.) and personnel costs (overtime, fee-for-service, clothes allowance etc.).

Document	Approach	Article	Features and Goals	Process
Financial and Trading Bylaws (Document 4) (22)	Economic	Financial and Trading Bylaws of Universities and Faculties of Medical Sciences and Health Services, 2011	In pursuance of the implementation of accounting system in the health sector, the Ministry of Health, Medical Education and Training developed the Financial and Trading Bylaws of Universities and Faculties of Medical Sciences and Health Services.	Financial and trading operations of the headquarters and all executive departments (independent and dependent) in accordance with the approved organization including colleges, research centers, hospitals, health care network, health centers, international offices, etc. will be conducted in accordance with these bylaws. This Bylaw was drawn in 7 chapters (Generalities, Budget and Income financial resources, Payments and Expenses, Settlement of account and supervision, property, machinery, equipment, etc.), 106 Articles and 64 Notes in the implementation of Paragraph T, Article 7 of the law on the establishment of a university board of trustees and higher education and research institutions, and Law No. 20 of the fifth five-year plan.

Table 2. The main and the sub-themes derived from the focus group discussion with experts

The main themes	The sub-themes
The decision –making authority	Poor performance of the board of trustees in decision-making
	The fundamental role of the head in decision-making
	The moderating role of the manager in decision-making
	The weak role of managers council in financial decision-making
	The weak role of physicians council in financial decision -making
The decision-making process	The low transparency of the prioritization
	The dominance of the approach of traditional budgeting in the process of allocation of financial resources
Decision-making criteria	Payments based on the need without having a clear criteria for allocation
External flows affecting decision-making	The effect of political decision-making
	The effect of financial bottlenecks on decision-making

Discussion

The present study examined and showed how financial resources are allocated in a board of trusteeship hospital. The mechanism of reforming the decision-making and management system of state hospitals was raised through the development and granting of the necessary powers to them by planning and building the structure of the board of trustees. The results of the present study showed that, unlike the potential capacity of the trusteeship structure, in practice, the head and chief executive of the hospital played a major role in allocating financial resources, and there was no systematic mechanism together with specific criteria in the decision-making process and prioritizing of hospital issues. In addition, the political currents and financial bottlenecks of the hospital exacerbate the responsive and contingency approach to allocating financial resources in a hospital. In the following, the main findings of the present study are discussed

focusing on the four characteristics of chaos theory and also the garbage can model of decision-making.

Based on the chaos theory, the world is a nonlinear, complex and unpredictable system. Although, the affairs of the world seem disorderly, random and unpredictable, they have an orderly and definite nature. This theory refers to systems that, while displaying disorderliness, contain a sort of inherent order within themselves, representing irregular, nonlinear, and unpredictable and complex behaviors in systems, and endorses the existence of a pattern of ultimate order in all these disorders. Chaos theory refers to four main principles including dynamical system, self-similarity, butterfly effect, and the strange attractors principle. The dynamical system principle means that the relationship of the components of the system are in such a way that each component can independently perform its tasks while having dynamic and synergistic communication with other components. The self-similarity principle refers to the existence of a kind of similarity between components and the whole. Butterfly effect shows that a good and low-powered move could cause huge changes. The strange attractors principle also points to the fact that all that appears to be disordered at first glance, shows a regular pattern in the long run and by repetition (19,20, 23-24).

Based on the dynamical system principle of chaos theory, it can be argued that the processes of prioritizing and allocating financial resources in the AMC are dynamic processes. In this process, there is no systematic approach and no particular order, and it is quite dynamic because there are many variables involved. These variables include the existence of a variety of decision-making centers both within and outside the hospital, and at the university level. Meanwhile, in addition to the existence of numerous decision makers, the different roles of decision makers and their presence in both public and private sectors cause more dynamism and complexity in the hospital, where the existence of multiple decision makers with different roles cause a disorder in the system. Papadopoulos et al. (25), in their study entitled "Is the National Health Service at the edge of chaos?", introduced the system as a large and complex system with many stakeholders, such as patients, doctors and managers, and decision-making for reforms within this system have brought more complexity. The multiplicity of roles, complexity, dynamism and unpredictability of processes are among the most significant reasons for chaos.

In a study entitled "The Status Quo of Prioritizing Health Services in Iran", Tourani et al. (26), stated that prioritizing health services is essential in order to prioritize systematic prioritization. Therefore, prioritizing can lead to the optimal use of limited resources in the health system using a clear approach and participation of all stakeholders.

Based on the Self-Similarity principle of chaos theory, the lack of transparency in the process of allocating financial resources using the fee-for-service methods and the political processes derived from the stakeholder groups (centers of clinical power), budgeting with the traditional method and the opposition of these flows can be seen at all levels of the health system. This pattern is repeated by moving between levels, and its scale is changed. The fee-for-service payment system and the view of influential groups (professionalism) on one hand, and the allocation of authority related to the allocation of resources to universities on the basis of the new system plan on the other, causes disorder and multiple performances of universities and their subsidiary hospitals. In the prioritization study, based on a combination of scientific evidence and values, Kapariry and Norheim (27) stated that prioritization models should use a combination of scientific evidence and public values, since prioritizing is successful when used in addition to the scientific principles, it includes preferences and aspirations of stakeholder, as this will have a dramatic effect on the acceptance and implementation of priorities.

The lack of use of modern budgeting methods at the center due to lack of highly skilled and expert staff force will exacerbate low transparency and inadequate utilization of the expected benefits of the new systems and, thus, cause inefficiencies in resource allocation. According to Funnel and Mahdavi (28), human resources and the logic dominating them are considered as a primary factor

in change of systems, which has not been considered in the deployment of the modern systems program and has led to more irregularities.

Based on the Butterfly Effect in the chaos theory, a small change in system can have a positive or negative effect on the different levels of the department, hospital, university and even the network of hospitals in the country. The policy-maker's emphasis on fee-for-service plans and the new system, together with the lack of transparency in the goals, criteria and decision-making processes for allocating financial resources, create the butterfly effect. That is, a very small change in the percentage of payments to doctors or personnel in various services lead to bankruptcy of the hospital and the lack of financial resources at the university level.

Based on the principle of strange attractors in the chaos theory, it can be stated that the government, by injection of oil budget, cause balance between different flows and logics of maintaining disorder in determining the purpose, criterion and process of allocating financial resources at different levels of the system. It needs to be explained that in addition to the oil budget, receiving different services by patients not in the commitment of the insurers is also responsible for stabilizing the disorder flows at the center under study.

In Figure 1, a general picture of the chaos theory as one of the most influential factors in the mechanism for allocating financial resources at different levels of the hospital is shown. On the basis of the 1999 WHO report, almost 80% of the health system resources are allocated to hospitals, while producing only 20% of the outputs of this sector (29). This explains the importance of systematic allocation of financial resources and the application of transparent approaches in the manner of allocation.

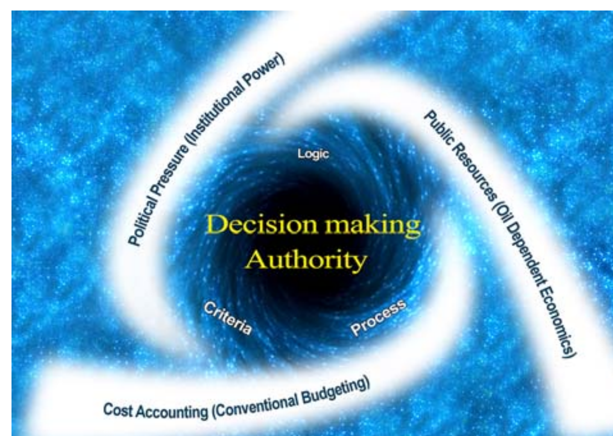

Figure 1. Conceptual model of financial resource allocation of the chaos theory

In addition to the chaos theory, based on the findings, the garbage can model in organizational decision-making also explains the manner of allocating financial resources in the educational center under study. It is assumed in this model that the combination of decision-makers and the process of identifying issues and prioritizing them are ambiguous, leading to contingency and accidental treatments based on necessity. And these contingency conditions are the product of the intersection between opportunities, issues, organizational responses and external factors affecting decision making (30).

Conclusion

This study briefly shows that the multiplicity of decision-making authorities and low transparency in determining the approach, goals and criteria lead to a disorder and exacerbation of the complexity of allocating financial resources in the educational and training center studied. The resource allocation process in the center is less compliant with the logical approach, and chaos theory and garbage can model dominate decision-making in the governmental bureaucratic structure. The board of trustees structure of the hospital has not regulated the system due to the lack of attention to the necessary infrastructure,

including the powerful human resources; it has also led to an increased complexity and chaos by creating a new authority in decision making. In these circumstances, the oil-affiliated budget could stabilize this disorder in allocating financial resources. The quadruple characteristics of chaos theory and the garbage can model can be a good way to explain the decision-making on the allocation of financial resources in hospitals.

Based on the findings of this study, the correction of allocation of resources at the hospital level and the development of a chaos theory-based change plan to improve the allocation of resources to create a new order for increase in productivity are proposed, and in this regard, the butterfly effect that the payment and fee-for-service system can have, must be considered by managers and policy-makers.

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Conflicts of interest

The authors declare that have no conflicts of interest.

Authors' contributions

Mehrolhassani MH was involved in the study design, data analysis, and drafted the original manuscript. Lashkari M was involved in the data collection, data analysis, and drafting the manuscript. Yazdi-Feyzabadi V contributed to the methodology development and drafting and revising the manuscript. Saberi H also contributed to some consultations about the data collection. All authors read and approved the final manuscript.

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