Research Article

Identifying the Criteria Affecting Appropriate Allocation of Health System Resources to Different Diseases in Iran: A Qualitative Inquiry

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Abstract

Background: Health policymakers need to use prioritization for resource allocation in the health system because of limitations to financial resources.

Objectives: This study aimed to explore the criteria affecting the appropriate allocation of health system resources to different diseases.

Methods: A qualitative study was carried out in 2017 using semi-structured interviews. Participants were chosen using purposeful and snowball sampling methods. Totally, 25 experts in the health care system were interviewed. The present study employed conventional content analysis and data were analyzed using MAXQDA10 software.

Results: The findings were categorized into four main categories and 21 sub-categories. The main categories included criteria related to "type of disease", "patients' characteristics", "type of treatment", and "ethical and responsiveness issues". Furthermore, the most effective factors on resource allocation included the emergency or non-emergency aspects of the disease, disease severity, disease onset, treatment effectiveness, and disease prevention.

Conclusions: Health policymakers should direct resources toward emergency and severe diseases that significantly affect people's quality of life. According to the findings of the present study, the "type of disease" was one of the most important criteria in health resources allocation. Therefore, similar to DRG, we can categorize diseases and health system problems based on their priority and use such grouping for health resources allocation.

Keywords: Resources Allocation, Health System, Public Health

1. Background

Prioritization of health care services is inevitable (1). Most decision-makers have accepted the need for prioritization in health resources allocation. However, there is no census among decision-makers on the criteria and fundamentals for prioritization (2). There are two approaches to prioritization. The first approach is to use the cost-benefit technique in which health benefits are calculated using financial terms such as willingness to pay (3, 4). The second approach focuses on quality-adjusted life years (QALY). Here, in addition to increasing the absolute health, people's preferences for important variables are also taken into account and it tries to answer the question "who should receive the health care services?" (5, 6). Furthermore, maximizing public health cannot be the only goal

for a health system. Therefore, it is logical to consider some other indicators for the prioritization of health services. For instance, the National Health Service considers egalitarian goals such as improving the health of the poor for the allocation of health resources (7, 8). According to the literature, mechanisms that cover a broad spectrum of health care benefits and issues should be applied for resource allocation (9, 10).

Population aging along with concerns associated with instability of financial resources has made decisions on resource prioritization more and more challenging (11). Economic evaluation studies have shown that the allocation of resources based on traditional evaluation methods is not in line with society's preferences (12). On the other hand, the limited health sector resources have made health pol-

icymakers consider the prioritization of health resources. Nevertheless, there are still some disagreements between policymakers on the variables that should be considered for prioritization (2, 13). One of the controversial topics for health sector decision-makers is the allocation of health resources to groups with lower life expectancy such as elderly people or people with chronic conditions leading to death. Some believe that such a strategy will waste health resources; others, however, point out that all people should benefit from health services equally. Studies show that two-thirds of society disagree with allocating health resources to groups with lower life expectancy (14, 15).

In addition, the current method used for national health resource allocation does not encourage managers to compete on controlling the expenditures. Nonetheless, they compete more on increasing the hardware facilities, as such facilities attract more budget (16). Public health status is not considered at the time of resource allocation. In other words, they never pay attention to factors such as various regions' population structure like the number of elderlies or youngsters.

To the best of our knowledge, no similar study has ever been conducted in Iran. Some studies have focused on the health resources allocation from specific aspects such as ethical (17) and social values (18); however, the present study investigated all the important criteria from the perspective of health professionals. To allocate health resources efficiently, it is necessary to identify a series of factors that reflect public health and are effective in resource allocation (17).

2. Objectives

Therefore, the present study aimed to assess the appropriate criteria and features and develop a new solution for the prioritization of health resources for different diseases.

3. Methods

3.1. Expert Interviews

This is a qualitative study carried out in Iran in 2017. Participants in this research included managers, health policymakers, and the personnel of the Ministry of Health and its affiliated universities with at least five years of managerial and administrative work experience. Participants were chosen using purposeful and snowball sampling methods.

Before the interviews, we provided participants with an information sheet to clarify the study for them. We also obtained their verbal consent while reassuring them about the anonymity and confidentiality of the data. Then, after getting their informed consent, the interviews were carried out at their workplace in person.

The data were gathered during semi-structured interviews using semi-open questions. In the semi-structured interviews, researchers and participants can discuss more the topic. Researchers are allowed to ask more questions in addition to the questions identified in the interview guide to obtain more detailed information. We also tried to gather more exact and deeper information by asking probing questions during the interviews.

Interviews were done by two of the research team members using an interview guide developed based on the experts' and the research team's opinions. Each interview lasted for 45 to 60 minutes. Each interview was conducted by one of the researchers and no other person was present during the interview. Data were recorded using a voice recorder and note-taking was also used to record the information. Data collection stopped when new interviews provided no extra information to the research team or the collected information was all repetitive (data saturation). Data saturation happened at interview No. 22. However, the research team extended the interviews up to 25 to make sure of adequate data collection.

The present study utilized conventional content analysis and data were analyzed using MAXQDA10 software. Content analysis is a proper method for gathering valid and reliable results from text data. Interviews were digitally recorded and transcribed verbatim, and then they were read several times for familiarization. Next, coding was done by breaking texts into the smallest meaningful units. In addition, to enhance the credibility of our findings, we shared the transcripts with the participants (member check) to ensure the accuracy of our interpretations of the data. Finally, an agreement reached on the codes and interview texts were peer checked.

3.2. Ranking the Criteria

After identifying the effective criteria for health resources allocation, we decided to give a weight to each criterion. In line with this, we created a complete list of criteria and asked 20 health experts (who were chosen from participants of the previous round of interviews) to score these criteria from one (the least important) to five (the most important). Therefore, the score of each criterion ranged from 20 to 100. Finally, the total score and the rank of each criterion were determined by adding up the weights.

4. Results

In this study, 25 people (20 men and 5 women) were interviewed. The participants' working conditions and work experience are presented in Table 1. After analyzing the obtained data from the interviewees, the results were classified into four main and 21 subsidiary categories (Table 2).

Table 1. Demographic Characteristics of the Participants

Characteristics, Categories	No. (%)
Job status	
At the Ministry of Health level (manager, policymaker)	13 (52)
At the University of Medical Sciences level (manager, faculty)	7 (28)
At hospital level (chief executive officer, faculty)	5 (20)
Total	25 (100)
Work experience, y	
5 - 15	6 (24)
15 - 20	8 (32)
> 20	11 (44)
Total	25 (100)

4.1. Criteria Related to the Type of Disease

The majority of the participants believed that the type of disease is one of the important criteria in the allocation of resources. Acuteness, prevalence, and prevention of the disease were among the criteria related to the type of disease. In addition, emergency cases, being contagious, and the patient's living standard after treatment were among the other factors related to the type of disease.

Concerning the significance of the emergence of disease as one of the important criteria for allocating resources, one of the interviewed faculty members stated:

"Given the fact that the most valuable aspect of treatment systems is to save human life, the riskiest diseases must be given the highest priority. We always give the first priority to patients at the risk of imminent death in terms of allocating resources" (participant No. 13).

Concerning the significance of patients' living standard after treatment, one of the other policymaking participants believed that:

"In order to allocate the resources effectively, the way a patient continues his/her life after treatment should be investigated. If the standard of living is low in terms of efficiency, it is not logical to allocate resources to this group of patients" (participant No. 7).

One of the other policymaking participants stated:

"The issues related to endemic and prevalent diseases in society should be taken into account. For instance, in our country, trauma and accidents are more prevalent and they definitely need to have a bigger share of health resources" (participant No. 24).

One of the hospital managers said:

"Treating some diseases has just an individual aspect but there are some groups of diseases whose treatment has highly important social effects. We prefer to push resources toward a direction that is of higher social importance; in this case, we can have a better health condition in the long run by making use of our limited resources" (participant No. 18).

Furthermore, several other interviewees (No. 1, 2, 4, 8, 9, 10, 11, 12, 14, 17, 19, 21, and 25) pointed to the importance of some criteria related to the type of disease.

4.2. Criteria Related to Patients' Qualities

The majority of the participants in this study believed that the allocation of health resources to specific groups of patients with different qualities is of considerable importance. Age, the onset of disease, socioeconomic and cultural conditions, risky behaviors that might lead to diseases, being the head of the family, and the patients' gender were among the mentioned items. Concerning patients' qualities, a deputy director of treatment in one of the medical universities stated:

"When an infant is afflicted by a disease, we should pay more attention to him/her because it will take more DALY from society and it will impose a huge burden on society. Besides, women require more health care at specific ages; consequently, all these factors need to be taken into consideration" (participant No. 1).

Another participant who was in charge of the health economics committee at a medical university said:

"Productive population should be given a high priority for allocating resources because the treatment of younger people has a higher rate of return on investment; therefore, they have to be given a higher priority. In addition, we should pay attention to the fact that disability and death among productive people or people at working age can affect more people" (participant No. 19).

One of the managers of the Ministry of Health said in his interview:

"There are some groups in society who are more susceptible to diseases and they do not posse the required awareness and ability to fight against the disease. It is better to identify such groups and the reasons behind their disability to help them become more immune to diseases" (participant No.12).

Some other interviewees (No. 3, 7, 8, 9, 11, 16, 18, 20, 22, and 25) also pointed to the importance of patients' qualities.

4.3. Criteria Related to the Type of Treatment

Apart from who the patient is or what the illness is, the type of treatment that should be used is basically important. The qualities related to the type of treatment included the effectiveness of treatment, dependency of treatment on para-clinical services, the probability of undesirable side effects, and the cost of treatment. One of the hospital managers said:

"For instance, take a patient into consideration who has referred to a dentist. If the dentist implants his teeth with around 5 million Tomans, he can repair his teeth and the patient will not suffer from long-term complications such as digestive disorders and infections. However, given the health resources or the

Table 2. The Important Criteria in Health Resources Allocation

Category	Sub-Category
Criteria related to the type of disease	Severity of disease
	Prevalence of disease
	Preventive aspect of the disease
	Emergency or non-emergency dimensions of the disease
	Communicable or non-communicable aspects of the disease
	Quality of life after treatment
Criteria related to patients' qualities	The onset of disease
	Cultural and socio-economic conditions
	Risky behaviors leading to diseases
	Being the head of the family
	Patient's gender
Criteria related to the type of treatment	The effectiveness of treatment
	The cost of treatment
	The probability of undesirable side effects
	Dependency of treatment on para-clinical services
Criteria related to ethical and responsiveness issues	Availability of effective substitute care
	Waiting time
	The place of providing services
	Excessive costs for rural or distant areas
	The age of death in case of not being treated
	The number of services that a person has used in the past

patient's conditions, the dentist may only do the dental scaling that may cause more infections in the future and the patient requires to spend more money on health" (participant No. 5).

An authority in charge of the treatment economics committee at a hospital believed that:

"*Effectiveness of treatment is one of the main qualities in allocating resources; spending money in a way that has low effectiveness is equal to wasting health resources*" (participant No. 10).

One of the other interviewees said:

"*In equal conditions, if an intervention or medicine has fewer side effects, it has to be given a higher priority and more resources have to be allocated to that*" (participant No. 3).

The other participants (No. 1, 4, 6, 9, 12, 14, 23, and 25) also pointed to the criteria relevant to this category.

4.4. Criteria Related to Ethical and Responsiveness Issues

Ethical challenges have always been a controversial issue in allocating health resources although discussing different levels of the remaining criteria is an ethical issue per se. The availability of effective substitute care, waiting time, the place of service provision, excessive costs for rural or distant areas, the age of death in case of not being treated, and the number of services that a person has used in the past was among the mentioned factors. One of the managers who has been working in the Ministry of Health for over 20 years said:

"*One of the most important criteria that should be given special attention is the people and populations with low income. Fortunately, in recent years, the government has given a high priority to providing services for a population of 11 million living in the suburbs because this class of society is the neediest with the least facilities*" (participant No. 20).

One of the other participants said:

"*Taking an ethical doctrine into consideration is of high importance for determining the characteristics of resource allocation. For instance, some people believe that we should just take the total benefit of each intervention as the most important factor; some others believe that all people in the society should have access to the required services. I believe that all people in the society should be able to take the advantage of services without considering their financial status but it must not be in such a way that some patients use health services during their lives because of their high demands and on the other hand, some people remain deprived of the limited required services*" (participant No. 17).

Another participant who was a policymaker in the Ministry of Health stated:

"*A big population of society lives in rural areas and acting based on justice and without any prejudice requires paying special attention to this part of society. The only service provider in villages is the government sector and we should not sacrifice justice for efficacy. In my view, villages, suburbs, and distant*

areas must be given special attention to resource allocation" (participant No. 16).

Another participant stated:

"Distant and rural areas often require more health resources but providing services to these areas imposes higher expenses on the health system…one of the other important issues in resource allocation is paying attention to the fact that when substitute services are available and they have suitable efficacy, we will be able to use them according to the expenses of each service." The health systems that provide effective substitute care have higher accountability and satisfaction. He added, "*In similar conditions, a group of people who have received a smaller share of health care will be given a higher priority in resource allocation*" (participant No. 11).

Some other participants (No. 1, 3, 10, 14, 15, 18, 19, 21, and 23) pointed to the criteria related to this category

The results from the prioritization of resource allocation criteria are presented in Table 3 in two groups with the highest and lowest priority.

Table 3. Prioritization of Resources Allocation Criteria

Type of Criteria, Criteria	Score of Criteria
Criteria with the highest priority	
Emergency or non-emergency[a]	88
Severity of disease	85
The onset of disease	84
The effectiveness of treatment	81
Preventive aspect of the disease	79
Criteria with the lowest priority	
The probability of undesirable side effects	42
Risky behaviors that might lead to diseases	37
The place of providing services	36
Patient's gender	33
Waiting time[b]	32

[a]The highest priority.
[b]The lowest priority.

5. Discussion

In this study, health experts were interviewed and surveyed in two stages to get information on the main criteria in allocating health resources to different diseases. In addition, these criteria were ranked. Since the results of this study can be used at the levels lower than the health system, it is hoped that the conclusions drawn from the obtained priorities will be used for decision-making in the country's health system. All of the criteria obtained in this study can affect allocating resources to different groups. According to the results achieved in this part of the study, it can be observed that three out of five factors with the highest importance in prioritization, including "preventability of the disease", "severity of the disease", and "emergency or

non-emergency aspects of the disease", were related to the type of disease. Moreover, none of the criteria related to the type of disease was among the criteria with the lowest priority. This suggests that the criteria related to the type of the disease are of the highest importance in resource allocation.

Being in emergency or non-emergency had the highest priority in health resources allocation in our study. This indicates that the risk that threatens the patient's life is the main criterion in resource allocation. Many health experts believed that when a patient is in an emergency and life-threatening condition, all resources must be allocated to that patient. The acuteness of the disease had a second rank in allocating health resources. Disease acuteness indicates low living standards due to being sick without considering the risk of death in an emergency shows an immediate need for receiving medical services due to being at risk of death. A study conducted by Skedgel and Regier in Switzerland in 2014 revealed that disease acuteness is one of the main factors in this regard (19). In addition, the studies by Blumenschein et al. in Canada in 2016 (20) and Green and Gerard in 2008 on social values of health interventions suggested that disease acuteness is an influential factor in investigating social preferences (21). In many of the conducted studies in other countries, emergency and acuteness have not been separated but in our study, because our statistical population consisted of health experts who had an important role in health policy- and decision-making, the quality of emergency was separated and a higher score was given to this factor. Probably due to this reason, health experts have given the highest priority to the emergency aspect of the disease for its direct relation with patients' death and this is of high importance from an ethical and policymaking point of view.

The age of the patient is an important criterion in resource allocation and it has been investigated as an important quality in studies concerning prioritization. Eisenbrg et al. conducted a study to investigate the effect of health programs on survival and non-fatal diseases. They concluded that the age of the patient is an effective factor (22). In a study conducted by Lancsar to assess the relative weight of QALY, the age of the onset of the disease and the age of death were analyzed as the main criteria from the descriptive study (4). In addition, Johansson-Stenman and Martinsson carried out a study in 2007 to find out if some lives are more valuable than others. They concluded that the current value of saving life years did not change by aging but the saved relative value decreased by aging (23).

As shown in the findings of the current study, the effectiveness of treatment is one of the other important factors affecting the prioritization of health resources. It measures the effect of the treatment on patients and if the effect is not great, the quality of life will decrease after

treatment. For this reason, many studies have used post-treatment quality of life to measure the effectiveness of treatment. In line with this finding, Gyrd-hansen (24) in a study in Denmark investigated whether all patients or only some of them should be treated, and reported that post-treatment health status was the main factor in this regard. Moreover, Green (25) measured the severity of disease and post-treatment health separately. However, in this case, there is an ethical and efficiency trade-off on whether or not we should shift resources towards areas with high post-treatment quality of life, which can also contribute to production. Given the importance of treatment effectiveness, it is suggested that this factor be used as a separate measure for the allocation of health system resources.

The "preventability of the disease" was the fifth criterion in our study concerning resource allocation. Treating preventable diseases can reduce the economic and social burdens on the patient in society. Steuten and Buxton's study in 2010 revealed that the preventability of the disease is an important quality in all fields (26).

In Lancsar et al. study, since there was a little focus on criteria relevant to diseases, disease preventability was not considered as a major criterion in the study (4). However, in our study, because health experts focused on macro-level policymaking, the preventability aspect of treatment was regarded as an important quality.

Furthermore, the patient's gender and doing risky behaviors leading to diseases were identified as effective factors in allocating health resources, but these factors did not obtain high scores and they were classified as less important criteria. Nonetheless, Norman et al. study in Australia (27) identified gender, healthy lifestyle, and smoking as behaviors resulting in diseases but health experts in our country maintained that factors like patients' gender and lifestyle did not have significant effects on accessing health care services due to their incompatibility with justice. Similar to our study, in Lancsar et al. study, patients' gender and committing risky actions leading to diseases were not determined as significant factors although they were put forward (4). Some other criteria such as the "possibility of undesirable side effects", "the place of providing services", and "waiting time" were identified as effective criteria in our study but they were given a low priority and were classified as insignificant criteria. In Oremus et al. study in Canada (28), the possibility of undesirable side effects was selected as one of the most important criteria. It may be because this study was conducted on important criteria in allocating a budget for patients suffering from Alzheimer's disease but our study included resource allocation in the whole health system and this criterion could not be part of the most important criteria. Furthermore, the criterion of "waiting time" in Ratcliffe study in England (29) and the criterion of "place of providing services" in Watson et al.

study in Scotland (30) were classified as the final and significant criteria. Ratcliffe et al. study was carried out to investigate resource allocation for liver transplant in which much attention was paid to patients' waiting time. Moreover, in Watson et al. study done in Scotland, there was a noticeable variation in the place of providing services (home, office, etc.), which is not considered an important factor in comparison with environmental and cultural conditions in our country. In the studies carried out by Lancsar et al. (4), Steuten and Buxton (26), and Norman et al. (27), like our study, factors such as "possibility of undesirable side effects", "place of providing services", and "waiting time" were not classified as high-rank criteria and they were not utilized in the quantitative study. The current study had some limitations. One of the most important limitations was the difficulty of having access to health professionals and experts. We tried to arrange everything before the interview and set the time of the interview after contacting the participants in the study.

5.1. Conclusions

As indicated by the results of this study, the most important criteria for health resources allocation were divided into four main categories. Decisions on the allocation of health resources are made at macro-levels, i.e., the Ministry of Health, and micro-(operational) levels. Moreover, the results of the present study can be applied to all decisional levels associated with health resources allocation. It seems that doing some research on identifying society's preferences to involve them in health resources allocation will help complete the present study. In addition, doing a study on categorizing the criteria such as age and determining their importance would be cost-benefit.

According to the findings of the present study, "type of disease" was one of the most important criteria in health resources allocation. Therefore, similar to DRG, we can categorize diseases and health system problems based on their priority and use such grouping for health resources allocation.

Supplementary Material

Supplementary material(s) is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

Acknowledgments

Footnotes

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