

The Experience of Healthcare Service Stratification in Controlling COVID-19 in Iran

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Abstract

A new coronavirus, called COVID-19, caused the outbreak of pneumonia from Wuhan, China, to the whole country in late 2019, affecting other countries of the world, one after another. COVID-19 has posed great health threats to public health around the world. The COVID-19 outbreak in Iran has caused many people to develop the disease. Since the onset of COVID-19 in Iran, healthcare services for the management of COVID-19 have been stratified at three levels: The primary prevention level, which involves measures such as education and promotion of personal and environmental health as well as protection and screening; the secondary prevention level, which includes the first-level outpatient care, second-level specialized inpatient care, and third-level superspecialized inpatient care; and the tertiary prevention level, involving rehabilitation care during the recovery period in the referral system. The use of a referral and service stratification system within the national healthcare network, which covers all households up to the most peripheral level (home care level), has been one of the important contributions to the management of COVID-19 in Iran, which could enhance healthcare service delivery to patients efficiently and cost-effectively based on local evidence-based protocols.

Keywords: Service stratification, COVID-19, Iran, Referral system, Prevention levels

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Introduction

Healthcare service stratification is one of the important strategies for the effective provision of healthcare services (1), which refers to the specific arrangement of healthcare service providers to promote service delivery to all members of the community (2). In countries with a primary healthcare (PHC) system, the distribution of healthcare service units follows the health needs of the community starting from simpler units at the primary level and ending in more specialized units at higher levels (1). The healthcare system in most countries is divided into three primary, secondary, and tertiary prevention levels to be more efficient, as well as to establish justice and provide access for all people in the community. Accordingly, given the stratified structure of services, people can access more specialized services through the referral system (3,4).

The referral system, as an advanced healthcare service delivery system provides services based on the available vacant capacities and at three primary, specialized, and sub-specialized levels (5). In the referral system, caregivers

at the lower levels who are not able to diagnose or treat the patients refer them to higher levels that have more skilled human resources and more advanced technology through a two-way exchange of information (3). In the reverse referral system, hospitals and specialized medical centers of higher levels send their patients to centers and hospitals at lower levels to receive services that are similar in terms of quality to the services provided at higher levels, but at a lower cost, and this leads to the optimal allocation of professional workforce at higher levels and also creates a balance between the utilization of high- and low-level hospitals (6).

The healthcare network system and referral system in Iran

In Iran, after the victory of the Islamic Revolution, many efforts have been made to establish a good health system that can respond to all the needs of Iranian citizens. The most important measure taken was developing and establishing the country's healthcare network system,



which in its time created a significant change in healthcare service delivery. Structurally, the Iranian healthcare network comprises the lowest and most peripheral levels of outpatient service delivery, rural healthcare centers, health post and comprehensive urban healthcare centers. Public hospitals in cities are placed at the second level followed by specialized and sub-specialized hospitals providing inpatient services at the third level (7). The establishment of a referral system and also the family physician plan in the healthcare network system is one of the most important strategic plans for the national health system, which pursues important goals to establish justice and create efficiency for the correct and integrated management of citizens' access to the limited resources in the health sector (8, 9).

The COVID-19 epidemic started in China in late 2019 and spread to all countries of the world in a short period. The emergency committee formed during the COVID-19 outbreak in China reported that this disease could be eliminated with early diagnosis, quarantine, rapid treatment, and a strong system to trace the contacts of patients (10). Following such measures, the World Health Organization (WHO) in its published guidelines entitled "Health Systems Respond to COVID-19" made recommendations with a focus on prioritizing services as well as planning and clearly defining services at the national and regional levels (11). According to the WHO definitions and recommendations, healthcare services provided for diseases such as COVID-19 can also be stratified and delivered via the referral system.

Stratification of services provided to COVID-19 patients in Iran

Healthcare services for COVID-19 management in Iran were stratified and provided in the referral system at three levels: The primary prevention level (education and promotion of personal and environmental health and individuals' protection and screening), secondary prevention level (the first-level outpatient care, second-level specialized inpatient care, and third-level superspecialized inpatient care), and the tertiary prevention level (rehabilitation care during the recovery period) as displayed in Table 1.

Figure 1 shows the referral process for COVID-19 patients at different levels of the healthcare system:

Discussion and lessons learned

Quick and timely response to crises such as COVID-19 is a very vital process that requires extensive and active participation of all involved and relevant sectors. Following scientific and international documents and the recommendations of the WHO, primary diagnosis, and quarantine are defined as two important factors in fighting this disease (12). Accordingly, immediately after the COVID-19 outbreak in Iran, the national mobilization

plan against COVID-19 was established as part of the referral system and healthcare stratification, especially PHC services (education, environmental disinfection, screening, and production of masks and disposable clothes). In addition to using the therapeutic capacities of the Ministry of Health, Treatment, and Medical Education, the healthcare and medical resources and capacities of other organizations and institutions such as the Social Security Organization, banks, the Army, the IRGC, and the police force were also used to control the disease (13). To speed up the flow of information and improve inter-departmental coordination, some protocols were developed to establish coordination between all relevant institutions and departments, especially the public and private departments with non-governmental sectors.

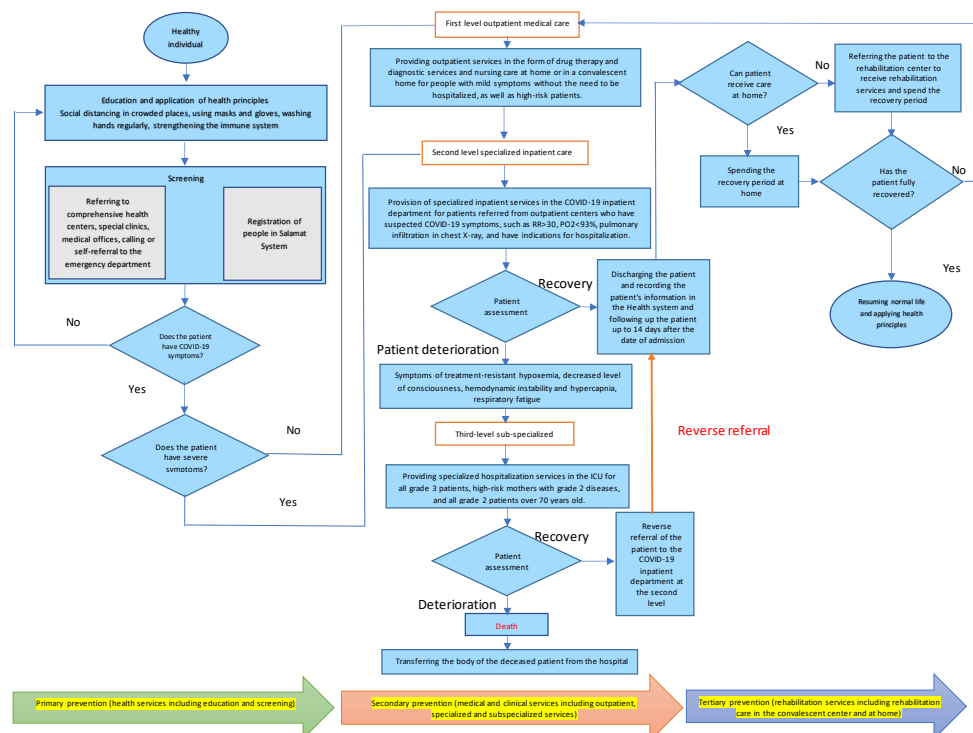
The provision of healthcare services to COVID-19 patients in the form of a referral system was associated with positive outcomes such as reducing waiting time, not overcrowding hospitals, medical centers, and emergency rooms, reducing unnecessary specialized visits, increasing access to specialized services, and upgrading standard procedures, and integrity in the provision of health services, as reported by Nasrollahpour et al (14). Immediately after the COVID-19 outbreak in Iran, many people suspected of having COVID-19 visited the emergency room of the hospitals on their own without first referring to the first-level service centers, and this caused crowding in the emergency departments of the hospitals, leading to the transmission of the disease from confirmed COVID-19 patients to healthy people, as reported by Nasrollahpour et al (4).

About 15 days after the announcement of the COVID-19 outbreak in Iran and the possibility of its spread throughout the country, the PHC system actively started screening suspected cases, which is a very important measure in the fight against other epidemics. Since, inevitably, the major costs of the health system, both financial and human, are allocated to hospitals, studies have shown that if 80 to 90% of patients are diagnosed and treated in the first level of service delivery in the referral system, in developing countries, there will be a decrease in the number of visits to hospitals and less need to allocate credits at this level (15,16).

One of the strengths of the stratification and referral system in the management of COVID-19 in Iran was screening and providing services and care at home. In Iran, family support and care for patients are very important. Thus, COVID-19 patients could receive rehabilitation services at home, but homeless patients or those who did not have the possibility of receiving care at home were admitted to rehabilitation centers. Thus, providing services at home and isolating people at home were part of the stratification of services, and based on that, the campaign "Each house is a health post" was promoted. The promotion of medical services at home and their

Table 1. The healthcare services provided to COVID-19 patients based on the stratification levels in the referral system

Prevention Level	Standard service level	Target groups	Type of services provided	Service delivery place/ center
Primary prevention (healthcare services)	Education and promotion of personal and environmental health	All healthy individuals in the community	Social distancing protocols, Environmental health and environmental disinfection procedures, Formulation of health requirements for all high-risk businesses for COVID-19 control and prevention Self-care: Preparing educational pamphlets, preparing and releasing educational content via radio and TV programs	Community
	Protective services	All healthy and at-risk individuals in the community	Enhancing the body's immune system: developing nutritional guidelines to increase the body's immunity	Community, comprehensive healthcare centers, and PHC
	Patient screening	Healthy individuals and COVID-19 suspected cases	National screening plan for COVID-19 and registration of people in the Salamat System for COVID-19 self-assessment	Community, home, PHC, comprehensive healthcare centers, pre-hospital emergency centers
Secondary prevention (healthcare and clinical services)	First level: Ambulatory care	People with symptoms such as sore throat and dry cough, with or without fever, who have mild symptoms without the need for hospitalization and high-risk patients	Outpatient services including drug therapy, diagnostic services, and nursing care at home	Home, nursing rooms of comprehensive healthcare centers, private clinics, and emergency departments
	Second level: Specialized inpatient care	Patients who have been referred to selected hospitals by outpatient centers or to the hospital's emergency department and have suspected COVID-19 symptoms are indicated for hospitalization.	Specialized inpatient medical services, drug therapies, and diagnostic services	Specialized hospitals
	Third level: Sub-specialized inpatient care	All grade 3 patients with neurological disorders and a reduced level of consciousness, respiratory failure, septic shock or failure of various organs, high-risk mothers with grade 2 disease, and all grade 2 patients over 70 years old	Mechanical ventilation, oxygen therapy with a CPAP mask, or non-invasive or invasive ventilation	Super specialty hospitals with an ICU
Tertiary prevention (rehabilitation services)	Rehabilitation care during recovery	Patients with improvement of clinical symptoms, no fever, no need for fever medicines, and no dependence on ventilator	Post-discharge care (care and nursing services)	Home or rehabilitation centers

**Figure 1.** The Referral Process for COVID-19 Patients at Different Levels of the Healthcare System

improvement, especially through telemedicine and the presence of different teams at home, is an important issue that should be given more attention by health planners and policymakers. Moreover, protocols for providing home services at different levels should be developed. This highlights the need to implement the health team plan centered on family physicians in urban and rural areas as specified in the Fifth National Development Plan (9).

Conclusion

The use of a referral and service stratification system within the national healthcare network, which covers all households up to the most peripheral level (home care level), has been one of the important contributions to the management of COVID-19 in Iran, which could enhance healthcare service delivery to patients efficiently and cost-effectively based on local evidence-based protocols at all service levels.

Suggestions

To use and mobilize different resources within the national healthcare network, it is necessary to utilize the special PHC inter-sectoral cooperation model and emphasize home and family physician services according to Iran's cultural norms. Accordingly, using the capacity of new technologies and updating Iran's PHC system will provide many capabilities to improve the performance of the health system, especially in responding to epidemics such as COVID-19. Finally, to deal with crises similar to COVID-19 in the future, there is an urgent need to develop an integrated management system to cover home care in the PHC and healthcare network and to use telemedicine to increase productivity and establish justice in access to healthcare services.

Authors' Contribution

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Competing Interests

The authors declared no conflict of interest.

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