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Health in the Islamic Republic of Iran, challenges and progresses

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Précis

This debate article highlights some characteristics, progresses and challenges of the Iranian health system. Integration of medical education and health service provision, control of some important communicable and non-communicable disease, some health initiatives and health financing system have been discussed from the viewpoint of ex-managers of the system.

Introduction

The Islamic republic of Iran (Iran) is a great country with a wide area and dispersed population. You may find only few countries in the world that neighbor 17 countries in which two of them involved in a concurring war. The weather, culture, the environmental hazards and the infrastructures and ultimately heath indicators have a great diversity in Iran. The specific geographic situation of Iran and mass immigration from Afghanistan and Iraq, the wars and insecurity after it in the region, and illegal drug traffic from eastern borders with Pakistan and Afghanistan have all affected the health system in Iran (1).

There are noticeable health inequalities within the country; for instance, the difference between life expectancy between different provinces reaches 24 years. The same is through for almost all indicators excluding the vaccine coverage and access to primary health care which are above 90% nationwide.

While the major burden of disease in the country as a whole and specially in the large metropolitans is non communicable diseases (NCDs) including cardiovascular disease (CVD), cancer and injuries, the country is still faced with the problem of infectious diseases which in many instances are somehow related to its neighbor countries (2,3). In the both recent epidemics of the Cholera which occurred in Iran in 2005 and 2007 through fingerprinting of the bacteria it was clearly shown that organisms was imported from Pakistan and Iraq respectively (4). Cremean Congo fever previously not known in Iran is now a real health hazard with up to 250 cases each year affected with a fatality rate of 25%. All these reported cases were related to smuggled poultry from neighbor countries. Two out of four countries which could not still eradicate poliomyelitis are neighbors of Iran. Despite of these challenges, it is now 12 years that Iran has obtained the certificate of polio eradication and sustained this success. Malaria although previously endemic in Iran is now confined to three south eastern provinces which its ma-

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jority of falciparum cases being foreigners who entered the country illegally.

These threats could not stop the success of the Ministry of Health and Medical Education (MHOME) in control of all of epidemics and even in helping the neighbor countries through the so called group 5 initiative which was launched on 2005 during Eastern Mediterranean regional meeting of the world health organization(WHO) between Iran, Iraq, Pakistan, Afghanistan and WHO with central role of Iran as the secretary. This could have been done only through strengthening of the primary health care (PHC), active surveillance and frequent monitoring, vaccination at borders and even sending free vaccines to the neighbor countries.

Working for the future is based on our current capacities. This is through analyzing the previous achievements and realizing today's needs and predicting fluctuating situations in tomorrow. In this study, we reviewed some of the achievements of Iranian health system in the recent decades.

Integration of Medical education and service provision

Iran has applied the principles of Alma Ata but this was not just like rewriting a written statement; Iran has had it own model. Integration of the medical education and health services and accountability of the educational system to match the real needs of the population have changed our situation from a country hosting more than 3000 working foreign physicians in 1983, to a country fulfilling all her needs in higher education in the health and medical sciences (5). The expansion of medical education while the country was suffering from an imposed war which lasted 8 years and while confronting a sanction lasting now for more than 29 years is a unique experiment in the world. You may see such an expansion in other countries but this usually happened through foreign supports. For the health workers or as is called in Iran Behvarz, the initial group was based on those rural inhabitants whom completed their elementary educations. They then entered the special training program for 2 years and then appointed as Behvarz to the health house covering up to 1500 people. The major strength of the administration process was introducing the most appropriate local people to local health authorities by rural councils for being a Behavrz. This resulted in a proper environment that helped the health system to have support of the community. Only through this support it was possible to improve the health indicators dramatically during a very short period. For instance, it took only 3 years to increase neonatal vaccine coverage from 33% to over 90% nationwide (6).

Although continuous professional development program for all of them were conducted and they become experienced and educated further but they had basically only elementary education. The health system initiatives had to be tailored so that these 30,000 Behvarzes as the main acting bodies could be participated [6]. The reason for choosing vital horoscope as a simple model of census has turned the Behavrzy into an university degree. Although the central role of people for appointing the Behvarz have been maintained, they are now appointed from those rural inhabitants who have successively graduated from high schools. This promotion in Behvarz activity now has increased the capacity of the health system and more sophisticated health programs could become a reality. For instance screening for diabetes and hypertension now covering almost in all inhabitants of the cities with less than 20,000 population and all rural regions. Interestingly using HBA1c as an indicator of blood sugar control it was shown that known diabetic patients of this group have a better control of their blood sugar compared to urban inhabitants (7,8).

Hepatitis B Vaccination

Since 2007, Iran's MOHME carried out a nationwide hepatitis-B vaccination campaign for 17-year-old adolescents in four stages. then, the second and third stages were done targeting adolescents born during 1990 and 1991. The National Committee for Hepatitis

selected a passive approach –media education – for mass vaccination. The target populations in 2008 and 2009 included 1 709 337 and 1 673 571 adolescents respectively. In each year, Iran organized three rounds of vaccination throughout the country. At the end of each round, data were collected and sent to MOHME for analysis. The overall coverage rate was 74.9 per cent for one dose of vaccination, and 62.76 per cent for all three doses in 2008 and 75.7 per cent and 55.6 per cent, respectively in 2009. Coverage rates in rural areas were significantly higher ($p<0.001$). The media education approach achieved acceptable outcomes in that campaign (9).

The coverage of HBV vaccination of infantile vaccination has been very high in IR. Iran. And the impact of this vaccination in decreasing the burden of infections have been confirmed (10).

Mental health services in primary health care

Mental health integration in primary care was started to screen for major psychiatric disorders and their referral cases. Since substance use is one of the major causes of mental disorders burden in Iran, the initiatives were aimed to integrate the harm reduction programs which are now mainly a vertical program to the PHC(11, 12).

Developing e-health

Computer based health data gathering and e health expansion covering other domains including referral system, insurance and even telemedicine now could become a reality. Several pilot studies have been done in Iran with largest now covering near 1,000,000 people in Golestan province.

Sophisticated health services

On 1982, it was estimated that annually more than 4000 Iranian were going aboard only for coronary artery bypass graft surgery. Now every year at least 18,000 such operations are performed in Iran and 27 out of 31 provinces have active cardiac surgery services. This is an example and this expansion has covered many other speciality cares.

Social determinants of health

Iran has played important role in many health initiatives in the world. In social determinants of health, Iran is one of the few pioneer countries. Now all of the families with a low income have some coverage by the governmental societies. This coverage includes not only economic support but also capacity building to have them moving them toward a self sufficient within approximately 10 years after starting the support. The only exception are elderly and those suffering from irreversible disabilities or incurable diseases(13).

Evidence based policy making has been the basis of all of the initiatives in the recent years. Here we provide few examples:

Neonatal and Maternal Mortality

Before Islamic revolution of Iran, the absolute number of maternal death was over 5000 per year, when population was 35 million with an estimated annual birth number of 500,000. Now the absolute number of mother deaths is less than 300 annually with an estimated 1.2 million births per year. Iran is one of the few countries in the world who reached targets of the millennium development goal number 5 on 2008, seven years ahead of the planned time.

The cause of neonatal mortality has changed in past two decades. While the share of infectious diseases has been decreasing, the importance of prematurity and congenital disorders was increased. One of the main causes for decreasing the burden of infectious disease is the accessibility to safe water, proper sewer system and proper toilet usage.

Infectious diseases like neonatal tetanus have been totally eradicated in past 10 years. Considering these changes MOHME have changed the educational program for nurses. A special program for intensive care for neonates has been started. Meanwhile according to the available demographic features, birth rates and burden of neonatal diseases in different provinces, a program for expansion

of neonatal intensive care units was launched in 2006. Within 3 years the number of beds have increase three times with much wider distribution which expanding the coverage from less than 30 cities to more than 100 (13, 14). The program is still running. Other activities included a national program for expanding the coverage for prenatal visits specially for high risk mothers, expanding the prenatal diagnostic facilities and increasing access to standard delivery system targeting the most needy regions. For instance the number of the neonatal facilities in Sistan – Balochestan province with the highest maternal and neonatal mortality in the nation was tripled within a two year period while in some of the regions with decreasing birth rate, the centers have merged. Through these activities the neonatal mortality in some of the provinces have decreased up to 40% and the differences in the death rate between provinces and districts nationwide have decreased dramatically nationwide (15, 16).

Non-communicable diseases

Burden of the non communicable disease is increasing worldwide and much of its impact is now in developing countries and lower socioeconomic classes within countries. For this reason the control, prevention and offering of affordable treatment for these diseases became adopted as the main objectives in the field of disease control in the ministry of health. Based on World Health Assembly (WHA) resolutions specially WHA 53.17 (May 2000) several initiatives were started in the MOHME in past 11 years. At the ministry, a new branch under deputy of health was established which dedicated to NCD control on 2006 (4).

The national health surveillance (NHS) which is a regular activity was re-organized to target the monitoring and surveillance for NCD. Several reports have been published based on the results of NHS and these are now the basis of the national plans to control NCDs (17, 18).

One of the main problems in control of NCDs with higher burden in developing countries is late diagnosis precluding effective treatment because of established complications. Recognizing the importance of early diagnosis, a national screening program for hypertension and diabetes were implemented in rural areas with central role played by Behvarz. The success for this program led to expansion of this program into the urban area since 2010. It is now estimated around 30% of the adult population in the urban areas and more than 80% of inhabitants in the rural regions have been screened for obesity, hypertension, diabetes and hyperlipidemia and were referred for treatment when indicated(19,20). Although there are problems for referral precluding the appropriate treatment in some instances, concurrent implementation of the family physician program in the rural area and smaller cities have increased the capacity of the system in providing appropriate treatment of these newly diagnosed cases (21,22).

Fight against tobacco usage

The importance of Tobacco use as a risk factor of NCDs cannot be over emphasized. All the components of the so called MPOWER strategy to control tobacco consumption were initiated in Iran. The components of this strategy include **M**onitoring tobacco use and prevention policies, **P**rotecting people from tobacco smoke, **O**ffering help to quit tobacco use, **W**arning about the dangers of tobacco, **E**nforcing bans on tobacco advertising, promotion, and sponsorship, and **R**aising taxes on tobacco. There has been an extensive collaboration with both governmental and non-governmental organizations in this regard. Iran has been considered as a pioneer in the global fight against tobacco usage and WHO has reported Iran as one of the 20th countries with the highest achievement in this regards. For instance Iran is among the only seven countries in the world who adopted the strongest level of regulations for smokeless tobacco warning. Nevertheless strengthening of PHC for treating tobacco dependency has been piloted in Iran. The initial results of national surveys on tobacco usage show the preva-

lence of regular users have decreased, but the problem of water pipe smoking and smoking among younger adults is still prominent (23).

Cholesterol as a risk factor for cardiovascular disease (CVD)

Another important factor in the development of NCDs is diet. Among dietary factors, consumption of saturated fatty acids especially its trans isomer has a great impact on later development of CVD and subsequent mortality. A national survey on September 2005 in Iran revealed that the more than 85% of consumed oil by families were saturated fatty acids with an average trans-isomer of 25%. A legislation was passed in the higher council for health and approved by the president of Iran targeting less than 50% consumption of saturated fatty acids and less than 5% trans-isomer by Iranian families through well defined tasks and intersectional actions in ministries of commerce, industry, economy and health, standard organization of Iran, office of custom and with the support of national Iranian mass media. Three years later the estimated use of saturated fatty acids were 52% and share of trans-isomer was 7.5% (24).

Achievements in Control of burden of Traffic accidents

The medical care of trauma patients have been a major challenge for many years. A multilevel program for expanding pre-hospital emergency services (EMS) and improving the related medical care was designed and implemented in the past 6 years. Through this national program the number of EMS has increased dramatically from less than 600 to near a 2000. The EMS was free before and this was sustained despite this huge expansion. The cost of in hospital care were also financed through commercial insurance companies which provided insurance for vehicles and drivers and victims of these accidents did not have to pay any more for care when admitted to governmental hospitals. Also parts of the cost in the private hospitals were also covered.

Head injury is considered to be one of major causes of mortality in car accident in Iran. Implementation of preventive measures such as seat belts and air bag could reduce this adverse event.

Seat belt usage was enforced in Iran through major campaign in the media and has gained a good recognition in the past 5 years through the central role of police and other parties. Nonetheless law enforcement obligated the use of the seat belts and it is now estimated that more than 85% of divers use seat belts regularly compared to less than 20% just 10 years ago. But medical care for those who were injured due to lack of seat belt was still a great challenge. Since many accidents occurred in remote areas, promotion of the district hospitals especially in area of high rates of head injury was planned. In this regards access to computerized tomography (CT), intensive care unit (ICU) with provision of appropriate staff were in need through localization of the hot points and their nearby hospitals . While the equipments were arranged, the training of staff also was started. The training of nurses was rapidly started through a new educational program for master in ICU nursing, however the availability of surgeon was still a problem. The number of residency seasts for neurosurgery were increased during a 3 year period by 75% but it was considered that depending on neurosurgeons as the sole care provider for head trauma patients would be a waste of a highly trained staff who will become available for service only after 5 years at minimum .Since most hospitals already had working general surgeons, hence a new program for fellowship in trauma was designed to promote these surgeon. Through an 18 months training course they learned how to manage the trauma patients with special emphasis on head injury. They were trained to do emergency neurosurgery procedures and decide when to refer to a neurosurgeon. It is hoped that graduation of these new staff would increase the access to appropriate care for head trauma patients nationwide especially in the remote areas.

Moreover a subcommittee of higher health

council was devoted to road safety and through a collective action of 32 different governmental, public and non-governmental organizations a target of reduction of road traffic mortality by 25% was set. During the first year on 2006 11% reduction was reached despite 13% increase in the number of vehicles nationwide but on next years the success was much less around 5%. There was even an increase in mortality by 2% in 2008. This failure was probably because of surge of vehicles and the roads, some of them with low standards including absences of airbag and accelerated break systems. Though, some other factors may also have played a role including higher speeds of the new vehicles.

Swine flu pandemic

Since declaration of swine flu pandemic by WHO, Iran has launched a surveillance system to test all suspected cases both in community and hospital settings. They confirmed cases of pandemic influenza A (H1N1) by RT- PCR. For Iran, it is of utmost importance to strengthen the surveillance system for such disease and transfer the generated knowledge appropriately to the professionals, stakeholders and general population accordingly (25).

In Iran, the Primary health care (PHC) as the first level of contact of all individuals, the family and the community with the national health system have a prominent role in response to different health events such as H1N1 pandemic. Pyramidal model could combat against H1N1 pandemic. Pyramidal model puts all key components such as community, NGOs, PHC, hospitals, policy makers together to confront concurrent H1N1 pandemic and other health issues by a comprehensive, integrated and organized approach. This model should be regarded as a continuous, flexible and dynamic solution to pandemics. The H1N1 pandemic, as a multi-wave and unpredictable event of the 21st century that involved most countries, threatens communities and confronts hospitals with growing demands of patients for health services. By defining the role of the PHC and other important parts of pyramidal models such as community, we could fight against H1N1 pandemic appropriately with the least human and financial resources (26).

Thalassemia and primary health care

PHC has been a main approach to control communicable diseases over past thirty years. The PHC has generated opportunities to non-communicable diseases including genetic disorders (27). Progress in controlling communicable diseases increases the relative importance of non-communicable diseases, including genetic disorders. In Iran, the development of primary health care over the past 20 years has greatly reduced infant mortality and crude birth rate. Accordingly, in 1991 prevention of non-communicable diseases were added to the primary healthcare program, hence a department for the control of non-communicable disease, including a genetics office, was established within MOHME. The β Thalassemia, which is an important health problem in Iran, was chosen to test the feasibility of preventing non-communicable disease in primary care setting. Iran's experience has shown that genetic screening could be successful in lower resource countries and also provides some lessons for high resource nations. The program is economically fruitful because it works through the established primary healthcare and educational systems, which focused existing (though scattered) genetic expertise on a common objective, and added thalassemia screening to the pre-marital blood tests(28).

Other issues

There are several other initiatives which could be discussed including the cancer registry program now covering near 70,000 new cases of cancer each year, the program for adolescent vaccination against HBV, the harm reduction program for control of HIV and other sexually transmitted diseases and many more other examples which we would not describe them in detail.

Challenges

Although many progresses have been made and more visible changes have occurred but there still many shortcomings which make the health system far away from ideal. One of the major concerns is to sustain resources for health system. Although human resource development has improved greatly in the past three decades and as mentioned before the number of physicians, nurses, midwives and other health professionals have increased dramatically, the challenge of sustainability of these man power in the remote under developed area are still prominent. The burden of this problem has become less for nurses, midwives and general physicians in the recent years with a policy of indigenous participation of students in these disciplines. The problem for specialist physicians is growing since many of them are married and they want to live in the larger cities. A refinement of policy of using indigenous graduates was made with mandatory 10 year service in the remote area but the impact needs to be seen in future. However the payment system not only could affect the sustainability of staff in the remote area but also affecting their performance. The best model for the payment is yet to be defined. Currently a mixture of fixed payment and pay for performance is the usual payment for non physician staff, while the physicians are usually paid through fee for service mechanism. The exception is family physicians in the rural insurance program that are paid through per capita payment with bonuses for performance. The analysis of effects of these different models of payment on outcomes of health system and the costs are beyond the scope of this paper but the current payment system needs to be improved. The financial resources of the system are also another challenge. While attempts for health tax were made in recent years through taxation on tobacco and a share of vehicle insurance, but the major financial input of the system is still through governmental support for most of the employees in the public domain with a small share usually fixed from the salaries. Since the amount of public budget devoted to health is limited, the health care system is usually faced with shortage of financial resources for its program. Inefficiency of the system and high administrative costs has augmented to this problem.

The health system is one of the most complex systems with many variables and uncertainties. The management of this system needs trained mangers. One of the current shortcomings is lack of those specifically trained for this purpose. The main mangers are usually physicians who are not trained for this job. The trained mangers on the other hand do not understand the realities and the complexities of the health system in depth. A discipline of hospital management was started with Bachelor, Master and PhD degrees but still this program is far from the real needs while the mangers are not always appointed based on their capacities.

The intersectional collaboration in the highest political level for policy making in the health system has gained some success with establishment of the higher council of health under direct supervision of the president, but the new ministry of "work, social welfare and cooperation" which have replaced the ministry of welfare has many common grounds with MOHME making consensus decisions very difficult to be implemented.

The health system specially the PHC is aimed at maternal, neonatal and childhood health and is more powerful in rural regions. It would take some time to integrate new targets such as NCDs to this system. The system has not a good coverage for suburban regions and created a concern among some policy makers that increasing social services in these areas could increase migration from rural regions to larger cities. Despite the MOHME has started several initiatives in these regions but most of them still in pilot stage and needs to rapidly scale up to response to the health needs of this vulnerable group.

Conclusion

The Health system has progressed dramatically in Iran after Islamic revolution. The most rapid developments were devoted to

Iranian version of the primary health care system with central role of the Behvarz. New threats and requirements have reshaped the system and many new initiatives have been implemented targeting NCDs and road traffic accidents but still there are challenges ahead which mandate a more collective action with a consensus on what the ideal health system should be in the country.

Conflict of Interest

The corresponding author was minister of health and medical education of Iran from 2005 till 2009 and Seyed Moayed Alavian was deputy for health from 2005 till 2008.

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