The Current Status of Cardiovascular Facilities in the Islamic Republic of Iran

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Abstract

The Islamic Republic of Iran is one of the youngest countries in the world, as more than 50% of its population of 70 million are less than 30 years of age. The incidence of cardiovascular diseases has changed dramatically since the Islamic Revolution of Iran. For example, rheumatic heart disease was the most common cardiac disease in the past, while its incidence has decreased significantly in recent years. Coronary heart disease, however, is currently the most common and serious cardiac problem. The incidence of congenital heart disease has remained almost unchanged. Nevertheless, early diagnoses and appropriate treatments have led to better care and prevention of subsequent complications. Risk factors for coronary artery disease are similar to those in other countries. Nonetheless, cigarette smoking is more frequent than hyperlipidemia in our population, according to some studies.

1) Training Programs:

A) General Cardiology:
There are two types of training programs for cardiology: a four-year residency period after medical degree, and a 3-year postgraduate fellowship following board certification in Internal Medicine.
B) Cardiovascular Surgery:
The training course for cardiovascular surgery is in the form of a three-year postgraduate residency program following board certification in General Surgery.
C)Pediatric Cardiology:
Pediatric cardiology training is a three-year postgraduate training program following board certification in Pediatrics.
There are nation-wide entrance examinations for the above-mentioned training courses, each of which requires passing the final nrionL board examinations.
D) Fellowships:
Apart from the afore-mentioned sub-specialties in the fields of cardiovascular medicine, the following fellowships are available in our country:

- Cardiac Anesthesiology: an 18-month postgraduate course after receiving board certification in nesthesiology.
- Electrophysiology: an 18-month postgraduate course after receiving board certification in general cardiology.
- Interventional Cardiology: an 18-month postgraduate program after receiving board certification in General Cardiology.
- Echocardiography: an 18-month course after receiving board certification in general cardiology

2) Cardiovascular Training Centers

Cardiovascular centers presently training physicians in the various fields of cardiovascular medicine are as follows:

A) Cardiology:
There are four centers in Tehran and four centers, one each in Shiraz, Isfahan, Tabriz, and Mashhad.
B) Cardiovascular Surgery: There are four centers in Tehran and three centers, one each in Tabriz, Mashhad and Kermanshah.
C) Pediatric Cardiology: There is one center in Tehran and one in Shiraz.

3)Cardiovascular Treatment Centers
Cardiovascular centers for the diagnosis, management and treatment of cardiac patients are divided into two groups: **A)** university hospitals, and **B)** private hospitals.

University Hospitals: these hospitals are divided into two groups: 1) those centers specified only for cardiac patients, and 2) those centers with a dedicated cardiovascular department, albeit within a general hospital. Of 6 centers from the first group, two centers are located in Tehran, one in Rasht, one in Kermanshah, one in Isfahan and one in Tabriz. Apart from cardiac units found in all major general hospitals, there are 22 major cardiovascular departments as part of general hospitals in Iran, equipped with cardiac catheterization laboratories and cardiovascular surgery units, 10 of them located in Tehran and 12 in other cities (Table I, Figs. I-III).

Distribution of Cardiac Procedures I.R.I Table: I

NO	University/ Hospital	University affiliate	Private	Province	Cardiovascular Surgery Center	Invasive/ Intervention	Cath-Lab
1	Tehran University of Medical Sciences/ Imam Khomeini Hospital	×		Tehran	*	×	1
2	Tehran University of Medical Sciences/ Shariati Hospital	×		Tehran	*	×	4
3	Tehran University of Medical Sciences/ Tehran Heart Sente	×		Tehran	*	×	5
4	Shaheed Beheshti University of Medical Sciences/ Moddares Hospital	×		Tehran	*	×	2
5	Shaheed Beheshti University of Medical Sciences/ Taleghani Hospital	×		Tehran	-	×	1
6	Iran University of Medical Sciences/ Shaheed Rajaie Cardiovascular Medical Center	×		Tehran	*	×	10
7	Baghiatallah University of Medical Sciences/ Baghiatallah Hospital	×		Tehran	*	×	2
8	Baghiatallah University of Medical Sciences/ Jamaran Heart Hospital	×		Tehran	*	×	1
9	ShahedUniversity /Khatamolanbia Hospital	×		Tehran	*	×	1
10	Shahed University /Mostafa Khomeini Hospital	×		Tehran	-	×	1
11	Army University of Medical Sciences/ Be, sat Hospital	×		Tehran	*	×	3
12	Oil Company Hospital National Iranian	×		Tehran	*	×	2
13	Day Hospital		×	Tehran	*	×	3
14	Mehr Hospital		×	Tehran	*	×	1
15	Pars Hospital		×	Tehran	*	×	1
16	Atieh Hospital		×	Tehran	*	×	1
17	Kasra Hospital		×	Tehran	*	×	1
18	Tehran Pars Hospital		×	Tehran	-	×	1
19	Sasan Hospital		×	Tehran	*	×	1
20	Sajjad Hospital		×	Tehran	-	×	1
21	Mehrad Hospital		×	Tehran	*	×	1
22	Milad Hospital		×	Tehran	*	×	1
23	Shaheed Lavasani Hospital		×	Tehran	*	×	1
24	Isfahan University of Medical Sciences/ Shaheed Chamran Hospital	×		Isfahan	*	×	4
25	Sepahan Hospital		×	Isfahan	×	*	1
26	Yazd University of Medical Sciences/Afshar Hospital	×		Yazd	×	*	1
27	Kerman University of Medical Sciences/ Shafa Hospital	×		Kerman	×	*	1

2N	Hospital /University	University affiliate	Private	Province	Cardiovascular Surgery Center	Invasive/ Intervention	Cath-Lab
28	Javadolaemeh Hospital		×	Meshhad	*	×	1
29	Meshhad University of Medical Sciences/ Ghaem Hospital	×		Meshhad	*	×	1
30	Meshhad University of Medical Sciences/ Emam Reza Hospital	×		Meshhad	*	×	1
31	Sistan Balochestan University of Medical Sciences/ Khatamol Anbia Hospital	×		Zahedan	*	×	1
32	Tabriz University of Medical Sciences/ Shaheed Madany hospital	×		Tabriz	*	×	2
33	Shams Hospital		×	Tabriz	*	×	1
34	Shiraz University of Medical Sciences/ Namazi Hospital	×		Shiraz	*	×	2
35	Shiraz University of Medical Sciences/ Shaheed Faghihe Hospital	×		Shiraz	*	×	1
36	Dena Hospital		×	Shiraz	*	×	1
37	Ordibehesht Hospital		×	Shiraz	*	×	1
38	Jondi Shapour University of Medical Sciences/ Golestan Hospital	×		Ahvaz	*	×	2
39	Mehr Hospital		×	Ahvaz	*	×	2
40	Hamedan University of Medical Sciences/ Ekbatan Hospital	×		Hamedan	-	×	1
41	Kermanshah University of Medical Sciences/Iman Ali Hospital	×		Kermanshah	*	×	1
42	Lorestan University of Medical Sciences/ Shaheed Madani Hospital	×		Lorestan	-	×	1
43	Lorestan University of Medical Sciences/ Emam Khomeini Hospital	×		Lorestan	-	×	1
44	Oromieh University of Medical Sciences/ Taleghani Hospital	×		Oromieh	*	×	1
45	Zanjan University of Medical Sciences/ Shaheed Beheshti Hospital	×		Zanjan	-	×	1
46	Gilan University of Medical Sciences/ Heshmat Hospital	×		Gilan	*	×	1
47	Golsar Hospital		×	Gilan	*	×	1
48	Mazandaran University of Medical Sciences/ Hazrat Fatemeh Hospital	×		Mazandaran	×	×	1
49	Shafa Hospital		×	Mazandaran	*	×	1
50	Vali Asr Hospital		×	Ghom	-	×	1
	Total	**30**	**20**	**17**	**41 (U= 24) (P= 17)**	**50 (U=30) (P=20)**	**79 (U=56) (P=23)**

C) Private Cardiovascular Centers: There are 9 private hospitals in Tehran and 8 centers in other cities, specialized in cardiothoracic surgery and 11 private hospitals in Tehran and 9 centers in other cities, specialized in cardiology and equipped with cardiac catheterization laboratories and facilities (Table I, Fig. I-III).

Fig. I. Distributuion of catheterization laboratories across the IRI.

Fig. III. Distributuion of cardiovascular surgery centers across the IRI.

Fig. II. Distribution of conventional and interventional cardiology centers across IRI.

4)Human resources:

Cardiovascular diagnostic and clinical services are rendered by specialists, subspecialists and qualified nursing teams across the country. In summary, the number of these specialists and subspecialists is as follows:

1- Adult cardiologists: more than 900
2- Cardiovascular surgeons: more than 110
3- Pediatric cardiologists: more than 55

5) Services: All cardiovascular diagnostic and clinical services, ranging from minor to complex interventional and surgical procedures are currently rendered at various university and private centers across the country.

Diagnostic procedures include:
- adult and pediatric cardiovascular catheterization,
- coronary and peripheral artery angiography,
- intravenous ultrasound study,
- electrophysiology study,
- Tilt Test,
- Holter Monitoring (HR Variability, BP, etc.)
- echocardiography (Doppler, transesophageal, stress, etc.).

Interventional cardiology including:
- percutaneous coronary intervention (PCI), with or without stenting
- percutaneous peripheral intervention,
- percutaneous transluminal mitral valvuloplasty (PTMC),
-percutaneous transluminal pulmonary valvuloplasty,
- percutaneous transluminal aortic valvuloplasty,
- ASD closure with Amplatzer,
- PDA closure with Amplatzer or coil,
-temporary and permanent pacemaker implantation,
- ICD, ICD3- chamber implantation
- treatment of persistent arrhythmia via RF ablation,

Surgical procedures including:
- minor and major congenital heart diseases,
- cardiac valve disorders,
- CABG,
- cardiac reoperations (redo surgery)
- simultaneous cardiac surgery such as CABG and valvular heart disease (CABG + MVR or AVR).

Table II and III present a list of important diagnostic, clinical, surgical and interventional procedures and their total numbers per year.

Table II. Number of Cardiac Procedures, IRI (2004)

Procedure	N
Coronary Angiography	106000
Cardiac Catheterization (Adult & Pediatric)	4520
Percutaneous Coronary Intervention (PCI)+ Stenting	14100
Percotaneous Transluminal Mitral Comissurotomy (PTMC)	410
Pulmonary Valvuloplasty	142
Aortic Valvuloplasty	57
ASD and PFO Closure with Amplatzer	105
PDA Closure with Amplatzer	155
PDA Closure with Coil	152
EPS with/ without ablation	655
Tilt Table Test	254
Permanent Pacemaker	2250
Temporary Pacemaker	3600
AICD	220
Pacemaker, 3 -Chamber	10
ICD, 3- Chamber	18

Table III. Number of Cardiac Surgery Procedures, IRI, (2004)

Operation	NO	Average Age	Mortality Rate
CABG Surgery	17,400	60	<2.5%
Mitral Valve Repair or Replacement	1350	50	<4%
Aortic Valve Replacement	1200	45	<3.5%
Congenital Heart Disease Surgery	1800	1.5	<5%
Redo Surgery	1150	65	<5%

According to the statistics, the infection rate in surgical operations is less than 1%, and mortality rates for those having undergone CABG and valve replacement are approximately 2.5% and 4-5%, respectively.

The same rates for minor and complex congenital heart diseases are less than 1% and up to 7%, respectively. The mean age of the patients receiving services is 60 years for CABG, 50 years for valve replacement and 1.5 years for congenital heart diseases.

6)Preventive cardiology

1) The Ministry of Health is involved in the field of prevention by having a special division and office and organizing teaching programs for general practitioners and the public.

2) Iranian Heart Association organizes research and teaching courses for medical doctors.

3) The Ministry of Health enjoys the co-operation of the mass media in raising awareness.

7) Future goals

1. Training courses for:
   A) speciality training
   B) subspeciality training in pediatric cardiology
   C) fellowship training in interventional cardiology
   D) fellowship training in EPS
   E) fellowship training in echocardiography
2. Continuing medical education through medical education courses for: cardiologists, internists, GPs, workshops and congresses
3. Research and intervention approaches through
   A) Healthy Heart Project: a survey for CVD risk factors and KAP (knowledge, attitude, and practice.)
   B) National Project for CVD prevention
4. Community-based integrated approaches, including preventive activities
5. Health technology services and assessments