

THE STATUS OF RADIOLOGY IN THE ARAB WORLD First World Report

Maurice C. HADDAD¹, Shukri I. LOUTFI¹, Jean C. TAMRAZ², Aghiad O. AL-KUTOUBI¹

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RÉSUMÉ : Cet article présente un aperçu général sur l'état actuel de la radiologie dans les pays arabes. Une discussion est menée sur l'historique, les associations de radiologie, les équipements et les systèmes de santé, la radioprotection, la prévention et le dépistage précoce de certaines maladies. Quelques recommandations sont émises sur l'évolution future de la radiologie dans les pays arabes.

INTRODUCTION

The aim of this world report is to give an overview on the practice of radiology in the Arab countries, with emphasis on the progresses that have been achieved and the problems encountered in this part of the world. The data are sparse and some of the information is based on personal recollections.

HISTORICAL BACKGROUND

Shortly after the discovery of X-rays by the German physicist Wilhelm C. Roentgen in November 1895, the first X-ray apparatus was installed in 1898 in Beirut at the Prussian Hospital affiliated since 1887 with the Medical School of the Syrian Protestant College founded in 1867 (later American University of Beirut in 1920). The first chest radiographs were produced after a long exposure time in 1900 by the Reverend Père Maurice Collangettes at the Faculté Française de Médecine (FFM) in Beirut and by Dr. Arthur Bacon and Mr. Brahim Youssef Succar, the first Lebanese X-ray technologist, at the X-ray laboratory of Prussian Hospital. In Sudan, the first X-ray was performed in 1898 during the British invasion battle of Omdurman. The first Lebanese specialized roentgenologist was Dr. Toufic Hajjar who trained in Paris from 1910 to 1912, returned to Lebanon

as chief of the X-ray laboratory at the American University Hospital, built in 1905 (later American University of Beirut Medical Center in 1970). He stayed for two years and then left to Egypt. Subsequently, Dr. Naadir Qadduwra (MD 1921 from Syrian Protestant College) who specialized in roentgenology in France and Germany (1921-1923) came back and opened a private office in Beirut [1]. In neighboring Damascus the X-ray facilities were limited and operated by physicians and surgeons like Dr. Nazmi Khani. In 1943, just before Syria's independence from France, the first trained roentgenologist, Dr. Muayyad Azm, started practicing at the University Teaching Hospital ; but it wasn't until 1950 after Dr. Wahid Sawwaf had finished a full residency training in the United States that the modernization and expansion of facilities started, spearheaded by the building of new teaching hospitals and the Watani Hospital. In Aleppo, Dr. Tahsin Masri is credited with the establishment of the first radiological clinic. The first Saudi Arabian radiologist was Dr. Mohamad Khalid Kashogi who graduated from Damascus School of Medicine in 1921 in Syria, and certified as specialist from University of Paris in 1932. In 1933, he installed in the "Holy city of Mecca" the first X-ray machine in Saudi Arabia. Information on the history of radiological services in other Arab countries is not available.

In the last three decades modern imaging has found its way into the radiological practice throughout the region with increasing subspecialization. Interventional radiology, a specialty that started in academic centers like the American University of Beirut in the early 1970s, has expanded extensively and enjoy a protected status in some countries like Kuwait but face the same challenges from other specialties just like in other parts of the world.

ASSOCIATIONS AND STAFFING

The first association of radiologists was established in Egypt in 1949 under the leadership of Professor Mustafa Ragheb [2]. Similar progress was observed in other Arab states with slower development of the radiology community, because of lack of medical schools in some countries and priority of career choices which were directed mainly towards surgical and medical specialties but not radiology [3-4]. Table I shows some demographic and workforce data collected by the PAN ARAB ASSOCIATION OF RADIOLOGICAL SOCIETIES (PAARS) which was recently founded in Beirut in September 2004, with the participation of eleven representatives of Arab radiological societies.

From the Departments of Radiology, ¹American University of Beirut Medical Center, and ²Centre Hospitalier Universitaire Hôtel-Dieu de France, Beirut, Lebanon.

Correspondence : *Maurice C. Haddad, MD. American University of Beirut Medical Center. Department of Diagnostic Radiology. P.O.Box 11-0236 Beirut. Lebanon.*

Tel : +961 3 720767 Fax : +961 1 743634

E-mail : *mh02@aub.edu.lb*

TABLE I
DEMOGRAPHIC AND WORKFORCE DATA OF ARAB RADIOLOGICAL SOCIETIES AND STATES

STATE	Society Year of foundation	Radiologists Number	Population in Million	Ratio # Radiologists/10 ⁶ Inhabitants
EGYPT	1949	600	60	10
TUNISIA	1952	250	10	25
LEBANON	1957	210	3.8	55
SUDAN	1970	200	30	7
MOROCCO	1978	450	30	15
JORDAN	1981	120	5	24
SYRIA	1994	400	17	24
BAHRAIN	1994	39	0.7	56
ALGERIA	1996	500	33	15
PALESTINE	1999	50	3.2	16
SAUDI ARABIA	2004	375	20	19
MAURITANIA	2004	11	2.5	5
U.A.E.	N/A	62*	2.378*	26
LIBYA	N/A	25	5	5
QATAR	N/A	25	0.7	36
KUWAIT	–	120	2.5	48
IRAQ	–	–	–	–
YEMEN	–	–	–	–
DJIBOUTI	–	–	–	–
SOMALIA	–	–	–	–
ERITREA	–	–	–	–
OMAN	–	–	–	–

– : No data available to the authors **N/A** : No society is available * : Data collected from ref. 5 in 1995 by N.M. Kronfol

From this data we realize the serious shortage of radiologists that affect all Arab states with some variability if we consider an acceptable world standard of 70 radiologists per million people [6-7]. For this reason, there was an influx of professionals migration in the early 1980s towards the Arabian Gulf countries where job opportunities were more available. In the early 1990s the drive towards training and employing local health personnel started in some countries, particularly Saudi Arabia, but according to the recent data from the RADIOLOGICAL SOCIETY OF SAUDI ARABIA (RSSA) the non-Saudi to Saudi radiologists ratio is still high, estimated at 2.86:1. However, there is still at least one Gulf country that relies exclusively on expatriates for radiological services. All these problems are compounded by the worldwide shortage of radiologists in the setting of rapid technical development and subspecialization. Unbalanced distribution of radiologists and clustering in major cities has led to the introduction of teleradiology services in 1994 to underserved areas, especially rural, with limited human resources in the United Arab Emirates, Kingdom of Saudi Arabia, Jordan and Lebanon with mixed success [8]. The teleradiology service which is relatively expensive was used primarily for subspecialized consul-

tations and videoconferencing over international telephone lines. It did not last long with the advent of the Internet that has largely replaced it in most countries with the possible exception of Saudi Arabia. Attempts at creating associations with international societies to further knowledge were started in 1990s. For example, associations with the SOCIÉTÉ FRANÇAISE DE RADIOLOGIE (SFR) established in 1999 and memberships with the INTERNATIONAL SOCIETY OF RADIOLOGY (ISR), were initiated namely with Mediterranean and North African francophone nations. Regional associations of radiologists such as the FÉDÉRATION MAGHRÉBINE DE RADIOLOGIE ET D'IMAGERIE MÉDICALE was founded in Tunis in 2003 comprising all North African Arab nations, and the GULF SOCIETY OF RADIOLOGY founded in Beirut in 2004 comprising all Gulf countries. Several Pan Arab societies for radiological subspecialties were also created like the MEDITERRANEAN AND AFRICAN SOCIETY OF ULTRASOUND (MASU) founded in the Greek Islands in 1986 and member of the WORLD FEDERATION OF ULTRASOUND IN MEDICINE AND BIOLOGY (WFUMB), the LIBYAN SOCIETY OF ULTRASOUND IN MEDICINE AND BIOLOGY (LSUMB) founded in the city of Misurata in 1991, the PAN ARAB NEURO-RADIOLOGY SOCIETY (PANRS) founded in 1994 in Beirut

in association with the WORLD FEDERATION OF NEURO-RADIOLOGICAL SOCIETIES (WFNRS), the AFRICAN-MIDDLE EAST ASSOCIATION OF RADIOLOGISTS founded in Cairo in 2001, the EGYPTIAN SOCIETY FOR WOMEN'S IMAGING AND HEALTHCARE founded in Cairo in 2005, and the PAN ARAB INTERVENTIONAL RADIOLOGY SOCIETY (PAIRS) founded in Dubai in 2006.

HEALTHCARE SYSTEMS AND EQUIPMENTS

Healthcare systems in the Arab world are varied, but in general are either government-subsidized or free healthcare systems [9]. There is an increasing number of privately insured patients and private health institutions [10], but only a small minority of self-payers.

In Lebanon for instance the private sector is growing because although governmental healthcare expenditure is quite high (representing 12.3% of the national gross domestic product [GDP] compared to a world middle-income-country average of 5.7%), yet the standard of medical care in the public sector is ranking 92, poorly on the overall health system performance ranking scale because of wastage of financial resources resulting in a coverage of less than 18% of the healthcare market. The radiology and laboratory billing proportion has remarkably increased in the past few years from 6-7% to 17-18% of the total hospital bills because of the increasing demand on radiology and laboratory services, particularly expensive cross-sectional imaging. These data and figures were recently published by the Lebanese Order of Physicians. Radiologists working in governmental hospitals are usually paid a monthly fixed salary, whereas those working in the private health institutions are reimbursed on the basis of fee-for-service according to a nomenclature for professional acts. Some specialists may work in both the public and private sectors.

From the technical resources viewpoint, data about the provision of equipment across the Arab world is lacking and much variation exists. Data from Lebanon (1 MR/125.000 inhabitants and 1 CT scan/45.000 inhabitants) show the number of radiology equipment available per number of population to be equivalent to or slightly exceed that of industrialized countries. However, the quality of imaging services is much inferior because of lack of evidence-based or standardized system, lack of accreditation and quality assurance or governmental control. In private health institutions or even clinics competition can lead to the purchase of the latest advanced and expensive technology, such as a 3 Tesla MR or a PET scanner, before they are acquired by academic teaching institution.

Reforms in the healthcare systems are taking place, even in oil producing countries where they are considering the option of relieving government budgets from healthcare financing through the adoption of user charges and private health insurance to individuals [11]. The health authorities in the future will have a new role of planner rather than direct provider of healthcare services [12].

RADIATION PROTECTION

Rising awareness among radiation workers about radiation hazards or concern and application of safety standards in radiology is noticeable. In this regard, several regional initiatives and meetings on radiation protection against ionizing radiation took place since 1994 with the latest effort in July 2005 at the Rafic Hariri University Hospital, in collaboration with the Lebanese Atomic Energy Center and the International Atomic Energy Agency (IAEA) which is a United Nations (UN) organization.

TRAINING AND QUALIFICATIONS

Radiology education in Lebanon started in 1925 with the opening of Institut de Radiologie at the Faculté Française de Médecine of Université Saint Joseph, it was pioneered by Dr. Lamarche. In 1934, Professor Chaumet inaugurated the first course in radiology and radiotherapy at the same institute in Hôtel-Dieu de France University Hospital. The second residency programme in radiology was established in 1950 in the Department of Diagnostic Radiology at the American University of Beirut Medical Center attracting candidates from the region. The residency programme was initially for two years then extended to 3 years, and to 4 years training programme in 1997 with a very comprehensive curriculum that covers all aspects of conventional and advanced diagnostic imaging and interventional radiology. Integrated radiology teaching was also introduced into the basic medical school curriculum for education of undergraduate medical students in the United Arab Emirates [13]. Radiology teaching and medical reports are done in different languages e.g. Arabic (Syria), French (North African francophone countries and Lebanon), and English in Lebanon and the remaining countries. Radiology residents obtain their national diplomas, certificates or fellowships, and then pursue higher education and qualifications in European and North American centers through links and affiliations with overseas universities. Accredited centers with the Royal College of Radiologists of United Kingdom and Ireland were established in 1973 in Lebanon, and in 1986 in Saudi Arabia and Kuwait, offering foreign qualifications prior to the uncoupling system adopted in 1995. The need for a unified qualification across the Arab countries led to the establishment of the Arab Board of Radiology by The Arab Board of Medical Specializations in Damascus in 2004 under the governance of the Arab League. Numerous radiology courses and conferences are offered by national societies, universities and teaching institutions [14]. The input and support of eminent immigrant Arab professors working in European and North American universities are of paramount importance in maintaining academic activities, particularly in these difficult times when scholars from the Western hemisphere are discouraged from traveling to the Middle

East for security reasons. The calendar for continuing medical education events is usually announced in local medical journals with little cooperation between the different countries in the region.

The only radiology journal that the authors know about is the bi-quarterly *Egyptian Journal of Radiology and Nuclear Medicine* which is not an indexed journal. Publication of radiological articles is limited, the majority of articles represent clinically oriented research directed to international journals for recognition and promotion purposes rather than pure funded research. Arabs produce less than 1% of the biomedical citations in the world [15].

DISEASES AND SCREENING

There has been a decline in the incidence of most infectious/parasitic diseases and malnutrition. However, with the modernization and improvement in living conditions, traumatic – particularly road traffic accidents –, cardiovascular diseases and hypertension, obesity and hypercholesterolemia, diabetes, and cancer are on the rise [16-17]. Disease prevention is limited to vaccination programmes, while trends are towards curative rather than preventive medicine for other diseases. There are no national screening programmes for early detection of breast cancer and others in the majority of countries. Cancer databases from the Arab world have shown that breast cancer is the most common cancer in Arabic women and presents at a younger age than in women of Western countries, this has led oncologists to recommend breast cancer screening starting at the age of 40 years. Only breast and prostate cancers awareness campaigns or studies are conducted for a short period of time [18]. In a survey conducted in the United Arab Emirates women lacked adequate knowledge about breast cancer screening, and only 10.3% of women had mammography screening examination on a yearly basis [19].

THE FUTURE OF RADIOLOGY

The Arab world is rich in natural and human resources but has suffered for a long time from many devastating wars and sanctions that have hindered development and frustrated its people including radiologists. Major problems and challenges in health development remain to be addressed through thoughtful and appropriate planning and healthcare management. Radiology reflects the standard of medical care and one way to move forward is by increasing inter-Arab cooperation, the most likely giant step towards change [20].

CONCLUSIONS

We have tried our best to collect demographic data from all parts of the Arab world. However, the collection of information from Iraq, Yemen, Oman, Somalia, Eritrea and Djibouti was not possible despite an exten-

sive effort to establish direct contacts and a search of the literature.

The authors wish this first world report on Arab radiology with all its shortcomings to be a position paper for the Arab radiologists, junior and senior, and other health workers to strengthen their links and efforts towards improving the provision and standard of radiological care and training.

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