

INTRODUCTION

THIS paper deals with the history and development of radiology services on the island, taking into consideration that these services had been and are still concentrated in the various sections/departments of the Ministry of Health. Information to availability of such services in the earlier years, particularly in the 40s, was not obtainable.

HISTORICAL PERSPECTIVE

1. 'X-ray' facilities have been available on the island at least since the 50s, if not, since the early 1940s.
2. Up till November 1975, urological studies, gastro-intestinal investigations by barium, plain tomography, and other special procedures for Salmania Hospital patients were all carried out in the Radiology Department of Naim Health Centre (two diagnostic rooms : for general Bucky work and fluoroscopy). The Radiology Department of Salmania Hospital before then (November 1975) was just not equipped to do this work as it had been made up of only one general room, supported by a mobile machine and several low powered portable machines. This was a great disadvantage for the in-patients of Salmania Hospital, and the many attendants of the Accident and Emergency Department, some of whom were victims of road traffic accidents. The efforts started in 1974 to expand the facilities at the Radiology Department of Salmania Hospital materialised in November 1975, when the facilities gained a new quality. For the first time in Bahrain, image intensification with television monitoring, and image recording on 70-mm films were possible. It was now possible to perform dynamic

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studies utilizing 6-frames per second. This resulted in the transfer of emphasis for radiological studies from Naim Health Centre to Salmania Hospital, and consequently the gradual decline of the Department at N.H.C. as a major department.

3. In 1976, the ageing Siemen's room in Salmania Hospital was renovated and converted into a twin X-ray diagnostic room, including facilities for mammography, one side of which fitted with a Bucky table equipped to do linear tomography (the Multix table).
4. Mass Chest X-ray Unit with a 70-mm camera was acquired by us in 1977, and has been used exclusively for "patients" from Medical Commission. It was first housed in N.H.C. and later moved to a near permanent location nearby the X-ray Department in Salmania Hospital.
5. In December 1978, we moved over to the new Salmania Medical Centre adding to our existing facilities six X-ray diagnostic rooms with added facilities to do the following :

1. thin section tomography
2. cervical myelography (90/90° table)

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3. biplane angiography
4. bipedal lymphangiography (using injector driven by electric power)
5. arthrography
6. In May 1980, a general purpose grey scale ultrasound B-scanner with "multiformat" for image recording was acquired by us.
7. Prior to the summer of 1974, all film processing had been manual. Starting August 1974, automatic film processing had become a reality and now all departments are equipped with automatic processors.

MANPOWER

- 8.1 The mid sixties had seen the emergence of trained radiographers; initially recruits from the "on the job training programme", but later Bahraini radiographers qualified in Cairo and Baghdad, and later at the American University of Beirut Medical Centre were recruited by the Ministry of Health. The College of Health Sciences has taken over the training of medical radiographers, when it opened in April 1976.
- 8.2 At the same time (the sixties), there was enough justification to recruit a full time radiologist. By 1975 the Ministry of Health had two full time radiologists. The force was increased to three (1978), and in January 1980, the number of radiologists was brought up to "four".

STATISTICS :

Annual Figures for Radiological Investigations, Radiology Department, Ministry of Health

Year	Total No. of Pts. (Xrays)	S.M.C.	C.M.H.	Chest Dis. Hosp.	N.H.C.
1975	—	18792	1105	—	18855
1976	98183 (98606)	56202	2045	3825	36111
1977	—	69753	2045	—	—
1978	73201 (82076) 87761 (Including patients from the medical commission — pre-employment chest X-rays)	48915	2839	2180	28142
1979	74542 (87587) 96414 (109459) — (Including 21872 patients from the medical commission)	56407	3604	3115	10754
1980				

P.S. It was not possible to collect authenticated data prior to the year 1975.

STATISTICAL ANALYSIS

(Analysis of the annual figures for radiological investigations)

1. General

1.1. The demand on X-ray facilities shows an upward swing. The big jump was in 1976, when major departments (then) of N.H.C. and Salmania Hospital showed a double and triple utilization respectively, when compared with the previous year, 1975.

1.2 Thereafter the increase has remained stable at an average of 5-10 % annually.

1.3. Only in 1980, did we study film usage per patient, and the figure obtained was 2.27 films/patient. European and American Hospitals have a similar average.

2. Departmental

1.1. Central Maternity Hospital — Muharraq.

The initial annual figure of 1105 examination (1975) almost doubled in the following year, and thereafter the annual increase seemed to be on a steady decline from 85 % (1976) to projected 33 % (1980). The newly opened S.M.C. is the main factor in this decline adding to the frequent breakdowns of the machine in this Department.

2.2. Chest Disease Hospital

Part of the facility is utilized by the psychiatric unit, and this will explain why only 92% of the xrays taken there (1979) are of the Chest. The X-ray

department was closed for 14 weeks during 1978 to install a new unit replacing the old one accounting for the relatively low figure for this year. The new facilities at the Salmania Medical Centre may explain the relatively low projected figure for 1980.

2.3. Naim Health Centre (N.H.C.)

In 1976, the load on this department almost doubled. However, the apparent decline in X-ray utilization in the later years can be explained by the introduction of mass chest X-ray for patients from the Medical Commission utilizing 70-mm filming, and thus the figure excludes Medical Commission patients.

Thereafter, (1979) patients from the Health Centres, and previously all referred to the X-ray department in N.H.C. were redistributed to be partly absorbed by the X-ray department in the old building of Salmania Hospital.

2.4. *Salmania Medical Centre (S.M.C.)*

2.4.1. Has always had the major share in utilization of radiological services.

2.4.2. The annual figure of below 20,000 patients for 1975 tripled in 1976.

2.4.3. The apparent 'low' figure in 1978 is due to major machine breakdown putting out of function 1/3 of the total facility — over several months.

2.4.4. The projected figure for 1980 is 60-72,000, an increase of 7-27 % with an average of 17%.

The Radiological Services

These exist at two levels :

1. The health centres' level (Family Practice, Primary Health Care set-up).
2. Hospital (Salmania Medical Centre, Central Maternity Hospital, and Chest Diseases Hospital).

A. Health Centres Level

1. all doctors of H.C. level can request 'X-ray' for their patients.
2. X-rays requested by H.C. doctors are limited to :
 - a. plain radiography
 - b. *special procedures* — namely

intravenous pyelogram (I.V.P./Excretory Urography),

Barium Studies : Barium Swallow, Barium Meal (U.G.I. Series); and Oral Cholecystography (OCG).

3. *Plain radiography* for H.C. patients are carried out at :
 - a. The Health Centre where X-ray facilities exist (eg H.C. category A).
 - b. the geographically nearest H.C. with X-ray facilities provided it was designated to receive these particular patients.

4. *Special Procedures*: (O.C.G.S., I.V.Ps, Barium Studies). These are carried out in the central department/pool (at present Radiology Department old building, Salmania Hospital) on appointment basis as such investigations :

1. require a radiologist to perform the examination
2. require sophisticated machinery (eg. T.V. monitoring, tomographic attachment), which is too expensive to be allocated in more than one area.
3. require usage of contrast media (barium, iodinated contrast media).
4. are usually lengthy.
5. All X-rays taken at H.C. level are read by a radiologist, except on emergency basis, when the physician-in-charge does the initial reading.
6. All reading of X-rays are done in the central/pool department.
7. Reports in three copies are made available. One copy to stay in the X-ray department, one in the X-ray envelope, and one to be

included in the patient's chart.

8. A dual system for filing of X-rays exists at present, but in future, patients will have their X-rays filed along with their charts.
9. While in the past, patients were sent to the Radiology Department to collect their X-rays and results, this is no longer the practice, and has been so far more than four years. Films reports are sent directly to the H.C. from which the X-ray requisition had been initiated.

Radiology Services at The Salmania Medical Centre :

1. The department has six diagnostic rooms, one of which is a twin room, with facilities equipped to do all general plain radiography, all investigation requiring fluoroscopy utilizing 70-mm camera at 1-6 plates/second, tomography including elleptical, hypocys-loidal and small circle tomography, cervical myelography and biplane angiographic techniques. Lately, gray scale sonographic service had been introduced (June 1980). In addition, II T.V. monitoring is available for theatre use.
2. The department is staffed by four radiologists supported by 59 radiographers, 7 dark-room technicians, 9 clerks and three medical secretaries. In addition, twelve 2nd year, students of the Associated Degree Medical Radiography Programme, College of Health Sciences.
3. *Duty Coverage* : 24-hours technical coverage — seven days a week, all year round.
Radiologists Coverage : full staff during working hours; radiologist-on call outside working hours.

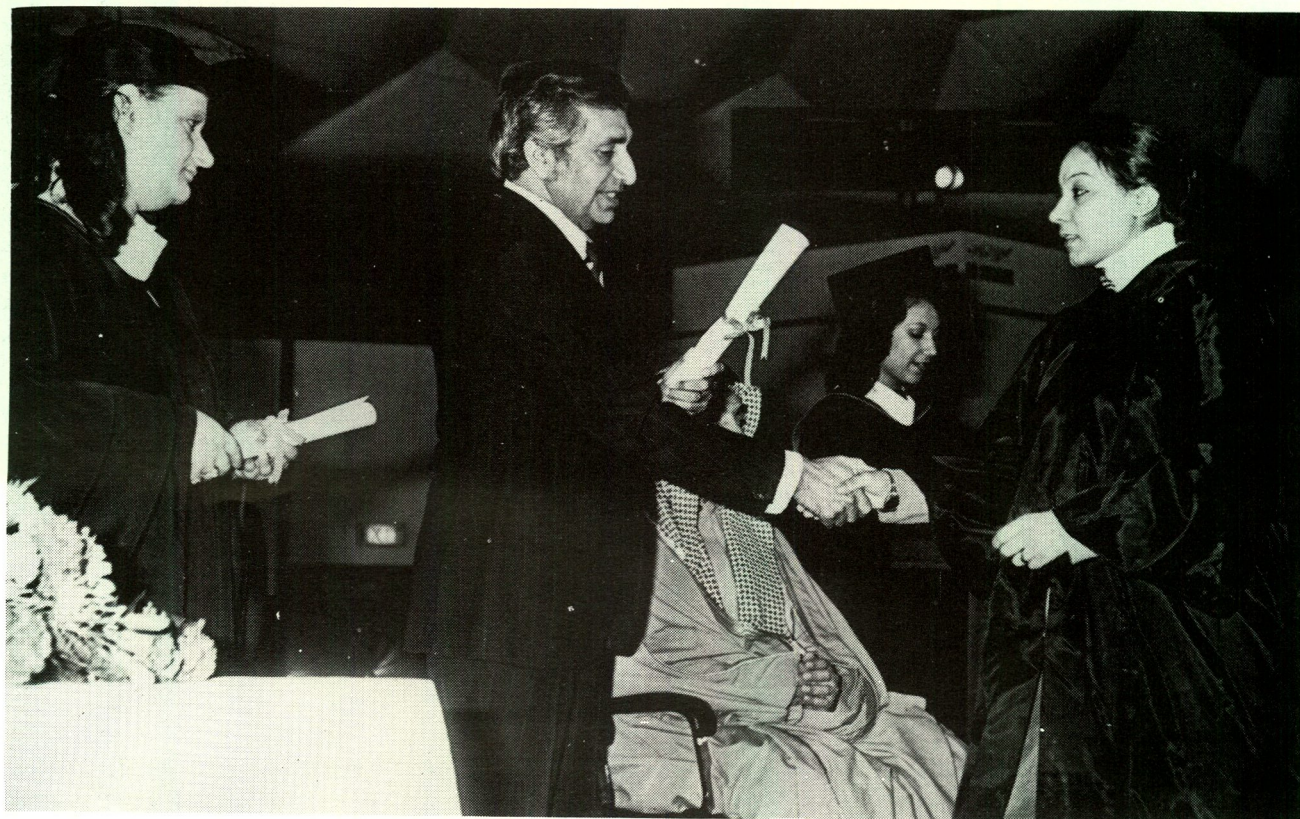
4. Ideally, all X-rays should be read by a radiologist with a typed report available within 24-hours. However, this is not possible at the present, mainly for reason of shortage of staff (medical and supportive staff). The report is in three copies : one copy is filed in the X-ray department, the 2nd copy is in the X-ray envelope; and the 3rd for inclusion in the patient's chart.

Training and Teaching File/Library :

1. Scheduled teaching activities were introduced in late 1979. These have already expanded, and in some areas have become a regular feature (Radiology Conference, Monday morning level 5). Intake of 'summer' medical students is now well established. The department is also involved in training of doctors in the Family Practice Residency Programme, on rotational basis.
2. The X-ray museum is now better organized and classified, and has been found extremely useful in teaching of doctors, from the Family Practice Residency Programme.
3. The department library contains medical literature, relevant to the practice of radiology, but an extensive radiological literature does exist in the main Shaikhan Al-Farsi Library of Health Sciences.
4. The Radiology Department at S.M.C. is the natural training ground for the A.D. student radiographers from the College of Health Sciences.

Future Plans

1. Expansion of academic activities towards establishment of speciality conferences, (eg. uro-radiology, G.I. radiology), regular tutorials for post and under-graduate medical students, and training of radiologists.
2. Expansion of the radiology museum.
3. Introduction of Daylight System for film processing.
4. Study feasibility of introduction of nuclear medicine, and computed tomography, when the Department is expanded (as planned) to double its present size. □□



279 Graduates of the College of Health Sciences received their Graduation Certificates for the years 1979 and 1980