Medical Education in the Sudan

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The purpose of this paper is to relate the history and development of medical education in the Republic of the Sudan, its present position and possibilities for future development. In recent years this topic has attracted the attention of various authors and organizations (1-6); both the Sudan Medical Association and the Medical Students Society of the Faculty of Medicine in Khartoum have held conferences and seminars on various aspects of the subject.

THE COUNTRY AND THE PEOPLE

The Republic of the Sudan is situated just south of the United Arab Republic and east of Ethiopia in Northeast Africa. It has a population of about 12 million inhabitants scattered over an approximate area of 1 million square miles (7). The capital of the Sudan is made up of 3 towns—Khartoum at the junction of the Blue and White Niles, Omdurman to the west of the Nile, and Khartoum North to the east of the Nile. The towns are connected with one another by bridges across the rivers.

The Nile River provides some means of transportation, but its course is interrupted by cataracts and rapids. The roads in most of the country are poor and the railway service is limited. There are many areas in the Sudan which may become inaccessible during the rainy season. Apart from the main cities and certain centers, water for drinking and domestic purposes is drawn directly from the Nile, pools of rainwater, or shallow wells without any treatment (8).

The standard of sanitation, compared to neighboring countries, is high and the general population is fairly healthy. Nutritional diseases are not common; endemic diseases include enteric fevers, malaria, schistosomiasis, tuberculosis, dysenteries, kala azar, and some helmenthic infections. Epidemics of smallpox, infective hepatitis, cerebrospinal meningitis, and yellow fever may occur from time to time (9). The Sudan is fortunate in that there have been no cases of epidemic typhus, plague, or cholera in the last seventy-five years.

The majority of the people in the northern, central, and western areas of the Sudan are Arab and most of them are Moslem. In the south the people are Nilotic. Many of the tribes in the western and eastern parts of the country still lead a nomadic life and thus require a special type of health care.

THE MEDICAL SCHOOL

The proposal to establish a medical school in Khartoum was put forward by Lord Kitchener (Governor General of the Sudan, 1898-99) on the occasion of his last visit to the Sudan in the summer of 1914. However, the outbreak of war in August, 1914 put an end to any immediate development of plans for such a school. It was not until 1916, when the news of Lord Kitchener's death at sea reached the Sudan, that it was decided to follow up on the proposal. The idea of establishing a medical school appealed very strongly to the people of the Sudan, who had great respect for medicine and were anxious that their young men be trained as doctors. Therefore, it was decided that the medical school should be

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built and that it should stand as a memorial to Lord Kitchener (10).

Construction on the Kitchener School of Medicine began in May, 1922 and the School was opened on February 29, 1924. The Khartoum Civil Hospital, which had been in operation since 1908, became the major teaching hospital for the School. The students were housed in hostels adjacent to the School.

The Kitchener School of Medicine is the second medical school with a comprehensive syllabus to be established in Northern Africa. The first was Kasr-El-Aini Medical School, which was opened in 1825 in Cairo, Egypt (11).

The objectives laid down for the Kitchener School (12) were the following:

1. To build up a cadre of Sudanese doctors who would be in a particularly favorable position to combat the epidemic and endemic diseases that were wasting and debilitating the population of the country and preventing its natural increase.

2. To afford an opportunity to educated Sudanese to take part in the development of their country.

3. To provide postgraduate courses for doctors trained at the School and to provide opportunities for special study and research.

Initially, the course of training covered four years; in 1934 it was extended to five years, and in 1939 to six years. The classes were small; the enrollment quota was limited to 10 students a year until 1938. For a number of reasons, no students were enrolled in the years 1926, 1937, 1941, 1945, and 1947. Applicants to the Kitchener School of Medicine were the top graduates of the Gordon Memorial College, a school established in 1902 in honor of Charles Gordon, Governor General of the Sudan in 1884-85. The college started as an elementary school and later became a secondary school.

All the School of Medicine faculty were government officials either from the Sudan Medical Services or the Wellcome Tropical Medical Research Laboratories, and the courses were taught in English. One doctor was appointed by the Medical Service both to act as Registrar (in later years called Dean) and to teach anatomy and physiology.

TABLE 1

NUMBER OF STUDENTS ENTERED AND GRADUATED, 1951-1966

Year	No. Entered	No. Graduated
1951	14	....
1952	24	10
1953	23	6
1954	23	12
1955	30	2
1956	28	14
1957	26	12
1958	30	19
1959	32	18
1960	38	22
1961	40	26
1962	50	22
1963	52	32
1964	60	27
1965	61	34
1966	64	37
Total	789	399

In September, 1951 the School of Medicine and the Gordon Memorial College were amalgamated into the University College of Khartoum and the School officially became a Faculty of Medicine in the University College. In the twenty-seven years of its separate existence, 106 Sudanese, 2 of whom were women, graduated from the School. During this same period, a total of 194 students entered the School.

Table 1 shows the number of students who entered and who graduated from the School each year from 1951 to 1966. The annual enrollment rose sharply in 1952, reached 30 by 1955, and was as high as 64 in 1966. During 1964-65, there were 59 students in the second-year class,* 56

* For the first year of study the students are enrolled in the Faculty of Science.

in the third, 46 in the fourth, 38 in the fifth, and 38 in the sixth. The enrollment figures for 1965-66 for the respective classes were 61, 64, 46, 45, and 39. Eighteen of the total student population in 1965-66 were women.

RELATION OF THE SCHOOL TO THE INTERNATIONAL MEDICAL COMMUNITY

From the start it was intended that the School should be a part of the international medical community. Competent assessors, including professors from the Cairo Medical School and distinguished members of the profession from London teaching hospitals, were invited to view the examination procedure, to inspect the various departments of the School, and to offer criticism and advice. In 1938 the Committee of Management of the Conjoint Board of the Royal Colleges of England appointed Sir Alfred Webb-Johnson (later Lord Webb-Johnson), President of the Royal College of Surgeons, to act as Visitor to the School. The School was approved by the Conjoint Board for the period of one year (this approval being subject to review each year), and its graduates were declared eligible to take the examinations for the several diplomas granted jointly by the Royal Colleges. After that date, Visitors were appointed annually by the Committee of Management. Many of the graduates of the School have since obtained memberships or fellowships in these Colleges; others have obtained postgraduate diplomas granted by the University of London.

In 1960 the Royal College of Surgeons of England recognized Khartoum as an examination center for the primary examination for membership in the Royal College of Surgeons. Since that time, many candidates have passed their primary examinations in Khartoum and later taken the final examination in England.

In October, 1964 the Council of the Royal College of Obstetricians and Gynecologists of England recognized appointments at Khartoum Civil Hospital, the major teaching hospital of the Faculty of Medicine, as fulfilling one year's training requirement for membership in the College. Since that date, 3 of the graduates of the Khartoum Faculty of Medicine have obtained their M.R.C.O.G. degree.

The School has strong connections with various educational and research centers in Europe and Africa, for example, the Orthopedic Center at Oxford, and the London School of Hygiene and Tropical Medicine. The School is a member of the Association of Medical Schools in Africa, which was established in 1965; the Secretary of the Association for 1965-66 and for 1966-67 is a staff member of the Khartoum Faculty of Medicine.

FACULTY OF MEDICINE

At the time the School of Medicine was incorporated into the University College of Khartoum in 1951, it was decided to establish full-time chairs in the preclinical departments and in medicine, surgery, gynecology, pathology, and public health. This decision was implemented in 1952 (13). In 1956 the Sudan became an independent republic and the University of Khartoum was established with 8 faculties under a vice-chancellor. In 1959 the combined degree of bachelor in medicine and surgery (M.B., B.S.) was conferred for the first time instead of the diploma of the Kitchener School of Medicine (D.K.S.M.). Also in 1959, new facilities were opened at the Khartoum Civil Hospital. The additions to the old hospital increased its capacity by 700 beds, making a total of 1,000 beds, most of which are available for teaching. Two other hospitals, the Omdurman and Khartoum North Hospitals, are also used for teaching, but not to the same extent as the Khartoum Civil Hospital.

TABLE 2

NUMBER OF FULL-TIME STAFF, 1965-66

Department	Professor	Reader	Senior Lecturer	Lecturer	Research Assistant	Total
Anatomy	1	....	1	2	3	7
Physiology	2*	....	1	2	2	7
Biochemistry	1	....	1	2	3	7
Bacteriology and Parasitology	1	....	....	4	3	8
Pathology	1	1	1	2	6	11
Social and Preventive Medicine	....	....	1	4	....	5
Medicine	2	....	....	....	5	7
Surgery	1	....	2	7	4	14
Obstetrics and Gynecology	1	....	1	3	2	7

* Visiting professors.

The number of full-time academic staff during the 1965-66 session is shown in Table 2. The full-time staff is augmented by 17 part-time teachers and 14 full-time technicians.

COURSE OF STUDY

The curriculum is patterned after the curriculum of the British schools of medicine with some bias toward tropical medicine and hygiene. Special attention is also given to social and preventive medicine.

Students are selected from those who have completed one year of biology in the Faculty of Science. The students spend two preclinical years (the second and third years) studying anatomy (including embryology and histology), physiology, and biochemistry. During the second year, the students are assessed by class examinations and those who do not do well are not promoted to the next year. At the end of the third year, the students are examined and only those who pass the examinations in all 3 subjects are permitted to proceed to the fourth year. Those who fail in 1 subject are usually allowed to take the examination again after three months. Those who fail in 2 or more subjects are required to repeat the entire year. No student may spend more than three years in the preclinical period. The second M.B. examination is given at the end of the preclinical period, and this is considered to be the appropriate time for eliminating those who are not likely to successfully graduate from medical school.

The clinical period consists of three years—the fourth, fifth, and sixth years. In the fourth year students study bacteriology, including parasitology, mycology, and virology; pharmacology; dispensing; medical entomology; and general pathology. In addition, they spend the first term of the year (nine weeks) studying introductory medicine and surgery; the other two terms are spent clerking and dressing on the wards. In the fifth year they study special pathology, social and preventive medicine, forensic medicine, medicine, surgery, pediatrics, and obstetrics. In the final year they cover medicine, including psychiatry, dermatology, and venereal diseases; surgery, including ophthalmology and orthopedics; and gynecology, including antenatal care and child health.

Teaching methods consist of lectures, seminars, tutorial sessions, and laboratory instruction. Clinical instruction is

carried on by means of ward rounds, clerking, dressing, and outpatient work.

From time to time experts are invited from abroad to spend a few weeks lecturing on their specialties. Medical students from schools outside the Sudan are welcome to spend their elective periods in Khartoum. In 1965, 2 students from the Middlesex Hospital Medical School in England spent two months at the Faculty of Medicine, living with the undergraduate students in the hostels and attending lectures, ward rounds, and other activities of the School.

Those who complete the course successfully and pass their final examinations in the 3 subjects—medicine, surgery, and obstetrics and gynecology—graduate with the M.B., B.S. degree from the University of Khartoum. The final examination is supervised by a Visitor appointed by the Committee of Management of the Examining Board of the Royal College of Physicians of London and the Royal College of Surgeons of England. The examination in each subject is conducted by an external examiner and examiners from the Faculty of Medicine.

INTERNSHIP

After passing their final examination and obtaining their M.B., B.S. degree, the graduates are required to spend one year of internship in one of the 3 teaching hospitals. The period of internship was formerly two years; but because of the great need for doctors to work in the provinces, it was reduced to one year, which is spent as follows: three months in general medicine, three months in general surgery, three months in obstetrics and gynecology, and the last three months in ophthalmology, psychiatry, chest diseases, E.N.T., pediatrics, or anesthesia.

During this period, the interns work in groups under the professors of the Faculty of Medicine or the consultants of the Ministry of Health. Their work is closely supervised, and they have the benefit of constant aid and advice from their senior colleagues. They also work in the outpatient and casualty departments and take night duties.

POSTGRADUATE TRAINING

As noted earlier, when the Kitchener School was established, one of the objectives was to provide postgraduate training and facilities for research for its graduates. There is still much to be done in this area. At present only the following postgraduate facilities and programs are in operation:

1. A course is offered for the Diploma of Gynecology and Obstetrics, Khartoum (D.G.O.K.). The standard of this three-year program is comparable to that required for membership in the Royal College of Obstetricians and Gynecologists, England. A total of 14 graduates have obtained this diploma.

2. Instruction in anatomy, physiology, and pathology is provided for graduates who wish to take the Primary F.R.C.S. Examination in Khartoum. The course extends over six months. As of 1966, 31 candidates had passed their Primary Examination in Khartoum. Of these, 12 have already received the final diploma in England. In addition to the Sudanese graduates, candidates also come from neighboring countries, such as Uganda, Kenya, Ethiopia, and Aden, to take this examination.

3. Instruction is also provided to help graduates who wish to take the examination for membership in the Royal College of Physicians of London as well as for graduates working for the University of Khartoum postgraduate degrees (M.D.) in internal medicine, pathology, obstetrics and gynecology, and public health, or Ph.D. degrees in the basic sciences.

FINANCING

As has been noted, the Faculty of Medicine is a part of the University of Khartoum, which is a corporate body with its own independent budget. For the year 1965-66 the University revenue consisted of LS.75,000 ($210,000) from private income and LS.2,577,765 ($7,217,742) as a government grant-in-aid.

The budget of the Faculty of Medicine for the same year was as follows: personnel—LS.207,550 ($581,140); laboratory supplies—LS.13,400 ($37,520); and new expenditure—LS.10,832 ($30,330). The total for the year was LS.231,782 ($648,990). With a student population of 255 for that year, the teaching cost per student was just under LS.1,000 ($2,800). All hospital expenses are borne by the Ministry of Health and not included here.

The expenses for full board and lodging per student in a hostel was LS.120 ($336) per year. To this must be added the small bursaries which are given to almost all students to cover incidental expenses and the cost of railway or air transportation to and from home which is provided for students at vacation time.

According to information obtained from the Financial Controller of the Medical School, there are other expenses incurred by the University administration on behalf of the medical students (such as class tours, educational visits to the provinces or neighboring countries, and various social and athletic activities of the student societies) which are not accounted for by these figures.

FUTURE NEEDS

The Republic of the Sudan has only about 400 qualified medical men and women at present. Some of these doctors received their degrees from the former Kitchener School of Medicine, some from the Faculty of Medicine of the University of Khartoum, and some from medical schools abroad. The physician-population ratio in the centers where the doctors tend to concentrate is adequate, but in the country as a whole the ratio is about 1 to 35,000. Wilson and McDonald (14) writing on medical education in the Middle East in 1961 stated that "the doctor deficit varies greatly from country to country and is especially marked in the Sudan and the Arabian Peninsula where the physician-population ratios are 1:38,000 and 1:30,000 respectively."

The current ratio is far from that prevailing in Europe or the United States (approximately 1 to 1,000). Clearly, the country cannot at present afford to employ the 11,600 expatriate doctors that would be needed to reach that ratio; and even to reach the modest ratio of 1 to 10,000, 800 more doctors would be required. At the same time, the country cannot afford to limp along with its present medical manpower pool.

The present outlook for production of doctors in the Sudan is not very favorable. The student population of the Faculty of Medicine now numbers 255, and there are about 200 Sudanese students studying medicine in various medical schools abroad. It is expected that in 1968, 45 students will graduate from the Faculty of Medicine and that from 1969 to 1971, 55 students will graduate each year. Thus, it is clear that at its present pace the Faculty of Medicine will not be able to satisfy the future requirements of the country.

The logical solution is to expand the medical school so that it can admit an adequate number of students. Before this step can be taken, however, a number of factors must be considered. First is the question of whether or not there will be enough students from the secondary schools who will be qualified to enter medical school. Professor El Nazeer Dafalla, Vice-Chancellor of the Uni-

versity College of Khartoum, in a recent unpublished report to the Council of the University of Khartoum about the future of higher education in the Sudan indicated that this would not be a problem. He estimated that from 1968-1974 approximately 950 students will enroll in the University of Khartoum annually while the number of graduates from secondary schools who are eligible for a university education will rise from 1,713 in 1968 to 2,744 in 1974.

Another essential point to be considered is the number of the teaching staff available. It must be remembered that a key point in medical education is the relationship between students and teachers and that an effective interaction requires an adequate number of faculty. When the School started, the majority of the teaching staff were expatriates; but the University administration adopted a wise policy of training Sudanese for the teaching posts. At the present time 5 out of the 9 heads of departments are Sudanese, as are 50 of the 73 members of the academic staff. There are about 30 scholars and fellows studying for higher diplomas abroad. This is an important step forward not only because of its financial implications but because it is sometimes extremely difficult to recruit and maintain suitably qualified expatriate staff.

The third factor which has to be considered in planning a program expansion is the parallel expansion in housing, teaching facilities, and equipment that will be required.

At the present time these factors are under very serious consideration by both the University authorities and the Ministry of Health. The intention is that the number of students admitted annually should be expanded so that the School will graduate about 120 doctors per year. It is hoped that this increase in the number of graduates will come nearer to meeting the requirements of the country.

Although progress may seem slow, the trend of ideas is nevertheless encouraging.

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