Sudan Cardiology

Siddiq Ibrahim Khalil

Professor of Medicine, University of Medical Science and Technology, Khartoum, Sudan

Background

Medical care was provided by native healers throughout the centuries until the early nineteen century when the Turkish rule introduced western medicine to Sudan. The early doctors were Europeans who were recruited into the Turkish army. They had small hospitals in the garrison towns like Khartoum, Berber, Medani and El Obied. Their medical service was provided only to the soldiers and their families. Later after 1870 Khartoum Hospital provided better service and improvement in sanitation was noticeable.

Following the fall of Khartoum to the Mahdist army and during the rule of Mahdia few of the doctors and nuns remained and worked at the only hospital at Bait Al Mal. Dr Naom Al Atrash was in charge of that hospital. Dr Hussien Zaki an Egyptian doctor who worked in Omdurman during this era provided medical care the Mahdi during his last illness.

The greatest advance in medical service and the introduction of modern medicine came with the Anglo-Egyptian Condominium which started on 19/1/1899. The building of the first college in Sudan, Gordon Memorial College, started in February 1899 and the opening reception was on November 1902 attended by Lord Kitchener (Figure 1). In 1951 the college was officially incorporated in Khartoum University College and in 1956 following independence as the University of Khartoum (UK). The main purpose and policy of the British rulers towards medical care may be inferred from the statement of Sir Reginald

Figure 1: Opening reception of Gordon Memorial College in Khartoum. In 1956 the college became the University of Khartoum.

Figure 2: Khartoum Civil Hospital opened (1909). Presently housing Sudan Medical Specialization Board which offers Cardiology Fellowship.

Figure 3: Kitchener School of Medicine (1924) now Faculty of Medicine, University of Khartoum

Figure 4: Photograph of the first coronary care in Sudan (1984), the patient shown recovered from ventricular fibrillation by the first time use of the defibrillator at the front of the photo.

* Corresponding author. E-mail: psiddiq@gmail.com
Wingate Governor General of Sudan (1899-1916): “I believe that the pacification and contentment of these primitive people can be obtained more effectively by medical aid than by any other means.”

That policy was zealously followed during the British Military Rule. The medical corps of Kitchener army provided medical care in field hospitals and some of the houses in Omdurman and later in the rest of Sudan with the prime objective of pacification of people by medical care.

The first British hospital in Sudan was that at Wadi Haifa (1896) which catered for the health of Kitchener invading army. The medical service at its infancy was composed of only Military doctors of the British Army and by 1900 small civil hospitals were erected in Omdurman, Khartoum, Atbara, Berber, Dongola and Port Sudan. The medical services were carried out by carefully selected army officers who really proved their worth both in vocation and administration.

The first three civilian doctors who arrived in Sudan in 1901 were Dr EA Gates, Dr Web Jones and Dr ES Crispen. Nurse Pye Moore arrived in 1907 and should be remembered as the first nurse in Sudan and the first matron of Khartoum Civil Hospital (KCh). She retired unwillingly in 1930s. KCh was opened in 1909 (Figure 2) and among the physicians who worked there was Dr Christopherson who was the first to use antimonial for the treatment of Schistosomiasis. The hospital is now more than 100 years old and is presently housing the Sudan Medical Specialization Board which trains and accredits all medical specialties including the fellowship of cardiology.

Three major events had impacted education and health during the early decades of the Condominium: The opening of Gordon Memorial College in 1902, Wellcome Research Laboratory in 1903 and the Kitchener School of Medicine (KSM) in 1924. The three institutions have contributed immensely to the foundations of medicine with its different specialties, training and also research.

KSM was the first medical school in Sudan (Figure 3). The first batch of students (7 students) were selected in 1924 and graduated in 1928. Since its inception the medical school has graduated most of the doctors who worked in Sudan, but during the last 20 years more than 25 universities have been inaugurated and are now graduating doctors, dentists and pharmacists.

**Cardiovascular disease in Sudan**

Cardiovascular (CV) disease was rare in Sudan during the early twentieth century. Dr Bousfield who worked in Sudan during that era wrote in 1908:

“The main diseases in Sudan were malaria and dysentery, there was, however a striking absence of some diseases encountered at home (England). I have never seen a case of scarlet fever. Rheumatic fever was rare and as a corollary there were very few cases of heart disease except those of syphilitic origin.”

Syphilis continued to dominate CV disease until the thirties of the last century when Halim reported in 1937 that it accounted for 80% of CV disease admissions in Khartoum Hospital. Halim was the first Sudanese cardiologist who graduated in 1932 and was elected member of the Royal College of Physicians in 1948. Following the advent of Penicillin syphilis dropped to 5% by 1961. Syphilis is a disease with wide spectrum of clinical presentations and those who were medical students in the sixties of the last century can well remember the dictum: know syphilis and you know medicine. Cardiovascular syphilis presents as aortitis involving the ascending aorta and resulting in aortic regurgitation, angina pectoris and aortic aneurysm that may rupture even as a result of emotional distress. As medical students we have seen few cases of pure aortic regurgitation and the rule those days was to check the Wassermann, the test
for syphilis for patient with aortic regurgitation. It is pertinent to report the comment of John Hunter (1728-1793), the great British surgeon and anatomist who had contaminated himself with syphilis in his laboratory and later developed huge aortic aneurysm: “I am under the mercy of a fool who makes me angry”

The first report of rheumatic heart disease (RHD) in Sudan came in the paper by halim in 1937 when he reported mitral stenosis as forming 5% of cardiovascular disease admissions3. there had been gradual increase in the prevalence of rhd reaching 12% in 1945, 25% in 1960, and 34% in 1984.

In 1986-1989 WHO launched a global rheumatic fever/rheumatic heart disease (rF/rhd) prevention program with objectives of detecting the prevalence and initiating prophylaxis with Benzathine Penicillin for primary school children at the target age of 7-15 years. the study was carried out in Sahafa Town during which 13,332 children were screened and prophylaxis initiated for susceptible cases. rF prevalence rate was found as 10.4/1000 and penicillin coverage was measured as reaching 30-72%. the study had also provided a prevalence rate for congenital heart disease reaching 2% of school children.

A similar study was carried out as who rF/rhd phase II during 1998-1996. the target population was primary school children. the study showed a ten-fold reduction in the prevalence of rF/rhd.

The burden of rF/rhd was immense especially during the seventies and eighties and with morbidity and mortality that had affected many children and adults in the prime of their lives. Hospital resources were also over-stretched with chronic valvular disease admissions. Multivalvular disease was specially a difficult surgical problem and has contributed to nearly 25 % of the total admission of RHD (Table 1).

The prevalence of hypertension in Sub-Saharan Africa was reported as 8-25%. In Sudan hypertension is the most common cause of cardiovascular disease and acts as major risk factor for stroke and coronary heart disease (CHD). At the level of population studies hypertension constituted 7.5% , and 6.6% among university students . At autopsy level hypertension was found to be the commonest cardiac pathology . A hospital based studies have shown that hypertension is the commonest cardiovascular disease and accounted for 34% in 19844 and 28% in 2011.

The high rates of hypertension are also accompanied by lack of awareness reaching 27% and poor control level (18.5%) as shown in (Figure 2).

Until the fifties coronary heart disease was rare among Sudanese. Professor Siddiq A Ismaeel has reported that during his final year as a medical student they were called to see a patient admitted to south Block (the private wing in Khartoum Hospital) who was the only admitted case of acute myocardial infarction in the span of 3 years. In ten years’ time Halim reported ischemic heart disease as accounting for up to 12.6% of Khartoum hospital admissions in of cardiovascular disease5. the disease has since shown increasing rates and by 1984 it formed 17.2%.

The toll from coronary heart disease continued during the seventies and eighties. A recent (2011) hospital based study of cardiovascular admission in Shaaib Hospital, Khartoum, and reported CHD accounting for 65% among of admissions12. This high rate has reflected into high prevalence of heart failure reaching of 73% of the acute admissions at Al Shaaib Hospital. A recent study of heart failure in Sudan reported ischemic cardiomyopathy as the leading cause of heart failure accounting for 46% of hospital admissions in CV disease .

A summary of the changing prevalence of CV disease is shown in (Figure 3).

### Table 1: Load of multivalvular disease in a sample of 143 patients with rheumatic heart disease

<table>
<thead>
<tr>
<th>Valvular disease</th>
<th>Number of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR</td>
<td>35</td>
<td>24.5</td>
</tr>
<tr>
<td>MS</td>
<td>32</td>
<td>22.4</td>
</tr>
<tr>
<td>MR+MS</td>
<td>32</td>
<td>22.4</td>
</tr>
<tr>
<td>MR+MS+AR</td>
<td>10</td>
<td>7.0</td>
</tr>
<tr>
<td>MR+MS+AS+AR</td>
<td>22</td>
<td>15.3</td>
</tr>
<tr>
<td>AS</td>
<td>8</td>
<td>5.4</td>
</tr>
<tr>
<td>AS+AR</td>
<td>4</td>
<td>3.0</td>
</tr>
<tr>
<td>Total</td>
<td>143 cases</td>
<td>100%</td>
</tr>
</tbody>
</table>

iMR= mitral regurgitations, MS= mitral stenosis, AS= aortic stenosis AR= aortic regurgitation

### Table 2: Changes in the prevalence of CV disease between 1937 and 2011

<table>
<thead>
<tr>
<th>Type of HD</th>
<th>Halim 1937</th>
<th>Daoud 1945</th>
<th>Halim 1961</th>
<th>Khalil 1984</th>
<th>Suliman 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>HHD</td>
<td>44.4</td>
<td>33.7</td>
<td>28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Syphilis</td>
<td>80</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RHD</td>
<td>3</td>
<td>14</td>
<td>25.4</td>
<td>26.5</td>
<td>7</td>
</tr>
<tr>
<td>CHD</td>
<td>12.6</td>
<td>17.8</td>
<td>65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IDCN</td>
<td>3.6</td>
<td>4.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONGEN</td>
<td>3.7</td>
<td>3.9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

HD= heart disease, HHD= hypertensive HD, IDCN= idiopathic Dilative cardiomyopathy, CONGEN= congenital HD.

The burden of RF/RHD was immense especially during the seventies and eighties and with morbidity and mortality that had affected many children and adults in the prime of their lives. Hospital resources were also over-stretched with chronic valvular disease admissions. Multivalvular disease was specially a difficult surgical problem and has contributed to nearly 25 % of the total admission of RHD (Table 1).

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in (Table 3). It reflects the complete disappearance of syphilis and decline in rheumatic heart disease. Hypertension and coronary heart disease remain the major causes of CV disease and consequently the main cause of heart failure.

The changing high rates of hypertension and coronary heart disease may be explained by the rapid changes that affected the Sudanese way of life. Improvement in transport, telecommunications, living conditions (improvement in GDP) and access to media and satellite broadcasts have promoted affluent (western) lifestyle. Traditional Sudanese food has been replaced by fast foods containing high amounts of refined carbohydrates and saturated fats. Add to that rapid urbanization and adoption of urban lifestyle that affected rural communities. Consequently higher rates of coronary risk factors; smoking, diabetes mellitus, hyperlipidemia and obesity were seen resulting in high rates of CHD.

The need for more attention to provide special care for CHD was apparent when the first coronary care unit (CCU) was established in 1984 (Figure 4). WHO focus on CV disease at that time was to improve the awareness of the public as well as the medical profession towards the new impending danger and for that reason provided technical support for the new unit.

The burden of CV disease in Sudan is immense. Hypertension is still a leading cause with high prevalence at community and hospital level. Rheumatic heart disease has receded in cities and towns due to improvement in socio-economics but there is still a big backlog of chronic valvular disease the “unfinished agenda”. The emerging epidemic of coronary heart disease is still unharnessed and efforts to improve awareness, prevention and treatment are needed. There is also clinical evidence supporting emerging higher rates of cardiomyopathies especially; post-partum cardiomyopathy, idiopathic dilated cardiomyopathy and endomyocardial fibrosis.

Much of the credit regarding the progress of cardiology in Sudan goes to Dr A Halim who was the first physician in Sudan to obtain MRCP and later took the specialty of cardiology and set the foundation of the cardiac set up at Al Shaab Hospital. Mr Ahmed Aziz was the first Sudanese to perform mitral commissurotomy. Credit also goes to Siddiq Ismaeel who was the first professor of cardiology at the University of Khartoum, Dr Al Nour Abdul Majeed and Dr Mohamed Gabir who were the senior consultant cardiologist of Sudan between 1967 and 1982. The first surgical set up and the subsequent open heart surgery were strongly supported by the efforts of Mr. Magdi Yacoub and Mr. Donald Ross who not only performed many surgeries at Al Shaab Hospital but also provided training for surgeons, scrub nurses, sisters and technicians (Figure 5).

The first cardiac catheterization laboratory was installed in 1979 (Figure 6). The support of Harefied Hospital was remarkable in setting the initial foundation and training of scrub nurses, cardiac technician and heart surgeons.

Following the year 2000 cardiology became well established in Sudan. There are now four cardiac centers, in Khartoum and Medani, performing percutaneous interventions and open heart surgery. Implantation of pacemakers, implantable defibrillators and cardiac resynchronization devices are now offered as part of the treatment.

In 1994 Sudan Medical Specialization Board was formed by a presidential decree to train registrars from the different specialties of medicine. Those who complete the prescribed course of 4 years are granted the fellowship of the Board. Cardiology fellowship started 5 years ago and the first batch of Sudanese Cardiology Fellows graduated in 2014.

The first Sudanese Society of cardiology was founded in 2012 and has since organized three international conferences. The last conference was held in January 2015 and was attended by many world leading cardiologist among them were Professor Michael Henein from Umea University in Sweden, Professor Allan Frazer from University of Cardiff, Professor Mayosi from South Africa, Mr. Yacub from Malysia, Professor Magdi form Egypt and Dr Daggubati from US and many other cardiologist from Middle East and Europe.

Sudanese Society of Hypertension has also contributed immensely towards training, putting guidelines and organizing conferences.

Although Sudan cardiology has progressed with slow but firm steps it has to face challenging issues in the future, among which are the prevention of both RHD and CHD. Health authorities should continue to improve services through better emergency reception, intensive and coronary care and the provision of adequate ambulance service.

Cardiology is a rapidly progressing discipline and as the years pass by immense changes are expected to occur both in the increase of health facilities, professional staff, equipment and treatment methods. It is expected that Sudan Cardiology will advance, sufficiently enough, within the next coming years to meet the expectations of both the patient and community.

Address for correspondence:
Siddiq Ibrahim Khalil FRCP, FESC, FACCC PO Box 2850, Khartoum, Sudan.
E-mail: psiddiq@gmail.com

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