2

Blindness: A Historical Preamble

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2.1 Historical Background

When looking at the area covered by this study, the way in which it was studied, and the history of the people, it is wholly appropriate to speak also of the heritage of medicine in the Arab world.

The formal study of medicine as a science was developed by the Sumerians, Acadian and Babylonians, the ancestors of today's Arabs some five thousand years ago. Medicine flourished in the Middle East from antiquity within the Semitic civilisations, spreading beyond the region to Hellenistic Europe and continued to evolve until well into the Middle Ages. (1), (2), (3), (4), (5)

Islam, as an ideology of the time, continued to encourage the scientific and medical endeavours of earlier civilizations. Medicine was practised by physicians who were outside the immediate control of the mosque, in contrast to the view prevailing in Europe for several centuries where it lay in the hands of the clergy. The practise of medicine during the early part of Islam was also influenced by the Hadith (sayinng of the Prophet Mohammed) and of these the most relevant to this study must be: -

'Science is the remedy for the infirmities of ignorance, a comforting beacon in the height of injustice. The study of the sciences has the value of a fast; the teaching of them has the value of prayer; in a noble heart they inspire the highest feelings and they correct and humanise the perverted.' (6)

In Iraq, the Baghdad school of medicine in Al-Mustansiriya University was based on a truly scientific spirit. To go from the known to the unknown, then from effects to causes, and only to admit as true what had been demonstrated by experimental work, were the principles taught by the masters. (1)

Medical education and practice were initiated in hospitals. These were built, endowed and administered by the state. There were regular inspections and certification. In the city of Baghdad a census of all practising physicians was made in 949 AD on the order of the caliph. There were 860 physicians, excluding those working directly for the government service. They were re-certified and licensed, and licenses were only given after an examination. (1), (2), (3), (4)

There were also out-patients departments where treatment and prescriptions were dispensed, usually free, for the poor.

The concept of hospitals spread throughout the Arab and Muslim world. Indeed, Tamerlane the conqueror was so impressed by what he considered to be the basics of Arab civilization that he ordered every town in his dominions to be provided with '*a mosque, a school, a sarai (ie on Eastern quadrangular inn), a bath and a hospital*'. (7)

Another particularly good example of this deeply civilised approach, and one which is especially relevant to the current study, was that taken by Sinan ibn Thabit who spent much of his life as a travelling physician, working with and organizing the mobile

hospitals that were so important both to Arab military and village life. During epidemics they were particularly valuable; fully equipped teams of doctors and orderlies would be rushed to stricken areas to give advice on preventing the spread of the disease as well as providing actual treatment. A personal letter written to Sinan ibn Thabit by a minister in Baghdad is very enlightening.

'I have been thinking of the lot of the prisoners who, on account of the greatness of their numbers and poorness of their lodging, are exposed to innumerable diseases. …… There is thus an opportunity for you… to set aside for them certain physicians who may visit them every day and provide for them remedies, medicine and all medical requirements'. (7)

On another occasion the same minister writes of outlying villages that could not support a doctor:

'I have considered the cases of the inhabitants of the villages of al-Sawad and others which are without a doctor and may have need of one if the inhabitants are ill. Take steps therefore…. to delegate certain physicians, equipped with a supply of medicines to go to al-Sawad and bid them stay there as long as may be necessary for the treatment of the sick of each village' (7)

Both the concept of hospitals and attitudes were influencial; they deeply impressed those Westerners taking part in the Crusades and one of the orders of Knights, the Knights Hospitaller, also known as the Knights of Rhodes and Knights of Malta, established their hospitals on the model of that founded by Saladin and even copied the Arab mobile hospitals with their hospital ships. They set new standards for medical care in the West and their clean, airy hospitals, isolation wards, knowledge of medicines and system of using metal utensils and cleaning them with boiling water aroused admiration for many centuries. (3)' (7)

It was the availability and use of such a facility at the St John's Eye Hospital that allowed this current work to be undertaken. It was, thus, a case of history repeating itself in that very part of the world from which it originated.

2.2 Care for the Blind

Although national and international programmes for the prevention of blindness are relatively new, interest in, and care of the blind has a much longer history. Egypt, with its huge and ever growing population, is one of the principle countries in the region under study and in this respect it has a long history of eye care. The Emperor Hadrian of Rome, known for his reforms, praised the welfare system introduced by the Egyptians whereby a large number of their blind were gainfully employed and independent. In the 10th century CE the University of Al-Azhar in Egypt established the first educational programme for the blind. This was a 12-years course which required memorisation of all material. (3)' (8)

In respect of medical care for the blind, the Kalaun Eye Hospital was opened in the 14th century by Sultan El Mansur Kalaun making it the second oldest eye hospital in the world. (9)

In terms of reading and writing facilities for the blind, there is evidence that Didymus the Blind, born in 309 CE, became a teacher, theologian and author at Alexandria and developed his own tactile reading system. (10)

The first recorded inventor of a method of reading and writing for the blind, preceding Braille by 800 years, was the Andalucian scientist Ahmed bin Mohammed bin Abdul Warith at the end of the 9th century (cited by Imam ibn Hazm in his work entitled 'Al Takrib li Had Al Montaq' (roughly translated as 'Bringing Closer the Limits of Logic - reproduced from Arabic). This relied on raised letters produced by the use of bitumen. (2)

The modern adaptation of Braille being adapted to Arabic is credited to Dr Onsy in 1874 who opened a school for the blind in Egypt. (10)

In Europe the history of the care of the blind dates from the Hospice des Quinze Vingts in Paris founded by Louis IX in 1260 who, we are told, collected '300 blind persons, Crusaders and others". The inmates of this institution were encouraged to beg for their living. (8)

In succeeding centuries numerous other smalller hospices were established in other European countries and brotherhoods for the welfare of the blind were founded in many cities. These formed the earliest voluntary agencies for the welfare of the blind.

They were followed by schools for the blind dating back to Vienna (1784) and subsequently Liverpool (1791), Berlin (1806), Milan (1807) and Amsterdam (1808). (8)

In the Middle East, a school for the blind was opened in Beirut (then Syria) in 1868 and from 1893 various schools for the blind were opened in Palestine, very often by religious organisations. (10)

2.3 St John's Eye Hospital, Jerusalem

The centre from which this work was undertaken is the St John's Eye Hospital (SJEH) in Jerusalem

(Figure 2.1) and the area covered by the research is the occupied West Bank and Gaza Strip.

The hospital has a long and illustrious history from its establishment in 600 CE when it was founded as a hospice for pilgrims in Jerusalem and known as the Order of the Hospital of St John of Jerusalem. It was not until 1882 however that the Eye Hospital came into existence under the aegis of the Order of St John and at that time one of its essential functions was research on trachoma. A literature search on causes of blindness will give an idea of how important this was. (11)

This hospital, which was damaged and partially blown up in the 1914-18 war, grew and gained the confidence and respect of all the inhabitants of the Middle East. Unfortunately, again in 1948 the hospital was badly damaged and lay desolate and isolated from the Arabs who formed the majority of its patients. The following year, the Order opened up a temporary eye hospital in the Old City in Strathearn and Watson House. (11) (Figure 2.1)

Figure 2.1
Top: Plague at the site of the old SJEH in the Old City. Bottom: Current hospital in Shaikh Jarrah, Jerusalem.

In 1956, a site was purchased on the Nablus Road outside the Old City and the old building on the site was demolished. The research institute was built and a team of scientists from London commenced work. (12)

In the late summer and early autumn of 1956, further political problems led to the withdrawal of the scientific staff and the British medical nursing staff who were unable to return until December of that year. (11) The Outreach Programme was launched in January 1982. Two vans were provided and equipped by Eyesight Universal of Canada and the Arab British Chamber of Commerce in London. Visiting staff consisted of a surgeon, two nurses, a technician and a driver. A complete survey by Sir Stephen Miller, then the Hospittaler, in 1982 concluded that '*one fourth of the patients who seek care at your Hospital in Jerusalem have a blind eye. One patient in every six who walks through the doors of your Hospital in Jerusalem is blind in both eyes'.* This report also sheds light on fascinating historical insights; one of these includes the reason behind the deep resistance on the part of many Arab villagers to the wearing of spectacles. The writer reported being told by an elderly village elder that '*The Turks would interrogate anyone with glasses since they feared the educated classes'.* (13)

When speaking of the mobile outreach unit, it is of interest to note that Sorsby proposed the use of mobile medical units run by the medical officers for the Colonies; he spoke of the only ophthalmic one being in Cyprus. He noted, however, the provision of an Albion lorry and Eccles trailer supplied to the Palestine Government in 1933 and the list of drugs and equipment which would be used for an Army mobile ophthalmic section of a general hospital. Whether this was ever put into action we have not been able to ascertain, but it is interesting to note, as we have done earlier, that a simple idea to deal with far-flung communities, and proposed centuries earlier, was brought back into use. (14)

2.4 Epidemiological Research on Blindness

Since the last century, data on the prevalence, incidence, and causes of blindness and visual handicap have usually been collected by a mixture of governmental, non-governmental, medical and charitable agencies. Prior to that time, periodic census returns were the only source of statistics on the blind and this method, together with the lack of an adequate definition of blindness added to the difficulties inherent in such works. (15)

Specific epidemiological work on childhood blindness (CB) is very recent and data addressed blindness in general. One of the earliest studies on the prevalence of blindness worldwide, covering 36 countries with a total population of 950 million was presented to the International Congress of Ophthalmology in Amsterdam in 1929. The average number of blind was 13.3 per 10,000; in Europe and Northern America this varied from 4-12 per 10,000. However, it was Sorsby who was responsible for much of our earliest knowledge on the causes and incidence of blindness which he presented in a series of monographs published between 1950 and 1979, together with statistics for the UK published by the

Department of Health and Social Security in 1979. (16), (17), (18), (19), (20), (21) (22), (23)

Sorsby also prepared the first really major report on the incidence and prevalence of blindness worldwide in 1950. This revealed rates of blindness in Europe varying from 47 per 100,000 of all age groups in Denmark, to 354 per 100,000 of all age groups in Cyprus (figures taken from 1921and 1931 respectively). This prompted him to divide the areas into Western, Central and North Western Europe where the rate was below 100 per 100,000, and Eastern Europe where the rate was about double this. In the 0-19 years age group, rates varied from as low as 10 per 100,000 in Estonia (1934) to 43 per 100,000 in USSR (1926). Rates from North America corresponded to those seen in Western Europe. (17)

At the end of the 19th century the prevalence of ophthalmia neonatorum among live births in maternity hospitals exceeded 10%, producing corneal damage in 20% and blindness in approximately 3% of affected infants. Credé in 1880, having recognised the causing organism and the mode of transmission of this infection, introduced the technique of cleaning the eyes of newborn infants with a 2% aqueous solution of silver nitrate. This succeeded in the reduction of major cause of blindness in Credé's maternity hospital in Leipzig from 30–35 per year to only one in the second half of 1880. This ultimately led to a dramatic reduction in the prevalence of ophthalmia neonatorum worldwide. (24), (25)

Sorsby also noted rates from non-European countries (including Egypt and Palestine) and these showed very large swings ranging from 59 per 100,000 in Australia (1933); 403 per 100,000 in Formosa (1930) to 775 and 843 per 100,000 for Egypt (1927) and Palestine (1931) respectively. Sorsby then broke down these figures further into the 0-19 years age group where the rates came down to 12 per 100,000 in Australia; 47 per 100,000 in Formosa; 214 per 100,000 in Egypt and 154 per 100,000 in Palestine. (17)

Sorsby's studies also revealed some conflicting tendencies; in most countries there was a steady decline whilst in others, including Canada and New Zealand, there was a marked increase. He believed the most probable explanation for this to be changes in the census criteria which were the method of data collection at that time. However, this geographical distribution of blindness also revealed a clear indication of the association of diseases with levels of health care and sanitation. (17)

In 1967, a large British work carried out by Fraser and Friedman undertook the study of 776 children on the blind register in the UK. These were from a variety of special schools that included blind children with additional handicaps. This study went further than previous ones in that all those included underwent ophthalmic and systemic examination and investigations, in addition to detailed histories being obtained from the families. Almost one quarter of the total number of children registered had severe visual handicap.

2.5 History of Blindness in Arabia in the 20th Century

Our earliest knowledge of the prevalence of blindness in the Middle East comes from Dr René Nicolas Desgenettes, Napoleon's Chief Medical Officer during the French occupation of Egypt. In 1798, he presented a paper on the causes of ophthalmia to the French Institute at Cairo. Whilst attributing the well-being of Egyptian society to the sobriety of their life style, he noted '*The most common affliction of all, affecting a third of the population (at Cairo) is some form of disease of the eye; no other town contains so many sightless.*' (26)

The causes of blindness for Arab countries were not recorded for the 1931 census and much of our knowledge of the scale of blindness in the Arab world in the last century comes from work done by the Colonial Office on 'Blindness in British African and Middle East Territories in 1948. (23)

Blindness in Egypt

Egypt had an incredibly high rate of blindness. In 1937, the Annual Report of the Egyptian Government Ophthalmic Hospitals cited the causes of blindness as; acute ophthalmia 72% primary glaucoma 10% and trachoma 6.6%. Of the 74,184 cases examined in the report, only 9 were classed as congenital. (17)

It was also noted that in Egypt there was little conjunctivitis of any kind in the coldest part of the year but as the weather got warmer, the incidence of Koch-Weeks conjunctivitis increased, reaching its maximum in May or June. A secondary and milder exacerbation occurred in August. Gonococcal conjunctivitis was rarely seen during the winter months; cases becoming frequent in June and, after a temporary check the maximum epidemic outbreaks were reached in October. The distribution of organism in cases of ophthalmia seen at the government hospitals in 1937 was: Gonococcus, 55,682; Koch-Weeks, 29,251; Morax-Axenfeld, 6,145; and other organisms or gram negative, 30,497.

Although epidemics of gonococcal ophthalmia were a major scourge, it was strange that ophthalmia neonatorum, both gonococcal and non-gonococcal were unknown in Egypt. (17) Sadek, an Egyptian

writer on blindness, in 1937 summed up the problem of the blind in Egypt as:-

'The life story of the poor community in a tropical country is a chain of misery, hardships and disease aggravated by ignorance. Their infants are brought into the world in the hands of ignorant midwives who have seldom heard a word about disinfections or how to care for the eyes of a newborn baby…. the mother knows practically nothing of the rules of hygiene or the proper ways of rearing her young.' (17)

To combat this high rate of blindness, Egypt established in the early part of the 20th century a system of 'temporary eye hospitals' upon the advice of an Austrian ophthalmologist practising in Alexandria, Dr Osborne, which were based on similar lines to those in Russia. Under the scheme, hospitals composed of tents were erected near a town so that the population of the surrounding districts could be treated and, then after 6 months, another town was chosen. By 1923, this system of five temporary hospitals, together with eighteen permanent ones were treating 156,837 new and an incredible 1,666,791 old patients per year. (27)

The results of this drastic approach to eye disease were reported by Fuchs in 1924 when he noted that in Al-Azhar University, which had previously 4000 students, of whom 600 were blind, there were now 5,422 students with "enough good eyesight" and only 230 blind. This was attributed to the greatly improved services provided for the treatment of eye disease in the preceding decades. Figures taken from Sorsby's survey confirmed the success of the Egyptian treatment centres in the decline in rates for the blind taken from the censuses. (16) These revealed steadily declining rates of 1,325 per 100,000 in 1900-09; 1,222 per 100,000 for 1910-19; and an increased reduction to 775 per 100,000 for 1920-29. (27)

Blindness in Palestine

In Palestine, Sorsby reported that the figures from the 1931 census of the blind revealed conditions comparable with, if not worse than, those of Egypt and the census report summed up the results as follows: '*Palestine now takes the first place in regard to the gravity of this affliction'.* Sorsby also noted the differences between the Muslim and Christian Arab populations; the rates for Christian Arabs being 564 per 100,000, but 1,061 per 100,000 for Muslim Arabs. These were higher than for any other major country in Asia or Africa studied. (17)

Ten years later, the 1947 Report of the Order of St John in Jerusalem gives the following distribution of the causes of blindness in Palestine in 1808 persons blind in one eye and 545 blind in both eyes. Out of the total of 2898, acquired conditions formed the absolute majority of causes whilst only 2 cases were reported as congenital. The former were; conjunctivitis 1544; cataract 823; primary glaucoma 295; conditions of the fundus 212; injury 22. (17)

Blindness in Algeria

In Algeria, Sorsby reported that in 1936, 41.5% of all hospital outpatient consultations were ophthalmological in nature. Despite this, rates in Algeria, for native Algerians, were still less than for Egypt and Palestine at 396 per 100,000 (although this was felt to be an under-estimate); whilst for Europeans living in Algeria they were 123 per 100,000. Unlike Egypt, epidemics of gonococcal ophthalmia were rare or absent. The presence and incidence of trachoma varied greatly in the different parts and, again, between indigenous and European populations living in Algeria, being 7-20% in the latter, but 40-85% in the former. (17)

Working on these figures, the rate for the Middle East was assumed to be 800 per 100,000 in a population of 100,000,000. In terms of childhood blindness, in the 0-19 years Egypt had a rate of approximately 214 per 100,000, whilst Palestine was approximately 154 per 100,000 as stated earlier. It should be noted that trachoma was still a cause of ocular morbidity in some European countries such as Poland. (28)

2.6 History of Blindness from Trachoma

On the subject of trachoma, it is interesting to mention that it is the oldest disease reported in the world. Its descriptions, including trichiasis and surgery for their removal are found in Egyptian papyri. Galen was the first to use the word trachoma, which means rough in Greek. In the 11th century, the Arab physician Ibn 'Isa identified four stages of trachoma and was the first to mention trichiasis as a sequelae of the disease. In Europe, the disease became known as the "Egyptian ophthalmia" following the French mission to Egypt from 1798 to 1801. The disease spread to the opposing British troops, and later it spread to Europe and then, through emigration, to North America. Many of the eye hospitals founded in England in the 19th century, including Moorfields in London, were established to

deal with trachoma. The communicable nature of trachoma and its association with poverty, crowding, poor hygiene, and lack of adequate water supply were recognised quite early. The infectious agent was seen microscopically in 1907 but it was not until 1957 when the organism was cultured. New York newspapers at the beginning of the 20th century often contained public-health warnings about trachoma in schools. As a result, trachoma became an exclusion criterion for immigrants to the USA. Immigrants were examined at Ellis Island and signs of the disease could result in hospital admission or rejection; 36,035 immigrants were denied entry into the USA between 1897 and 1924. A vigorous campaign was conducted by the US Public Health Service to control the trachoma "menace" in what was described as the "trachoma belt". Special public education efforts were carried out and trachoma hospitals were established in many of the south-eastern US states. The US Public Health Service programme was turned over to the individual states in 1935, and trachoma had ceased to be a problem in the USA by the 1950s. (29)

2.7 History of Blindness in Africa

In Africa, the early investigators of onchocerciasis from 1874-1930 made no mention at all of concomitant severe eye disease. In 1917-1919, publications of observations in Central America prompted some specialists in tropical medicine to look for eye disease associated with African onchocerciasis. However, it was not until 1930-1931 that Hissette reported that 20% of patients with onchocerciasis were blind in an onchocerciasis focus on the Sankuru River in the Belgian Congo, and that 50% of the villagers suffered from eye troubles. Two years later, he found a second focus with the same pathology on the Uele River. Thus, it appears that before 1930, cases of African onchocerciasis with ocular complications were demonstrably localised and the reason for this is likely to have been that the severity of the disease still varied from focus to focus at that time and /or because the individuals concerned still had a relatively mild microfilarial infection. (30)

2.8 History of Research on Childhood Blindness

One of the earliest statistics on childhood blindness quoted in the literature came from the UK on the causes of blindness among the inmates of the Liverpool School for the Indigent Blind between 1791 and 1872. This revealed that nearly half of the pupils had lost their sight from inflammations and infections and, of these, one third were as a result of smallpox. By the end of the 19th century, ophthalmia neonatorum was the leading cause of blindness in schoolchildren, being responsible for approximately 30% of cases. (19), (31), (32), (33)

Sorsby analysed the causes of blindness between 1948 and 1968 and highlighted the increasing trend towards genetically determined causes of blindness, and the almost 50% decline in blindness between 1923 and 1943. He found that in the age group 0-4 years and 5-14 years, congenital, hereditary and developmental defects accounted for 60-62.5% of all cases. However, in the 15-29 years, although the same group of causes predominated, its percentage was much less at 38.7% and other infective aetiologies such as syphilis and ophthalmia neonatorum contributed to 13.7% and 12.2% respectively. (22), (23)

This trend was confirmed by a later DHSS study based on blind and partially sighted registrations of children under the age of 16 years between the years 1976-85. This study included 2,000 blind and a further 2,400 partially sighted children. Of note was the fact that there were disproportionately more boys than girls. Analysis of the causes is limited by the fact that only 60% of registrations had accompanying blind registration forms. However, the main cause found for both sexes was optic atrophy (30%), followed by congenital anomalies (20%), and retinal conditions (20%). The only new finding in this study, in comparison to reports covering the period 1969-1976, is the drop in the incidence of cataract from 16% to 8%. (21), (22), (34)

In western Europe, and as late as the 1970s, prenatal and perinatal factors were considered important contributors although hereditary conditions were the prime aetiology of blindness. (35) These factors were mainly rubella, toxoplasmosis, dysoxygination; prematurity and low birth weight and birth injuries such as asphyxia, (35)

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