PREVENTION OF BLINDNESS IN SINGAPORE *

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Any effective measure to prevent blindness must include the education of the public to create an awareness of ocular diseases especially those which can cause blindness; the training of general practitioners and opticians who are frequently first to be consulted for an ocular complaint; the maintainance of a high standard of clinical and surgical practice of ophthalmologists; and the development of centres for ocular research.

While the education of the public must go on and the training of general practitioners and opticians should continue, the most important factor in prevention of blindness would be the establishment of a high standard of clinical and surgical practice and research amongst local ophthalmologists. It is this aspect of prevention of blindness that I will be talking about in greater detail.

BLINDNESS IN SINGAPORE

The causes of blindness in Singapore which I am about to present would include all cases registered at the Singapore General Hospital from January 1953 to December 1962. It is necessary for me to stress that while there is some doubt as regards the accuracy of the registration for a variety of reasons, I am convinced that the registration of these 1,098 patients is of considerable significance as a guide to the common causes of blindness in Singapore and therefore essential for a systematic attack on the problem of prevention of blindness.

There is one point regarding the registration of blindness that is important. Private practitioners generally do not register their paying patients and since those seen at the Singapore General Hospital are usually free patients it follows that our blind register is largely limited to the poorer classes of patients. Thus the percentage of blindness associated with poor socio-economic conditions such as infection and malnutrition is exaggerated.

Table I shows the major blindness in Singapore classified by clinical entity. It shows that optic atrophy accounts for 222 blind, glaucoma 218, corneal diseases 191, and developmental anomalies 113. Together they account for 75% of blindness in the State of Singapore.

Table I: Classification of Blindness by Clinical Enitity in Singapore 1953-1962.

Classification of blindness	Number of cases	Percentage of known causes
Optic atrophy	222	22.5%
Glaucoma	218	22.1%
Corneal disease	191	19.4%
Congenital & developmental anomalies	113	11.6%
Phthisis	61	6.2%
Cataract	54	5.5%
Uveitis	49	4.9%
Trauma	7	0.7%
Macular degeneration	2	0.2%
Retinopathy	2	0.2%
Miscellaneous	67	
TOTAL	986	100%
UNCLASSIFIED CASES	112	—
TOTAL REGISTERED CASES	1098	—

Figure I shows the major blindness in Singapore classified by clinical entity compared to the figures for England and Wales 1960 (Sorsby).

The significant findings are:

i. the high incidence of optic atrophy.
ii. the high incidence of corneal diseases.
iii. the low incidence of cataracts.
iv. the negligible incidence of macular degenerations and diabetic and vascular retinopathy.

Figure II shows the major blindness classified by site compared to the figures for England and Wales 1960 (Sorsby).

The significant findings are:

i. the high incidence of corneal and optic nerve diseases.

* This paper was read at the 2nd Asia Pacific Ophthalmic Congress held in April 1964 in Melbourne.

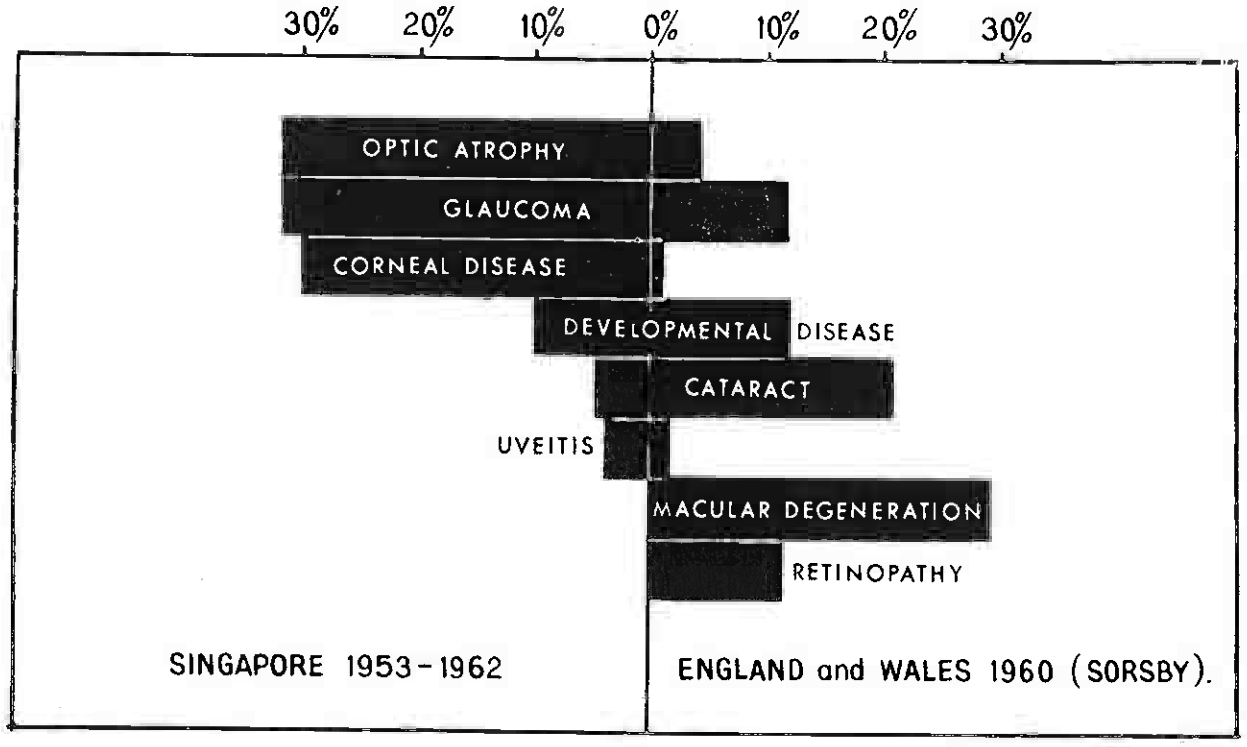

Figure I: Comparison of Classification of Blindness according to clinical entity

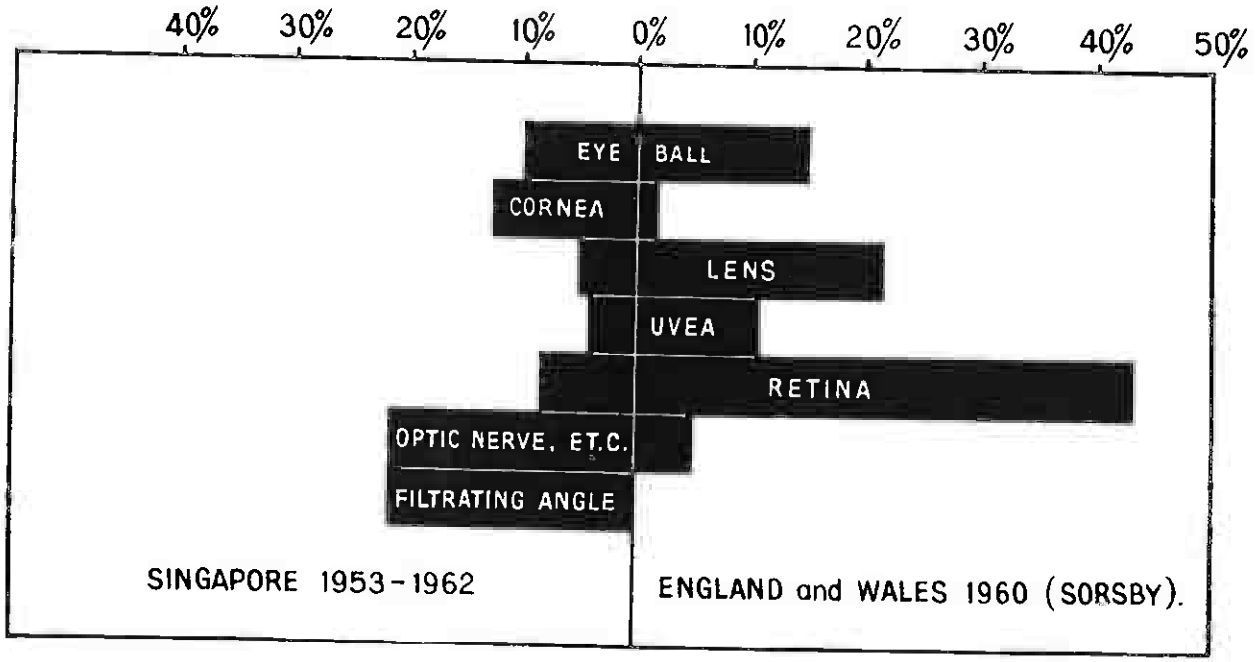

Figure II. Comparison of Classification of blindness according to site of disease.

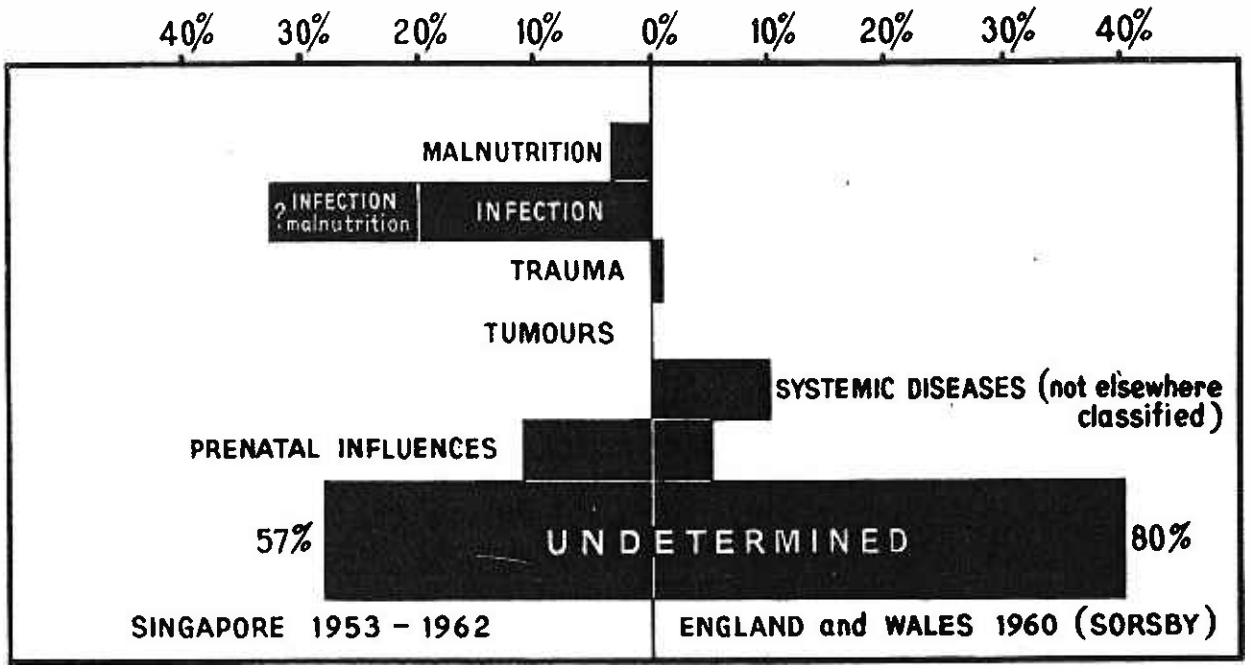

Figure III. Comparison of Classification of blindness according to etiology.

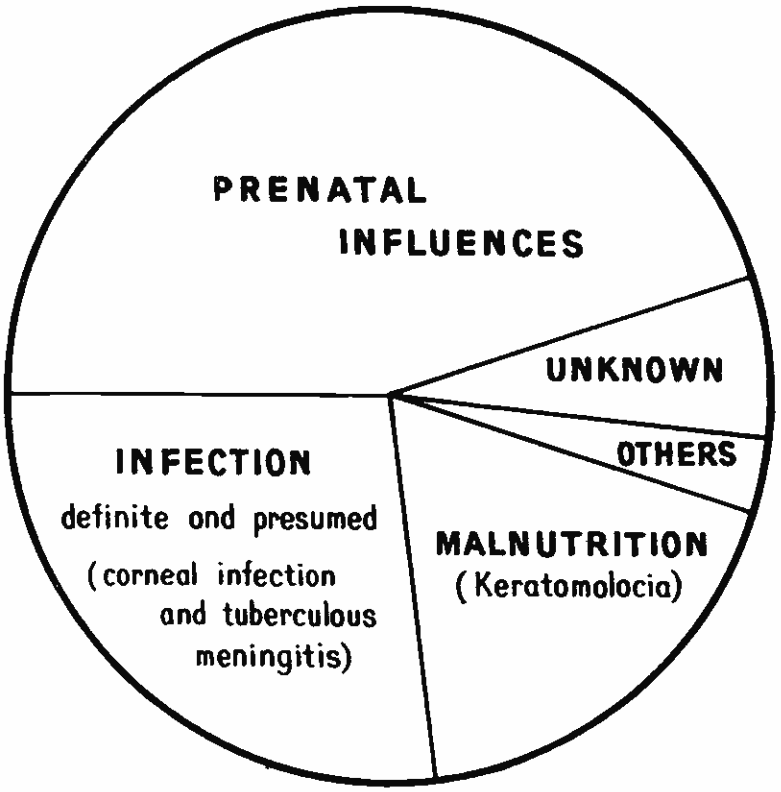

Figure IV. 141 blind children between 0-14 years classified by etiology: Singapore 1953-1962.

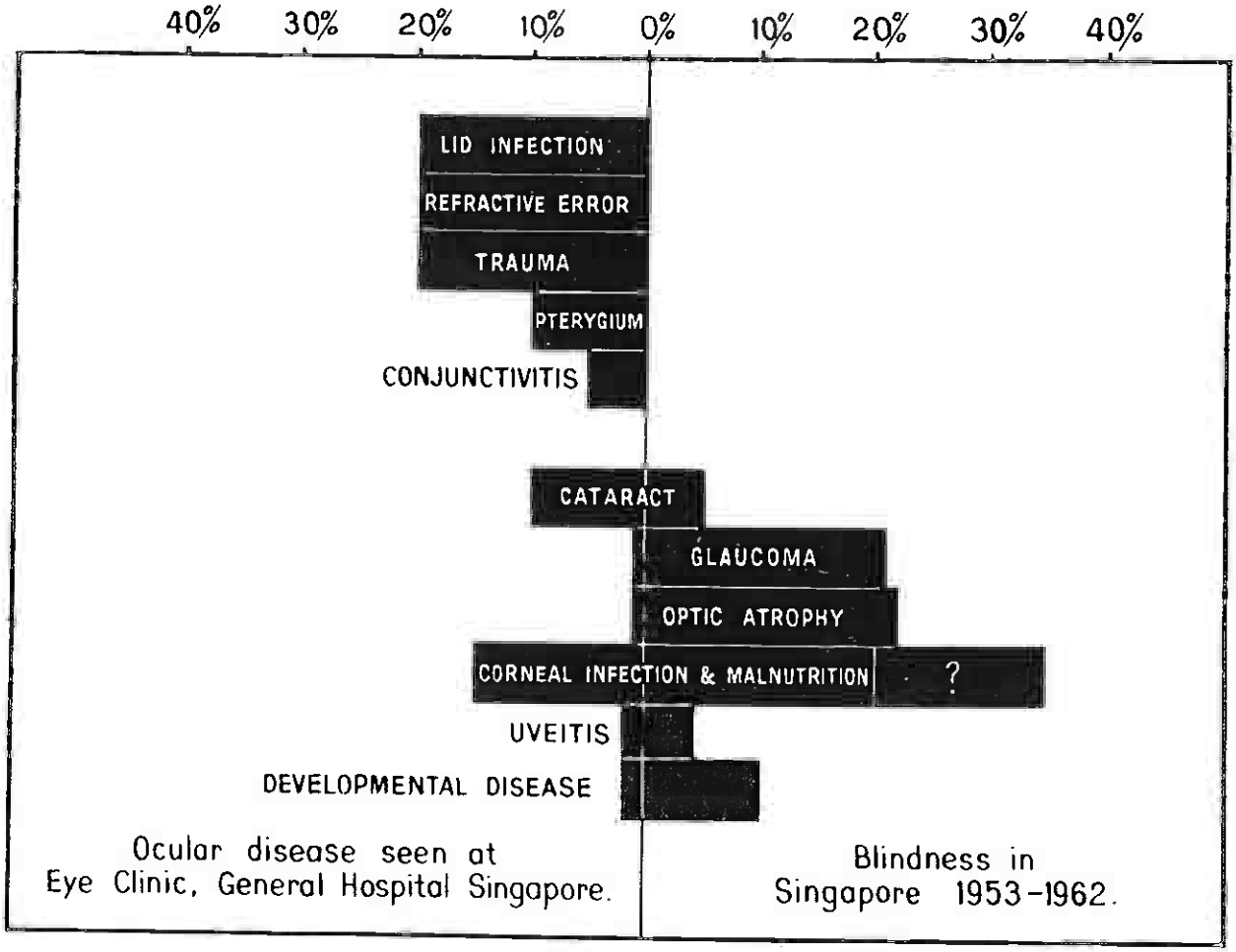

Figure V. Comparision of Ocular disease to incidence of blindness in Singapore.

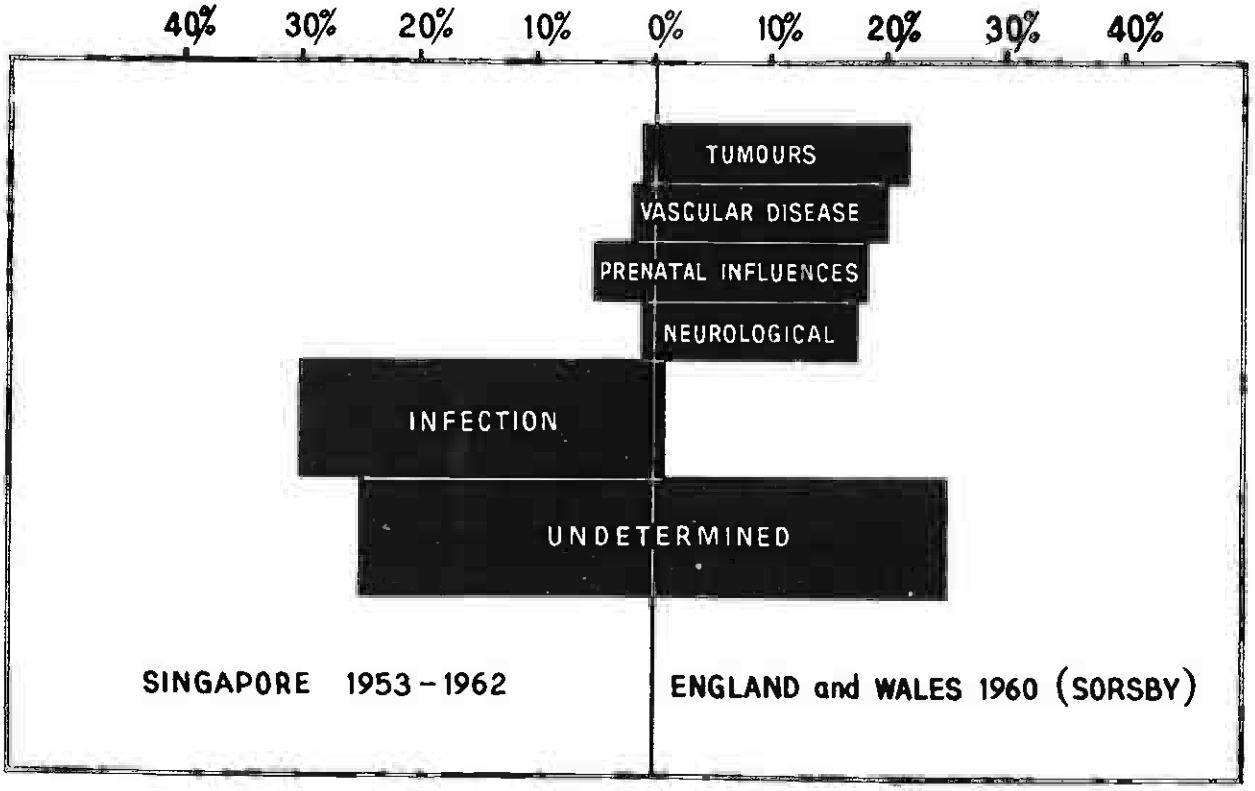

Figure VI. Comparison of Classification of optic atrophy.

ii. the low incidence of retinal and lenticular diseases.

Figure III shows the major blindness in Singapore classified by etiology compared to the figures of England and Wales 1960 (Sorsby).

The significant findings are:

i. The high incidence of unknown etiology in both series: 57% in Singapore and 80% in England and Wales.

ii. the high incidence of infection and malnutrition in Singapore compared to England and Wales where they are negligible causes of blindness.

Infection alone accounts for 23% of blindness and malnutrition for 2%. If we include the blindness where the etiology is presumed to be due to either infection and/or malnutrition, then the total incidence due to infection and malnutrition account for 35% of blindness in Singapore.

iii. the negligible incidence of blindness due to systemic diseases in Singapore.

Figure IV shows the incidence of blindness in Singapore of children from O to 14 years classified by etiology.

The significant findings are:

i. the high incidence of infection and malnutrition.

ii. about half the incidence is due to prenatal influence.

Figure V shows the incidence of blindness in Singapore classified by clinical entity compared to the incidence of ocular diseases in patients seen at the out-patient eye clinic of the Singapore General Hospital.

The significant points are:

i. Each year about 8,000 new patients are seen at the eye clinic of which 75% are due to lid infection (20%), refractive errors (20%), trauma (20%), pterygium (10%), conjunctivitis (5%): these did not as expected cause blindness except a few (7) cases of trauma.

ii. On the other hand, glaucoma (1%), optic atrophy (1%), uveitis (2%), and developmental anomalies (2%), which together account for only 6% of the total number of outpatients account for 55% of blindness.

Figure VI shows the classification of optic atrophy in Singapore (222 cases, 22.5%) compared to that of England and Wales in 1960 (452 cases, 4.5%).

The significant findings are:

i. the undetermined etiology in over 50% in both Singapore and England and Wales.

ii. the high incidence of infection in Singapore mainly due to syphilis.

iii. the low incidence of intracranial tumours, vascular diseases, prenatal influences and neurological conditions in Singapore compared to England and Wales.

OPTIC ATROPHY AND CORNEAL DISEASES

Most of the blindness due to optic atrophy and corneal diseases are the result of infection or malnutrition, and together they account for more than 25% of total blindness (figure III). The tragedy of this is that they are preventable. This calls for a planned programme of education, better social and economic conditions and improvement of general health service rather than development of facilities for specialist ophthalmic treatment, as it was found that usually by the time these patients were presented for treatment their ocular condition was too advanced to save their sight.

A number of the registered blind from corneal opacity can have their vision at least partially restored by corneal grafting. Unfortunately we could only perform this very occasionally because of the lack of donor material. We have so far been unsuccessful in our attempts to start an Eye Bank. The main drawback is the failure to acquire the legislation to permit removal of an eye from the dead. Nevertheless we hope that legislation will soon be passed to enable the establishment of an Eye Bank.

CATARACT

The incidence of blindness due to cataract is about 7% which is relatively low. We have a programme of removing cataracts as soon as possible when indicated, and patients who are blind from cataract are given an early date, often within one week. This programme is very successful in our small island and has much to recommend it.

GLAUCOMA

In October 1962, the Ophthalmic Department of Singapore General Hospital started a Glaucoma Clinic. 300 cases have been seen and studied. The results have been worth the effort as a number of cases which required further treatment or control were spotted and many cases which would otherwise have lost their vision have maintained whatever vision they had. Further, several significant findings were noted. Firstly, closed angle glaucoma was found to be 3 times more common than open angle glaucoma. Secondly we have found that the second eye of patients who have had an attack of acute closed angle glaucoma in the first should have routine prophylactic peripheral iridectomy in the fellow eye as not only was an acute attack almost certainly prevented, but the visual result after peripheral iridectomy in the fellow eye was significantly better when compared to that of patients not treated surgically (Lim 1964).

DEGENERATIVE CONDITIONS AND DIABETIC RETINOPATHY

Only two cases of blindness in Singapore were due to macular degeneration. (Table I) This incidence is extremely low especially when compared to the figures of England and Wales 1960 when it caused 30% of the total blindness.

There are several explanations for this. Firstly, our population structure is peculiar in that 50% of our population is below the age of 21.

Figure VII shows a comparison of the age distribution of blindness in Singapore 1953-1962 and England 1954. It shows that in England 70% of the blind were over the age of 70 while in Singapore only 9% were over the age of 70. Secondly, there is the possibility of a racial factor as the cause of macular degeneration and thirdly, the failure of elderly patients in Singapore to register or to seek treatment as many are illiterates and defective vision is often considered as part of the physiology of old age.

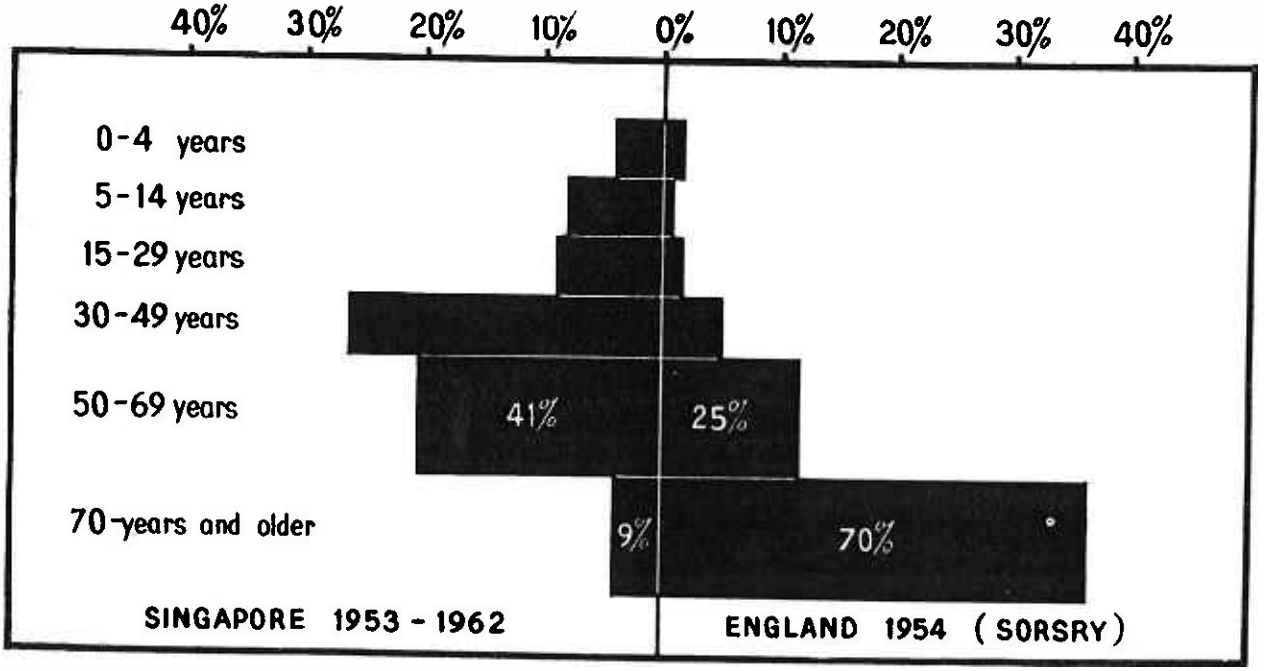

Figure VII. Comparison of age distribution of blindness.

The low incidence of diabetic and vascular retinopathy (Table I) are probably due to similar reasons. Diabetes is a common disease amongst the local population, but it is possible that our diabetics do not survive long enough due to poorer control to develop extensive retinopathy. Whatever the reasons, this matter merits further study and I must admit that at the moment we have insufficient data to allow a more definite conclusion.

In all, it is certain that the causes of blindness in Singapore will swing away from infection and malnutrition and that in the next ten years the major causes of blindness will shift to that of congenital and developmental anomalies, degenerative conditions, glaucoma and diabetic and vascular retinopathy, which are already the major causes of blindness in developed countries. With modern antibiotics and sound economy of our country we are confident that the present phase will pass away rapidly.

MODERN TRENDS IN PREVENTION OF BLINDNESS

With some variations, it appears that in all developed countries the major blinding conditions of the later half of the 20th century will be largely that of congenital and developmental anomalies, myopia, glaucoma, cataract, macular degeneration, diabetic retinopathy and inflammatory diseases (uveitis). Our knowledge of the causes of disease is limited and any step towards the breakthrough of our present ignorance would require a more intensive effort in ocular research. And until we can discover the basic facts concerning the etiology and biochemical changes in these conditions it will not be possible for us to significantly lower the incidence of blindness in the more developed countries.

It is well known that the numerous causes of blindness are closely related to general medical conditions such as diabeties, vascular degenerations, senility, etc. and progress in knowledge would likely be achieved by the establishment of medico-ophthalmological clinics where the combined efforts of the physician and the ophthalmologists may open new chapters in ocular research.

Another potentially rewarding study is geographical ophthalmology, which has repeatedly showed the effects of racial, climatic and cultural patterns on ophthalmic disease (Mann 1961). For example sympathetic ophthalmitis and malignant choriodal melanoma are virtually unknown in Singapore.

It is interesting to note that there is much evidence to show that cataract, glaucoma, macular degeneration and myopia have familial and hereditary tendencies. This suggests that the answer to the problem of prevention of blindness in the future may depend on new knowledge in ocular genetics (Mann 1962). In any case, ocular genetics must be understood before we can prevent blindness from congenital and development anomalies which already accounts for 20% of total blindness in many countries.

In conclusion may I say that in Singapore our present problem is the eradication of the more "primitive" causes of blindness, but if we are to look beyond the immediate future we will have to hope for new knowledge to enable us to fight against the "modern" causes of blindness.

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