

## REGISTRATION OF BLINDNESS IN SINGAPORE 1950 - 1972

By K. H. Lim

## SYNOPSIS

The pattern and problem of blindness in Singapore is presented by examining the method and definition of blindness adopted for registration in the country. Available records for the past 23 years dating back to 1950, when blindness was first registered, are reviewed. Analysis is made of persons on the blind register on yearly prevalence, age and sex, age of registration, site and type of affection and cause. The number of blind persons and rate per 100,000 population is compared with figures from other countries. Local factors affecting these findings are discussed and prospects for our future presented.

For the period 1950—1972, congenital causes of blindness forming less than 10% prior to 1960 increased to 15% in 1964, 15.4% in 1968 and 24% in 1972, with proportionate decrease in acquired causes of blindness. Of those born blind, the commonest causes were malformation, congenital cataract, optic atrophy and congenital glaucoma. Of those who acquired blindness, glaucoma was the commonest cause prior to 1964, followed by optic atrophy, corneal disease and retinal degeneration. During 1965—1968 the acquired causes in order of frequency were glaucoma, optic atrophy, retinal degeneration and corneal disease whilst during the last four years from 1969—1972 the acquired causes were retinal disease, glaucoma and optic atrophy. A rising figure is thus seen of those who were born blind and of those who acquired blindness, retinal disease, glaucoma, optic atrophy and corneal disease remain the chief causes.

## INTRODUCTION

"No survey conducted on a scientific and systematic manner has ever been made to assess the extent of blindness in Singapore." (Chai, 1960, Research paper, University of Singapore.)

"No systematic and comprehensive survey has been conducted to measure accurately the incidence of blindness in the Republic." (Singapore Association for the Blind, 1971—1972, Annual Report).\*

Information concerning blindness is still uncertain and inadequate in many parts of the world. In many countries some form of organised social and economic aid is available for the blind, hence, the blind has to be defined for consideration to receive such aid. Such a definition must necessarily vary in different countries depending on the living standards and again

on the need and availability of social support. In practice, the definition is sometimes a practical assessment of visual impairment and sometimes an ophthalmic assessment—thus, a number of terms arise: "practical blindness", referring to a person who lacks locomotor vision; "social blindness", referring to economic blindness; and "legal blindness", referring to the degree of visual impairment which, in a given country, entitles a person to receive aid (Lindstedt, 1969).

In Singapore there is no national registration of persons with physical handicaps or blindness. An historical account may thus be traced of the practice and definition of blindness adopted in the country in order to study the pattern and problem of blindness locally. As far back as 1946, just after the Second World War, an attempt was made to maintain a count of blind persons by the Department of Health, now Ministry of Health. These early files were handed over to the Singapore Association for the Blind (S.A.B.) when it was founded on November 6, 1951 "to provide financial assistance and welfare for the blind", but it was not until 1953 that a register of blind persons was started by the S.A.B. (Chai, 1960), based on information provided by the government ophthalmologists at the then General Hospital. In 1953, Sir Clutha MacKenzie, himself blind, was sent out by the Technical Assis-

\*The point is made that 12 years after research workers began to look for statistics of blindness in Singapore, figures are still unavailable.

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tance Administration of the United Nations, at the request of the Governments of Singapore and the Federation of Malaya, to advise on a programme for the blind, with particular reference to the development of blind services and facilities for rehabilitation. MacKenzie's report (1953) contained an account given by the late Mr. A. D. Williamson, then eye surgeon at the General Hospital, on the chief sight destroying conditions prevailing at that time. Speaking of the sight destroying conditions, Williamson (1953) observed that: "Keratomalacia, ophthalmia neonatorum, optic atrophy, cataract, congestive glaucoma, corneal ulceration, interstitial keratitis, iridocyclitis, penetrating wounds, intra-ocular tumours and trachoma were the chief causes" but no actual figures were quoted. Although entries for blindness against cause were made from 1950, there was no definition of blindness as such that was adopted in Singapore at that time.

#### DEFINITION OF BLINDNESS

"O dark, dark, dark" Samson Agonistes.

There is still no definition of blindness which is universally accepted. The International Classification of Diseases (World Health Organisation, 1965) includes blindness believed to be congenital, but excludes impaired vision due to refractive error. Specifically defined, it refers to a central visual acuity of 6/60 or worse with the best correcting lens, or a field defect in which the field has contracted to such an extent that the widest diameter of visual fields subtends an angular distance no greater than 20 degrees. Not specifically defined, it includes the less specific "economic blindness" which means inability to do any kind of work, industrial or otherwise, for which sight is essential.

As early as October, 1955, the Far East Conference on Work for the Blind met in Tokyo and recommended for recognition and implementation throughout the world the following definition which had been taken by the World Council for the Welfare of the Blind:

"Resolution 1. Definition of Blindness

- a) Total absence of sight, or
- b) Visual acuity not exceeding 3/60 or 10/200 (Snellen) in the better eye with correcting lenses, or
- c) Serious limitation in the field of vision, -generally not greater than 20 degrees."

The World Council, in taking the definition, had recognised that many persons with sight in the better eye, after correction equal to 20/200 (or 6/60) were seriously handicapped visually, and had also strongly urged that wherever possible the definition of blindness be expanded to include all those with this degree of visual loss. (Far East Conference, 1955).

Following on the Far East Conference in Tokyo of 1955, the Government of the Federation of Malaya (Kuala Lumpur, 1956) accepted the definition under Resolution 1 of the Far East Conference but included the wider definition under (b), viz: it accepted "(a) Total absence of sight, and (b) Visual acuity not exceeding 3/60 in the better eye with correcting lenses." Adoption of this definition was communicated to the Government of Singapore on May 18, 1956 and on May 28, 1956 the Ministry of Labour and Welfare of the Government of Singapore sought the view of Professor Arnold Sorsby (Singapore, 1956) as follows: "At present we have no official definition in Singapore but, presumably in the long run it would be wise to have the same definition in the Federation and Singapore." A reply from Sorsby could not be found on our records (Chew, 1973) and the Government of Singapore, in fact, continued to follow the definition of "economic blindness" in England, viz: "A person is considered blind if he is too blind to perform work for which eye-sight is essential." In practice the definition referred to children who had insufficient sight to receive education through normal school and to adults who had insufficient sight to enable them to do a job for which eye-sight was essential.

#### REGISTRATION OF BLINDNESS IN SINGAPORE

Persons in Singapore were registered blind under two categories, viz: (a) "totally blind" or (b) "partially blind". A person was certified "totally blind" when he was unable to see anything, and "partially blind" when he could make out movements and shadows but had insufficient eye-sight to carry on an occupation where vision was necessary. Monocular blindness, by definition, was not registered. As certification was carried out by the ophthalmologists at the General Hospital for the purpose of social aid and certification was not required by law, blind persons who were not referred to the Hospital by their doctors or private ophthalmologists were not registered. (The implication may be

made that blindness in the more affluent was not counted but these figures are not expected to be many, Lim, 1964).

Since 1964, for the conformity of practice of the Hospital staff, certification of "total" or "partial" blindness was discontinued, and a person was registered "blind" when he has:

- (a) Total absence of sight, or
- (b) Visual acuity not exceeding 6/60 or 20/200 (Snellen) in the better eye with correcting lenses, or
- (c) Visual acuity not exceeding 6/24 or 20/80 (Snellen) with a field of 10 degrees around fixation (20 degrees) in diameter."

## RESULTS

Data from our registration for 1950—1964 (a 15 year period) and for 1965—1972 (a further 8 year period) are presented:

### Prevalence

The yearly prevalence of blindness based on registration for the past 23 years, since registration was started in Singapore, is shown in Table I, in which a total of 1,959 were registered and 517 deregistered for the period 1950—1972. The number of registered blind persons in Singapore on December 31, 1972 was 1,442, with a rate of 67 per 100,000 population, compared with 55 per 100,000 in 1964 based on the mid-

TABLE I

### YEARLY PREVALENCE OF BLINDNESS IN SINGAPORE BASED ON REGISTRATION, 1950-1972

Year	New Registrations	Deregistrations	Additions to prevalence	Current Prevalence
1950	15	2	13	13
1951	19	3	16	29
1952	36	9	27	56
1953	121	34	97	153
1954	119	29	90	243
1955	162	48	114	357
1956	110	24	86	443
1957	89	16	73	516
1958	87	19	68	584
1959	129	19	110	694
1960	69	13	56	750
1961	52	10	42	792
1962	84	11	73	865
1963	69	4	65	930
1964	87	2	85	1015
1965	105	55	50	1065
1966	91	33	58	1123
1967	89	42	47	1170
1968	84	42	42	1212
1969	93	29	64	1276
1970	88	32	56	1332
1971	63	29	34	1366
1972	98	22	76	1442
TOTAL 1950 to 1972	1959	517	1442	

TABLE II  
NUMBER OF BLIND PERSONS IN  
SINGAPORE AND RATE PER  
100,000 POPULATION IN 1964  
AND 1972

Year	Number registered blind	Mid-year population	Rate per 100,000
1964	1015	1,841,600	55
1972	1442	2,147,400	67

year population (Table II). These figures are compared with the blind population and prevalence in other countries where blindness is registered (W.H.O., 1966) but no conclusion can be drawn from the Table (Table III) as the definition for registration varied in different countries. The difficulty lies in establishing the true incidence of blindness and the main causes.

#### Age and Sex

The age and sex of registered blind persons in Singapore by 1970 is shown in Table IV, and by 1972 is shown in Table V. There is a slight preponderance of males over females, with the

TABLE III  
COMPARISON OF BLIND POPULATION AND PREVALENCE IN  
SINGAPORE WITH OTHER COUNTRIES WHERE BLINDNESS IS  
REGISTERED\*

Country	Year	Blind Population	Rate per 100,000 population
Singapore	1964	1015	55
Singapore	1972	1442	67
<i>Africa</i>			
South Africa:	1957		
Asian population		320	75
Bantu population		26420	—
Coloured population		2058	156
White population		2480	84
Zanzibar	1960	590	192
<i>America</i>			
Canada	1965	24671	128
Dominican Republic	1956	660	29
Guadeloupe	1937	100	—
<i>Europe</i>			
Belgium	1963	4779	51
Faevre Islands	1932	24	98
<i>United Kingdom</i>			
England and Wales	1963	96472	205
Northern Ireland	1963	2327	161
Scotland	1964	10108	194
<i>Oceania</i>			
New Zealand	1962	2700	112

\*(Data from: W.H.O. Epidemiological and Vital Statistics Report, Vol. 19, No. 9, 441-445, 1966).

TABLE IV  
NUMBER OF BLIND PERSONS IN SINGAPORE, BY AGE AND SEX,  
ON AUGUST 31, 1970\*

Age Group	Male	Female	Total
Birth — 5	15	8	23
6—10	28	20	48
11—20	60	44	104
21—30	61	39	100
31—40	54	43	97
41—50	96	36	132
51—60	184	109	293
61 and above	289	304	593
<b>TOTAL</b>	<b>802 (58%)</b>	<b>588 (42%)</b>	<b>1390</b>

\*(Data from Welfare Office, Singapore Association for the Blind, Annual Report 1969-70).

TABLE V  
NUMBER OF BLIND PERSONS IN SINGAPORE, BY AGE AND  
SEX ON OCTOBER 31, 1972\*

Age Group	Male	Female	Total
Birth—6	12	10	22
6—16	76	60	136
16—21	36	26	62
21—44	156	105	261
44 and above	563	427	990
<b>TOTAL</b>	<b>843 (57%)</b>	<b>628 (43%)</b>	<b>1471</b>

\*(Data from Rehabilitation and Social Services, Singapore Association for the Blind, Annual Report 1971-72.)

largest majority of both sexes above 44 years of age. The age at registration (not necessarily the same as the age of onset) analysed for the past 8 years (from 1965—1972) is shown in Table VI. These age-groupings were adopted by the S.A.B., based on decades (Table IV) and on pre-school, schooling, secondary school and working age-groups (Table VI), whilst the almoner's (now Medical Social Worker's) office based the age-groups for children, adult and pensionable age. (Table VI). (Henceforth, i.e. after 1972, as a result of the present study, age-groups are arranged to tally with accepted statistical practice, thus: birth to below 15 years, 15 to below 55 years, 55 and over; and in decades from 0-9, 10-19, etc.).

### Causes of Blindness

The number of blind persons in Singapore found by aetiology and by site and type of affection for the period 1950—1972 is shown in Table VII. This is not to be regarded as a prevalence table but refers only to blind persons for which causes of blindness were available.

### Double Groupings

In most cases of blindness, the cause was found to be the same for both eyes of a person but when the cause for the two eyes was substantially different it was recorded separately as a double grouping but registered as one person. The cause of blindness in the last eye to go blind is more relevant to the patient, although this is not reflected in the tables.

TABLE VI  
BLIND PERSONS IN SINGAPORE BY AGE AT REGISTRATION,  
1965-1972

Year	Birth to 15 years	16 to 55 years	56 and above	Total
1965	18	39	48	105
1966	19	37	35	91
1967	20	30	39	89
1968	11	30	43	84
1969	21	30	42	93
1970	21	27	40	88
1971	20	19	24	63
1972	30	31	37	98
TOTAL	160 (22.5%)	243 (34.2%)	308 (43.3%)	711

TABLE VII  
NUMBER OF BLIND PERSONS IN SINGAPORE FOUND BY  
AETIOLOGY AND BY SITE AND TYPE OF AFFECTION, 1950-1972

(This is not to be regarded as a prevalence table but refers only to blind persons for which causes of blindness were available)

Group	Cause	Number	Percent
I	Congenital and developmental	268	13.68
II	Corneal diseases	302	19.59
III	Uveitis	82	4.18
IV	Other inflammation involving uvea (panophthalmitis, endophthalmitis, phthisis, atrophy)	75	3.82
V	Retinal degeneration (including myopia and detachment)	180	9.18
VI	Cataract	88	4.49
VII	Glaucoma	380	19.39
VIII	Optic atrophy (excluding those due to glaucoma)	389	19.85
IX	Trauma	24	1.22
X	Tumours	6	0.30
	Unknown	88	4.49
	Double-groupings	77	3.93
	TOTAL	1959	100

TABLE VIII  
BREAKDOWN OF BLIND PERSONS REGISTERED ACCORDING TO CAUSE, 1950-1972

Year	I	II	III	IV	V	VI	VII	VIII	IX	X	Unknown	Double Grouping	Total
1950	0	2	0	0	0	0	1	1	0	0	11		15
1951	1	3	0	1	0	1	1	1	0	0	11		19
1952	1	12	1	1	1	0	4	8	0	1	7		36
1953	7	30	5	5	3	5	17	27	1	0	23		121
1954	11	28	7	5	3	7	29	20	1	0	8		119
1955	10	39	8	8	8	9	29	35	2	0	14		162
1956	13	20	8	8	5	2	23	27	0	0	4		110
1957	11	17	4	9	6	3	21	13	0	4	1		89
1958	11	23	5	6	4	2	13	17	0	0	6		87
1959	10	19	8	8	6	6	29	35	3	1	4		129
1960	9	13	5	3	9	2	8	16	2	0	0		69
1961	3	10	3	5	3	4	14	8	2	0	0		52
1962	15	11	2	2	6	5	27	16	0	0	0		84
1963	14	8	2	1	6	5	17	14	2	0	0		69
1964	12	17	3	2	9	9	13	21	1	0	0		87
1965	19	12	4	3	12	2	20	28	1	0	0	4	105
1966	13	2	3	2	17	2	22	21	0	0	0	9	91
1967	12	3	4	1	14	7	20	19	4	0	0	5	89
1968	13	1	0	3	12	6	21	13	1	0	0	14	84
1969	17	10	5	1	15	2	13	15	1	0	0	14	93
1970	16	7	3	1	16	5	15	16	1	0	0	8	88
1971	23	5	1	0	8	2	10	7	2	2	0	5	63
1972	27	10	1	1	18	6	14	14	0	0	0	7	98
TOTAL 1950-1972	268	302	82	75	180	88	380	389	24	6	88	77	1959

TABLE IX  
BLINDNESS ACCORDING TO CAUSE, ANALYSED QUADRENNIALLY,  
1950-1972

(Numbers and proportions by cause)

Cause of Blindness	1950-1952	1953-1956	1957-1960	1961-1964	1965-1968	1969-1972	Total
Congenital	2 2.8%	41 8%	41 10.9%	44 15%	57 15.4%	83 24.2%	268 13.7%
Acquired	68 97%	471 92%	333 89%	248 85%	312 85%	259 75.7%	1691 86.3%
TOTAL	70	512	374	292	369	342	1959

### Changing Pattern of Blindness

A breakdown of blind persons registered according to cause for the 23 year period from 1950—1972 is shown in Table VIII. Blindness according to cause is further analysed quadrennially in Table IX. Congenital causes forming less than 10% prior to 1960 increased to 15% in 1964, 15.4% in 1968 and 24% in 1972, with proportionate decrease in acquired causes of blindness for the same period.

### Congenital Causes of Blindness

An analysis of 80 cases of congenital causes of blindness on the register in 1969 is shown in Table X. Of those born blind, the commonest causes were malformation (40%), congenital cataract (20%), optic atrophy (8%) and congenital glaucoma (5%) which was found to be similar to that of a previous analysis made in 1963 (Loh, 1968).

TABLE X

CONGENITAL CAUSES OF BLINDNESS,  
ANALYSIS OF 80 CASES IN 1969  
(Numbers and proportions by cause)

Cause	Number
Cataract	15
Microphthalmos	7
Maldevelopment	5
Optic atrophy	6
Optic disc aplasia	5
Retinal degeneration	4
Nystagmus	4
Glaucoma	4
Corneal opacities	4
Uveitis	4
Retrolental fibroplasia	3
High myopia	3
Coloboma	3
Albino	3
Vascular anomaly	2
Retinal folds	1
Detachment	1
Ectopia lentis	1
Aniridia	1
Retinoblastoma	1
Toxoplasmosis	1
Pseudoglioma	1
Retinitis pigmentosa	1
TOTAL	80

#### Acquired Causes of Blindness

The acquired causes of blindness for the past 23 years, analysed quadrennially, is shown in Table XI. Of those who acquired blindness, glaucoma (28.6%) was the commonest cause prior to 1964, followed by optic atrophy (23.7%), corneal disease (18.5%) and retinal degeneration (9.6%) whilst during 1965—1968 the acquired causes in order of frequency were glaucoma (26.6%), optic atrophy (25.9%), retinal degeneration (17.6%) and corneal disease (5.7%). During the last four years from 1969—1972 the acquired causes were retinal disease (22%), glaucoma (20%), optic atrophy (20%) and corneal disease (12.3%)—thus, a rising figure is seen of those who were born blind and of those who acquired blindness, retinal disease, glaucoma, optic atrophy and corneal disease remain the chief causes.

## DISCUSSION

### Local factors affecting these findings

A decline is seen in blindness due to infections and malnutrition. Thus, Williamson observed in 1953 that keratomalacia, ophthalmia neonatorum and optic atrophy were the common sight destroying conditions prevailing at that time; Loh reported in 1964 that the incidence of keratomalacia was on the decline; by 1972, we could hardly find a case of acute trachoma (Jones, 1972) and xerophthalmia is virtually non-existent, compared with vast areas of India, Pakistan, China and Indonesia where trachoma and xerophthalmia is still rampant. This local decline is a reflection of the improvement in health and developing economy of the country but, as pointed out by Tonkin (1968), affluence and industrialization bring problems of potential blindness. Thus, an increase is seen in congenital and developmental causes of blindness with proportionate decrease in acquired causes of blindness, whilst of those who acquired blindness retinal disease in the elderly is coming into prominence, reflecting an increased affluence and life-expectancy of persons who would not have survived previously with unhealthy genes.

### New Definitions

After 16 years of the adoption of the definition of the World Council for the Blind (1956) and 7 years after the definition of the World Health Organisation contained in the International Classification of Diseases (I.C.D., 1965), the International Association for Prevention of Blindness of the World Council for the Welfare of the Blind called a study group in Geneva in November, 1972 (Tarizzo, 1972) to redefine blindness. Such a change in concept is not unexpected in view of the changing standards of living and social needs of different countries, but the difficulty will lie with adopting a common definition that can be applicable to all. There is no argument about complete blindness but it appeared that the terms severe, moderate and sub-clinical variously used also confused administrators and social service workers, for in addition to visual acuity and field loss, consideration could also be given to other visual characteristics which constituted the sense of vision, meaning accommodation, light and dark adaptation and the like (Holmes, 1972).

### Prospect for the future in Singapore

Prospects for the future in Singapore are reflected in our prevention programmes in terms



TABLE XI  
ACQUIRED CAUSES OF BLINDNESS ANALYSED QUADRENNIALLY,  
1950-1972  
(Numbers and proportions by cause)

Cause	1950-1952	1953-1956	1957-1960	1961-1964	1965-1968	1969-1972	Total
Corneal diseases	17 25%	117 24.8%	72 21.6%	46 18.5%	18 5.7%	32 12.3%	302 19.5%
Uveitis	1 1.4%	28 5.9%	22 6.6%	10 4%	11 3.5%	10 3.8%	82 4.1%
Other inflammation	2 2.9%	26 5.5%	26 7.8%	10 4%	9 2.8%	3 1.1%	75 3.8%
Retinal degeneration	2 2.9%	19 4%	25 7.5%	24 9.6%	55 17.6%	57 22%	180 9.1%
Cataract	1 1.4%	23 4.8%	13 3.9%	23 9.2%	17 5.4%	15 5.8%	88 4.5%
Glaucoma	6 8.8%	98 20.8%	71 21.3%	71 28.6%	83 26.6%	52 20%	380 19.3%
Optic Atrophy	10 14.7%	109 23%	81 24.3%	59 23.7%	81 25.9%	52 20%	389 19.8%
Trauma	0 0%	4 0.8%	5 1.5%	5 2%	6 1.9%	4 1.5%	24 1.2%
Tumour	1 1.4%	0 0	5 1.5%	0 0	0 0	0 0	6 0.3%
Unknown	29 42.6%	49 10.4%	11 3.3%	0 0	0 0	0 0	88 4.4%
<b>TOTAL</b>	<b>68</b>	<b>471</b>	<b>333</b>	<b>248</b>	<b>312</b>	<b>259</b>	<b>1691</b>

of awareness of eye diseases that can cause blindness, safety precautions, adequate diagnosis, prompt treatment and research into causes of blindness (Lim, 1964).

Some success in this direction has already been achieved, e.g. occurrence of retrolental fibroplasia in Singapore of premature babies nursed in incubators declined when the dangers of oxygen were recognised; similarly, pedigrees of families with blindness traits were studied for counselling (Lim and Wong, 1974). Research on ocular trauma, a common cause of instant loss of sight is currently being pursued and it is hoped that data obtained will provide pointers for prevention, backed up if necessary with suggestions for legislation, e.g. eye injuries and blindness from fire-crackers were totally eradicated when these were banned (Lim, 1975).

#### Social Aid

Finally, of those who have been registered blind, in which further remediable treatment is of no avail, their lot can partly be mitigated by

training (Loh, 1968) rehabilitation and acceptance by the sighted so that the blind can still find a dignified place in society and active assistance in this direction is urgently being pursued by the Government Ophthalmic Unit and by the Singapore Association for the Blind (Dudley, 1974) for blindness "is not only of natural interest to all ophthalmologists but it is also of interest to a much wider following in the general public" (Chua, 1968) and our society in Singapore is as much concerned with the challenge in the treatment of the blind as with their rehabilitation.

#### ACKNOWLEDGEMENTS

I am indebted to Miss Santha Dharan, B.Sc., Dip. Soc. Studies I and II, M.S.A.S.W., Medical Social Worker, for the blind registration figures, and to Miss Margaret Pang for typing the manuscript. This paper is presentation No. 2 in a series on the Prevention of Blindness in Singapore. An abstract was presented at the Confer-

ence on the Prevention of Impaired Vision and Blindness, International Association for Prevention of Blindness, held in Paris during May 24-25, 1974.

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