



ICMR BULLETIN

DIRECTOR GENERAL
DR. C. GOPALAN

RESEARCH INFORMATION BULLETIN
DIVISION OF PUBLICATION & INFORMATION
ANSARI NAGAR NEW DELHI-110016

EDITOR
DR. N.D. DATTA BANIK

Vol. 5 No. 10

COMMUNITY HEALTH CELL
326, V Main, I Block
Koramangala
Bangalore-560034
India

October 1975

RESEARCH IN BLINDNESS

Blindness is both a health and a socio-economic problem. India with the exception of Egypt is said to have the highest proportion of blind population in the world. Early reports indicated a total of 2 million blind persons in the country, the figure being based on information collected from the Census of 1941. This figure continued to be quoted till the early sixties even though the population had increased from 350 million to 460 million.

In 1956 the Trachoma Pilot Project of ICMR assisted by WHO carried out a survey on the incidence of blindness. It was estimated that there were at least 3.5 million blind in India. These figures, though not representative of the whole of India as they were obtained from predominantly rural areas, do indicate the enormity of the problem.

EARLIER STUDIES

Trachoma Control Project:

With the Council's emphasis on communicable diseases, it is not surprising that the first major project in the field of blindness was on trachoma, which was undoubtedly one of the most important and preventable causes of blindness in India.

A Trachoma Commission was organised in 1954 with the objective of reviewing the problem of trachoma and recommending the most useful approach to the problem.

In 1956 the Trachoma Control Pilot Project was initiated with the assistance of WHO

and later UNICEF. The project was located at Aligarh and as a part of its programme of research, carried out a survey to determine the prevalence of blindness in the area under study. Defining economically blind as those persons who cannot count (with both eyes open) fingers beyond 2 meter distance, the total number in the rural areas was estimated at nearly 3 million.

VITAMIN A DEFICIENCY & BLINDNESS:

Vitamin A deficiency, an important public health problem in developing countries, is responsible for a large proportion of cases of preventable blindness in India.

Studies on vitamin A deficiency have been in progress for over a decade at the National Institute of Nutrition.

The earlier studies were carried out among the preschool children (the high risk group) in 2 different areas of South India: one in Coonoor and the other in Hyderabad.

One of the outstanding achievements of these studies was the demonstration of the value of a 6 monthly massive oral dose of vitamin A in preventing the severe form of vitamin A deficiency (Keratomalacia), a frequent cause of blindness. This preventive therapy was incorporated in the fourth Five Year Plan by the Government of India and has been adopted in a nation-wide programme. The programme is now in operation in several states of India and a method for its evaluation, even in the absence of baseline data, has been recently developed.

035

THE PREVALENCE OF CORNEAL BLINDNESS IN DIBRUGARH AREA:

A study of the prevalence of corneal blindness in Dibrugarh area was carried out over a period of two years (1970-72). A population of 80,029 persons in 23 wards was screened. When the 27,758 patients attending the Eye OPD of the Assam Medical College were included, a total of 1,07,787 persons had been covered.

The number of corneal blind was found to be 1,744 i.e. 1.7 per cent. The prevalence was higher in the 0-9 years age group and among males. Vitamin A deficiency appeared to be a predominant cause (27.5 per cent) and next in order was trauma. Trachoma was not found to be a common cause of blindness in this area and was more often seen in migrants from other parts of the country. On the whole corneal blindness was associated with poor socio-economic conditions.

PREVALENCE OF TRACHOMA IN CERTAIN ENDEMIC AREAS IN RAMANATHAPURAM DISTRICT:

A study in 1972 on the prevalence of Trachoma on 4,424 school children in Ramanand District of Tamil Nadu revealed that 9.3 per cent of the children (417 cases) were suffering from trachoma.

A PILOT REHABILITATION CENTRE AND MOBILE OPHTHALMOLOGICAL UNIT FOR PERSONS DISABLED BY EYE DISORDERS:

A project for the establishment of a pilot Rehabilitation Centre and Mobile Ophthalmological Unit for Persons Disabled by Eye Disorders was started in 1968 at Chandigarh. The project was planned to provide services to the blind in rural areas at their very door, so as to reintegrate them into family and village life. The village rehabilitation of the incurably blind consisted of providing mobility training, instruction in communication skills, vocational counselling and other needed personal adjustment services. It also planned to establish a mobile unit to identify and treat persons with visual impairment, to undertake rehabilitation of the corneal blind by grafting and to establish low vision and contact lense centre and to develop an undergraduate and graduate training programme in the problems of blindness. The programme of rehabilitating persons disabled by eye disorders has made satisfactory progress.

By the end of 1974, work in 4 rural blocks had been taken in hand and it was planned to include the remaining 5 blocks in the future programme. The Contact Lens and the Low Vision Clinics were well established. In 1974 the former was attended by 1716 patients and 67 eyes showed improvement with contact lenses. Thirty-eight persons attended the Low Vision Clinic and 26 benefited with visual aids.

COORDINATED STUDY OF THE PREVALENCE OF BLINDNESS:

In view of the importance of the problem of blindness and the lack of precise information on the prevalence of this disability in the country, the Council initiated a coordinated project in 1970. Seven centres located in different parts of India i.e. Ahmedabad, Cuttack, Delhi, Indore, Madurai and Varanasi were organised simultaneously. The main aim of this project was to carry out studies on the prevalence and etiology of blindness in the country.

A brief report on the findings of the study is presented. A detailed report is under preparation and will be published as a Technical Report Series of the Council.

Definition of Blindness:

For the purpose of the survey a totally blind person was defined as one who was unable to count fingers beyond 2 meters (vision 2/60 or less). A person with a vision 6/60 or less or when the field of vision was reduced to 20° or less was taken as economically blind. The data presented here pertain to that on economically blind only.

Sampling Design:

The sampling was done on the basis of the 1971 Census figures and whenever 1971 figures were not available, 1961 Census figures were used. In each centre a total of 6 million population was covered and 1 per cent sample of this population was included in the study. The urban/rural ratio was 1:2.

Urban Areas:

The urban population was divided into 2 strata, one with cities with a population of one lakh and above and the other with towns having less than one lakh population. It was



planned to cover 10,000 persons from each stratum. To accomplish this, one city and 4 towns were selected in each urban area. From each area 200 blocks from the city and 50 blocks from each of the 4 towns were included in the study, using random sampling procedure. Finally 10 households were taken from each of the urban blocks using systematic sampling. All members of the selected households were examined by trained screeners and observations recorded on the proformae. Every person categorised as blind on the screening was examined by an ophthalmologist.

Rural Areas:

In the rural areas 11 tehsils were selected at random and 27 villages were included in each of the selected tehsils. Twenty-five households were taken from each of the selected villages by using systematic sampling.

Prevalence of Blindness in Areas Studied:

From the analysed data, it was estimated

that the total prevalence of blindness in India was 14 per 1000 population. On the basis of this information taking the population as 600 million, it may be computed that there are approximately 8.4 million persons with vision 6/60 or less in the country. The survey showed that the prevalence of blindness in urban population was around 11 per 1000, while in the rural population it was 15 per 1000 i.e. a ratio of 2:3.

It is interesting to note that the higher prevalence of blindness in rural areas as compared to urban was seen in all centres, except in those from Indore and Varanasi. A high prevalence for blindness was reported from Cuttak and Madurai. It is perhaps more difficult to explain the relatively high prevalence found in Delhi area. Table 1 gives the prevalence of blindness in the different centres.

TABLE I

Blindness in different geographical areas per 1000 population

Centre	Population covered		One eye		Both eyes	
	Urban	Rural	Urban	Rural	Urban	Rural
Ahmedabad	21568	37120	6.12	7.70	5.06	6.17
Cuttak	20993	33349	5.81	5.99	16.10	3.52
Delhi	21561	44800	7.35	12.46	13.50	20.75
Indore	23586	38368	12.59	3.52	12.63	5.99
Madurai	22023	31898	14.48	9.31	19.30	28.52
Srinagar	20387	24313	2.50	2.92	2.85	5.64
Varanasi	18170	37625	11.01	6.46	7.32	5.64

Sex:

Prevalence of blindness appeared to be higher in females than in males. This may be associated with the fact that the majority of Indian women are housewives and do not receive medical treatment till the visual deterioration becomes a handicap in their day to day life, for which visual requirement is of a lower order.

Age:

The survey showed that prevalence of

blindness increased with advancement of age. It is suggested that this may, to some extent, be a cumulative effect of blindness carried over from the younger to the older age groups and may also indicate that blindness in childhood was often untreated or incurable.

Religion:

The prevalence of blindness is markedly higher among the Hindus as compared to the Muslims: the ratio being 2:1. This was found both in urban and rural areas and is contrary

to the usual concept. Muslims do have a higher prevalence of trachoma, but with the use of chemotherapeutic and antibiotic agents and the improvement in socio-economic conditions, this condition has ceased to be a major cause of corneal blindness. Sikhs featured in fair numbers in the Delhi and Srinagar figures and the prevalence of blindness was of the same level as among the Hindus.

Jains formed a significant part of the Ahmedabad urban and rural and Indore urban surveys. It was noted that the prevalence of blindness in this community was relatively high.

Occupation:

For the purpose of the survey, different types of activities were grouped into 5 major categories: professional workers, clerical workers, farmers, craftsmen and a non-earning group consisting of students, retired persons and housewives. The prevalence of blindness in relation to occupation was estimated in both urban and rural areas. Considering only males, the prevalence rate among farmers, a major group in rural areas, was between 4-40 per 1000 blind in both eyes and 4-7 per 1000 in one eye. The rate among professional workers (urban areas) ranged between 3-11 per 1000 in both eyes and 8-30 per 1000 in one eye. The non-earning group (urban areas) showed a prevalence rate of 3-15 per 1000 blind in both eyes and 1-7 per 1000 blind in one eye.

Major causes of blindness in India:

The survey indicated that diseases of the anterior segment of the eye are the most common causes of blindness in India. The prevalence of cataract and corneal pathology was higher in rural areas while diseases of the uvea, retina and optic nerve were slightly more common among urban population. Blindness as a result of cataract was twice as frequent in rural areas in comparison to urban areas. This possibly could be due to relative paucity of treatment facilities in the rural areas. The highest figures for blindness following cataract were obtained from the rural areas of Cuttak and Madurai Centres: the prevalence being 38 per 1000 in Cuttak and 25 per 1000 in Madurai.

Need for Ophthalmic Services:

Cataract, glaucoma and corneal diseases, the commonest causes of blindness in India, are conditions which require early diagnosis and treatment facilities. The great need for intensive and continued ophthalmic services in the country requires no emphasis.

The economic liability to the nation and to the family caused by blindness is enormous. A way to prevent this dreadful deformity would be to ensure early and accurate diagnosis by providing better training in the subject of ophthalmology to the medical graduates and short term refresher courses to the medical practitioners.

ABSTRACTS

Some Research Projects completed in 1974

OPHTHALMOLOGY

GABA in visual system following stimulation with light or in its absence

Experiments were conducted on healthy adult albino rabbits without any ocular pathology of either sex. The study revealed that GABA the proposed neuroinhibitory substance is present in all the tissues of visual pathways having neural cells and synapses. There is no significant change in the levels of GABA following adaptation to any condition of environmental illumination that was employed (viz. continuous illumination of 2000 lux, red and blue light of 602 nm and 532 nm respectively, and total darkness) or under any of the

three experimental pathological conditions of the retina and optic pathways (viz. oral alcohol poisoning, complete sectioning of optic nerves and blockage of all the four vortex veins).

However, it was notable that various types of environmental illuminations employed seem to, by and large, diminish most of the predominant free amino acids of the pool in the different tissues of the visual pathways. A similar, though less, marked generalised decrease of the free amino acids was also found in the retina following some of the experimental pathological degenerative conditions. Furthermore, it was noted that along with the diminished levels of various free

amino acids, there was also a decrease of total proteins, which was without any concomitant or specific changes in the ribonucleic acids estimated.

The electrophysiological alterations, as demonstrated by various workers, in visual pathways following exposure to various types of environmental illumination and in the three types of experimental pathological degenerative conditions of retina did not seem to have any quantitative or qualitative specific correlation with the biochemical parameters investigated.

S. Goswamy
Dr. R.P. Centre for Ophthalmic Sciences
All India Institute of Medical Sciences
New Delhi.

Aetiopathogenesis of Contracted Socket

Experiments were conducted on adult rhesus monkeys of 2-3 years of age with one of the two eyes enucleated. An experimental model for study of contracted socket was set up. This simulated the clinical condition seen in human beings and permitted a critical evaluation of the various parameters which were supposed to be responsible for production of clinical condition of contracted socket. Again in the same model it was possible to study the various preventive measures too. In the study it was observed that the presence of infection adversely affected the process of contracture. The vertical suturing of conjunctiva seemed to help in reducing the incidence of shallowing of fornices. Early insertion of prosthesis was seen to reduce the degree of contractures.

Histologically it was found that presence of prosthesis increased the degree of lymphoid hyperplasia, squamous cell metaplasia and hyperplasia and hypertrophy of the goblet cells. Cartilagenous metaplasia was observed for the first time in the orbital tissues. The insertion of the bone implant could favourably modify the process of contracture.

Y. Dayal
Dr. R.P. Centre for Ophthalmic Sciences
All India Institute of Medical Sciences
New Delhi.

Immunological studies in keratoconjunctivitis

A preliminary study has been carried out in cases of Keratoconjunctivitis which were

divided into three groups: Group A - Keratoconjunctivitis sicca only (11 cases); Group B - Keratoconjunctivitis sicca and rheumatoid arthritis (17 cases); Group C - Keratoconjunctivitis and Xerostomia (2 cases). Abnormal immunological reactions were seen in all the groups but were minimum in Group A and maximum in Group B. Out of group B maximum changes were observed in 4 female cases having keratoconjunctivitis sicca, xerostomia and rheumatoid arthritis. These were labelled as cases of definite sjogren syndrome and patients having keratoconjunctivitis sicca and rheumatoid arthritis only, were labelled as having possible sjogren syndrome.

Because of minimum immunological changes in pure keratoconjunctivitis sicca cases, it was difficult to postulate auto-immunity as the basis for its aetiopathogenesis. Trachoma also does not appear to play any role in its aetiology. No clear relationship between pure keratoconjunctivitis sicca and sjogren syndrome could be established. But it was felt that pure keratoconjunctivitis sicca could be the earliest manifestation of the sjogren syndrome. With the passage of time, either components of sjogren syndrome may appear and more and more of immunological reactions may become positive. But there is no evidence to support this hypothesis in the present study. In the present study, positive antinuclear factor and positive thyroid antibodies were much less and no case showed LE cell phenomenon and antibodies against lacrimal gland, so it was felt that there is a different spectrum of this disease in this geographical area.

S.D. Gupta
Postgraduate Institute of Medical
Education and Research
Chandigarh.

Fluorescein Fundus Photography in normal and various types of retinopathies

The study of various retinopathies was carried out and Fluorescein Fundus Photography was standardised, for which an old retinophot camera was suitably modified. During the course of this enquiry 900 angiographs were carried out which included diabetic retinopathy (70), hypertensive retinopathy (67), retinopathy of iron deficiency anaemias (72), central nervous retinopathy (78), phlebitic retinopathy and presumed sickle retinopathy (110), methyl alcohol retinopathy (7), circi-

nate retinopathy and a wide range of fundus lesions.

Fluorescein angiography revealed that the frequency of disc oedema in Anaemic Retinopathy was much higher (found in 50 per cent of eyes), than hitherto recognised. Microaneurysm, soft exudate and a peculiar prominence of the capillary system on the fluorescence photographs were some of the interesting findings. In cases of methyl alcohol poisoning there was an initial disc oedema with a clinical picture of papillitis followed by optic atrophy with deep excavation of the cup. There was a distinct peripapillary vascular atrophy similar to glaucomatous discs. The most interesting finding was a damage to the pigment epithelium. Circinate retinopathy could develop in a variety of conditions where there was a leakage of fluorescein to the subretinal space. It was established by both horizontal and vertical studies that whatever may be the etiology a phlebitis of sufficient severity can lead to a clinical picture of Eales's disease. (Phlebitic retinopathy).

S.R.K. Malik
Deptt. of Ophthalmology
Maulana Azad Medical College
New Delhi.

Comparative evaluation of Immuno-suppressive agents in corneal graft reaction

The results obtained will be useful to clinicians. It was inferred from the study that the corticosteroids are the best immuno-suppressive agents as they suppress graft reaction in as high as 90 per cent of cases and are free from serious systemic side effects. They can also reverse an established graft reaction. Mitomycin-C has good immuno-suppressive effects but is not free from serious side effects, and requires more elabo-

rate clinical studies before its clinical application. Irradiation and Chloromycetin, though produce profound immunosuppressive effects have serious systemic side effects and prove fatal in high percentage of cases. Antilymphocytic serum is a potent immunosuppressive agent but it has serious side effects in the form of anaphylactic reaction and marked haemopoietic depression.

S.R.K. Malik
Deptt. of Ophthalmology
Maulana Azad Medical College
New Delhi.

Relationship of Cup-Disc ratio to tonometry, tonography, central field changes after raising the intraocular pressure artificially in normal eyes

Normal cases with clear media and corrected vision better than 6/12 were picked up and studied at random from the eye outpatients departments. It was found that the susceptibility to field defect on artificially raised intraocular pressure had a direct correlation with the Cup-Disc (area) ratio of high statistical significance ($P < 0.001$). In other words, persons with high Cup-Disc ratio are more susceptible to field defects if affected with glaucoma. The Cup-Disc ratio has no significant relationship with age, sex, intraocular pressure and out flow facility.

The Cup-Disc ratio on the basis of their areas was found to be most accurate and fairly practical. It can be obtained in 5 minutes by use of Polar Planimeter, a slit lamp with funduscopy arrangements and an ocular micrometer.

B. Patnaik
Department of Ophthalmology
Maulana Azad Medical College
New Delhi.

ICMR NEWS

Dr. Usha K. Luthra, Deputy Director-General, Indian Council of Medical Research, participated in Second Asian Cancer Conference held at Singapore from September 22 to 25, 1975. She presented a paper entitled "Prevalence and distribution of cancer of the uterine cervix in an urban population of Delhi".

Dr. Vijai Dhanda, Assistant Director, Virus Research Centre, Poona has been deputed to

Fiji and Tonga islands for carrying out investigations of the outbreak of Dengue-like fever and to advise methods of Vector Control for a period of three months w.e.f. September 15, 1975.

Dr. A.J. Baxi, Senior Research Officer, Blood Group Reference Centre, Bombay has proceeded to Australia to avail himself of the WHO Research Training Grant for study in the field

of "Biochemical genetics-iso-enzyme polymorphism" at the Australian National University, Canberra, Australia for a period of six months from September 20, 1975.

Dr. (Mrs.) Shanta S. Rao, Deputy Director, Institute for Research in Reproduction, Bombay attended Third International Symposium of Reproduction held at Varna, Bulgaria from September 21 to 25, 1975.

Dr. (Mrs.) R.A. Vaidya, Senior Research Officer Institute for Research in Reproduction, Bombay

attended the meeting of WHO Task Force on methods to regulate sperm migration and survival in Human Female (Section on intravaginal medication) at Geneva from September 25 to 27, 1975.

Shri D.A. Gadkari, Assistant Research Officer, Virus Research Centre, Poona has proceeded to U.K. to avail himself of the Commonwealth Research Training Grant for Study in the field of Virology at the University of Glasgow to be held from October 1, 1975 to July 10, 1977.

LIST OF TOPICS AND DATES OF WEEKLY SYMPOSIA/LECTURES TO BE
HELD ON SATURDAYS AT 3.30 P.M. IN ICMR OFFICE, NEW DELHI
DURING OCTOBER - NOVEMBER, 1975

Date	Topic	Speaker(s)
4.10.1975	Guineaworm and Hydatid diseases in Andhra Pradesh	Dr. C.R.R.M. Reddy, Visakhapatnam.
18.10.1975	Mental functions and role of pyridoxine in Pellagra	Dr. Kamala Krishnaswamy, Hyderabad.
25.10.1975	Management of Burns	Dr. J.L. Gupta, New Delhi.
1.11.1975	The role of hormones in the evolution of Kwashiorkor and marasmus (Dr. V.N. Patwardhan Oration)	Dr. Kamala S. Jaya Rao, Hyderabad
15.11.1975	Hypnosis and its medical applications	Dr. H. Jana, Ahmedabad.
22.11.1975	Thyroid Physiology and Radioimmunoassay	Dr. G.K. Rastogi, Chandigarh.
29.11.1975	Biologically active components of Cobra venom in relation to cancer research (Sandoz Oration)	Dr. B.M. Braganca, Bombay

INDIAN COUNCIL OF MEDICAL RESEARCH
TECHNICAL REPORT SERIES

- | | |
|---|--|
| 1. Research in Medical Education 1970 | 5. Exfoliative Cytology 1971 |
| 2. Research in Health Practices 1970 | 6. Symposium on Nutrition and Heart Disease 1971 |
| 3. Acute Encephalopathy Syndrome in Children 1970. | 7. Developments in Industrial Psychology in India 1971 |
| 4. Technical Review on Pneumoconiosis in India 1970 | 8. Study Group in Urolithiasis 1971 |

9. Proceedings of Seminar on Immunity and Immunoprophylaxis in Cholera 1971
 10. Assessment of the National Filaria Control Programme (India 1961-70) 1971
 11. Diagnosis and Treatment of Pesticide Poisoning 1971
 12. Symposium on Clinical Evaluation of new Drugs 1972
 13. Techniques in Blood Group Serology 1972
 14. Laboratory Methods in Investigation of Thyroid Diseases 1972
 15. Symposium on 'Health in Relation to Work & Heat Stress in Place of Work' 1972
 16. Young Scientific Workers' Conference held in March 1973 (in press)
 17. Proceedings of the First Annual Meetings of the Indian Academy of Cytologists 1972
 18. Growth and Physical Development of Indian Infants and Children 1972
 19. Review of Work Done in Rural Water Supply in India 1972
 20. Genetics and our Health 1972
 21. All India Conference on Research in Reproduction and Fertility 1973
 22. A study of Morbidity Patterns and Standard of Medical Care in the Rural Health Centres of West Bengal 1973
 23. Proceedings of the First All-India Workshop Conference on Stroke, 1971
 24. Proceedings of Seminar on Infectious Hepatitis and Study Group on Australia Antigen, 1971
 25. Atlas of Histopathology of Liver: Hepatitis and Cirrhosis, 1974
 26. Studies on Pre-school Children 1974.
 27. Studies on Weaning and Supplementary Foods 1974.
- (Price Rs.4/- each except No.25 = Rs.10/-)

(Available from Division of Publication & Information, Indian Council of Medical Research, Ansari Nagar, New Delhi-110016)

EDITORIAL BOARD

Chairman

Dr. C. Gopalan
Director-General

Editor

Dr. N.D. Datta Banik

Members

Prof. Usha K. Luthra
Dr. Sabita Tejuja
Dr. A.D. Taskar
Dr. S.V. Apte

Printed and Published by Shri Prem Chand for the Indian Council of Medical Research, New Delhi at the ICMR Offset Press, New Delhi.

R.N. 21813/71