

Prevalence

A survey of childhood blindness in three schools for the blind in Zambia



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Aim: To assess the causes and distribution of blindness in children in three schools for the blind in Zambia, and to estimate the average cost of primary education per child per year. The results of this study will be used to develop baseline data for planning a nationwide intervention.

Methods: This was a descriptive, cross-sectional study with a quantitative component, conducted in three schools for the blind in Zambia. The World Health Organization Prevention of Blindness childhood blindness proforma was used to collect data and a questionnaire on cost was developed and administered to the head teachers. The data were recorded in Excel and analysed in the Epi Info™ statistical software package, version 6.

Results: A total of 133 children were examined. The sex distribution was 91 males (68.4%) and 42 females (31.6%), giving a male to female ratio of 2.2:1. The age range was 6–24 years with a mean age of 13.9 years. A total of 64.7% of the children were below 16 years of age. Whereas 1.5% of the children were found to have no visual impairment, the majority (60.9%) were blind. The major anatomical site for visual loss was the retina (30.8%). Oculo-cutaneous albinism accounted for 68.3% of all visual loss affecting the retina. Hereditary diseases (36.8%) were the most common cause. Measles and vitamin A deficiency combined accounted for 65.2% of all causes due to childhood factors. A total of 60.2% of children were blind from conditions that could have been avoided. Fifty per cent of children changed visual status from blind to severely visually impaired after refraction. Overall, 23.3% of children were recommended for enrolment into mainstream education. The three schools had unique features, which meant there was a wide variation between them in the total yearly cost per pupil. It was therefore not possible to determine a yearly cost per child that could be used as a guide for the whole country.

Conclusion: If low vision aids are provided, a significant proportion of visually impaired children can be given the same opportunities and educational experiences as sighted children.

Using the key informant method to investigate childhood blindness related to vitamin A deficiency disorder in six rural sub-districts in Bangladesh



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Aim: This study was undertaken to assess the prevalence, causes, and risk factors of childhood blindness related to vitamin A deficiency disorder (VADD) in six rural sub-districts in Bangladesh.

Methods: The study was carried out in rural sub-districts of Kishoreganj during June and July 2006. Risk factors of VADD-related childhood blindness were explored in six rural sub-districts. The key informant method of identifying blind children was used for the study. Key informants are unpaid volunteers from the local community who know their community very well. After receiving training from the field team of the Child Sight Foundation, the key informants had two weeks to identify blind children and motivate parents to bring the child for an eye examination. A cross-sectional study design was used to determine the prevalence and causes of childhood blindness for the Kishoreganj district. A case-control study was carried out to

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QUALITATIVE AND QUANTITATIVE METHODS

When to use which method

Qualitative methods	Quantitative methods
Use when the research question requires narrative data or data about meaning, e.g. patients' attitudes towards a new treatment, or the reasons that women do not come for cataract surgery	Use when the research question requires numerical data, e.g. the number of people affected by a specific condition or the risk factors for a particular disease
Use when the subject matter is unclear or unknown, e.g. health-seeking behaviour, personal experiences, or perceptions	Use when the subject matter is or can be clearly defined, e.g. blindness is defined as visual acuity <3/60 in the better eye
Use when variables are unknown or the definition is unclear, e.g. providers' or consumers' definitions of cataract blindness	Use when the condition can be measured, e.g. visual acuity can be measured with a Snellen chart
Use when there is a need to explain or relate aspects of behaviour to a wider context, e.g. lack of transport as a barrier to the uptake of cataract services	Use when there is no need to explain or relate findings to social or cultural settings because the situation is well understood, e.g. the prevalence of trichiasis cases in a region where trachoma is endemic
Use when a flexible methodology is needed which can expand as issues are explored in depth and which allows for the discovery of the unexpected	Use when the research is designed in advance and the methodology is to be repeated with accuracy at different times and places
Use when it is important to study issues in depth and in detail	Use when it is important to be able to generalise results and make comparisons across populations

Comparing qualitative and quantitative methods

	Qualitative methods	Quantitative methods
Methods	In-depth interviews, focus group discussions, observation, etc; requires capturing data through field notes, audio/video recording and transcription	Examination and/or structured interviews, followed by recording of findings on a data-recording form specifically designed for the study
Participants	Individuals or groups identified as having insight, experience, or information relevant to the study	Clearly defined, selected sample which needs to be representative of the target population
Sample size	Not random sampling, but requires a clear sampling strategy to select appropriate respondents; sampling may continue until redundancy or 'saturation', i.e. when no new information is elicited	Uses a random sample of predetermined size which is decided at the outset of the study and should not be changed
Analysis	Interactive process that requires immersion in the raw data, identification of common patterns and themes, and interpretation of meanings; can be done manually or with qualitative data analysis software	Requires data entry into a database, followed by analysis using statistical methods

explore the risk factors of VADD-related childhood blindness.

Results: Prevalence of childhood blindness in Kishoreganj was found to be 1.03/1,000 children; 32.7% of all children with severe visual impairment/blindness (SVI/BL) had lens disorders leading to blindness. Corneal opacity was the cause of SVI/BL in 23.4% of the study children. Thirty per cent of children were severely visually impaired or blind due to hereditary diseases and 27.1% were severely visually impaired or blind due to childhood factors. Overall, 37.8% children were severely visually impaired or blind due to treatable eye conditions. Illiteracy of mother (odds ratio [OR]=2.45), illiteracy of father (OR=1.74), mother's disease in pregnancy (OR=3.74), child not receiving vitamin A capsule during diarrhoea (OR=5.01), and child not receiving vitamin A capsule during measles (OR=3.88) appeared as significant risk factors for VADD-related childhood blindness. The following were found to be significant protective factors against vitamin A deficiency in children: child immunised against measles (OR=0.10); colostrum given to child (OR=0.15); child breastfed (OR=0.13); child given dark green leafy vegetables (OR=0.01); child given meat/fish/eggs (OR=0.08); oil/fat used in child's food (OR=0.14); vitamin A capsule given to child in last year (OR=0.31); vitamin A-rich food eaten during pregnancy (OR=0.02); and antihelmintics given to child (OR=0.15).

Conclusion: A comprehensive and integrated programme is needed to control the high prevalence of childhood blindness in the Kishoreganj district. The control programme should include primary prevention strategies for VADD-related blindness, strategies to identify children with eye disease at an early age, and referral and treatment of children with cataract. These programmes should take a primary eye care approach to highlight the risk factors and protective factors of VADD-related blindness in children.

Khumbo Kalua



Children waiting to be screened for eye problems surround Khumbo Kalua in Chikwawa district. MALAWI

Use of key informants in determining the magnitude and causes of childhood blindness in Chikwawa district, southern Malawi



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Background: Population-based studies to determine the magnitude and causes of childhood blindness require very large sample sizes and are very costly. Alternative methods such as the key informant method (which is cheap and easy to use) have been found to be as reliable as population-based studies in settings where the population is very dense.

Aims: To determine the magnitude and causes of childhood blindness in Chikwawa district, Malawi, using the key informant method; to see how this method can be used in a setting of low population density, where the population is widely dispersed.

Methods: Key informants are local people who know their community well. They were randomly selected by the communities themselves and trained for one day in techniques to identify children in the community who are blind. Each key informant covered on average 4–7 villages which were widely dispersed. Identified children were examined by the ophthalmologist to confirm the diagnosis.

Results: A group of 44 key informants was selected and trained. There were more female (80%) than male (20%) key informants. The key informants correctly identified 37 children who were blind in 196 villages (86% of the expected number from the area). The prevalence of childhood blindness was found to be 0.09%. Cataract was found to be the most common cause (35%) of childhood blindness, followed by corneal scarring (22%).

Conclusion: The key informant method was found to be cheap and useful in identifying children who are blind, even in areas where the population is widely dispersed. We recommend that this method be used to identify children who are blind in other districts of Malawi and where population-based surveys cannot be conducted.

Lutful Husain



Blind children identified during Lutful Husain's key informant study, conducted in collaboration with the Child Sight Foundation. BANGLADESH

Muhammad Muhtit



The Child Sight Foundation team. BANGLADESH

A national survey of visual impairment in Botswana



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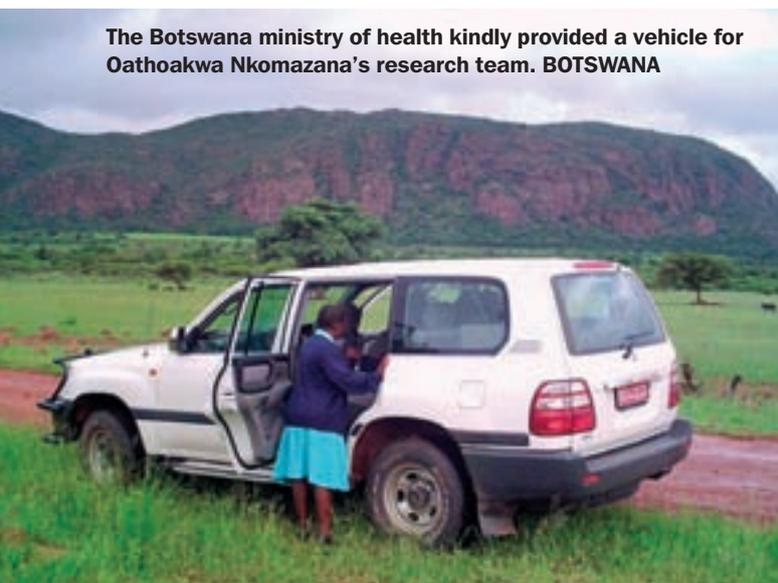
Aims: To estimate the prevalence and determine the causes of visual impairment in people aged 50 years and older in Botswana, and to assess cataract surgical services in the country.

Methods: Multi-stage cluster randomised sampling with probability proportional to size was used to select a cross-sectional, nationally representative sample of 2,662 adults aged 50 years and older. Demographic details were collected for each of the subjects. This was followed by measurement of distance visual acuity. The crystalline lenses of all the subjects were examined for cataract. All those whose vision did not improve to 6/18 with pinhole had their pupils dilated with a short-acting mydriatic and their fundus examined. Subjects with vision <6/60 due to cataract were asked why they had not had surgery. Blindness was defined as vision <3/60 in the better eye with available correction and visual impairment as vision <6/18 in the better eye with available correction. The convention used by the World Health Organization, of assigning the major cause to the disorder most amenable to treatment, was used for those with more than one disorder causing visual impairment.

Results: A total of 2,127 eligible subjects were examined (79.9% response rate) from 55 clusters. Of those, 130 were blind. The age- and sex-standardised prevalence of blindness was calculated to be 3.69% (95% confidence interval [CI] 2.38–5.00%). A total of 56 had severe visual impairment (age- and sex-standardised prevalence of 1.69%, 95% CI 1.04–2.33%). The main causes of blindness were cataract (46.9%), diabetic retinopathy (20.0%), non-trachomatous corneal opacities (13.1%), and trachoma (6.2%). Cataract was also the main cause of both severe (58.9%) and moderate (40.2%) visual impairment. Refractive errors were responsible for 38.5% of moderate visual impairment. In total, 55 (37%) of the eyes had best corrected vision <6/60 after cataract surgery. The age- and sex-standardised cataract surgical coverage for vision <3/60 was 66.5% for persons and 40.9% for eyes. For both blind and severely visually impaired people, the main reason given for not seeking surgery for cataract was lack of awareness of the presence of cataract. For those who were bilaterally blind, this was followed by lack of escort and cost of surgery. For those who were blind in one eye, fear of the operation ranked second, followed by lack of escort and the cost of surgery.

Conclusion: There are an estimated 6,370 adults aged 50 years and older who are blind in Botswana. The majority of them are blind from operable cataract. There is a need to provide high-volume, high-quality, efficient and accessible cataract surgical services in Botswana to address cataract blindness. Strategies also need to be developed to combat blindness secondary to corneal scarring and diabetic retinopathy.

The Botswana ministry of health kindly provided a vehicle for Oathokwa Nkomazana's research team. BOTSWANA



Prevalence of blindness and low vision in Sawah Kulon village, Purwakarta district, West Java, Indonesia



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Background: In order to provide comprehensive eye care in a district, it is important to determine the prevalence and causes of visual impairment. Studies done in various parts of the world have identified a large proportion of treatable causes of blindness in people aged 40 years and older.

Aim: To conduct the first study to assess the prevalence of blindness and low vision in Sawah Kulon, Purwakarta district, West Java, Indonesia, where there is a primary health care centre.

Methods: Census data were used to design the survey. A sample size of 1,102 people aged 40 years and older was calculated for this district. Enumeration and door-to-door visual acuity examinations were performed for all persons aged 40 years and older. Further eye examinations were conducted by an ophthalmologist on people with visual acuity <6/18. Differences in the prevalence of blindness associated with age group, sex, and economic status were explored using stratified analyses.

Results: Blindness and low vision were found in 1.67% and 6.05% of the sample, respectively. Blindness and low vision increased significantly with increasing age; these conditions were also twice as high in females as in males. They were higher in people with lower income, although this was not statistically significant. Cataract was the principal cause of low vision (70.7% of people) and blindness (62.5% of people). Refractive error was responsible for 20.7% of blindness and 25.0% of low vision.

Conclusion: These data will be valuable in planning appropriate services in this district. People with lower income have poorer access to services and local health services need to be developed appropriately.

Diabetic retinopathy: analysing the Pakistan survey and evaluating local resources



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Aims: To estimate the prevalence of diabetic retinopathy (DR) in adults in Pakistan, to estimate the current service facilities for DR treatment in the province of Sindh, and to compare the current infrastructure with similar data collected in 1998 in order to provide evidence that can be used for provincial planning of diabetic eye services in Sindh.

Methods: The data of the recent Pakistan National Blindness and Visual Impairment Survey were analysed to calculate the prevalence of DR and to identify risk factors. Statistical methods used to assess association between the variables included summary statistics, simple cross-tabulation, and Mantel-Haenzel odds ratios (OR). Two community ophthalmologists from the department of ophthalmology at Dow University of Health and Sciences (Karachi) collected information about available infrastructure and human resources from all government tertiary centres and non-government hospitals which had treatment facilities for DR. This was performed under supervision of the provincial co-ordinator of the prevention and control of blindness programme in Sindh. Relevant information was collected using a data collection form based on one developed

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in a previous study. This allowed comparisons within Sindh province to be made. Additional data on the availability of fundus fluorescein angiography (FFA) were collected.

Results: A total of 17,311 adults (aged 30 and older) were enumerated for the survey. Among the 16,507 subjects examined, 660 diabetic patients were identified. Of these, 101 (15.3%) exhibited evidence of DR. The overall prevalence of diabetes was 4% and the overall prevalence of DR was 0.6%. The odds ratio (OR) of DR was higher in adult diabetic subjects living in urban areas (OR 2.7, 95% confidence interval [CI] 1.08–4.1) compared to those living in rural areas. The risk was also higher in hypertensive (OR 2.77, 95% CI 1.0–4.1) and obese (body mass index >30) participants (OR 2.2, 95% CI 1.7–4.2). Government sector hospitals provided better diabetic eye care services in terms of diagnosis (100% had diagnostic facilities) and treatment (85% had functional laser facilities), compared to the situation in 1998 (when only 50% had functional lasers). Twenty per cent of government tertiary centres and 50% of non-government hospitals had FFA capability. We found the same picture as in 1998 regarding vitreo-retinal surgical facilities.

Conclusion: The burden of blindness due to diabetic retinopathy can be reduced by good planning. Equal distribution of resources among the rural and urban areas must be targeted to obtain a comprehensive diabetic eye care programme. There has been some training of human resources for the management of DR, but it needs to be improved. Further research regarding the affordability of the service is required.

Rapid assessment of avoidable blindness in Kunming, China



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Background: According to global estimates by the World Health Organization (WHO), there were 141 million people with visual impairment in 2002 and cataract was then the leading cause of blindness. A national survey of China in 1987 suggested that the prevalence of blindness (as defined by the WHO) was 0.42% for all ages.

Aim: To evaluate the prevalence and causes of visual impairment in people aged 50 and older in Kunming, China.

Methods: A population-based cross-sectional study was conducted using multi-stage cluster sampling (including probability proportional to size, compacted segment and non-compacted segment sampling) to select 46 clusters of 60 individuals, each over 50 years of age. The standardised protocol for rapid assessment of avoidable blindness (RAAB) was used to identify people with visual impairment (VI) and ophthalmic examination was used to determine the main cause of VI. The RAAB software package and STATA 9 software were used to enter and analyse data.

Results: A total of 2,588 people from the sample of 2,760 were examined. Age- and sex-standardised prevalence of blindness (available corrected visual acuity <3/60 in the better eye) was 2.7%. It was 2.3% for severe visual impairment (SVI) and 7.2% for VI. The main causes of blindness were cataract (63.2%), other corneal scarring (14.7%), and glaucoma (7.4%). In total, 84.2% of blindness was avoidable, including cataract, other corneal scarring, uncorrected aphakia, and surgical complications. Cost was the most common barrier to cataract surgery. Cataract surgical coverage (CSC) in persons with best corrected visual acuity <3/60 was 58.9%. Cataract operations had a good outcome (visual acuity ≥6/18) in 43% of operated eyes.

Conclusion: The prevalence of blindness in Kunming is relatively high. The leading cause of blindness, SVI, and VI is still cataract. CSC is quite low and the outcome of cataract surgery is poor in the survey area.

Aldo Nogueira



Miriam Cano examines a patient in the ophthalmic ward of the Social Security Institute (IPS) Central Hospital, PARAGUAY

Prevalence and perceptions

Prevalence of diabetic retinopathy and barriers to uptake of eye care services by diabetic patients at the Social Security Institute Central Hospital in Asunción, Paraguay



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Aims: To estimate the prevalence of diabetic retinopathy (DR) among patients at the endocrinology department of the Social Security Institute (IPS) Central Hospital, Paraguay, and to explore the health-seeking behaviour of diabetic patients.

Methods: We randomly selected 307 patients from all diabetic patients attending the endocrinology clinic in order to establish the presence or absence of DR. Systemic and ophthalmic data were collected using questionnaires. DR was classified according to international disease severity scales for clinical diabetic retinopathy and diabetic macular oedema. Blindness and visual impairment were measured according to the grading system of the World Health Organization. Two focus groups, one comprising patients with visual impairment due to DR and another comprising diabetic patients with normal vision, were identified through purposive sampling. Patient behaviour with regards to seeking health care was explored in both groups. Quantitative data were analysed using EpiData and Stata, and a thematic framework was developed for the qualitative analysis.

Results: Of the 307 diabetic patients examined, 113 (36.8%) were male and 194 (63.2%) were female. A total of 304 (99%) patients had type-2 diabetes and three had type-1 diabetes (0.9%). Eighty-nine patients (29%) had some level of visual impairment. Of these, 16 were blind, a prevalence of 5.2% (blindness from all causes). DR accounted for 33% of visual impairment and 43.8% of blindness. The overall prevalence of blindness from DR was 2.28%, while 149 patients (48.53%) had some level of DR. Diabetic macular oedema was present in 88 patients (28.7%). Proliferative DR was

present in 26 of all patients (8.5%). The risk of getting DR was on average 1.9 times higher for every five years a patient had suffered from diabetes. Associations with other risk factors such as high blood pressure, body mass index, or HbA1c level were not significant in this study. The most important issues raised by the qualitative study included a general lack of awareness about diabetes and its possible complications, denial of the disease, and fear of going blind once DR had become established.

Conclusion: Findings from the study in the IPS Central Hospital in Paraguay suggest that diabetic retinopathy is an important public health problem. We highly recommend that a systematic screening programme be implemented to diagnose and treat DR earlier. Some of the issues encountered in the qualitative part of the study included lack of awareness about the serious complications of diabetes and difficulty coping with or accepting the disease. These results call for an urgent improvement of health education and promotion, as well as the provision of social services to patients.

Genetic eye diseases and genetic counselling services in Egypt



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Background: Available data suggest that two-thirds of childhood blindness in the Middle East is due to genetic diseases (with a prevalence ranging from 47% in Tunisia to 86% in Kuwait) and that autosomal recessive disorders, attributed to high rates of consanguineous marriage (between blood relatives), are common. Consanguineous marriage is common in Egypt (40%) and genetic eye diseases are assumed to cause at least half of all cases of childhood blindness. Genetic counselling services have been recommended by the World Health Organization as a potential control measure, but these services have not been evaluated with respect to eye diseases in children.

Aims: To assess the availability and level of use of genetic counselling services in Egypt, to evaluate parents' attitudes towards and satisfaction with these services, and to assess ethno-cultural beliefs about the causes of genetic disorders.

Methods: In-depth interviews were carried out in Egypt with consumers of the service (the parents of affected children) and service providers (ophthalmologists and geneticists).

Results: There are no guidelines for referral to genetic counselling services, and referral by ophthalmologists is affected by their personal experiences and research activities. The parents of affected children interviewed were satisfied with the service provided and the geneticists interviewed were qualified and highly skilled. However, services are insufficient and there are long waiting lists. The main barriers to service uptake were lack of motivation by parents, cost, long waiting lists, distance, and lack of awareness among doctors. Many parents attributed the condition of their child to the will of Allah, while doctors thought consanguinity to be the cause. Parents' perceptions of the term 'genetic disease' varied, but the majority understood it to mean a condition inherited within the family. The main motivation for seeking advice was to discover the risk of having another affected child. Parents were compliant with doctors' advice, but they often found it difficult to understand the level of risk. Abortion is prohibited in Islam and mothers were often blamed, even by other women, for their child's blindness. The possible consequences of genetic diseases were reported as divorce, husband taking another wife, social stigma, having no more children, and financial difficulties.

Conclusion: Genetic eye diseases are prevalent in Egypt, where they are due to high rates of consanguineous marriages. Genetic counselling services have the potential to reduce the prevalence of genetic disorders, but education and community support are needed to maximise the efficiency of such programmes.

Visual impairment in leprosy patients in northern Viet Nam



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Background: The visual impairment suffered by leprosy patients is an additional health burden often overlooked by health service providers. The prevalence of visual impairment and blindness is higher among leprosy patients than in the wider population, and it occurs as a complication of the disease or as part of the ageing process. Various studies have found that the prevalence of visual impairment is about 15% in patients who have had leprosy for less than 10 years, increasing to 40% in those who have had leprosy for 15 years or more. Eye care services in lepro-saria are often neglected or under-utilised by patients. It is necessary to know the prevalence and causes of visual impairment and blindness, and to investigate existing eye care practices, in order to improve utilisation of eye care services and to allocate appropriate resources.

Methods: One of the largest and oldest leprosy villages in northern Viet Nam was selected for this study. All the residents of this leprosarium (all of whom have leprosy) were invited to participate and examined for visual impairment and blindness. Patients who would have benefited from eye surgery, but who had not taken it up, were interviewed about their reasons. Responses were recorded on the questionnaire.

Results: A total of 403 patients were seen at the leprosarium. The prevalence of blindness was 9.9% and that of visual impairment, 24.1%. Cataract was the most common cause of blindness (57.5%) and of visual impairment (83.5%). Corneal opacity, from exposure keratitis (15%) and trachoma (12%), was the second most common cause of blindness. Cataract surgical coverage was 42.9%, trichiasis surgical coverage was 50%, and lagophthalmos surgical coverage was only 7.9%. Lack of awareness about treatment was the main reason given for not seeking treatment.

Conclusion: The prevalence of visual impairment and blindness in leprosy patients is very high and, at present, patients' eye care needs are not being met. There should be an urgent, comprehensive blindness prevention programme for leprosy patients. There is a need for better collaboration between leprosy control and blindness prevention programmes.

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Le Van Tung



A field worker explains how a visual chart works to a leprosy patient in Van Mon leprosy village, Thai Binh. VIET NAM

Assessing resources

Roya Husainzada



An operating room in Kabul Noor Hospital. AFGHANISTAN

Situation analysis of human resources in eye care in Afghanistan



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Background: The lack of adequately trained eye care personnel in low- and middle-income countries has been identified as a factor in the persistence of avoidable blindness. This situation is even more acute in fragile states, such as Afghanistan, where governments lack the capacity to manage public resources and deliver basic services, and are unable to protect and support poor and vulnerable groups.

Aims: To undertake a situation analysis of human resources in eye care in Afghanistan by assessing the number, qualifications, and distribution (geographical and by type of practice) of ophthalmologists, ophthalmic paramedical staff, and other ophthalmic personnel; and to assess the number and distribution (geographical and by category) of training institutions for eye care personnel.

Methods: The study was carried out between July and August 2006 in all provinces that had eye care centres and institutes. Data were collected from all private, government (public and army), and non-governmental organisation (NGO) eye care centres, as well as from training institutes for eye care personnel. This was done by visiting most of the centres and using electronic communication.

Results: The total number of eye care personnel in the country was 441. Out of these, 118 (26.8%) were ophthalmologists, 197 (44.7%) were ophthalmic paramedics (of which 103 were mid-level ophthalmic personnel), and 126 (28.5%) were other ophthalmic personnel. The ratio of ophthalmologists to population was 1:200,000 and that of mid-level ophthalmic personnel was 1:229,126. A total of 384 eye care personnel (87%) worked in urban areas and 57 (13%) worked in rural areas. Amongst them, 29 worked in the private sector (6.5%), 60 in the public sector (14%), 148 in NGOs (33.5%), 118 (43%) in mixed organisations (government and NGOs), and 15 in the army (3%). There were no eye sub-specialists or paediatric ophthalmologists. A total of 74 eye doctors were medical officers (62%) and there were just four community ophthalmologists. Of the ophthalmic paramedics, 103 were mid-level ophthalmic personnel (ophthalmic technicians and nurses, refractionists, and optometrists). There were five eye care training institutions in the country.

Conclusion: The human resources presently available in Afghanistan are inadequate, not only in quantity but also in quality. Eye care personnel are poorly distributed, with serious shortages in rural and peripheral areas. Most eye care personnel worked in government centres and NGOs. There were very few eye care training institutions, most of which were run by NGOs.

A situation analysis to provide information for developing a screening and treatment programme for retinopathy of prematurity in Sri Lanka



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Background: Sri Lanka is a lower-middle-income country with very good health indicators and services for premature babies. However, the expansion of intensive neonatal care units (NCUs) is leading to greater survival of premature babies and more blindness from retinopathy of prematurity (ROP).

Aim: To collect information on policies regarding neonatal care, current service provision and facilities for premature babies, and to assess current programmes for ROP. This information will be useful for planning a national ROP programme.

Methods: Hospitals with NCUs were visited in three provinces. Data were collected on infrastructure, personnel, policies regarding ventilation and oxygen administration, and survival of premature babies (from hospitals and the Ministry of Health). Data on ROP screening policies and the number of babies examined and treated were collected from ophthalmic units where possible.

Results: There are approximately 340,000 births annually, 17% of which are premature (defined as birth weight [BW] <2,500 g). There are no data on the proportion of babies with BW <1,500 g. Survival of babies with BW <1,000 g is 51%; it is over 75% for babies with BW of 1,000–1,500 g. Continuous monitoring of oxygen is not possible in all NCUs and alarms are often not adequately set up. Equipment is not equally distributed among provinces. Screening for ROP is not well organised and babies are often examined outside the NCU. The incidence of pre-threshold and threshold ROP ranged from 34.8% to 46.8%, and that of stage 4/5 was 1.3% in one NCU. Data collection is inconsistent.

Conclusion: Survival rates are relatively good in babies most at risk of ROP. Rates of ROP are high, which may be due to inadequate oxygen monitoring. Current ROP programmes need to be better organised, with standard screening criteria, examination methods, indications for treatment, and data collection. Long-term follow-up and referral systems for rehabilitation also need to be planned.

Assessing human resource needs for prevention of blindness in Association of Southeast Asian Nations (ASEAN) countries: identifying the gaps



Pg Hj Md Khairol Asmiee Bin Pg Hj Sabtu

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Aim: To obtain an overview of the current human resource needs in eye care for the prevention of blindness in the member countries of the Association of Southeast Asian Nations (ASEAN): Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam. We identified the different levels of eye care personnel, their numbers and distribution, and the training capacity for them in the region.

Methods: A mail-based questionnaire survey was used. Participants were recruited using the 'snowballing' technique, whereby one subject gives the researcher the name of another subject, who in turn provides the name of a third, and so on (Vogt, 1999), based on predetermined criteria. The specially designed questionnaire was pre-tested before distribution to assess its validity. Various channels were used to distribute it and participants were provided with several

options to respond, including a web questionnaire. Ethical approval was obtained from the London School of Hygiene and Tropical Medicine ethics committee prior to conducting the survey. Participants were provided with information sheets about the survey before their informed consent was sought.

Results: Seven out of ten countries responded. The result of the study shows that there is, to varying degrees, a shortage and maldistribution of ophthalmologists in some ASEAN member countries, particularly in Indonesia and CMLV countries (Cambodia, Myanmar, Lao People's Democratic Republic, and Viet Nam), where the burden of blindness is significantly higher. Furthermore, the integration of primary eye care into mainstream primary health care is incomplete. At secondary and tertiary level, the shortage of ophthalmologists has been supplemented by the use of mid-level eye personnel. However, their impact in addressing cataract (the main cause of blindness in the region) is restricted, as their roles are limited to carrying out basic eye tests, history-taking, and instrument care. Local training facilities are available for most levels of eye care workers, but questions about their quality and capacity remain unanswered. The working conditions of ophthalmologists in the ASEAN region are reasonable, and ophthalmologists are supported by professional and regulatory bodies. However, career structures for mid-level personnel are not available in all member countries.

Conclusion: In order to meet current needs, especially in countries with a high burden of blindness, there is an urgent need to address the shortage and maldistribution of ophthalmologists. Career structure and deployment of mid-level eye personnel need to be addressed and aligned to meet current eye care needs. The ASEAN region has the capacity to address its eye care needs and should do so through capacity building and service delivery programmes.

Situation analysis of human resources for eye care in the North West Province of Cameroon



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Aim: To provide comprehensive information on existing human resources for the provision of comprehensive eye care services in the North West Province of Cameroon.

Methods: Quantitative data were collected using a pre-tested questionnaire administered to all consenting eye care workers in the North West Province. Data on service outputs were obtained using a checklist and other available documents. Qualitative data were collected by means of semi-structured interviews administered to staff of eye units, primary level eye care workers, and visual

rehabilitation workers.

Results: The North West Province, which has a population of 2.1 million, had 9 eye units, 3 ophthalmologists, 21 ophthalmic paramedics, 47 community-based rehabilitation workers trained in primary eye care, and 8 ophthalmic paramedic students. There were also 19 special education teachers in two schools for the blind. In addition, the province had 3,131 community-directed distributors of ivermectin. The duration and type of ophthalmic training of ophthalmic paramedics, as well as their educational backgrounds, were very diverse. Close to 90% of the staff in the eye units were employed by mission hospitals and the distribution of human resources in the province was grossly unequal. The cataract surgical rate had increased by 35% between 2002 and 2005, to a total of 414 per year. The coverage of refractive services and the number of patients consulted per outreach had remained constant during the same period, at less than 1% and at 30 patients, respectively. The main barriers to the provision and uptake of eye care services were lack of human resources, poor collaboration among stakeholders, cost of services, and patient beliefs.

Conclusion: The number, distribution, mix of skills, and output of eye care workers in the North West Province are inadequate. At provincial level, it would be desirable to have a committee for the prevention of blindness. It would be worthwhile to research consumer perceptions and barriers to the uptake of eye care services. At national level, an action plan, advocacy, and funding for in-country training of different levels of eye care personnel should be considered.

Evaluating interventions/programmes

Evaluation of the SAFE strategy for preventing trachomatous visual impairment in the Enemor and Ener District of Ethiopia



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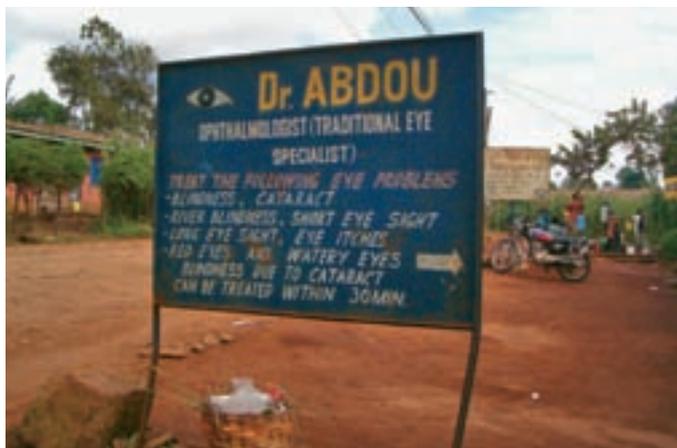
Background: Although the SAFE strategy (Surgery, Antibiotics, Face washing, Environmental change) is increasingly implemented to control trachoma, its operational effectiveness is not well known.

Aim: To evaluate the implementation of the SAFE strategy in a trachoma control programme area in the context of VISION 2020.

Methods: A cross-sectional trachoma survey, focus group discussions, and routine data analysis were undertaken in July 2006 in the Enamor and Ener District of southern Ethiopia. Using multi-stage cluster sampling with probability proportionate to size and compact segment sampling methods, 544 households were selected from a population of 110,000. Individuals were examined for signs of trachoma and visual impairment, and the heads of two-thirds of households were interviewed about risk factors.

Results: Of the 2,510 people enumerated, 2,637 (95%) were examined. The prevalence of trichiasis (TT) in people older than 14 was 9.04% (95% confidence interval [CI] 7.4–10.6%). Trachoma was responsible for 13% of visual impairment in people older than 40. Follicular trachoma (TF) in children aged one to nine was 33.1% (95% CI 29.4–37.1%), while 56.1% (95% CI 52.7–59.5%) had clean faces. The percentage of households using latrines was 74.4% (95% CI 69.9–78.87%). The themes that emerged from discussions included distance and fear as barriers to surgery, appreciation of antibiotics, “quest for water” and “education with legal enforcement” in terms of facial and environmental hygiene. A minimum of US \$18 per person was invested on SAFE over five years. Although active trachoma and visual impairment were moderately reduced as

Henry Nkumbe



A signpost advertising the services of a traditional healer in Bamenda, capital of the North West Province of Cameroon. Many interviewees in Henry Nkumbe's study made reference to the services of this healer. CAMEROON

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compared to baseline estimates and projections (40% for active trachoma and 25% for visual impairment), the programme was not adequate to control trichiasis.

Conclusion: The SAFE strategy may be effective when implemented for a longer duration, to an adequate extent, and with concurrent development programmes. SAFE should be routinely evaluated in order to improve its implementation. Further investigation of its socio-economic impact is recommended.

Evaluation of cataract surgical outcomes in Cicendo Eye Hospital, Bandung, West Java, Indonesia



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Aims: Cicendo Eye Hospital is a referral hospital in West Java Province. Every year, the hospital performs about three thousand cataract operations on average. However, cataract surgical outcome has not been evaluated. Outcome is an important indicator for monitoring the progress of the hospital's cataract surgical services towards the goals of VISION 2020.

Methods: This was a prospective observational study of all consecutive, age-related cataract operations booked on the elective list at the hospital from 1 April 2006 to 31 June 2006. Data were collected by means of a standardised computer cataract surgery outcome record form. Pre-operative visual status was recorded and the post-operative visual outcomes were measured at one day and one month after surgery. Analysis was done to identify the risk factors for poor outcome.

Results: A total of 443 patients were operated on. The mean age was 63 years and 52% of all patients were male. Using the WHO definition, 26.6% were blind pre-operatively and 72.69% of all eyes operated had visual acuity <3/60. Most of the operations were extracapsular extractions with intraocular implantation. One day after surgery, 42.44% of eyes achieved a visual outcome better than 6/18. At one month, this was the case for 76.08% of eyes. A poor outcome of less than 3/60 was seen in 11 cases (2.48%) at one month after surgery. Intra- and post-operative complications were seen in 10.84% of all cases, mainly due to vitreous loss (66.67%). Intra-operative complications, systemic diseases present before the operation, and associated eye diseases were significant risk factors for poor outcome.

Conclusion: At one month after surgery, visual outcome of the operated eye almost attained WHO criteria for available correction. The most significant risk factor for poor outcome was intra-operative complications, which could be minimised by improving skills and taking due care during operations.

An evaluation of eye health promotion activities to increase the use of eye care services in the Kilimanjaro VISION 2020 Direct Referral Site programme



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Aims: To assess community awareness about the Kilimanjaro VISION 2020 Direct Referral Site (DRS) eye care programme in Tanzania and the effectiveness of promotion strategies to increase the use of eye care services, and to solicit ideas on how these activities can be improved.

Methods: Quantitative methods were used to analyse secondary data (30,019 patient records collected at the point of service between January 2003 and June 2006) about how patients received information about the Kilimanjaro VISION 2020 DRS programme. Additionally, 75 interviews were conducted at markets,

mosques, and churches in the districts of Same, Mwanga, and Hai to complement the retrospective data. Qualitative methods were used to collect perceptions about eye diseases and about the programme from patients, the community, and health facility personnel. Fifteen semi-structured interviews were conducted with patients and families of operated and non-operated cataract patients. Focus group discussions with community leaders and health facility workers involved a total of 47 participants. Purposive non-probability sampling was used to select participants. The sample included a roughly equal balance of men and women.

Results: The quantitative analysis of existing data revealed that most respondents (39.3%) had received information from churches or mosques. The second most frequently mentioned source of information was posters (25.4% of responses), followed by radio, medical personnel, other sources, and village leaders. The qualitative analysis showed a high level of awareness about eye diseases, with cataract emerging as the most commonly recognised eye problem. Some people were aware that an operation was the treatment for cataract, but there was limited understanding amongst the community and health facility workers of what the operation entailed. However, patients who had undergone the operation were able to give quite detailed accounts. The conceptions held by community members provided useful entry points for future promotional work. One community member suggested that "the word upasujaji (operation) gives a bad impression, meaning to cut the eye." Suggestions from others included explaining the operation in terms of cleaning of the eye, removing the cataract, or correcting the eye. Many people in the DRS areas were able to describe in detail how the programme worked and what services were provided. However, users wanted more clarity, particularly about the costs of surgery. Health facility workers were both aware of and involved in the promotional activities. The community perceived the DRS programme as providing an affordable service close to home which included transportation to hospital. People reported that the eye health promotion activities had helped to dispel fear about surgery. There were, however, a few comments about how the programme had become too "business-like," not allowing enough time for detailed examination. Opinions about how best to communicate the DRS programme emphasised multiple-method approaches, and suggested improvements to the posters, greater use of interpersonal channels, more time for promotional activities in the build-up before a DRS visit, and the use of loudspeakers.

Conclusion: Promotional activities have created awareness, encouraged the use of eye care services, provided opportunities for facility workers and community members to participate, and fostered positive attitudes towards the DRS programme. There is room for improvement: we can increase the reach of promotional activities, perfect the posters, ensure greater clarity on the issue of fees for services, and build interpersonal channels to encourage more two-way communication with users.

Cataract surgical outcome and gender-specific barriers to cataract services in Tilganga Eye Centre and its outreach microsurgical eye clinics in Nepal



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Aims: To evaluate the cataract surgical outcome in Tilganga Eye Centre (TEC) and its outreach microsurgical eye clinic, to determine the barriers to patient uptake of cataract services in both urban (TEC) and rural (outreach clinic) settings, and to explore gender-specific health care-seeking behaviour.

Methods: The records of 562 patients who had undergone cataract surgery in the hospital from 1 January 2006 to 30 June 2006 and of 178 patients treated by the outreach clinics were analysed. Surgical

outcomes were measured using the OUTCOME software package. An open-ended questionnaire was used to interview 80 cataract patients with visual acuity <6/60 (38 in hospital, 42 in outreach clinics), in order to explore possible gender-specific barriers to cataract surgery. **Results:** At discharge from the hospital, 69.9% of patients presented with visual acuity (VA) >6/18 and 78% presented with best corrected visual acuity (BCVA) >6/18. At the three-week follow-up, 79.4% presented with VA >6/18. On providing them with best correction, VA was >6/18 in 93.2%. A total of 50 (8.9%) presented with VA <6/60 at discharge. At three-week follow-up, 2.8% presented with VA <6/60, which improved to 2.4% when best corrected. At discharge from the outreach clinic, 79.2% of patients presented with VA >6/18 and 85.5% presented with BCVA >6/18. At the three-week follow-up, 72.8% presented with VA >6/18. When best corrected, VA was >6/18 in 93.6%. A total of 16 (9%) presented with VA <6/60 at discharge. At three-week follow-up, 5.8% presented with VA <6/60, which improved to 2.6% when best corrected. The rate of complications was 7.8% in the hospital and 6.7% in the outreach clinics. The causes of poor outcome were surgical complications and case selection in the hospital, and refractive error ($p=0.02$) and case selection in the outreach clinics. Urban women chose to seek cataract services later, as they felt able to cope with their deteriorating vision, whereas rural women gave the long distance to services as the main reason for postponing surgery. For urban and rural men, the main barriers were cost and the lack of someone to accompany them.

Conclusion: Good visual outcome can be achieved in outreach clinics if strict protocols are followed. Operative complications and the rate of poor vision are not significantly different in both settings, despite the differences in environment. To bridge the barriers presented by distance and a lack of money, it is possible to carry out operations with good outcomes closer to rural communities.

Cost

Cost analysis of cataract services by eye care providers in Nigeria



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Aim: To determine and compare cost-effectiveness of cataract services in different eye care settings in Nigeria.

Methods: The study was conducted in three eye care facilities in the states of Lagos and Ogun in Nigeria between January and December 2005. Patient records were retrieved from three eye hospitals: a private hospital, a government hospital, and an NGO hospital. Recruitment criteria included all bilaterally blind cataract patients above the age of 40 with visual acuity (VA) <6/60 on the Snellen visual acuity chart who had undergone cataract operations in one eye. Twenty to thirty per cent of the operated patients were traced to their homes and interviewed to determine their vision-related quality of life, using an adapted version of the Indian vision function questionnaire, the IND-VFQ33. Cost data included provider and patient costs. Major outcome measures were cost-effectiveness ratios, restoration of good vision post-operatively, gain in utility and quality-adjusted life years (QALYs) post-operatively, change in vision-related quality of life, and patient satisfaction.

Results: Within the period of the study, 350 cataract operations were performed in the private hospital, 53 in the government hospital, and 543 in the NGO hospital. Among the patients who were bilaterally blind, 60 were in the private hospital (17%), 15 were in the government hospital (28%), and 147 were in the NGO hospital (27%). The mean age was 66.59 years (standard deviation 0.50). The unit cost of cataract surgery was highest in the government hospital (US \$2,734), while good sight restoration (VA $\geq 6/18$) was highest in the private hospital. The NGO hospital was the most cost-effective, at US \$224 per QALY gained. Patient

satisfaction was greatest for the private hospital and lowest for the government hospital.

Conclusion: Although cataract surgery in the private and NGO eye care sectors in Nigeria falls within an acceptable range of cost-effectiveness, there is an urgent need to reduce unit cost. Cost outlay, output and outcome of cataract surgery need to be reviewed in the government sector.

Comparing the cost-effectiveness of school eye screening versus a primary eye care model to provide refractive error services for children in India



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Aim: To compare the cost-effectiveness of school eye screening (SES) for refractive errors with a primary eye care (PEC) model that provides comprehensive eye care, including refractive services, to children of school age.

Methods: Retrospective data from SES and PEC clinics in Delhi slums for 2005–2006 were examined. Children who had been dispensed spectacles through both models over 12 months were surveyed. Visual acuity with and without spectacles was measured and the children's spectacle-wearing behaviour was evaluated. The quality-adjusted life years (QALYs) gained were calculated using utility analysis for each model and were compared.

Results: The SES model was more cost-effective than the PEC model in all areas. In the SES model, the cost to examine a child was US \$0.64, the cost to examine and dispense spectacles was US \$12.13, and the undiscounted cost per QALY was US \$18.11. In the PEC model the cost of examining a child was US \$3.10, the cost of examining and dispensing spectacles was US \$25.58, and the undiscounted cost per QALY was US \$45.42. The correlation of spectacles prescribed to spectacles manufactured was excellent in both models, with a combined correlation of 98%. The sensitivity of teachers screening for vision impairment was 100%, while their specificity was 59.8%.

Conclusion: School eye screening in India is a highly cost-effective method of correcting visual impairment due to refractive errors in school-age children and should be expanded where possible. As not all children can be examined through school screening, comprehensive eye care clinics play an important role in the correction of refractive errors, but at a higher cost.



Barry Lester

The South Delhi slum where Barry Lester conducted a survey of children who had received spectacles. INDIA