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Paper	:	Strategies Prevention for Visual Impairment
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Strategies Prevention for Visual Impairment

RATE VISUAL IMPAIRMENT WHO

Strategies Prevention for Visual Impairment

Introduction

Blindness and visual impairment are major health problem worldwide. Blindness and visual impairment affect at least 2.2 billion people around the world. Globally, 1 billion people have a visual impairment that could have been prevented or has yet to be addressed. This 1 billion people includes those with moderate or severe distance visual impairment or blindness due to unaddressed refractive error (123.7 million), cataract (65.2 million), glaucoma (6.9 million), corneal opacities (4.2 million), diabetic retinopathy (3 million), and trachoma (2 million), as well as near vision impairment caused by unaddressed presbyopia (826 million). The vast majority of the of the world blindness in the developing country, where infection, malnutrition, and lack of eye care give rise to a high proportion of blindness, particularly in rural populations. Thus, these countries have blindness rates that are 10 – 40 times greater than those industrialized countries, where blindness is due mainly to degenerative and metabolic disorders related to the ageing. Major portion of blindness and visual impairment in developing country either can be cured or could have been prevented, by a reasonal deployment of skills and resources. Blindness cause by infection or nutritional can easily be prevented, and visual loss from cataract can be restored with simple surgery.[1,2]

Indonesia is the largest archipelago in the world with an estimated total of 17504 islands. The country is ranked fourth globally in term of population, with more than 240 million inhabitants. This large population includes numerous ethnic, cultural and linguistic groups, speaking 724 distinct languages and dialects. The country is in the midst of a fundamental demographic shift as the working-age population increases relative to the rest of the population. Indonesia has also emerged as a lower-middle-income economy, economically strong and politically stable. Based on RAABs survey between 2014-2016 in 15 provinces in Indonesia. Cataract was the commonest cause of blindness (71.7-95.5%) in all 15 provinces.[3,4]

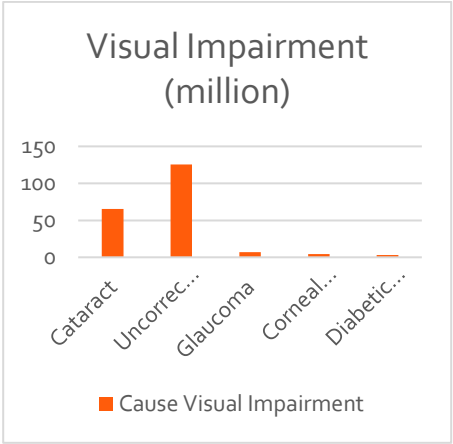

Table 1. Prevalence Visual Impairment in the Worldwide

Source : WHO

Vision impairment and age-related eye diseases affect economic and educational opportunities, reduce quality of life and increase the risk of death. The aim of the present article is to discuss strategies for prevention of visual impairment from major blinding eye problems; cataracts, refractive errors, glaucoma, diabetic retinopathy and childhood blindness. [5]

Strategies Prevention for Visual Impairment

WHO since over 50 years ago has spearheaded efforts to assist member states to meet the challenge of needless blindness. WHO has programme for the Prevention of Blindness in 1999, called "VISION 2020" for the Elimination of Avoidable. This programme is need to take the steps necessary to achieve the goal of eliminating avoidable blindness worldwide by the year 2020. Two principal objective WHO, programme for the prevention of blindness are to make essential eye care available to all populations and to eliminate avoidable blindness. [2,6,7]

ACTION FOR STRATEGIS PREVENTION VISUAL IMPAIRMENT AND BLINDNESS

- Identification of the magnitude of visual impairment problem through a Rapid Assessment of Avoidable Blindness (RAAB)
- Situational analysis and development of plan of action
- Training of human resources in eye health
- Strengthening of referral system
- Integration of eye health service with national health insurance (JKN)

Through effective programmes, national blindness can be reduced to less than 0,5% with no more than 1% in individual communities. Goal of this plan will be achieved with well planned activities which is using community based action originating at the national level to eliminate avoidable vision loss. Indonesia joined the blindness prevention program of Global Vision 2020 The Right to Sight in 2000 and established a national coordinator and Action Plan in 2005. Ministry of Health of the Republic of Indonesia, jointly with National Eye Health Committee, Indonesian Ophthalmologist Association (IOA) and nongovernmental organizations (NGOs) designed 5 strategies to eliminating avoidable blindness. [2,3]

> **"Five strategies for management of visual impairment in Indonesia are conceptualized through a road map"**

To evaluate the success of management of visual impairment strategies, the following target were set : [3]

- In 2017 – 2020 data of prevalence visual impairment and development of work plan were available at province level in Indonesia
- In 2020 – 2024 implementation of work plan of management visual impairment
- In 2025 – 2030 sustainbility of work plan for management visual impairment

Cataract is the leading cause of visual impairment and blindness in Indonesia. Hence the priority of the program for the management of visual impairment is to reduce the prevalence of cataract caused visual impairment, without neglecting other causes as well through 5 strategies. In accordance with the WHO recommendation, the road map reflects 6 building blocks of health system: governance, human resources, improvement of access to services, financial management, medical tools and technology, and health information system, in addition, partnerships. [3]

Magnitude of Visual Impairment

The latest data on the prevalence visual impairment is obtain thorugh a survey called Rapid Assessment of Avoidable Blindness (RAAB), Undertaken in 15 province within the period 2014 – 2016. RAAB employed a method of collection of blindness and visual impairment data among population aged 50 years old, which is recommended by WHO through Global Action Plan (GAP) 2014 – 2019. The results of 15 province, shows that the prevalence of blindness among population above 50 years old in Indonesia range from 1,7 % - 4,4 %. Prevalence of blindness in Indonesia is 3.0 %. The highest prevalence of blindness is in East Java (4.4%) province followed by West Nusa Tenggara (4.0%) and South Sumatra (3.6%).[3,4]

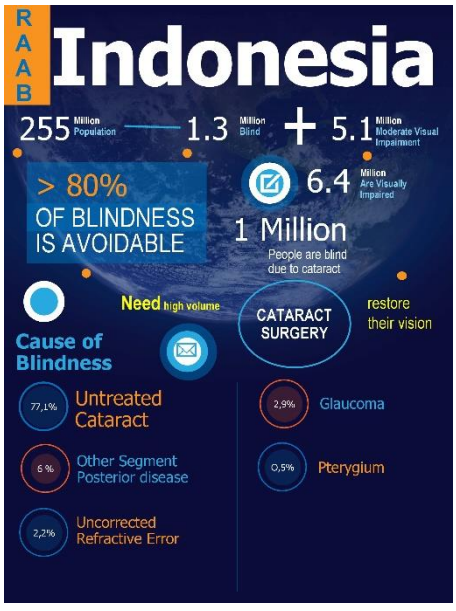

Figure 1. RAAB Indonesia
Source : Ministry of Health

Situational Analysis and Development of Action Plan

Roadmap of Visual Impairment Control Program in Indonesia 2017-2030, showed there is a need to understand current situation and to discover unmet need to support the blindness prevention program and guiding its implementation. Population based surveys have been the main source in providing information to refine the program and ensure that the progressing is in the right direction. Rapid assessment technique has been developed and provide valid estimates in a short period time and can also reduce the cost of conducting a survey.[3,4]

Handling of vision problems requires ophthalmologists. Until December 2013, the number of ophthalmologists registered at the Indonesian Medical Council (KKI) was 1,455 person. The number of ophthalmologists and eye resident registered residents in the Perdami Central Board are 1,522 people and 612. Thus, nationally, 1 ophthalmologist is on average serving more than 170,000 residents. WHO standard, ideally ophthalmologist serving 1: 20,000. Distribution opthalmologist are also not evenly distributed, it is hoped that every district / city will have at least one specialist doctor eyes to facilitate public access. Situational analysis for human resources (opthalmologist, trained opthalmic nurse, refractionist, trained community nurse and trained community health worker) calculates how many personnel are requires for the implementation of visual impairment control programs.[2,4,8]

Eye care has been integrated on every level of health service (primary, secondary, tertiary). Situational analysis for eye care infrastructure is performed by assessing the discrepancy between availability and demand of eye care service in the community, and every level health service. [5,6]

No	Provinsi	Jumlah Sp. M Terdaftar di KKI[a]	Jumlah Anggota Perdami [b]		Jumlah Sp. M di Rumah Sakit[c]	Jumlah Kab/ Kota[d]	Rasio Penduduk/ Sp.M KKI[e]
			Sp.M	Residen			
1	Aceh	26	20	0	52	23	179.687
2	Sumatera Utara	72	77	32	132	33	185.989
3	Sumatera Barat	47	57	32	88	19	107.134
4	Riau	25	23	0	60	12	245.747
5	Jambi	10	2	0	25	11	332.989
6	Sumatera Selatan	52	78	44	83	15	151.105
7	Bengkulu	2	2	0	6	10	899.834
8	Lampung	13	3	0	24	14	606.213
9	Bangka Belitung	4	1	0	8	7	334.944
10	Kepulauan Riau	9	3	0	15	7	215.286
11	DKI Jakarta	297	308	54	425	6	33.677
12	Jawa Barat	217	205	108	302	26	209.552
13	Jawa Tengah	137	141	51	259	35	238.574
14	DI Yogyakarta	43	62	56	63	5	82.793
15	Jawa Timur	244	237	134	326	38	156.839
16	Banten	46	45	0	104	8	250.500
17	Bali	35	52	15	52	9	118.277
18	Nusa Tenggara Barat	9	15	0	29	10	516.850
19	Nusa Tenggara Timur	5	3	0	10	21	994.360
20	Kalimantan Barat	7	4	0	23	14	644.138
21	Kalimantan Tengah	4	3	0	6	14	582.206
22	Kalimantan Selatan	13	7	0	27	13	295.427
23	Kalimantan Timur	18	28	0	37	14	220.433
24	Sulawesi Utara	39	51	39	53	15	60.376
25	Sulawesi Tengah	8	5	0	21	11	348.396
26	Sulawesi Selatan	55	72	47	86	24	151.003
27	Sulawesi Tenggara	2	1	0	5	12	1.185.275
28	Gorontalo	3	3	0	14	6	370.098
29	Sulawesi Barat	1	0	0	1	5	1.252.071
30	Maluku	3	3	0	12	11	554.322
31	Maluku Utara	1	1	0	8	9	1.114.917
32	Papua Barat	0	1	0	3	11	
33	Papua	8	9	0	10	29	413.839
	Indonesia	**1.455**	**1522**	**612**	**2.369**	**497**	**170.737**

Table.1 Distribution Ophthalmologist in Indonesian
Source : Ministry of Health RAAB Indonesia

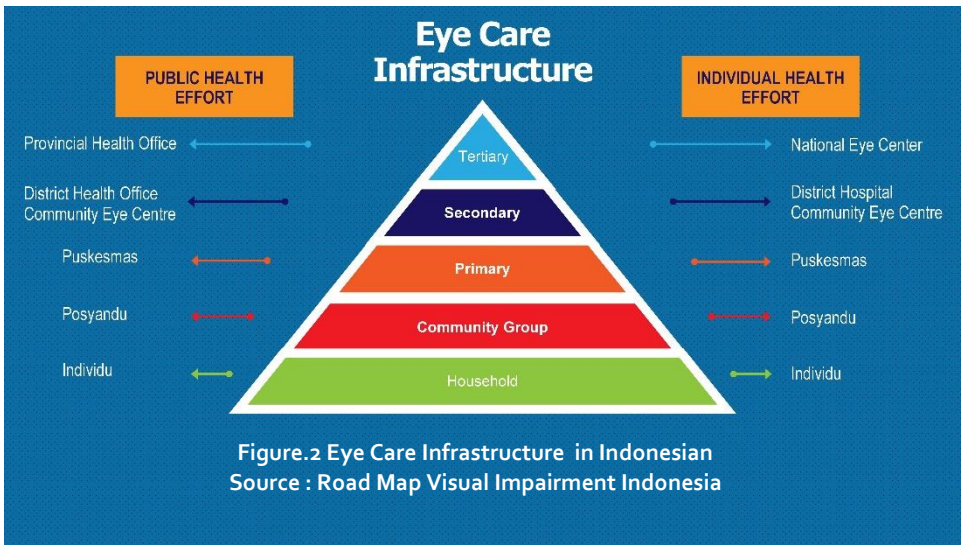

Figure.2 Eye Care Infrastructure in Indonesian
Source : Road Map Visual Impairment Indonesia

Management for Visual Impairment

The target of visual impairment control programs in Indonesia is classified into two priorities : [3]

- **Cataract-caused visual impairment**
- **Non-cataract caused visual impairment**

The non-cataract caused visual impairment includes uncorrected refractive error, glaucoma, diabetic retinopathy and childhood blindness.

Visual Impairment Caused by Cataract

Visual impairments due to cataract is a public health-based control strategy through the provision of safe, effective, and efficient delivery of affordable cataract surgery. Diagnosis of cataract is well defined and can be performed by trained health personnel. The initial intervention takes place at the primary level, where available health care personnel can be trained for visual acuity screening and identify patients with visual acuity less that predetermined level. Further examination for detection of cataract can be directly accomplished or by referral to higher level. Selection of cases and cataract surgery should be performed at the secondary level. Tertiary level are primarily oriented for more complicated cases, they can also serve as a base for the development of satellite hospitals and mobile eye units and for providing of training and outreach surgical services.[2,3]

To prevent visual impairment or blindness from cataract, can be done by manage program visual impairment consist of : [3]

1. Increase the number, quality, and coverage of communication media, information and education regarding cataract in quick and optimal manner
2. Increase the number, quality, and coverage of early detection and surgery of cataract in quick and optimal manner
3. Promote comprehensive and inclusive management of cataract, taking into account demographic and geographic aspect and prevalence of blindness due to cataract
4. Increase of number, quality, and coverage of referral and surgery of cataract in quick and optimal manner, from community to advanced health facility
5. Develop a model of cataract management system with the available resources in each district or city

Visual Impairment Caused by Non-Cataract

UNCORRECTED REFRACTIVE ERROR

Refractive error as a cause of blindness has been recognized to increase recently since available/ presenting distance visual acuity has been used to define blindness. Refractive error in many parts of the world would become the second largest cause of treatable blindness after cataract. Refractive error is also one of the most common causes of visual impairment. Because of the increasing realization of the enormous need for correction of refractive error worldwide, this condition has been considered one of the priorities of the recently launched global initiative for the elimination of avoidable blindness (VISION 2020). [5,7,9]

Blindness due to uncorrected or inadequately corrected natural refractive error starts at a younger age than cataract, which manifests itself in old age. Blindness due to natural refractive error can hinder education, personality development, and career opportunities, in addition to causing an economic burden on society. Detection of individuals suffering from refractive error can be obtained through routine examination of

patients who present to eye care services, or through large population vision screening. [7,9]

Vision screening is most commonly carried out on schoolchildren, which is a valuable method of identifying potentially treatable ocular abnormalities, including blindness due to refractive error and related amblyopia. However, in developing countries many children do not attend school, and they are therefore missed by vision screening program conducted in schools. This problem can be overcome by the community vision screening approach. The community vision screening approach involves door-to-door surveys by trained field workers to assess visual acuity and identify people with vision problems. Community vision screening approaches involve more financial and human resources than school screening approaches, but community screening is likely to be more useful in dealing with refractive error blindness in the population, particularly when implemented as part of a comprehensive eye care program. [9,10]

Most refractive error can be easily treated by appropriate refractive correction, including spectacles, contact lenses, or refractive surgery. However, spectacles are the most commonly used of refractive correction since they are the most simplest and inexpensive method. The availability and affordability of spectacles are currently a challenge in many developing countries. Strategies are tried to increase the provision of high quality spectacles, including manufacturing low-cost spectacles and use of ready-made spectacles. [10]

GLAUCOMA

Glaucoma is also one of the visual impairment problem in the worldwide. Glaucoma in most case is asymptomatic but progressive and irreversible. Early detection and diagnosis are thus essential. [5,11]

72-85 %

Patient **UNWARE** of Having Glaucoma

Delayed diagnosis of glaucoma was highly associated with poor knowledge about glaucoma. Thus, public health education is essential for promoting public awareness and influencing behavior. [5,11]

Assessment of public awareness and knowledge level toward glaucoma is a critical step in the prevention of blindness. Many studies found that the general population lacks knowledge about glaucoma across different countries. However, most of these studies lack data on the knowledge level and factors impacting it, especially for individuals seeking eye care service or accessing to health education. [2,11]

There is not much the primary health care worker can do to identify patients with early glaucoma. However, acute angle closure glaucoma characterized by an acute red eye, reduce vision, pain, dilated pupil and corneal clouding should be recognized and referred immediately. Person at secondary level should be able to diagnose, provide available medical therapy, and reffered to the tertiary level if needed. In tertiary eye centers, high-quality filtering surgeries, laser iridotomy, and management of postoperative complications should be available. [2,11]

DIABETIC RETINOPATHY

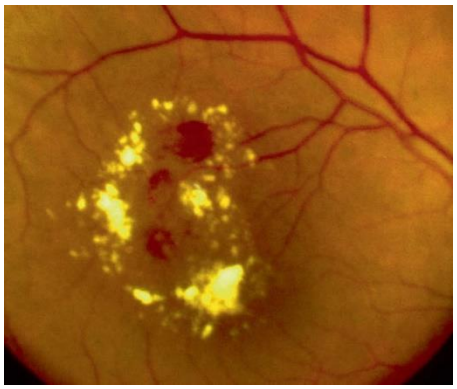

Figure. 3 Diabetic Retinopathy
Source : Retinal Atlas

Diabetes is a global public health disease projected to affect 642 million adults by 2040, with about 75% residing in low and middle income countries. The duration of diabetes is the most important predictor for the development diabetic retinopathy (DR). DR is characterized by microaneurysm formation and the presence of small haemorrhages such that the retina shows scattered red dots. DR affects 1 in 3 people with diabetes and remains the leading cause of blindness in working-aged adults. DR is associated with a poor quality of life, lower levels of psychosocial well-being, and an increased risk of other diabetes complications and mortality. Risk factors for DR include duration of diabetes, level of glycaemia, presence of high blood pressure, pregnancy, dependence on insulin, levels of serum lipid, nutritional and genetic factors. [12,13]

"THREE BROAD STRATEGIES TO PREVENT BLINDNESS CAUSED BY DIABETIC RETINOPATHY"

Early detection and proper treatment are particularly essential to prevent sight threathening complication from DR, as the disease can be asymptomatic until the

1

Prevent Delayed onset of DR

2

Prevent Progression of DR

3

Prevent Blindness caused by DR

disease progress and there is significant irreversible damage and vision loss. [12,13]

Primary prevention requires preventing or delaying the onset of DR in those with diabetes by systems-level lifestyle modifications such as increasing physical activity or dietary modifications, pharmacological interventions for glycaemic and blood pressure control, and systematic screening for the onset of DR.[13]

Secondary prevention requires preventing the progression of DR in patients with DR by continuing systemic risk factor control, regular screening to monitor for the progression of mild DR to vision-threatening stages, and the development and implementation of evidence based guidelines for managing DR. In this aspect, telemedicine-based DR screening incorporating artificial intelligence technology has the potential to facilitate more widespread and cost-effective screening, particularly in low and middle income countries. [13]

Tertiary prevention of DR blindness has been the main focus of the clinical ophthalmology community, classically based on laser photocoagulation treatment and ocular surgery but with an increasing use of anti-vascular endothelial growth factor (anti-VEGF) for vision-threatening DR. Evidence from serial epidemiological studies shows blindness due to DR has declined in high-income countries (e.g., the USA and UK) due to coordinated public health education efforts, increased awareness, early detection by DR screening, sustained systemic risk factor control, and the availability of effective tertiary level treatment.[13]

CHILDHOOD BLINDNESS

Generally, prevalence of childhood blindness is at least three to five times greater in poor areas of the world than in industrialized countries. It is estimated that there are approximately 1.5 million blind children in the world, and an estimated 500000 become blind each year, of whom probably more than half die in childhood. The prevalence of low vision is probably three to four times greater than that of blindness, with approximately 5 million children being affected worldwide. In order to estimate the childhood blindness, it is important to determine an appropriate sample size that accurately and precisely provide the prevalence and causes of childhood blindness. However, the prevalence of childhood blindness is very low; therefore, it is almost not possible to conduct a population-based epidemiological study with larger sample size to determine the prevalence and causes of childhood blindness. [2,14]

The major causes of blindness in children vary widely from region to region and largely driven by the socioeconomic condition of a household in any country along with the availability of the primary health care and eye care services. The causes of childhood blindness are classified according to the anatomical site of the abnormality, as well as the underlying etiology. Corneal scaring due to vitamin A deficiency, measles infection, and ophthalmia neonatorum predominates in the poorest countries in the world. Perinatal contidions, particularly retinopathy of prematurity (ROP) and lesions of the central nervous system are more important in high-income countries. In middle-income countries, the causes are mixed, but ROP is emerging as an important cause of avoidable blindness. Other significant causes in all countries are congenital abnormalities, such as cataract, glaucoma, and hereditary retinal dystrophies. [14]

Childhood blindness is one of the priorities in Vision 2020. Various strategies are required that are region specific, based on various activities to prevent blindness in children in the community. Some of such precautionary measures are measles immunization, health education, and control of vitamin A deficiency

and the provision of tertiary level eye care facilities for conditions that require specialist management. Prevention and treatment of childhood blindness is disease specific. Good primary health care and personnel trained in primary eye care are essential for the control of blindness in children. Ophthalmologist at the secondary level should be capable to perform a full examination, make a correct diagnosis, and prescribe glasses and simple low vision devices for children. Tertiary centre should be able to provide surgical services for the management of cataract, glaucoma, and corneal scarring.[2,14]

CONCLUSION

Blindness and visual impairment have far-reaching implications for society, the more so when it is realized that 80% of visual disability is avoidable. The marked increase in the size of the elderly population, with their greater propensity for visually disabling conditions, presents a further challenge in this respect. However, if available knowledge and skills were made accessible to those communities in greatest need, much of this needless blindness could be alleviated.

WHO since over 50 years ago has spearheaded efforts to assist member states to meet the challenge of needless blindness. WHO has programme for the Prevention of Blindness in 1999, called VISION 2020 for the Elimination of Avoidable. This programme is need to take the steps necessary to achieve the goal of eliminating avoidable blindness worldwide by the year 2020.

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