Prevalence and causes of vision loss in Southeast Asia and Oceania: 1990–2010

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ABSTRACT

Background To assess prevalence and causes of vision impairment in Southeast Asia and Oceania in 1990 and 2010.

Methods Based on a systematic review of medical literature, prevalence of moderate and severe vision impairment (MSVI; presenting visual acuity <6/18 but ≥3/60 in the better eye) and blindness (presenting visual acuity <3/60) was estimated for 1990 and 2010.

Results In Oceania, the age-standardised prevalence of blindness and MSVI did not decrease significantly (1.3% to 0.8% and 6.6% to 5.1%) respectively, but in Southeast Asia, blindness decreased significantly from 1.4% to 0.8%, a 43% decrease. There were significantly more women blind (2.18 million) compared with men (1.28 million) in the Southeast Asian population in 2010, but no significant gender differences in MSVI in either subregion. Cataract was the most frequent cause of blindness in Southeast Asia and Oceania in 1990 and 2010. Uncorrected refractive error, followed by cataract, macular degeneration, glaucoma and diabetic retinopathy were the most common causes for MSVI in 1990 and 2010. With the increasing size of the older population, there have been relatively small increases in the number of blind (2%), and with MSVI (14%) in Southeast Asia, whereas increases have been greater in Oceania of 14% for blindness and of 31% for MSVI.

Conclusions The prevalence of blindness has reduced significantly from 1990 to 2010, with moderate but non-significant lowering of MSVI. Cataract and uncorrected refractive error are the main causes of vision impairment and blindness; cataract continues as the main cause of blindness, but at lower proportions.

The goal of Vision 2020: the 'Right to Sight' is to eliminate avoidable blindness by the year 2020.[1] Data published by WHO have shown that despite the increase in the global population, the numbers who are blind have remained at a similar level, suggesting a reduction in prevalence, and so indicating progress towards the goal of Vision 2020.[2–5]

Data on blindness and visual impairment are a component of the Global Burden of Disease, Injuries and Risk Factors 2010 (GBD)[6–10] that covered 21 subregions and 187 countries. This paper presents the blindness and low vision data for Southeast Asia and Oceania. The Southeast Asian subregion includes 11 countries which have a medium Human Development Index (HDI), and two countries, Sri Lanka and Malaysia that have a high HDI. The Oceania region consists of nine countries, seven of which rank in the medium HDI except for Papua New Guinea and the Solomon Islands which have a low HDI rank. Apart from Papua New Guinea, the other Oceania countries have total populations less than one million people with the smallest included, the Federated States of Micronesia having 55 000. Australia and New Zealand are not included in this report as they have been grouped in a subregion of high-income countries, as they both had a HDI rank of 'Very High'.[11]

METHODS

The detailed methods used to collect and extract data, statistical methods and metrics used for the GBD Vision Loss Project are published elsewhere.[8 9] Only population-based cross-sectional studies that are representative of the general population were considered for data extraction. More detailed description of the methodology and statistical analysis can be found in the GBD High Income Countries paper (paper under review).[11] For the Southeast Asia and Oceania subregions, a total of 86 studies were identified from the published literature and unpublished reports. After excluding ineligible studies, 26 studies for the two subregions were included. Data were available from surveys for 13 of the 20 countries. The small island states in Oceania with populations less than 500 000 people (Federated States of Micronesia, Samoa, Marshall Islands, Kiribati and the Solomon Islands) and Lao People's Democratic Republic (Lao PDR) and the Maldives in Southeast Asia, did not have prevalence data.

National studies in Malaysia, Thailand and Vanuatu included adults and children, whereas, a Cambodian study was of older adults (≥50 years), and one in Fiji was of children aged 0–15 (table 1). Some countries had multiple subnational studies used for national estimates, such as Vietnam, where two surveys have been conducted with the 2007 survey including Rapid Assessment of Avoidable Blindness (RAAB) surveys in 17 provinces.

Presenting binocular visual acuity was used to define blindness (<3/60) and moderate to severe vision impairment (MSVI) (<6/18–≤3/60). The prevalence of uncorrected refractive error was estimated from presenting and best-corrected visual acuity; these data were lacking for Sri Lanka, Tonga and Vanuatu.

RAAB surveys have provided data in many countries where none were previously available. Ten of

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Table 1 Reference studies that met the GBD criteria from the Oceania and South-east Asia regions

Country	Study years	Coverage	Age group	Total examined	Urban/ rural	Rapid assessment yes/no	Acuity data available	Presenting or best corrected vision	Cause data available
Cambodia	1996	Subnational	0–99	5803	Both	No	Distance	Presenting	All-cause, cataracts, refractive error
Cambodia	2002	Subnational	50–99		Both	Yes	Distance	Presenting	All-cause
Cambodia	2007	National	50–99		Both	Yes	Distance	Presenting	All-cause
Fiji	2006–2007	National	0–15		Both	No	Distance	Best-corrected	All-cause
Fiji	2009	Subnational	40–99	1381	Both	No	Near and distance	Presenting	All-cause, cataracts, refractive error
Indonesia	2001–2002	Local	21–99	989	Both	No	Distance	Presenting	All-cause, cataracts, macular degeneration, refractive error
Indonesia	2004	Local	50–99		Both	Yes	Distance	Presenting	All-cause
Malaysia	1993–1994	Local	18–99	282	Rural	No	Distance	Best-corrected	All-cause, cataracts, macular degeneration, diabetic retinopathy, refractive error
Malaysia	1996–1997	National	0–99	18 027	Both	No	Distance	Presenting	All-cause, glaucoma, cataracts, macular degeneration, diabetic retinopathy, refractive error
Malaysia	2000	Local	40–99	311	Rural	No	Distance	Presenting	All-cause
Malaysia	2003	Local	7–15	4629	Urban	No	Distance	Both	All-cause, cataracts, macular degeneration
Malaysia	2004–2006	Local	40–80	3280	Urban	No	Distance	Both	All-cause, glaucoma, cataract, macular degeneration, diabetic retinopathy, refractive error
Myanmar	2001	Local	50–99		Both	Yes	Distance	Presenting	All-cause
Myanmar	2005	Local	40–99	2076	Rural	No	Distance	Both	All-cause, glaucoma, cataract, macular degeneration, refractive error
Papua New Guinea	2004–2005	Local	50–99	1174	Both	Yes	Distance	Presenting	All-cause, cataract
Philippines	2005	Local	50–99	2774	Rural	Yes	Distance	Presenting	All-cause, cataract
Philippines	2006	Local	50–99	3177	Rural	Yes	Distance	Presenting	All-cause, cataract
Sri Lanka	2006–2007	Local	40–99	1375	Rural	No	Distance	Best-corrected	All-cause
Thailand	1994–1995	National	0–99		Both	No	Distance	Presenting	All-cause, glaucoma, cataract, macular degeneration, trachoma, refractive error
Thailand	1997–1999	Local	50–99	701	Urban	No	Distance	Both	All-cause, glaucoma, cataract, macular degeneration
Thailand	1997–1998	Local	40–99	2092	Urban	No	Distance	Best-corrected	All-cause, glaucoma, cataract, macular degeneration
Timor-Leste	2005	Subnational	40–99	1414	Both	Yes	Near and distance	Presenting	All-cause, cataract
Tonga	1991	Subnational	20–99	4056	Both	No	Distance	Best-corrected	All-cause, cataract, macular degeneration, diabetic retinopathy, refractive error
Vanuatu	1989	National	6–99	3520	Both	No	Distance	Best-corrected	All-cause, cataract, macular degeneration
Viet Nam	2000–2002	Subnational	50–99	14 138	Both	Yes	Distance	Both	All-cause
Viet Nam	2007	Subnational	50–99	28 033	Both	Yes	Distance	Both	All-cause

From Oceania, data were not available for Kiribati, Marshall Islands, Micronesia, Samoa and Solomon Islands. For Southeast Asia, data were not available for Lao PDR and Maldives. A list of all references used for this analysis can be found in a web appendix at http://www.anglia.ac.uk/verugbd.

the 26 surveys were RAABs, and all of these were conducted in the decade from 2000 (table 1).

The GBD calculated estimates for 187 countries with populations over 20 000,[6 10 12] whereby, six Oceanic countries were excluded—Cook Islands, Nauru, Niue, Palau, Tokelau and Tuvalu.

RESULTS

In Southeast Asia, there has been a significant 43% decrease in the prevalence of blindness from 1990 to 2010 in the total population (1.4% to 0.8% in all ages, and 5.6% to 3.2% in older adults; table 2). The rates of blindness in women were higher than in men, but the differences at either time were not significant. There appears to be a lower prevalence in blindness and MSVI in Oceania in the total population between 1990 and 2010, but these trends are not significant due to the very wide confidence intervals (CIs). Also, the prevalence for blindness and MSVI appears much higher than the global figures, but this also is not significant.

Apart from Papua New Guinea, with a population of 7 million people, all other countries in the Oceania subregion have fewer than 1 million people. The Southeast Asian region, by contrast, has countries with very large populations, such as

Table 2 Age-standardized prevalence of visual impairment by sex, region, and year

	Men		Women		Total	
Region	Blind (%)	MSVI (%)	Blind (%)	MSVI (%)	Blind (%)	MSVI (%)
Adults ≥50 years						
1990						
Oceania	4.2 (2.4 to 6.4)	23.1 (13.7 to 28.9)	5.8 (3.4 to 8.7)	26.1 (15.7 to 32.5)	5.1 (3.0 to 7.6)	24.7 (14.8 to 30.8)
Southeast Asia	4.7 (3.5 to 5.6)	20.0 (14.9 to 25.7)	6.3 (4.6 to 7.4)	22.5 (16.9 to 28.6)	5.6 (4.1 to 6.6)	21.4 (15.9 to 27.4)
World	2.8 (2.4 to 3.2)	13.8 (11.6 to 15.6)	3.2 (2.9 to 3.7)	14.8 (12.5 to 16.8)	3.0 (2.7 to 3.4)	14.3 (12.1 to 16.2)
2010						
Oceania	2.7 (1.5 to 3.9)	17.5 (10.7 to 22.2)	3.8 (2.1 to 5.5)	20.1 (12.4 to 25.3)	3.3 (1.9 to 4.8)	18.9 (11.8 to 23.7)
Southeast Asia	2.7 (2.1 to 3.1)	13.4 (11.0 to 19.2)	3.7 (2.9 to 4.3)	15.3 (12.7 to 21.5)	3.2 (2.5 to 3.8)	14.4 (12.0 to 20.5)
World	1.7 (1.5 to 1.9)	9.7 (8.8 to 11.5)	2.1 (1.9 to 2.4)	11.0 (10.0 to 13.1)	1.9 (1.7 to 2.2)	10.4 (9.5 to 12.3)
All ages						
1990						
Oceania	1.0 (0.6 to 1.6)	6.4 (3.6 to 8.3)	1.4 (0.8 to 2.2)	7.3 (4.1 to 9.3)	1.3 (0.7 to 1.9)	6.8 (3.9 to 8.8)
Southeast Asia	1.2 (0.9 to 1.4)	5.4 (4.0 to 7.1)	1.6 (1.1 to 1.8)	6.2 (4.6 to 8.0)	1.4 (1.0 to 1.6)	5.8 (4.3 to 7.6)
World	0.7 (0.6 to 0.8)	3.9 (3.2 to 4.4)	0.8 (0.7 to 1.0)	4.3 (3.5 to 4.9)	0.8 (0.7 to 0.9)	4.1 (3.4 to 4.7)
2010						
Oceania	0.7 (0.4 to 1.0)	4.7 (2.7 to 6.1)	0.9 (0.5 to 1.4)	5.5 (3.3 to 7.1)	0.8 (0.5 to 1.2)	5.1 (3.0 to 6.6)
Southeast Asia	0.7 (0.5 to 0.8)	3.6 (3.0 to 5.2)	0.9 (0.7 to 1.1)	4.1 (3.4 to 5.9)	0.8 (0.6 to 0.9)	3.9 (3.2 to 5.6)
World	0.4 (0.4 to 0.5)	2.7 (2.4 to 3.2)	0.5 (0.5 to 0.6)	3.1 (2.8 to 3.7)	0.5 (0.4 to 0.6)	2.9 (2.6 to 3.5)

95% CI shown in parentheses.

Indonesia with 242 million, Philippines 94 million and Vietnam 87 million. The numbers of people blind, and with MSVI, reflect the population size (table 3). The total numbers of men and women in the Southeast Asian population in 2010 were similar, but there were significantly more women blind (2.18 million) compared with men (1.28 million) in 2010. There were no significant gender differences for MSVI in either Southeast Asia or Oceania, unlike the global data.

The absolute numbers of people blind in both these subregions and globally have changed very little from 1990 to 2010, despite the total population having increased by 23% (table 3). The increase in numbers of blind was <1% (12.77 million to 12.84) for men and 3% for women (19.03 million to 19.61 million). For MSVI, the increase in numbers was 8.6% for men and 11.0% for women.

Cataract remains the leading cause of blindness in subregions and globally in 2010 with only small changes since 1990 (table 4). Cataract was the second leading cause of MSVI in both subregions, with a significant reduction in MSVI due to cataract globally (25.6% in 1990 and 18.4% in 2010) (table 5). The reduction of MSVI due to cataract was similar in each subregion. Uncorrected refractive error remains the leading cause of MSVI, and the second cause of blindness, both at similar levels, from 1990 to 2010.

As seen globally, there have been apparent increases in the amount of blindness due to macular degeneration and glaucoma in each of the subregions, but these increases were not significant. The proportion of MSVI caused by macular degeneration was low in both regions, but it has doubled from 1990–2010 as seen globally (table 5). Glaucoma has followed a similar pattern globally and in the subregions.

Diabetes ranks second highest in the percentage change in global DALYs in the GBD data between 1990 and 2010, second only to HIV/AIDS,[6] and yet there were only small increases of diabetes-related blindness in the total population (table 4). The proportion of MSVI from diabetic retinopathy in both subregions has not changed over time. Globally, there was a significant change in MSVI attributable to diabetic retinopathy between 1990 and 2010, but not for blindness (table 5).

Table 3 Population with vision impairment by gender, region, year, and severity of impairment, all ages. 95% CI is shown in parentheses

	Male			Female		
Region	Blind ('000s)	MSVI ('000)	Total population ('000)	Blind ('000s)	MSVI ('000)	Total population ('000)
1990						
Oceania	11 (6 to 17)	86 (45 to 118)	2975	17 (9 to 26)	102 (54 to 137)	2840
Southeast Asia	1295 (934 to 1535)	6976 (5010 to 9267)	229 066	2090 (1503 to 2446)	9049 (6687 to 11 944)	230 480
World	12 776 (11 059 to 14 746)	75 315 (61 143 to 86 983)	2 671 106	19 039 (16 811 to 22 103)	96 892 (79 823 to 111 438)	2 632 068
2010						
Oceania	12 (7 to 18)	109 (58 to 145)	4618	20 (11 to 30)	138 (78 to 186)	4430
Southeast Asia	1282 (1001 to 1504)	7841 (6513 to 1150)	303 000	2180 (1696 to 2565)	10, 500 (8785 to 15 200)	306 000
World	12 848 (11 418to 14 626)	82 740 (74 444to 99 069)	3 480 000	19 610 (17 719 to 22 165)	108 883 (99 159to 130 141)	3 420 000

Table 4 Proportion of blindness by cause, Southeast Asia and Oceania regions, 1990 and 2010, all ages

Region	Cataract	Uncorrected refractive error	Macular degeneration	Glaucoma	Diabetic retinopathy	Trachoma	Other causes/unidentified
1990							
Oceania	43.3 (35.2, 49.9)	13.4 (8.0, 17.5)	3.3 (2.3, 4.7)	2.8 (2.0, 4.1)	1.2 (0.9, 1.8)	–	36.0 (29.7, 43.7)
Southeast Asia	47.2 (42.0, 51.7)	13.0 (7.8, 17.1)	3.7 (2.9, 5.0)	3.3 (2.6, 4.4)	1.1 (0.9, 1.4)	0.3 (0.3, 0.5)	31.4 (27.2, 36.1)
World	38.6 (35.2, 42.0)	19.9 (14.9, 24.9)	4.9 (4.4, 5.8)	4.4 (4.0, 5.1)	2.1 (1.9, 2.5)	2.8 (2.3, 3.1)	27.4 (24.9, 30.0)
2010							
Oceania	40.6 (31.5, 48.6)	13.6 (8.1, 17.7)	4.6 (3.1, 7.6)	4.2 (2.5, 7.2)	1.4 (0.9, 2.4)	–	35.6 (27.4, 45.0)
Southeast Asia	42.0 (34.8, 47.9)	13.4 (8.0, 17.4)	5.9 (4.7, 8.3)	5.6 (4.3, 8.2)	1.4 (1.1, 2.1)	0.2 (0.1, 0.2)	31.5 (25.8, 37.3)
World	33.4 (29.6, 36.4)	20.9 (15.2, 25.9)	6.6 (6.0, 7.9)	6.6 (5.9, 7.9)	2.6 (2.2, 3.4)	1.4 (1.2, 1.7)	28.6 (26.1, 31.5)

The proportions of blindness and MSVI due to trachoma in Southeast Asia were very low, but still have reduced over the two decades from 0.3% to 0.2% for blindness and 0.2% to 0.1% following the global pattern (tables 4 and 5).

There is great variation between countries in the model-based, age-standardised prevalence estimates of blindness and MSVI. The highest rates were in Southeast Asia in 1990 in women ≥50 years; an almost 10% prevalence of blindness, and over 30% for MSVI in Myanmar, Lao PDR and Timor Leste (figures 1 and 2). The lowest rates were in Oceania in men ≥50 years in Tonga: <1% for blindness and <8% for MSVI.

In all countries, males and females have lower rates of vision impairment in 2010 than in 1990. The lowest rates of blindness and MSVI were in the very small Pacific Island countries and in Sri Lanka (figures 1 and 2). Sri Lanka is an example where the age-standardised prevalence of blindness has been halved over the two decades (men 0.6, to 0.3; women 0.8 to 0.4). Malaysia and Vietnam also are countries where the data for adults demonstrate substantial lowering of the prevalence of blindness. The reduction in MSVI rates to 2010 was not significant in the Oceania and Southeast Asia subregions.

DISCUSSION

The trend in Southeast Asia and Oceania follows the global reduction in the prevalence of blindness in adults (3.0% to 1.9% and MSVI (14.3% to 10.4%) from 1990 to 2010.[10] Changes are related to demographic transitions in all countries and improvements in health systems. All countries now have life expectancy at birth greater than 60 years, whereas in 1990, life expectancy was less than 60 years in Cambodia, Lao PDR and Myanmar, and below 50 years in Timor Leste. Similarly, substantial changes in adult mortality from 1990 to 2011 are evident in Vietnam, Thailand, Sri Lanka, Solomon Islands and Indonesia.[13] The impact of longer life expectancy is twofold. Age is a major risk factor for common conditions such as cataract, macular degeneration and glaucoma; the number of people at risk has increased markedly. The percentage of the population ≥65 years in Indonesia has increased from 3.8% in 1990 to 5.6% in 2010, in Sri Lanka from 5.6% to 8.2%, and Thailand from 4.6% to 8.9%[14] In addition to this increase in the numbers of older people with vision loss, the health system is required to provide long-term ongoing management of these chronic age-related eye diseases and diabetes.

Cataract and refractive error are the causes of the majority of vision loss. The proportion of blindness and MSVI due to cataract globally and in each region was lower than in 1990, although the amount of MSVI due to uncorrected refractive error has increased slightly. The change in global figures can be linked to major cataract programmes that have been conducted in some of the most populous countries, such as India which now has a cataract surgery rate 4000 per million population.[15] Indonesia, the country with the highest population in Southeast Asia has a cataract surgery rate less than 1000.[15] Other countries in Oceania have similar low rates, and some do not even have a resident ophthalmologist. Programmes for the correction of refractive error are yet to show comparable benefits.

Although the increase in diabetes has been slow or even negative in Southeast Asia, Oceania has the highest growth rates of any region; almost 100% growth in age-standardised prevalence from 1980 to 2008 in men, and over 60% in women.[16] The Pacific Island countries are ranked among the top 10 in the prevalence of diabetes.[17] These relatively recent increases in diabetes rates will change the future pattern of causes of vision loss with a much greater proportion of vision loss due to diabetes over the next two decades.

Table 5 Proportion of MSVI by cause, Southeast Asia and Oceania regions, 1990 and 2010, all ages

Region	Cataract	Uncorrected refractive error	Macular degeneration	Glaucoma	Diabetic retinopathy	Trachoma	Other causes/unidentified
1990							
Oceania	25.2 (20.1, 31.5)	43.5 (35.4, 50.6)	1.4 (1.0, 2.1)	0.7 (0.5, 1.1)	0.8 (0.6, 1.3)	–	28.3 (22.7, 33.9)
Southeast Asia	30.1 (25.4, 35.2)	42.8 (34.2, 49.7)	0.9 (0.7, 1.3)	0.8 (0.7, 1.1)	0.8 (0.6, 1.0)	0.2 (0.2, 0.3)	24.4 (20.4, 29.4)
World	25.6 (22.7, 28.4)	51.1 (45.6, 56.0)	1.9 (1.6, 2.4)	1.2 (1.1, 1.5)	1.3 (1.2, 1.6)	1.3 (0.97, 1.5)	17.6 (15.4, 20.3)
2010							
Oceania	18.2 (12.1, 25.4)	44.5 (35.8, 51.3)	2.7 (1.7, 4.8)	1.4 (0.9, 2.5)	1.2 (0.8, 2.3)	–	32.0 (24.2, 40.1)
Southeast Asia	22.7 (17.9, 27.4)	44.2 (35.2, 50.7)	1.8 (1.3, 2.7)	1.8 (1.3, 3.0)	1.2 (0.9, 1.9)	0.1 (0.1, 0.2)	28.1 (22.8, 34.2)
World	18.4 (15.8, 20.9)	52.9 (47.2, 57.3)	3.1 (2.7, 4.0)	2.2 (2.0, 2.8)	1.9 (1.6, 2.7)	0.7 (0.6, 0.9)	20.8 (18.4, 23.8)

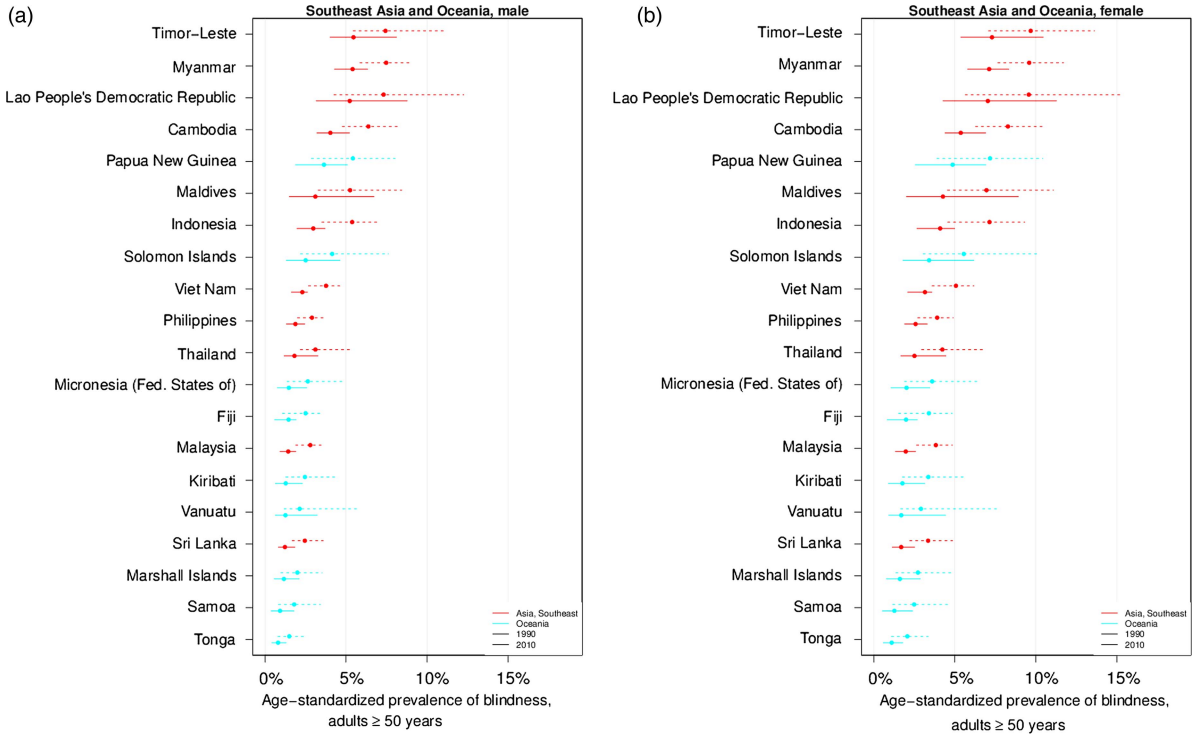

Figure 1 (A) Age standardised prevalence of blindness in males aged ≥50 years in Oceania and Southeast Asia. (B) Age-standardised prevalence of blindness in females aged ≥50 years in Oceania and Southeast Asia.

Given the size of the confidence limits for data in many countries, the differences between males and females is uncertain, but there is a trend for a higher rate of blindness in females as reported elsewhere.[18] The assessment of gender differences is compounded by the longer life expectancy of women resulting in a progressive increase in the ratio of women to men in the older age groups. When data were collected and analysed using 5–10-year age groups, the differential life expectancy cannot be

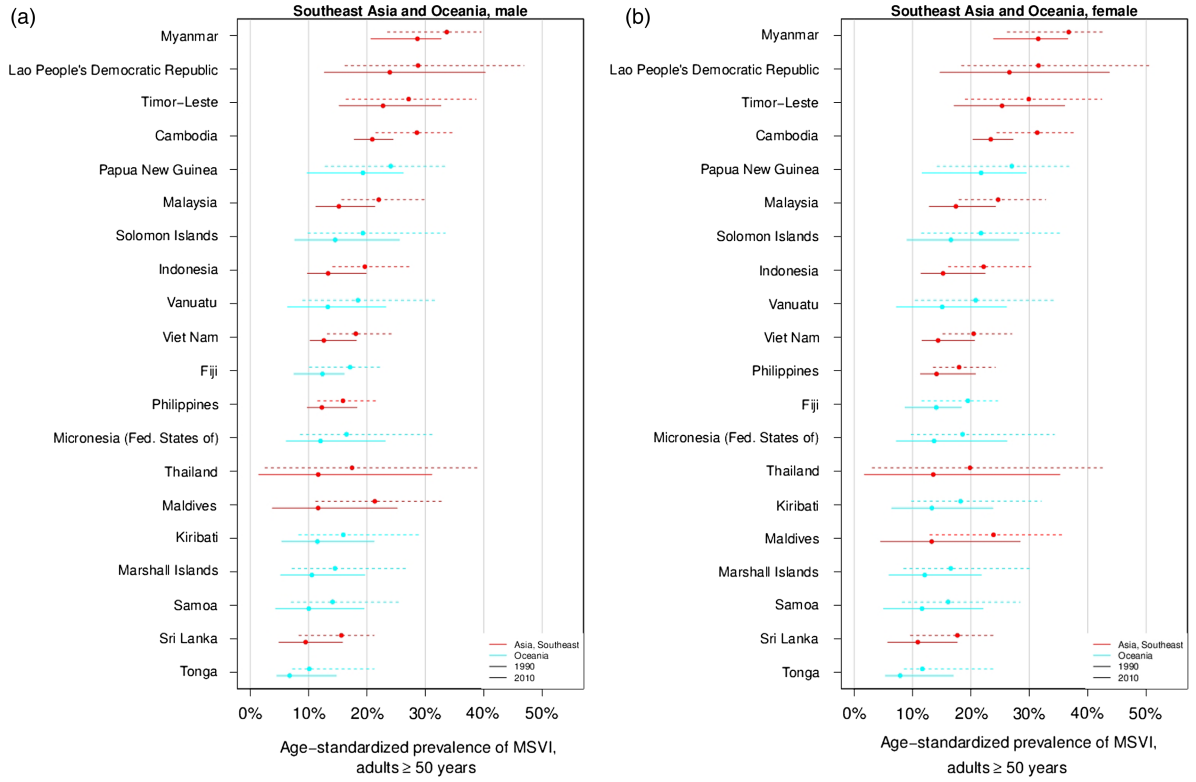

Figure 2 (A) Age-standardised prevalence of moderate and severe vision impairment in males aged ≥50 years in Oceania and Southeast Asia. (B) Age-standardised prevalence of moderate and severe vision impairment in females aged ≥50 years in Oceania and Southeast Asia.

adequately adjusted for. There is less gender difference in MSVI where uncorrected refractive error is the main cause of vision loss. This situation is shown in data from a survey in Papua New Guinea where blindness due to cataract was 86.7% of the total in women, but 57.5% in men.[19] For MSVI, there were no real differences between genders for cataract (M 42.8%, F 50.5%) and refractive error (M 43.3%, F 41%). Differences between countries were even more marked, with blindness and MSVI as high as 10% and 13%, respectively, in women ≥50 years in Myanmar, Lao PDR and Timor Leste, yet as low as 1% and 8%, respectively, among men ≥50 years in Tonga.

There have been very few population-based studies of vision loss in children; most have been in selected populations in schools for the blind or in hospitals. However, the study in Fiji was population-based and provided a national estimate for the prevalence of blindness in children 0–15 years of age at 0.39 per thousand.[20] This matches the WHO estimate of blindness for Fiji of 0.4 per thousand that was based on under-5 mortality figures for a country.[21] Given the very large decreases between 1990 and 2010 in under-5 mortality in other countries, such as Vietnam (50 to 22), Timor Leste (180 to 54) Cambodia (117 to 43) and Indonesia (82 to 32), the estimates of blindness prevalence in children were likely to be much lower than those previously suggested.[17] As shown in Fiji, the causes of blindness now are more likely to be congenital rather than related to infection or malnutrition.

Rates of MSVI from trachoma have halved, from 0.2% to 0.1%, and blindness rates have fallen from 0.3% to 0.2%. This follows the global decrease of trachoma, and in these subregions, is in large part attributable to general improvements in living conditions rather than specific trachoma control or elimination programmes.

The substantial increases in the populations of many countries have led to only a small increase in the numbers of people blind or with MSVI because of the almost 40% reduction in the prevalence of blindness and MSVI in these regions for 2010. Although there still is a long way to go to eliminate avoidable vision loss, there has been some remarkable progress towards achieving the goal of Vision 2020: Right to Sight.

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Collaborators Group Information: A list of the Vision Loss Expert Group members appears at http://www.anglia.ac.uk/ruskin/en/home/microsites/veru/other_research_areas/global_burden_of_diseases.html.

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