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Population-based glaucoma prevalence studies in Asians

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ABSTRACT

Glaucoma-related population-based studies from Japan, Mongolia, India, Singapore, Thailand, China, Bangladesh, Myanmar, Sri Lanka, and South Korea show a higher glaucoma prevalence in Asian patients, including a higher incidence of primary angle-closure glaucoma, than in white patients, although primary open-angle glaucoma (POAG) is still the most commonly reported. Among POAG, normal tension glaucoma predominates over high tension glaucoma, a distinctive finding. Risk factors for glaucoma in population-based studies in both Asian and white patients are similar, except that myopia is a greater risk factor in Asian patients. Diagnostic criteria differ among studies, some using the International Society of Geographic and Epidemiologic Ophthalmology (ISGEO) classification and others not. The devices used to observe the optic disk and test the visual field are also not uniform across studies. Moreover, the ages of patients, and whether rural or urban, were different. To allow reliable comparison of the results of epidemiologic studies, efforts to standardize the diagnostic criteria, devices, and the age range of the study population are required.

Glaucoma is the leading cause of irreversible blindness worldwide[50] and thus is of major public health importance.[44] Asians account for almost half of the world's glaucoma population.[46] Primary open-angle glaucoma (POAG) is the most commonly reported type of glaucoma in population-based prevalence studies worldwide, with rates ranging from 0.5%[11] to 8.8%.[35] Racial variation has been reported in previous studies on the prevalence of glaucoma.[52] Those of African descent are known to have the highest prevalence of POAG.[30,35,40,61]

Glaucoma-related population-based studies have been reported in many Asian countries, including Japan,[20,56] Mongolia,[15] India,[13,48,49,64,65] Singapore,[17,55] Thailand,[4] China,[19,33,58,59,67,72] Bangladesh,[47] Myanmar,[9] Sri Lanka,[57] and South Korea.[23] Besides the prevalence, risk factors were also addressed in most of these studies; there has been no systematic review, however.

We address the prevalence and the characteristics of glaucoma reported in Asian countries and compare the risk factors for, as well as the prevalence of, glaucoma.

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1. Prevalence of glaucoma in population-based studies in Asia

1.1. Inclusion criteria

Population-based studies from Asia are summarized in Table 1. In addition to age range, those who had been a resident in the selected Chinese village for at least 6 months were eligible for inclusion in some studies, such as those from Kailu, Inner Mongolia;[58] from Harbin;[59] and from Liwan.[19] Some studies investigated population of a specific race in the survey area. In the Hadan Eye Study,[75] the study population consisted of self-identified Han Chinese. The Tanjong Pagar Study[17] included ethnic Chinese in Singapore, and the Singapore Malay Eye Study[55] included Malay adults in Singapore.

Some studies were performed in a particular area for a reason. A population-based study was performed in Mongolia[15] because it is believed to be the genetic center of the Sino-Mongoloid race. The decision to select Liwan District, Guangzhou,[19] for the survey was made because of its stable, older population and a socioeconomic profile representative of Guangzhou as a whole. Kumejima[54] was chosen because the composition of the population in Kumejima is almost identical to that of Okinawa Prefecture as a whole. A study was carried out in Dhaka Division,[47] in the central riverine area of Bangladesh,[47] because Bangladesh is home to a significant fraction of the total population of South Asia. The Singapore Malay Eye Study[55] was conducted on Malay adults because Malays constitute the third largest racial/ethnic group in Asia; there are approximately 300 to 400 million Malays living in Southeast Asia. West Bengal[49] was chosen because there were existing, well-established community links because of a child health program (ICDS) that were considered likely to improve local collaboration and participation.

1.2. Prevalence of primary open-angle glaucoma

The prevalence of POAG reported in Asian population-based studies are summarized in Table 1. They ranged from 0.5%[15] in Hovsgol, Mongolia, to 3.9%[20] in Tajimi, Japan. POAG is the most commonly reported type of glaucoma in most population-based studies in Asia.

Asia is generally divided into three subregions by their geographical location and culture—East Asia, South Asia, and Southeast Asia. This classification is widely used[46,55] even by the United Nations. Although the Middle East is part of the Eurasian continent, it has mainly Arabs and Arabian culture. Therefore, we exclude the Middle East in this review.

1.2.1. Prevalence of POAG in East Asia

Epidemiologic studies from East Asian countries have been conducted in Mongolia and different provinces of China,

Table 1 — Prevalence of glaucoma in population-based studies in asia

Study population	Age	Prevalence, %		Ratio of POAG/PACG
		POAG	PACG	
East Asian				
Hovsgol, Mongolia	40+	0.5	1.4	0.3
Kailu, Inner Mongolia, China[a]	40+	1.4	1.4	1.0
Harbin, China[a]	40+	0.7	1.6	0.4
Liwan, China[a]	50+	2.1	1.5	1.4
Handan, China[a]	40+	1.0	0.5	2.0
Beijing, China[a]	40+	2.5	1.0	2.5
Namil, South Korea[a]	40+	3.5	0.7	5.0
Nationwide glaucoma survey, Japan	40+	2.6	0.3	8.6
Tajimi, Japan[a]	40+	3.9	0.6	6.5
Kumejima, Okinawa, Japan[a]	40+		2.0	
Average, calculated		2.02	1.10	3.08
South Asian				
Calcutta, West Bengal, East India[a]	50+	3.1	0.2	10.0
Aravind, South India	40+	1.7	0.5	3.4
Andhra Pradesh, South India	40+	2.6	1.1	2.4
	30+	1.6	0.7	2.3
Chennai, rural South India[a]	40+	1.6	0.87	1.8
Chennai, urban South India[a]	40+	3.5	0.88	3.9
Dhaka, Bangladesh[a]	40+	2.5	0.4	6.3
Kandy, Sri Lanka[a]	40+	2.3	0.6	3.8
Average, calculated		2.36	0.66	4.24
Southeast Asian				
Meiktila, Myanmar[a]	40+	2.0	2.5	0.8
Rom Klao, Thailand[a]	50+	2.3	0.9	2.6
Tanjong Pagar, Singapore[a]	40+	1.6	1.1	1.5
Singapore Malay Eye Study[a]	40+	2.5	0.12	20.8
Average, calculated		2.10	1.16	6.43
Total Asian average, calculated		2.20	0.96	4.16

a ISGEO (International Society of Geographic and Epidemiologic Ophthalmology) classification applied.