

MAGNITUDE AND BURDEN OF GLAUCOMA IN AFRICA

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Sub-Saharan Africa

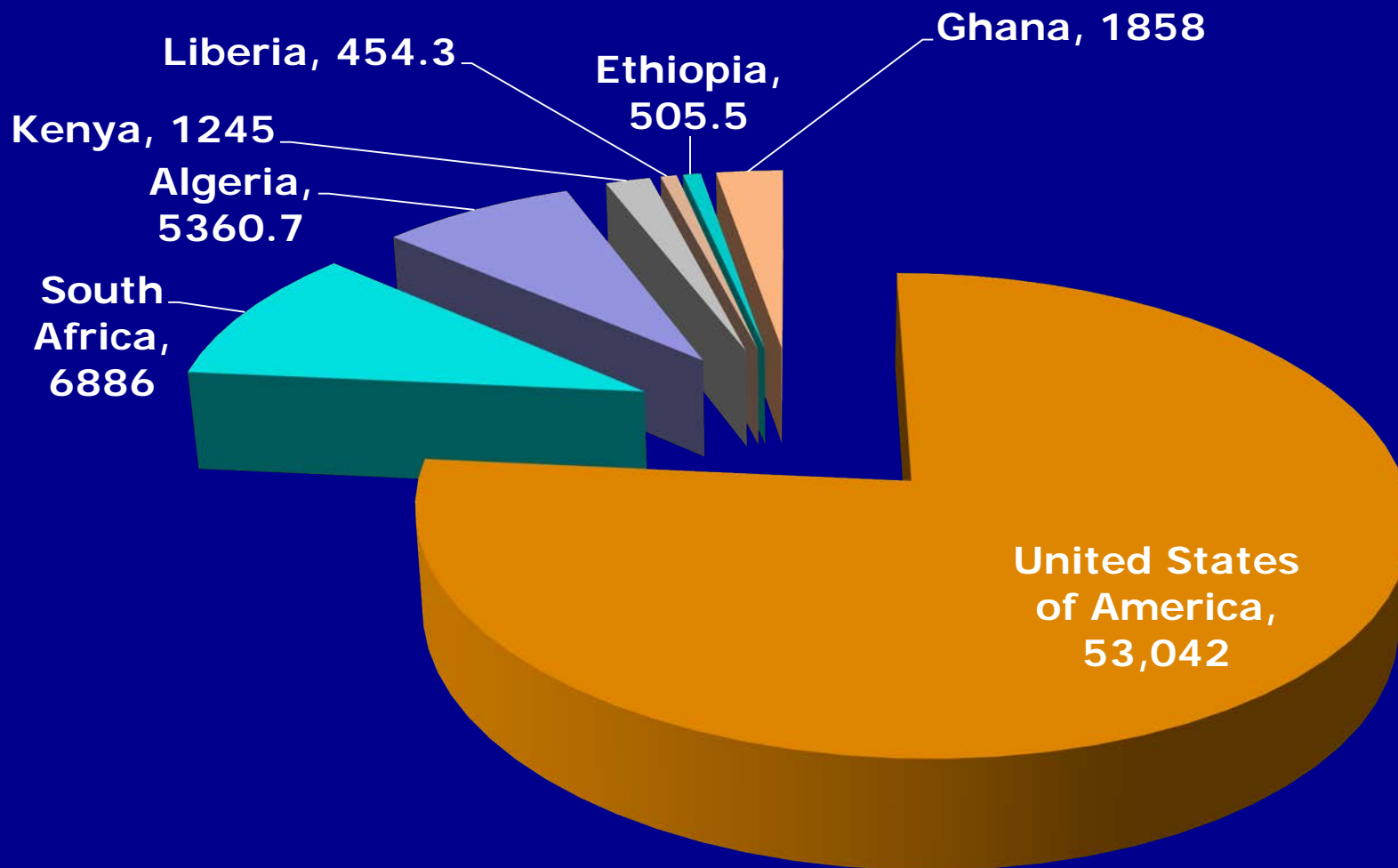
- Area of the continent South of the Sahara
- Made up of 46 states out of 54
- 2017 population is 1.06 billion
- Growth of 2.7%



What makes Sub-saharan Africa peculiar?

- Most of the countries in SSA are less developed countries with the following characteristics
 - A low living standard
 - Undeveloped Industrial base
 - Low Human Development Index (HDI) relative to other countries

Comparison of GDP(nominal) per capita in some countries 2011-2014



World Bank

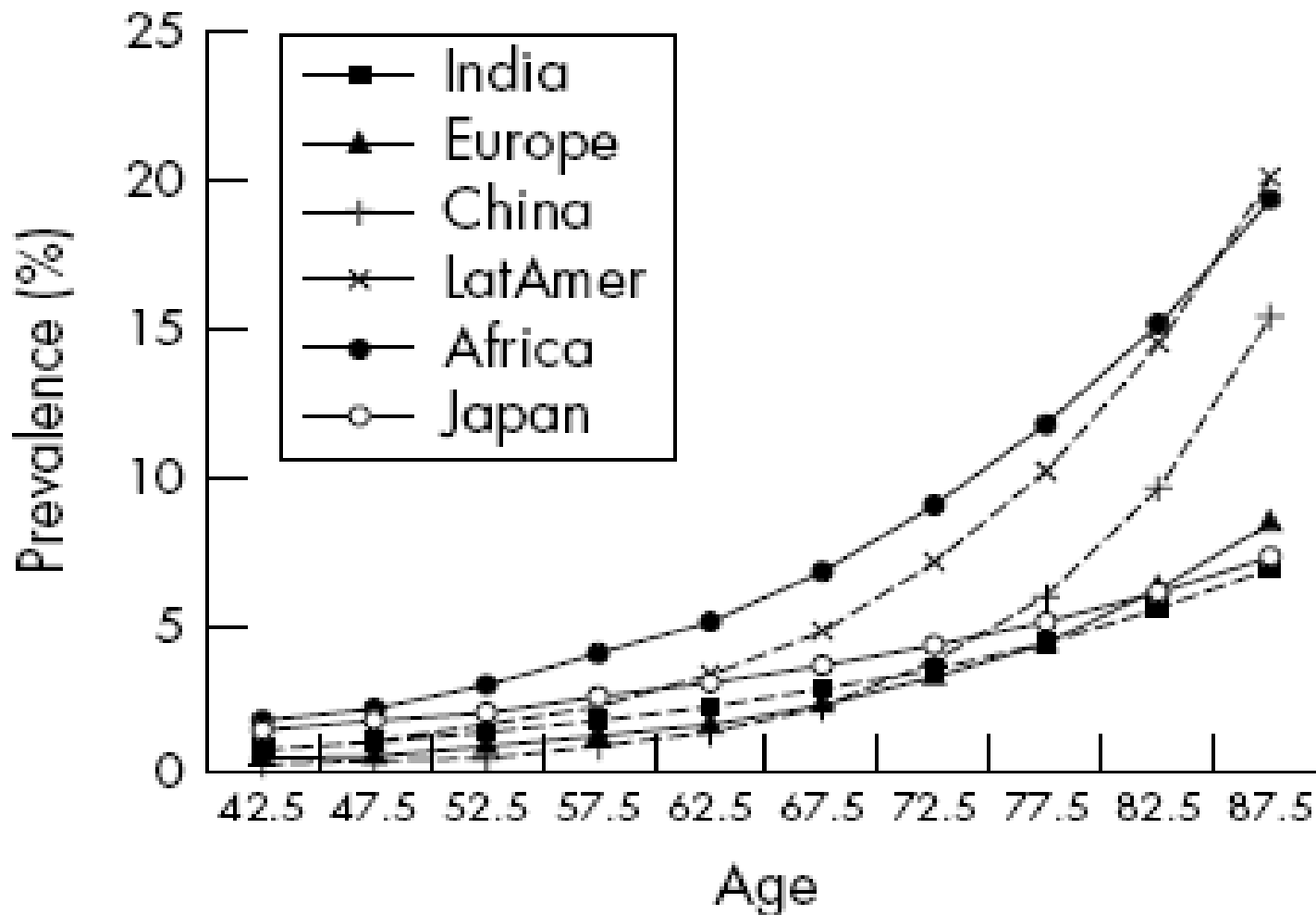
Burden of glaucoma in Sub-Saharan Africa

- WHO- Glaucoma affects Africans on a scale unparalleled in most of the world.¹
- Africa is disproportionately affected by blindness.¹
- POAG in African descents is 4X greater than in Caucasians. (1.29% vs 4.74%)²
- 4x likelihood of blindness in Blacks vs. Whites

¹Resnikoff et al. *Bulletin World Health Org* 2004; 82: 844-51.

² Tielsch JM et al . The Baltimore Eye Survey *JAMA*1991; 266:369-74

Prevalence of POAG



Quigley and Broman, The number of people with glaucoma worldwide in 2010 and 2020. Br J Ophthalmol 2006; 90: 262–7.

World region	Total glaucoma	Lower CL	Upper CL	Total population >40	glaucoma to population >40
China	15,782,196	11,114,702	23,640,340	593,278,000	2.66%
Europe	12,064,740	8,910,048	16,475,405	541,993,000	2.23%
India	11,944,896	9,443,597	15,447,556	468,426,000	2.55%
Africa	6,458,023	5,227,245	7,979,655	149,408,000	4.32%
Latin America	5,677,158	3,252,201	10,035,372	169,215,000	3.35%
SE Asia	4,257,620	2,990,848	6,432,503	178,899,000	2.38%

Prevalence of glaucoma in population studies in SSA

Population based studies	Prevalence of Glaucoma
TEMA EYE STUDY (Ghana)	6.5%
NIGERIA	5.02%
St Lucia & Barbados	8.8% & 7.0%
KONGWA (TANZANIA)	4.2%
BALTIMORE EYE STUDY	4.7%
SOUTH AFRICA	3.8%
WHITES	1.29%

Comparison with other African derived populations

Countries	Prevalence % Blacks	Caucasian
Baltimore	4.74	1.29
Barbados	7.1	0.8
St Lucia	8.8	

Tielsch J. et al The Baltimore Eye Survey. JAMA 1991; 266: 369-74

Leske et al. The Barbados Eye Study . Arch Ophthalmol; 1994; 112: 821-29

Mason RP et al. National Prevalence and Risk factors of Glaucoma in St Lucia, Ophthalmology 1989; 96: 1363-68

Other African derived populations

- Higher prevalence in Barbados and St Lucia studies linked to West African origin
- Attributed to genetic diversity and Drift theory with environmental and socioeconomic modifications.
- Runs aggressive course in blacks

Racette L et al. Surv. Ophthalmol 2003; 48: 295-313

Kosoko-Lasaki et al. J Natl. Med Assoc. 2006; 98: 1626-9

Leske MC et al. Barbados Eye Study. Arch Ophthalmol. 1994; 112: 821-29

Glaucoma in Africa

- OAG is the most common type of glaucoma
- 80-95% in some studies
- Ample evidence of ACG in parts of Africa
- More likely to be chronic

Disease inheritance

- ▶ Inheritance is multifactorial
- ▶ 10% of 1st degree relatives in Caucasian and 20% in blacks
- ▶ 4% of the offspring

Baltimore Eye Survey. JAMA 1991; 266: 369-74

Incidence of Glaucoma

- Provides evidence of long term risk
- Conservative Estimate in SSA
400/1million population annually
- Barbados studies revealed 9 year incidence rate of 4.4% or 0.5% per year amongst African descent
- Increased risk with Age and Male gender.

Barbados Eye Study. 2007; ; 114(6): 1058-64

Cook C .Glaucoma in Africa: J.Glaucoma 2009; 18(2): 124-8

Glaucoma Blindness in SSA

Country	Proportion of Glaucoma blindness	Glaucoma Specific Blindness Prevalence
Akwapim (Ghana)	9.5	0.81
Tema (Ghana)	2.5	0.26
Ibadan (Nigeria)	5.8	0.37
Nigerian National Surv	16.7	0.7
Kongwa (Tanzania)	14.1	
Temba (South Africa)	33	1.79
Mamre(South Africa)	15.2	
Hlabisa(South Africa)	41	0.37(0.06%whites)
Baltimore	5.3	

Glaucoma blindness

- Blindness is almost 7–10 times higher in blacks compared to whites
- Global glaucoma blindness **0.7/1000**
- Western Pacific Subregion 0.18/1000
- **Africa** Subregion **1.5/1000**
- Twice the Global glaucoma figure

Sommer Aet al Racial differences in the cause specific prevalence of blindness in East Baltimore N.Eng J Med 1991; 325: 1412-7

Kyari et al.Epidemiology of Glaucoma in sub Saharan Africa.MEAJO 2013; 20(2)111-125-

Risk Factors

- African descent especially dark skinned
- Family history X4fold risk
- Higher IOP
- Large C:D ratio, with small rim to disc ratio

PECULIAR PRESENTATION OF GLAUCOMA IN SSA

- Presents at an earlier age (21-26% <40 yrs)¹
- Associated with higher IOP²
- Rapidly progressive and aggressive^{1,2}
- ≈50% present with blindness in one eye^{1,2}
- Tema eye study reported a prevalence as high as 3.7% in subjects in the age range of 40-49 years³
- Thinner CCT, Lower Systolic BP/IOP ratio
- Lower Mean OPP

¹ Herndon, J Glaucoma. 2002; 11: 421-425

²Ntim-Amponsah. Eye 2004; 18: 491-497.

³Budenz et al. JAMA Ophthalmol 2013 May; 131(5):651-8.

Why such a big burden?

- Issue of higher risk for the disease
- Early onset of disease
- Aggressive nature of the disease in blacks
- Higher risk of going blind x10

Why such a big burden?

- **Awareness** is very **low**, over 90% not aware across studies even amongst sufferers
- Poor Knowledge/Understanding of disease
- **Late presentation** in 85-90%
- Very Advanced form of disease, **50% blind at presentation**

PECULIAR PRESENTATION OF GLAUCOMA IN SSA

- Larger disc diameters and cupping¹
- Thinner corneas¹
- Reduced amenability to surgical treatment
- Increased chronic systemic diseases²
- Patients are more likely to develop VF damage than individuals of European descent.³

¹ Fansi AA et al Can J Ophthalmol 2009 Oct;44[5]:576-81

² ADAGES study AM J Ophthalmol 2015;159:777-87

³ADAGES study Arch Ophthalmol 2009;127:1136-1145

Glaucoma in Africa

High prevalence
+
Early onset of disease
+
aggressive course

PRODUCES

A high rate of **GLAUCOMA BLINDNESS**²²

Conclusion

- The magnitude and burden of glaucoma in Sub-Saharan Africa is huge
- A multi dimensional approach will be necessary to tackle the huge burden of glaucoma in Sub Saharan Africa

Thank you

