

# **"Risk Factors for Moderate and Severe Glaucoma in a Ghanaian Population"**

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# Background

- I am a third-year undergraduate at Yale University
- Majoring in Molecular, Cellular, and Developmental Biology
- Global Impact Corps Volunteer for Unite For Sight in **Accra, Ghana** in June and July of 2010



# What is Glaucoma?

- Eye disease – damage to the optic nerve
- Permanent, irreversible loss of sight
- Correlated with high intraocular pressure (IOP)
- Two main types
  - Primary Open Angle Glaucoma (**POAG**)
    - GRADUAL
    - MAJORITY OF GLAUCOMA CASES
  - Primary Closed Angle Glaucoma (**PCAG**)
    - ACUTE
    - MINORITY OF GLAUCOMA CASES
- Treatment can only prevent further sight loss

EXTREME GLAUCOMA



ADVANCED GLAUCOMA



EARLY GLAUCOMA

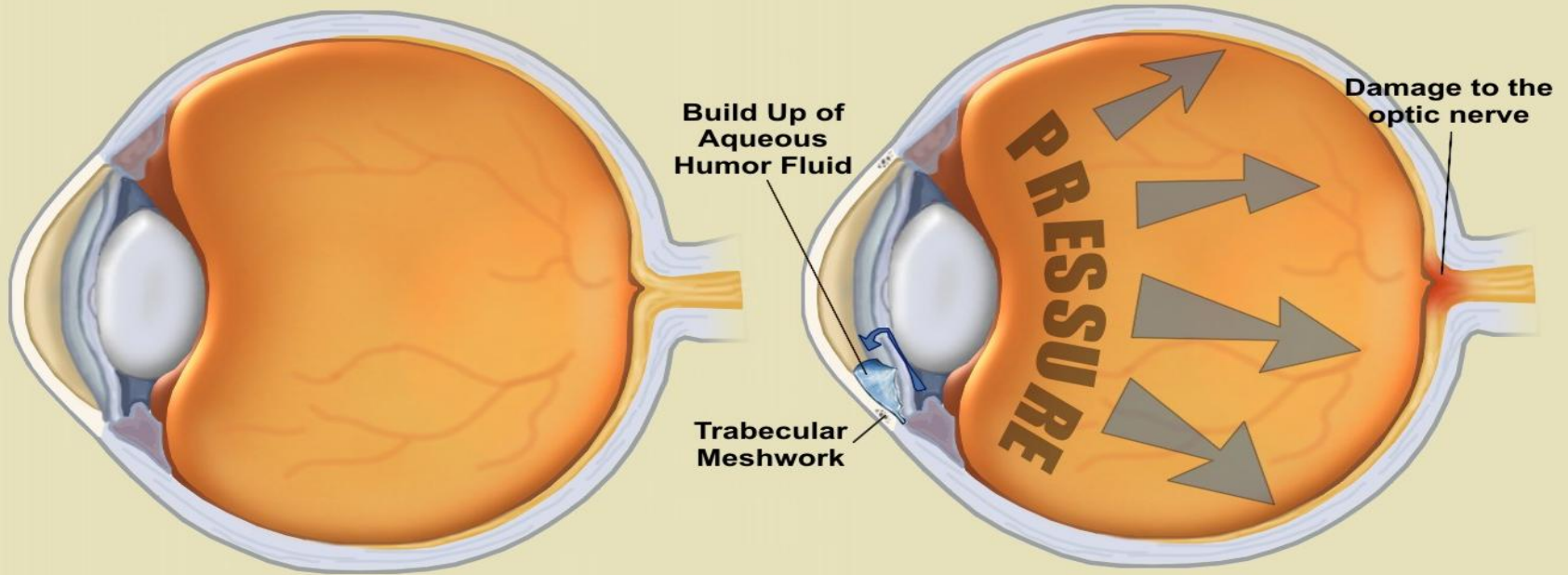


NORMAL VISION



## Normal Eye

## Eye with Glaucoma



# Glaucoma in Ghana

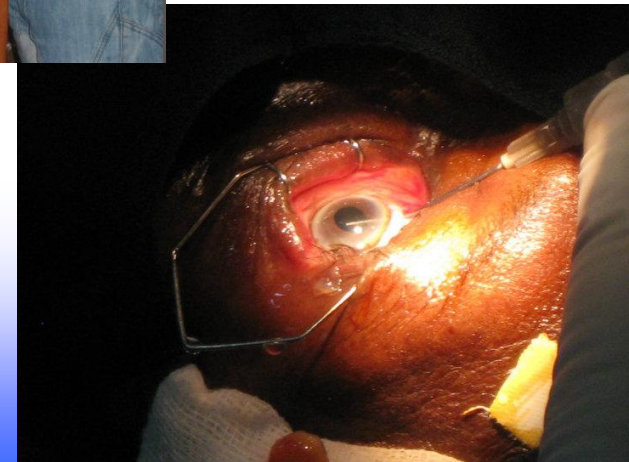
- Developing Democratic Country in West Africa
- Greater impact for poor country + rural areas
- Many barriers to receiving proper eye care
  - Shortage of ophthalmologists and clinical staff
  - Financial and economic insecurity
  - Few hospitals and shortage of medical equipment
  - Low availability of care, especially in poor, rural villages and areas, transportation
  - Education



# UFS in Ghana

## How to Treat Glaucoma

- Early detection
  - Visual test
  - Measurements
    - Intraocular pressure
    - Cup-to-disc ratio
- Treatment with medicated eye-drops
  - Timolol is a beta-adrenergic receptor blocker that slows aqueous humor production
- Surgery
  - Goniotomy
  - Iridotomy



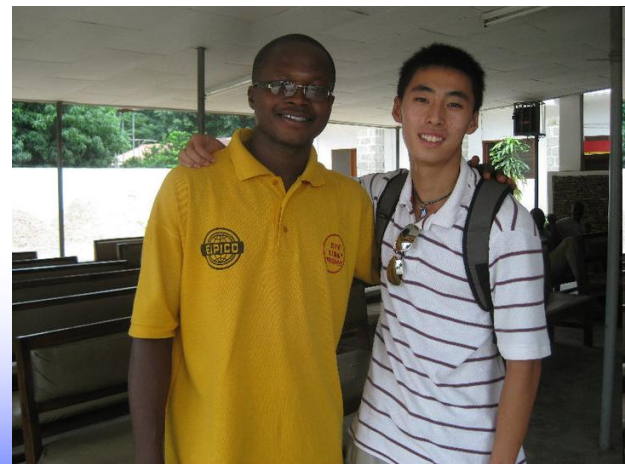
# Focus on Juvenile Glaucoma



- Glaucoma symptoms usually emerge in older patients
- Earlier affliction = greater loss of sight over time
- Juvenile: Patient age < 41 years old

# Study Logistics

- Month of July at Emmanuel Eye Centre in Accra, Ghana
- Under mentorship of Dr. Michael Gyasi
- Compiled glaucoma patient chart reviews and expanded existing database





# Sample Size Statistics

- Sample size: # glaucomatous eyes = **1384**
  - # juvenile glaucomatous eyes = 289
  - % juvenile glaucomatous eyes =  $(289/1384) =$  **20.88%**
  - **INTERESTING TREND**
    - In world-wide studies, for any sample population, ~20% glaucoma patients are juveniles



# Distribution of Glaucoma Types

Glaucoma Type	# eyes	Percentage
<b>POAG</b>	<b>125/289</b>	<b>43.3%</b>
POAGS	95/289	<b>32.9%</b>
Disc Suspt	42/289	<b>14.5%</b>
NTG	24/289	<b>8.3%</b>
PACG	2/289	<b>0.7%</b>
SACG	1/289	<b>0.3%</b>

# Glaucoma and Blindness (based on ISGEO standards)

Eye(s)	# eyes or patients blind	Percentage
Bilateral	3 / 148 patients	<b>2.03%</b>
O.D. only (right eye)	<b>10 / 144 O.D.s</b>	<b>6.94%</b>
O.S. only (left eye)	<b>17 / 145 O.S.s</b>	<b>11.7%</b>

- X<sup>2</sup>-test for OD/OS following 50:50 distribution, p<0.05... what does this mean?

# Age and Sex Distribution

- Basic Stats

- Average age = 28.152

- StDev = 8.233

- Min = 10

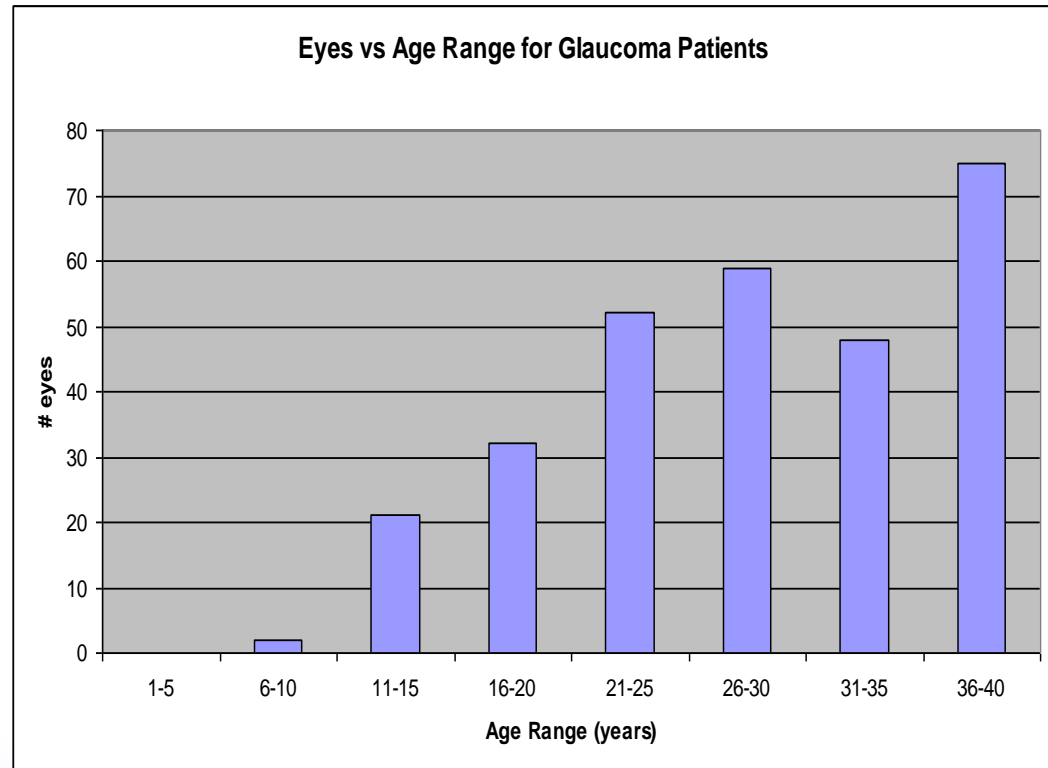
- Med = 29

- Max = 40

- Male/Female ratio

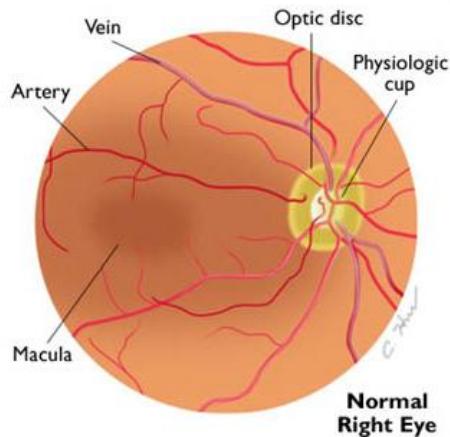
- 144 males; 145 females

- 0.993:1 male:female

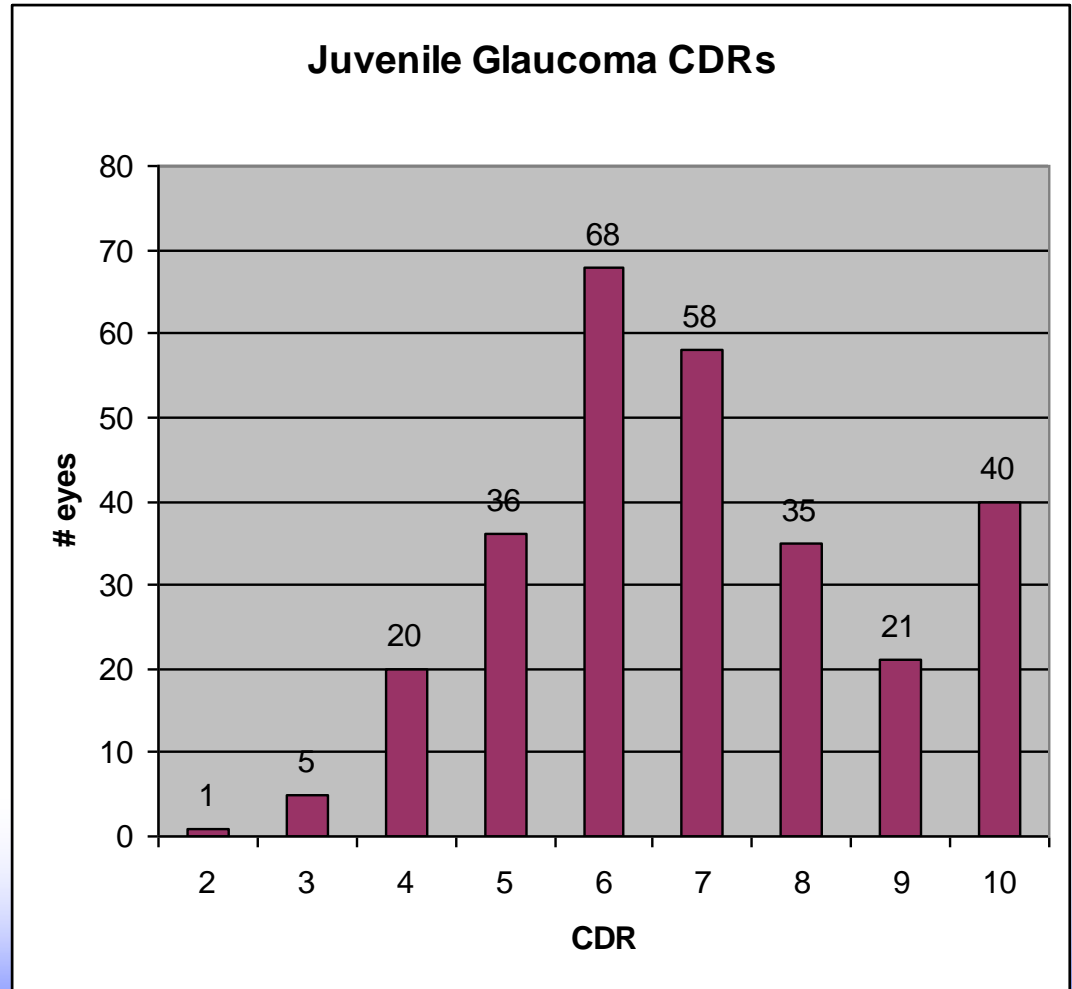


# Technical Data

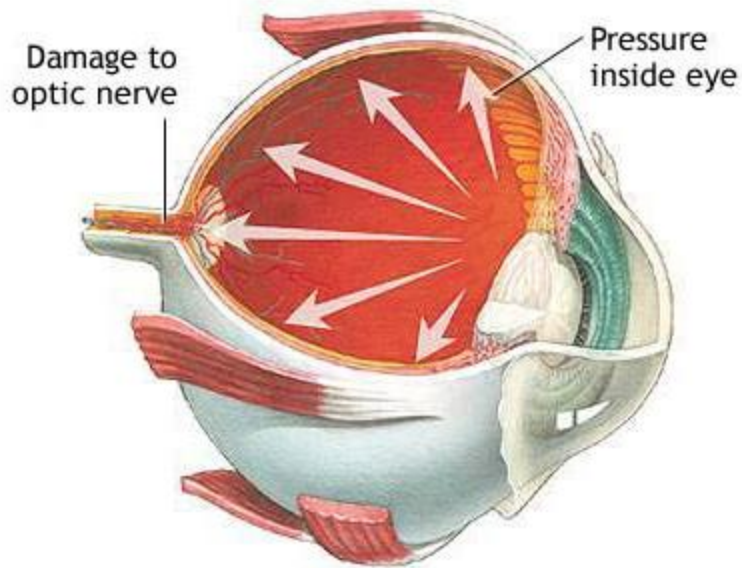
- Cup to Disc Ratio (CDR)



Average CDR = 7.7

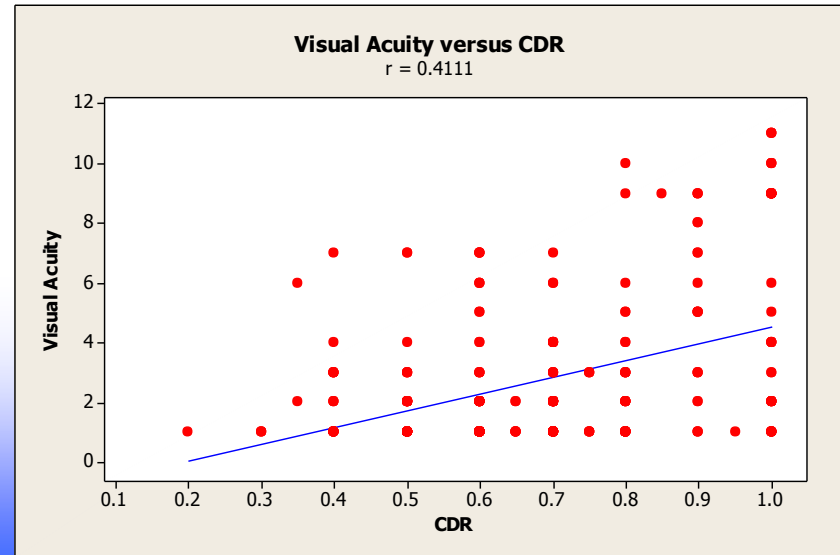
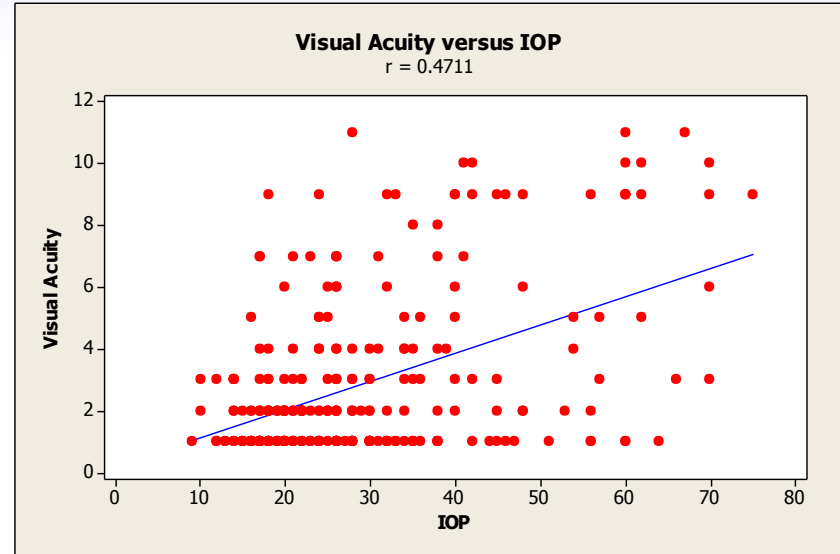
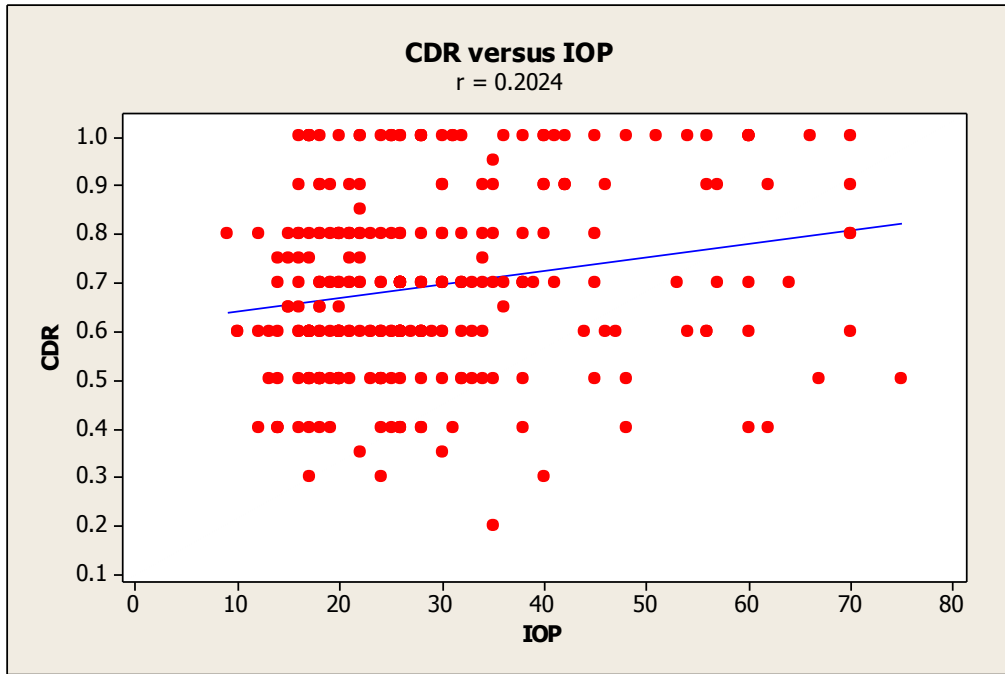


# Intraocular Pressure



Eye	O.D. (Right eye)	O.S. (Left eye)
# eyes	144	145
Mean	29.01	29.06
StdDev	13.99	13.53
Min	10	9
Median	26	26
Max	75	70

# Regression



# So what's the big picture?

- Glaucoma is widespread in Ghana
- Juveniles are affected
- It can be **DIAGNOSED**
  - Simple measurements (Visual acuity, IOP < CDR, etc.)
- It is **TREATABLE**
  - Some components not enough data...
  - Need to reach out more!!





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## **On-site Advisor:**

Dr. Michael Gyasi

Chief Ophthalmologist at Northwestern Eye Clinic and Emmanuel Eye Centre in Accra, Ghana

**This study is purely academic – the author and affiliates has no financial or commercial interests in undertaking this study**