KERATOCONUS EPIDEMIOLOGICAL PROFILE AND RISK FACTORS

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EPIDEMIOLOGICAL PROFILE?

- **Epidemiology** (*cornerstone of public health*)
  - study & analysis of disease within defined populations
  - *determines the extent, distribution and progression of disease.*
  - *identifies etiology or cause of disease.*
  - *identifies the risk factors*
  - *targets preventive and therapeutic measures for a disease*
  - *informs public health policy.*

- E**pidemiological profiles** - describes the burden of a disease on the population in terms of sociodemographic, geographic, behavioral and general clinical characteristics of the population.

- KC - epi data in most countries?

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INCIDENCE vs PREVALENCE

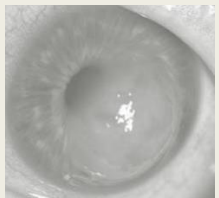
- **Incidence** often confused with **Prevalence**

- **PREVALENCE** - proportion of cases in the population at a given time - tells us how widespread the disease is.

- **INCIDENCE** - conveys the rate of occurrence of new cases - risk of contracting the disease,

PREVALENCE OF KERATOCONUS

- Global prevalence estimated at 0.2-2.3% *(Jonas el al., 2009)*
- High prevalences reported in Asian and Middle Eastern countries – India, Israel, China *(Millodot et al.; Assiri et al.)*
- Minimal empirical data on prevalence of KC globally
- Limited population based studies: 5 out of 19 prevalence studies



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GLOBAL PREVALENCE STUDIES

REGION	COUNTRY	SITE	STUDY SAMPLE	PREVALENCE
N. AMERICA	USA (2) MEXICO (1)	*POPULATION* HOSPITAL CLINIC	13 395 + 64 221	600/100 000 & 54,5/100 000 1.8/100 000
ASIA	INDIA JAPAN (1) AUSTRALIA (1)	POPULATION HOSPITAL HOSPITAL	4667 2601 241	2 300/100 000 9/100 000 (I)
SCANDINAVIA	FINLAND (1) DENMARK (1) NETHERLANDS (1)	HOSPITAL HOSPITAL NATIONAL REGISTRATION REVIEW	249 772 4 M	30/100 000 86/100 000 265/100 000
EUROPE	UK (2) FRANCE (1) SPAIN (1) RUSSIA (1)	HOSPITAL *ARMY RECRUITS* HOSPITAL HOSPITAL	382 + 74 670 400 91	57-229/100 000 1 190/100 000 24-36/100 000 0.2-0.4/100 000
MIDDLE EAST	SAUDI ARABIA (2) PALESTINE (1) ISRAEL (1) IRAN (1)	HOSPITAL *POPULATION* *POPULATION* *POPULATION*	125 + 23 1 234 981 401	20(I) 4/100 000 97/100 000 54/100 000 & 2 340/ 100 000 7.6/100 000

(Gordon-Shaag et al., 2015, Jordan et al.)

EPI PROFILE OF KERATOCONUS

- Starts in 2nd decade of life / early adulthood & progress until 3rd - 4th decade (Rabinowitz *et al.).*
- Affects both men and women
- Disease progression:
  - *early stage - Px typically asymptomatic*
  - *progresses - V/A decreases*
  - *severe cases* $\rightarrow$ *significant visual loss*

- **SA** practitioners & hospitals – increasing incidence of patients mostly presenting with late stages of disease.

- NO POPULATION BASED STUDY - **EPI-K STUDY**

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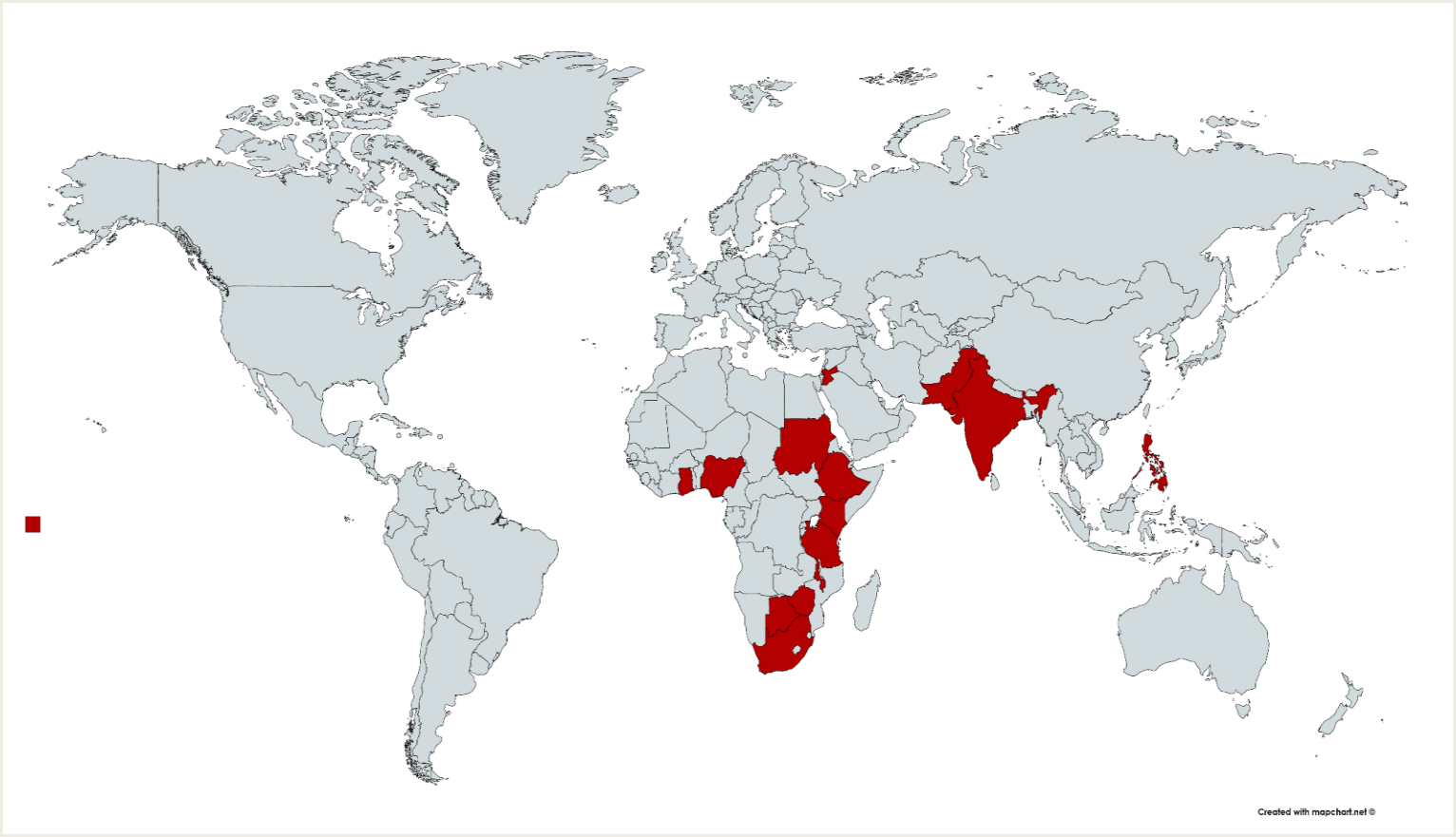
EPI-K STUDY



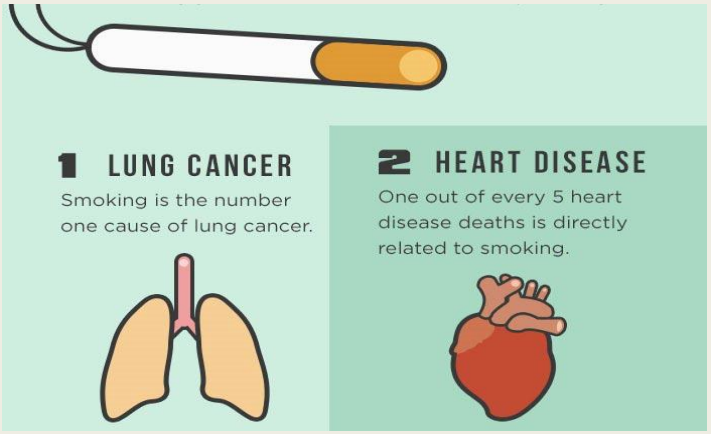
RISK FACTORS

A characteristic, exposure, condition or behaviour that increases the likelihood of a person getting a **disease** or injury.

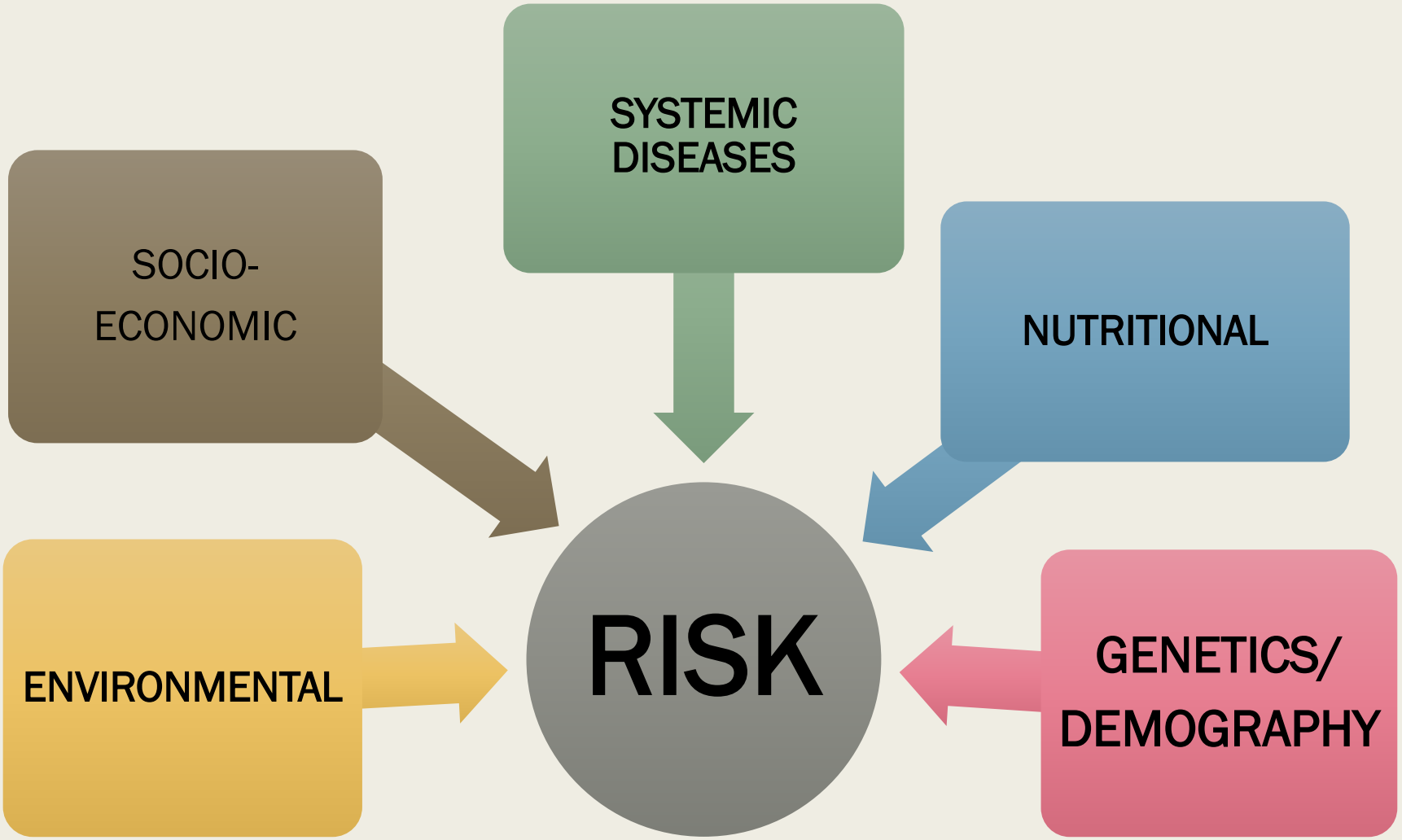
Eg.

Smoking – lung disease

Obesity – heart disease



RISK FACTORS TO BE DISCUSSED



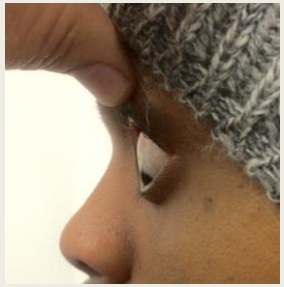
(Gorden-Shaag et al., Suger et al., Patel et al., Copeman, Karsas, Rabinowitz)

DEMOGRAPHY

- AGE – Average age at diagnosis 27,3 ± 9,5years *(CLEK study)*
  - *incidence at much younger age (4-6YRS)*

- GENDER - unclear whether men or women have higher prevalence of the disease *(Millodot et al.,1983).*

- ETHNICITY – Asians, African Americans, Latinos



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SOCIO-ECONOMIC STATUS

1. LOW SOCIOECONOMIC STATUS
   - *Parental Education*

2. Other questions that could be asked:
   - *Social grant*
   - *School feeding scheme*

NUTRITION

DECREASED TRACE ELEMENTS	INFO ON FOOD CONSUMPTION
ZINC SELENIUM COPPER Possible lower antioxidative activity	FISH BEANS CHICKEN CHICK PEAS ALMONDS/CASHEWS

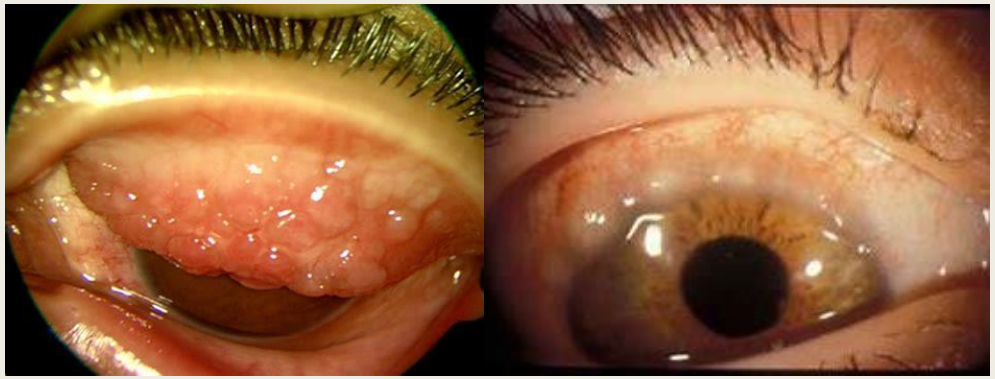
SUN EXPOSURE

- Warmer Climates (India, Israel, Lebanon, Iran, Saudi Arabia) - higher KC prevalence
- Cooler Climates (Northern USA, Europe & Russia) – low KC prevalence

- UV light– produces excessive reactive oxygen species in cornea- KC cannot process → oxidative stress, cytotoxicity & corneal thinning
- Wearing a hat outdoors during susceptible age – protective for KC

SYSTEMIC DISEASES

- Downs Syndrome
- Asthma
- Atopy
  - VKC*
- Sleep apnea
- Connective Tissue Disorders
  - Ehlers-Danlos syndrome
  - Marfan syndrome



GENETICS

- Positive family history – 12-27%
- Autosomal dominant: 50% of the descendants have the risk of inheriting the disease
- NO causative gene identified but many factors indicate genetic link:
  - *familial aggregation*
  - *high ectasia concordance in monozygotic compared to dizygotic twins*
  - *association with genetic systemic disorders*

- **Environmental factors combined with the genetic** disposition triggers the cascade of biochemical events which cause KC.

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CONSANGUINITY

Consanguineous Marriage:

- Unions contracted between biologically-related individuals
  - *first cousins*
  - *second cousins*

Prevalence of KC found to be more in communities where the culture allows

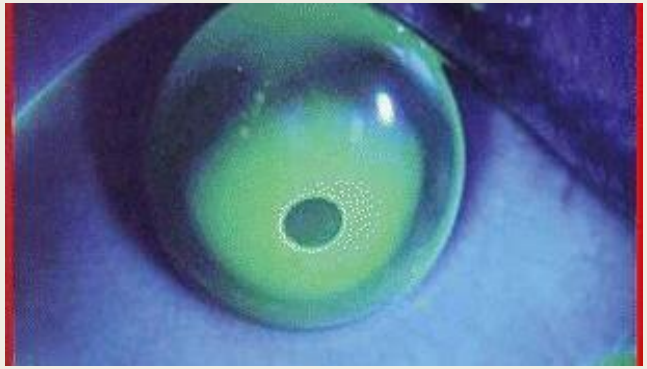
EYE RUBBING

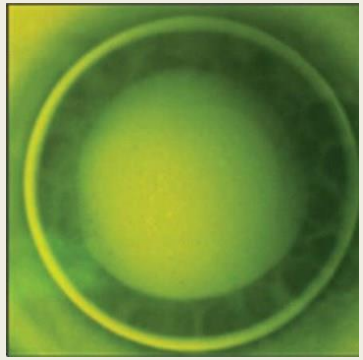
- MOST SIGNIFICANT PREDICTOR OF KC (*Bawazeer et al.*)
- PARTICULARLY IF RUBBING WITH KNUCKLES

RGP WEARING?

LONG TERM WEAR

IMPROPER FITTING LENSES



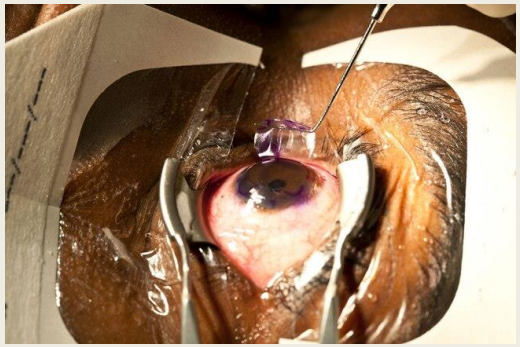


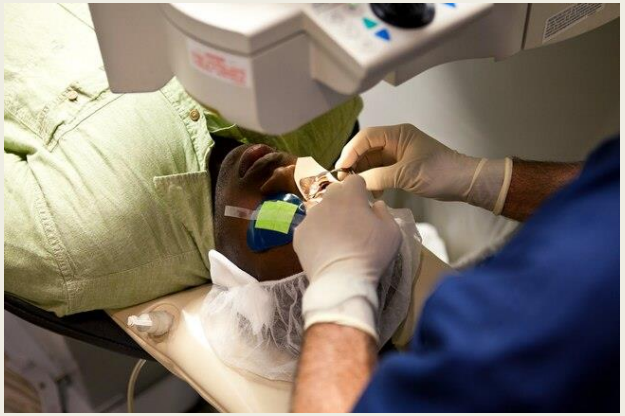
LASIK

a) Post-LASIK ectasia - genetic KC patients and LASIK hastens development of KC.

b) >90% of the post-LASIK ectasias had genetic keratoconus

c) If caused by LASIK – ectasia will be central as opposed to inferior temporal.





(Source: https://www.eyeworld.org/)

FUTURE WORK NEEDED

- SLEEP POSITIONS
  - *PRONE*
  - *SIDE*
- HISTORY OF DRY EYE
  - *NIGHT TIME WORK*
  - *SCREEN TIME*
- SLEEP APNEA
- DIABETES – strengthens cornea

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KRIS QUESTIONNAIRE

Thank you!

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UPCOMING WEBINARS:

6-PART KERATOCONUS SKILLS DEVELOPMENT PROGRAMME

PART I KERATOCONUS: DISEASE PROFILE AND EPIDEMIOLOGY

PART II DIAGNOSTIC APPLICATIONS IN KERATOCONUS

PART III CLINICAL CLASSIFICATION AND THERAPEUTIC OPTIONS 1:

a) Fitting Soft and Corneal RGP Contact Lenses

b) Fitting Hybrid & Scleral Contact Lenses

PART IV CLINICAL CLASSIFICATION AND THERAPEUTIC OPTIONS 2:

Intracorneal Rings & Corneal Cross Linking

PART V SURGERY FOR KERATOCONUS

Keratoplasty modalities, complications & co-mangement

DATES: 3RD FRIDAY OF EACH MONTH

TIME??

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