

# Figure S1: Keratoconus Management: a survey of primary eye care practice in Kenya

Dear Eye Care Practitioner

This survey is intended for Ophthalmic Clinical Officers, Opticians and Optometrists practicing in Kenya.

In order to to develop national guidelines on the screening, diagnosis and management of keratoconus, we need to establish how keratoconus patients are managed in the primary eye care setting in Kenya. The survey should not take more than 15 minutes and is accessible on your phone.

Your return of this anonymous survey implies your consent to participate in this research. Your contribution to this research is appreciated.

For further information please contact Zahra Rashid (email: [alyzahra@gmail.com](mailto:alyzahra@gmail.com), Tel: 0734726600).

The study has received ethical approval from Ministry of Health - Office of the Director General Ref: MOH/ADM/1/1/82(100), Amref Health Africa, Ref: ESRC P918/2021 and the Biomedical Research Ethics Administration (BREC), University of Kwazulu-Natal (UKZN), Durban South Africa Ref: BREC/00001226/2020. Should you have any concerns about the conduct of this research project, you can contact:

a) Ministry of Health - Office of the Director General, Mobile no. 020-2717077, email: [dghealth2019@gmail.com](mailto:dghealth2019@gmail.com)

b) The Research Officer, Amref Health Africa in Kenya, Office Tel: 020-6994000, Mobile No: 0795746777,OR

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Thank you for your support.

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\*Required

1. 1. Choose your qualification \*

*Mark only one oval.*

Ophthalmic Clinical Officer

Optician

Optometrist

Other: \_\_\_\_\_

2. 2. Which educational institutions have you received qualifications in eye care from? \*

*Tick all that apply.*

- KMTC  
 Masinde Muliro University of Science and Technology  
 Other: \_\_\_\_\_

3. 3. What is the highest qualification in eye care that you have achieved? \*

*Mark only one oval.*

- Diploma  
 Higher Diploma  
 Bachelor  
 Masters  
 Doctorate  
 PhD

4. 4. How long have you been practicing since you qualified as an Eye Care Practitioner? \*

*Mark only one oval.*

- <5 years  
 5-10 years  
 10-15 years  
 15-20 years  
 >20 years

5. 5. Which City/Town do you practice in? \*

\_\_\_\_\_

## 6. 6. Which setting do you work in? \*

*Tick all that apply.*

- Optical Shop
- Public Hospital/Clinic
- Private Hospital/Clinic
- NGO/Faith based Hospital
- University/ College
- Other: \_\_\_\_\_

## 7. 7. Please select the following equipment/ consumables that you have access to at your place of work: \*

*Tick all that apply.*

- Distance visual acuity charts
- Retinoscope
- Trial lens set and trial frame
- Lens meter/ Focimeter
- Cross-cylinder
- Auto-refractor
- Slit lamp
- Keratometer
- Corneal topographer
- Pachymeter
- Corneal tomographer
- Local anesthetic drops
- Fluorescein
- Contact lens fitting sets for keratoconic eyes
- Contact lens solutions

## 8. 8. Do you perform the following assessments regularly? \*

*Mark only one oval per row.*

	Yes	No
<b>Retinoscopy</b>	<input type="radio"/>	<input type="radio"/>
<b>Subjective refraction</b>	<input type="radio"/>	<input type="radio"/>
<b>Slit lamp exam</b>	<input type="radio"/>	<input type="radio"/>
<b>Keratometry</b>	<input type="radio"/>	<input type="radio"/>
<b>Pachymetry</b>	<input type="radio"/>	<input type="radio"/>
<b>Corneal topography</b>	<input type="radio"/>	<input type="radio"/>
<b>Corneal tomography</b>	<input type="radio"/>	<input type="radio"/>
<b>Fit hard corneal contact lenses</b>	<input type="radio"/>	<input type="radio"/>
<b>Fit hybrid/scleral contact lenses</b>	<input type="radio"/>	<input type="radio"/>
<b>Manage mild allergic conjunctivitis</b>	<input type="radio"/>	<input type="radio"/>
<b>Manage moderate-severe allergic conjunctivitis</b>	<input type="radio"/>	<input type="radio"/>
<b>Corneal cross-linking</b>	<input type="radio"/>	<input type="radio"/>

## 9. 9. Are you aware of national guidelines on the diagnosis and management of the following \* eye conditions?

*Mark only one oval per row.*

	Yes	No
<b>Allergic conjunctivitis</b>	<input type="radio"/>	<input type="radio"/>
<b>Keratoconus</b>	<input type="radio"/>	<input type="radio"/>

10. 10. How many patients do you see on a monthly basis? \*

Mark only one oval.

- <50
- 50-100
- 100-150
- 150-200
- >200

11. 11. When you see a patient with allergic conjunctivitis do you perform/recommend the following investigations? \*

Mark only one oval per row.

	Always	sometimes	never
<b>Refraction</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Slit lamp exam</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Keratometry</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Corneal topography</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. 12. How do you therapeutically manage patients with allergic conjunctivitis?

Tick all that apply.

	mild cases	moderate cases	severe cases
<b>Counsel against eye rubbing</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Prescribe a lubricant</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Prescribe an anti-allergy eye drop</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Prescribe a steroid eye drop</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Refer to an ophthalmologist</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13. 13. How many patients on average with keratoconus do you see in a month? \*

Mark only one oval.

- None
- 1-10
- 11-20
- >20

14. 14. What investigations would you consider important in making a diagnosis of keratoconus? \*

Tick all that apply.

- History and visual acuity
- Retinoscopy
- Manual Keratometry
- Slit lamps signs
- Corneal topography/tomography
- Other: \_\_\_\_\_

15. 15. How do you manage your keratoconus (KC) patients? \*

Tick all that apply.

	mild KC	moderate KC	advanced KC
<b>Prescribe spectacles</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Fit/refer corneal hard contact lenses</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Fit/refer hybrid/scleral contact lenses</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>manage/refer allergic conjunctivitis</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>monitor progression</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Refer to ophthalmologist</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. 16. What is the lower limit of binocular best corrected visual acuity in glasses that you would fit/refer a patient with keratoconus for specialized contact lenses? \*

*Mark only one oval.*

- 6/6
- 6/9
- 6/12
- 6/18
- 6/24
- 6/60

17. 17. What is the lower limit of binocular best corrected visual acuity with contact lenses that you would refer a patient with keratoconus to an ophthalmologist for possible surgical interventions? \*

*Mark only one oval.*

- 6/6
- 6/9
- 6/12
- 6/18
- 6/24
- 6/60

18. 18. How do you manage Keratoconus patients who require contact lenses?

*Mark only one oval.*

- Fit the contact lenses yourself
- Refer to an optometrist
- Don't refer

19. 19. At what stage would you consider referring a patient with keratoconus to an ophthalmologist? \*

*Tick all that apply.*

- Upon initial diagnosis
- At patients request
- Signs and symptoms of mild allergic conjunctivitis
- Signs and symptoms of moderate to severe allergic conjunctivitis
- Reduction of best corrected visual acuity
- Signs of progression
- No set time

20. 20. Which patients do you recommend for corneal cross-linking? \*

*Mark only one oval.*

- All keratoconus patients regardless of age and whether the condition is progressing or stable
- Only those keratoconus patients whose condition is progressing
- I don't know
- Other: \_\_\_\_\_

21. 21. Do you currently co-manage patients with ophthalmologists after surgical treatment, for example: corneal cross-linking or contact lens fitting following intra-stromal corneal rings or penetrating keratoplasty? \*

*Mark only one oval.*

- Yes
- No
- occasionally



## 22. 22. At the Practice/Hospital/Clinic where you work: \*

Mark only one oval per row.

	Yes	No
<b>Do you have colleagues in eye care with whom you can share knowledge and experiences</b>	<input type="radio"/>	<input type="radio"/>
<b>Do you have access to continuous medical education in eye care</b>	<input type="radio"/>	<input type="radio"/>

## 23. 23. Which of the following options do you use to update your knowledge and skills in eye care? \*

Tick all that apply.

- Journals/publications/online resources
- Attending continuous medical education sessions
- Registering for courses
- Attending conferences
- Other: \_\_\_\_\_

24. 24. On a scale of 1-5 on how confident do you feel at using the following tools/performing \*  
the following assessments when screening, diagnosing and managing patients with  
keratoconus (1-not confident, 5- very confident)

Mark only one oval per row.

	1	2	3	4	5
<b>Retinoscopy</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Subjective Refraction</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Keratometry</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Corneal Topography</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Hard contact lens fitting</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Managing mild allergic conjunctivitis</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Managing moderate allergic conjunctivitis</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

25. 25. Please rate your interest for further training in the following areas (1- not interested, 5 \*  
very interested)

Mark only one oval per row.

	1	2	3	4	5
<b>Keratoconus diagnosis &amp; management</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Retinoscopy</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Subjective Refraction</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Corneal topography</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Hard contact lens fitting</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Managing allergic conjunctivitis</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Corneal cross-linking</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

26. 26. Do the following factors hinder you from increasing your knowledge and skills in eye care? \*

Mark only one oval per row.

	Always	Sometimes	Never
<b>Not knowing where to access it</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>No mentor at work</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Lack of diagnostic tools</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Lack of professional development opportunities</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Cost of conferences</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Cost of journal subscriptions</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Lack of motivation / incentive</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Time constraints</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

27. 27. Do the following factors hinder you from diagnosing keratoconus (KC) early and managing your patients effectively? \*

Mark only one oval per row.

	Yes	No
<b>Lack of knowledge &amp; skills</b>	<input type="radio"/>	<input type="radio"/>
<b>Lack of useable equipment</b>	<input type="radio"/>	<input type="radio"/>
<b>Cost of diagnostic equipment</b>	<input type="radio"/>	<input type="radio"/>
<b>Difficulty in examining eyes with KC</b>	<input type="radio"/>	<input type="radio"/>
<b>Lack of facilities that offer KC services in the same city where you work</b>	<input type="radio"/>	<input type="radio"/>
<b>Lack of spectacle supply</b>	<input type="radio"/>	<input type="radio"/>
<b>Cost of spectacles</b>	<input type="radio"/>	<input type="radio"/>
<b>Lack of local hard contact lens supply</b>	<input type="radio"/>	<input type="radio"/>
<b>Cost of hard contact lenses</b>	<input type="radio"/>	<input type="radio"/>
<b>Lack of national guidelines on managing KC</b>	<input type="radio"/>	<input type="radio"/>
<b>Lack of patient educational material</b>	<input type="radio"/>	<input type="radio"/>
<b>Lack of space</b>	<input type="radio"/>	<input type="radio"/>
<b>Fear of litigation</b>	<input type="radio"/>	<input type="radio"/>
<b>Lack of support from clinic leadership</b>	<input type="radio"/>	<input type="radio"/>
<b>Poor communication with secondary eye care facilities</b>	<input type="radio"/>	<input type="radio"/>

28. 28. Do the following patient factors act as barriers in screening, diagnosing and managing your keratoconus patients effectively ? \*

*Mark only one oval per row.*

	Always	Sometimes	Never
<b>Patient affordability</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Patient motivation</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Willingness to pay</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Lack of patient education about KC</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Language barrier</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Hard contact lenses can be uncomfortable</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Patient compliance</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Patient perception of your role</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

29. 29. Please list any barriers not covered in the questions above that hinder you from providing quality eye care services to your keratoconus patients

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