

UNIVERSITY OF THE WITWATERSRAND
DISSERTATION for RESEARCH (MMED)



Keratoconus: a cross-sectional descriptive study looking at disease severity of patients presenting to the Corneal Clinic at St John Eye Hospital in Soweto (as part of the University of the Witwatersrand academic circuit), Johannesburg, South Africa.

Fathima Mitha

A Dissertation submitted to the Faculty of Science, University of the Witwatersrand, in fulfilment of the requirements for the degree of Master of Medicine.

Johannesburg, 2019

DECLARATION FOR WRITTEN WORK

I, Fathima Mitha, declare that this dissertation is my own work. It is being submitted for the degree of Master of Medicine in Ophthalmology at the University of the Witwatersrand, Johannesburg. It has not been submitted before and the investigator has no financial interests to declare.

The project was approved by the Human Research Ethics Committee (Medical) with Clearance Certificate number M160922 (Appendix D)

Signature

Signed at on the day of 2019.

ABSTRACT

Purpose: To assess the disease severity of keratoconus population at St John Eye Hospital (a single tertiary eye care centre) and to describe the demographic profile of the population.

Method: A cross-sectional descriptive study was conducted at St John Eye Hospital over a period of 18 months. 105 patients were enrolled. Patients completed questionnaires regarding demographic data. File audits and clinical examinations were then conducted with keratometry and pachymetry readings and Scheimpflug imaging.

Results: 105 patients were enrolled. The majority of participants, 56.2% (n=59) had advanced keratoconus (Amsler-Krumeich Classification). Prior to refractive correction the majority of patients were classified as severe to total blindness. With refractive correction, 41% (n= 43) and 40.4% (n=42) of patients had moderate improvement in their visual acuities in their right and left eyes respectively. Patients who had no improvement in their visual acuities in their right eyes represented 24.8% (n=26) and left eyes 26.7% (n=28), despite attempted refractive correction. 59% of the study group were female and 93.3% were of black ethnicity. 47% of patients presented to St John Eye Hospital for the problem of poor vision. 84.8% of patients had a history of ocular allergy. 18 individuals had had prior keratoplasty with 29 (27.6%) of the study population awaiting keratoplasty.

Conclusion: Opportunistic health promotion, through screening of patients with vernal keratoconjunctivitis will assist in detecting early asymptomatic disease in predisposed individuals. If the disease is detected early, collagen cross-linking may prove to be essential to halt progression. Despite advances made in refractive correction, increased availability of keratoplasty and attempts to halt the progression of the disease, there remains a large burden of morbidity. With a high burden of severe keratoconus, and a substantial backlog in patients awaiting keratoplasty, measures to facilitate keratoplasty are needed. Factors hampering keratoplasty access include availability of tissue and financial and system constraints.

ACKNOWLEDGEMENTS

Undertaking an MMED is a daunting task. From deciding on a topic, to completing the thesis and handing it in for assessment would not be possible without the assistance and support of many individuals and organizations.

I would like to say a very sincere thanks to Dr. Nicky Welsh, my supervisor who has offered extremely valuable advice and input to my research. I am grateful for the guidance and encouragement Dr. Welsh has given me.

No MMED would be complete without all the statistical calculation and interpretation of the relevant data. I would like to thank Stan Carries for all his assistance in interpreting the results of my research.

Thanks to Prof. McLaren (Head of Ophthalmology at St John Eye Hospital when I started my research) for permission to interview patients and collect data. Thanks too to the Chief Executive Officer of CHBAH for allowing my research to be conducted at the St John Eye Hospital.

Thank you to Dr Kashmira Rawjee for her assistance in finding and examining three of the study patients.

To my dear siblings, thank you for your endless patience and technical support without which I would not have been able to complete my research. Thank you for your time and patience with me during this period.

Finally, I wish to thank my parents, Thahir and Yasmin Mitha for all the time and assistance they have given me in completing this research.

LIST OF ABBREVIATIONS

AKC – atopic keratoconjunctivitis
AST – asymmetric bow-tie astigmatism
BCVA – best corrected visual acuity
CCL – collagen cross-linking
CCT – central corneal thickness
CEO – Chief executive officer
CF – counting fingers
CHBAH - Chris Hani Baragwanath Academic Hospital
CLEK – Collaborative Longitudinal Evaluation of Keratoconus
D - dioptre
DALK – deep anterior lamellar keratoplasty
HM - hand movements
ICRS – intrastromal corneal ring segment
IL – interleukin
I-S – inferior – superior
KC – keratoconus
KCI – keratoconus index
KISA – keratoconus percentage index
KPI – keratoconus prediction index
KSS – keratoconus severity score
MB – moderate blindness
MMP – matrix metalloproteinase
MLV – moderate low vision
n – number of patients
NLP – no light perception
NNV – near normal vision
NV – normal vision
OCT – optical coherence tomography
PK - penetrating keratoplasty
SLV – severe low vision
SRAX – skewed radial axis
STB – severe to total blindness

TNF – tumour necrosis factor

UV – ultraviolet

VA – visual acuity

VKC – vernal keratoconjunctivitis

LIST OF FIGURES

Figure 1 Gender	12
Figure 2 Ethnicity	13
Figure 3 Patients with a driver's license	14
Figure 4 Level of education	15
Figure 5 Occupation	16
Figure 6 Reason for presentation	17
Figure 7 Visual acuities for right and left eyes	20
Figure 8 Impact of best corrective measure on visual acuity	22
Figure 9 Keratometry readings	24
Figure 10 Keratometry mean readings	26
Figure 11 Central corneal thickness	28
Figure 12 Keratoconus staging	30
Figure 13 Keratoplasty types	32
Figure 14 Collagen cross-linking	33
Figure 15 Staging of keratoconus in patients with previous CCL	34

LIST OF TABLES

Table 1 Present ages, age at vision deterioration and at presentation	11
Table 2 Medical history	18
Table 3 Visual acuity classification	19
Table 4 Scale for measuring degree of improvement of VA post corrective action	21
Table 5 Keratoconus staging	30
Table 6 Clinical findings	31