

UNIVERSITI TEKNOLOGI MARA

**THE MORPHOLOGY OF CORNEAL
ENDOTHELIUM WITH THE WEAR OF
HYDROGEL COLOR CONTACT LENSES
PRESCRIBED BY UNLICENSED VENDORS**

SITI AFIFAH MD NOR

Project submitted in fulfilment of the requirements for the degree of

Bachelor of Optometry (Hons)

Faculty of Health Sciences

JULY 2015

AUTHOR'S DECLARATION

I declare that the work in this dissertation was carried out in accordance with the regulations of University Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This topic has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

In the event that my dissertation be found to violate the conditions mentioned above, I voluntarily waive the right of conferment of my degree and agree be subjected to the disciplinary rules and regulations of Universiti Teknologi MARA.

Name of Candidate : Siti Afifah Md Nor

Candidate I.D.No. : 2011689796

Programme : Bachelor of Optometry (Hons)

Faculty : Health Sciences

Thesis Title : The Morphology of Corneal Endothelium with The
Wear of Hydrogel Color Contact Lenses Prescribed by
Unlicensed Vendors

Signature of Candidate:

Date : June 18, 2015

ABSTRACT

Purpose: To compare the morphology of corneal endothelium following wear of hydrogel cosmetic color contact lenses (CCL) prescribed by unlicensed vendors and authorized eye clinician. **Materials and methods:** Eleven research subjects who wear CCL acquired from unlicensed vendors and another eleven regular patients of Contact Lens Clinic, UiTM Puncak Alam were invited to participate in this study. All subjects were female Malays with the age range of 21 to 25 years old. The participants were assessed with preliminary routine procedures prior to endothelial photography using Tomey EM-3000 non-contact specular microscope without wearing contact lenses. The output endothelial morphological parameters were endothelial cell density (ECD), coefficient of variation (CV) and percentage of cell hexagonality. Independent-samples t-test and Mann-Whitney U test were used to verify the mean difference of the endothelial morphological parameters. Pearson's product-moment correlation was used to determine the association of endothelial morphological changes with the duration of consuming CCL. **Results:** There was no clinically significant difference of corneal endothelial morphology between wearers who obtained CCL from unlicensed vendors and prescribed by authorized eye clinician. ECD of experimental group was 2879.82 ± 199.40 cell/mm² whilst control group was 2956.09 ± 215.93 cell/mm². The difference of -76.27 (95% CI, -261.13 to 108.58) cell/mm², $t(20) = -0.86$, $p = 0.589$ was not a statistically significant. The CV were $38.18 \pm 5.50\%$ and $37.09 \pm 4.30\%$ for experimental and control group respectively. The difference of 1.09 (95% CI, -3.29 to 5.47), $t(20) = 0.520$, $p = 0.422$ was also not significant. The percentage of cell hexagonality was not statistically significant with mean rank of experimental and control group of 10.36 and 12.64 respectively, $U = 48$, $z = -0.822$, $p = 0.438$. There was a small positive correlation between duration of consuming CCL with ECD changes ($p = 0.46$) and CV ($p = 0.44$). **Conclusion:** CCL wear would induce endothelial morphological changes, regardless of the sources of CCL supply. Despite the known effects of long duration of soft contact lens use on corneal endothelial cell morphology, this study could not draw a significant correlation between them.

Keywords: endothelium, morphology, cosmetic color contact lenses, license

TABLE OF CONTENTS

TITLE	PAGE
AUTHOR'S DECLARATION	ii
ACKNOWLEDGEMENT	iii
TABLE OF CONTENTS	iv
LISTS OF TABLES	vi
LIST OF FIGURES	vii
LIST OF ABBREVIATIONS AND GLOSSARY	viii
ABSTRACT	ix
ABSTRAK	x
CHAPTER1: INTRODUCTION	
1.1 Background of Study	1
1.2 Problem Statement	4
1.3 Research Question	4
1.4 Research Objective	4
1.5 Research Hypothesis	4
1.6 Significance of Study	4
1.7 Concept of Definition	4
CHAPTER 2: LITERATURE REVIEW	
2.1 Complications of Cosmetic Color Contact Lenses	6
2.2 Wearers' Preparation and Compliance	8
2.3 Pathogenesis of Corneal Endothelial Hypoxia Following Wear of Contact Lenses	9
2.4 The Changes of Corneal Endothelium with Contact Lenses Wear	10
2.4.1 Decrease of Endothelial Cell Density	
2.4.2 Changes of Endothelial Cell Size and Shape	
CHAPTER 3: METHODOLOGY	
3.1 Study Design	12
3.2 Setting	12
3.3 Sampling	12
3.3.1 Sample Size Calculation	12
3.3.2 Criteria	13
3.3.2.1 Inclusion Criteria	
3.3.2.2 Exclusion Criteria	
3.4 Research Protocol	14
3.5 Ocular Parameters & Procedure	15
3.5.1 Habitual Visual Acuity	15
3.5.2 Slit Lamp Biomicroscopy	15
3.5.3 Non-contact Specular Microscope	16
3.6 Ethical Approval	17
3.7 Data Analysis	17

CHAPTER 4: RESULT	
4.1 Demographic Data	19
4.2 Normality Test	21
4.3 The Morphology of Corneal Endothelium of Study Subjects	21
4.4 Association of Endothelial Morphology Parameters with Duration of Consuming CCL	23
CHAPTER 5: DISCUSSION	25
CHAPTER 6: CONCLUSION AND RECOMMENDATION	
6.1 Summary of Study	29
6.2 Limitation of the Study	29
6.3 Suggestion for Further Research	30
REFERENCES	31
APPENDICES	
Appendix A: Consent Form	36
Appendix B: Recording Sheet	37
Appendix C: Raw Data Material	39
Appendix D: FHS Ethical Committee Forms	61