

FACTORS ASSOCIATED WITH SOFT CONTACT LENS REPLACEMENT
NONCOMPLIANCE OF WEARERS IN WINDHOEK.

SHAMISO G GWATA

APRIL 2017

FACTORS ASSOCIATED WITH SOFT CONTACT LENS REPLACEMENT
NONCOMPLIANCE OF WEARERS IN WINDHOEK.

A RESEARCH THESIS SUBMITTED IN PARTIAL FULFILMENT
OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF PUBLIC HEALTH
OF
THE UNIVERSITY OF NAMIBIA

BY

SHAMISO G GWATA

201302827

APRIL 2017

SUPERVISOR: PROFESSOR. L. HAOSSES-GORASES

ABSTRACT

Approximately hundred and twenty five million people worldwide wear contact lenses (Barr, 2006). The contact lens market is increasing at an alarming rate globally and Namibia is no exception, but there are no known national statistics. Soft contact lens wearers do not comply to their specific lens replacement schedule and continue to present with contact lens discomfort and complications yet they are avoidable. Some of the resulting complications if not treated eventually lead to blindness. Noncompliance leads to deterioration in the wearer's health, increasing the amount of time they need services, increase in the time it takes to treat them and increases health expenditure. The aim of this study was to explore and describe the frequency and factors that are associated with soft contact lens replacement noncompliance of wearers in Windhoek. An analytical cross sectional study was conducted using a convenient sampling technique. A structured questionnaire was conducted on voluntary participants. The data was analysed using Epi Info 7 software and setting p values of 0.05 for statistical significance. A total of 118 participants were enrolled into the study. A total of 80% (n=94) were females and 20% (n=24) were male. A total of (n=49) 41.5% of the soft contact lens wearers did not comply to their specific lens replacement schedule. The factors that were associated with noncompliance were gender (p=0.01), age (p=0.012) and employment status (p=0.020). Factors that were not associated with noncompliance were home language, race, education level, income, smoking, type of contact lens worn and number of years of contact lens wear. The most common replacement modality of contact lenses in Windhoek is monthly wear, and most of the participants had worn their contact lenses for an average of 1-3 years. The majority of the participants had also been for their last check up between a year or two ago. The average number of days that each

contact lens wearer wore their lenses for was 37 instead of the advised 30 days. Discomfort was the main reason that the soft contact lens wearers replaced their lenses on time. The main reason that participants gave for not replacing their soft contact lenses according to their schedule was that they forgot on which day they were supposed to replace the lens (n=57) 48.3%, the second most popular reason for not replacing the lenses on time was because participants forgot to reorder their next batch of soft contact lenses on time. Very few participants (n=21) 17.8% expressed the view that it was in order to save money. Although (n=49) 41.5 % of the participants were non compliant with their soft contact lens replacement schedule it is important to note that only (n=9) 7.6 % of the participants had ever experienced a serious eye infection. Soft contact lens patients also advised that the best method to help them comply better would be to send a telephonic reminder. The study also encountered some limitations, the initial sample size was calculated to be 384, however the study only attained 118 participants. This is due to the decline in the Namibian Contact lens market, the decline in the Angolan economy has caused a decline in the number of contact lens wearers. The researcher recommended that more time needs to be given when educating soft contact lens wearers. It is also imperative that all soft contact lens wearers need to sign and leave with compulsory written instructions and information, as they do in other countries. If the soft contact lens wearers view the lens as the serious therapeutic ocular device that it is, they will be more compliant with replacing the soft contact lenses on time.

TABLE OF CONTENTS

ABSTRACT.....	i
TABLE OF CONTENTS.....	iii
LIST OF TABLES.....	ix
LIST OF FIGURES.....	xi
LIST OF ABBREVIATIONS.....	xii
ACKNOWLEDGEMENT.....	xiii
DEDICATION.....	xiv
DECLARATIONS.....	xv
CHAPTER 1: INTRODUCTION AND RATIONALE OF THE STUDY... ..	1
1.1 INTRODUCTION.....	1
1.2 BACKGROUND OF THE PROBLEM.....	2
1.3 STATEMENT OF THE PROBLEM.....	9
1.4 RESEARCH AIM.....	10
1.5 OBJECTIVES OF THE STUDY.....	11
1.6 SIGNIFICANCE OF THE STUDY.....	11
1.7 OPERATIONAL DEFINITIONS.....	12
1.8 SUMMARY.....	13
CHAPTER 2: LITERATURE REVIEW.....	14
2.1 INTRODUCTION.....	14

2.2 COMPLIANCE IN GENERAL HEALTH CARE.....	14
2.3 DEFINITION OF COMPLIANCE.....	15
2.4 COMPLICATIONS OF CONTACT LENS WEAR.....	18
2.5 NONCOMPLIANCE IN SOFT CONTACT LENS WEARER.....	25
2.6 PREVALENCE OF SOFT CONTACT LENS REPLACEMENT NONCOMPLIANCE.....	27
2.7 FACTORS AFFECTING SOFT CONTACT LENS REPLACEMENT NONCOMPLIANCE.....	28
2.8 REASONS FOR NOT COMPLYING TO THE SOFT CONTACT LENS REPLACEMENT SCHEDULE.....	33
2.9 IMPROVING COMPLIANCE.....	35
2.10 SUMMARY.....	39
CHAPTER 3: METHODOLOGICAL APPROACH.....	40
3.1 INTRODUCTION.....	40
3.2 RESEARCH DESIGN.....	41
3.2.1 Quantitative Research.....	41
3.2.2 Cross Sectional Study.....	42
3.2.3 Analytic Studies.....	43
3.3 STUDY POPULATION.....	43
3.3.1 Inclusion Criteria.....	44

3.3.2 Exclusion Criteria.....	45
3.4 SAMPLE METHOD.....	45
3.4.1 Sample Size.....	46
3.5 DATA COLLECTION PROCESS.....	47
3.5.1 Data Collection Instrument.....	48
3.5.2 Pilot Study.....	49
3.5.3 Validity.....	50
3.5.4 Reliability.....	50
3.6 DATA COLLECTION PROCEDURE.....	51
3.7 DATA ANALYSIS.....	52
3.7.1 Descriptive analysis.....	52
3.7.2 Cross Sectional Analysis.....	53
3.8 ETHICAL CONSIDERATIONS.....	53
3.8.1 Permission to conduct the research.....	54
3.8.2 Informed consent.....	54
3.8.3 Voluntary Participation.....	55
3.8.4 Right to privacy and confidentiality.....	55
3.8.5 Non Maleficence.....	55
3.8.6 Anonymity.....	56
3.9 SUMMARY.....	56
CHAPTER 4: PRESENTATION OF THE RESULTS AND DISCUSSION.....	57
4.1 INTRODUCTION.....	60

4.2 ANALYSIS OF THE SOCIO-DEMOGRAPHIC CHARACTERISTICS OF SOFT CONTACT LENS WEARERS IN WINDHOEK.....	58
4.2.1 Gender.....	58
4.2.2 Age of respondents.....	60
4.2.3 Ethnic groups of respondents.....	61
4.2.4 Home language.....	62
4.2.5 Employment status.....	63
4.2.6 Highest level of education attained.....	64
4.2.7 Total monthly income.....	65
4.2.8 Medical Aid.....	66
4.2.9 Smoking.....	66
4.3 SOFT CONTACT LENS REPLACEMENT NONCOMPLIANCE AND KNOWLEDGE OF COMPLICATIONS.....	67
4.3.1 Replacement Modality.....	67
4.3.2 The period of contact lens wear.....	68
4.3.3 Last contact lens check up.....	69
4.3.4 Sleeping with contact lenses on.....	70
4.3.5 Hours of soft contact lens wear per day.....	70
4.3.6 Knowledge on how often to replace the soft contact lenses.....	71
4.3.7 Perceived compliance on soft contact lens replacement.....	72
4.3.8 The number of days each respondent wears their contact lenses for before replacement.....	73
4.3.9 Reason for replacing contact lenses.....	74

4.3.10 Main reason for wearing contact lenses longer than recommended ..	75
4.3.11 Knowledge on contact lens complications.....	76
4.3.12 Naming a complication that can arise from contact lens misuse.	77
4.3.13 Personal experience of a serious contact lens related eye infection.....	78
4.3.14 Best method that would help you to replace the contact lenses when recommended	78
4.3.15 Actual soft contact lens replacement compliance	79
4.4 FACTORS AFFECTING SOFT CONTACT LENS REPLACEMENT	
NONCOMPLIANCE	80
4.4.1 Gender	80
4.4.2 Age	82
4.4.3 Employment status	83
4.5 FACTORS THAT DO NOT AFFECT SOFT CONTACT LENS REPLACEMENT	
NONCOMPLIANCE	84
4.5.1 Race.....	84
4.5.2 Home language.....	86
4.5.3 Highest level of education attained	87
4.5.4 Monthly Income	88
4.6 SUMMARY	89
CHAPTER 5: CONCLUSION, RECOMMENDATIONS, LIMITATIONS AND	
SUMMARY.....	91
5.1 INTRODUCTION	91

5.2 AIM AND OBJECTIVES OF THE STUDY	91
5.3 CONCLUSION.....	92
5.3.1 Conclusion regarding objective 1: Assess the prevalence of soft contact lens replacement noncompliance.....	92
5.3.2 Conclusion regarding objective 2: Determine possible factors associated to replacement noncompliance in soft contact lens wearers	93
5.3.3 Conclusion regarding objective 3: Determine the main reason for soft contact lens replacement noncompliance.....	93
5.4 RECOMMENDATIONS	95
5.4.1 Health education of soft contact lens wearers.....	95
5.4.2 Programme implementation and strategies	95
5.4.3 Management by Optometrist.....	96
5.4.4 Further research.....	97
5.5 LIMITATIONS	98
5.6 SUMMARY	99
REFERENCES.....	101
Annexure A: Questionnaire.....	107
Annexure B: Unam research permission letter	114
Annexure C: Ethical Clearance Certificate from Unam	115
Annexure D: Informed consent.....	116
Annexure E: Contact lens do's and don'ts.....	118

LIST OF TABLES

Table 4.1	Ethnic group of respondents.....	61
Table 4.2	Employment status	63
Table 4.3	Total monthly income ..	65
Table 4.4	Medical Aid.....	66
Table 4.5	Smoking.....	66
Table 4.6	Replacement Modality	67
Table 4.7	Period of Contact lens wear ..	68
Table 4.8	Last contact lenses check up	69
Table 4.9	Sleeping with contact lenses on	70
Table 4.10	Hours of lens wear per day	70
Table 4.11	Number of days you wear contact lenses before disposal ..	73
Table 4.12	Reason for wearing contact lenses longer than recommended .	75
Table 4.13	Knowledge on contact lens complications.....	76
Table 4.14	Naming a complication that arises from contact lens misuse ..	77
Table 4.15	Serious contact lens related eye infection	78
Table 4.16	Method that would help you to replace the contact lenses when recommended	79
Table 4.17	Actual soft contact lens replacement compliance	79
Table 4.18	Actual compliance by Gender.....	80
Table 4.19	Gender and compliance –chi squared test.....	81
Table 4.20	Association between compliance and age group.....	82
Table 4.21	Age group and compliance chi square tests	83
Table 4.22	Association between compliance and employment status	83

Table 4.23 Employment status and actual compliance Chi Squared test.....	84
Table 4.24 Association between compliance and race.....	85
Table 4.25 Race and actual compliance Chi-Squared Test.....	85
Table 4.26 Association between compliance and home language.....	86
Table 4.27 Association between language and actual compliance Chi-Square tests .	86
Table 4.28 Association between attained education and actual compliance.....	87
Table 4.29 Education and compliance Chi-Square tests.....	88
Table 4.30 Association between compliance and monthly income	88
Table 4.31 Monthly Income and compliance Chi-Square tests	89

LIST OF FIGURES

Figure 2.1	Soft contact lens wear complications.....	23
Figure 4.1	Gender.....	59
Figure 4.2	Age of respondents.....	60
Figure 4.3	Home language.....	62
Figure 4.4	Highest level of education attained.....	64
Figure 4.5	Knowledge on how often to replace the soft contact lenses.....	71
Figure 4.6	Perceived compliance on soft contact lens replacement.....	72
Figure 4.7	Reason for replacement of contact lenses.....	74

LIST OF ABBREVIATIONS

ECP : Eye Care Practitioner

GPC : Giant Papillary Conjunctivitis

HIV : Human Immunodeficiency Virus

MOHSS : Ministry of Health and Social Services

SCL : Soft Contact lens

UK : United Kingdom

UN : United Nations

UNAM : University of Namibia

USA : United States of America

WHO : World Health Organization

ACKNOWLEDGEMENTS

- First and foremost I would like to thank God, my Father, my creator, my friend. I am here and able to do and achieve so much only through your enabling power. It is only through your grace that I have made it this far.
- I would also like to express my sincere gratitude to my research supervisor Dr. L. Haoses-Gorases. Your constant support, advice, guidance, worthy comments and suggestions have been so invaluable. Your constant encouragements and deadlines have seen this work into completion.
- I wish to express my sincere gratitude to the following people or institutions
 - Shaetonhodi Optometrists for allowing me to conduct this study at my place of work, and creating a work atmosphere that promotes staff development and empowerment
 - University of Namibia for allowing me to study at the institution
 - Optometrists in Windhoek who agreed to distribute the questionnaire to their clients, your support and cooperation have been invaluable
 - Soft contact lens wearers that agreed to participate in the study, without your cooperation this study could not have been possible
- Finally, my appreciation and thanks are extended to all of those who in one way or the other directly or indirectly have contributed to the success of my studies.

DEDICATION

This thesis is dedicated to my parents, Steven and Maria Gwata who have shown unconditional love, endless support and taught us the value of a good education and hard work. Mom and dad, your love for me knows no bounds. You have taught me that all tasks can be accomplished if done one step at a time. My main goal in life is to make you proud of me. I pray that one day, I may achieve that.

To my son Tadiwa, for being the reason I smile every day and for showing me the colour of love.

To my dearest darling sister Lucy who has never given up on me and who has taught me that to err is human and one must laugh at their mistakes and thereafter move on gracefully.

To my Windhoek family The Gwasiras thank you so much for all the support, Sekai your hard working nature, beautiful soul and giving spirit have been my constant inspiration. You have been my number one supporter from day one, you are truly heaven sent.

To Shaarla Persadh and my girls, I couldn't have done it without you creating an environment conducive for study, entertaining my tiny human, helping me relax and preparing the delicious meals. I am forever grateful.

DECLARATION

I, **Shamiso Gwata**, declare hereby that this study is a true reflection of my own research, and that this work or part thereof has not been submitted for a degree in any other institution of higher education.

No part of this thesis may be reproduced, stored in any retrieval system, or transmitted in any form, or by means (e.g. electronic, mechanical, photocopying, recording or otherwise) without the prior permission of the author, or The University of Namibia in that behalf.

I, **Shamiso Gwata**, grant the University of Namibia the right to reproduce this thesis in whole or in part, in any manner or format which the University of Namibia may deem fit, for any person or institution requiring it for study and research purposes; provided that the University of Namibia shall waive this right if the whole thesis has been or is being published in a manner satisfactory to the University.

..... [signature]

Date.....

Shamiso Gwata

CHAPTER 1

1. INTRODUCTION AND RATIONALE OF THE STUDY

1.1 INTRODUCTION

This chapter provides an overview of research undertaken to explore and describe the frequency and factors that are associated with soft contact lens replacement noncompliance of wearers in Windhoek. A brief background of the research problem is presented and the research aim and objectives are outlined. Operational definitions of the key concepts in the research topic are also stated.

Soft contact lenses are becoming a more common choice of visual correction. People are choosing soft contact lenses over spectacles as their preferred choice of visual correction. This is mainly because the lenses are comfortable, convenient and provide excellent peripheral vision in comparison to spectacles. Additionally, contact lenses do not fog up as spectacles do. They do not interfere with one's facial features and are more convenient and practical for people participating in sport. Some visual conditions are typically corrected better with contact lenses. The average age of all contact lens wearers worldwide is 31 and 66 % of all contact lens wearers are female (Morgan, Efron, Woods & Jones, 2011).

When a soft contact lens is dispensed to a client, it comes with instruction of when the contact lens should be replaced. Replacing the lens is important since cleaning the lens will no longer removes microbes and allergens adequately. To be clinically and subjectively successful, the contact lens has to be replaced timeously.

In the general health care sector, noncompliance has always been a challenge for practitioners; the contact lens field is not spared of this problem. Chief amongst the many problems associated with it is, deterioration in the persons health as a result of complications which may eventually lead to blindness. Another challenge emanating from noncompliance is an increase in time they spend in your office or clinic, treatment costs, time off work and the overall effect of increasing health care expenditure.

In order to tackle the problem of noncompliance, one has to first understand what factors cause the noncompliance to begin with and how frequently a patient does not comply? These ideas form the basis of my research thesis

1.2 BACKGROUND OF THE STUDY

Nearly 125 million people worldwide wear contact lenses. The greatest number of wearers live in North America (36 million) followed by Asia (24 million), Europe (20 million) and South Africa (500 000) (Barr, 2004). Of the total number of contact lens wearers, 95% wear soft contact lenses and the remaining 5% wear rigid gas permeable lenses. The average age of all contact lens wearers worldwide is 31. Two thirds of all the contact lens wearers are female (Morgan et al, 2011). Experts in the ophthalmic field have estimated that the global contact lens market is expected to grow at the compound annual growth rate of 6.2 % during the period of 2016-2020. This is a clear indication of how fast the contact lens market is growing (Chen, 2013).

¹ Please note that the researcher has made use of older studies conducted because there are no new studies that exist although the research problem is still evident

A contact lens is a thin disc shaped lens that clings to the tear film that covers the surface of the eye called the cornea. Contact lenses are worn to correct visual defects, for cosmetic purposes and therapeutic purposes. There are mainly two types of contact lenses, soft contact lenses and rigid gas permeable contact lenses also known as hard contact lenses. The soft contact lenses are made of hydrogel or silicone. They cover both the cornea and part of the sclera. Contact lenses have different replacement schedules, being replaced daily, fortnightly, monthly or even yearly. The patient needs to strictly adhere to the replacement schedule of their specific lens in order to avoid any contact lens complications.

A soft contact lens has micro pores which get clogged by bacteria, tear lipids, tear proteins and allergens over time. These eventually cannot be removed even by cleaning the lens over time. Frequently replacing the contact lenses has been proven to be very beneficial. Replacing the lens more frequently is advised as opposed to lenses that are worn for longer periods. A replaced lens will have fewer deposits, reduced complications and improved subjective and clinical performance (Marshall, Begley & Nguyen, 1992). It has also been investigated that the shorter the wearing schedule of the contact lens, the more likely the patient is to comply. It should therefore follow that patients who wear daily disposable contact lenses, that need to be replaced each morning, are more compliant than patients who wear monthly disposable lenses.

However, most people in Africa wear monthly disposable soft contact lenses as they are the most affordable (Dumbleton, Richter, Woods, Jones, & Fonn, 2010).

The complications that arise when a patient is noncompliant with the replacement schedule of their contact lenses are mainly moderate to severe and in a majority of the cases; the effects are reversible if treated early. The complications that arise with the extended wear of contact lenses include corneal infiltrates: opacities in the cornea, contact lens papillary conjunctivitis, corneal neovascularization: ingrowth of new vessels due to hypoxia, corneal wrinkling, corneal striae, superior epithelial arcuate lesion and blepharo-keratoconjunctivitis. The corneal infiltrates can be further subdivided into four types

- contact lens induced acute red eye
- Contact lens induced peripheral ulcer
- Infiltrative keratitis
- Asymptomatic infiltrates (Kanski, 1994)

Fortunately, the complications that exist as a result of infrequent replacement of lenses take a long time to manifest. It thus follows that wrong use of contact lenses by a patient without the manifestation of immediate negative symptoms reinforces noncompliance. However the belief is that contact lens wearers never intend to be noncompliant their busy schedule or lack of all relevant information among many other factors may

influence their behaviour. The lack of visible consequences then reinforces it (Hickson-Curran, 2012).

Compliance has been defined as 'the extent to which a patient's behaviour coincides with the clinical prescription' (Sackett & Haynes, 1974). Medical practitioners assume that the patient will comply to the instructions and advice that is given to them, but this is not always the case. The patient may choose to partially comply, not comply at all, periodically or seasonally comply, completely comply or even over comply (Bennett & Brown, 2003).

In general health care studies, 30-40% of patients have been reported to be noncompliant with preventative regimens (Claydon & Efron, 1994). Studies have also noted that 38% of patients with type II diabetes fail to adhere with prescribed insulin regimens. The same study also showed that 33-15% of diabetic patients that were on oral hypoglycemic agents did not comply to their specific regimen (Cramer, 2004). Furthermore 40% of patients with osteoporosis do not take their prescribed medication (Boccuzzi, Folz & Kahler 2005). Showing that noncompliance is of great concern in all health care sectors. Research studies have shown that 40-91% of patients are noncompliant with the use, care and maintenance regimes of contact lenses. This is an alarming statistic, as it is clearly much higher than the normal levels of noncompliance (Turner, Gower & Stein, 1993).

The problem of noncompliance is worldwide, and not only affects people from one geographical location or race. The number of return patients in Namibia exhibiting noncompliance related complications is quite significant according to the researcher's observation. Unfortunately, no research on contact lenses has ever been done in Namibia, so there are no statistics on the number of patients that wear soft contact lenses, and there are also no combined statistics on the complications due to noncompliance in soft contact lens replacement schedule.

The geographic area of study will initially cover the city of Windhoek, this decision having been made in order to ease collection of data and other considerations such as demographics, population density and access to ophthalmic care of the sample population. However if at a later stage the hypothesis with the initial sample proves to be true, it will then be prudent to test with a larger sample across the entire country.

Fundamentally the responsibility of compliance lies on both the practitioner and the patient. It is the practitioner's responsibility to give the patient all the relevant information verbally. Having acquired all the relevant information it then becomes the patients responsibility to adhere to the regiment. Therefore in contact lens wear, it is the optometrists responsibility to give the contact lens wearer all the relevant information, and for the contact lens wearer to adhere.

Current strategies to improve compliance are limited. Patient education is of paramount importance when dealing with compliance. Most practitioners now make a point of ensuring that their clients leave consultation rooms with informative pamphlets or printed documents with written instructions in an attempt to educate, remind or offer a quick and accessible point of reference to their clients. However it is very worrisome to note that in a previous study conducted in the United Kingdom 74% of the patients did not know that they were noncompliant with the care and maintenance of their contact lenses (Collins & Carney, 1986).

A number of factors have been previously suggested to affect compliance. These include the age, duration, cost of the treatment regime, the clients' interpretation of the written information, and the relation between the client and the practitioner. Factors that were suggested not to interfere with compliance were sex, race, education, occupation, socioeconomic level and the threat of the disease (Davidson & Akingbehin, 1980). These studies are however outdated, and were not conducted in a third world country. The results from a third world country may prove to be very different. As this first study was also conducted in the United Kingdom, the official language and mother tongue of all the participants was the same. This is not the case in the Khomas Region of Namibia, where although English is the official language, most people are more proficient in their mother tongue. There being eleven other spoken languages, with many different dialects of each, it is clear that the studies cannot be compared.

Another discrepancy in the previous studies was that soft contact lenses were much more expensive than they are today. As a result the use of contact lenses was restricted to the more affluent in society or those who had access to medical aid or insurance. However as the years have progressed and the price of the lenses gradually decreased, we find that more and more people are now able to afford the initial set of lenses. They may however not be able to sustain the expense, and therefore end up being noncompliant.

In the health care sector, noncompliance with prescribed medical regimes accounts for a significant increase in the health care expenditure. This also leads to increases in disease morbidity, development of complications, hospitalization, increased practitioner and client time and additional treatment (Zuger, 1998). Previously, many studies have examined the most efficient way to increase compliance, however conflicting evidence exists. Some argue whether the optimal mode of education is oral versus written instructions. Others also argue that repetition and post training evaluations would increase the success rate (Sokol, Mier & Bloom, 1990).

Evidenced by the above statistics and information, it is clear that noncompliance in soft contact lens replacement is a big problem. Since the contact lens market is growing exponentially, it goes without saying that unless contained, soft contact lens complications will become more common. It is therefore critical that we improve soft

contact lens wearer compliance, but in order to improve compliance, the cause and rate of actual noncompliance must first be determined.

1.3 STATEMENT OF THE PROBLEM

The study intended to explore and describe the factors that are associated with contact lens replacement noncompliance of soft contact lens wearers in Windhoek. The researcher became interested in this topic because being an Optometrist herself; she was examining soft contact lens wearers who were presenting with discomfort and complications in Windhoek where she works. The researcher then tried to find information on soft contact lens wearers in Namibia and there was none. The researcher then decided to conduct this study in Windhoek, where she is based, to find out why soft contact lens wearers in Windhoek do not comply with their specific lens replacement schedule.

Soft contact lens wearers do not comply with their specific lens replacement schedule and continue to present with contact lens discomfort and complications yet they are avoidable. Soft contact lenses have micro pores that get clogged with the proteins and lipids from the tears. With increased duration of lens wear, the proteins and lipids cannot be removed with cleaning agents hence the need to replace the lens.

Some of the complications are a mild infection, painful corneal ulcer or sight threatening corneal keratitis. If not treated these may eventually lead to blindness.

Amongst the many problems associated with contact lens noncompliance is deterioration in the patients' health as a result of complications. Other problems emanating from noncompliance are increased time they will spend in your offices and clinics and treatment period with the overall effect of increasing health care expenditure. Noncompliance in soft contact lens wear was thought to be mainly caused by increased cost, poor materials and difficult care regimens, and although all these three factors have improved, noncompliance still remains a big problem in contact lens wear worldwide (Dumbleton & Jones, 2011). Annually the cost of treating contact lens complications and loss to working hours continues to rise .Noncompliance is proving to be very costly especially in America where in 2011 noncompliance to medication proved to cost more than treating diabetes, cancer and heart failure (Bailey, 2013).

A significant number of soft contact lens wearers in Windhoek where also examined to have contact lens related complications.

1.4 RESEARCH AIM

The aim of this study was to explore and describe the factors that are associated with contact lens replacement noncompliance of soft contact lens wearers in Windhoek.

1.5 OBJECTIVES OF THE STUDY

The objectives of the study were to:

1. Assess the prevalence of soft contact lens replacement noncompliance of wearers in Windhoek.
2. Determine possible factors contributing to noncompliance of soft contact lens replacement of wearers in Windhoek.
3. Determine the main reason for soft contact lens replacement noncompliance of wearers in Windhoek

1.6 SIGNIFICANCE OF THE STUDY

The study aspired to investigate factors associated with soft contact lens replacement noncompliance. It was envisaged that the study results might be used by the Ministry of Health and Social Services and by various private optometric practices to create strategies that combat soft contact lens replacement noncompliance. This would result in a reduction in the disease burden caused by the complications that result from soft contact lens replacement noncompliance. In addition the study would be of importance in guiding the Namibian Optometric Association on what type of client is less likely to comply thereby ensuring that the eye care practitioner takes more time educating the client and providing written instructions to increase the likelihood of compliance. The study might also contribute to the existing body of knowledge on the demographic and socio-economic characteristics of patients who are noncompliant to soft contact lens replacement.

1.7 OPERATIONAL DEFINITIONS

Concepts defined in this study are derived from the title of this thesis that is, "Factors associated with soft contact lens replacement noncompliance of wearers in Windhoek".

The concepts are defined as follows:

Compliance is defined as the extent to which a patient's behaviour (in terms of following instructions, taking medication and making necessary lifestyle changes) coincides with the healthcare providers recommendations for health and medical advice (Sackett & Haynes,1974).

Noncompliance therefore occurs when an individual's behaviour lacks congruence with the recommendations as prescribed by a health care provider (Sackett & Haynes,1974).

Replacement noncompliance in contact lens wear differs with the wearing schedule, for someone wearing a daily disposable lens; noncompliance is wearing the lens for more than one day. For a two weekly disposable lens; noncompliance would be wearing the lens for 17 days or more. Then with a monthly disposable lens; noncompliant behaviour would be wearing the lens for more than 34 days (Dumbleton et al, 2010).

An **eye care practitioner or Optometrist** is anyone who has undergone a four year university degree program in optometry and is registered by the Namibian Optometric Association as an optometrist who is involved at operational level with the diagnoses of

visual defects and diseases of the eye, the provision of non prescriptive medicine and aids for the improvement or healing of defects of the eye. Optometrist are also involved in the restoration of coordination between the eyes, the improvement of vision by means of exercises of the eye, the provision of counselling regarding the efficient care and protection of eyes for the prevention of diseases of the eye and blindness (Government Gazette, 2011).

A **soft contact lens** is a thin disc shaped lens made from hydrogel or silicon. It clings to the tear film that covers the anterior surface of the eye called the cornea and is used to correct visual defects for therapeutic and cosmetic purposes (Collins & Carney, 1986).

A **client/patient or wearer** is an individual who is receiving professional services from a licensed practitioner or optometrist. A wearer specifically is an individual who is inserting contact lenses into their eyes on a regular or intermittent basis (Stedman, 2005).

1.8 SUMMARY

In this chapter, the background to the problem, problem statement, the significance of the study, the purpose and the objectives of the study are outlined and discussed in length. The next chapter contains a comprehensive discussion of the literature review

CHAPTER 2: LITERATURE REVIEW

2. Literature review

2.1. Introduction

This chapter is a literature review and will present a review of the existing literature on the subject. Aveyard (2010) states that a literature review is part of a dissertation or thesis that aims to identify, analyze, assess and interpret a body of knowledge in a particular topic. In this instance it sets a context for a research study and provides rationale for addressing particular research questions in the light of an existing body of literature (Aveyard, 2010).

2.2 Compliance in general health care

Noncompliance with prescribed medication or regime is an ongoing problem in the public health sector. Although there have been studies done and many interventions to try and reduce or eliminate noncompliance altogether, it is still an ongoing problem. The World Health Organization (WHO) reports that approximately 50% of individuals typically follow the orders given by their doctors with regards to prescribed medication. (Sabaté, 2003)

Patients with chronic medical conditions such as hypertension have also been known to be the most non-compliant with rates of 50% or more. In a study conducted on the compliance in hypertensive medication, nearly half of hypertensive patients were found

to be noncompliant with their prescribed medication and only one quarter of those who were on treatment had their blood pressure adequately controlled. Hypertension is a chronic disease with known serious consequences of noncompliance. Uncontrolled hypertension can have adverse effects on the cardiovascular, cerebrovascular and renal systems. Prolonged noncompliance and mismanagement can lead to mortality (Burt et al., 1995).

A study on acute myocardial infarction showed that approximately 13% of patients admitted, discontinued all prescribed medications for them within one month of being discharged from the hospital (Ho et al., 2006).

The problem of noncompliance poses a health hazard; it wastes health resources, causes frustration to the health care provider and client. With the increase in the number of patients using contact lenses, noncompliance is now becoming a common problem in the contact lens field. Before expanding on noncompliance in the contact lens field, what really is compliance?

2.3 Definition of Compliance

The term compliance is derived from the Italian word *complire* which means to fulfil or to act according to a wish or request, thereby completing an action, process or request. The oxford dictionary defines compliance as, 'the practise of obeying rules or requests made by people in authority' (Compliance, 1995). Compliance means acting in

accordance with a request or direction in order to yield the expected outcome. In medical literature compliance has been defined as ‘ the extent to which a patient’s behaviour (in terms of following instructions, taking medication and making necessary lifestyle changes) coincides with the healthcare providers recommendations for health and medical advice’ by Sackett and Hayes in their popular work on compliance. The patient has no involvement in the decision making, but must just follow the orders that they are given. Noncompliance therefore occurs when an individual’s behaviour lacks congruence with the recommendations as prescribed by a health care provider (Sackett & Haynes, 1974).

In medical literature, other terms may be used in place of compliance and these terms have more or less similar meanings. A common term that may be used is adherence. Adherence is taking medications or interventions correctly as prescribed by a health care provider. Adherence is defined as, ‘the extent to which the patients’ behaviour matches agreed recommendations from the prescribers.’ It involves the active, voluntary and collaborative involvement with the health care provider’s recommendations with respect to timing, dosage and frequency of medication. Adherence also makes it clear that the patient may also disagree to taking the medication and therefore should not be blamed, since they too have a choice in the matter. There are mainly three types of nonadherence, the first is when the original prescription is not filled, the second is when refills are not obtained and the third is when there is suboptimal dosing (Barofsky, 1978).

Another term that is used is concordance. The oxford dictionary defines concordance as, ‘The fact of agreeing or being concordant; agreement, harmony’ (Concordance,1995). Concordance is the process whereby the patient and the health care provider make decisions together about treatment; there is patient and health care provider agreement and harmony. Concordance is negotiation between the patient and health care provider. It acknowledges that the patient and the health care provider have different beliefs and wishes about the illness and the treatment options, therefore they need to discuss and negotiate the matter in order to come to mutual agreement. Compliance is passive whereas adherence is active (Steiner & Earnest, 2000).

The traditional view of the patient and health care provider relationship where the patient is passive and the health care provider knows everything and doesn’t make mistakes, is the idea that most people are trying to move away from. In contrast, the modern day patient is extremely well informed, expects a great deal from their health care provider and is capable of being responsible for their own health care status. Where possible, patients should be encouraged to promote their own independent health care capacities in partnership with the health care provider (Claydon & Efron, 1994).

In the United Kingdom National Health Service, staff is encouraged to make use of the term client as opposed to patient. The use of the term patient makes it seem as though one is ill and is therefore seeking treatment. The use of the word client promotes the idea that they are seeking professional health care are no necessarily ill. It also promotes the idea that both the client and the health care provider are active, co dependent and

working together to promote excellent health. This clearly shows that the issue of compliance is a responsibility of both the client and the health care provider. To minimize confusion, I will continue to use term compliance in my thesis.

2.4 Complications of contact lens wear

A contact lens is a foreign object inserted into the eye; this alters the natural environment of the eye. The amount of bacteria on the surface of the eye is then increased due to contaminated hands, lenses, and lens care systems. Putting a contact lens on the eye causes attraction of pathogens and increases antibiotic resistance. This enables bacteria to adhere to the contact lens.

Materials on the lens or in the contact lens solution can cause a mild allergic reaction. This initiates a disturbance in the tear film which causes an irritation, which may lead to **Giant Papillary Conjunctivitis (GPC)**. GPC is also known as contact lens-induced papillary conjunctivitis. GPC refers to large lumps that form under the palpebral conjunctiva which is found under the eyelid, mainly on the upper tarsal plate. It is often caused by an allergic reaction to lens deposits, lens materials or contact lens solutions. GPC causes great discomfort by being very itchy, producing a discharge, increasing movement of the lens and reducing visual acuity. To treat GPC, the contact lens wearer must stop wearing lenses completely for a while. When their optometrist or ophthalmologist lets them know that they have recovered and can now continue lens wear, they are advised to replace lenses more frequently, wear lenses for fewer hours

and pay close attention to lens care and wear procedures. GPC is not a sight threatening condition (Kanski, 1994).

A tiny particle may attach itself on the lens and end up under the lens, scratching the eye. This may result in a **corneal abrasion**. A corneal abrasion also occurs when the edge of a soft contact lens has a tear or defect. This may cause some degree of pain and discomfort. It normally does not require medical attention since it normally only affects the superficial layers of the cornea.

Contact lens wear changes the quality and quantity of tears and limits tear exchange. The contact lens causes the mucin layer to stop the release of anti-microbial factors. Contact lens wear causes reduction in blinking, which reduces tear exchange, resulting in reduced ocular defence. If any pathogen should enter the eye, all of the above then causes the pathogen to get more time and opportunity in the ocular system, leading to greater chances of infection.

The cornea needs oxygen for normal cellular function. It gets oxygen from the atmosphere and small quantities from the limbal aqueous vasculature. The oxygen diffuses from air through the tear film and reaches the cornea. At night when we are sleeping and our eyes are shut, oxygen diffuses through the palpebral conjunctiva capillaries through the tear film and into the cornea. Contact lenses cause micro-trauma as they prevent adequate amounts of oxygen from reaching the cornea. This is why it is imperative for most wearers to remove their contact lenses at night, unless advised otherwise. Removal of lenses at night allows the palpebral conjunctiva to provide

oxygen to the cornea. If however the contact lens remains on the cornea, the cornea then experiences hypoxia. Hypoxia causes corneal oedema. Oedema is when there is water retention in the cornea resulting in swelling and endothelium and epithelial cell disruption. This causes reduction in corneal sensation and increases the risk of **corneal keratitis** (Tariq & Koay, 2013).

A **corneal ulcer** can be caused by bacteria, fungi or parasitic amoeba. Improper lens care, a small break in the cornea or a corneal abrasion can result in microorganisms having an opportunity to invade the cornea. Signs and symptoms include a painful red eye, photophobia, tearing and foreign body sensation. Wearers are advised to seek medical attention immediately if that happens. A corneal ulcer leads to permanent decrease in vision due to corneal scarring and or corneal perforation and should be treated as quickly as possible (Tariq & Koay, 2013).

Sleeping in contact lenses leads to a times eight incidence of **corneal infiltrates**, and a times four incidence of **microbial keratitis**. Acute hypoxia may lead to **contact lens over wear syndrome (CLARE)** and chronic hypoxia can lead to the commencement of **corneal neovascularisation** which may affect the visual acuity. Corneal neovascularisation is the growth of new blood vessels from the limbus to the cornea. Under normal conditions the cornea does not have blood vessels. If however the contact lens is worn for extended periods of time, or does not allow oxygen delivery for extended periods, the cornea responds to the hypoxia by growing abnormal blood vessels. Further hypoxia leads to larger vessels and growth of connective tissue (Kanski, 1994).

Superior Limbic Keratoconjunctivitis is an infection that is caused by an immunological response to the spoilage of a soft contact lens or by exposure to thimerosal-preservative solutions. This response can occur even after many years of successfully wearing contact lenses. Signs and symptoms include hyperemia of the bulbar and palpebral conjunctiva, superior arcuate staining of the cornea, superior limbic proliferation, pain, foreign body sensation photophobia, burning and itching (Benitez-del-Castillo & Lemp, 2013). The symptoms continue to increase in intensity as time progresses and may last for years. Soft contact lens wear should be stopped completely for as long as ten months in severe cases.

Bacteria from the hands, contact lens care system and storage system, now reach the surface of the eye with the aid of the contact lens. Contact lenses reduce the ocular defence, change the quantity and types of bacteria and interfere with the natural barrier. Any compromise in the cornea allows bacteria to adhere to the cell membrane. **Pseudomonas aeruginosa** is a sight threatening infection that is caused by the bacterium pseudomonas. **Acanthamoeba** is a rare microbial keratitis that is caused by a pathogen that is found in soil and air. It is mainly contracted from contaminated water (Kanski, 1994).

The meibomian glands are sebaceous glands on the upper and lower rims of the eyelids. They supply meibum, an oily substance that prevents the evaporation of the tears. Disturbance of the meibomian gland reduces or stops the production of this oily substance. This then causes instability in the tear film. This then leads to **meibomian**

gland dysfunction. Signs and symptoms include burning, itching, photophobia and foamy tears, dry eye and intolerance to lenses. The meibomian gland may be blocked, or dilated and releasing a yellow creamy discharge (Beljan, Beljan, & Beljan, 2013).

Blepharitis is an inflammation of the eyelids. It is likely to occur in individuals who wear contact lenses for extended periods. Signs and symptoms of blepharitis include dryness, burning, itching, photophobia and an irritated eye. Blepharitis can be classified as either seborrheic or staphylococcal. Both types occur in contact lens wearers. The material in the soft contact lenses may evoke an allergic reaction or hypersensitivity in the eye. Over extended periods of wearing the soft contact lenses, this can lead to inflammation of the eyelid. This leads to seborrheic blepharitis. It is characterized by crusty lid margins, lid inflammation and greasy lashes. Staphylococcal blepharitis is an infection of an inflamed eyelid by bacteria for example staphylococcal aureus. It can lead to loss of eye lashes. Blepharitis needs treatment with lid scrubs, antibiotics and topical steroids.

Figure 2.1 below shows the complications that can arise due to contact lens wear

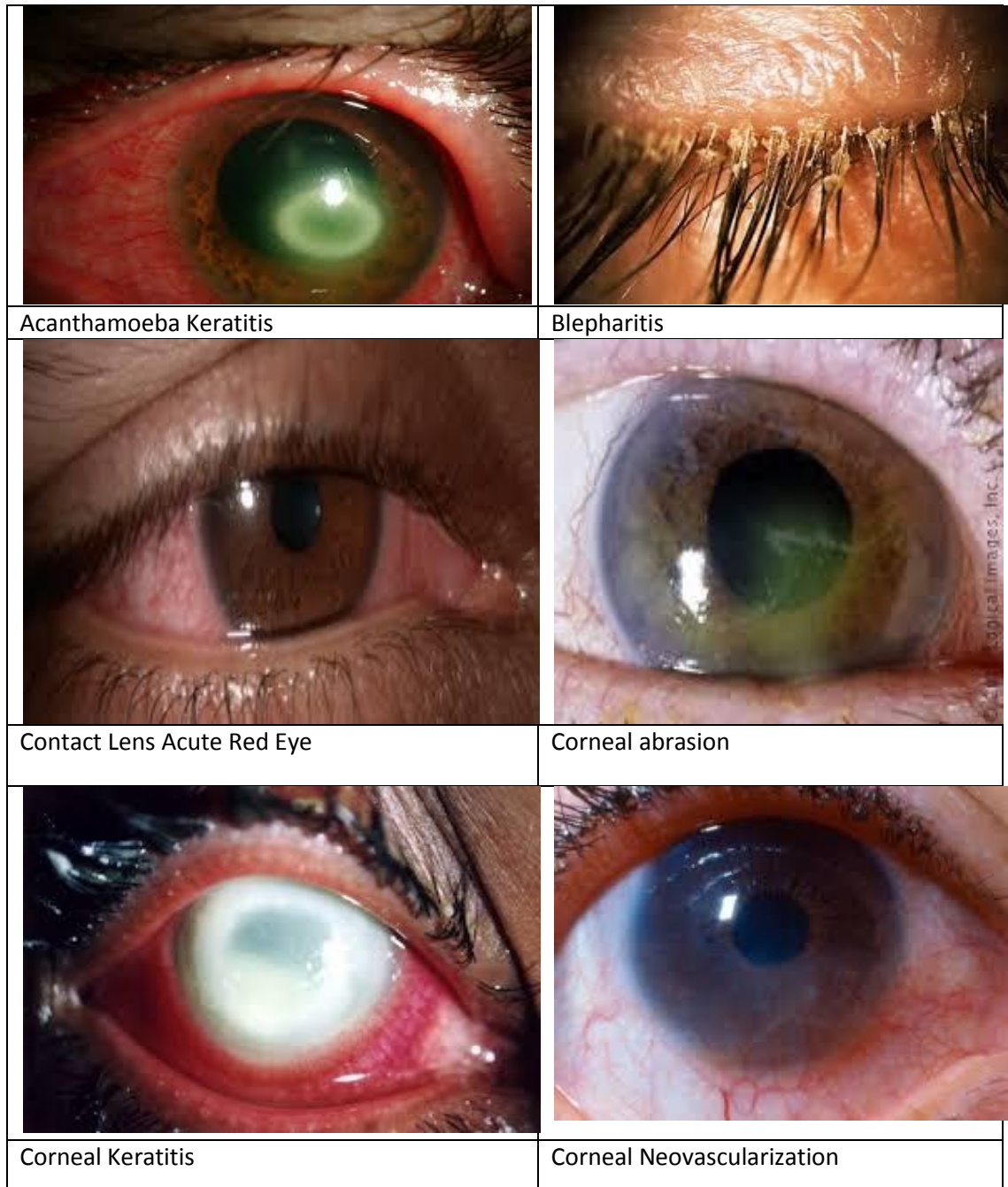


Fig 2.1 Contact Lens Complications

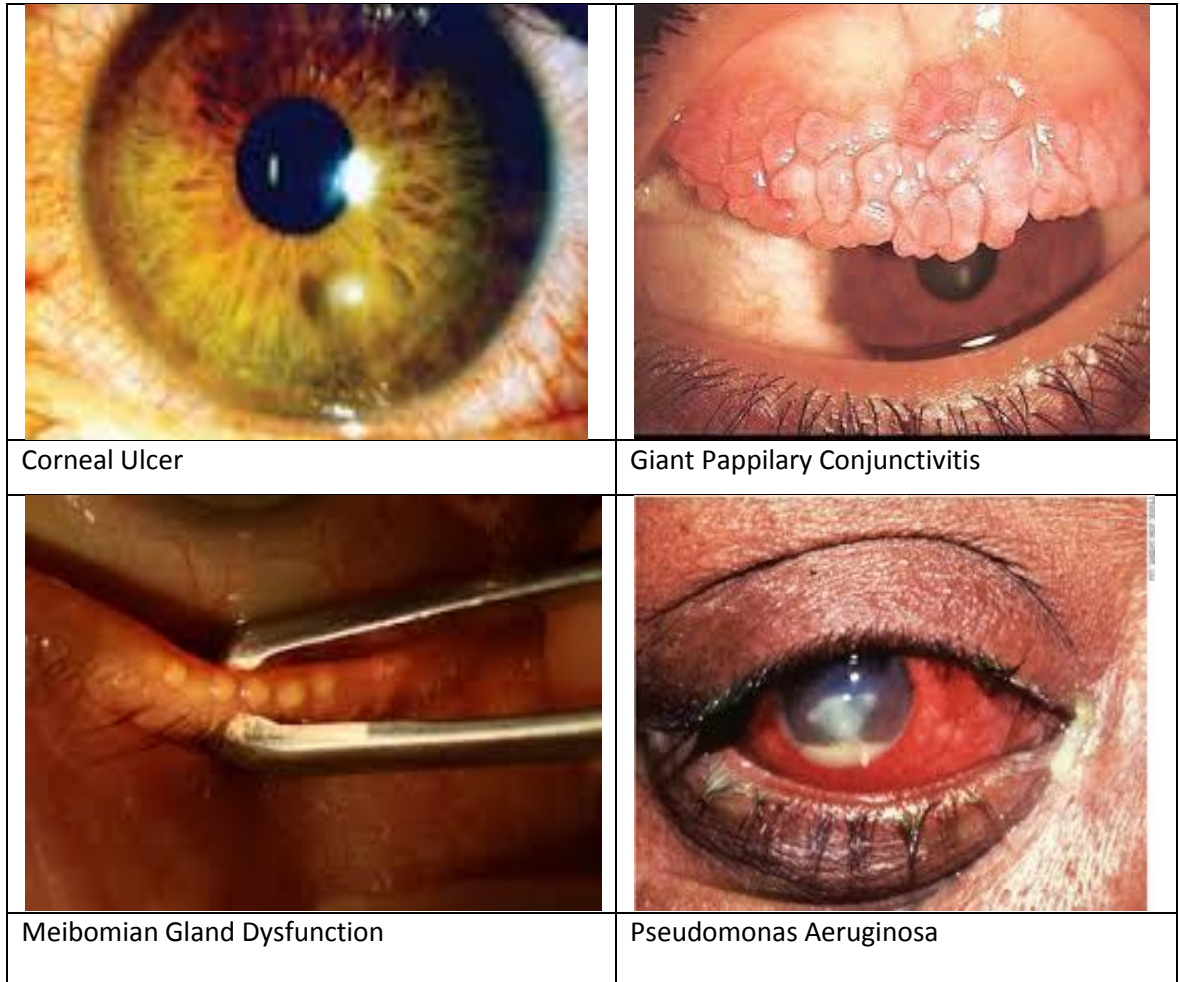


Fig 2.1 continued: Contact Lens Complications

www.clinicaloptics.com

2.5 Noncompliance in soft contact lens wearers

Contact lens wear and care regimens remain a persistent problem in the contact lens market. The main things in which a client can be noncompliant in are washing hands before handling the contact lens, cleaning, rinsing and storing the contact lens with the correct solution, cleaning and replacing the contact lens case, adhering to recommended wear and replacement schedule. Hand washing is important in contact lens wear. Hands must be washed with soap then dried with a lint free towel. Not washing hands before handling contact lenses increases ones risk of developing microbial keratitis and sterile keratitis (Dumbleton & Jones, 2011).

Contact lens wearers are often not aware of the brand name of the contact lens that they are wearing. They are also unaware of the name of the contact lens solution or cleaning system that they are using. This becomes dangerous when they need to order the next batch of lenses or solution, they may end up ordering another product that may lead to compromised fit, compatibility, vision and comfort as they may have switched products.

Noncompliance with wearing schedule for example sleeping with your contact lenses is another common problem. Most of the contact lens wearers are advised to remove their contact lenses before going to bed. This however is not the case with some of the contact lens wearers. In a study done on silicon hydrogel lens wearers 16% of the clients reported sleeping in their lenses occasionally, frequently or almost every night. Sleeping

in lenses increases ones risk of getting infected with microbial keratitis by ten times (Dumbleton & Jones, 2011).

Contact lenses and the case they are stored in, should not come into direct contact with water. Contact lens wearers should not shower or go swimming whilst wearing their lenses. Water contains bacteria and the wearer may end up with *Acanthamoeba* keratitis which is sight threatening. The case where the contact lens is stored needs to be cleaned with the solution, and placed on a tissue face down to dry. The case also needs to be replaced at least once every three months to reduce any chance of infection.

Another aspect that contact lens wearers are noncompliant in is following the recommendations on how to use the care system. Most contact lens solutions require that the patient rub the lens. If the solution states that no rubbing is required it is important that the contact lens wearer follows the manufacturer's instruction on duration of rinsing. Some contact lens wearers also top up solution in the case, instead of discarding that solution and then replacing with a fresh batch of solution.

The most commonly reported aspect of contact lens noncompliance is wearing lenses longer than recommended. Contact lens wearers fail to replace lenses on schedule. Wearing lenses for longer than prescribed is associated with a greater risk of infection. There has also been reported to be reduced comfort and vision (Dumbleton & Jones, 2011). The researcher wants to explore contact lens replacement noncompliance since it has previously been reported to be the greatest area of noncompliance

2.6 Prevalence of soft contact lens replacement noncompliance

Soft contact lens replacement noncompliance is a common problem. In 2002 some researchers found out that 43% of biweekly soft contact lens wearers were noncompliant with their replacement schedule. In the same study 33% of monthly contact lens wearers were non compliant in their replacement schedule (Jones, Dumbleton, Fonn & Dillehays, 2002). In another study done in Canada and the United States of America noncompliance was most frequent in biweekly contact lens wearers 51% and the average noncompliance of monthly contact lens wearers in both Canada and the United States of America was 30.5%.

In a more recent study conducted by Ramamoorthy and Nichols in 2014, they discovered that 47% of the soft contact lens wearers were not compliant with recommended contact lens replacement. This shows that the issue of contact lens replacement noncompliance continues to be a serious problem, with noncompliance rates even higher than in general health (Ramamoorthy & Nichols, 2014).

Another research done in Malaysia discovered lower levels of noncompliance. A total of 28% of the contact lens wearers did not dispose of their contact lenses after the expiry date. The main reason for not doing so was because they forgot the expiry date of the contact lens (Yee et al, 2013). Morgan's (2007) study of 1 402 contact lens wearers

found that approximately 37% of daily wear lens users were noncompliant with the replacement schedule of their contact lens (Morgan, 2007).

A more comprehensive study was done in the USA, it involved 2 147 respondents. Two weekly replacement contact lens wearers were noncompliant by 66%. Patients who wore daily disposable contact lenses were non compliant by 28% and patients who wore monthly contact lenses were non compliant by 33% to their recommended replacement schedule (Dumbleton et al, 2013). Another study done in Croatia reported that 55% of soft contact lens wearers were non complaint with replacing their lenses as recommended (Petri et al., 2013).

As seen from the previous studies contact lens replacement non compliance continue to be a challenge. It is important that new strategies are implemented in order to educate, change attitudes, perceptions and behaviours of soft contact lens patients

2.7 Factors affecting soft contact lens replacement noncompliance

The different factors have been shown to affect contact lens replacement non compliance, and they are discussed below

Cost of the treatment regime: When the prescribed treatment regime is affordable or at no cost to the patient, patients were found to be more compliant. When the treatment however was a pricey or of some strain to the patient's budget, it was reported that the patients became less compliant. This is reasonable as the patient though they might need

it and want it, they would not have been able to afford it. Replacing soft contact lenses daily is currently the most expensive regimen, and as seen from the previous study most of the daily contact lens wearers stated that their principle reason for being non compliant was to save money. One would hope that if the lenses were more affordable, then the patients would be more compliant, although it may not be necessarily correct to assume so. In a study done in 2010 the main reason for not replacing daily disposable soft contact lenses on time was to save money. Then for monthly and biweekly disposable soft contact lenses, the primary reason for not replacing the lenses on time was that the wearer forgot when to replace the lenses (Dumbleton, Richter, Woods, Jones and Fonn, 2010). Interestingly in a more recent study done in 2013 by Petri et al, 73% of the respondents said that they saw no need to replace a lens that they had no problem with. Only a few respondents said that the cost of the lenses was the major reason they did not replace the lenses on time (Petri et al, 2013).

Duration of treatment: It was reported in 2007 by Morgan that the longer the duration period of the treatment the less likely the patient is to comply. For treatment procedures like orthokeratology where the patient has to wear a hard contact lens at night, for a month, to improve their vision for the entire year, patients were found to be more compliant. However, with contact lenses the patient has to wear them for as long as the patient desires to see clearly. This in essence may be the rest of their life. Patients were found to be less compliant (Morgan,2007). So it would be expected that patients who have been wearing their contact lenses for longer would then be more non compliant since they have relaxed and seen no immediate consequences to their bad habits. This was also documented in a previous study that, non compliant wearers had been wearing

lenses for an average of two more years than complaint soft contact lens wearers (Petri et al,2013). A study also done by Jansen and associates also supports the same findings that new wearers are very compliant and contact lens wearers who have been wearing their lenses for more than a year are non compliant and wear their lenses overnight more often than they should, if at all (Jansen et al., 2011).

Age: There is a lot of conflicting evidence on whether age has any correlation to noncompliance. Some previous studies have found a positive correlation to age. They found that patients aged between 10 and 30 years and those over 50 years were less compliant. Sokol, Mier and Bloom (1990) had similar findings, their research concluded that contact lens wearers 30 years and younger were less compliant. However another study done by Radford, Woodward and Stapleton (1993) found no significant correlation between age and noncompliance. Many reasons can be speculated for the connection between age and compliance. One may assume that as the patient's age increases, their perception of inconvenience and cost changes, therefore altering the effect on compliance levels. More recently in a study on lens replacement habits of soft contact lens wearers, it was found that older wearers were noncompliant (Petri, Lovri, Pokupec, & Jandrokovi, 2013). Another study conducted on noncompliance in overnight wear, it was reported that patients between the ages of 18 to 25 years were compliant. Patients younger than 18 were more likely to report non compliant behaviour in extended wear (Jansen et al., 2011).

Attending contact lens checkups: It is very important for contact lens wearers to come for follow up appointments. This gives the Optometrist a chance to check for ocular changes due to over wear, allergies or any other complication. For the wearer, this then

gives them too a chance to refresh on instructions and procedures. It also gives them a chance to ask on any issue of concern. They may have forgotten, misunderstood or simply missed a concept and this gives an opportunity for a refresher session. In previous studies it has been suggested that patients who do not come frequently for their aftercare visits, are also more likely to be compliant with the wear on care of their contact lens. In a recent study conducted by Dumbleton, Richter, Bergenske and Jones, patients who did not comply to the manufacturers recommended replacement frequency took longer intervals to come back for the follow up examination (Dumbleton, Richter, Bergenske & Jones, 2013).

Smoking: A number of studies have linked smoker to risk taking behaviour. These thrill seeking and risk taking behaviours may increase the smoker's chances of being compliant with soft contact lens replacement noncompliance. Smokers either simply do not hear or take into consideration the instructions given with regard to contact lens wear and care. It is assumed that smokers may also not comply to health advice since they are not very health conscious. A recent study done on soft contact lens extended wear did not find any link between smokers and noncompliance. It is however thought that this may be the case because the sample size was small since there were very few smokers who were soft contact lens wearers.

It is important to note that most of the previous studies done on contact lens replacement compliance were all quantitative in nature and was conducted using a questionnaire. This is very limiting in nature, as the participant must choose from the options provided as opposed to sharing their own opinion. This loop was also noticed by Dumbleton, Spafford, Sivak and Jones in 2013. So, they conducted a qualitative focus group to

understand the main reasons for replacement noncompliance. The main reason for noncompliance was forgetting. One wearer for example said that they should replace their lenses every Monday morning, however sometimes they forgot and ended up wearing those lenses for even three weeks. Other participants also mentioned that instead of replacing their lenses every month, they rely on other triggers to help them see that its time for them to replace their lenses. One participant for example mentioned that they wait until they can see deposits, or when the lens starts to deform or feel uncomfortable which occurs in about eight weeks. The wearers also suggested that a reminder on the cellphone may assist them in being more compliant (Dumbleton, Spafford, Sivak & Jones, 2013).

Factors showing no correlation with noncompliance: Some factors have been suggested to have no correlation to noncompliance. These are gender, race, education, socio-economic level and the threat to the disease.

Gender: Males are generally thought to be more risk taking and thrill seeking than woman and therefore one may incorrectly assume that they will be noncompliant with contact lens care and wear instructions. It is interesting to note that most Optometrists normally recommend extended wear lenses to males as they assume this to be true and prescribe this lens to reduce the incidence of complications in the event of noncompliance. It is however important to note that most studies still concur that gender

is not a factor when it comes to compliance as was also seen in a study conducted by Jansen and his colleagues (Jansen et al., 2011).

Replacement Schedule: A study conducted in the United States of America and Canada simultaneously to investigate the replacement frequency of soft contact lenses. It was observed that patients on different lens replacement schedules complied differently. All patients on the different replacement schedules were found to be non compliant to some extent, however some schedules found more non compliant than others. The three different lens schedules that were observed were daily disposables, two weekly disposables and monthly disposables. It was observed that patients were most compliant with daily disposable contact lenses. Least compliance was found with two weekly replacement lenses. The most popular reason for noncompliance in the daily disposable replacement schedule was to save money (Dumbleton et al., 2010).

Many Inter-related factors have been suggested as influencing non-compliant behaviour. Research studies in contact lens practice have explored many of these factors but few have been affirmed as significant. It is imperative that optometrists understand the extent and significance of noncompliance among contact lens wearers. Optometrists should regard every patient as potentially non compliant and attempt to encourage compliant behaviour.

2.8 Reasons for not complying to the soft contact lens replacement schedule

In previous years it was thought that the main reason that patients did not comply with their specific replacement schedules, was to save money. However cheaper brands and

wearing schedules of contact lenses were introduced on the market but the problem remained. Then it was assumed that contact lens wearers did not comply to their specific replacement schedule because they were not aware of the risks involved in overextending contact lens wear.

Dumbleton et al in 2013 did a focus group study to try and understand why contact lens wearers were noncompliant with their replacement schedule. Some respondents said that they failed to replace their lenses on time because they forgot when it was supposed to be done. Other respondents from the focus group said they only replaced the lens when they could see some deposits or when the lens started to deform, which could be in 6-7 weeks time (Dumbleton et al., 2013).

In a study conducted in Croatia 38 % of respondents who were noncompliant with their soft contact lens replacement schedule expressed that they saw no reason to replace lenses they had no problem with. The second most popular reason (35%) for not replacing the lenses on time, was because they forgot to replace them (Petri et al, 2013).

In another study conducted in the USA, the chief reason for not replacing ones lenses on time was because they forgot on which day they were required to do so (39%). The second most popular reason for not replacing ones contact lenses was to save money (32%). The third reason for not replacing the lenses was because the respondent felt that there was no harm in wearing the lenses for longer. Eleven percent of the respondents said they forgot to reorder their next batch of lenses, and where therefore forced by circumstances to be noncompliant (Dumbleton et al, 2013).

It may however be assumed that one can only forget to replace a lens if it is still comfortable in the eye. If the wearer would experience great discomfort they would surely replace it earlier. More research needs to be done to get to the core of why soft contact lens wearers do not comply to their specific replacement schedule.

2.9 Improving Compliance

Contact lenses although cosmetic and convenient are a medical device and wearers need to be reminded of that constantly, in order to improve compliance. Better patient education alone is not adequate, attitudes need to change and behaviours need to be modified. Strategies to improve compliance include verbal instruction, written instruction, visual aids, repetition and frequent monitoring.

a.) Verbal information

Verbal information given to the soft contact lens wearer needs to be comprehensive, easy and brief in order for them to be followed meticulously and not forgotten or distorted. Advice given to the contact lens wearer should be consistent over time. Staff should be adequately informed so that the information they give the wearers should be the same as the Optometrists. The optometric practice environment should be friendly and welcoming. This enables the wearer to be free to ask questions if they did not understand something. The easier the procedures the more likely it is to follow. The Optometrist should minimize gibberish and information overload. Summarise information, say it in a practical and realistic manner. Set attainable

goals with the patient. Repeat key information and try and establish a good relationship with the contact lens wearer. Explanations must not be complex. Explanations need to be clear, straight forward, short and easy, so the patient can comply. It is also important to inform the wearer of possible complications that may arise due to non compliant behaviour.

b.)Written Information

To enforce the verbal instructions that the patient would have been given, it is also important to give written advice. Written advice is important so that the wearer can refer to it if they have forgotten, missed or did not understand a concept. The written advice should be readable, well illustrated with minimal words and clear. It should include all information on contact lens wear and care instructions. It should include information on when the wearer needs to replace his soft contact lenses, and when they should come back for a follow up appointment.

c.)Visual Aids

Make use of instruction videos as a reference point so that soft contact lens wearers have something visual they can refer to when they need to. The Optometrist can also show them a short video when they are in the consulting room and discuss compliant and non compliant behaviour with the patient. Also make use of pamphlets, posters and take home cd's. The information should be exciting, appropriate and relevant.

d.)Repetition

Repeating information that has been said before increases the likely hood of it been remembered therefore the contact lens wearer will be less likely non compliant. When the soft contact lens wearer comes in for their six month or annual contact lens check up, take the opportunity to repeat the information. It may be repetitive, but it

gives the wearer a chance to be re-educated of something they may have forgotten or misunderstood. Ask open ended questions for example, “How often do you replace your lenses?” .This will enable one to get precise information as opposed to asking closed questions. Radford, Woodward and Stapleton in their work published in 1993 also demonstrated that compliance can be increased by re-instructing the wearer frequently (Radford, Woodward & Stapleton, 1993).

e.) Frequent monitoring

Frequent follow up appointments allow the Optometrist to examine for early signs and symptoms of noncompliance. For example a client may come in and present with a contact lens complication, for example Giant Papillary Conjunctivitis. Giant papillary conjunctivitis is a complication that arises due to contact lens over wear. The optometrist must take it as a teaching opportunity to show the patient their condition and teach them how to prevent it from recurring.

It is important to note that will all these many strategies for improving compliance the rate of compliance is still high. The Optometrist can also try and identify those who are likely to be non compliant. A new client to your practise who has previously received lenses from another place may have been given different information and will therefore more likely non compliant. It is therefore imperative that you educate them appropriately. Long time contact lens wearers also tend to be more non compliant since they have been wearing lenses for a while and never experienced any consequences after bad behaviour. They may become relaxed and non compliant.

The Optometrist should not be the only one trying to increase compliance. The contact lens wearer's role in their own success needs to be related to them. Let them know that noncompliance leads to complications, blur vision, reduced comfort and therefore an uncomfortable and unhappy contact lens wearer. The Optometrist must use words that emphasize the soft contact lens wearer's role and responsibilities in maintaining optimum health by complying with the given instructions.

It is often found that when one signs a contract or commitment to comply they are less likely to be non compliant. People feel a strong sense of obligation to comply if they have signed something to that effect. Signing over compliance also gives them a clear indication of what the expectation and the instructions are. This then serves as a reminder to the patient of what skills were taught. It also helps as legal evidence so that someone can never claim they were not told or taught a certain skill. Two copies of the contract should exist, one for the client to take away with them and another to keep in records at the optometric practise (McMonnies, 2011).

It is also important for the client to keep a diary of when they must replace the lens. The diary must be on the cell phone and wall calendar. The optometric practise must also ensure that they send messages every six months to remind the client to come for a follow up examination. It would be difficult for them to know when the lenses are about to run out since some clients do not wear contact lenses continuously, but only occasionally for convenience.

2.10 SUMMARY

This chapter highlights the importance of a literature review in identifying factors that were previously suggested to be associated with soft contact lens replacement noncompliance of wearers. The literature review enables the researcher to build on the existing database of knowledge and to see the existing gap in the knowledge.

CHAPTER 3

METHODOLOGICAL APPROACH

3.1 INTRODUCTION

Methodologies are used by researchers to obtain information such as the subjects that were involved in the study, the elements and units of analysis, the procedure for data collection and analysis on how to interpret the results in order to make recommendations and draw conclusions. It is imperative for all researchers to outline their methodology in order to have a systematic approach in which to work and guide other researchers and readers. In this chapter the following have been discussed; the research design and research methodology, research population, sample and sampling technique, data collection, data analysis and ethical considerations (Brink, Van der Walt & Van Rensburg, 2006).

3.2 RESEARCH DESIGN

A research design is a step in the research process where logical arrangement and designing of the study is done. The function of the research design is to ensure that the evidence obtained enables the researcher to answer the initial question as unambiguously as possible. The research design provides a set of clear guidelines, instructions and the plan to be executed in addressing the research problem. It enables the researcher to minimise errors and maximise the validity of the research (Babbie & Mouton, 2002).

Welman, Kruger and Mitchell (2009) stated that in research design, the researcher needs to ensure that they specify the following; the initial number of groups and participants involved how the participants or groups will be selected and the exact procedure that will be followed. The number of groups that should be used is necessary in order to decide which statistical technique should be used. How the population or sample will be selected needs to be clear in order for the researcher to identify what the best sampling method will be.

The study was anchored on a quantitative analytical cross-sectional method involving the soft contact lens wearers in Windhoek. The design fits the study since it was used to assess the factors associated with soft contact lens replacement noncompliance of wearers in Windhoek.

3.2.1 Quantitative research

The study undertook a quantitative research design. Quantitative research is depicted as the traditional scientific approach to research that uses quantification for the measuring of data (Struwig & Stead, 2004). Quantitative research methods attempt to maximize validity, reliability, objectivity, replicability and generalizability of findings, and are typically interested in prediction. The researcher had no bias or influence in the research, thereby maintaining the objectivity of the research.

The study undertook the quantitative research design because the researcher conducted a logico-scientific research. Quantitative studies are deductive in nature, in this respect the researcher took a small sample of soft contact lens wearers, after the statistical data was analyzed, the researcher was hoping to deduce frequency and factors associated with soft contact lens replacement noncompliance of wearers in the whole country and only a quantitative research design can facilitate this. Quantitative methods are also frequently characterized as assuming that there is only one “truth” that exists, independent of human perception (Anney, 2014). The researcher needed data to be replicable and objective and only a quantitative design can help achieve this. When implementing solutions, the researcher intended to do so, on a national level as opposed to a regional level, so a design that accounts for generalization like the quantitative research design was appropriate.

3.2.2 Cross sectional study

The type of quantitative design used was a cross sectional analytic research design. This design was used as it allowed the researcher to estimate the prevalence of soft contact lens replacement noncompliance and it also enabled the researcher to make the association of each factor to compliance by making use of a two by two table. The study was analytic and permitted the description of the prevalence of soft contact lens replacement noncompliance in the population under study and then it determined the level of association between risk factors and noncompliance to soft contact lens replacement schedule. In order to determine the characteristics for example which increase ones chances of being non compliant.

A cross sectional study is observational in nature, it enables the researcher to investigate many variables at one point in time. The researcher recorded the necessary information that emerged from the population without manipulating the variables. A cross sectional study is an observational study that involves the analysis of data collected from the population or a sample that is representative of the population at a specific point in time, in the hope of answering the research question (Campbell, Machin, & Walters, 2007).

3.2.3 Analytical study

Analytical cross sectional study designs are used to investigate the association between a risk factor and a health outcome. It is also used to assess the frequency and distribution of a particular health outcome in the population. All factors are measured at the same time.

3.3 STUDY POPULATION

A study population is the total number of units, events or objects that have the feature that the researcher is interested in and meet the criteria for inclusion in the study (Brink, 2010). The target population consisted of established soft contact lens wearers from Windhoek. The participants did not necessarily have to live in Windhoek, but as long as they saw an Optometrist in Windhoek for a routine contact lens examination, they were included in the study. The researcher hopes that participants who lived in both rural and urban Windhoek participated and were representative of the diversity and demographics in the area giving access to people from different socio-economic groups. The soft

contact lens wearers had to have worn contact lenses for at least six weeks. This would have been necessary in order for the contact lens wearer to need to replace their lenses.

Only patients who consented were included in the research. People who were excluded from the study were the optometrists themselves, any staff working at the optometrists practice, patients younger than 18 years of age and patients who had worn lenses for less than six weeks, as they would not yet have had a chance to need to replace their lenses. All participants were asked to fill in the questionnaire during their routine contact lens eye examination.

3.3.1 Inclusion Criteria

Inclusion criteria are characteristics that the participants or elements must possess to be part of the target population (Burns, Grove & Gray, 2011). They are the critical requirements when choosing a sample, and they assist the researcher when deciding which participants to include in the study (Sipa, 2015). This study included all soft contact lens wearers who went for a soft contact lens examination at an optometric practice during the study period.

To be included in this study a soft contact lens patient had

- Worn soft contact lenses for more than six weeks
- Be over 18 years of age
- Have signed consent and be of sound mind
- Agreed to participate on voluntary basis

3.3.2 Exclusion criteria

Exclusion criteria are those elements or characteristics that can cause a person or element to be excluded from the target population. (Burns, Grove & Gray, 2011)

This study excluded:

- Optometrists and staff at optometric practices
- Patients younger than 18 years of age
- Patients who wore lenses for less than six weeks
- Wearers who were tested at optometric practices outside of Windhoek

3.4 SAMPLING METHOD

Sampling is a process of selecting subjects who represent the population being studied. Once the population has been clearly defined the researcher must decide whether to collect data from every member, which is not possible due to time and finances. Hence the researcher needs a suitable method to choose elements or units of the population who will be representative.

A sample is a group of people or elements that form part of a study population. Results from a study of the sample allow general observations to be made about the entire population (De Vos, 2002). The researcher used an accidental/convenience sampling method. This is a convenient, available and haphazard sample. Any participants that fitted the criteria were chosen consecutively until the desired number of participants was obtained. To try and reduce some form of bias in the study the researcher conducted the

study during a six month period thereby increasing the chances of getting a sample with greater variation.

It has been argued that convenience samples tend to harbour a lot of bias, since a sample may be taken from a specific place at a specific time and the likelihood of a specific group of similar people being there at that time is very high, causing bias. To try and reduce some form of bias in the study, the researcher decided to conduct the study during a six months period. This increased the chances of getting a sample with greater variation. Variation was also achieved by including participants that had been examined from different optometric practices.

3.4.1 Sample Size

Research findings need to be inferred to the population, in order to do this a minimum sample size needed to be chosen. The larger the sample size the better, as it then will be a true representation of the population (Brink, Van der Walt & Van Rensburg, 2006). However a large sample size requires a lot of resources and after a maximum number has been reached, more elements or units does not necessarily have any significance on the findings. That is why it is important to choose a small but representative sample in order to make the study feasible.

The sample size was calculated using Epi Info's StatCalc. The following values were used. The number of soft contact lens wearers in Namibia is unknown. Therefore the arbitrary number of 999 999 was chosen knowing that the researcher needed a 95% confidence interval.

Population size: 999 999

Expected frequency: 50%

Confidence Limit: 5%

Design Effect: 1.0

Clusters: 1

This produced a sample size of **384**

3.5 Data Collection Process

This section denotes the data collection instrument and the procedure that was carried out. Data collection is the process of gathering and measuring information on specified variables in a systematic manner which then allows one to answer the research questions, specific objectives and to evaluate the hypothesis of the study. Data was collected through an English questionnaire that was given to soft contact lens wearers who went for an eye test at a participating branch in Windhoek. The return rate of the questionnaires was very poor. The researcher only managed to attain a total of 118 questionnaires.

The contact lens market in Namibia has reduced due to the economic crisis in Angola. Namibia was also supplying Angolan clients with optical goods. Therefore this has reduced the number of soft contact lens wearers. The other reasons given by some Optometrists for not returning the questionnaires were that they lost the filled out

questionnaires, others did not get the time to ask their clients to fill out the questionnaires. A few Optometrists also mentioned that some of the soft contact lens wearers declined to fill out the questionnaire since they were running out of time.

3.5.1 Data Collection Instrument

A data collection instrument is a device used for obtaining information relevant to the research topic. In this study the researcher used a self completed structured questionnaire written in English as the research instrument. A questionnaire is a research instrument consisting of a list of questions that a number of people are asked so that information can be collected about a certain view or topic. The questionnaire was a favourable research tool as it provided a cheap and effective way of collecting data in a structured and manageable form (De Vos, Strydom, Fouche & Delport, 2005). This meant that all the patients had to be able to read and write in English, and the researcher did not experience any difficulty with this, as English is the official language in Namibia.

The study's questionnaire had structured questions in English. The questionnaire had two sections. Section A included questions on demographic data. Section B included questions on soft contact lens replacement noncompliance and knowledge of complications. (Annexure A) The questionnaire mainly consisted of closed ended questions. Only two opened questions were included. The structured questions included dichotomous questions as well as scaling questions. There were only two open ended questions and these were completely unstructured questions.

3.5.2 Pilot study

To determine whether the research process and instrument would produce the desired data, a pilot study was carried out. A pilot study is a small scale version of the intended study. Piloting is the process of administering the instrument to a small number of people who represent the population of interest or are from the population of interest before the main study is conducted. A pilot study is beneficial in orientating the researcher, identifying ambiguity, sensitivity, acceptability of questions and identifying possible defects in the planned study (De Vos, 2002). The questionnaire was prepared and sent to the supervisor for perusal, comment and approval before commencing the pilot study.

The instrument was tested on five eligible soft contact lens wearers who visited the Shaetonhodi Optometric Practice, which is the researcher's place of work. The wearers were a convenience sample of the first five patients that came in for their 6 monthly follow-up contact lens test in January 2016. This enabled the researcher to assess relevance and accuracy of the questionnaire establishing reliability. The outcome of the pilot study is covered in section 3.5.4 under reliability. The soft contact lens wearers included in the pilot study were excluded from the actual research study to avoid possible biases. The selection criteria which were indicated in section 3.3.1 were also applicable during the pilot study.

3.5.3 Validity

Validity is the degree to which an instrument actually measures what it intends to measure (De Vos, 2002). Different kinds of validity can be established, content, face, criterion and construct validity. In the study only face and content validity applied. Content validity measures the adequacy of the sampling to address the content of an instrument. Face validity refers to the concept of whether the instrument appears to measure the relevant construct. To establish face validity, the questionnaire was submitted to two colleagues and to the research supervisor, who were asked to evaluate the questions in relation to the thesis outline and the objectives of the study to ensure that the questions assessed the characteristics of wearers who are not compliant with their soft contact lens replacement schedule. To establish content validity, existing literature on soft contact lenses replacement noncompliance is referenced.

3.5.4 Reliability

Reliability can be defined as the accuracy or precision of an instrument. Reliability refers to the extent to which independent administration of the research instrument consistently yields the same results under comparable conditions (De Vos, 2002). It tries to encourage repeatability and ensure that the results are not just once off. In this study the researcher established measures to ensure reliability of the data collection instrument. The questionnaire was tested on 5 different individuals before the study was conducted. Reliability was tested through the pilot study (inter-rater reliability) that was conducted. The same questionnaire was also used on all the participants in order to collect the data.

The main problems encountered whilst pretesting the research tool were that the participants did not understand some of the questions. An example was Question 3 of Section B which previously stated , What is the name of the type of contact lens you are wearing? None of the respondents knew what the name of their brand of contact lens was, even when assisted with options to choose from. This prompted the researcher to remove the question. Section B question 5 and 6 also had so many variations in the answers the respondents suggested it be left for them to fill out the appropriate answer.

3.6 Data collection procedure

An email was sent to all the optometrists in Windhoek by the Namibian Optometry Association notifying them of the study and letting them know that the researcher would be in touch with them. The researcher then called 25 Optometrists in Windhoek and asked them if they were willing to let their soft contact lens wearers participate in the study. Each of the 20 Optometrists who agreed to participate had 20 questionnaires delivered to their optometric practise. The 400 questionnaires were then distributed to consecutively established contact lens patients. Oral informed consent was attained from the participants showing their willingness to partake in the study after the participating optometrist had explained the purpose, benefits, procedure of the study and responsibility of each participant. The soft contact lens wearers were then given general information on what the study was about, and were asked to fill in an anonymous self reported questionnaire during their examination.

To create some form of consistency all participants were asked to fill in the questionnaire during their eye examination. All soft contact lens wearers who filled out the questionnaire were given written information with contact lens do's and don'ts to encourage compliance (Annexure E). To ensure anonymity the optometrists and their staff were asked not to read the participants answers to the questionnaire. All participating optometric practices were given the same six months period and during the first week of November 2016 the researcher went in person to collect the filled out questionnaires and combined them with the 30 questionnaires that the researcher themselves had attained at Shaetonhodi Optometrist in Windhoek where the researcher was based. The data was captured in Epi Info 7 through a questionnaire.

3.7 Data Analysis

Data analysis is the process of systematically inspecting, organizing and investigating collected data and transforming it into numerical data that becomes useful information to address the research questions, present results and suggest conclusions (Bryman, 2006). Data was cleaned, entered, coded and edited for inconsistencies before analysis with Epi Info version 7. The data obtained from the study was then analysed using the software Epi Info 7. In the research study descriptive and analytical analysis was conducted.

3.7.1 Descriptive analysis

Descriptive analysis is used to describe the basic features of the data presented in the study. It provides simple summaries about the sample population. Descriptive analysis

together with graphics provides the basis of virtually every quantitative analysis of data. In this study distributions were displayed using frequency and percentages to describe the demographic characteristics of soft contact lens wearers. Variables analysed in this study include sex, age, level of education attained, home language, medical aid and smoking. The study employed descriptive analyses techniques, specifically the frequency procedure to show the prevalence of risk factors as well as the prevalence of noncompliance among the soft contact lens wearers in Windhoek.

3.7.2 Cross Sectional Analysis

Cross sectional analysis is a popular method of data analysis in quantitative studies. It assists the researcher in understanding what relations exist among two categorical variables by using cross tabulations (2 X 2 tables). In this study the researcher compared categorical variables in order to identify the association between soft contact lens replacement noncompliance versus age, gender and level of education. Chi-Square tests for association were used to ascertain if associations existed between individual covariates (risk factors) and noncompliance to the soft contact lens replacement schedule. Soft contact lens replacement noncompliance and the significant risk factors were identified using these methods.

3.8 Ethical considerations

Brink, Van der Walt and Van Rensburg (2006) state that ethics are a system of moral values that are concerned with the degree to which research procedures adhere to professional, legal and social obligation to the study participants when humans

especially are used as the study participants great care must be taken in ensuring that their rights as individuals are not violated. The researcher must research competently, manage resources honestly, communicate the results accurately and consider the consequences of not doing so for the society and the other researchers.

The following ethical principles guided the researcher in this study: permission, informed consent, right to privacy, voluntary participation, anonymity, non maleficence, beneficence and confidentiality.

3.8.1 Permission to conduct the research

Firstly in order to conduct the study the researcher got ethical clearance from the University of Namibia Research Ethics Policy and guidelines in accordance with the University of Namibia's Research Ethics Policy and Guidelines (Annexure B). A letter giving the researcher permission to conduct the study was also issued by the School of Postgraduate Studies at the University of Namibia (Annexure C). Permission to conduct the study at Shaetonhodi Optometrist which is the researcher's place of employment was also granted by the employer.

3.8.2 Informed consent

The researcher then got oral informed consent from the participants showing their willingness to partake in the study after the participating optometrist had explained the purpose, benefits, procedure of the study and responsibility of each participant. The participants were all over 18 years of age, legally and mentally competent. No false promises were made. The instructions and contact details of the researcher appeared on

the document (Annexure D). Informed consent also helped the researcher to adhere to the ethical consideration of doing no harm and not deceiving the participants.

3.8.3 Voluntary Participation

Voluntary participation means that the participants of the research study are free from coercion. The researcher informed the participants of the option to retract from the research at any time they wished to do so. All participants were volunteers and no compensation was offered for participants. This helped prevent falsification of inclusion in order to gain benefits

3.8.4 Right to privacy and confidentiality

The rights to privacy include both the right to respect for the dignity of the participants with respect to his/her physical privacy and the rights to respect for the participants secrets, namely confidentiality (Pera & Van Tonder, 2005). The privacy and the confidentiality of the participants were protected by ensuring that the researcher did not link the identity of the participant to the data. The researcher also did not share any completed questionnaires with any person/s not affiliated with the research.

3.8.5 Non Maleficence

Harm can be presented in the form of physical and or psychological and can cause anxiety, pain, stress and reduced self esteem. It is important that the research study does not harm the participants in any way. The participants were assured that there will be no risk to them in sharing the information, but if in any way during the course of filling in

the questionnaire they felt violated, then they were free to retract from the study with no questions asked.

3.8.6 Anonymity

Anonymity is a stricter form of privacy and confidentiality, as the identification of the participant should remain unknown to the research team (Trochim, 2006). In this study anonymity was withheld because no names were entered into the questionnaire. This then protected all the participants' identity, since it was unknown. The results were also reported as frequencies and percentages and do not indicate any particular person or identity

Written instructions with contact lens do's and dont's will be offered after the completion of a questionnaire, to encourage compliance (Annexure D).

3.9 Summary

The chapter above presented the research methodology that was used, in the study. The study made use of a quantitative cross sectional analytic research design. This design was most suitable in addressing the study objectives. The purpose of the chapter was to outline the approach the researcher followed for data collection methods, sampling the population for the study and the methods used for data analysis. The methods used by the researcher on how to ensure reliability and validity was explained. The ethical principles that guided the study were explained in detail.

CHAPTER 4

PRESENTATION OF THE RESULTS AND DISCUSSION

4.1 INTRODUCTION

This chapter presents the findings of the research on soft contact lens replacement noncompliance of wearers in Windhoek and discusses the findings. Descriptive statistics were used to analyse the socio demographic characteristics of soft contact lens wearers in Windhoek. Epi Info 7 was used to assess the risk factors of soft contact lens replacement noncompliance of wearers. The data analysis was done in November 2016 after all the data was collected, captured, cleaned and stored. The data was then presented in the form of tables and figures so that it would be easy to understand, practical, convenient and interesting.

Although the sample size of the study was calculated to be 384, the researcher only managed to attain 118 filled out questionnaires. This is due to the decline in the Namibian contact lens market. Namibia also serves the Angolan market in supplying optical commodities. The decline in the Angolan economy has caused a great decline in the optical industry and thereby reducing the number of contact lens buyers and wearers that were previously serviced. The second challenge in data collection was that contact lens fitting itself takes an average of 45 minutes to one hour, which is a long time. So despite their willingness to participate, most respondents just did not have the time to do so. The third challenge was that because data was collected by other optometrists also, some of them were unwilling to participate, some of them lost the filled out

questionnaires that they collected from their wearers and some of them just completely forgot about the questionnaires.

4.2 ANALYSIS OF THE SOCIO-DEMOGRAPHIC CHARACTERISTICS OF SOFT CONTACT LENS WEARERS IN WINDHOEK

Demographic and Socioeconomic factors are variables which the researcher has no control over, however they have a huge impact on a person's actions and behaviours. The following socio-economic variables were analysed in the study gender, age, race, home language, education level, employment status, income level, smoking and medical aid. A total of 118 soft contact lens wearers in Windhoek participated in the study.

4.2.1 Gender

The distribution for gender of the respondents in this study is shown below in figure 4.1.

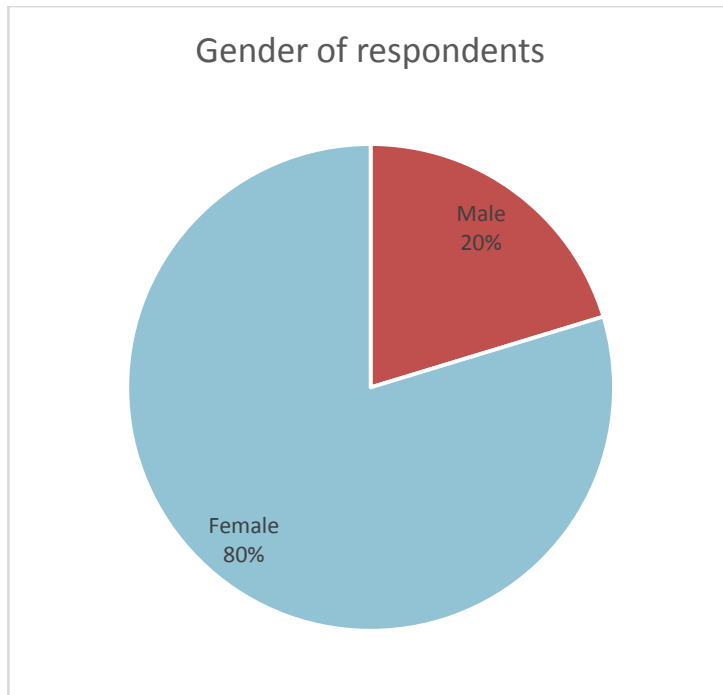


Fig 4.1 Gender of respondents

Analysing the respondents who participated 80% were female (n=94) and the remaining 20% were male (n=24). The total respondents to this question were 116. One responded marked both male and female and the other respondent did not mark the question at all, hence the two were excluded as dirty data. Two thirds of all the contact lens wearers in the world are female (Morgan et al, 2011). This study found a greater percentage of females but the ideology that the majority of soft contact lens wearers are female, is the same. A previous study conducted by Cope et al in 2015 also reported 82% of the respondents as female. They also suggested that the use of a convenience sample may have resulted in sample bias giving reason for more females and not necessarily representing the contact lens wearing population (Cope et al, 2015).

4.2.2 Age of respondents

The distribution of respondents by age group is presented in the figure below

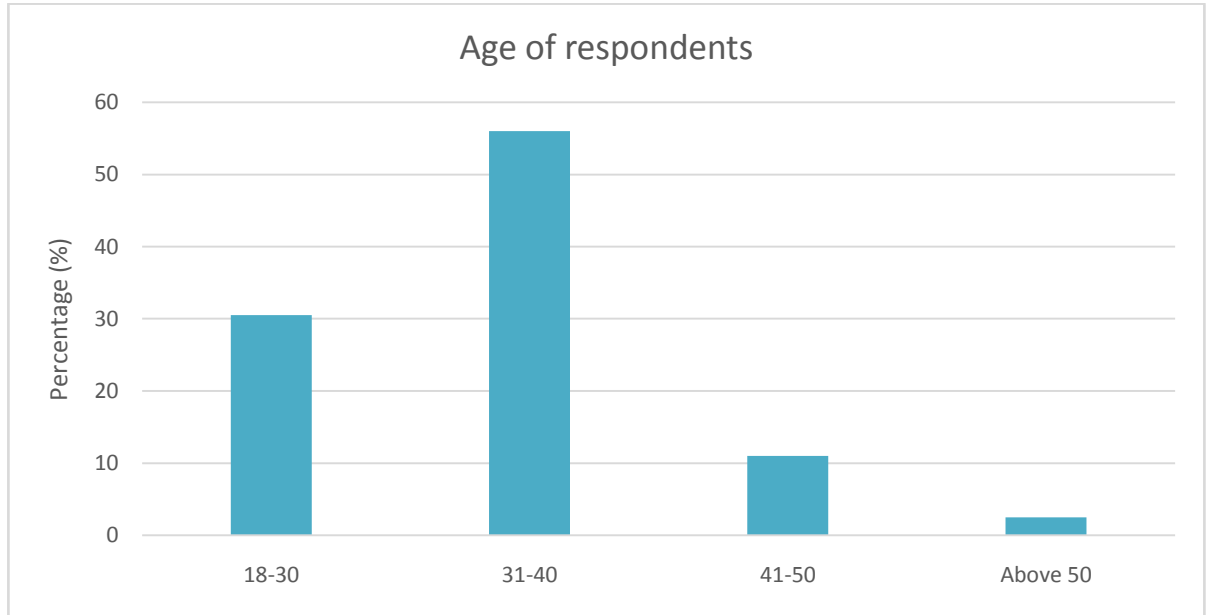


Figure 4.2 Age of respondents

Figure 4.2 above shows that the majority of the respondents, 56% are in the age category of 31 to 40 years old ($n=66$), followed by 30% who are aged 18 to 30 years old ($n=35$). Approximately 12% of the respondents are between the ages of 41-50 ($n=14$). The remaining 2% of elderly respondents are aged 50 years or more ($n=3$). The mean age of the respondents is 33 years. The median age is 35 years and the Mode is 35 years. This is very similar to previous studies that state that the average age of a contact lens wearer is 31 years (Morgan et al, 2011).

4.2.3 Ethnic groups of respondents

The distribution of respondents by ethnicity is presented in the table below

Ethnic group of respondents		
	Frequency	Percent
Black	71	61.6
White	34	29.1
Coloured	11	9.4
Total	117	100.0

Table 4.1: Ethnic group of respondents

The participants who participated in the study were dominated by black race with 61.6% (n=71), followed by 29.1% (n=34) of whites and then only 9.4% (n=11) of these participants are coloured. This is a true representative of the Namibian population since the majority of the individuals are black. According to the Namibian 2011 Population and Housing Census 87.5 % of the population are black, 6% are white and the remaining 6.5% are mixed.

4.2.4 Home language

The distribution of respondents by home language is presented in the figure below.

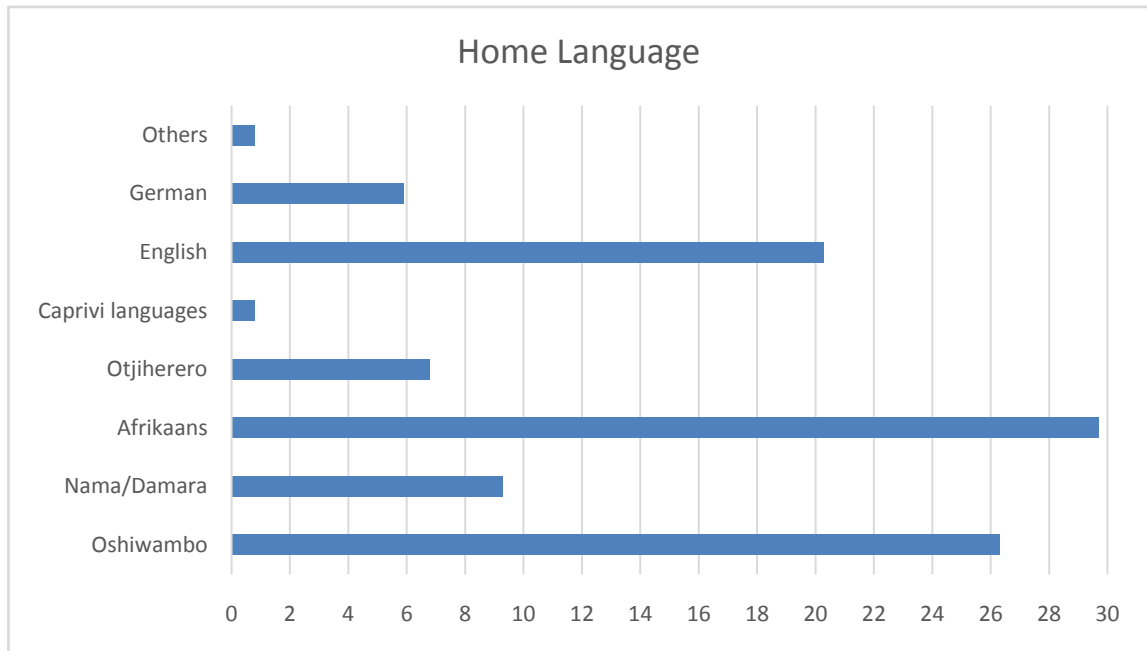


Fig 4.3 Home language

The figure 4.3 above indicates that the three most popular home languages are Afrikaans, Oshiwambo and English. A total of 118 respondents answered this question. The study revealed that 29,7% (n=35) of the respondents home language was Afrikaans, 26.3% (n=26) were Oshiwambo speakers, followed by English 20.3% (n=24) home language communicators. In addition, a very little percent less than 1 speak either Caprivi language 0.8% (n=1) or other languages 0.8% (n=1) at home. According to the Namibia 2011 Population and Housing Census, the top three spoken languages are Oshiwambo, Nama/Damara and Afrikaans, although English is the official language.

4.2.5 Employment Status

The distribution of respondents by employment status is presented below

Table 4.2: Employment Status		
	Frequency	Percent
Fully Employed	90	76.3
Not Employed	21	17.8
Others	7	5.9
Total	118	100.0

Table 4.2 Employment status

The table 4.2 above shows that 76.3% (n=90) of the respondents are fully employed, 17.8% (n=21) are not employed and 5.9% (n=7) have other employment status'. Some of the respondents went on to specify that other, in their case meant that they were self-employed or either studying at the time of the interviews. This showed that the majority of soft contact lens wearers are working class individuals

4.2.6 Highest level of education attained

The distribution of respondents by highest level of education attained is presented in the table below.

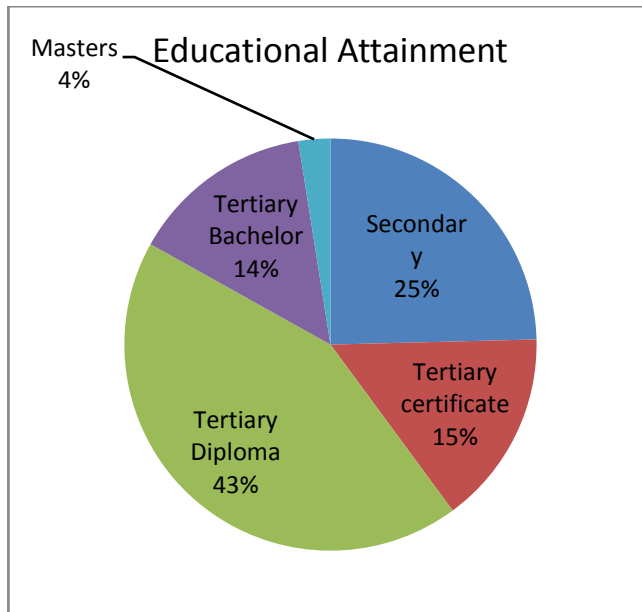


Fig 4.4 Highest level of Education attained

The chart above shows that 43% (n=51) of the participants had obtained a tertiary diploma as their highest level of education, 25% (n=29) had only gone up to secondary school. There were only 14% (n=16) of respondents who had obtained a bachelor's degree, 15% (n=17) had attained a tertiary certificate and 4% (n=5) of respondents had attained a masters degree. This shows that the majority of the soft contact lens wearers were educated people.

4.2.7 Total Monthly income

The distribution of respondents by their total monthly income is presented in the table below.

Total Monthly Income			
	Frequency	Percent	Cumulative Percent
Less than N\$1000	8	6.8	6.8
N\$1000-N\$ 3000	7	6.0	12.8
N\$ 3001- N\$5000	8	6.8	19.7
N\$ 5001- N\$ 10000	8	6.8	26.5
N\$10001- N\$ 15000	22	18.8	45.3
N\$ 15001- N\$ 25000	29	24.8	70.1
Over N\$25001	35	29.9	100.0
Total	117	100.0	

Table 4.3: Total Monthly Income

Most of the participants earned more than N \$ 25 000 (30%) (n=35), followed by 25% (n=29) of the respondents who earned the amount between N\$ 15 001 and N\$ 25 000. Moreover, 19.7% (n=22) of respondents earned N\$ 5000 or less, 45.3% (N=53) of the respondents earned the amount of N\$ 15 000 and below. This showed that generally most of the people wearing soft contact lenses in Windhoek are of the middle to higher class of the population. A previous study done in Australia also came to the conclusion that contact lens wearers were of higher socio-economic status than the national average (Edwards, Keay, Naduvilath, & Stapleton, 2014)

4.2.8 Medical Aid

The distribution of respondents registered on a medical aid fund is presented in the table below.

Table 4.4: Medical Aid		
	Frequency	Percent
Yes	104	88.9
No	13	11.1
Total	117	100.0

Table 4.4: Medical Aid

Table 4.4 above indicates that about 89% of the respondents had a medical aid fund and only 11.1% of respondents did not have a medical aid fund. It is therefore evident that the majority of soft contact lens wearers in Windhoek had a Medical aid fund. This indicated that soft contact lenses are mainly accessible to the middle and upper class individuals in the society.

4.2.9 Smoking

The distribution of respondent by being a smoker or non smoker is presented in the table below.

Smoking		
	Frequency	Percent
Yes	8	6.8
No	110	93.2
Total	118	100.0

Table 4.5: Smoking

According to the table 4.5 on smoking a total number of 110 participants out of 118 (93.2%) do not smoke, there are only 8 people out of 118 (6.8%) who participated that smoke. All respondents stated that they wear soft contact lenses. It is important to note that smoking presents risky behaviour and also means one must take extra care in cleaning hands before inserting the contact lenses. It is therefore good that most of the soft contact lens wearers were non smokers.

4.3 Soft contact lens replacement noncompliance and knowledge of complications

As per the inclusion criteria all the patients who filled in the questionnaire were soft contact lens wearers who had worn their contact lenses for more than six weeks. This was done in order to ensure that by then, they would have needed to replace them and the researcher would therefore be able to document their replacement habits.

4.3.1 Replacement Modality

The distribution of respondents by their soft contact lens replacement modality

Replacement Modality		
	Frequency	Percent
Monthly	101	85.6
Two week	3	2.5
Daily	8	6.8
Yearly	6	5.1
Total	118	100.0

Table 4.6: Replacement Modality

Most of the participants indicated that they wore monthly replacement soft contact lenses (85.6%) (n=101). Then 6.8% (n=8) wore daily disposable soft contact lenses.

Only 2.5% (n=3) of participants wore contact lenses on a two weekly replacement schedule. Therefore it would be correct to assume that the most common replacement schedule is the monthly replacement schedule. This result is similar to the results found in Canada, where monthly replacement lenses are the most common (Dumbleton et al., 2010). In the USA the most common replacement schedule is the two weekly lenses. It is important to note that very few people in the study used two weekly replacement contact lenses in Windhoek, whereas in USA and Canada a significant number of participants used two weekly replacement contact lenses.

4.3.2 The period of contact lens wear

The distribution of respondents by duration of soft contact lens wear is presented in the table below

The period of contact lens wear			
	Frequency	Percent	Cumulative Percent
Less than 6 weeks	1	.9	.9
6 weeks- 6 months	7	6.0	6.8
6 months to 1year	13	11.1	17.9
1-3 years	38	32.5	50.4
3-5 years	22	18.8	69.2
More than 5 years	36	30.8	100.0
Total	117	100.0	

Table 4.7: The period of contact lens wear

Of the 117 respondents who answered this question, 38 had been wearing contact lenses for one to three years (32.5%). The other 36 respondents (30.8%) had been wearing lenses for more than five years. The number of respondents who had been wearing contact lenses for three to five years are 22 (18.8%). This shows that the majority of the

respondents have been wearing contact lenses for more than a year. There were only 7 respondents (6%) who stated wearing contact lenses 6 weeks to 6 months only during the study period. The researcher reported that only 30.8% (n=36) had worn contact lenses for more than 5 years.

4.3.3 Last soft contact lens check up

The distribution of respondents by the duration since their last contact lens check up is presented in the table below.

Last contact lenses check up			
	Frequency	Percent	Cumulative Percent
Less than a year	50	43.1	43.1
1-2 years	63	54.3	97.4
3-4 years	2	1.7	99.1
More than 4 years	1	.9	100.0
Total	116	100.0	

Table 4.8: Last soft contact lenses check up

Table 4.8 above shows that more than (n=63) 50% of the respondents had their last check up one to two years back. A lesser (n=50) 43.1% had their last check up within a year ago. It is however important to note that 3 of the respondents (2.6%) had their last contact lens check up more than three years ago. One should have a contact lens check up on average every six months when they replace their lenses if possible or at least once every year. The results are similar to those found in a previous study done on 2 147 contact lens wearers; the mean interval between eye tests was 16 months. The study also indicated that the interval between eye tests was longer for those who were non-compliant (Dumbleton, Richter & Jones, 2012).

4.3.4 Sleeping with contact lenses on

The distribution below presents how many times the respondent has slept with their contact lenses on.

Sleep with contact lenses on						
Mean	Median	Std. Deviation	Range	Minimum	Maximum	Responses
6.77	4.00	10.013	40	0	40	60

Table 4.9: Sleeping with contact lenses on

On average participants have slept with their soft contact lenses on about 7 (6.77) times, 50% of those who respondents had sleep with their contact lenses more than 4 times while the other 50% slept with their contacts on less than 4 times. Some respondents did note that they do not sleep with their soft contact lenses on at all, and some participants indicated that they sleep with their lenses on about 40 times.

4.3.5 Hours of soft contact lens wear per day

The distribution of how many hours the respondents wear their contact lenses per day is presented in the table below.

Hours of lens wear per day						
Mean	Median	Std. Deviation	Range	Minimum	Maximum	Responses
12.77	12.00	4.520	24	0	24	118

Table 4.10: Hours of lens wear per day

Table 4.10 above shows the number of hours per day that the contact lens wearer was spending with their contact lenses on. The average number of hours participants spent with their contacts on is 12.77 hours. Also, half of the respondents indicated they spend less than 12 hours with their contact lenses on. It is normally recommended that one

wears their contact lenses for a maximum of 10-12 hours per day. Generally this proves that the majority of soft contact lens wearers in Windhoek were wearing their lenses for the number of hours advised.

4.3.6 Knowledge on how often to replace the soft contact lens

The figure below presents the distribution on whether the respondent had the knowledge on how often they had to replace their soft contact lenses

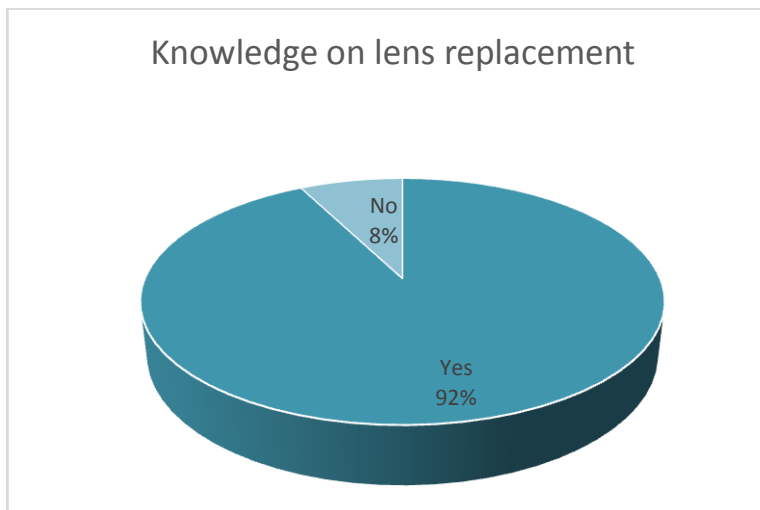


Fig 4.5: Knowledge on how often to replace the soft contact lenses

The figure 4.5 indicates that the majority $n=109$ (92%) of the respondents were well informed on when to replace their lenses since their optometrist had relayed this information to them, however $n=9$ (8%) had not gotten any information of this nature or do not remember getting it. This is alarming because without the information they would not know when to replace their soft contact lenses.

4.3.7 Perceived compliance on soft contact lens replacement

The pie chart on below presents the distribution of how the respondents perceived their own soft contact lens replacement habits.

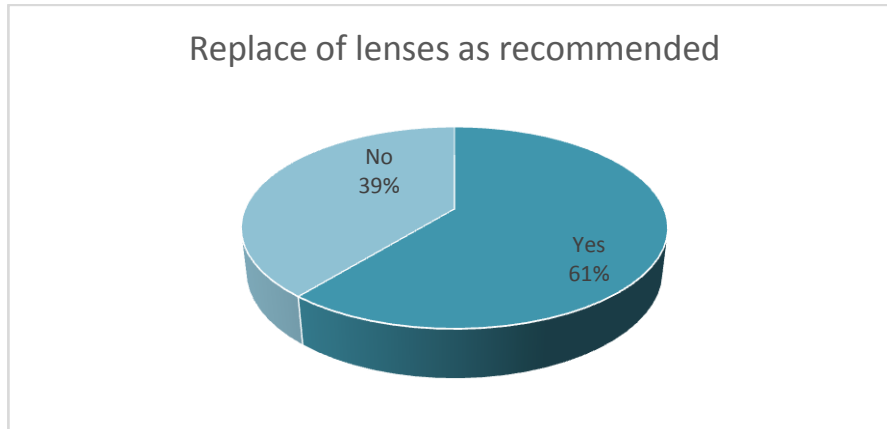


Fig 4.6: Perceived compliance on soft contact lens replacement

The figure 4.6 above shows that (n=46) 39% of the participants perceived themselves to not replace lenses as recommended. The other (n=72) 61% of the respondents perceived themselves to be replacing the lenses as they were informed to. This was important to measure because previous studies suggested that sometimes the wearers actually think they are compliant, however when observed they are noncompliant. This stems from the fact that the information they have is wrong. However in this study the percentage of perceived noncompliance to those that were actually noncompliant is the same, therefore knowledge or misinformation is not the main reason for soft contact lens replacement noncompliance.

4.3.8 The number of days each respondent wears their contact lenses for before disposal

The table below presents the information on the number of days each respondent wears their contact lenses for before they discard them

Number of days you wear contact lenses before disposal						
Mean	Median	Std. Deviation	Range	Minimum	Maximum	Responses
37.28	31.00	18.983	119	1	120	118

Table 4.11: Number of days you wear contact lenses before disposal

Table 4.11 above shows that the average number of days each participant wore their soft contact lenses before they threw them away was 37.28 days. This means that participants mostly wore contact lenses for 5 weeks before they replaced them. It is therefore evident that the soft contact lens wearers wore their lenses for longer than recommended. Since the majority of the contact lens wearers in the study wore monthly contact lenses, these lenses should only be worn for an average of 30 days. The maximum number of days a participant wore their soft contact lenses was 120 days.

4.3.9 Reason for eventually replacing contact lenses

The figure below presents the percentages for the reason the respondents eventually replaced their soft contact lenses.

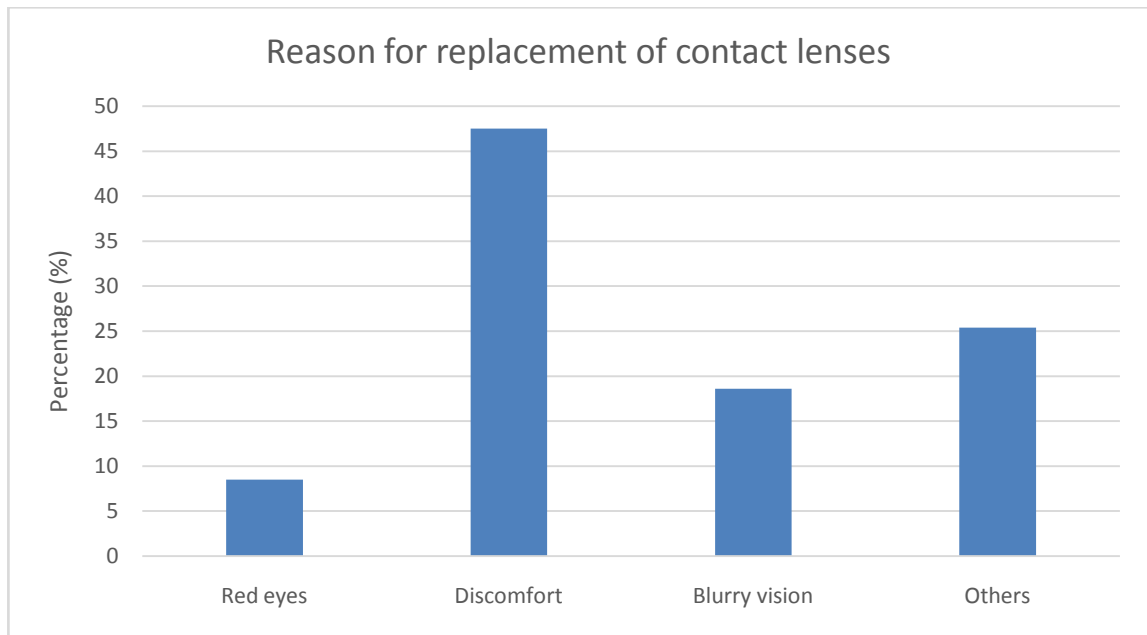


Fig 4.7 Reason for replacement of soft contact lenses

The figure 4.7 above depicts that discomfort ($n=56$) 47.5% was the main reason that the participants eventually replaced their soft contact lenses. Blurry vision was also regarded as one of the reasons that was dominating the reasons for eventually replacing their soft contact lenses as far as ($n=22$) 18.6% is concerned. In a previous study done in Croatia, blurry vision was also among the top reasons for eventually replacing the contact lenses (Petri et al., 2013). In addition, ($n=30$) 25.4% replaced their lenses due to other various reasons. The most common of the other reasons for replacing the lenses was that the 30 days was up. Clearly some contact lens wearers did not wait to experience discomfort or blurry vision, when the 30 days was up, they disposed of their lenses, as they should.

4.3.10 Main reason for wearing the contact lenses longer than recommended

The table below presents the distribution for the respondents' main reason for wearing the soft contact lenses longer than recommended

Reason for wearing contact lenses longer than recommended		
	Frequency	Percent
Forgot to reorder	24	20.3
Forgot day to replace	57	48.3
To save money	21	17.8
No harm in wearing longer	15	12.7
Total	117	99.2

Table 4.12: Reason for wearing contact lenses longer than recommended

The most common reason for wearing the contact lenses for longer than the recommended time was that the participants forgot on which day they were supposed to replace the lenses (n=57) 48.3%. The second most popular reason for wearing the contact lenses longer than recommended was because they forgot on which day they were supposed to replace the contact lenses (n=24) 20.3% . Twenty one participants (17.8%) noted that they did not replace their contact lenses on time in order to save money. The remaining 15 participants (12.7 %) noted that they saw no harm in wearing the contact lens longer than recommended. These results are comparable to those reported by Dumbleton et al in 2013. Dumbleton et al in their study also found the main reason for wearing the contact lens longer than recommended was because they forgot on which day they were supposed to replace the lenses (51%). The second most popular reason for not replacing the lenses on time in their study was because the wearer wanted to save money (Dumbleton et al, 2013). Saving money would have been the most

obvious reason for extending the wear of ones soft contact lenses, however both studies prove that it is not the chief reason. Therefore compliance issues lies deeper than just the cost of the therapeutic commodity. Cost may not be an issue because the contact lenses are mainly accessible to the middle and high income population.

The third objective of the study was to determine the main reason for soft contact lens replacement noncompliance which in this study was, they forgot on which day they were supposed to replace the lenses.

4.3.11 Knowledge on contact lens complications

The distribution of respondents by knowledge on soft contact lens complications is presented in the table below.

Knowledge on contact lens complications	Frequency	Percent
Yes	82	69.5
No	36	30.5
Total	118	100.0

Table 4.13: Knowledge on contact lens complications

Table 4.13 above shows that (n=82) 69.5% of the respondents had knowledge about the complications that may arise from the misuse of contact lenses, (n=36) 30.5% indicated that they did not know about soft contact lens complications. This may mean that the respondents where never advised on the complications that can arise due to soft contact lens wear.

4.3.12 Naming a complication that can arise from contact lens misuse

The distribution below represents the naming of complications that arise from soft contact lens misuse in the table below.

Naming a complication that can arise from contact lenses misuse			
		complication arise due contact lenses misuse	
		Yes	
		Frequency	Percent
		20	39.2
Contact lenses related complication	Acanthamoeba Keratitis	1	2.0
	Bacterial Infection	3	5.9
	Blurry vision and eventually going blind	1	2.0
	Conjunctivitis	1	2.0
	Corneal disturbance	1	2.0
	Corneal ulcer	1	2.0
	Dry eyes	3	5.9
	eye infection	9	17.6
	Glaucoma	1	2.0
	Lenses Tearing	1	2.0
	Less oxygen	4	7.8
	New blood vessels	1	2.0
	Red eyes	4	7.8
	Total		51

Table 4.14: Naming a complication that can arise from contact lenses misuse

The table above shows the complications that the participants were able to name that can arise from contact lens misuse. It is important to make note that of the 82 participants who said they had been advised of the complications related to soft contact lens wear in section 4.3.11 above, only 51 actually went on to attempt to name a complication. The total number of 51 respondents who participated indicated that they could name a

complication due the misuse of contact lenses. Infections were the most known complication of contact lens misuse as indicated by (n=9) 17.8% of respondents. Less oxygen and Red eyes are other complications that the respondents who wore contact lenses were aware of.

4.3.13 Personal experience of a serious contact lens related eye infection

The table below presents the presence or absence of an experience of a serious contact lens related eye infection

Serious contact lenses related eye infection		
	Frequency	Percent
Yes	9	7.6
No	109	92.4
Total	118	100.0

Table 4.15: Serious contact lenses related eye infection

Table 4.15 above demonstrates that 9 people out of the 118 participants had a serious eyes infection problem. The other (n=109) 92.4% never had an eye infection.

4.3.14 Best method that would help you to replace the contact lenses when recommended

The respondents' opinion on the best method that would help them replace their soft contact lenses on time is tabulated on the table on the next page

Method that would help you to change contact lenses when recommended		
	Frequency	Percent
Written information	25	22.5
Telephonic reminder	71	64.0
More check-ups	9	8.1
Other	6	5.4
Total	111	100.0

Table 4.16: Method that would help you to change contact lenses when recommended

Table 4.16 above shows that most of the participants felt that a telephonic reminder would be the most effective method that would help them to replace the contact lenses on schedule (n=71) 64%, this is followed by (n=25) 22.5% whereby participants prefer to have written information. Participants also gave other suggestions that would help them to change the contact lenses when recommended; these were email reminders, sms on the cell phone as opposed to a call and that the optometrist must write on the box when the participant should replace their lenses.

4.3.15 Actual compliance with soft contact lens replacement

The actual compliance with soft contact lens replacement is presented in the table below

Actual soft contact lens replacement compliance		
	Frequency	Percent
Yes	69	58.5
No	49	41.5
Total	118	100.0

Table 4.17: Actual soft contact lens replacement compliance

Table 4.17 on page 84 shows that (n=69) 58.5% of these participants were compliant with their soft contact lens replacement schedule. This means that (n=49) 41.5 % of the respondents were non compliant with their specific soft contact lens replacement schedule.

The first objective of the research was to assess the prevalence of soft contact lens replacement noncompliance among soft contact lens wearers in Windhoek which is 41.5%

A study done in 2002 in the USA reported that 33% of soft contact lens wearers were non compliant. In another study conducted by Dumbleton and colleagues in the USA and Canada, they discovered that 33% of soft contact lens wearers in the USA did not replace their lenses on time and 28% of soft contact lens wearers in Canada did not replace their lenses on time. Another study done in Croatia reported that 55% of soft contact lens wearers were non compliant with replacing their lenses as recommended.

4.4 Factors affecting soft contact lens replacement noncompliance

4.4.1 Gender

The following table presents a 2x2 association of actual compliance to the gender of the respondents

Actual Compliance						
		Yes		No		Total
		Frequency	Percent	Frequency	Percent	
Gender	Male	21	87.5	3	12.5	24
	Female	48	51.1	46	48.9	94
Total		69	58.5	49	41.5	118

Table 4.18: Actual Compliance by Gender

The table indicated that (n=21) 88% of the male were reported to be compliant, as opposed to only (n=3)13% who reported to be non-compliant. On the other hand there is no much difference between female (n=48) 51% who were compliant and (n=46) 49% who were non compliant.

The table below presents the Chi-square test for the association between compliance and gender

Gender and compliance Chi-Square Tests			
	Value	df	p-value
Pearson Chi-Square	10.453 ^a	1	.001
N of Valid Cases	118		

Table 4.19: Gender and compliance Chi-Square Tests

It can be observed from the chi-square table that there is a significant difference between gender and compliance meaning that gender has an influence on the compliance since $p=0.01$ which is less than 0.05 it is therefore significant.

The results from the study reflect that females are more noncompliant than men. This is contrary to a previous study, which suggested that there is no association with gender and compliance in contact lens wear (Ramamoorthy & Nichols, 2014). Few previous studies suggested that males were more non compliant than females in contact lens wear. A study done in the USA also supports the notion that males are more non compliant (Jansen et al., 2011). The reason for the difference in the results may have been that there were far more female respondents as compared to the males a convenience sample may sometimes create this bias.

4.4.2 Age

The table below presents a 2x2 association of actual compliance and the age group of the respondents

		Compliant				Total
		Yes		No		
Age Group		Frequency	Percent	Frequency	percent	
	18-30	27	75.0	9	25.0	36
	31-40	37	56.1	29	43.9	66
	41-50	3	23.1	10	76.9	13
	Above 50	2	66.7	1	33.3	3
Total		69	58.4	49	41.5	118

Table 4.20: Association between compliance and age group

Regarding compliance with age, it was reported that those between the age 18-30 (n=27)75%, 31-40 (n=37) 56% and above 50 (n=2) 68% were compliant with their soft contact lens replacement schedule. However it was reported that those in age group 41-50, only (n=3) 23% of them were compliant to their soft contact lens replacement schedule, while 78% of them were not compliant with replacing their soft contact lenses on schedule.

Age group and compliance Chi-Square Tests			
	Value	df	p-value
Pearson Chi-Square	10.998 ^a	3	.012
N of Valid Cases	118		

Table 4.21: Age group and compliance Chi-Square Tests

The results indicated a significant association between age and compliance existed, this is because the p value is 0.012 which makes it statistically significant since it was less

than 0.05. This indicated that the older the soft contact lens wearer, the more non compliant they are likely to be. This is contrary to previous studies which suggested that young patients were more noncompliant than older patients (Jansen et al., 2011).

Not all previous studies have the same view, since others suggest that there is no association between contact lens compliance and age (Ramamoorthy & Nichols, 2014).

The study may have gathered these results because the older or more comfortable individuals get, they tend to be more relaxed and less compliant with their soft contact lens replacement schedule.

4.4.3 Employment status

The table on page 84 represents a 2 x 2 table to show the association between actual compliance and employment status

Compliant						
		Yes		No		Total
		Frequency	Percent	Frequency	Percent	
Employment Status	Fully Employed	47	52.2	43	47.8	90
	Not Employed	15	71.4	6	28.6	21
	Others	7	100	0	0.0	7
Total		69	58.5	49	41.5	118

Table 4.22 Association between compliance and employment status

It can be observed from the table that more than half of the respondents who are compliant are either fully employed (n=47) 52% or not employed (n=15) 71.4%. All the participants who stated their employment status as other who are either students or self

employed, they were all compliant with replacing their soft contact lens as and when they were supposed to.

The table below shows the Chi-Square tests between employment status and actual compliance.

Employment status and actual compliance Chi-Square Tests			
	Value	df	p-value
Pearson Chi-Square	7.871 ^a	2	.020
N of Valid Cases	118		

Table 4.23: Employment status and actual compliance Chi-Square Tests

Table 4.23 above demonstrates that employment status of an individual has an impact on the compliance of a person, this can be observed from the table above.

The second objective of the study was to determine possible factors contributing to noncompliance of soft contact lens replacement in patients. In this study the factors that were reported to be statistically significant are gender, age and employment status.

4.5 Factors that are not statistically significant in affecting soft contact lens replacement noncompliance

4.5.1 Race

The following table represents a 2 x 2 table to show the association between actual compliance and race of the respondents

Compliant						
		Yes		No		Total
		Frequency	Percent	Frequency	percent	
Race	Black	43	59.7	29	40.3	72
	White	22	64.7	12	35.3	34
	Coloured	4	36.4	7	63.6	11
Total		69	59.0	48	41.0	117

Table 4.24: Association between compliance and race

Results indicated that more white people tend to be compliant with soft contact lens replacement (n=22) 65%, than black with (n=43) 60% and then coloured who represent (n=4) 36%. It was reported that (n=7) 64% of the coloured were not compliant with their soft contact lens replacement schedule, followed by black (n=29) 40%, and white (n=12) 35%.

The table below shows the Chi-Square tests between employment status and actual compliance.

Race and actual compliance Chi-Square Tests			
	Value	Df	p-value
Pearson Chi-Square	2.803 ^a	2	0.246
N of Valid Cases	117		

Table 4.25: Race and actual compliance Chi-Square Tests

Further statistical results indicated that there was no association between race of the respondents and compliance in this study, simply means race does not has an influence on soft contact lens replacement compliance, since he p value =0.246

4.5.2 Home Language

The table below represents a 2 x 2 table to show the association between actual compliance and home language.

		Compliant				Total
		Yes		No		
Language		Frequency	Percent	Frequency	percent	
	Oshiwambo	18	58.1	13	41.9	31
	Nama/ Damara	5	45.5	6	54.5	11
	Afrikaans	19	54.3	16	45.7	35
	Otjiherero	5	62.5	3	37.5	8
	Caprivi	1	100.0	0	0.0	1
	English	17	68.0	8	32.0	25
	German	3	50.0	3	50.0	6
	Others	1	100.0	0	0.0	1
Total	69	58.5	49	41.5	118	

Table 4.26: Association between compliance and home language

The Oshiwambo speakers, Afrikaans and English speaking people were reported to be the most compliant with replacing their soft contact lenses on schedule. Nonetheless, German and Caprivians were the most non compliant with their soft contact lens replacement schedule.

The table below represents the Chi-Square tests between language status and actual compliance.

Association between language and actual compliance Chi-Square Tests			
	Value	Df	p-value
Pearson Chi-Square	3.608 ^a	7	0.824
N of Valid Cases	118		

Table 4.27: Association between language and actual compliance Chi-Square Tests

Results from *table 4. 27*, indicate that our p-value is bigger than the alpha value, thus we conclude there is no significant difference between language and soft contact lens replacement noncompliance, this simply means home language has no effect on soft contact lens replacement noncompliance.

4.5.3 Highest level of education attained

The table below represents a 2 x 2 table to show the association between actual compliance and education attained

		Compliant				Total
		Yes		No		
Attainment education		Frequency	percent	Frequency	percent	
	Secondary	17	58.6	12	41.4	29
	Tertiary certificate	12	66.7	6	33.3	18
	Tertiary Diploma	30	58.8	21	41.2	51
	Tertiary Bachelor	9	52.9	8	47.1	17
	Masters	1	33.3	2	66.7	3
Total		69	58.5	49	41.5	118

Table 4.28: Association between education attained and actual compliance Chi-

Square tests

In the table above, it can be seen that (n=12) 66.7% of the participants who are compliant with their soft contact lens replacement schedule are in possession of a tertiary certificate as their highest qualification. In addition, the table above shows that majority of the participants are actually compliant with soft contact lens replacement schedule, with reference to the highest level of education.

The table below demonstrates the Chi-Square tests between education and actual compliance.

Education and compliance Chi-Square Tests			
	Value	df	p-value
Pearson Chi-Square	1.496 ^a	4	0.827
N of Valid Cases	118		

Table 4.29: Education and compliance Chi-Square Tests

It was observed that educational attainment of an individual statistically has nothing to do with compliance, this can be seen on *table 4.29* , with the p-value tend to be greater than the alpha value (0.05).

4.5.4 Monthly income

The table below represents a 2 x 2 table to show the association between actual compliance and monthly income.

		Compliant				Total
		Yes		No		
Monthly Income		Frequency	Percent	Frequency	percent	
	Less than N\$1000.00	8	100.0	0	0.0	8
	N\$1000.00 -N\$ 3000.00	5	71.4	2	28.6	7
	N\$ 3001.00 - N\$5000.00	6	75.0	2	25.0	8
	N\$ 5001.00 - N\$ 10000.00	6	75.0	2	25.0	8
	N\$10001.00 - N\$ 15000.00	10	45.5	12	54.5	22
	N\$ 15001.00 - N\$ 25000.00	15	51.7	14	48.3	29
	Over N\$25001.00	18	51.4	17	48.6	35
Total	68	58.1	49	41.9	117	

Table 4.30 Association between compliance and monthly income

It is tabulated above that all of the participants who earn N\$1 000.00 or less are compliant with their soft contact lens replacement schedule; from the range of N\$1 000.00 to N\$ 10 000.00 about (N=17) 75% in each category are actually compliant with replacing their soft contact lenses on time. The compliance proportion seems to decline over N\$ 10 000.00 and vice-versa.

The table below represents the Chi-Square tests between monthly income and actual compliance.

Monthly income and actual compliance Chi-Square Tests			
	Value	Df	P-value
Pearson Chi-Square	10.728 ^a	6	0.097
N of Valid Cases	117		

Table 4. 31: Monthly income and actual compliance Chi-Square Tests

It was observed from the table that there is no association between monthly income and actual compliance, this simply means that monthly income has no impact on the soft contact lens replacement compliance

4.6 Summary

In this chapter the data that was collected by the researcher was analysed and interpreted in accordance to the objectives of the study. The researcher was able to get 118 participants who were willing to take part in the study. An analytical cross sectional study was conducted using a convenient sampling technique. A structured questionnaire was conducted on voluntary participants. The data was analysed using Epi Info 7 software and setting p values of 0.05 for statistical significance. A total of 118 participants were enrolled into the study. A total of 80% (n=94) were females and 20%

(n=24) were male. A total of 41.5% of the soft contact lens wearers did not comply to their specific lens replacement schedule. The factors that were associated with noncompliance were gender ($p=0.01$), age ($p=0.012$) and employment status ($p=0.020$). Factors that were not associated with noncompliance were home language, race, education level, income, smoking, type of contact lens worn and number of years of contact lens wear. The most common replacement modality of contact lenses in Windhoek is monthly wear, and most of the participants had worn their contact lenses for an average of 1-3 years. The data is presented in the form of tables and charts. P values less than 0.05 were considered statistically significant.

CHAPTER 5

CONCLUSION, RECOMMENDATIONS, LIMITATIONS AND SUMMARY

5.1 Introduction

This is the final chapter of the study and it summarizes the main findings of the study objectives. This chapter analyzes the aim and the objectives of the study together with the results produced in order to come to conclusions, address limitations and to make recommendations.

5.2 Aim and objectives of the study

The aim of this study was to explore and describe the factors and frequencies that are associated replacement noncompliance of soft contact lens wearers in Windhoek. The specific objectives of the study were to

- 1.) Assess the prevalence of soft contact lens replacement noncompliance
- 2.) Determine possible factors contributing to noncompliance of soft contact lens replacement in wearers.
- 3.) Determine the main reason for soft contact lens replacement noncompliance

The researcher managed to attain 118 filled out questionnaires from willing participants in Windhoek. It was concluded from the research findings and the comparison from

previous studies done that the research aim was achieved to the greatest extent by the findings of the study.

5.3 Conclusion

The conclusions are presented in relation to the specific objectives

5.3.1 Conclusion regarding objective 1: Assess the prevalence of soft contact lens replacement noncompliance

The first objective of the research was to assess the prevalence of soft contact lens replacement noncompliance among soft contact lens wearers in Windhoek which is 41.5%

From the literature review we discussed in Section 2.6 it was observed that the soft contact lens replacement noncompliance has a range of percentages between 28%-66%. The observation of noncompliance in Windhoek is still concerning as it is in the middle of the range.

It is evident from the finding that there are a considerable number of soft contact lens wearers who do not comply to their specific contact lens replacement schedule. One would have thought that with the advancement in technology and better contact lens regimes that the contact lens clients would be more compliant with their specific replacement schedule. This result clearly indicates that noncompliance in health care is a continuous problem that needs more investigation

5.3.2 Conclusion regarding objective 2: Determine possible factors contributing to noncompliance of soft contact lens replacement in wearers

The factors that were associated with noncompliance were gender ($p=0.01$), age ($p=0.012$) and employment status ($p=0.020$). Female were found to be more non compliant than males. This may also be so because there were many more females who wore contact lenses as opposed to males. Age was also found to be a possible factor contributing to soft contact lens replacement noncompliance. The study found that the older patients were more non compliant than the younger patients. This is similar to the findings of a study done in Croatia (Petri et al,2013). However, other previous studies done on noncompliance indicated that younger patients were more noncompliant due to the risky behaviours of youth. The last factor that was reported to be statistically significant is employment status. Individuals that were fully employed were reported to be the most non compliant. Individuals that were students, self employed and not employed were reported to be more compliant. Factors that were not associated with noncompliance were home language, race, education level, income, smoking, type of contact lens worn and number of years of contact lens wear.

5.3.3 Conclusion regarding objective 3: Determine the main reason for soft soft contact lens replacement noncompliance.

The main reason that participants gave for not replacing their soft contact lenses according to their schedule was that they forgot on which day they were supposed to

replace the lenses (48.3%), the second most popular reason for not replacing the lenses on time was because participants forgot to reorder their next batch of soft contact lenses on time. Fewer participants (17.8%) expressed the view that it was in order to save money. The main reason for not replacing the lenses on time is similar to a study done in the USA and Canada, however their secondary reason for not replacing the lenses on time was to save money (Dumbleton et al., 2010). Whereas a study done in Croatia reported that the main reason for noncompliance was that the majority of the wearers saw no reason to replace lenses they had no problem with (Petri et al, 2013).

Discomfort was the main reason that the soft contact lens wearers eventually replaced their lenses. The longer the contact lens is worn, micropores in the lens become blocked by lipids, proteins and tear film. This causes a decrease in wet ability of the lens and the lens becomes drier in between blinks. The wearer can then feel the lens more and needs to blink more often in order for the lens to feel more comfortable. This is the same phenomenon that the wearer experiences at the end of the day after many hours of contact lens wear. By the time the wearer experiences discomfort they may also have mild hypoxia that has caused a mild inflammation. To ensure that this inflammation does not progress the contact lens wearer must replace their lenses.

5.4 Recommendations

Strategies to improve soft contact lens replacement compliance include verbal instruction, written instruction, visual aids, repetition and frequent monitoring

5.4.1 Health education to soft contact lens wearers

Some of the soft contact lens wearers indicated that they had not been informed on how and when to replace their contact lenses. Some also indicated that they had no idea that there are complications that could arise with soft contact lens over wear and misuse. It is important that a wearer gets information in order for them to comply. Soft contact lens wearers should comply in the wear and care of soft contact lenses, but before they comply, they need to be taught. Patient education is of paramount importance

5.4.2 Programme implementation and strategies

Not adhering to one's specific contact lens replacement schedule causes complications and discomfort. This increases the amount of time that they spend at the practice and money spent on treatment and time of work. This increases the health expenditure of the individual and the economy as a whole. Awareness messages need to be publicized on the radio, television and in the newspaper to inform people about contact lenses in general and how to wear and care for them accordingly. Information packages should be made compulsory for all the soft contact lens wearers in local languages which will be easier to understand. The Ministry of Health and Social Services needs to work together with local

Optometrists in order to create a standard contract and information leaflet to give to the soft contact lens wearers. In other countries soft contact lens wearers sign a contract to agree to the responsibility of taking care of the lenses and their own eye health whilst wearing the lenses. This is thought to improve compliance since it demonstrates the seriousness of the matter.

5.4.3 Management by Optometrist

The optometrist needs to ensure that they take their time when giving instruction to soft contact lens wearers. Verbal information given to the soft contact lens wearer needs to be comprehensive, easy and brief in order for them to be followed meticulously and not forgotten or distorted. Staff should be adequately informed so that the information they give the wearers may be the same as the Optometrists. The optometric practice environment should be friendly and welcoming. It is also important to inform the wearer of possible complications that may arise due to non compliant behaviour.

To enforce the verbal instructions, soft contact lens wearers should also be given written advice. Written advice is important so that the wearer can refer to it if they have forgotten, missed or did not understand a concept. It should include information on when the wearer needs to replace their soft contact lenses, and when they should come back for a follow up appointment. Optometrists need to be more active and aggressive in following up with clients who did not order replacement contact lenses on time and also remind clients when they are due for a check up. Repeating information that has been said before increases the likelihood of it being remembered

therefore the contact lens wearer will be less likely non compliant. When the soft contact lens wearer comes in for their six month or annual contact lens check up, take the opportunity to repeat the information.

The researcher recommended that more time needs to be given when educating soft contact lens wearers. It is also imperative that all patients need to sign and leave with written instructions and information. The researcher recommended that this written information should be made compulsory so that all Optometrists give their soft contact lens wearers, as they do in other countries.

5.4.4 Further research

As was indicated earlier on in the study there had been no research conducted regarding contact lens wear in Namibia. Although the market is increasing, no one is researching on where, what, when and how the soft contact lens wearers are taking care of their lenses. What is evident is that periodically you see a client who comes in and presents with a contact lens wear complication. Research needs to be done initially to determine the size of the contact lens market in Namibia. Further studies need to be done on observation to see the contact lens practises of wearers and how they care and maintain for their soft contact lenses. Investigations also need to be done on a more personal level to find out why exactly clients do not comply to their specific soft contact lens replacement schedule on a larger scale with more participants.

5.5 Limitations

The researcher throughout the writing of the research thesis experienced a few limitations, these will be listed below

- There was a big challenge finding recent information. Although a lot of studies were done on soft contact lens replacement noncompliance, the majority of the studies were done quite a while ago therefore since the researcher could not find recent articles, they had to include the studies more than twenty years old. Clearly, the problem of soft contact lens replacement noncompliance still exists at a concerning rate in a different location twenty years after.
- The researcher experienced great difficulties during the data collection procedure. The first challenge that the researcher experienced was a decline in the Namibian contact lens market. Namibia also serves the Angolan market in supplying optical commodities. The decline in the Angolan economy has caused a great decline in the optical industry and thereby reducing the number of contact lens buyers and wearers that were previously serviced.
- The next challenge experienced was in data collection. A contact lens fitting in itself takes an average of 45 minutes to one hour, which is a long time and people have busy lives. So despite their willingness to participate, most respondents just did not have the time to do so.
- Another challenge was that because data was collected by other optometrists also, some of them were unwilling to participate, some of them lost the filled out questionnaires that they collected from their wearers and some of them just

completely forgot about the questionnaires. The study would have been more representative of the entire Windhoek population if the researcher had managed to attain the 394 study participants that were calculated in the sample size, instead of the 118 respondents.

- The researcher was using a questionnaire and not observation to measure the respondents' compliance. This may have resulted in respondents writing what they assume to be the correct answer instead of reporting their own behaviour. To try and reduce the likelihood of that happening, the researcher made use of an anonymous questionnaire.
- Another limitation is that all the respondents filling in the questionnaire were only tested in Windhoek and due to the small sample size the research findings cannot be inferred.
- However the study did successfully highlight that soft contact lens replacement noncompliance is a growing concern in the Windhoek community and needs to be dealt with.

5.6 Summary

This chapter presented the conclusion, limitations and recommendations that came out from the findings of the study. The conclusion was outlined in terms of the aim and the objectives. A total of (n=49) 41.5% of the soft contact lens wearers did not comply with their specific lens replacement schedule. The factors that were associated with noncompliance were gender ($p=0.01$), age ($p=0.012$) and employment status ($p=0.020$). Factors that were not associated with noncompliance were home language, race, education level, income, smoking, type of contact lens worn and number of years of

contact lens wear. The main reason that participants gave for not replacing their soft contact lenses according to their schedule was that they forgot on which day they were supposed to do so (n=57) 48.3% .The researcher recommended that more time needs to be given when educating soft contact lens wearers. It is also imperative that all patients need to sign and leave with written instructions and information. If the soft contact lens wearers view the lens as the serious therapeutic ocular device that it is, maybe they will be more compliant with replacing the soft contact lenses on time.

REFERENCES

- Anney, V. (2014) Ensuring the quality of the findings of qualitative research; Looking at trustworthiness criteria. *Journal of Emerging Trends in Education Research and Policy Studies* 5(2), 272-281
- Aveyard, H. (2010) *Doing a literature review in health and social care*. 2nd edn, Maidenhead: Open University Press
- Babbie, E. & Mouton, J. (2002). *The practice of social research*. Oxford: O. U. P
- Bailey, G. (2013) The cost of contact lens and lens care noncompliance. *Optometry times*. Retrieved from <http://optometrytimes.modernmedicine.com/optometrytimes/news/RC/cost-contact-lens-and-lens-care-noncompliance>
- Barofsky, I. (1978) Compliance, adherence and therapeutic alliance: Steps in the development of self care. *Social Science and Medicine* 12(5), 369-376
- Barr, J. (2004) Annual report. *Contact Lens Spectrum*, January 2005
- Barr, J. (2006) Twenty years of contact lenses. *Contact Lens Spectrum* 2006; 21:28-38
- Beljan, J., Beljan, K., & Beljan, Z. (2013). Complications Caused by Contact Lens Wearing, *37*, 179–187.
- Bennett, P. & Brown, M. (2003) *Clinical pharmacology*. 9th ed. Edinburgh: Churchill Livingstone.
- Benitez-del-Castillo, J., & Lemp, M. (2013) *Ocular Surface Disorders*. 1st edition. New York: JP Medical Publishers
- Boccuzzi, S., Folz, S., & Kahler K. (2005). Assessment of Adherence and Persistence with Daily and Weekly Dosing Regimens of Oral Bisphosphonates; Abstract presented at the 6th International Symposium on Osteoporosis; Washington, DC,

USA

- Brink, H.I. (2010). *Fundamentals of research methodology for health care professionals*. Cape Town. Juta.
- Brink, H., Van der Walt, C., & Van Rensburg, G. (2006) *Fundamentals of Research Methodology for Health Care Professionals*.(2ND ed). Juta & Company. Cape town: Cerda Press
- Bryman, A. (2006) Intergrating Quantitative and Qualitative Research:How is this done? Qualitative research. *Sage journals*(6) 97-113
- Burns, N., & Grove, S.K. (2005). *The Practice of Nursing Research:Conduct, Critique and Utilization*. 5th edition. St Lois: Elsevier Saunders
- Burt, V. L., Whelton. P., Roccell, E. J., Brown, C., Cutler, J.A., Higgins, M., ..., Labarthe D (1995) Prevalence of hypertension in the US adult population:results from the Third National Health and Nutrition Survey, 1988-1991 *Hypertension* 1995,**25**, 305–13.
- Burns, N., Grove, S. K., & Gray, J. (2011). *Understanding nursing research: Building an evidence-based practice*. Maryland Heights, MO: Elsevier/Saunders.
- Campbell, M. J., Machin, D., & Walters, S. J. (2007). *Medical statistics: A textbook for the health sciences* (4th ed.). Chichester, UK: Wiley.
- Chen, J. (2013) Taiwan contact lens sector. Retrieved from https://doc.research-and-analytics.csfb.com/docView?language=ENG&source=ulg&format=PDF&document_id=1011057291&serialid=Si87cU4rDMWXbWWBCgPBhaI5djH%2FKyQ%2Bgt9C%2FVgiqv%3D
- Claydon,B.&Efron,N.(1994)Review, Non-compliance in general health care . *Ophthalmic and Pysiological Optics* 257-264

- Collins, M. J. & Carney, L. G (1986). Patient compliance and its influence on contact lens wearing problems. *Am J OptomPhysiol Opt*; **63**:952-956.
- Compliance (1995) *Oxford Advanced Learners' Dictionary of Current English*(2nd ed)
- Concordance (1995) *Oxford Advanced Learners' Dictionary of Current English*(2nd ed)
- Cope, J.R., Collier,S.A., Rao, M. M, Chamler,R., Mitchell,G.L, Richdale,K., . . . Beach, M.J (2014) Contact lens wearer demographics and risk behaviours for contact lens related eye infection-United state. *Morbidity and Mortality Weekly Report Volume 64*(32)
- Cramer, J.(2004) A systematic review of adherence with medications for diabetes. *Diabetes Care* **27**(5):1218–1224
- Davidson, S. & Akingbehin, T. (1980) Compliance in ophthalmology. *Trans Ophthalmol Soc U K* 100:286-290.
- De Vos, A. S. (2002). *Research at grassroots 2nd edition*. Pretoria: J L van Schaik.
- De Vos, A.S., Strydom, H., Fouche, C.B. &Delpport, C.S.L. (2005). *Research at Grass Roots. For the Social Science and Human Service Professions*. 3rd Edition.Pretoria: Van Schaik Publishes.
- Dumbleton, K. (2013). Patient Compliance with Contemporary Contact Lenses : Impact on Successful Contact Lens Wear by.
- Dumbleton, K., & Jones, L. (2011) Non-compliance: so what? *Contact Lens Update*. Retrieved from <http://contactlensupdate.com/2011/09/26/non-compliance-so-what/>
- Dumbleton, K.,Richter,D., & Jones, L.(2012) Compliance with len replacement and the interval between eye examinations. *Optometry Vision Science*(89)
- Dumbleton, K., Richter, D., Bergenske, P., & Jones, L. (2013) Compliance with lens

replacement and the interval between eye examinations. *Optom Vis Sci* ,90(4): 351-8.

Dumbleton, K., Richter, D., Woods, C., Jones, L., & Fonn, D. (2010). Compliance with Contact Lens Replacement in Canada and the United States, *Optometry and Vision Science* 87(2), 131–139.

Dumbleton, K., Spafford, M., Sivak, A., & Jones, L. (2013) Exploring Compliance: A Mixed-Methods Study of Contact Lens Wearer Perspectives. *Optometry and Vision Science*(8), 898-908

Edwards, K., Keay, L., Naduvilath, T., Stapleton, F. (2014) The penetrance and characteristics of contact lens wear in Australia. *Clin Exp Opt* **97**, 48-54

Government Gazette (2011) Ministry of Health and Social Services. *Government gazette of the Republic of Namibia* 4752

Hickson-Curran, S (2012) Compliance before, during and after contact lens wear. *Contact lens Spectrum* **27**, 38-43

Ho, P. M., Spertus, J. A., Masoudi, F. A., Reidi, K.J., Peterson, E. D., Magid, D. J., . . . Rumsfeld, J.S. (2006) Impact of medication therapy discontinuation on mortality after myocardial infarction. *Arch Intern Med* 166(17), 1842-7

Jansen, M. E., Chalmers, R., Mitchell, G. L., Kinoshita, B. T., Lam, D. Y., McMahon, T. T., . . . Wagner, H. (2011). Characterization of patients who report compliant and non-compliant overnight wear of soft contact lenses. *Contact Lens and Anterior Eye*, 34(5), 229–235. <http://doi.org/10.1016/j.clae.2011.01.001>

Kanski, J. (1994) *Clinical Ophthalmology: A systematic approach* (3rd ed). Edinburgh : Butterworth-Heinemann/Elsevier..

Marshall, E., Begley, C., & Nguyen, C. (1992) Frequency of Complications among

- wearers of disposable and conventional soft contact lenses. *Int Cont Lens Clin*, **19**,55-60
- McMonnies, C (2011) Improving patient education and attitudes towards compliance instructions for contact lens use. *Contact lens and anterior eye* 34(5) 241-248
- Morgan, P (2007). Contact lens compliance and reducing the risk of keratitis. *Optician* 2007;234:20–5.
- Morgan, P., Efron, N., Woods, C., & Jones, D. (2011) International Contact lens Prescribing in 2010. *Contact lens Spectrum*, October 2011
- Pera, S. & Van Tonder, S. (2005) *Ethics in nursing practice*, (2nd Edition). Lansdowne, Kenwyn: Juta
- Petri, I., Lovri, I., Pokupec, R., & Jandrokovi, S. (2013). Lens Replacement Habits in Soft Contact Lens Wearers, *Collegium Antropologicum*, **37**, 175–178.
- Polit, D. F. & Hungler, P. (2001). *Nursing Research: Principles and Methods*. 4th edition. Philadelphia: Lippincott-Raven.
- Radford, C. F., Woodward, E. G., & Stapleton, F. (1993) Contact lens hygiene compliance in a university population, *J. Br. Contact Lens Assoc.* 16, 105-111
- Ramamoorthy, P., & Nichols, J. (2014) Compliance factors associated with contact lens-related dry eye. *Eye Contact Lens*, 40(1), 17-22
- Sabaté E, ed. (2003) *Adherence to Long-Term Therapies: Evidence for Action*. Geneva, Switzerland: World Health Organization
- Sackett, D.L. and Haynes, R.B. (1974) *Compliance with therapeutic regimens*. John Hopkins University Press, Baltimore, USA
- Sipa, K. (2015) Perception of health workers regarding the occupational Health Services at Onandjokwe Hospital, Namibia :Windhoek.

- Sokol, J., Mier, M. G., and Bloom, S. (1990). A study of patient compliance in a contact lens wearing population, *CLAO J* 16, 209-213
- Stedman, T. L. (2005). *Stedman's medical dictionary for the health professions and nursing*. Philadelphia: Lippincott Williams & Wilkins
- Steiner, J.F., & Earnest, M. A., (2000) The language of medication-taking. *Ann Intern Med* (132) ,926-930
- Struwig, F. W & Stead, G.B (2004). *Planning, designing and reporting research*. Cape Town : Pearson Education
- Tariq, F., & Koay, P. (2013). The Risk of Contact Lens Wear and the Avoidance of Complications, *I*(2).
- Trochim, W.M.K. (2006). *Research Methods Knowledge Base*. Natorp Boulevard Mason: Atomic Dog. Retrieved from <http://www.socialresearchmethods.net/kb/reotypes.php>
- Turner, F., Gower, L., & Stein, J.(1993) Compliance and contact lens care: a new assessment method. *Optom Vision Science* **70**, 998-1004
- Welman, C., Kruger, F. & Mitchell, B. (2009) *Research Methodology* (3rd Ed) Cape Town: Oxford Southern Africa Press.
- Yee, C., Xuan, L., Govindarajan, K., Ming, T., . . . Thambypillai, V.(2013) Knowledge, practices and compliance during contact lens wear among students in SEGi University, Kota Damansara, Seangor. *SEGi Review* **6**
- Zuger, A. (1998) "The 'Other' Drug Problem: Forgetting to Take Them," *The New York Times*, June 2:(2), pg2

ANNEXURE A : QUESTIONNAIRE**QUESTIONNAIRE****INSTRUCTIONS:** Please put an **X** or fill in the appropriate answer**Section A: Demographic data**

1.) Gender

Male	
Female	

2.)Age

18-30	
31-40	
41-50	
Above 50	

3.) Which race do you belong to?

Black	
White	
Coloured	
Other(specify)	

4.) What is your home language?

Oshiwambo languages	
Nama/Damara	
Afrikaans	
Otjiherero languages	
Kavango languages	
Caprivi languages	
English	
German	
San languages	
Other(please specify)	

5.) What is the highest level of school you have completed?

No schooling	
Primary	
Secondary	
Tertiary certificate	
Tertiary Diploma	
Tertiary Bachelors	
Master's degree	
Doctorate	

6.) Employment status

Fully employed	
Not employed	
Retired	
Other(specify)	

7.) What is your total monthly income?

Less than \$1000	
\$1 000-\$3 000	
\$3 001-\$5 000	
\$5 001-\$10 000	
\$10 001-\$15 000	
\$15 000-\$25 000	
Over \$25 001	

8.) Do you have medical aid?

Yes	
No	

9.) Do you smoke?

Yes	
No	

Section B: Contact lens replacement noncompliance and knowledge of complications.

1.) What type of contact lenses do you wear?

Hard	
Soft	

2.) Are you wearing a monthly, two week or daily disposable contact lens?

Monthly	
Two week	
Daily	
Yearly	

3.) How long have you been wearing contact lenses?

Less than 6 weeks	
6 weeks-6 months	
6months-1year	
1-3years	
3-5years	
More than 5 years	

4.) When last have you attended a contact lens check-up?

Less than a year	
1-2years	
3-4years	
More than 4 years	

5.) How often do you sleep wearing your contact lenses?.....days

6.) How many hours a day do you wear your lenses?.hours

7.) Did the optometrist explain how often you should replace your lenses?

Yes	
No	

8.) Do you replace your lenses as recommended?

Yes	
No	

9.) How many days do you wear your contact lenses before throwing them away?

I wear my lenses approximately days.

10.) What makes you eventually replace your lenses?

10.1	Red eyes	
10.2	Discomfort	
10.3	Blurry vision	
10.4	Other(please specify below)	

.....

11.) What would be your most likely reason for wearing contact lenses for longer than recommended?

Forgot to reorder	
Forgot day to replace	
To save money	
No harm in wearing longer	

12.) Have you been advised about complications that can arise from contact lens misuse?

Yes	
No	

13.) Can you name any complication that can arise from contact lens misuse?

Yes	
No	

14.) Please name any contact lens related complication that you know

.....

15.) Have you ever had a serious contact lens related eye infection?

Yes	
No	

16.) What method would help you to change your contact lenses when recommended?

Written information	
Telephonic reminder	
More check-ups	
Other(specify below)	

.....

17.) Please write any suggestions or comments below

.....

.....

.....

.....

.....

.....

.....

.....

ANNEXURE B: UNAM RESEARCH PERMISSION LETTER

University of Namibia, Private Bag 13301, Windhoek, Namibia
 340 Mandume Ndemufayo Avenue, Pioneers Park
 ☎ +264 61 206 3111; URL: <http://www.unam.edu.na>



Date: 24 February 2016

TO WHOM IT MAY CONCERN**RE: RESEARCH PERMISSION LETTER**

1. This letter serves to inform that student: **Shamiso G Gwata** (Student number: **2001302827**) is a registered student in the School of Public Health at the University of Namibia. His/her research proposal was reviewed and successfully met the University of Namibia requirements.
2. The purpose of this letter is to kindly notify you that the student has been granted permission to carry out postgraduate studies research. The School of Post- graduate Studies has approved the research to be carried out by the student for purposes of fulfilling the requirements of the degree being pursued.
3. The proposal adheres to ethical principles.

Thank you so much in advance and many regards.

Yours truly,

Name of Main Supervisor: Prof. L. Haoses - Gorases (Co)

Signed:  _____

Dr. M Hedimbi

Signed:  _____

Director: Centre of Postgraduate Studies

Tel: 206 4662

Fax: 206 3290

E-mail: mhedimbi@unam.na

ANNEXURE C: ETHICAL CLEARANCE CERTIFICATE FROM UNAM



ETHICAL CLEARANCE CERTIFICATE

Ethical Clearance Reference Number: SOM/91/2016

Date: 19 February, 2016

This Ethical Clearance Certificate is issued by the University of Namibia Research Ethics Committee (UREC) in accordance with the University of Namibia's Research Ethics Policy and Guidelines. Ethical approval is given in respect of undertakings contained in the Research Project outlined below. This Certificate is issued on the recommendations of the ethical evaluation done by the Faculty/Centre/Campus Research & Publications Committee sitting with the Postgraduate Studies Committee.

Title of Project: FACTORS ASSOCIATED WITH SOFT CONTACT LENS REPLACEMENT NONCOMPLIANCE OF WEARERS IN WINDHOEK

Nature/Level of Project: Masters

Researcher: Shamiso G. Gwata

Student Number: 201302827

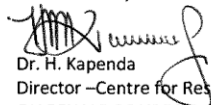
Faculty: School of Nursing and Public Health

Supervisor: Prof. L. Haoses-Gorases

Take note of the following:

- (a) Any significant changes in the conditions or undertakings outlined in the approved Proposal must be communicated to the UREC. An application to make amendments may be necessary.
- (b) Any breaches of ethical undertakings or practices that have an impact on ethical conduct of the research must be reported to the UREC.
- (c) The Principal Researcher must report issues of ethical compliance to the UREC (through the Chairperson of the Faculty/Centre/Campus Research & Publications Committee) at the end of the Project or as may be requested by UREC.
- (d) The UREC retains the right to:
 - (i). withdraw or amend this Ethical Clearance if any unethical practices (as outlined in the Research Ethics Policy) have been detected or suspected,
 - (ii). request for an ethical compliance report at any point during the course of the research.

UREC wishes you the best in your research.


 Dr. H. Kapenda
 Director –Centre for Research and Publications
ON BEHALF OF UREC

ANNEXURE D: INFORMED CONSENT**INFORMED CONSENT**

TITLE: FACTORS ASSOCIATED WITH SOFT CONTACT LENS REPLACEMENT NONCOMPLIANCE OF WEARERS IN WINDHOEK.

DATE: JULY 2016

INTRODUCTION: You are kindly requested to participate in this research project. This information will help you to make an informed decision on whether to participate or not in the research. If you have any unanswered questions please do not hesitate to contact the researcher directly

PURPOSE OF THE RESEARCH: The purpose of this study is to explore and describe the frequency of and factors that are associated with contact lens replacement noncompliance of soft contact lens wearers in Windhoek. It is envisaged that the study results might be used by the Ministry of Health and Social Services and by various private optometric practices to create strategies that combat soft contact lens replacement noncompliance. This might result in a reduction in the disease burden caused by the complications that result from soft contact lens replacement noncompliance

INSTRUCTIONS: Please complete the following questions to reflect your opinions as accurately as possible and to answer factual questions to the best of your knowledge. Your information will be kept strictly confidential.

RIGHTS OF THE PARTICIPANTS: You are at liberty to terminate from the study at any time that you wish to do so. The implication of completing the questionnaire is that informed consent has been obtained from you.

CONFIDENTIALITY: All information obtained during the study is strictly confidential. The information given by you will not be traceable. Data may be used in local and international journals but will never include information that identifies you as a participant of this study.

If any information is needed, please do not hesitate to contact: Shamiso Gwata...0813267121

Thank you for taking your time to go through the questionnaire

ANNEXURE E: CONTACT LENS DO'S AND DON'TS

Important dos and don'ts for handling and wearing contact lenses

Here are some useful tips on contact lens wear and care to help you get the best out of your contact lenses.

Do

- Get an annual eye checkup
- Always wash hands with soap and dry them thoroughly before handling your lenses
- Always rub, rinse and store your lenses in the recommended solution before and after each use
- Always clean the lens case with solution, wipe with a clean tissue then air-dry after each use by placing the case and lids face down on a tissue
- Always insert and remove the same lens first to avoid mixing them up
- Inspect the lenses before inserting them to ensure there is no damage or irregularity
- Handle carefully to avoid damaging the lens
- Insert your lenses before applying make-up
- Remove your lenses immediately if you experience pain, excessive tearing and or unusual redness
- Keep your eyes closed when using hairspray or other aerosols
- Replace your lens case every two months
- Discard lenses and solutions that have expired
- Wear only the lenses specified by your optometrist
- Stick strictly to the recommended wearing schedule and replacement frequency

- Make sure you have an adequate supply of replacement lenses
- Have an up-to-date pair of spectacles for when you need to remove your lenses

Don't

- Use tap water, spring , distilled or any other water, on your lenses or lens case
- Wet your lenses with saliva
- Put a lens on the eye if it falls on the floor or other surface, without cleaning and storing again
- Apply a lens if it is dirty, dusty or damaged
- Continue to wear your lenses if your eyes don't feel good, look good, or see well
- Re-use or top up solution – discard and replace with fresh solution each time lenses are stored
- Wear lenses left in the case for more than seven days without cleaning and storing them in fresh solution
- Sleep in your lenses unless specifically advised to by your optometrist
- Use your lenses for showering, swimming, hot tubs or water sports, unless wearing goggles
- Switch the solution you use
- Use any eye drops without advice from your optometrist
- Wear any lenses not specified by your optometrist

N.B If you have any questions about your contact lenses you should consult your optometrist for advice