

CONTACT LENS COMPLIANCE IN OPTOMETRITY STUDENTS

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ABSTRACT

Background: This research project explores the rates of compliance among optometry students with regard to the contact lens wear and care procedures recommended by their eye care providers. The issue of non-compliance among contact lens wearers is a rampant one within the general population and it has serious consequences. This study compares the rates of compliance among optometry students with those of the general population. It also explores reasons behind non-compliance and methods to increase compliance among contact lens wearers. *Methods:* A 13-question survey addressing different aspects of contact lens compliance was distributed to the students at the Michigan College of Optometry. Results were compared to previously published studies of the general public. *Results:* Optometry students were found to be more compliant than the general population in most aspects of lens wear/care behavior. *Conclusions:* Although optometry students tend to be more compliant with their contact lens wear/care behavior, they do not comply 100% to their eye care providers' recommendations.

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TABLE OF CONTENTS

	Page
INTRODUCTION.....	1
METHODS.....	2
RESULTS.....	4
DISCUSSION.....	5
APPENDIX	
A. SURVEY OF CONTACT LENS COMPLIANCE.....	10

INTRODUCTION

The purpose of this study is to compare contact lens compliance of optometry school students to those in the general population. The study also aims to research reasons for non-compliance among contact lens wearers and consequences of non-compliance. To compile this information, a short survey was formulated and distributed to the students at the Michigan College of Optometry. Results from this survey were compared to similar, previously published studies of the general population.

All eye care practitioners frequently encounter eye problems caused by patients' non-compliance to recommended contact lens wear and care procedures. One of the most serious complications is microbial keratitis.^{1,2} If not treated appropriately it can cause vision loss or even loss of the eye. Many times these infections are linked to contact lens induced hypoxia. This hypoxia can occur when a patient wears a soft daily wear or gas permeable lens, with low oxygen permeability, through one or several sleep cycles.² Microbial keratitis can also result when a patient does not adequately disinfect a lens contaminated with bacteria.

Other eye problems caused by hypoxia, or over wearing contact lenses, include corneal neovascularization, microcysts, corneal edema, endothelial polymegathism, and corneal hypoesthesia.¹ Unfortunately, most of these conditions have few, if any, symptoms. If patients do not feel that there is anything wrong with their eyes, they may be more likely to continue their non-compliant behavior against the recommendation of their eye care provider. However, all of these conditions have serious sequelae if not stopped early enough.

In order to increase compliance among contact lens wearers, one must understand some of the reasons for non-compliance in the first place. These reasons include inadequate patient education concerning the possible consequences of non-compliance. Other reasons include misunderstanding of lens wear and care instructions or forgetfulness on the patient's part. Above all, it seems that patient education and communication between the patient and the practitioner is the key to achieving the best compliance rates.

It is true that patients must be educated about their contacts. However, patients who are also students in optometry school should be expected to know much more than the average person about lens wear and lens care and the possible consequences of non-compliance with these guidelines. These students must pass exams and quizzes concerning these topics. Because of this, one would hypothesize that optometry students are more likely than the average person to comply with lens wear and care recommendations.

METHODS

A survey was distributed to all optometry students who wear contact lenses at the Michigan College of Optometry. The survey was voluntary and anonymous. All students who wear soft daily wear, soft extended wear, gas permeable, and orthokeratology contact lenses were eligible to participate in the project. Before the students received the survey they were instructed to read and sign an informed consent statement. They were also encouraged to complete two surveys if they had worn more than one lens modality in the past year.

The students who participated were both male and female, of all ages, and ethnic groups. The only restriction placed on the participants was that they must be contact lens wearers. Sixty-one completed surveys were received.

The survey consisted of 13 general questions concerning the participants' lens wear and care (Appendix A). Questions 1 and 2 addressed the type of lenses worn by the participants and the type of lens care system they used. Questions 5-10 had two parts; the first part asked specifically about the subject's behavior and the second part asked if this behavior was compliant with the recommendations given by that subject's optometrist. The subject answered a simple "yes" or "no" to the second part of the question.

After the surveys were submitted, the results were tallied. An answer of "yes" to the second part of questions 5-10 determined that the subject was compliant in the aspect of lens wear/care addressed by that question. An answer of "no" was considered non-compliant. For each question the number of "compliant" and "non-compliant" were tallied and percentages were calculated.

Questions 3, 4, 11, 12, and 13 did not have a second "yes/no" part. For questions 3 and 4 compliance was determined by the contact lens solution manufacturer's instructions. For question 11, a subject was considered compliant if they either swam in the contacts, but immediately cleaned and disinfected them afterward or if they did not swim in their lenses at all. For questions 12 and 13 having a yearly eye exam was considered compliant. Results for these questions were also tallied and percentages calculated. Finally, all these percentages were compared to percentages of compliance and non-compliance among the general population from previously published studies.

RESULTS

Sixty-one students responded to the "Survey of Contact Lens Compliance". Fifty-four percent of students wore soft daily wear lenses, 20% wore soft extended wear lenses, 11% wore gas permeable lenses, and 15% wore orthokeratology lenses. This study found that 74% of optometry students at the Michigan College of Optometry exhibited at least one aspect of non-compliant behavior. This is the same percentage found in the general population in another published study.³

Studies of the general population have found that 40-90% of the contact lens patients are non-compliant in their recommended care and maintenance regimen.³ This study found that only 24% of optometry students are non-compliant in their lens care. These results can be broken down further. Only 16% of optometry students who use a "No Rub" solution demonstrated non-compliant behavior. Non-compliant behavior was considered neither rubbing lenses nor rinsing them for the specified amount of time (generally 5 seconds) before storing the lenses. Only 18% of students who use a separate cleaning and disinfecting solution did not clean lenses as often as they were instructed, and only 20% of students who were instructed to use an enzymatic cleaner periodically did not comply.

Furthermore, this study found that 79% of optometry students adhered to the lens replacement schedule advised by their optometrists. In contrast, only 25% of people in the general population follow their OD's instruction in this regard. Clearly optometry students are more compliant with the replacement schedule of their lenses than the general population.

Another aspect of contact lens wear and care addressed by this study was wearing time. It was concluded that 20% of optometry students over-wear their contact lenses. Twenty percent of optometry students also sleep in their contacts although they were not recommended to do so. In addition, this study found that 33% of optometry students swim while wearing their lenses and do not clean and disinfect them after doing so. This is the aspect of lens wear and care optometry students were least compliant in. No data on these three aspects of lens wear could be found for the general population.

Finally, students were asked how often they get their eyes examined by an optometrist. Sixty-nine percent reported that they get yearly eye examinations, which is the standard of care for contact lens wearers. A study done on the general population reported that 29% of contact lens wearers get their eyes examined once every two years.³ No data was available on how many get examined every year.

As an aside, one question had to be discarded from the final results of the survey. Question 9 addressed lens case replacement. Sixty-eight percent of optometry students surveyed stated that they were not given a recommendation from their eye doctor on how often to replace their case.

DISCUSSION

There are many reasons for non-compliance among contact lens wearers. Some of these include forgetfulness, misunderstanding, economic reasons, and inadequate patient education. Many practitioners have tried to increase compliance among contact lens patients through better and more thorough patient education. Others have accepted a

certain amount of non-compliance, and have therefore fitted patients with less risky lens wear modalities.

A study was done concerning compliance of glaucoma patients in taking their medication. Researchers found that the reason most patients missed getting their drops in was that they forgot.⁴ Although this study did not involve contact lens wearers, forgetfulness seems a plausible reason for non-compliance among them as well. For example, it is easy to believe that a patient who is instructed to replace her lenses each month could potentially forget to do so if the lenses were still comfortable.

Another reason for non-compliance among contact lens wearers is misunderstanding or misinformation. Sometimes patients hear conflicting information about recommended wearing times of different brands of similar contact lenses.⁵ Some patients do not know that there is a difference between saline and multipurpose solutions. Others do not understand that optometrists recommend certain solutions to their patients for a reason. For example, a study has shown that PHMB-containing multipurpose solutions may cause corneal staining in patients wearing extended wear silicone hydrogel contact lenses.⁵ Therefore it is best for these patients to use non-PHMB containing solutions. Also it is possible that some patients are unable to read and comprehend manufacturers' instructions.⁵

Some patients are non-compliant with contact lens replacement schedules and lens care recommendations because of economic reasons. They may wear lenses longer than advised so that they need to buy fewer lenses in one year. They may switch to a multipurpose solution that is less expensive than the one they were recommended to use

to save money. However, one study found that social and economic factors are not the most important factor in compliance of contact lens care routines.⁶

Non-compliance may not be entirely the patient's fault. Non-compliance stems from how little patients value the services of their optometrist.⁵ Contact lenses are now marketed like appliances, and patients can easily purchase them without a prescription. Optometrists need to better communicate the importance of compliance to their patients as well as properly instruct them on exactly what they want them to do with their lenses. In the survey of optometry students, 69% reported that they were not given specific instructions as to when they should replace their lens case.

Most studies on this topic suggest education and repetition of instructions are the keys to increasing patients' compliance.^{3,5,7} This can be accomplished through staff education, instructional videos, and pamphlets.³ Personal instruction by the optometrist to the patient also emphasizes the importance of following the recommendations also.

Some practitioners have found other ways of enhancing compliance. One optometrist believes that switching patients from soft to gas permeable contact lenses increases patient compliance.⁸ He reasons that the fitting process for gas permeable lenses is more involved than for soft lenses, therefore patients perceive more value in these services. He claims that patients that wear gas permeable lenses are generally more concerned about the health of their eyes than soft lens wearers. Gas permeable lenses are also more economical in that they only need to be replaced every 1-2 years as long as they are properly maintained. The author of this article also reports fewer contact lens related eye problems among gas permeable contact lens wearers than soft lens wearers.⁸

Some lens manufacturers have also taken measures to increase compliance. For example, CIBA offers an electronic messaging service that reminds patients to replace their lenses.⁵ Along the same lines, Focus Daily contacts, also made by CIBA, become uncomfortable if over-worn, signaling the patient to replace them.⁵

In conclusion, this study found that optometry students were somewhat more compliant with most aspects of contact lens wear and care than the average person. However, this was not the case with every aspect that was surveyed.

If education is the key to compliance among patients, then why are optometry students not 100% compliant? They are certainly more educated in the recommendations than the average person. The reason is most likely not an economic one since all of the students at the Michigan College of Optometry receive a yearly eye exam, contact lenses, and solutions at no cost while attending the school. An interesting addition to this study might be to survey these same students addressing their reasons for non-compliance.

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APPENDIX A

SURVEY OF CONTACT LENS COMPLIANCE

Survey of Contact Lens Compliance

Instructions: Please answer the following questions honestly and return the survey to Jamie Barnes or mailbox #1. If you have worn more than one type of contact please fill out a survey for each type. Thank you for your participation.

1. What type of contact lenses do you wear? Soft DW ____ Soft EW ____
 RGP ____ Ortho-K ____

2. What type of lens care solutions do you use?
Oxidation (Clearcare, Pure Eyes, etc) ____ Chemical (Renu, Optifree, etc) ____
RGP Solns. (Boston, Unique pH) ____ Other ____
What brand of solution do you use? _____

3. Do you use a "no rub" solution? Yes ____ No ____
If so, do you still rub your lenses? Yes ____ No ____
If you do not rub your lenses how long do you rinse your lenses before storing
them? <5sec ____ 5-10sec. ____ 10-20sec. ____ >20sec. ____

4. On average, how long do you soak your lenses in disinfectant before re-inserting
them? <2hrs. ____ 2-4hrs. ____ 4-6hrs. ____ 6-8hrs. ____ >8hrs. ____

5. If you use a traditional lens care system with a separate cleaner and disinfecting
solution, how often do you clean your lenses?
Never ____ 1-2 x/wk. ____ 3-4 x/wk. ____ Daily ____
How often was it recommended that you clean your lenses? _____

6. If instructed to use an enzymatic cleaner periodically, how often do you do this?
<1 x/mo. ____ 1 x/mo. ____ 2 x/mo. ____ 1 x/wk. ____ >1 x/wk. ____
How often was it recommended that you do this? _____

7. How many hours a day do you wear your lenses on average?
20-24 hrs. ____ 18-20 hrs. ____ 16-18 hrs. ____ 14-16 hrs. ____
10-16 hrs. ____ <10 hrs. ____
How often was it recommended that you wear your lenses? _____

8. How often do you sleep in your lenses?
Nightly ____ 4-6 x/wk. ____ 1 x/wk. ____ 1 x/mo. ____ 2-3 x/yr. ____
Never ____
Did your OD approve this amount? Yes ____ No ____

9. How often do you replace your lens case?
>Bi-weekly ____ Bi-weekly ____ Monthly ____ Quarterly ____ Yearly ____
>Yearly ____
How often was it recommended that you replace your lens case? _____

10. How often do you replace your lenses?
Daily ____ Weekly ____ Bi-weekly ____ Monthly ____ Quarterly ____
Yearly ____ >Yearly ____
How often did your OD recommend that you replace them? _____

11. Do you ever swim in your contacts? Yes ____ No ____
If so, after swimming do you either discard the lenses immediately or clean and disinfect them?
 Yes ____ No ____

12. When was your last complete eye exam? _____

13. On average, how often do you have a complete eye exam?
Every 6mo. ____ Yearly ____ Every 2 years ____ Every 3 years ____
>Every 3 years ____