

CONTACT LENS COMPLIANCE SURVEY

by

Rami El-Bkaily
Roman Moeckel

This paper is submitted in partial fulfillment of the
requirements for the degrees of

Doctor of Optometry

Ferris State University
Michigan College of Optometry

May, 2019

CONTACT LENS COMPLIANCE SURVEY

by

Rami El-Bkaily
Roman Moeckel

Has been approved



16 ^{May}
~~February~~, 2019

APPROVED:



Faculty Advisor: Dr. Joshua Lotoczky

ACCEPTED:

Faculty Course Supervisor

Ferris State University
Doctor of Optometry Senior Paper
Library Approval and Release

CONTACT LENS COMPLIANCE SURVEY

We, Rami El-Bkaily and Roman Moeckel, hereby release this Paper as described above to Ferris State University with the understanding that it will be accessible to the general public. This release is required under the provisions of the Federal Privacy Act.

Rami El-Bkaily, Roman Moeckel

Doctoral Candidates

3/20/19
Date

ABSTRACT

Background: *Contact lens compliance has been researched at length and shows poor compliance leads to adverse reactions. Many studies have looked to identify trends within contact lens wearers. Research suggests non-compliant patients continue to be non-compliant even after they have been educated on risks. In addition, research also suggests that even with a modified patient education, there was no significant difference in patient non-compliance. Research has identified the factors that plague most patients such as: hand hygiene, lens care, and return appointments. In our study we will attempt to assess the compliance of patients who wear contact lenses at the Michigan College of Optometry as compared to those who wear contact lenses in the Detroit Metropolitan Area.* **Methods:** *We created a survey that contact lens patients were asked at their yearly eyecare appointment. The survey asked about behaviors such as: hand cleanliness, lens case hygiene, wear schedule and adherence, contact lens insertion and removal, and others. This survey was given to twelve contact lens patients at the Michigan College of Optometry (n=12) and forty-five contact lens patients in the Metropolitan Detroit Area in a private practice setting (n=45, total n=57).* **Results:** *Compliance to prescribed care plan and wear schedule, and general hygiene was compared between modalities and analyzed to discover any difference in responses in the Michigan College of Optometry patients compared to patients of a private practice. Our results showed both groups showed non-compliant behaviors, with a moderate percentage greater in the private practice patients. The two biggest areas of non-compliance seem to be lens cleaning and case replacement.* **Conclusions:** *This project has shed light on the attitudes and habits of contact lens wearers. It revealed that a great number of patients are non-compliant with the hygiene, care, and wear schedule of contact lenses. There are differences in compliance between patients of the Michigan college of optometry and a private practice setting; These differences may exist due to the amount of patient education the patient receives and how that affects compliance. Patients also perceive themselves to be better compliant than they are.*

TABLE OF CONTENTS

	Page
LIST OF TABLES.....	6
CHAPTER	
1 INTRODUCTION.....	7
2 METHODS.....	7
3 RESULTS.....	8
4 DISCUSSION.....	11
APPENDIX	
A. IRB APPROVAL LETTER.....	14
B. SURVEY QUESTIONNAIRE.....	15
C. SURVEY INVITATION AND VERBAL CONSENT.....	16

LIST OF TABLES

DEMOGRAPHICS AND PATIENTS.....	21
COMPLIANCE OF PATIENTS.....	25
NON-COMPLIANT BEHAVIOR	28

INTRODUCTION

Contact lenses are considered a healthy and effective modality of vision correction if properly cared for by the user. Compliance with the prescribed regimen is an important factor in health and comfort in contact lens use. Contact lens compliance has been researched at length and shows poor compliance leads to adverse reactions, while 41-90% of patients are considered non-compliant in some or all aspects of lens care².

Many studies have looked to identify trends within contact lens wearers. Research suggests non-compliant patients continue to be non-compliant even after they have been educated on risks. In addition, research also suggests that even with a modified patient education, there was no significant difference in patient non-compliance³. Lastly, research has identified the factors that plague most patients such as: hand hygiene, lens care, and return appointments for complications associated with contact lens use. In our study we will attempt to assess the compliance of patients who wear contact lenses at the Michigan College of Optometry as compared to those who wear contact lenses prescribed at a private practice in the Detroit Metropolitan Area. This revealed differences in the compliance between patients and facilities we tested in. This research aimed to identify which population if either has worse compliance compared to the other.

METHODS

Subjects for our research were selected from the Michigan College of Optometry and private practices around the Detroit metropolitan area. Participants were given verbal informed consent and educated on the purpose of the study and proper contact lens care

after the survey and exam. Patients were asked to participate and given a choice whether they wanted to or not and were recruited at their yearly eye exams seeking contact lenses as established lens wearers. Questionnaires were administered orally by the principal investigators and responses were recorded into Excel spreadsheets for analyses.

Appendix B below is a copy of the questionnaire that was used for data collection.

Appendix C shows the survey invitation and verbal consent form. Patients wearing many different modalities of contacts were included, but most of the patients we surveyed were soft contact lens wearers. Due to the high rate of wear of soft contacts compared to different modalities.

At the Michigan College of Optometry, twelve patients were surveyed, and at private practice locations forty-five patients were surveyed giving a total of fifty-seven surveys being administered to patients. Responses to the surveys were analyzed for trends in compliance and contact lens health in terms of age, sex, modality, adverse events for the patient, and lens solution used.

RESULTS

Patient population demographics are presented in Table 1. We were able to gather fifty-seven (n=57) patients for our study. Among them, roughly 1/4 (or 12) patient surveys were from the educational facility, Michigan College of Optometry's Eye Center. The other 3/4 (or 45) patient surveys have been collected from various private practice settings including: Henry Ford Optimeyes, etc. The majority of patients were soft contact lens wearers while the minority wore hard or RGP contact lenses. In addition, the majority of patients wore their contacts abiding by a daily modality.

Table 1 – Demographics

	Private Practice	Educational facility
<i>Gender</i>		
Male	19	6
Female	26	6
<i>Age (years)</i>		
Average	35.73	30.17
<i>Lens Type</i>		
Soft	41	12
Daily/Monthly/Bi-weekly/Other	<i>14,18,9,1</i>	<i>4,4,3,1</i>
RGP	4	0
Other	0	0
<i>Lens Solution</i>		
Multipurpose	22	5
Hydrogen Peroxide	9	3
Not applicable/RGP cleaner	15	4

Patients were also surveyed using questions that took into account their compliance of the contact lenses. There were 6 questions that focused on the compliance of patients. For a patient to be regarded as a “Good Compliance” patient, they would have to have been compliant with all 6 questions. To be regarded as “Average Compliance” they would have been compliant with 3-4 of the questions. Lastly, to be regarded as “Poor Compliance” a patient would have been compliant with less than 3 of the questions. We

also contrasted their perceived compliance, a subjective measure, on a scale of 1-5 with 5 being the most compliant. The results can be viewed in Table 2

Table 2 – Compliance Private Practice Educational Facility

<i>Perceived Compliance</i>	Private Practice	Educational Facility
5 (most compliant)	25	6
4	16	5
3	2	0
2	1	1
1	1	0
<i>Actual Compliance</i>	Private Practice	Educational Facility
Good	17	5
Average	14	5
Poor	14	2

Patients were asked about their non-compliant behaviors which have been tabulated in table 3 shown below. There three areas of main concern when it comes to non-compliant behavior. The first is wear of the lenses which include schedule compliance and sleep in lenses (non-extended wear patients). The second is care of the case which include case replacement as well as topping off solution. Lastly, we were concerned about patient hygiene/care of the lenses. This includes whether a patient rubs/rinses lenses as well as washing of hands. Many of the patients described in the study were daily wearers and subsequently some of these behaviors are not applicable.

Table 3 – Non-compliant behavior

Private Practice

Educational Facility

	Private Practice	Educational Facility
<i>Wear</i>		
Wear Schedule Compliance	12/45	2/12
Sleeping in lenses	7/45	0/12
<i>Case</i>		
Case Replacement	13/45	3/12
Topping Off Solution	9/45	1/12
<i>Hygiene</i>		
Rub/Rinse lenses	24/45	6/12
Hand-Washing	7/45	2/12

DISCUSSION

The results of our survey have shed light on the compliance of contact lens patients seen in two different modes of practice of optometry. Our results followed trends that previous studies have shown; Patients are typically not compliant with prescribed regimen of contact lens wear and care. The Michigan College of optometry patients showed a higher rate of compliance than those patients cared for in private practice.

Firstly, the results we generated from our survey appear to indicate that patients that visit a private practice for their contact lens services perceive that they are more compliant than they are in actuality. This is illustrated in Table 2 where primarily private practice patients in the large majority believe they are 100% compliant with their contact lenses. Based off the results of our survey it is evident that patients are mostly average to

poor in contact lens compliance. This is likely due to the exorbitant amount of patient education that is given to patients by students on initial, and follow-up visits.

Secondly, we can infer based off these results that the main area of concern, in regard to patient compliance, is patient hygiene. This is illustrated in Table 3 where majority of patients in both private practice and the educational facility were non-compliant with hygiene, specifically rubbing and rinsing lenses as recommended by the practitioner. Although there are a few patients whom it is not incumbent to rinse and rub their lenses (daily lens wearers) the numbers still indicate that in general there is a higher trend of this non-compliant behavior. One source of this non-compliance includes lack of repeated patient education in this regard. It is likely that the patient was informed of this upon initial contact lens dispense but many of these patients are not first-time wearers and subsequently if they are not re-educated on this and other forms of non-compliance, we will see non-compliance increase.

Lastly, based off of the results of our surveys, we can come to the conclusion that patients who visit an educational facility are more likely to be compliant with their contact lenses. As has been mentioned previously, a plausible theory for this is that there is a great deal of emphasis at the Michigan College Optometry for patient education. In addition, the students are required to perform the classes to teach new patients about insertion and removal giving ample amounts of time. This is may be in contrast to what is done at a private practice setting where time is of the essence. During this time, students will re-iterate proper compliance throughout. Students will also emphasize compliance at the dispense visit whereas private practice settings are likely to just dispense without seeing a healthcare professional.

Results were collected from random patients that agreed to participate in our research, and therefore include a good estimation of the general population of patients that wear contacts. Due to relatively small sample sizes available, this may not be completely representative of the population, but gives a good sampling of patients and can be used to show trends of patients in each specific location. A larger sample size and a survey that is structured to produce better analysis of data are our recommendations for future investigation into this topic.

REFERENCES

1. Collins, M J, and L G Carney. "Patient Compliance and Its Influence on Contact Lens Wearing Problems." *Advances in Pediatrics.*, U.S. National Library of Medicine, Dec. 1986, www.ncbi.nlm.nih.gov/pubmed/3799806.
2. Robertson, Danielle M., and H. Dwight Cavanagh. "Non-Compliance with Contact Lens Wear and Care Practices: a Comparative Analysis." *Advances in Pediatrics.*, U.S. National Library of Medicine, Dec. 2011, www.ncbi.nlm.nih.gov/pmc/articles/PMC3223553/#R1.
3. Collins, M J. "A Prospective Study of Non-Compliance in Contact Lens Wear." *Contact Lens Journal*, 1996, [www.contactlensjournal.com/article/S0141-7037\(96\)80006-1/abstract](http://www.contactlensjournal.com/article/S0141-7037(96)80006-1/abstract).
4. Chattu, Vijay Kumar, and D. Yousef. "Importance of Compliance in Contact Lens Wear - A Study to Assess the Knowledge and Practices among Contact Lens Users for a Healthy Vision." *Academia.edu*, www.academia.edu/4488348/Importance_of_Compliance_in_contact_lens_wear
=
A study to assess the knowledge and practices among contact lens users f
or a healthy vision.

APPENDIX A

Ferris State University

Institutional Review Board (FSU - IRB)
Gregory Wellman, R.Ph, Ph.D, IRB Chair
820 Campus Drive
Ferris State University
Big Rapids, MI 49307
(231) 591-2759

IRB@ferris.edu

Date: October 23, 2018

To: Joshua Lotoczky

From: Gregory Wellman, R.Ph, Ph.D, IRB Chair

Re: IRB Application *IRB-FY18-19-26 Contact Lens Compliance Survey*

The Ferris State University Institutional Review Board (IRB) has reviewed your application for using human subjects in the study, *Contact Lens Compliance Survey (IRB-FY18-19-26)* and approved this project under Federal Regulations Exempt Category 2. Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Approval has an expiration date of three years from the date of this letter. **As such, you may collect data according to the procedures outlined in your application until October 22, 2021**. Should additional time be needed to conduct your approved study, a request for extension must be submitted to the IRB a month prior to its expiration.

Your protocol has been assigned project number IRB-FY18-19-26. Approval mandates that you follow all University policy and procedures, in addition to applicable governmental regulations. Approval applies only to the activities described in the protocol submission; should revisions need to be made, all materials must be approved by the IRB prior to initiation. In addition, the IRB must be made aware of any serious and unexpected and/or unanticipated adverse events as well as complaints and non-compliance issues.

This project has been granted a waiver of consent documentation; signatures of participants need not be collected. Although not documented, informed consent is a process beginning with a description of the study and participant rights, with the assurance of participant understanding. Informed consent must be provided, even when documentation is waived, and continue throughout the study via a dialogue between the researcher and research participant.

As mandated by Title 45 Code of Federal Regulations, Part 46 (45 CFR 46) the IRB requires submission of annual reviews during the life of the research project and a Final Report Form upon study completion. Thank you for your compliance with these guidelines and best wishes for a successful research endeavor. Please let us know if the IRB can be of any future assistance.

Regards,

Gregory Wellman, R.Ph, Ph.D, IRB Chair

Ferris State University Institutional Review Board

APPENDIX B

Contact Lens Health Survey

GENDER:

AGE:

Circle the participants response(s)

1. What type of contact lenses do you wear? HARD, SOFT, SCLERAL, OTHER:
2. What contact lens solution do you use? OPTI FREE PURE MOIST, BIO TRUE, RENU, CLEAR CARE, BOSTON, GENERIC/STORE BRAND, OTHER:
3. What is your wearing schedule prescribed by your eye doctor? DAILY, WEEKLY, BI-WEEKLY, MONTHLY, OTHER:
4. How often do you truly replace your lenses? DAILY, TWICE A WEEK, WEEKLY, BI-WEEKLY, MONTHLY, OTHER:
5. How often do you replace your case? MONTHLY, EVERY 3 MONTHS, TWICE A YEAR, YEARLY, N/A, OTHER:
6. How would you rate your comfort on a scale of 1-5 in the morning? 1 2 3 4 5
7. How would you rate your comfort on a scale of 1-5 when you take them out, or at the end of the day? 1 2 3 4 5
8. If not in daily disposable lenses, how often do you rinse and rub your lenses? DAILY, WEEKLY, MONTHLY, NEVER, OTHER:
9. Have you been told that you can sleep in your lenses? YES, NO
If Yes; how long? FOR A DAY, FOR A WEEK, FOR TWO WEEKS, FOR A MONTH, OTHER:
10. How often do you sleep in your lenses? NEVER, ONCE OR TWICE A MONTH, ONCE A WEEK, TWO-THREE TIMES A WEEK, 5 DAYS A WEEK, DAILY, OTHER:
11. On a scale of 1-5 how satisfied are you with your vision in your contact lenses? 1 2 3 4 5
12. If you wear soft lenses, how often are they ripped/torn/bent when you handle them or take them out of the packaging? EVERY OTHER, ONCE A WEEK, ONCE A MONTH, ONCE OR TWICE A YEAR, NEVER, OTHER:

13. How long do you wear your lenses per day? 4-6 HOURS, 6-8 HOURS, 8-12 HOURS, 12-16 HOURS, 16 + HOURS, OTHER:

14. How often do you add more solution on top of your existing solution? DAILY, 5 DAYS A WEEK, THREE-FOUR TIMES A WEEK, ONCE OR TWICE A WEEK, TWO TO THREE TIMES A MONTH, ONCE MONTHLY, OTHER:

15. How often do you wash your hands before inserting and removing your lenses? EVERYTIME, EVERY OTHER TIME, ONE IN THREE TIMES, ONE QUARTER OF THE TIME, ONE IN TEN TIMES, NEVER, OTHER:

16. On a scale of 1-5 how compliant do you think you are with your contact lenses and care system? 1 2 3 4 5

17. Have you ever had redness or irritation associated with wearing your contact lenses?

If so, how many times?

How many times did you go to the eye doctor for this problem?

18. How many years have you been wearing contact lenses? Please specify how many years.

APPENDIX C

Contact Lens Health Survey

Thank you for considering participating in our Contact Lens Health survey. This will consist of a series of questions concerning your use, comfort, and knowledge of contact lens health. This is a voluntary survey and you may refuse to participate at any time. We the investigators will not be collecting any personally identifying information, nor linking any to your provided answers, so please answer all questions honestly to the best of your ability. Your participation in this survey will not affect the care you get from your eye doctor, or your eligibility for services they provide. By participating you will be eligible to receive any informational outcomes obtained from this study. The investigators would be happy to provide you with information on the proper use and care for your contact lenses. Thank you for your participation.