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Patient Compliance During Contact Lens Wear: Perceptions, Awareness, and Behavior

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Abstract

Objectives—Patient noncompliance with recommended hygienic practices in contact lens wear is often considered a significant risk factor for microbial keratitis and adverse contact lens–related events. Despite advancements in lens materials and care solutions, noncompliant behavior continues to hinder efforts to maximize contact lens safety. The objective of this pilot study was to assess the relationship between perceived and actual compliance with awareness of risk and behavior.

Methods—One hundred sixty-two established contact lens wearers were sequentially evaluated after their routine contact lens examination at the Optometry Clinic at the University of Texas Southwestern Medical Center at Dallas, TX. Each patient was questioned by a single trained interviewer regarding his or her lens care practices and knowledge of risk factors associated with lens wear.

Results—Eighty-six percent of patients believed they were compliant with lens wear and care practices; 14% identified themselves as noncompliant. Using a scoring model, 32% demonstrated good compliance, 44% exhibited average compliance, and 24% were noncompliant; age was a significant factor ($P = 0.020$). Only 34% of patients who perceived themselves as compliant exhibited a good level of compliance ($P<0.001$). Eighty percent of patients reported an awareness of risk factors, but awareness did not influence negative behavior. Replacing the lens case was the only behavior associated with a positive history for having experienced a prior contact lens–related complication ($P = 0.002$).

Conclusions—Perceived compliance is not an indicator for appropriate patient behavior. A large proportion of patients remain noncompliant despite awareness of risk. Education alone is not a sufficient strategy to improve behavior; newer approaches aimed at improving compliance with lens care practices are urgently needed.

Keywords

Contact lenses; Care solutions; Compliance

Within the health care field, noncompliance with prescribed medical regimens accounts for a significant increase in health care expenditures and disease morbidity, necessitating increased physician time and additional interventional treatments.[1] Although factors driving noncompliant behavior are poorly understood, the economics, time requirements, and regimen complexity are all likely contributors. To improve compliance, the rate of actual

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compliance must first be determined. Establishing true levels of compliance, however, is fraught with error because there is no testable direct quantitative measure of compliance. In the contact lens field, numerous studies have attempted to evaluate compliance, many using self-reported written questionnaires, which have generated estimates of noncompliance ranging from 40% to 91%.[2–7] More recently, a study in the United Kingdom reported that for daily lens wearers, only 0.3% of patients were fully compliant compared with 2.7% for extended lens wearers.[8] The ability to assess compliance in these studies is further clouded by the fact that many patients are unaware that their contact lens wear and care practices are reflective of a noncompliant behavior.[2,9] To date, there is no single predictor for noncompliance among contact lens wearers,[6] and despite the introduction of daily disposable lens wear and one-step "no-rub" multipurpose disinfection systems, compliance with contact lens wear remains an ongoing clinical problem.

The benefits of increasing patient compliance are clear. Noncompliance with lens care has been shown to be associated with contact lens–related complications, likely because of increased bacterial bioburden at the ocular surface, and symptoms of lens discomfort and reduced performance, which ultimately contributes to nonadaptation and the persistent contact lens dropout rate.[2,10–12] Although there is a significant need to enhance compliance, strategies to effectively increase compliance are limited. Previous studies have examined different methodologies purportedly to increase compliance; however, conflicting evidence exists on the optimal mode of education with respect to oral versus written instructions, repetition, and posttraining evaluation success rates.[13–16] The inability to identify successfully the underlying reasons driving noncompliant behavior and implement useful training programs contributes to the complexity of the problem.

This pilot study, using direct patient interviews, evaluated patient compliance as a function of both perception of compliance with lens wear and care practices and actual compliance using a calculated compliance score based on reported behaviors. We further assessed patient knowledge and history of ocular complications associated with contact lens wear and examined the relationship between awareness of risk factors that cause disease and subsequent patient behavior.

METHODS

Study Population

Patients with appointments for routine contact lens examination at the Optometry Clinic at The University of Texas Southwestern Medical Center were identified as established contact lens wearers who had worn contact lenses for at least 1 month. One hundred sixty-two sequential patients were asked to participate in the study between June and August 2009. Standard contact lens education is routinely provided by a trained contact lens technician after lens dispensing at the time of the initial fitting for a first-time wearer or if a patient is switched to peroxide. Patients were examined by one of three faculty optometrists before the interview. After their examination, patients were relocated from the examination room to the investigational study room for completion of the informed consent. Individual patients were then interviewed by a single trained independent medical student (T.H.B.). All participants who had worn contact lenses for less than 1 month or for therapeutic purposes were excluded from this study. Approval for this study was obtained through the Institutional Review Board at The University of Texas Southwestern Medical Center, Dallas, TX.

Study Procedures

Participants were asked 26 questions for information on their demographics, contact lens usage, care practices, perceived overall compliance, and their knowledge of contact lens–

related complications. To determine perceived compliance, patients were asked the question: Do you think you are compliant with your contact lenses? To assess knowledge and history of contact lens–related complications, patients were first asked, on a scale from 1 to 5, with 1 being very uncommon to 5 being very common, how common are contact-related complications? Patients were subsequently asked whether they could name a contact lens–related complication and whether they had experienced a contact lens–related complication. To determine awareness of risk, patients were queried on 10 behaviors routinely evaluated as critical factors in compliance and risk factors for contact lens–related adverse events[2,4,5,7,8,13,17–22] as to whether they increased, decreased, or showed no effect on the risk of having a contact lens–related complication (Table 1). Patients were subsequently asked "do you do it?" Consecutive patients were surveyed to eliminate any selection bias. Participation was voluntary, and those who did not complete the survey were excluded.

Statistical Analysis

For the purpose of this article, perceived compliance was defined as whether the patient considered himself or herself compliant with his or her contact lenses. Actual compliance was defined based on a compliance score and grouped into one of three categories similar to a previous study by Morgan.[8] The compliance score was calculated using the number of positive behavior responses divided by 10 and the total number of behaviors analyzed. A correct response was identified as "yes" or "no," frequency of the behavior was not included in this pilot study. A patient was considered to have good compliance when receiving a 90% (demonstrating 9 of 10 correct behaviors) or better pass rate. Average compliance was defined as 70% to 80% pass rate (demonstrating 7 or 8 of 10 correct behaviors), and poor compliance was defined as 60% or worse pass rate (demonstrating 6 or fewer correct behaviors of 10). Sleeping in lenses was only considered a noncompliant behavior when it was not recommended by the eye care practitioner. For univariate analysis, chi-square or Fisher exact tests were used to investigate if there were significant differences in categorical variables between groups, such as risk factor awareness (does a factor increase, decrease, or have no effect on risk of having a contact lens–related complication) and patient behavior or perceived compliance and behavior. Analysis of these findings was completed using two levels of behavior ("no" vs. "sometimes + yes"). Similar results were obtained when analyzed using three levels of behavior ("no" vs. "sometimes" vs. "yes," data not shown). Student *t* tests were used to examine if there were significant differences in continuous variables between two groups (such as age and contact lens wearing years between perceived compliant and noncompliant groups). An analysis of variance was used to test if there were significant differences in continuous variables between more than two groups (such as age and contact lens wearing years between good, average, and noncompliant groups). Statistical significance was set at $P < 0.05$. Stepwise logistic regression analysis was conducted to identify significant behaviors associated with history of a complication. The risk factors with a *P* value less than 0.2 from univariate analysis were entered into the stepwise logistic model for analysis as candidate independent variables. Replacing the lens case was the only significant independent risk factor in the stepwise logistic regression analysis.

RESULTS

Patient Demographics

The study population consisted of 33% male and 67% female subjects. The mean age of all patients was 38.7 ± 15.1 (ranging from 13 to 75 years of age). There was no significant difference between ages for male and female subjects ($P = 0.501$). All respondents wore lenses for vision correction with an average of 17.7 ± 12.5 (range, 0.08–49) years of contact lens wear. There was no significant difference in years of wear between men and women (*P*

= 0.670). Eighty-five percent of patients were soft lens wearers, 14% wore rigid gas-permeable (RGP) lenses, and 2% reported wearing an RGP lens on one eye and a soft lens on the contralateral eye. No patients reported wearing lenses solely for cosmetic eye color change and no therapeutic lens wear was included in the study. Of the care products used, 91% used a multipurpose solution and 6% used peroxide. One person reported using only saline and three patients reported using no solution because they were daily disposable lens wearers. Ninety-three percent reported using the recommended lens care product, and 82% reported always using the same lens care product. The primary reason stated for not using the recommended product was cost. Regarding place of lens purchase, 66% purchased their lenses through the Optometry Clinic at the medical center, 14% through a corporation, 10% on the Internet, 6% from a wholesale warehouse, and 4% from private optometric practices.

Complications Associated With Contact Lens Wear

Patients were queried on their knowledge of complications associated with contact lens wear (Table 2). Most of the patient responses ranged from uncommon to somewhat common. Fewer than 5% of patients reported that lens-related problems were very common; four patients did not know. When asked whether they could name a contact lens–related complication, 41% of patients responded with infection as the most common lens-related complication, with corneal abrasion, corneal hypoxia, neovascularization, and vision loss also reported. Forty-two percent of patient responses included items related to lens comfort and handling, such as having torn/damaged lenses, wearing lenses inside out, protein buildup or debris, or both, on lenses, dryness and lens irritation, tired eyes/eye strain, and the displacement or loss of the lens behind the eye and into the head. Regarding history of lens-related complications, 11% reported having experienced a contact lens–related infection, followed closely by 9% reporting a corneal abrasion as direct result of contact lens wear. Fifteen percent of responses were grouped into a comfort and handling category, with responses similar to that described earlier. More than half of the patients surveyed (59%) reported that they had not experienced a contact lens–related complication.

Perceived Versus Actual Compliance

Overall, 86% of all respondents reported “yes” when asked if they were compliant with the use of contact lenses, whereas 14% readily identified themselves as being knowingly noncompliant. The mean age of patients who believed of themselves as compliant was 39.6±15.6 years compared with 33.3±10.4 years for those who perceived themselves as noncompliant ($P = 0.020$). There was no relationship between perceived compliance and years of contact lens wear ($P = 0.325$) or gender ($P = 0.256$). In actual compliance, 32% demonstrated good compliance, 44% exhibited an average level of compliance, and 24% were noncompliant. Swimming while wearing lenses was the most frequently reported noncompliant behavior (57% of all respondents). There was a significant difference in age between good compliance (43.4 ± 14.9 years) and noncompliance (33.0 ± 13.9 years) ($P = 0.005$). Although patients with average compliance tended to be older than noncompliant patients (37.9 ± 14.1 years), this was not significant. Similar to perceived compliance, there was no significant difference in actual compliance between years of contact lens wear ($P = 0.069$) or gender ($P = 0.61$). When compared with perceived compliance, 60% of patients who identified themselves as noncompliant were truly noncompliant, whereas only 34% patients who perceived themselves as compliant exhibited a good level of compliance ($P = 0.006$; Table 3). Analysis of perceived compliance with behavior highlighted four behaviors that patients did not associate with compliance (Table 4). These included swimming while wearing lenses, topping up care solutions, rinsing lenses with tap water, and replacing the lens case.

Awareness of Risk Factors and Patient Behavior

Of the 162 patients surveyed, 80% of patients reported “yes,” they were aware of the risk factors associated with lens wear, whereas 20% reported “no,” they were not. There was no relationship between awareness of risk and age ($P = 0.332$), awareness of risk and contact lens wearing years ($P = 0.205$), or awareness of risk and gender ($P = 0.535$). Similarly, when asked about specific individual risk factors, there was no significant relationship between awareness of risk and age, contact lens wearing years, or gender. There was an association between patient behavior and awareness of risk for 7 of the 10 risk factors listed. These findings are reported in Table 5. Importantly, 138 patients reported that sleeping in their contact lenses increased their risk of having a contact lens–related complication; however, 27% did so anyway ($P = 0.022$). This included overnight wear (on either an occasional or a regular basis) and napping. Of the patients who responded “yes” to sleeping in their lenses, 63% did so even though it was not recommended by their eye practitioner ($P < 0.0001$). Similar to sleeping in lenses, 134 patients reported that replacing their lenses less frequently than recommended increased risk, yet 41% responded positively to performing this behavior ($P = 0.043$). Swimming while wearing lenses demonstrated the highest proportion of wearers who performed a negative behavior despite awareness of risk (50%, $P = 0.006$); however, 27% of patients surveyed were unaware of the risks associated with contact lens use during swimming. Eleven percent of patients reported topping up solutions despite risk awareness ($P = 0.002$), and 9% of patients reported rinsing their lenses with tap water ($P = 0.001$). The use of tap water in this study represented 52% of all RGP lens wearers and 4% of all soft lens wearers. Of the positive behaviors that were evaluated, 30% of patients reported failing to ever replace their lens case, despite awareness that it decreased risk ($P = 0.002$). Only one behavior was associated with having a positive history of a contact lens–related complication (Table 6). Seventy-nine percent of patients reported “yes” to replacing their lens case after a complication, as opposed to 53% of patients who reported “yes” in the absence of having experienced a complication. Subsequent multivariate analysis identified patients who replaced their lens case as being 3.4 times more likely to have experienced a contact lens–related complication ($P = 0.001$, OR 3.43, 95% CI 1.61–7.32). Importantly, 21% of patients still fail to replace their lens case despite having experienced a problem ($P = 0.002$).

DISCUSSION

This study investigated the relationship between perceived and actual compliance with knowledge of contact lens–related complications and awareness of established potentially modifiable risk factors. When directly questioned, 86% of patients surveyed perceived themselves as compliant with their current lens care practices, whereas 14% readily identified themselves as non-compliant. Using a three-tiered model of actual compliance, 32% of patients were compliant in all or 90% of the behaviors evaluated. Initial estimates of patient compliance with lens wear completed more than 20 years ago reported that only 26% of patients were compliant with all aspects of their lens care regimen.[2] Thus, when compared with these prior findings, compliance rates, similar to infection rates, have remained relatively unchanged for more than two decades. As previous studies have suggested, a significant proportion of patients may think they are compliant, yet simply are unaware that their behaviors are noncompliant.[2,5] In this study, although two thirds of patients who admitted to being noncompliant truly were, only one third of patients who identified themselves as compliant actually demonstrated good compliant behavior practices. The specific behaviors that patients did not associate with compliance included swimming in their lenses, topping up solutions, the use of tap water, and failing to replace the lens case.

Irrespective of compliance, more than half of all patients surveyed reported swimming in their lenses, which is in close agreement with prior estimates.[7,22,23] In contrast to risk factors that were easily identifiable by patients as increasing or decreasing risk such as sleeping in lenses or wearing lenses longer than recommended, almost one third of patients felt that swimming showed no effect on risk of infection, and of those that knew it increased risk, 50% did so anyway. Likewise, 91% of the patients surveyed responded with a positive awareness of the risks associated with tap water. This high percentage is in strict accordance with a similar report which showed that 92% of patients knew that cleaning lenses with tap water posed an infection risk.[24] The lack of compliance with swimming during lens wear and use of tap water account for a persistent water exposure risk within the contact lens wearing population. Because certain silicone hydrogel lenses demonstrate increased preferential attachment of *Acanthamoeba* to the lens surface, eliminating lens exposure to water is imperative in the prevention of *Acanthamoeba* keratitis.[25] The significance of this finding is further highlighted by the recent surge in reported amoebic infections attributed in part to regional changes in municipal water supplies.[26] Thus, the lack of awareness associated with the use of tap water underscores an urgent area of need in maximizing patient safety.

Similarly, replacing the lens case, which was not associated with perceived compliance, represents an additional area where education is lacking. In support of this view, a recent evaluation of recommendations on proper lens case hygiene found significant variations among eye care practitioners.[27] Thus, this failure to associate lens case replacement with compliant contact lens practices may signify the absence and much needed development of standardized guidelines regarding adequate lens case hygiene procedures. Of lenses, cases, and solutions, lens cases represent the most common source of contamination and have been shown to include a host of pathogenic microorganisms, including bacteria, amoeba, and fungi, with contamination rates estimated to be as high as 81%, 24%, and 59%, respectively.[28,29] Thus, it is not surprising that inadequate lens case hygiene is associated with an increased risk for microbial keratitis (MK).[18] In this study, 63% of patients reported changing their lens case. Even though frequency of replacement was not evaluated, this high percentage was not surprising as a previous study evaluating lens case replacement showed that 78% of patients replace their lens cases once or more within a 6-month period.[22] More importantly, however, was the association between lens case replacement and a positive history for having experienced a lens-related complication. As patients were 3.4 times more likely to replace their lens cases after having a problem, this implies that lens case hygiene is somehow addressed during the patient–practitioner interaction after a complication and of critical clinical significance, suggests that under appropriate circumstances, behavior may be modifiable.

When queried about choice of care products, 93% of patients reported using the recommended solution. As pointed out in a previous report on contact lens compliance, however, only a fraction of patients recall whether their eye care practitioner made a recommendation with respect to their lens care system, suggesting that this number may be greatly overestimated.[12] In contrast to this, 83% of patients reported always using the same product. Because most patients associate the color of the bottle of their care solution with the brand that they use, it is not unreasonable to surmise that patient identification of color at the shelf likely drives their continued purchase. Of the two factors relating to proper lens disinfection technique that were evaluated, 97% of patients reported using fresh solution, which was highly significant with perceived compliance. This may reflect, as suggested, that some behaviors are inherently simple with respect to lens hygiene practices.[8] This high number could also be attributed in part to a mixed population of patients who always use fresh solution and some that generally use fresh solution, although occasionally reuse. Likewise, hand washing also demonstrated a high compliance rate, with 93% of patients

reporting positively to performing this behavior. In support of this finding, compliance rates as high as 88% with hand washing have been reported.[22] In that study, the authors speculate that further characterization of hand washing methods, such as with and without soap, would likely reduce this number.[22] Although patients may have readily identified with the importance of using fresh solution and hand washing with compliance, 13% of patients admitted to topping up care solutions, a behavior that was not associated with compliance. Topping up solution in the lens case can lead to inadequate disinfection and subsequent lens contamination, thus posing a significant risk for infection.[30] Additional variables in lens care such as rub and rinse steps were not investigated in the present study.

Just as important as those who incorrectly perceive themselves as compliant are the 14% of contact lens wearers who readily identify themselves as noncompliant. This strongly suggests that as many as one patient in seven would not be compliant with their daily lens care practices. In the case of daily disposable lens wear, where the incidence of infection is not reduced and may in fact be higher, this low level of actual compliance may account for, as prior studies have suggested, an increased risk for the development of a lens-related complication.[20] Furthermore, when extrapolated over 140 million contact lens wearers worldwide, this number represents a significant population that is not overtly concerned by their lack of compliance. Moreover, within this subpopulation of wearers, compliance was not altered by risk awareness. One could thus speculate that this group of wearers represents those who are not likely to modify their behavior with better education and training.

Oral administration of this survey was selected in this pilot study in lieu of a written questionnaire to enable the single trained interviewer to clarify any ambiguity in the questions presented, ensure completion of the questionnaire, maintain sequential order of the questions being asked, and force a prompt answer from the participant, thus preventing them from reading through all the questions and contemplating their responses. Drawbacks to using an oral format lie in the potential for bias from the investigator and the potential for a study participant to falsely respond to a query. The latter of the two may be lessened using an anonymous questionnaire; however, studies have shown that written answers on questionnaires are still not entirely truthful.[31] The principal drawbacks presented create the possibility for an overestimation of compliance and compliant behaviors in this study. A second potential for bias in this study lies in the select research population. Because this study was conducted at a clinic located within a major medical research institution, the study population was composed largely of medical and research personnel with a background that differs from that of the general population. Therefore, when questioned about complications of lens wear, a proportion of subjects responded with “hypoxia” and “neovascularization.” Because this is not likely to be reflected throughout the general population, a larger population-based study outside the medical school environment is needed.

CONCLUSIONS

Reducing the risk for contact lens–related MK remains a zero-sum game with the optimization of multiple parameters aimed at reducing epithelial surface damage and maintenance of a healthy lens-cornea-case environment.[32] Patient compliance is integral as noncompliance may potentially contribute to compromised ocular surface defense mechanisms through lens breakdown and spoilage from overwear, inactive or ineffective solutions after topping up or reuse, and an increase in the bacterial bioburden on both the lens and the case surfaces, resulting in part from poor hygiene practices.[33] The development of new successful educational and training strategies that actually modify subsequent patient behavior is thus critical to improve patient compliance, thereby potentially reducing overall risk. The findings in this study suggest that even in a better informed university clinic environment, neither perceived compliance nor awareness of risk is directly associated with

compliant behavior. Thus, more effective programs designed to enhance patient compliance are needed.

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TABLE 1

Risk Factor Questionnaire

Do you think the following increase or decrease risk? Increase/decrease/no effect/do you?
1. Sleeping in lenses
2. Sharing lenses
3. Wearing lenses longer than recommended
4. Replacing lenses less frequently than recommended
5. Swimming while wearing lenses
6. Using fresh cleaning solution
7. Topping off (adding) solution to lens case
8. Rinsing lenses with tap water
9. Replacing your lens case
10. Washing hands before handling lenses

TABLE 2

Patient Awareness of Contact Lens–Related Complications

Complication	N (%)
Assessment: How common are contact lens–related complications?[a]	
1	39 (25)
2	41 (26)
3	57 (36)
4	14 (9)
5	7 (4)
Can you name a contact lens–related complication?	
Abrasion	18 (12)
Hypoxia	4 (3)
Infection	61 (41)
Neovascularization	1 (0.7)
Comfort and handling	62 (42)
Vision loss	2 (1)
Have you had a contact lens–related complication?	
Abrasion	15 (9)
Allergy	4 (3)
Comfort and handling	25 (15)
Infection	18 (11)
Neovascularization	4 (3)
None	96 (59)

[a]Grading scale: 1 = very uncommon; 5 = very common.

TABLE 3

Association Between Risk Factor Awareness and Behavior

Risk awareness	No: I don't do it, n (%)	Yes: I do it, n (%)	*P*
Negative risk factor: Does it increase or decrease/have no effect?			
Sleeping in lenses			0.022[a]
Increase	101 (73)	37 (27)	
No effect	2 (29)	5 (71)	
Wearing lenses longer than recommended			0.432[a]
Increase	73 (52)	67 (48)	
No effect	2 (33)	4 (67)	
Replacing less frequently than recommended			0.043[a]
Increase	79 (59)	55 (41)	
No effect	1 (14)	6 (86)	
Swimming while wearing lenses			0.006[a]
Increase	51 (50)	50 (50)	
No effect	9 (24)	28 (76)	
Topping up care solutions			0.002[a]
Increase	125 (89)	16 (11)	
No effect	0 (0)	3 (100)	
Rinsing lenses with tap water			0.001[a]
Increase	118 (91)	11 (9)	
No effect	6 (50)	6 (50)	
Positive risk factor: Does it decrease or increase/have no effect?			
Washing hands before handling lenses			—
Decrease	10 (7)	139 (93)	
Using fresh care solution			0.079[a]
Decrease	2 (1)	142 (99)	
No effect	1 (25)	3 (75)	
Replacing lens case			0.002
Decrease	36 (30)	84 (70)	
No effect	17 (71)	7 (29)	

Sharing lenses is not included in the earlier analysis because no patients reported sharing lenses in this study.

[a] *P* values from Fisher exact test; other *P* values from chi-square test.

TABLE 4

Association Between Perceived and Actual Compliance

Perceived compliance	Good compliance, n (%)	Average compliance, n (%)	Noncompliance, n (%)	*P*[a]
No	3 (15)	5 (25)	12 (60)	<0.001
Yes	44 (34)	61 (47)	24 (19)	—

[a] *P* values from chi-square test: significant differences were seen between average compliance and noncompliance ($P = 0.002$) and good compliance and noncompliance ($P = 0.004$).

TABLE 5

Association Between Behavior and Perceived Compliance

Behavior	Perceived noncompliant, n (%)	Perceived compliant, n (%)	*P*
Negative behaviors: Do you do it?			
Sleeping in lenses			0.020
No	10 (9)	97 (91)	
Yes	10 (24)	32 (76)	
Wearing lenses longer than recommended			<0.0001
No	1 (1)	75 (99)	
Yes	19 (27)	52 (73)	
Replacing less frequently than recommended			0.007
No	6 (7)	78 (93)	
Yes	14 (23)	48 (77)	
Swimming while wearing lenses			0.725
No	8 (12)	57 (88)	
Yes	12 (14)	72 (86)	
Topping up care solutions			1[a]
No	18 (14)	111 (86)	
Yes	2 (10)	18 (90)	
Rinsing lenses with tap water			0.471[a]
No	19 (15)	111 (85)	
Yes	1 (5)	18 (95)	
Positive behaviors: Do you do it?			
Washing hands before handling lenses			0.030[a]
No	4 (40)	6 (60)	
Yes	16 (12)	123 (88)	
Using fresh care solution			0.008[a]
No	3 (75)	1 (25)	
Yes	17 (12)	128 (88)	
Replacing lens case			0.192
No	10 (18)	45 (82)	
Yes	10 (11)	84 (89)	

[a] *P* values from Fisher exact test; other *P* values from chi-square test.

TABLE 6

Association Between Behavior and History of a Complication

Ocular history	No, I don't do it, n (%)	Yes, I do it, n (%)	*P*
Have you had a complication?			
Sleeping in lenses			0.955
Negative	66 (73)	25 (27)	
Positive	41 (71)	17 (29)	
Wearing lenses longer than recommended			0.492
Negative	44 (49)	46 (51)	
Positive	32 (56)	25 (44)	
Replacing less frequently than recommended			0.657
Negative	53 (60)	36 (40)	
Positive	31 (54)	26 (46)	
Swimming while wearing lenses			0.786
Negative	41 (45)	50 (55)	
Positive	24 (41)	34 (59)	
Topping up care solutions			0.084
Negative	75 (82)	16 (18)	
Positive	54 (93)	4 (7)	
Rinsing lenses with tap water			0.118
Negative	83 (91)	8 (9)	
Positive	47 (81)	11 (19)	
Washing hands before handling lenses			0.683
Negative	5 (5)	86 (95)	
Positive	5 (9)	53 (91)	
Using fresh care solution			0.643[a]
Negative	2 (2)	89 (98)	
Positive	2 (3)	56 (97)	
Replacing lens case			0.002
Negative	43 (47)	48 (53)	
Positive	12 (21)	46 (79)	

[a] *P* values from Fisher exact test; other *P* values from chi-square test.