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KNOWLEDGE OF THE PRACTICE OF USE AND CARE OF CONTACT LENSES OF MEDICAL STUDENTS

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Abstract: Goal: To evaluate the handling and maintenance of contact lenses by medical students. Methods: Descriptive and cross-sectional study based on the application of a questionnaire composed of objective questions addressing various criteria for the use of contact lenses. **Results:** A sample of 82 students was obtained, predominantly female (62%). Almost half of the students stated that they correctly replaced the LC, but 77% and 60% claimed to sleep and swim with these artifacts, respectively. The frequency of changing the kit that prevailed was the quarterly option (44.4%) and the predominance of boiling this utensil was weekly (9.8%). Complications were reported by the minority and only half of users claimed to have received information about the use and maintenance of contact lenses. **Conclusion:** Half of the respondents used contact lenses according to the manufacturer's guidelines, resulting in fewer eye complications. These data can be explained by the fact that the interviewees are health students and, consequently, are more informed about the possible risks arising from the incorrect use of these utensils.

Keywords:Contact lenses, Preventive maintenance, Eye infections, Medical students.

INTRODUCTION

It is estimated that around 125 million people worldwide wear contact lenses (CL), which represents two percent of the world's population. Currently, there is a variety of these utensils available on the market, and it is up to the specialist to prescribe the types of CL: rigid, rigid gas permeable, hydrophilic gelatinous, silicone-hydrogel gelatinous, hybrid.[1,2]

As for cleaning the lenses and the storage case, two types of disinfectant solutions can be used: multi-action, which proved to be more effective, or 3% hydrogen peroxide, in which studies indicated greater contamination of the case, because, most of the microbial contaminants found produced catalase, which breaks down hydrogen peroxide into water and oxygen.[2-5]

Contamination of lens storage cases has been attributed to several factors, such as poor hand hygiene, the type of disinfectant solution and the material of the case, being associated with an increased risk of microbial keratitis6-9. This is because more than half of CL routinely harbor microorganisms, including potentially pathogenic species. However, even in CL that are aseptically removed from the eyeball, microorganisms are found, almost exclusively bacteria, approximately 10% of which are Gram negative and pathogenic. (*Neisseria meningitidis*, *Proteus* sp) and 50% Gram positive (*Staphylococcus epidermidis, S. aureus*)[2]. In addition, it is worth mentioning that the incorrect handling of CL and the products involved in their maintenance serves as a source of opportunistic microorganisms such as *Acanthamoeba* sp and *Pseudomonas aeruginosa.*[1,2]

Thus, it must be noted that CL are a foreign body in close contact with the cornea and that they need to be properly adapted. Its use must be controlled, as the user will always be subject to complications, such as irritative conjunctivitis, corneal ulcers and even loss of vision. Therefore, procedures are necessary to maintain and keep the CL clean and disinfected, facilitating users' compliance with the ophthalmologist's guidance and better understanding of the necessary ophthalmological care.[10-12]

METHODS

This was a cross-sectional observational study, whose instrument used was a questionnaire composed of objective questions addressing the use of contact lenses, from their maintenance method to the complications

that had already occurred in medical students from a private college of a city in the interior of the state of São Paulo, Brazil.

The collection procedure was performed in accordance with those determined by the Research Ethics Committee (opinion No. 2,232,619). Students of both sexes, over 18 years of age and users of CL were approached on the college's premises to be invited to participate in the research. After accepting, two copies of the Free and Informed Consent Term (FICT) were delivered to be signed by the students, one of them being with the participant and the other with the researchers. The printed questionnaire was then delivered to be answered at that moment, leaving those responsible for the research available to clarify any doubts about the questions.

Data were tabulated in Excel (Microsoft) and statistically analyzed using PASW version 18 for Windows (IBM-SPSS, Chicago, IL). Data were descriptively evaluated by calculating frequency, percentage, mean and standard deviation. The chi-square test was used for categorical variables (such as gender, lens type and yes and no answers) and Student's t test was used for the length of time the lenses were worn.

RESULTS

The questionnaire was answered by 82 students, 11% (n=9) interns. Female students predominated (62.2%) with a mean age of 21.65 years (sd = 3.13).

When asked about the time of use of CL, most answered around three to four years, with values of 25 years as the maximum and 2 months as the minimum.

About the current LC, some participants declared its use for five (3.6%, n=3), six (2.4%, n=2) and seven (2.4%, n=2) months, once that most students claimed to have been using it for about a month and a half.

As for the type of CL used by academics, figure 1 shows that the monthly disposable was chosen by more than half of them.

Almost half of the participants (46.3%) responded that they had to replace the CL according to the manufacturer's guidelines. However, 19.5% were unable to respond. It was also asked whether users slept or swam with the CL, with those who sleep (76.8%) and swim (59.8%) prevailing, with no statistical difference between the sexes. The same statistical profile was observed regarding the use of lubricating eye drops, most of which (75.6%) confirmed the application of this product.

As for the cleaning of the CL for placement, figure 2 shows the results obtained from the moment the students performed it.

Only one male student (1.2%) claimed to use tap water to sanitize their CL, and most used a multi-action solution for this purpose, leaving the CL at rest (50%) or rubbing it with this product. (29.3%). No student chose the option of washing the CL with water and liquid soap or serum with antibiotics.

As for the case that stores the CL, half of the students reported using the current container for more than two months (52%, n=43) and cleaning it weekly (51.2%, n=42) (Figure 3). However, boiling the kit weekly, as recommended by its manufacturers, was confirmed by only 9.8% (n=8) of the students, most of whom (62.5%, n=5) reported performing this activity four times a week. The replacement of the case prevailed in the quarterly period (44.4%, n=36).

Regarding the information obtained regarding the use and maintenance of the CL, the only answer with a statistically significant difference between the two sexes was about the duration of the CL, in which 100% of the men reported having received this type of explanation (p=0.041) (Table 1).

Regarding eye complications, the minority claimed to have had conjunctivitis (7.3%,

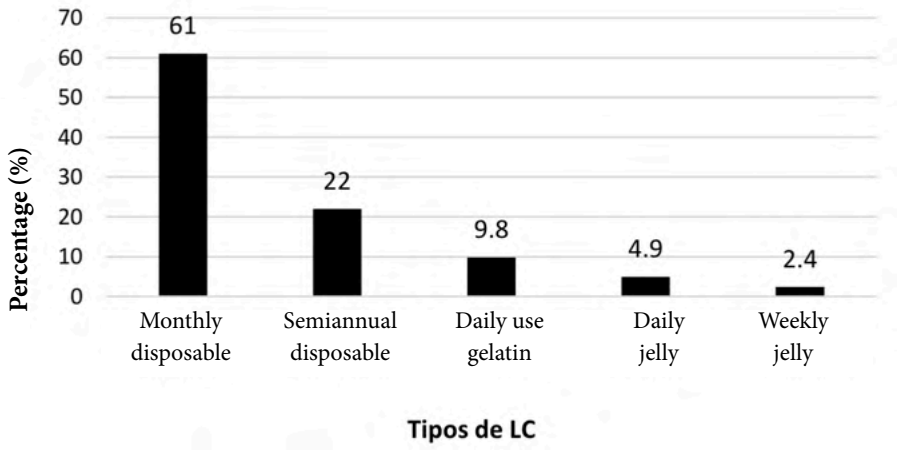

Figure 1. Percentage of students using different types of LC.

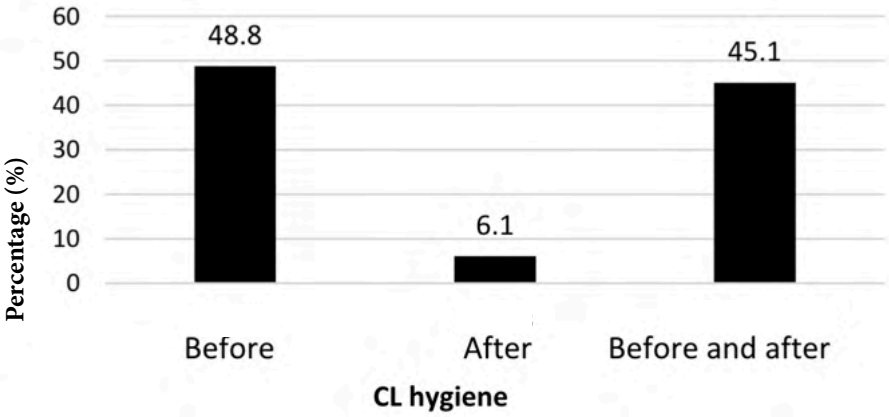

Figure 2. Percentage of students who sanitize their CL.

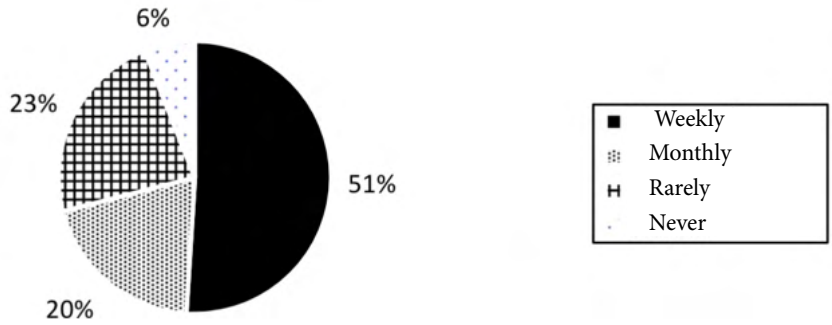

Figure 3. Percentage of respondents who answered about the frequency of cleaning the LC case.

	Percentage (%)	Number
Duration of the LC	91,5	75
Disinfection of LC	81,7	67
Placement/removal of LC	89	73
Number of hours of continuous use	50	41
Complications arising from use	57,3	47
Cleaning the case	69,5	57
Case replacement	42,7	35
Products purpose	36,6	30
Lifetime of the products	54,9	45

Table 1. Information regarding the use and maintenance of CL by academics.

n=6), allergy (17.1%, n=14) or eye infection (4.9%, n=4), with the red eye symptom (42.7%, n=35) reported by almost half of the interviewees.

DISCUSSION

The profile of CL users in the present research corresponded to those found in other studies, since there was a predominance of females and a mean age of 21.6 years. [13,14]. This fact can be explained by the increase in the number of women entering the medical course, which has been strengthening for more than a decade.[15]

As for the type of CL used by academics, all participants preferred to use gelatinous ones, which can be justified by the quick adaptation, tolerance and comfort, a result also found in the study carried out with students from the University of Chengdu, in China.[16-18] Regarding the frequency of exchange of this type of CL, the most used was the monthly discard, with the same behavior observed in studies carried out at the Federal Universities of Santa Catarina19, in Malaysia. [20] and of Chengdu (China)[18], since they are made of silicone hydrogel, which in addition to allowing more oxygen to pass through to keep eyes clear and white, can be more comfortable. [21]

Regarding the cleaning of CL, very similar percentages were found among the students of the present work who declared to perform it only before their placement and those who proceeded with it before and after their placement, unlike most Chinese students at the University of Chengdu, who do the cleaning after using the CL.

For this practice, most of the academics of this work and of the University of Malaysia stated that they use a multi-action solution, suitable for this purpose, leaving them to rest in the case. It is the type of multi-action solution that will determine whether or not to rub the CL, but it was not possible to detect whether the participants were acting in accordance with the manufacturers' recommendations, since most of them did not remember the name of the product they used. It is worth noting that lens friction is controversial. There are manufacturers of these products that report that cleaning the lenses from digital friction is no longer necessary, however, there are recent reports on infectious keratitis in CL users, suggesting the ineffectiveness of multipurpose solutions against certain agents, inadequate care and hygiene with the lenses. and cases, including elimination of the digital friction step.[22]

As for the case that stores the CL, half of the

students reported using the current container for more than two months and cleaning it weekly. However, boiling the kit weekly, as recommended by its manufacturers, was confirmed by a low percentage of students, most of whom declared that they performed this activity four times a week. This frequency is interesting for better disinfection of the case, but twice a week is enough for optimal cleaning and not to discourage this fundamental practice. The replacement of the case prevailed in the quarterly period, coinciding with the period recommended by the *American Optometric Association*, as prolonged use of the same kit can result in significant eye infections due to bacterial contamination.[23-25]

When asked about the time of use of CL, most students answered around three to four years, with values of 25 years as the maximum and two months as the minimum. When comparing these two extremes, the student who reported using it for two months declared replacing the CL according to the proposed guidelines, despite not having received information about cleaning and changing the case, purpose and duration of the products. He added that he did not sleep or swim with the LC, in addition to cleaning them before and after use and the case weekly. As an eye complication he complained only of hyperemia.

On the other hand, the student who declared that he had used CL for 25 years, reported not replacing the CL according to the manufacturer's guidelines, despite having received this information. He stated that he swam and slept for two days with the LC, in addition to cleaning the lens only before use and the case rarely, which is changed every three months. He reported having presented with hyperemia and allergy from ocular complications. This way, prolonged use of CL can lead to carelessness in hygiene and general care, increasing the risk of eye complications, since the adaptation of CL only ends when you stop using them and that this dynamic process represents a fragile balance between the eye and the LC, which can be ruptured at any time by a number of factors.[13]

In a study carried out in 2001, the authors evaluated the conditions of adaptation and sale of CL in opticians, observing the inadequacy in which the adaptation of the product is carried out, without selection, control or guidance to users26. Other studies have also shown that 80% of the complications presented with the use of CL may be related to poor understanding of the recommendations regarding the use and maintenance of the product27. Such facts were present in the study carried out at the Federal University of Santa Catarina, in which the vast majority of students reported having already suffered one or more complications or signs and symptoms associated with the use of CL, the most frequent sign being ocular hyperemia, present in 68.9% of the sample and the most common symptoms were foreign body sensation and visual blurring, data that are also compatible with the study by Vidotti et al.[14,20]

However, in the present study, it was observed that more than half of the students received information about disinfection of the CL, cleaning of the case, duration of the products, placement/removal of CL, duration of CL, complications resulting from use and number of hours of continuous use. In addition, almost 50% of the participants stated that they replaced the CL according to the manufacturer's guidelines, which may have been reflected in the lower number of eye complications, such as red eye, conjunctivitis, allergy or eye infection. This behavior is extremely important to avoid more serious problems, as reported by Holzchuh et al.[16], whose study showed that the prolonged use of CL, without the replacement recommended

by the manufacturers, can increase the risk of developing infectious keratitis by ten to fifteen times.

In addition, at the height of the current pandemic caused by the coronavirus, it is extremely important that the guidelines on the need to maintain good practices in the maintenance of CL, especially regarding hand hygiene before handling them and their case, are even more reinforced, even though, so far, there is no evidence to suggest that CL users must discontinue their use due to the increased risk of developing the disease. However, considering the guidelines for other types of diseases, such as those of the respiratory tract, patients with active COVID-19 must temporarily replace the use of CL with glasses.[28]

The advantages of contact lenses range from aesthetics to functional, such as the fact that they bring freedom of movement, allow an increased peripheral field of vision compared to glasses, do not fog up and are safer, as there is no risk of breakage during shocks[29]. Such characteristics are present when choosing to use them, the main reason being the aesthetic [18,30]. Thus, the constant awareness of users of these materials must be carried out by health professionals, as a way of alerting them to the advantages and even risks exposed, in order to increasingly prevent unwanted complications.

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