

# Knowledge in refractive surgery among medical students State University of Londrina

## *Conhecimento em cirurgia refrativa entre estudantes de medicina da Universidade Estadual de Londrina*

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### ABSTRACT

**Objective:** Evaluate the knowledge of medical students from Universidade Estadual de Londrina (UEL), about refractive surgery, as well as analyzing the percentage of students that presents refractive errors, their correction methods and their interest (or not) in the surgical procedure. **Methods:** We conducted a survey using self-evaluation questionnaire (previously tested) among 154 medical students from first to fourth year, between september and november 2011. **Results:** It was reported that 70.8% of students had some type of refractive error, and myopia was the most prevalent, with 72.5% of students with refractive errors presenting it, with or without other refractive errors associated. The glasses were the most used method of visual correction. About refractive surgery, 85.7% of students had already heard about, but only 42.9% knew how the procedure is performed, and the ophthalmologist was the main source of information on the subject, to 23.5% of students. Only 43.2% of students have an interest in surgery, and only 3 (1.9%) students have been undergoing the procedure. **Conclusion:** There has been little information and knowledge about refractive surgery among medical students, which affects their interest in undergoing the procedure, which maybe due the fact that many of them do not have the most adequate source of information to obtain knowledge about the subject.

**Keywords:** Students, medical; Myopia; Visual acuity; Refractive errors; Knowledge

### RESUMO

**Objetivo:** Avaliar o conhecimento de estudantes de Medicina da Universidade Estadual de Londrina (UEL), em cirurgia refrativa, assim como analisar o percentual de estudantes que são portadores de ametropias, seus métodos de correção e seu interesse ou não na realização do procedimento cirúrgico. **Métodos:** Realizou-se um levantamento através de questionário autoaplicável, previamente testado, entre 154 estudantes do primeiro ao quarto ano de Medicina da Universidade Estadual de Londrina entre setembro e novembro de 2011. **Resultados:** Foi relatado que 70,8% dos estudantes possuíam algum tipo de erro de refração, sendo a miopia o erro mais prevalente, com 72,5% dos estudantes amétropes apresentando-a, associada ou não a outros erros de refração. Os óculos foram o método de correção visual referido como o mais utilizado, por 80% dos pesquisados. Quanto à cirurgia refrativa, 85,7% dos estudantes já haviam ouvido falar a respeito, porém, apenas 42,9% sabiam como o procedimento é realizado, sendo o oftalmologista a principal fonte de informação sobre o tema, para 23,5% dos alunos. Apenas 43,2% dos alunos têm interesse na realização da cirurgia, e apenas 3 (1,9%) estudantes já foram submetidos ao procedimento. **Conclusão:** Apesar da importância da cirurgia refrativa na Oftalmologia verificou-se baixo conhecimento acerca do tema entre os estudantes, o que afeta o interesse dos mesmos em serem submetidos ao procedimento. Observou-se também uma taxa relativamente alta de falsa expectativa quanto ao seu resultado, principalmente entre os estudantes que querem ser submetidos ao procedimento, provavelmente pelas fontes pouco confiáveis alegadas pelos estudantes. Considerando o fato de que se tratam de futuros médicos, fica clara a necessidade de maiores esclarecimentos sobre o tema na graduação.

**Descritores:** Estudantes de medicina; Miopia; Acuidade visual; Erros de refração; Conhecimento

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## INTRODUCTION

Refractive surgery consists of the entire surgical procedure intended to correct a refractive error. It is a relatively recent surgical procedure dating back to 1898, when Dr Lendeer Jans Lans published his results on keratectomies and thermokeratoplasties performed on rabbits to treat astigmatism<sup>(1)</sup>. In 1933, the **Japanese ophthalmologist** Sato began a study on a patient with acute keratoconus associated with rupture of Descemet's membrane, which led to a flattening of the cornea and a reduced degree of myopia. This led him to carry out the first anterior and posterior keratotomies in 1939 to treat astigmatism and keratoconus. However, it was only after the PERK (*Prospective Evaluation of Radial Keratotomy*) study, published by the *National Eye Institute* in 1981, that radial keratotomy began to gain global significance. Since then, procedures have evolved at an impressive pace given the considerable interest by patients, doctors and researchers in finding a definitive alternative to wearing glasses.

There are a number of surgical procedures which can be performed in order to correct ametropic eyes, such as intraocular lenses and intracorneal implants. However, the most commonly used methods, such as PRK (*Photorefractive Keratectomy*) and Lasik (*Laser Assisted in Situ Keratomileusis*), employ the excimer laser<sup>(2)</sup>. Such procedures are fast and safe and have a lower rate of complications than the procedures more commonly used in the past.

This study analyses the prevalence of refractive errors in medical students at the State University of Londrina (UEL) as well as the most commonly used methods of visual correction. It also analyses the number of students who have already undergone refractive surgery and assesses the students' knowledge of and interest in refractive surgery, based on a study by Kara José<sup>(3)</sup> on students from ABC's Medical School.

## METHODS

The study was conducted from September to November 2011 at the Centre for Health Science (CCS) of the State University of Londrina and included 320 first- to fourth-year medical students. A standardised self-administered questionnaire (Annex 1) with 30 questions, 26 of which were multiple choice, was completed by the students. The questionnaire had previously been tested on first year physiotherapy students at the State University of Londrina. The students were asked about their epidemiological characteristics, whether they had myopia or other refractive errors (astigmatism, hyperopia, presbyopia), the correction methods they used, their knowledge of and interest in refractive surgery, their expectations regarding the procedure, and their sources of information. This was done on the basis of a similar study conducted at ABC's Medical School<sup>(3)</sup>.

The questionnaires were administered during school hours, therefore they were only completed by students who attended their course when the survey was applied and who wanted to take part in it — a total of 154 students.

Only selected data from the questionnaire were used. The remaining data may be used in future studies.

The study was approved by the medical school's Research Ethics Committee through its Opinion 039/2011. All the volunteers were informed about the study's objectives and procedures and provided their informed consent.

## RESULTS

Of the 154 participants, 109 (70.8%) stated they had some kind of refractive error, 38 (24.7%) stated they had no visual impairment, 4 (2.6%) could not answer, and only 3 (1.9%) confirmed they had undergone refractive surgery.

As shown in Table 1, out of the 109 students with refractive problems, 44 (40.4%) had myopia alone, 35 (32.1%) had myopia and astigmatism, 21 (19.3%) had astigmatism alone, and 9 (8.3%) had other refractive errors (or a combination of errors)

The average age of participants was 21.88 years (Standard deviation: 3.2). Regarding race, 126 (81.8%) self-identified as white, 17 (11%) as yellow, 10 (6.5%) as brown and only 1 (0.6%) as black.

With regard to gender, 68 (44.2%) were male and 86 (55.8%) were female. Among the male participants, 68.7% had some type of refractive error, while a higher proportion of females (72.4%) had refractive errors.

A total of 143 (92.8%) students stated they had already consulted an ophthalmologist, of which 76 (53.1%) had had their last consultation less than a year ago, 49 (34.3%) between 1-3 years and 18 (12.6%) more than 3 years ago. Among students with refractive errors, 66 (60.5%) had had a consultation less than a year ago, 39 (35.5%) between 1-3 years and only 4 (3.7%) more than 3 years ago.

Regarding the methods of visual correction, as shown in Table 2, most students used eyeglasses (including 79.7% of those with myopia and 60% of those with other refractive errors), sometimes associated with contact lenses. In addition, 10.1% of those with myopia declared they did not use any kind of visual correction, despite being advised to. This figure rose to 26.7% among students with refractive errors other than myopia

As shown in Table 3, of the 154 students, 132 (85.7%) said they had heard of refractive surgery, of which only 65 (49.2%) said they knew how the procedure was performed. Of the students who had heard of it, 95 (72%) had refractive errors. As shown in Figure 1, 23.5% stated that they had been informed about the procedure by their ophthalmologist, followed by 17% who were informed by their relatives. Students with refractive errors were also asked how they would feel about undergoing refractive surgery. 43.2% confirmed they would be willing to undergo the procedure, 38.9% said they would not and the remaining 17.9% did not know or did not answer.

Figure 2 shows that the main reason why the students who did not want to have refractive surgery had not undergone the procedure was because the doctor had advised them against it, as mentioned by 30.2% of participants, followed by financial reasons, mentioned by 24.5% of participants.

As shown in figure 3, 74.4% of students who did not want to undergo the procedure claimed this was because of their mild visual impairment. Of those who did not know, the aforementioned argument was also the most common, but it corresponded to 35.5% of answers.

As shown in figure 4, 89 (67.4%) of the students who knew about the procedure expected only a reduction of visual dependence after undergoing refractive surgery (Table 5). A larger percentage of students who wanted to undergo refractive surgery expected greater benefits.

Students with myopia were the most likely to consider undergoing the procedure: 69.8% of them wanted to undergo surgery.

Only 3 students, aged 22, 23 and 33, had already undergone refractive surgery, of which two were male and one was female.

Table 1

## Types of refractive errors found in the study population (n=109)

Refractive Error	Number	Frequency (%)
Myopia	44	40,4
Myopia and astigmatism	35	32,1
Astigmatism	21	19,3
Hyperopia	5	4,6
Astigmatism and hyperopia	3	2,8
Presbyopia	1	0,9
Total	109	100,0

Table 2

## Methods of visual correction amongst participants with refractive errors (n=109)

Visual Correction Method	Myopia		Other refractive errors*	
	Total number	Frequency (%)	Total number	Frequency (%)
Only glasses	38	48,1	18	60
Only contact lenses	4	5,1	0	0
Glasses and lenses	25	31,6	0	0
Not prescribed	4	5,1	3	10
Does not use, despite being advised to	8	10,1	8	26,7
Did not answer	0	0,0	1	3,3
Total	79	-	30	-

\*Errors not associated with myopia. Individuals with myopia + astigmatism were counted under myopia.

Table 3

## Distribution of students according to the type of refractive error and their knowledge of refractive surgery (n=151)

Heard of it?	Myopia		Other refractive errors		No refractive error		Did not know referir ametropia	
	Total number	%	Total number	%	Total number	%	Total number	%
Sim	69	87,3	26	86,7	30	78,9	4	100,0
Não	10	12,7	4	13,3	8	21,1	0	0,0

Table 5

## Expectations of refractive surgery (n=132)

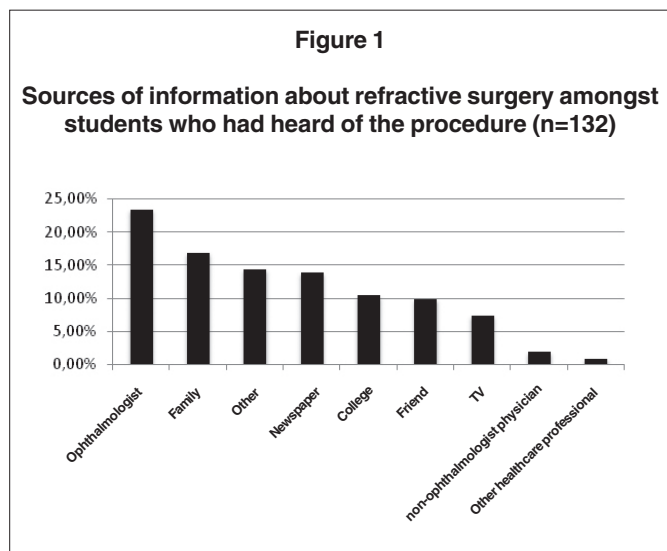
Expectations	Myopia	%	Other errors	%	Does not have	%	Does not know	%	Operated on	%	Total	%
Cure	25	36,2	4	15,4	10	33,3	1	25	3	100	43	32,6
Reduction of dependence	44	63,8	22	84,6	20	66,7	3	75	0	0	89	67,4

N refers to the number of students who had already heard about the procedure

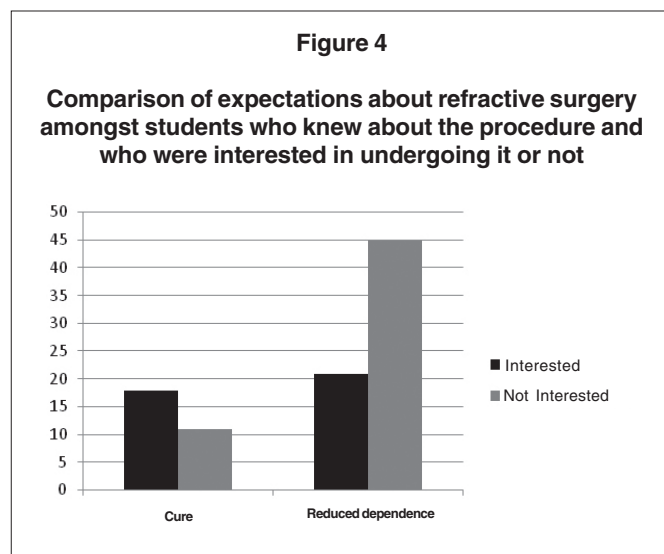
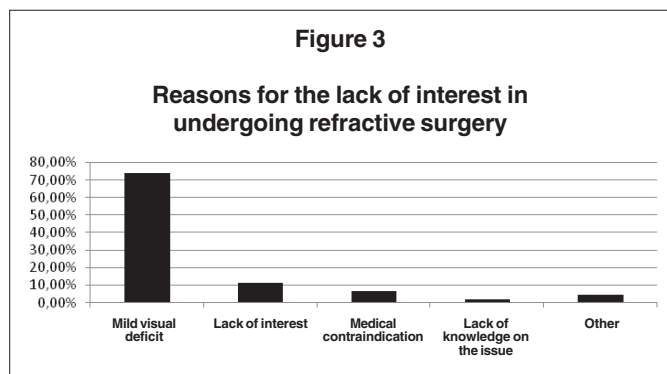
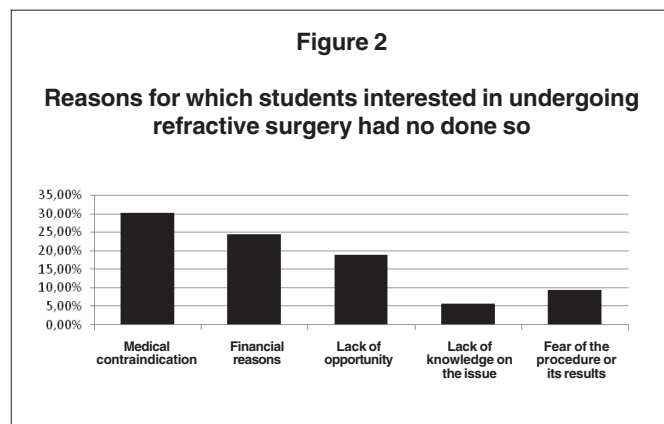
All had had a consultation with an ophthalmologist less than a year ago. All three students had been diagnosed with ametropia between the ages of 6 and 12. Also, both parents of all three students had some kind of refractive error. All three students said they had expected a complete cure before undergoing surgery, and none of them had a current visual impairment. Therefore, they expressed satisfaction with the results. With regard to where they obtained information about the procedure,

all three said they knew about it from their ophthalmologist, and even after having undergone the procedure, 1 student (33.3%) said he would like to know more about it.

The aforementioned procedures were carried out in the same year the questionnaire was administered. One was covered by a health insurance plan and the other two were paid for privately. Regarding the level of visual impairment before surgery, two students had between -1.25 and -3.00 dioptres and



As each alternative considered in the table allows for more than one answer, some show a number of answers greater than N.



one an impairment greater than -3 dioptres. The household income for all three students was greater than 15 times the minimum wage.

## DISCUSSION

A total of 109 (70.8%) participants stated they had some kind of refractive error. Myopia was the most common refractive error and was present in 40.4% of participants. This is twice the prevalence found in the general population, which is around 25% according to previous studies<sup>(4)</sup>. The figure found in our study is in agreement with the results of previous studies conducted on medical students, which also found a prevalence twice as high as in the general population<sup>(5,6)</sup>. One example came from a study carried out in the Federal University of Paraná, which found that 48.23% of medical students had myopia<sup>(7)</sup>.

Only 82 (85.7%) study participants had heard about refractive surgery. This rate was considered low given that the subjects were medical students and refractive surgery is one of the most well-known procedures in ophthalmology. This rate was lower than that found by Kara José<sup>(3)</sup> (92.8%) in a study conducted at ABC's Medical School.

On the other hand only 32.6% of students in our study said they expected a complete cure after undergoing the procedure, a false expectation reported by 69% of students in the study by

Kara José<sup>(3)</sup>. We also found that the expectation of a complete cure was higher among subjects who wanted to undergo the procedure.

Other relevant data which emerged from the questionnaires were the quality of information about refractive surgery and its relation to the source of information. A higher percentage of students who knew how the procedure is done and its risks had received information from their ophthalmologist. On the other hand, students who had heard about refractive surgery but did not know how it is done had mostly obtained information from the television and friends. These are seen as poor sources as they only provide limited information, which could explain why this group had only partial knowledge about the subject.

The main reasons why the students who wanted to undergo the procedure had not done so was because they had been advised against it by their doctor or because of financial reasons — 30.2% and 24.5% of participants, respectively. This confirms the results from a similar study conducted at ABC's Medical School, which showed that 39.6% were advised against the procedure by their doctor and 24.7%<sup>(3)</sup> mentioned financial reasons.

The main reason students gave for not wanting to undergo surgery was their low degree of visual impairment, which was also found in the study conducted at ABC's Medical School<sup>(3)</sup>.

Another relevant observation was that the fear of the procedure or its results was a reason given almost exclusively by students who did not know how the procedure was done. This

## Annex 1

## QUESTIONNAIRE

1. Gender: ( ) Female ( ) Male
  2. Race : ( ) White ( ) Black ( ) Brown ( ) Yellow ( ) Amerindian
  3. Age: \_\_\_\_\_
  4. Course: ( ) Medicine ( ) Fashion Design
  5. Have you ever consulted an ophthalmologist? ( ) Yes ( ) No
  6. If yes, when was your last consultation? ( ) Less than a year ago ( ) 1-3 years ( ) More than 3 years ago
  7. Do you have any visual impairment? ( ) No ( ) Yes, shortsightedness ( ) Yes, longsightedness ( ) Yes, short and longsightedness
  8. Did your DOCTOR diagnose you as having some kind of refractive error (myopia, astigmatism, hyperopia, presbyopia)? (more than one answer possible)
    - ( ) Yes, myopia (shortsightedness)
    - ( ) Yes, astigmatism (short and longsightedness — irregular blurred vision, i.e. some parts of the image are clearer or more blurred than others)
    - ( ) Yes, hyperopia (longsightedness)
    - ( ) Yes, presbyopia (longsightedness generally starting at 40 years of age)
    - ( ) I do not know (skip to question 13)
    - ( ) I was not diagnosed as having a refractive error (skip to question 13)
  9. At what age was the problem diagnosed?
    - ( ) 1-5 years ( ) 6-12 years ( ) 13-15 years ( ) 16-18 years ( ) over 18 years
  10. What is the degree of your visual impairment? (more than one answer possible)
    - Myopia:** ( ) -1.00 D or less ( ) Between -1.25 and -3.00 D ( ) More than -3.00 D ( ) I do not have myopia ( ) I have myopia but do not know the degree
    - Hyperopia:** ( ) +1.00 D or less ( ) Between +1.25 and +3.00 D ( ) More than +3.00 D ( ) I do not have hyperopia ( ) I have hyperopia but do not know the degree
    - Astigmatism:** ( ) 1.00 D or less ( ) Between 1.25 and 3.00 D ( ) More than 3.00 D ( ) I do not have astigmatism ( ) I have astigmatism but do not know the degree
    - Presbyopia:** ( ) +1.00 D or less ( ) Between +1.25 and +3.00 D ( ) More than +3.00 D ( ) I do not have presbyopia ( ) I have presbyopia but do not know the degree
  11. Do you use contact lenses or glasses for correction?
    - ( ) Yes, glasses ( ) Yes, contact lenses ( ) Yes, glasses and lenses ( ) I was prescribed visual correction but I do not use it ( ) I was not prescribed visual correction ( ) I no longer use them because I underwent corrective surgery
  12. If you use correction methods (glasses or contact lenses), when do you use them? (tick all situations in which you use them)
    - ( ) All the time ( ) For work or studying ( ) To drive ( ) To watch TV or for the cinema ( ) For the computer ( ) Other. Please specify:
- 
13. Has your father been diagnosed by a DOCTOR as having some kind of refractive error? (more than one answer possible)
    - ( ) Yes, myopia ( ) Yes, astigmatism ( ) Yes, presbyopia ( ) Yes, hyperopia ( ) Yes, but I do not know which one ( ) No ( ) I do not know
  14. Has your mother been diagnosed by a DOCTOR as having some kind of refractive error? (more than one answer possible)
    - ( ) Yes, myopia ( ) Yes, astigmatism ( ) Yes, presbyopia ( ) Yes, hyperopia ( ) Yes, but I do not know which one ( ) No ( ) I do not know
  15. On average, how much time do you spend reading each week?
    - ( ) 18 hours or more ( ) 14-17 hours ( ) 10-13 hours ( ) 6-9 hours ( ) 3-6 hours ( ) Less than 3 hours
  16. On average, how much time do you spend doing the following the activities per week?
    - Television:** ( ) Less than 2 hours ( ) 2-3 hours ( ) 4-5 hours ( ) 6-7 hours ( ) 8-9 hours ( ) 10 hours or more
    - Videogames:** ( ) Less than 2 hours ( ) 2-3 hours ( ) 4-5 hours ( ) 6-7 hours ( ) 8-9 hours ( ) 10 hours or more
    - Computer:** ( ) Less than 2 hours ( ) 2-3 hours ( ) 4-5 hours ( ) 6-7 hours ( ) 8-9 hours ( ) 10 hours or more
    - Writing or drawing:** ( ) Less than 2 hours ( ) 2-3 hours ( ) 4-5 hours ( ) 6-7 hours ( ) 8-9 hours ( ) 10 hours or more
  17. Have you heard of refractive surgery? (surgery to correct refractive eyesight problems) ( ) Yes ( ) No (skip to question 28)
  18. Do you know how the procedure is performed? ( ) Yes ( ) No
  19. How were you informed about it? (more than one answer possible)
    - ( ) Ophthalmologist ( ) Doctor but not an ophthalmologist ( ) Other healthcare professional ( ) University ( ) Newspaper ( ) TV ( ) Family ( ) Friends ( ) I do not know anything about it ( ) Other
  20. Do you know about the procedure's risks? ( ) Yes ( ) No
  21. What are your expectations of refractive surgery? ( ) Complete cure ( ) Reduction of dependence on visual correction
  22. Have you already undergone refractive surgery? ( ) Yes ( ) No (skip to question 25)
  23. If yes, were you satisfied with the result? ( ) Yes ( ) Partly ( ) No
  24. What is your monthly household income?

( ) 1-3 times the minimum wage ( ) 3-5 times the minimum wage ( ) 5-10 times the minimum wage ( ) 10-15 times the minimum wage ( ) 15-20 times the minimum wage ( ) More than 20 times the minimum wage ( ) I do not know

25. How was the procedure paid for? ( ) Covered by health insurance ( ) Privately ( ) Other: \_\_\_\_\_

26. What type and degree of visual impairment was corrected by the refractive surgery?

RIGHT EYE:

**Myopia:** ( ) -1.00 D or less ( ) Between -1.25 and -3.00 D ( ) More than -3.00 D ( ) I do not know

**Hyperopia:** ( ) +1.00 D or less ( ) Between +1.25 and +3.00 D ( ) More than +3.00 D ( ) I do not know

**Astigmatism:** ( ) 1.00 D or less ( ) Between 1.25 and 3.00 D ( ) More than 3.00 D ( ) I do not know

**Presbyopia:** ( ) +1.00 D or less ( ) Between +1.25 and +3.00 D ( ) More than +3.00 D ( ) I do not know

LEFT EYE

**Myopia:** ( ) -1.00 D or less ( ) Between -1.25 and -3.00 D ( ) More than -3.00 D ( ) I do not know

**Hyperopia:** ( ) +1.00 D or less ( ) Between +1.25 and +3.00 D ( ) More than +3.00 D ( ) I do not know

**Astigmatism:** ( ) 1.00 D or less ( ) Between 1.25 and 3.00 D ( ) More than 3.00 D ( ) I do not know

**Presbyopia:** ( ) +1.00 D or less ( ) Between +1.25 and +3.00 D ( ) More than +3.00 D ( ) I do not know

27. How old were you when you underwent the procedure?

28. If you have not undergone surgery, do you intend to? ( ) Yes ( ) No (skip to question 30) ( ) I do not know (skip to question 30)

29. If you would like to undergo refractive surgery, why have you not yet done so? (more than one answer possible)

( ) Advised against it by a doctor ( ) Financial reasons ( ) I do not trust the doctor and/or the procedure ( ) Lack of knowledge ( ) Lack of opportunity ( ) Afraid of results ( ) Other

30. If you would not like to undergo refractive surgery or do not know whether you want to or not, what is the reason? (More than one answer possible):

( ) Mild visual impairment ( ) Lack of interest ( ) Lack of trust ( ) Lack of knowledge ( ) Afraid of results ( ) Financial reasons ( ) Advised against it by a doctor ( ) Other

31. Would you like to know more about it? ( ) Yes ( ) No

group also showed the least interest in undergoing surgery.

Only 3 students in the sample had already undergone refractive surgery. This is probably due to the participants young age — 21 years old on average. At this age, eyesight usually has not yet stabilised, a prerequisite for surgery.

## CONCLUSION

Brazilian medical training currently prioritises certain areas of medicine to the detriment of others. Ophthalmology is given little importance on the medical curriculum. This is evident from the fact that although a significant number of students said they knew about the procedure, less than half knew how it was performed. As such, there is a clear lack of knowledge about one of the most commonly used and debated procedures in the field — Lasik is one of the most commonly performed operations in the world. The study participants showed a lack of information about the procedure; considering they are medical students, they should know much more about the topic.

Also, the lack of knowledge about the subject affects the interest of participants in undergoing the procedure, as shown by the considerably higher number of participants who did not want to undergo surgery amongst those who did not know how it was performed, compared to out of those who did know.

The main aim of refractive surgery is to reduce the dependence on correction methods. Interestingly, there was a greater number of students with false expectations amongst those who said they wanted to undergo surgery, compared to those who did not. That is to say, they expect the refractive error to be completely corrected. This situation is far from ideal because patients tend to be more satisfied when they have more realistic

expectations about the procedure.

Therefore, the general population, and medical students in particular, needs greater clarification on the matter. This is very important given that in the future, these students will become the professionals who will have to answer the doubts their patients might have about the matter.

## **Aknowledgements**

Marcelo Rosa Gameiro and Leonardo Thomaz de Aquino Filho.

## REFERÊNCIAS

1. Alves AA. Refração. 5a ed. Rio de Janeiro: Guanabara-Koogan; 2008.
2. Victor G, Urbano A, Marçal S, Porto R, Francesconi CM, Forseto AS, et al. Primeiro censo brasileiro em cirurgia refrativa. *ArqBras Oftalmol.* 2005;68(6):727-33.
3. Kara-José FC, Passos LB, Jervásio AC, Salomão GH. Interesse e conhecimento em cirurgia refrativa entre estudantes de medicina. *ArqBras Oftalmol.* 2002;65(1):71-4.
4. Sperduto RD, Seigel D, Roberts J, Rowland M. Prevalence of myopia in the United States. *Arch Ophthalmol.* 1983;101(3):405-7.
5. Midelfart A, Aamo B, Sjøhaug KA, Dysthe BE. Myopia among medical students in Norway. *Acta Ophthalmol (Copenh).* 1992;70(3):317-22. Comment in *Acta Ophthalmol (Copenh).* 1993;71(3):429.
6. Chow YC, Dhillon B, Chew PT, Chew SJ. Refractive errors in Singapore medical students. *Singapore Med J.* 1990;31(5):472-3.
7. Barreto Júnior J, Prevedello LM, Silveira CA, Yared JH, Abib FC. Prevalência da miopia em estudantes de medicina da Universidade Federal do Paraná. *Rev Bras Oftalmol.* 2000;59(10):719-23.