ORIGINAL ARTICLE

CONTENTS

Attitude of medical university students towards the need for knowledge about the organization of prevention and treatment of glaucoma

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ABSTRACT

Aim: To investigate the need among future doctors of various specialties (medical university students) to study the fundamentals of the organization of diagnosis, treatment and prevention of glaucoma.

Materials and Methods: A custom-designed questionnaire was used as the research tool. The study materials consisted of data obtained from a survey of senior students at three medical universities in Ukraine. Bibliographic, statistical, and analytical methods were employed in the study.

Results: Overall, 80% of medical students believe that knowledge of the discipline "Ophthalmology" is necessary for future physicians of all specialties. 75% of respondents rated the scope and quality of ophthalmology knowledge received during the pre-graduation stage at 3–5 points on a 5-point scale. One-third of students rated their knowledge of the organization of ophthalmologic care and the prevention of eye diseases at 3 points. More than 80% of students highly valued the importance of future physicians of all specialties being knowledgeable about modern approaches to glaucoma prevention and the factors influencing its development. However, while there is general understanding among future physicians about the need to know the current algorithm of actions when glaucoma or pseudoexfoliation syndrome is suspected, knowledge of modern treatment approaches for glaucoma patients is not deemed necessary by all. 75% of students plan to apply their knowledge of glaucoma prevention in their future practice, but they do not intend to carry out preventive activities aimed at preventing the development of glaucoma.

Conclusions: Overall, 70–80% of the surveyed medical students recognize the importance of ophthalmology knowledge. However, their assessment of the volume and quality of their own knowledge was not sufficiently high. Future physicians understand the importance of being informed about risk factors for glaucoma and its prevention. Evaluations of the need for in-depth knowledge of modern treatment approaches for glaucoma patients or the organization of glaucoma prevention were more reserved. Sixth-year students and medical interns feel uncertain about their theoretical and practical knowledge of ophthalmology. Educators teaching the "Ophthalmology" discipline should clearly demonstrate the relevance and value of ophthalmological knowledge for various medical specialties, especially for family physicians.

KEY WORDS: glaucoma, ophthalmology, medical education, knowledge needs assessment, organization of ophthalmologic care

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INTRODUCTION

One of the priorities of public health is the health of human eyes, as visual impairment and blindness have a negative impact on all aspects of human life, sustainable development and economies. At the same time, many people in the world continue to suffer from the consequences of poor access to high quality and affordable health care, including eye care. In 2020, approximately 596 million people worldwide had distance vision impairment, of whom 43 million were blind. According to the forecast, by 2050, their numbers may increase by 50.2% and 41.8%, respectively, including due to population aging. However, more than 90% of these cases have a preventable or treatable cause. The thirty-year dynamics (1990-2020) of a 28.5% decrease in the age-standardized prevalence of blindness worldwide as a result of timely diagnosis and effective treatment of eye diseases looks encouraging [1].

Glaucoma is the second leading cause of blindness in the world, and it is irreversible. Late diagnosis of the disease is often caused by its asymptomatic course in the early stages, which is why about half of the cases remain undiagnosed and untreated. The main prognostic risk factors for glaucoma are known: family and genetic history, ethnicity, myopia, and diabetes mellitus. However, the most important factor is elevated intraocular pressure, which is practically the only factor that can be effectively influenced [2].

This year's International Glaucoma Day is being held under the slogan «Unite for a Glaucoma-Free World» and is designed to help raise awareness of glaucoma among people around the world. Medical students, as future doctors, can make a significant impact on public awareness of glaucoma by emphasizing the importance of prevention, especially in cases of high risk.

The experience of involving medical students in glaucoma screening among low-income populations using portable tonometers (Student Sight Savers Program, an initiative launched at Johns Hopkins University, USA) in underserved areas not only raises public awareness of glaucoma, but also disseminates knowledge of future doctors, improves their practical skills, and encourages them to master the profession of ophthalmology [3].

In addition, the careful attitude of doctors of various specialties, especially family doctors, to patients with glaucoma will facilitate their early referral to an ophthalmologist and encourage continuous treatment, which can reduce the progression of the disease. Currently, there are many studies on the awareness of the public and medical students about glaucoma, but the motivational component of ophthalmology education for future doctors of various specialties is not sufficiently studied.

AIM

To investigate the need of future doctors of different specialties (students of medical universities) to learn the basics of organization of diagnosis, treatment and prevention of glaucoma.

MATERIALS AND METHODS

The research tool was a self-developed questionnaire containing 11 questions. The study materials were based on a questionnaire survey of 963 senior students of three medical universities in Kyiv, Chernivtsi and Poltava who had already completed the course «Ophthalmology» in the fourth year of study. The sample of medical students was dominated by women (68%), with men accounting for 32%. The average age of the students was 22.4 years. The study used bibliographic, medical and statistical, and analytical methods. The study was conducted in compliance with the standards and principles of the World Medical Association's Declaration of Helsinki «Ethical Conduct for Research Involving Human Subjects» (2014). The questionnaire used in the study was approved by the Ethics Committee of the A.A.Bogomolets National Medical University, Protocol No. 190, dated 12/23/24.

RESULTS

In Ukraine, medical students study the discipline «Ophthalmology» in the 4th year of study and a separate practical lesson is devoted to glaucoma. 75% of respondents rated the amount and quality of knowledge gained in this discipline at the undergraduate stage at 3-5 points (Table 1). The average score of answers to these questions did not differ significantly ($p>0.05$). It is noteworthy that one third of students rated their knowledge of the organization of ophthalmic care and prevention of ophthalmic diseases at 3 points. In general, 80% of medical students believe that knowledge of the discipline «Ophthalmology» is necessary for future doctors of all specialties.

More than 80% of students highly appreciated the importance of future doctors of all specializations' knowledge of modern approaches to the organization of glaucoma prevention and factors influencing the development of glaucoma (Table 2). However, if there is an understanding among future doctors that it is necessary to know the modern algorithm of actions in case of suspected glaucoma or pseudoexfoliation syndrome (mean score was 3.63±1.13 and 3.33±1.21, respectively), not all of them need to know modern approaches to the treatment of patients with glaucoma (mean score was significantly lower and amounted to 2.77±1.25, $p=0.00$, $t=15.38$).

Medical students in the vast majority plan to use knowledge about glaucoma prevention in their future activities (Table 3). In total, almost 75 of students rated these intentions at 3-5 points (mean score was 3.31±1.31), but the rest of the students do not see such a need, especially do not plan to carry out preventive activities to prevent the development of glaucoma (almost half of the students rated this possibility at 1-2 points). The mean score of this answer was significantly lower ($p=0.00$, $t=9.19$) and amounted to 2.79±1.25.

Perhaps this is related to the choice of future specialty by medical students, since only 9.35±0.94 of respondents had previously chosen ophthalmology. Despite the fact that 19.83±1.28 of respondents have not yet decided on their choice, 12.15±1.05 chose family medicine, 17.76±1.23 – therapeutic specialties, 19.42±1.27 – surgical specialties, the rest of the respondents (21.48±1.36) want to connect their future with other medical specialties (pediatrics, laboratory diagnostics, forensic medicine, psychology, radiology, etc.). Therefore, they believe that knowledge of ophthalmology, in particular glaucoma, is not as important for all specialties as it is for ophthalmologists. This is a serious challenge for ophthalmology teachers, who must convincingly demonstrate the importance of ophthalmology knowledge for various specialists, especially family doctors.

Table 1. Medical students' assessment of some aspects of mastering the discipline «Ophthalmology» (n=963)

№	Score on a scale from 1 to 5 (1 - the lowest degree, 5 - the highest degree), abs., (%±SE)					Average score (M±SD)
	1	2	3	4	5	
1	Do future doctors of all specializations need knowledge of the discipline "Ophthalmology"?					
	55 (5,71±0,75)	118 (12,25±1,06)	246 (25,55±1,41)	264 (27,41±1,44)	280 (29,2±1,46)	3,61±1,18
2	Do you consider the amount of knowledge gained in the discipline "Ophthalmology" at the pre-graduation stage sufficient for your future work as a doctor?					
	92 (9,55±0,95)	149 (15,47±1,17)	239 (24,82±1,39)	254 (26,38±1,42)	229 (23,78±1,37)	3,39±1,26
3	Could you please assess the quality of your knowledge on the organization of eye care and prevention of eye diseases?					
	74 (7,68±0,86)	158 (16,41±1,19)	287 (29,8±1,47)	247 (26,65±1,41)	197 (20,46±1,3)	3,34±1,19

Source: compiled by the authors of this study

Table 2. Medical students' assessment of the need to acquire knowledge about glaucoma: answer to the question «Do future doctors of all specializations need to know:» (n=963)

№	Score on a scale from 1 to 5 (1 - the lowest degree, 5 - the highest degree), abs., (%±SE)					Average score (M±SD)
	1	2	3	4	5	
1	modern approaches to the organization of glaucoma prevention?					
	52 (5,04±0,73)	140 (14,54±1,14)	262 (27,21±1,43)	271 (28,14±1,45)	239 (24,82±1,39)	3,52±1,16
2	factors that influence the development of glaucoma?					
	44 (4,57±0,67)	98 (10,18±0,97)	262 (27,21±1,43)	271 (28,14±1,45)	239 (24,82±1,39)	3,68±1,12
3	modern algorithm of actions in case of suspected glaucoma?					
	39 (4,05±0,64)	124 (12,88±1,08)	248 (25,75±1,41)	286 (29,7±1,47)	266 (27,62±1,44)	3,63±1,13
4	a modern algorithm of actions in case of suspected pseudoexfoliative syndrome?					
	84 (8,72±0,91)	154 (15,99±1,18)	276 (28,66±1,46)	250 (25,96±1,41)	199 (20,66±1,30)	3,33±1,21
5	modern approaches to the treatment of glaucoma patients?					
	170 (17,65±1,23)	268 (27,83±1,44)	246 (25,55±1,41)	167 (17,34±1,22)	112 (11,63±1,03)	2,77±1,25

Source: compiled by the authors of this study

Table 3. Assessment of medical students' intentions to use the acquired knowledge on glaucoma in future medical practice (, n=963)

№	Score on a scale from 1 to 5 (1 - the lowest degree, 5 - the highest degree), abs., (±SE)					Average score (M±SD)
	1	2	3	4	5	
1	Do you plan to use knowledge about glaucoma prevention in your future activities?					
	117 (12,15±1,05)	145 (15,06±1,15)	242 (25,13±1,4)	232 (24,09±1,38)	227 (23,57±1,37)	3,31±1,31
2	Do you plan to carry out preventive activities to prevent the development of glaucoma in your future activities?					
	167 (24,1±1,62)	245 (25,44±1,4)	228 (23,68±1,37)	214 (22,22±1,34)	199 (20,66±1,30)	2,79±1,25

Source: compiled by the authors of this study

DISCUSSION

The data obtained in this study on students' self-assessment of their knowledge of ophthalmology were considered low, which is consistent with the results of other studies. Gaps in knowledge were identified during a survey of senior medical students at the University of Punjab: only 45 of students know that glaucoma is the second cause of blindness in the world after cataracts, and 30 know that glaucoma is asymptomatic. The vast majority of students are familiar with the basic methods of diagnosis and treatment of glaucoma, but half of the respondents consider their level of knowledge insufficient [4]. A survey of students of the last two years of study at the Faculty of Medicine of the Federal University of Juiz de Fora (Brazil), which was aimed at finding out the level of knowledge about primary open-angle glaucoma, revealed that only one third of them mentioned fundoscopy and perimetry as important tools for assessing glaucoma. 95.1 of students recognized their knowledge as insufficient [5]. In another study,

where a survey of medical students from three colleges in India was structured as a glaucoma test, it was found that only 11 of students had good knowledge, 50 had satisfactory knowledge, but awareness of symptoms and risk factors such as family history of glaucoma, diabetes, hypertension, obesity, steroid use were low [6].

It should be noted that the study of ophthalmology is based on fundamental knowledge of normal and pathological anatomy and physiology of the eye. A study among Indian undergraduate college students who had not yet studied ophthalmology but were aware of the presence of glaucoma revealed an insufficient level of knowledge of pathophysiology and risk factors for its occurrence [7]. In addition, there is a certain time and semantic gap in the knowledge gained at the fundamental departments (2-3 years of study), then at the Department of Ophthalmology in the 4th year. In the 6th year, eye diseases are included as a separate topic in the family medicine cycle. Therefore, interdisciplinary collaboration can help to place ophthalmology knowledge in the contexts of different disciplines to build a more holistic view of ophthalmic pathology. It is also advisable to include the requirements of ophthalmic diagnostics in the OSCE exams using simulation models. This proposal was the result of an analysis of the state of ophthalmic education in the United States and Canada. When developing curricula, it is necessary to take into account the theory of cognitive load for better memorization of complex material in ophthalmology [8].

Regarding the choice of ophthalmology as a postgraduate specialization, it is known that students have a prevalent opinion that the discipline is difficult to master, as evidenced by the results of a survey of graduate students of an Indian medical university. However, their negative opinion can be changed by clinical experience [9]. A study of doctors in Brazilian clinics demonstrated the main reasons for choosing ophthalmology as a career. It turned out that they are common to doctors of different generations: flexible working hours, satisfaction from the opportunity to help people improve their vision, and the ability to perform surgical procedures. It has been found that younger generations in ophthalmology value short procedures and relatively quick results, while older generations value having a «family» ophthalmologist [10].

Leading ophthalmologists from Australian and New Zealand medical schools complain about the short duration of ophthalmology cycles, while pointing to the need for autonomous motivation in their students [11]. Thus, the results of a study of students' knowledge at the Medical School of the University of Split (Croatia) showed that, in general, the level of knowledge of students about glaucoma is characterized as low, even after completing the course of this discipline, possibly due to the fact that a short course in ophthalmology includes the study of a significant number of eye diseases. It has been suggested that elective courses on glaucoma should be created for students or for practicing medical professionals as part of their continuing education [12].

An even more significant lack of ophthalmology hours is observed at the postgraduate level of education. However, despite the fact that the number of hours of ophthalmic training received by family medicine interns at the University of Western Ontario was in line with the recommendations of the International Council of Ophthalmology Working Group, 80 of future family physicians were not entirely confident in their ability to treat common eye diseases, namely eye emergencies (acute angle-closure glaucoma, chemical eye burn). Therefore, it was reasonable to propose to increase the number of hours of ophthalmology in family medicine residency training [13].

Given that a significant number of medical higher education institutions have pharmaceutical faculties, the experience of involving pharmacists in disseminating information about eye diseases and their prevention among patients on the example of Saudi Arabia is relevant [14]. Pharmacists are the most accessible health care professionals, they have a unique opportunity to raise awareness of glaucoma among patients, improve patient compliance with the use of eye drops [15]. Therefore, it is advisable to support the idea of introducing ophthalmology into the educational training of pharmacists.

The survey of medical students at Jazan University provided insight into the compliance of the university's ophthalmology program with the International Council of Ophthalmology (ICO) recommendations, which included visual examination skills, emergency recognition, and more. It was found that almost half of the students reported insufficient practical experience, and only 20 had an average grade in ophthalmology of 4.76-5.00. Only 30 of survey participants expressed interest in ophthalmology. It was noted that medical education can be improved by increasing practical clinical experience, small group training, etc. Better quality of education can be achieved by improving the effectiveness of curricula for students to become qualified in ophthalmology [16].

Innovative practices of teaching ophthalmology and new international educational strategies can improve teaching and learning in a limited time. The «marginalization» of ophthalmology education (reducing it to determining visual acuity and prescribing glasses) can

be overcome by introducing innovations in the content of ophthalmology curricula, teaching methods, instructional design, learning objectives, and assessment methods [17].

A survey of students who underwent clinical practice in ophthalmology gave an idea of the motivation of medical students studying ophthalmology. It was found that, according to the theory of self-determination, the perception and awareness of the three basic psychological needs – autonomy, competence and belonging – are influenced by five main factors: leadership, growth mindset, evaluation, curriculum pressure and extracurricular pressure. This understanding should be taken into account by ophthalmology educators when developing curricula and using teaching methods to develop intrinsic motivation in students [18]. A study of factors that promoted or hindered the learning and motivation of 4th year medical students at the University of California identified the main areas of motivation support: teaching at the appropriate level; integration into the team and workflow; independent learning and career search [19].

CONCLUSIONS

The conducted survey of future doctors gave an idea of the level of formation of their motivational and value criteria regarding the need to acquire knowledge of early diagnosis, prevention and treatment of glaucoma in the process of undergraduate education. In general, medical students (70-80% of respondents) are aware of the importance of this knowledge, as well as mastering the discipline «Ophthalmology» in general. However, their own score on a 5-point scale was not high enough, as it did not reach 4 points for any question, and therefore students were not unanimous in assessing the importance of each aspect of glaucoma. 15-20% of respondents rated each question at 1-2 points. We can agree with this assessment regarding the need for in-depth knowledge of modern approaches to the treatment of patients with glaucoma or the organization of glaucoma prevention, which is required by doctors of not all specialties. Students of the 6th year of study or internship may be unsure of their knowledge of the theory and practice of ophthalmology. Only ophthalmologists who have undergone the appropriate specialization can be expected to have in-depth knowledge of the accurate diagnosis or complex treatment of glaucoma. It is important for doctors of other specialties to know the risk factors for glaucoma, methods of early diagnosis and basic preventive measures. Developing competency-based curricula, increasing practical clinical experience, and teaching in small groups will increase students' self-confidence, provide them with the necessary skills, and generally improve the quality of education.

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CONFLICT OF INTEREST
The Authors declare no conflict of interest

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