

ANALYSIS OF CURRENT OPHTHALMOLOGY RESIDENCY CURRICULUM

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SUMMARY – The aim of the study was to perform qualitative and quantitative analysis of residency curriculum in ophthalmology. A structured anonymous questionnaire was distributed to 73 medical doctors who were at least on the second year of their residency training in ophthalmology or young ophthalmologists with maximum 4 years of experience. The questionnaire consisted of 52 questions covering every segment of education from the current Protocol for Residency Education of Health Care Professionals in Ophthalmology. Forty-two (58%) doctors answered the questionnaire. Qualitative analysis showed that most of the procedures were mastered by residents. Diagnostic and/or examination procedures were mastered better than surgical and/or interventional procedures. Quantitative analysis showed that the majority of residents failed to reach the prescribed number of surgical procedures. Thirty-three (79%) participants were not satisfied with the current residency curriculum. Although residents mastered most of the prescribed procedures, current residency curriculum is far from being perfect and needs improvements. We think that objective assessment tools for monitoring the progress and competencies of residents during their residency training need to be developed.

Key words: *residency, education, ophthalmology*

Introduction

Current residency curriculum in ophthalmology has not changed since 1994. Moreover, there has not been any evaluation of the curriculum. In the USA, however, apart from traditional structure- and process-based learning, they are trying to employ a competency-based system which defines the desired outcome of training. This means that the desired outcome of training is evaluated (e.g., competence in caring for ophthalmologic patients) rather than training experience gained by exposure to specific content for specific periods (e.g., rotations during residency training). Since 1997, the Accreditation Council for Graduate Medical Education (ACGME) has identified 6 general competencies for resident education¹. Residency curricula must demonstrate that their

residents are competent in these areas. A failure to do so may result in the loss of accreditation. For this reason, evaluation tools in ophthalmology like OCEX (Ophthalmic Clinical Evaluation Exercise) and GRASIS (Global Rating Assessment of Skills in Intraocular Surgery) have been developed^{2,3}. They served as a major motivation factor for this survey.

Material and Methods

We constructed a questionnaire which consisted of 52 questions divided into 8 sections and covering every segment from the current Protocol for Residency Education of Health Care Professionals in Ophthalmology, issued by the Ministry of Health and Social Welfare, Republic of Croatia (Protocol).

The questionnaire was completely anonymous. It was installed on the web server and the link to the internet address with the questionnaire was sent to 73 medical doctors who were at least on the second year of their residency training or young ophthalmologists who

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Table 1. Two types of possible answers with descriptions as used in the questionnaire

Answer	Mark used in answering	Description
I	1	I was not allowed to perform the procedure.
	2	I was allowed to perform the procedure, but only under the supervision of the specialist.
	3	I was allowed to perform the procedure even without the supervision.
II	A	I don't know how to perform the procedure.
	B	I know how to perform the procedure, but I am not confident in performing it by myself.
	C	I know how to perform the procedure and I am confident in performing it by myself.

had been in practice for maximally 4 years. Every doctor was additionally informed about the questionnaire by phone. After someone had completed the questionnaire, the "send" button had to be pressed and the answers were automatically sent to the e-address of the author. In this way, the only information that we got apart from the answers was the server's web address and the date of sending.

Sections in the questionnaire included general ophthalmology, anterior segment, posterior segment, plastic and reconstructive surgery and orbit, pediatric ophthalmology and strabismus, glaucoma, neuro-ophthalmology with perimetry, and postgraduate study in ophthalmology.

Every question had to be answered by two answers. The first answer consisted of a number (1, 2 or 3) describing how much a particular procedure was demonstrated to the resident by his supervisor. The second answer consisted of a letter (a, b or c) describing how confident was the resident in performing that particular procedure (Table 1). In this way, the first answer described how well a procedure was taught by the supervisor, and the second answer described how well the resident did learn the same procedure. Those who did not get familiar with certain procedures due to short duration of their residency training (especially younger residents) were instructed not to answer the questions related to these procedures.

We added a question on the phacoemulsification procedure which is not included in the current Protocol, but we considered it important in current education.

Questions concerning surgical and laser procedures were complemented with answers indicating the total number of the procedures performed.

Questions related to obligatory postgraduate study in ophthalmology and general satisfaction of residents included mostly "yes"- or "no"-type answers.

Statistical analysis of two answers regarding each procedure was performed to check if the answers matched (1 with a, 2 with b, and 3 with c). For this purpose we used Wilcoxon signed rank test for dependent samples.

Results

The questionnaire was filled in by 42 doctors (30 residents and 12 young ophthalmologists). There were 13 second-year, 15 third-year and 2 fourth-year residents. Because of only two fourth-year residents their answers were analyzed together with the answers from the third-year residents.

After statistical testing of two answers for every procedure, we found the numbers to match with letters (1=a, 2=b, 3=c) for all except for 2 procedures: extracapsular cataract extraction (ECCE), $p=0.052$, and argon laser photocoagulation (ALP), $p=0.046$. This means that the first answer which described how well some procedure was taught matched the second answer which described how well the resident performed that procedure. According to this, we decided to group the possible answers into three categories as shown in Table 2: (a) those that do not know how to perform the procedure at all; (b) those who know how to perform the procedure, but are not confident in performing it by themselves; and (c) those who know how to perform the procedure and are confident in performing it by themselves. Because of the small number of answered questions from the 2nd-year residents in the posterior segment section, we decided to exclude their answers from analysis of that section.

The current Protocol prescribes preliminary exam to be held at the end of each rotation. Results show that only a small number of residents had preliminary exams: 13 after general ophthalmology, 1 after anterior

Table 2. Qualitative analysis of various procedures during residency training in ophthalmology

Procedure	No. of those who don't know how to perform the procedure not confident	No. of those who know how to perform the procedure, but are confident	No. of those who know how to perform the procedure and	No. of those who didn't answer the question
General ophthalmology				
Autokeratorefractometry and prescribing glasses	5	3	34	–
Applanation tonometry	4	1	37	–
Corneal foreign body extraction	1	2	39	–
Seidel test	6	3	30	3
Anterior segment				
Extracapsular cataract extraction ^a	7	30	3	2
Phacoemulsification	33	6	1	2
Intraocular lens implantation	11	21	7	3
Nd:YAG laser capsulotomy	12	6	16	8
Posterior segment ^b				
Indirect ophthalmoscopy	–	3	23	3
Examination with the Goldmann three-mirror lens	2	6	18	3
Examination with the panfundusopic lens	6	5	13	5
Argon laser photocoagulation ^a	12	8	5	4
Fluorescein angiography	12	9	4	4
Plastic and reconstructive surgery and orbit				
Small surgical procedures on eyelids and adnexa	–	2	35	5
Enucleation	11	14	9	8
Pediatric ophthalmology and strabismus				
Retinoscopy	2	7	22	11
Diagnosis of strabismus	3	13	13	13
Conservative treatment of strabismus	3	15	11	13
Strabismus surgery	13	14	1	14
Glaucoma				
Gonioscopy	2	7	20	13
Nd:YAG laser iridotomy	12	6	5	19
Neuro-ophthalmology with perimetry				
Static perimetry	11	9	8	14
Kinetic perimetry	9	8	6	19

^aquestions that showed statistically significant difference in number-letter matching; ^banalysis done without 2nd-year residents (n=29)

segment, 2 after posterior segment, and 8 after neuro-ophthalmology rotation.

Results of quantitative analysis which show the number of procedures done by the residents and young

specialists during their residency training are shown in Table 3.

Answers regarding the postgraduate study in ophthalmology are shown in Table 4. The first two questions

Table 3. Quantitative analysis of procedures performed during residency training in ophthalmology

Procedure	Number of residents																	
	with 0 procedures			with 1-10 procedure			with 11-25 procedure			with 26-50 procedure			with >50 procedures			no answer		
	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III
Extracapsular cataract extraction	7	6	2	5	8	8	0	2	1	1	-	1	-	-	-	-	1	-
Phacoemulsification	12	15	12	-	2	-	1	-	-	-	-	-	-	-	-	-	-	-
Intraocular lens implantation	8	6	3	4	7	8	-	2	1	-	-	-	1	-	-	-	2	-
Nd:YAG laser capsulotomy	8	6	6	1	4	2	1	4	2	-	2	2	-	-	-	3	1	-
Small surgical procedures on eyelids and adnexa	-	3	0	2	-	1	2	1	1	3	5	3	2	4	6	4	4	1
Enucleation	8	8	7	2	5	3	-	1	2	-	-	-	-	-	-	3	3	-
Strabismus surgery	8	12	12	1	-	-	-	-	-	-	-	-	-	-	-	4	5	-

I=2nd-year residents; II=3rd- and 4th-year residents; III=young ophthalmologists

could be answered by all participants, while the second two questions could only be answered by those who had completed the postgraduate study.

The last question was about the general satisfaction with the current way of residency education. Only six residents were satisfied, 33 were not satisfied, and three did not answer the question.

Discussion

This is the first paper on the analysis of the current residency curriculum in ophthalmology in Croatia. The analysis was qualitative because we evaluated percep-

tions of residents and young ophthalmologists of how well they were taught and how much they learned during their education. Also, the analysis was quantitative because it showed the number of procedures that residents and young ophthalmologists were able to perform during their residency.

In the general ophthalmology section, the majority of residents mastered all of the procedures.

In the anterior segment section, ECCE and intraocular lens (IOL) implantation, which are two connected procedures, were partially mastered, whereas phacoemulsification, which is a new method of cataract surgery, was not mastered. Interestingly, regarding Nd:YAG

Table 4. Questions and answers regarding postgraduate study in ophthalmology

Which way of continuous education is better?	Preliminary exam at the end of each rotation			Postgraduate study		No answer
	18			18		6
Postgraduate study should be:	Obligatory			Nonobligatory		No answer
	15			22		5
Postgraduate study lectures are:	Mostly "out of date"			Mostly contemporary		No answer
	18			7		17
Does the postgraduate study helps in learning for the specialist exam?	Completely	Partially	Very little	Not at all	No answer	
	6	16	3	-	17	

laser capsulotomy, which is a simpler method to perform than cataract surgery, there was an equal number of residents who did not or only partially mastered the procedure and those who completely mastered the procedure. If we look at the number of ECCE and IOL implantations performed, it is evident that most of the residents did not do any or did only a few procedures, which is inconsistent with the qualitative analysis of those procedures. Quantitative and qualitative analysis of phacoemulsification and Nd:YAG laser capsulotomy procedures match.

In the posterior segment section we excluded the 2nd-year residents from analysis because most of them did not answer the questions from this section. The rest of residents completely or partially mastered all methods of fundus examination with various lenses, whereas ALP and fluorescein angiography (FAG) were only partially or not mastered at all.

Most of the residents mastered small surgical procedures on eyelids and adnexa. There was an equal number of those who did not master, who only partially mastered, and those who completely mastered enucleation procedure. Quantitative analysis of small surgical procedures matches with the qualitative analysis, whereas that of enucleation procedure does not (the majority of residents did not do any procedure at all).

In the pediatric ophthalmology and strabismus section, retinoscopy, diagnosis and conservative treatment of strabismus were partially or completely mastered. Strabismus surgery was only partially or not at all mastered. This is not consistent with the quantitative analysis which shows that the majority of residents did not do any surgical correction of strabismus.

In the glaucoma section, gonioscopy was mastered better than Nd:YAG laser iridotomy.

In the neuro-ophthalmology with perimetry section there was an equal number of those who did not, those who only partially did, and those who completely mastered both static and kinetic perimetry procedures.

In general, most of the prescribed procedures were mastered by residents. Diagnostic and examination procedures were mastered better than surgical and interventional procedures. This could be the consequence of the lack of motivation from supervisors to teach interventional and surgical skills, which are harder to master than diagnostic procedures and demand more time and organization because they are less frequently performed⁴. The current Protocol for health professionals in ophthalmology in Croatia prescribes an exact number

only for the following procedures: ECCE (20 procedures), IOL implantation (10 procedures), enucleation (5 procedures) and strabismus surgery (5-10 procedures). The great majority of residents failed to reach the prescribed number of procedures.

Residents were divided when asked about the importance of preliminary exams and postgraduate study in continuous education. On the other hand, more participants think that postgraduate study should be non-obligatory. It is also interesting that most of the residents who finished postgraduate study agreed about lectures being out of date and that postgraduate study only partially helps in learning for the specialist exam.

Our questionnaire has two drawbacks. One is that only 42 (58%) doctors who were informed about the questionnaire answered the questions. The reasons for this could be a short period in which the study was conducted (approximately 2 months), indifference of participants, and fear that the questionnaire is not completely anonymous. The other drawback is that in some sections many answers were missing. There are two possible explanations why doctors did not answer certain questions. The first and the most obvious is that some residents have not been on certain rotations and according to instructions for filling in the questionnaire they were asked not to answer such questions. This is especially the case with younger residents, but since there is no strict order of rotations during residency training, it is also possible that a certain number of older residents did not answer some questions. The majority of unanswered questions were in the posterior segment, pediatric ophthalmology, glaucoma and neuro-ophthalmology sections, which are left by the majority of residents for the last year of residency training. The second explanation for not answering certain questions could be the fear that the questionnaire is not completely anonymous, or neglect.

Despite certain drawbacks of our questionnaire, it is the first survey of the residency curriculum in ophthalmology in Croatia. A similar report which evaluates young ophthalmologists' perceptions of how well residency has prepared them for various aspects of their clinical practice has been recently published in the USA⁵. Participants were United States ophthalmologists who have been in practice for maximum 5 years. Two hundred sixty-nine out of 900 questionnaires were completed and returned, yielding a 30% response. Our survey had a 58% response, but it does not make it more reliable because the total number of participants was twelve times low-

er. It is interesting that US ophthalmologists were satisfied with their clinical training, but less so with their training in non-clinical areas, which included business operations and finance, personal financial management, practice management skills, coding and reimbursement, political advocacy, and exposure to practice setting models.

In the USA, residency curricula are under supervision of ACGME and every year efforts are made that residents have adequate education and remain competent. Otherwise, the institution may lose its accreditation for residency education. Our survey was a one-way analysis of current residency curriculum in ophthalmology done by residents. For complete analysis it is necessary to have an additional survey which should include tested objective measurement tools for monitoring the progress of residents during their residency training by their supervisors.

Conclusion

This is the first survey about the current residency curriculum in ophthalmology in our country. Although

residents learned most of the prescribed procedures, the current residency curriculum is far from being perfect and needs improvements. We think that objective assessment tools for monitoring the progress and competencies of residents during their residency training need to be developed.

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Sažetak

ANALIZA PROGRAMA SPECIJALISTIČKE IZOBRAZBE IZ OFTALMOLOGIJE

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Cilj rada bio je provesti kvalitativnu i kvantitativnu analizu programa specijalističkog usavršavanja iz oftalmologije metodom anonimne ankete. O anonimnoj anketi obaviještena su ukupno 73 doktora medicine koji su bili najmanje na drugoj godini specijalizacije iz oftalmologije, odnosno oftalmolozi s maksimalno 4 godine specijalističkog staža. Anketa se sastojala od 52 pitanja vezana uza sve dijelove izobrazbe iz aktualnog Pravilnika o specijalističkom usavršavanju zdravstvenih djelatnika iz oftalmologije. Anketu su ispunila 42 (58%) doktora. Kvalitativna analiza pokazala je kako je većina predviđenih zahvata uspješno svladana za vrijeme specijalizacije. Dijagnostički zahvati i/ili razne metode pregleda svladani su bolje nego kirurški i/ili interventni postupci. Prema kvantitativnoj analizi većina specijalizanata nije ispunila predviđeni broj kirurških zahvata. Trideset i osam (78%) sudionika nije zadovoljno trenutnim programom specijalističkog usavršavanja. Dakle, premda su specijalizanti ovladali većinom predviđenih zahvata, sadašnji program specijalističkog usavršavanja daleko je od savršenog i potrebna su poboljšanja. Smatramo da je potrebno razviti kvalitetne metode za objektivnu procjenu napretka i kompetentnosti specijalizanata za vrijeme specijalizacije.

Ključne riječi: *specijalizacija, izobrazba, oftalmologija*