

Is there a need of reform in undergraduate Ophthalmology curriculum?

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Abstract

Objective: To assess the adequacy of ophthalmology undergraduate curriculum as perceived by interns working in a tertiary care setting of Pakistan.

Methods: A descriptive cross-sectional survey was conducted at Abbassi Shaheed Hospital, from October, 2016 till December, 2016. All eligible medical graduates doing internship at Abbassi Shaheed Hospital after satisfying the inclusion and exclusion criteria were invited to participate in the study through non probability convenience sampling technique. A validated self-administered questionnaire was used to assess the level of competence in diagnosing ophthalmic conditions, proficiency in performing core ophthalmic clinical skills and adequacy of exposure to core ophthalmic areas during undergraduate study from the study participants. Ethical approval was granted by the institutional ethical review committee of Karachi Medical and Dental College (KMDC), Pakistan and written informed consent was obtained from all participants prior to recruitment in the study. The data was entered and analyzed using SPSS version 21 (IBM, Chicago, IL).

Results: The data of one hundred and one participants was analyzed. The majority (88.1%) of study participants was female while the overall mean (SD) age was 25.1(1.2). Lowest competence was observed in diagnosing following ophthalmic conditions; Macular degeneration(15.8%), Pappiloedema(25.7%), Corneal ulcer(35.6%) and Leukocoria(35.6%); whereas lowest proficiency was observed in performing following core ophthalmic skills; anterior segment examination(18.8%), removal of superficial corneal/conjunctival foreign body(28.7%), upper lid eversion(28.7%), distant direct ophthalmoscopy(31.7%) and direct ophthalmoscopy(36.6%). Lowest adequacy was reported for the following core ophthalmic areas during undergraduate study; Vitreoretinal diseases(19.8%), Neuro-ophthalmology(21.8%), pediatric ophthalmology/squint(23.8%) and refractive surgery(37.6%).

Conclusion: The self rated adequacy of undergraduate ophthalmology education in terms of core knowledge and skills of medical graduates of Pakistan lack competence, proficiency, and adequacy in diagnosis and management of eye disorder to significant extent. Though, International council of ophthalmology (ICO) task force recommendations are incorporated in the undergraduate curriculum developed by Pakistan medical and dental council (PMDC) however, certain reforms in curriculum design and structure is required to positive influence the effective learning, academic progress and achievement.

Keywords: curriculum, ophthalmology, undergraduate medical student

Introduction:

As the modern medicine is advancing at a significant pace, the current medical student and postgraduate trainee encounters the growing body of scientific knowledge, evidences, skills and practices.^{1,2} However, there has been an understanding that it is beyond the capabilities of medical students and very unlikely to

learn everything.³ Considering this the medical education has been revolutionized with a trend towards the problem based learning (PBL).⁴ In PBL teaching is being focused on common core diseases prevalent in the community rather than time being spent on non-core diseases.⁵

It has been reported that 3-19% of primary

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consultation is being ophthalmic in nature.⁶⁻⁸ Moreover, the proportion of ophthalmic cases being presented to Accident and Emergency may be even higher. Therefore, highlighting that the ophthalmic skills for practitioners working in primary healthcare settings are essential as significant proportion of medical students does not enter in specialty training and in future work as a General Practitioner (GP).⁶ Moreover, ophthalmology is also relevant to other subspecialty i.e. neurology, cardiology, nephrology, pediatrics, rheumatology and endocrinology.⁹ Majority of primary care physicians perceive that they have not received an adequate undergraduate ophthalmic education.¹⁰ The sub optimal ophthalmic education at undergraduate level resulted in deficiencies in diagnosis and management of ophthalmic problems, thereby increasing the referrals and placing more burden on already scarce health resources at ophthalmic casualty departments as well as outpatient ophthalmic clinics.¹¹⁻¹³ The ICO, hence realizing and recognizing the issue developed appropriate guidelines for the structuring of undergraduate ophthalmology curriculum.¹⁴

Similar to other developing countries, Pakistan also has a high burden of eye diseases. The prevalence of blindness in Pakistan among adults aged 30 years and above is slightly less than 3%.¹⁵ It has been estimated that 1.7 million adults are blind in Pakistan, with majority greater than eighty five percent suffering from avoidable cause of blindness.¹⁶ Considering the high prevalence of blindness, eye disease and visual impairment, the competency in diagnosing ophthalmic conditions, proficiency in core ophthalmic skills and adequacy of exposure to ophthalmic areas, relevant knowledge and skills transformation at undergraduate level is imperative. In Pakistan, the ophthalmology curriculum has been designed by PMDC with an aim to develop doctors competent in dealing eye disorders. Recommendations of ICO task force are also part of undergraduate curriculum. There is paucity of information, as previously no study has been conducted in Pakistan to evaluate the undergraduate ophthalmology curriculum with most studies evaluating the medical skills or

skills in non-ophthalmic specialties.¹⁷⁻²⁰ Findings of the study will be useful in generating critical feedback on undergraduate ophthalmic curriculum planning. Therefore, the present study was conducted to get an insight of ophthalmology undergraduate curriculum as perceived by interns working in a tertiary care setting.

Material and Methods:

A descriptive cross-sectional survey was conducted at Abbassi Shaheed Hospital, from October, 2016 till December, 2016. The hospital has a well-established Ophthalmology department and recognized for internship by PMDC and for postgraduate training by College of Physician and Surgeons Pakistan.

All medical graduates doing the one year internship at Abbassi Shaheed Hospital were invited to participate in the study through non probability convenience sampling technique. The exclusion criteria were previous rotation or training in Ophthalmology. Demographic data i.e. age and gender was collected. A validated tool²¹ based on the International Curriculum Guidelines developed by ICO was used to assess the level of competence in diagnosing ophthalmic conditions, proficiency in performing core ophthalmic clinical skills and adequacy of exposure to core ophthalmic areas during undergraduate study. Study participants were also inquired related to adequacy of time allocated for the ophthalmology instruction during undergraduate study. The level of competence in diagnosing ophthalmic conditions consisted of 15 items structured on a five point Likert scale (1 – not competent; 5 – very competent). Moreover, proficiency in performing core ophthalmic clinical skills was evaluated using 12 items structured on a five point Likert scale (1 – not proficient; 5 – very proficient). The adequacy of exposure to core ophthalmic areas were assessed using 12 items structured on a five point Likert scale (1 – not adequate; 5 – very adequate). Study participants were also inquired about adequacy of time allocated for ophthalmology training (class room instruction/clinical instruction) on a five point Likert scale (1 – not adequate; 5 – very adequate).

Table 1: Study Participants level of competence in diagnosing ophthalmic conditions

Ophthalmic conditions	Competent(%)	Non competent(%)
Conjunctivitis	81 (80.2)	20 (19.8)
Cataract	77 (76.2)	24 (23.8)
Corneal Foreign Body	60 (59.4)	41 (40.6)
Leukocoria	36 (35.6)	65 (65.4)
Ocular trauma	49 (48.5)	52 (51.5)
Corneal ulcer	32 (31.7)	69 (68.3)
Refractive errors	73 (72.3)	28 (27.7)
Glaucoma	50 (49.5)	51 (50.5)
Diabetic retinopathy	44 (43.6)	57 (56.4)
Visual Field defects	57 (56.4)	44 (43.6)
Pappilodema	26 (25.7)	75 (74.3)
Hypertensive retinopathy	41 (40.6)	60 (59.4)
Strabismus	45 (44.6)	56 (55.4)
Macular degeneration	16 (15.8)	85 (84.2)
Pupillary abnormalities	52 (51.5)	49 (48.5)

Table 2: Study Participants proficiency in performing core ophthalmic clinical skills

Performance of Ophthalmic clinical skills	Proficient (%)	Non proficient (%)
Visual acuity testing	82 (81.2)	19 (18.8)
Confrontational visual field	70 (69.3)	31 (30.7)
Ophthalmological history taking	81 (80.2)	20 (19.8)
Pupil examination/swinging flash light test	78 (77.2)	23 (22.8)
Identifying indications for pupillary dilatation	69 (68.3)	32 (31.7)
Extraocular motility testing	59 (58.4)	42 (41.6)
Direct ophthalmoscopy	37 (36.6)	64 (63.4)
Corneal staining	48 (47.5)	53 (52.5)
Removal of superficial corneal/conjunctival foreign body	29 (28.7)	72 (71.3)
Anterior segment examination	19 (18.8)	82 (81.2)
Upper lid eversion	29 (28.7)	72 (71.3)
Distant direct ophthalmoscopy	32 (31.7)	69 (68.3)

Table 3: Study Participants adequacy of exposure to core ophthalmic areas

Core Ophthalmic areas	Adequate (%)	Non adequate (%)
Cornea and External eye	73 (72.3)	28 (27.7)
Refraction & Contact Lens	74 (73.3)	27 (26.7)
Lens and Cataract	76 (75.2)	25 (24.8)
Glaucoma	51 (50.5)	50 (49.5)
Lids, Lacrimal System and Orbit	56 (55.4)	45 (44.6)
Ophthalmic manifestation of systemic diseases	47 (46.5)	54 (53.5)
Paediatric Ophthalmology/squint	24 (23.8)	77 (76.2)
Intraocular tumors	50 (49.5)	51 (50.5)
Vitreoretinal diseases	20 (19.8)	81 (78.2)
Neuro ophthalmology	22 (21.8)	79 (78.2)
Refractive surgery	38 (37.6)	63 (62.4)
Fundamental principles	64 (63.4)	37 (36.6)

Ethical approval for study was granted by the institutional ethical review committee of KMDC,

Pakistan. Written informed consent was obtained from all participants prior to recruitment having explained comprehensively the process involved and benefits/risks of being the part this research. Anonymity and confidentiality of enrolled participant's data was maintained throughout the research and no unauthorized person had an access to the data.

Data Analysis:

The data was entered and analyzed using SPSS version 21 (IBM, Chicago, IL). The data was validated twice for incorrect entries. Initially, data transformation was performed and scores of 3 and above were coded as competent/proficient and adequate. However, responses on items for likert scale with score of 2 or less were coded as not competent/not proficient and not adequate. The competence in diagnosing ophthalmic conditions, proficiency in performing core ophthalmic clinical skills and adequacy of exposure to core ophthalmic areas was also computed as binary variable (Yes/No). Descriptive statistics were performed. The qualitative variables were presented as frequency/ percentage whereas the quantitative variables were presented as mean \pm SD.

Results:

The self-administered questionnaire was distributed among One hundred and seventeen eligible study participants. After excluding questionnaires with missing or incomplete responses, the response rate was 86.3%. Among one hundred and one participants who completed the questionnaire, majority (88.1%) were female. The mean (SD) age of the study participant was 25.1(1.2)

Table 1 gives details of study participant's competence level in diagnosing ophthalmic conditions. Lowest competence was observed in diagnosing the following ophthalmic conditions; Macular degeneration(15.8%), Pappilodema(25.7%), Corneal ulcer(35.6%) and Leukocoria(35.6%). Participants responded high competence in diagnosing following ophthalmic conditions; conjunctivitis(80.2%), followed by cataract(76.2%), and refractive errors(72.3%).

Table 2 gives details of study participant's proficiency in performing core ophthalmic skills. Lowest proficiency was observed in performing following core ophthalmic skills; anterior segment examination (18.8%), removal of superficial corneal/conjunctival foreign body (28.7%), upper lid eversion (28.7%), distant direct ophthalmoscopy (31.7%) and direct ophthalmoscopy (36.6%). Highest proficiency was observed in performing following core ophthalmic skills; visual acuity testing (81.2%), ophthalmological history taking (80.2%) and pupil examination (77.2%).

Table 3 gives details of study participant's adequacy of exposure to core ophthalmic areas during undergraduate study. Lowest adequacy was reported for the following core ophthalmic areas; Vitreoretinal diseases (19.8%), Neuro ophthalmology (21.8%), pediatric ophthalmology/squint (23.8%) and refractive surgery (37.6%). Highest adequacy was reported for the following core ophthalmic areas during undergraduate study; lens and cataract (75.2%), refraction and contact lens (73.3%) and cornea and external eye (72.23%).

Finally, seventy four (73.3%) of the respondents considered the timing of class room instruction to be inadequate. Similar proportions (80.2%) reported the timing for clinical instruction during ward rotation to be inadequate.

Discussion:

The results of the present study highlighted that the self rated adequacy of undergraduate ophthalmology education in terms of core knowledge and skills of medical graduates of Pakistan lack competence, proficiency, and adequacy in diagnosis and management of significant eye disorder to significant extent.

The present study reported high competence in diagnosing conjunctivitis (80.2%), cataract (76.2%) and refractive errors (72.3%). The self reported competence level was significantly lower compared to other researches. A study²² from Nigeria have reported consistent findings with that of our study with more than seventy

five percent respondents felt competent in diagnosing conjunctivitis, cataract, corneal foreign body and ocular trauma. However, diagnosing corneal ulcer reported in the present study was significantly lower than what reported from the study conducted in Nigeria.

The lowest proficiency was observed in performing the following core ophthalmic skills; anterior segment examination (18.8%), removal of superficial corneal/conjunctival foreign body (28.7%), upper lid eversion (28.7%), distant direct ophthalmoscopy (31.7%) and direct ophthalmoscopy (36.6%). The self reported proficiency level was far sub optimal as reported in other studies from developed as well as developing countries. The study conducted among medical interns of Nigeria and a multicentre study that collected data from twenty five medical schools throughout Asia and Australia also reported that for ICO core skills more than fifty percent of the participants felt proficient.²²⁻²³ However, in the present study the fifty percent proficiency was achieved only for visual acuity testing (81.2%), ophthalmological history taking (80.2%) and pupil examination (77.2%).

Regarding adequacy of exposure to core ophthalmic areas during undergraduate study; lowest adequacy was reported for Vitreoretinal diseases (19.8%), Neuro ophthalmology (21.8%), pediatric ophthalmology/squint (23.8%) and refractive surgery (37.6%) while highest adequacy was reported for lens and cataract (75.2%), refraction and contact lens (73.3%) and corneal and external eye (72.23%). The adequacy of undergraduate clinical ophthalmology exposure was significantly higher among interns or house officers from Nigeria.²² A study conducted among 25 medical schools throughout Asia and Australia also reported a higher adequacy for core ophthalmic areas among medical interns.²³ The study emphasized that Ophthalmology may increasingly be a small, or even absent component of undergraduate medical curriculum, despite established international Ophthalmology curriculum guidelines. However, a study conducted almost two decades before reported only 22% of all respondents felt their

undergraduate ophthalmic medical education to be adequate.²⁴ This is also consistent with findings of our study where around seventy four percent of the respondents considered the timing of class room instruction to be inadequate and around similar proportions (80.2%) reported the timing for clinical instruction during ward rotation to be inadequate.

Pakistan had a high burden of ophthalmic diseases. Adding to the problem, there are only around 1,860 ophthalmologists in Pakistan with work ratio of 11 ophthalmologists per million.²⁵ Aggravating the problem, majority (70%) of ophthalmologists reside in urban areas, thereby making the adequate eye care inaccessible for majority of population. Thereby, the competence, proficiency, and adequacy in diagnosis and management of significant eye disorders for graduating medical students became of prime importance. Though, ICO task force recommendations are incorporated in the undergraduate curriculum developed by PMDC however, certain reforms in curriculum design and structure is required to positive influence the effective learning, academic progress and achievement. This could be in terms of increasing timing of class room instruction and ward rotation as well as making ophthalmology rotation mandatory for all interns during their house job.

The present study conducted has limitations in terms of insufficient sample size and single centre study. Importantly all the participants filled in the self-administered questionnaire with self-evaluation, there is every possibility of over reporting and underestimating the competency and proficiency level. Though the interns being recruited in this study belonged to different institutes, some following a traditional curriculum while others following a problem based learning but a significant proportion of participants belonged to KMDC. Therefore, in future a multi-centre study with a larger sample size is desirable to be conducted to precisely assess the effectiveness of teaching of ophthalmology at undergraduate curriculum.

Conclusion:

The self rated adequacy of undergraduate ophthalmology education in terms of core knowledge and skills of medical graduates of Pakistan lack competence, proficiency, and adequacy in diagnosis and management of significant eye disorder to significant extent. ICO task force recommendations are part of undergraduate curriculum developed by PMDC however, certain reforms in curriculum design and structure is required to positive influence the effective learning, academic progress and achievement. This could be in terms of increasing timing of class room instruction and ward rotation as well as making ophthalmology rotation mandatory for all interns during their house job. This would not only decrease the morbidity, and blindness related to eye disorders, but will also improve clinical outcomes among patients with eye disease visiting the primary health care facilities.

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Role and contribution of authors:

Dr. Shama Mashhood. MBBS, DCPS-HPE, JMHPE. Assistant Professor Department of Medical Education, Karachi Medical & Dental College, Karachi, collected the data, references and wrote the initial writeup.

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