

# EFFECTIVENESS OF OPTOMETRISTS IN PEDIATRIC COMPREHENSIVE EYE EXAMINATION AND APPROPRIATE REFERRALS

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## ABSTRACT

**PURPOSE:** To evaluate the efficacy of practicing optometrists, series of ophthalmic procedures that are considered mandatory for pediatric comprehensive eye examination and making appropriate referrals to ophthalmologists according to international guidelines.

**METHODS:** Cross sectional survey of clinical practices of 52 optometrists working in different Govt. and Private Setups was done by a self-designed questionnaire, responses were collected and analyzed. Undergraduate optometry students and graduates who were not practicing were excluded from study.

**RESULTS:** In total 52 study participants 36(69.2%) were females and 16(30.8%) were males. 35(67.5%) optometrists regularly performed all ophthalmic procedures that are mandatory for comprehensive eye examination of children while 15(28.8%) responded that they do so off and on 3.8% do not perform basic and supplementary tests at all. 32(61.5%) mentioned their independent and differential diagnosis before referring patients, 11(21.2%) did not mention diagnosis and 7(13.5%) performed only refraction. 45(86.5%) participants regularly opt different training programs to enhance their clinical skills, 6(11.5%) attend some training sessions off and on, and 1.9% do not take any kind of training session.

**CONCLUSION:** Optometrists have knowledge and good practice skills regarding all ophthalmic instruments and clinical procedures that must be followed by them for comprehensive eye examination of children and for referring the patients appropriately. So they are helpful in decreasing the burden of pediatric ophthalmologists by providing them with all basic and supplementary examination findings of pediatric patients. Referrals that are made on the basis of these findings have higher chances of being appropriate.

**KEYWORDS:** Clinical efficacy, optometrists, pediatrics comprehensive eye examination. chart.

## INTRODUCTION

Visual system is of significant importance in our all sensory systems. It is the basic mean of interaction between human beings and external environment. When light enters into the eyes brain interprets this stimulus and vision results.<sup>1</sup>

In children visual system development starts prenatally and goes on after birth. Visual impairment (VI) has a considerable impact on the lives of the affected individuals as well as their families and society. Loss of vision in children influences their academic opportunities, career choices, and social life. Therefore, early diagnosis and management is important to ensure that children's visual system development proceeds

normally.<sup>2</sup> Comprehensive eye examination in children is important for identifying symptoms that often contribute to visual abnormalities.<sup>3</sup>

Screening is a method that is performed quickly to rule out whether a health disorder exists or not. In case of positive screening results additional investigations are required for the formulation of diagnosis.<sup>4</sup> Vision screening in pediatric population is done for early identification of children with visual anomalies. So that rehabilitative or therapeutic services could be provided to them timely.<sup>5</sup> It is generally a brief examination to indicate presence or absence of probable visual disorder, without comprehensive examination and

diagnosis. Besides to vision screening by persons without eye care training, a complete pediatric eye examination is performed by optometrists. Aim of this comprehensive examination is to make a diagnosis, plan for the management of visual disorder and appropriate referrals to the ophthalmologists as per requirement. Conventionally, thorough pediatric eye examination is performed by ophthalmologists. But there has been a substantial research on efficacy of eye care professionals in pediatric vision screening.<sup>6</sup>

Optometrists as trained health care professionals have a significant role in providing eye care services due to their contributions in the management of refractive errors and amblyopia that are principal causes of visual impairment world-wide.<sup>7</sup> Training of optometrists and formation of optometry teams promote the establishment of tenable, productive and comprehensive eye care system. It contributes in overcoming the hurdles of lacking eye care services and helps to sort out the issue of preventable visual impairment.<sup>8</sup> Optometrist's coordinated efforts are required for providing prompt and effective primary and specialized eye care services in general public. Optometrists refer critical patients to ophthalmologists for more detailed clinical procedure, surgical correction of abnormalities and treatment of diseases.<sup>9</sup> Optometric services with enhanced clinical skills are becoming exceptional due to lesser number of ophthalmologists. Optometrists have significant role not only in the treatment of refractive errors but also in the management and diagnosis of anterior segment pathologies.

As eye care professionals it is important to counsel general public and patients to visit eye specialist timely if they feel any kind of visual discomfort. Periodic, complete eye examination is necessary for early detection, diagnosis and treatment of visual ailments. Pediatric comprehensive eye examination helps in screening and diagnosis of visual disorders. Comprehensive eye examination in children consists of group of tests to assess the visual health from every aspect. Pediatric Comprehensive eye examination comprises of taking a complete patient history, torch light examination, VA testing, VF testing, color vision testing, contrast sensitivity testing, binocular single vision testing, depth perception testing, refraction, pupil examination, anterior and posterior segment

examination, Fundoscopy, Intra-Ocular Pressure (IOP) measuring.<sup>10</sup>

### HISTORY TAKING

Optometrists take complete history to ask the major concerns underlying the visit of patient.<sup>11</sup> It includes chief complaints, past medical and ocular history, children's general health, drug allergies, general health and previous examination and medication record.<sup>12</sup> Visual Acuity assessment is the fundamental step to evaluate refractive error, amblyopia, and other pathologies in pediatric eye examination. Different qualitative and quantitative methods are employed to check VA in children. Charts based on detection and recognition principles like HOTV, lea symbol, Kay picture, Keeler and different log Mar based charts are used.<sup>13</sup> Ocular motility exam comprises of cover uncover test, NPC, NPA, extra ocular movements.<sup>6</sup> Hirschberg test is performed to roughly estimate any suspected manifest deviations.<sup>14</sup> Supporting tests include Colour Vision testing, Contrast Sensitivity testing, Visual Field testing.<sup>15</sup> Refraction is done by optometrists to identify and manage refractive errors. They are primary health care professionals they prescribe spectacles, contact lenses and Low Vision Aids.<sup>16</sup> Several researchers have indicated that Bruckner test is a simple quick, and accurate objective test for screening of refractive errors in children.<sup>17</sup> Direct ophthalmoscopy is performed in children to detect ocular, adnexa, anterior and posterior segment anomalies. Indirect ophthalmoscope and slit lamp with accessory lenses is also used for fundus examination.<sup>18</sup>

### OBJECTIVES

To evaluate the prevalence of ophthalmic procedures performed by optometrists routinely and to which extent they decrease the work load of ophthalmologists by doing appropriate referrals and disease managements in the presence bulk of patients and to demonstrate their efficacy as primary contact point for eye care in primary healthcare centers.

### METHODS

Descriptive cross sectional study was done and data was collected through self- designed questionnaire which included 35 questions. It was circulated among 52 professional optometrists. It gave information about working experience of optometrists, workplace

(government/ private/ both), and efficacy of optometrists in performing all ophthalmic procedures that are mandatory for pediatric comprehensive eye examination and appropriate referrals as per standard protocols. Analysis of data was done by making tables, graphs, and charts. Frequencies and percentages of different variables were calculated. Research protocol was approved by the Ethical Review Board of the College of Ophthalmology and Allied Vision Sciences study method adhered to the tenets of the Declaration of Helsinki for the use of participants in biomedical research.

**RESULTS**

Out of total 52 participating optometrists 35(67.3%) followed all standard protocols for comprehensive eye examination of pediatric patients, 88.5% optometrists took complete patient history before starting examination, 75% performed torch examination and preliminary test and 51.9% optometrists performed cover and uncover tests before refraction(table1). 96.2% optometrists preferred cycloplegic retinoscopy for refraction in children(table 2).Out of 52 optometrists 13 used slit lamps for fundus examination, 25 used direct ophthalmoscopes and 8 used indirect ophthalmoscopes for fundus examination(fig.1).Out of 52 participants 32(61.5%) mentioned their independent diagnosis before referring 7(13.5%) persons did only refraction, 11(21.2%) persons left it for ophthalmologists(fig.2).

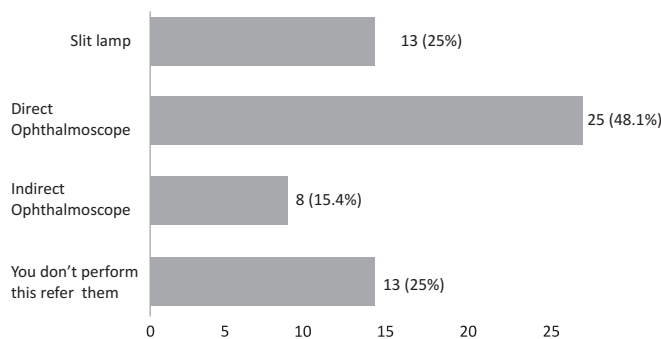
**Table-1:** Percentage of optometrists who follow all protocols of patient examination including complete history taking and preliminary tests

Response	Do you follow standard protocols of patient examination? n(%)	Do you take ocular and family history? n(%)	Do you perform torch examination as preliminary test? n(%)	Do you perform cover uncover test before refraction in children n(%)
Yes	35 (67.3%)	46 (88.5%)	39 (75%)	27 (51.9%)
No	2 (3.8%)	0	3(5.8%)	5(9.6%)
Off and on	15 (28.8%)	6 (11.5%)	10 (19.2%)	20 (38.5%)
Total	52 (100%)	52 (100%)	52(100%)	52(100%)

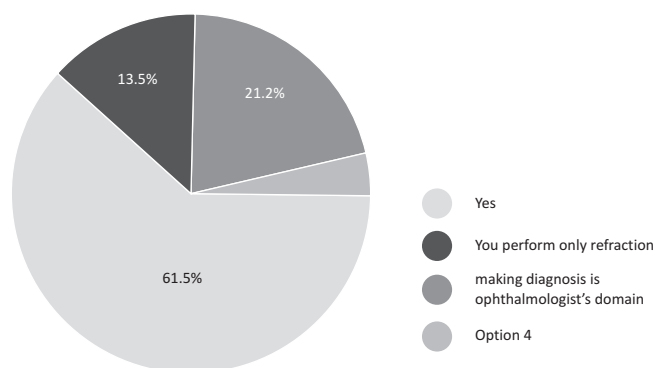
**Table-2:** Preferable mode of refraction in children

Responses	Frequency	Percentage
Subjective refraction	0	0
Auto refraction	1	1.9
Dry retinoscopy	1	1.9
Wet retinoscopy	50	96.2
Total	52	100

**Figure-1:** Preferable technique for fundus examination of children.



**Figure-2:** Percentage of optometrists who mention their independent diagnosis before referring patient to ophthalmologists



**DISCUSSION**

Many researchers have shown high accuracy levels of independent prescribing by experienced and well trained optometrists. This ensures the role of optometrists in independent dealing with high risk ophthalmic services. Efficacy of vision therapy by optometrists in children with learning disabilities is well known. However there is a lack of randomized clinical trials evaluating the effectiveness of vision therapy in this particular community. Optometrists also provide rehabilitation services to low vision persons. Aim of these rehabilitation services is to maximize the visual potential by making the best use of residual vision.

So it depends upon the efficacy of optometrists to perform complete eye examination for the diagnosis and appropriate referrals. After examining the patients and making their independent diagnosis and providing them basic eye care, optometrists refer patients to ophthalmologists or health care specialist whenever it

is needed. Handwritten referrals on prescription are in common practice. But nowadays electronic referrals are considered more appropriate and time sparing. Experience and skills of professionals has major impact on precision of referrals. Ophthalmologist's feedbacks on referrals from optometrists helps in improving future referrals and building confidence in clinical practices.

This study provides the survey of standard procedures of comprehensive eye examination of children that are in practice of optometrists. Childhood blindness is a major global issue. Global childhood blindness figures indicate that about 1.42 million to 17.52 million children suffer from blindness and mild to extreme vision impairment. Pediatric eye examination is critically important for early detection of visual disorders that may cause severe and long lasting visual issues in children.

Optometrists are primary eye care providers, primary care consists of many core elements, including diagnosis and first aid treatment; examination and management, personal support, and patient consultation and guidance on disease disorders, prevention of illnesses, and conservation of health. In this study 52 optometrists working in government and private setups participated. Those practicing in foreign countries, undergraduate optometry students and optometry graduates who were not practicing were excluded from the study. Qualitative analysis of most commonly employed ophthalmic procedures by optometrists while doing comprehensive pediatric examination was done by a self-designed questionnaire.

According to this study percentage and frequency of optometrists who follow series of tests that are mandatory for pediatric comprehensive eye examination were significantly high. Pediatric examination components that are mentioned in this study are not supposed to be all inclusive. The form and duration of tests is greatly influenced by clinical judgments, patient symptoms and examination results. Examination process can also vary from those mentioned in this study depending upon the patient cooperation, awareness and examination environment.

First step of patient evaluation is history taking,

majority of study participants responded that they take complete patient history, mainly including chief complaints, ocular and family history, review of previous medical record and clinical interventions. Most of the optometrists emphasized upon the importance of asking about any kind of drug sensitivity from patient while taking history. VA is main tool for screening and diagnosis of refractive errors or any other kind of ocular pathologies. All Optometrists used different qualitative and quantitative methods for measuring VA in children the use of which varied from patient to patient and examiner to examiner, depending upon their reliability, cooperation level of children and ease of testing. According to the study 75% optometrists responded that they consider torch examination an important test and routinely perform it while doing pediatric comprehensive examination. 32.7% optometrists checked RAPD and mentioned on prescription whether it is positive or negative. Higher percentage of optometrists routinely test visual fields either by finger mimicking and counting or by simple confrontation methods. 17% optometrists did not check visual fields in every patient but they did so only in suspected ones. Color vision testing was routinely done by 80% of respondents. They used different tests like Ishihara, arrangement tests, objective tests depending upon reliability and children cooperation level. Only 19.2% optometrists responded that they do not test color vision regularly. 96.2% optometrists consider cycloplegic refraction most reliable procedure and they perform it in their daily practice. This research results showed that 48.1% optometrists use direct ophthalmoscopy for ocular examination of anterior and posterior segments, 25% do slit lamp examination and 15.4% perform indirect ophthalmoscopy for comprehensive ocular examination, whereas 25% of optometrists responded that they do not perform anterior and posterior segment examination and refer patients to ophthalmologists. It indicates that significant number of optometrists have knowledge and efficacy regarding the use of this equipment

## CONCLUSION

Optometrists practicing in different govt. and private sectors were found to have good knowledge and enough practice regarding all ophthalmic procedures that are most commonly employed for comprehensive pediatric examination. During examination of children

they perform all preliminary and supplementary tests to provide complete case work up and differential diagnosis to ophthalmologists. This will definitely decrease the burden of ophthalmologists in the presence of bulk of patients. Referrals that are made after performing all the basic and supporting tests have higher probability of being accurate.

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*Literature search, data collection, Results.*

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*Main guidelines in script writing*

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