

# Subjective Verification of Refraction- A Quality Indicator: A Cross-sectional Study

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## ABSTRACT

**Introduction:** Subjective refraction helps in establishing the suitable lens for a patient. But it also needs a patient's cooperation for the proper estimation of the refractive error.

**Aim:** To determine the impact of counselling of Optometrists on subjective refraction and spectacle prescription to patients attending Ophthalmology Out Patient Department (OPD) at their first visit.

**Materials and Methods:** This was a cross-sectional study conducted for a period of two months from June 2020 to July 2020. All patients attending the OPD at Department of Ophthalmology at R L Jalappa Hospital and Research Centre, Tamaka, Karnataka, India, were included in the study. A total of 120 patients, whose vision was <6/9, were included in each group. Group A, before

counselling the Optometrists and Group B, after counselling the Optometrists by systemic random sampling method. The number of patients who required spectacle correction and those who were given spectacle prescriptions at their first visit were identified. The data was analysed using Statistical Package for the Social Sciences (SPSS) version 22.0.

**Results:** In Group A, out of 120 patients only 62 patients (51.7%), had undergone subjective refraction along with spectacle prescription at their first visit. In Group B, (88.3%) 106 patients out of 120, underwent subjective refraction and spectacle correction was given on their first visit.

**Conclusion:** This study shows a clear positive impact of counselling to Optometrists and the importance of counselling in achieving patient's satisfaction.

**Keywords:** Counselling, Optometrist, Patient satisfaction, Spectacle prescription, Vision

## INTRODUCTION

Eyesight is one of the most important special senses. Sight and vision help to connect people with their surroundings, learn things, etc. Best corrected visual acuity is must for a better quality of life [1]. Refractive errors are present in nearly half of all the children and adults [2]. In the recent years, patients expectations with respect to healthcare provision have changed significantly [3].

Subjective refraction determines the combination of lenses to attain the best corrected visual acuity. The examination is conducted by orthoptists, optometrists and ophthalmologists. The advantages of subjective refraction are, that it can be performed even in absence of special equipment and good pupillary reflex, for verifying objective refraction values and spectacle prescription can be prescribed at first visit. Only in certain cases as in hypermetropes, with excessive accommodation cycloplegic refraction is done, where spectacle prescription is not given in the same visit. In cases of uncontrolled diabetes mellitus also spectacle prescription is not recommended until blood sugar is under control. Optometrists or any other healthcare providers must explain procedures that can be employed to enhance the overall patient experience, patient's satisfaction, a regular review of office procedures and the development of alternative ideas [3]. Waiting time helps in determining the quality of care and the resultant patient satisfaction [4].

Patients evaluation of care enhances strategic decision-making, reduce cost, meet patients' expectations, frame strategies for effective management, monitor performance of health plans and provide benchmarking across healthcare institutions [5].

To the best of our knowledge this study was the first study which was conducted on patient's opinion/suggestion in order to improve patient satisfaction and improve the quality of life of the patient by decreasing the unnecessary revisits to the hospital. For this study, the participant Optometrists were counselled to make patient understand that every patient with less vision (<6/9 vision) should undergo subjective refraction and spectacle prescription needs to be given at their first visit. If not done, the uncorrected refractive error is associated with decreased vision-related quality

of life. High myopia is a predisposing factor for retinal detachment, myopic retinopathy, myopic maculopathy, and glaucoma [6]. Hence, this study aimed to determine the impact of counselling of Optometrists on subjective refraction and spectacle prescription to the patients attending OPD of Ophthalmology Department at their first visit.

## MATERIALS AND METHODS

This cross-sectional study was conducted at Department of Ophthalmology OPD at RL Jalappa Hospital and Research Centre, attached to Sri Devaraj Urs Academy of Higher Education and Research, Karnataka, India, from June 2020 to July 2020. The study was conducted after obtaining the Ethical clearance from the Institutional Ethics Committee (IEC) (NoSDUMC/KLR/IEC/446/2020-21 dated 30/02/2020).

There were 240 patients, divided into two group (considering 10 patients per OPD a total of 120 patients were included in each group). This study was conducted in two phases. In phase I, group A (120 patients) was studied. In phase II, the Optometrists were first counselled regarding the need for subjective correction and spectacle prescription for every patient in their first visit, wherever possible, so as to avoid unnecessary revisits to the hospitals for spectacle prescription, and then the study was conducted among Group B patients (120 patients). The Optometry students included in the study were same in both the phases. (Phase I is before counselling the Optometrists and Phase II is after counselling the Optometrists)

**Inclusion criteria:** All patients aged above 10 years and who had vision <6/9 were included in the study.

**Exclusion criteria:** Difficult retinoscopy (children <10 years), ocular media opacity, small pupil, corneal ectatic conditions, mentally challenged patients were excluded from the study.

As soon as the patient entered the Ophthalmology OPD, the patient's demographic details and medical history were noted. Then the patients were subjected to visual assessment (distant vision by using Snellen's chart and near vision by Jagger's chart) and

refraction by the Optometrist. Those patient who fit the inclusion criteria, were selected by systematic random sampling method (chit system). The subsequent patients were chosen by addition of three to the first chit number as per the systemic random sampling methodology. Informed consent was obtained from the patient. Patients were then subjected to a comprehensive eye examination of the anterior segment, by using slit lamp and posterior segment of eye/ fundus by slit lamp biomicroscopy using 90 D lens or indirect ophthalmoscopy.

## STATISTICAL ANALYSIS

The data obtained were entered in Microsoft excel and analysed using SPSS version 22.0. The statistical analysis was performed in terms of descriptive statistics (proportions and means).

## RESULTS

A total of 240 patients were included in the study, out of which 126 patients were females and 114 patients were males [Table/Fig-1].

Parameters	Group A (n=120) n (%)	Group B (n=120) n (%)
<b>Age (years)</b>		
10-20	16 (13.3)	26 (21.7)
21-30	26 (21.7)	16 (13.3)
31-40	24 (20)	22 (18.3)
41-50	22 (18.3)	24 (20)
51-60	8 (6.7)	11 (9.3)
61-70	18 (15)	20 (16.7)
>70	6 (5)	1 (0.8)
Mean±SD	40.1±17.9	38.6±18.1
<b>Gender</b>		
Males	44 (36.7)	70 (58.3)
Females	76 (63.3)	50 (41.7)

[Table/Fig-1]: Age and gender distribution in each group.

Irrespective of the chief complaint of patient, the Optometrist had to check vision and if vision was less than 6/9, both objective and subjective refraction was done along with spectacle prescription for best corrected visual acuity in their first visit. This method was followed among 62 patients, out of 120 patients in Group A [Table/Fig-2] In the remaining 58 patients, though there was decreased vision noted, Optometrist did not give subjective refraction and spectacle prescription in their first visit. Among them, 12 patients were deferred due to co-morbidity (seven had uncontrolled diabetes mellitus, three had cataract, two had age-related macular degeneration). If the visit was for fundoscopy, (n=16) patient were dilated after checking vision without giving correction, and for those patients (n=30) who came for anterior segment diseases medical treatment was given [Table/Fig-3].

Spectacle correction	No. of patients in Group A (n=120) n (%)	No. of patients in Group B (n=120) n (%)
Refractive error	21 (17.5)	40 (33.3)
Postoperative error	18 (15)	43 (35.8)
Presbyopia	23 (19.2)	4 (3.3)
Diabetic edema under control	-	19 (15.8)
<b>Total</b>	<b>62 (51.7%)</b>	<b>106 (88.3%)</b>

[Table/Fig-2]: Refraction done on first visit.

In phase II, after counselling the Optometrists the number of patients who received spectacle prescription in their first visit were higher (106/120) in Group B. Due to the presence of uncontrolled diabetes mellitus (n=11) and unwillingness for refraction (n=3), 14 patients were deferred [Table/Fig-4].

Condition	No. of patients
Uncontrolled diabetes mellitus	7
Age-related macular degeneration	2
Significant cataract	3
Pupil dilated for fundoscopy	16
Missed giving correction	30
<b>Total</b>	<b>58/120 (48.3%)</b>

[Table/Fig-3]: Refraction deferred in first visit in group A.

Condition	No. of patients
Uncontrolled diabetes mellitus	11
Patient refusal	3
<b>Total</b>	<b>14/120 (11.7%)</b>

[Table/Fig-4]: Refraction deferred in first visit in group B.

## DISCUSSION

In Phase I of this study only 51.7% patients were given spectacle correction at their first visit but in Phase II, after counselling the Optometrists regarding the importance of subjective refraction and spectacle prescription at the patient's first visit, the percentage of patient's who received correction increased to 88.3%. This study showed a positive impact of counselling the Optometrists, improving the patients satisfaction by avoiding unnecessary revisits to the hospital and most importantly corrected the refractive errors to improve the quality of life with best corrected visual acuity and also to prevent complications of uncorrected refractive errors.

Of 11.7% patients in group B who were deferred, uncontrolled diabetes mellitus were present in 11 of them. Their fluctuating blood sugar levels can alter the refractive power of the eye. Hence, these patient's vision has to be corrected after the blood sugars are under control. Three patients who refused correction, had asthenopic symptoms, discomfort with defective vision, which were associated with decreased quality of life.

Subjective refraction is considered the gold standard of refraction [7]. It is based on comparing different lenses (i.e., spherical and cylindrical lenses) and measuring changes in visual acuity to arrive at the lens combination that maximises it. It is dependent on the patient's responses to improvement or no improvement with different lenses. In this study subjective refraction was performed to give correction to patients, for improving their quality of life.

In phase I among group A, 58 patients deferred spectacle prescription in their first visit. Out of which 46 patients (16 dilated for fundoscopy and 30 missed) could have been given spectacle correction at their first visit itself, avoiding revisits to the hospitals and thereby improving the patient satisfaction. Similarly in this study, group B patients were studied in Phase II after counselling the Optometrist which improved the percentage of refraction and spectacle prescription among the patients, indeed improving the quality of life, reducing revisits and increasing patient satisfaction.

A study by Sun J et al., [8] showed a reducing effect on waiting time for filling prescriptions because of carefully designed continuous efforts, rather than a one-time campaign. Similarly, in the present study, there was a significant improvement in the percentage of patient's refraction done in the first visit after intervention in Phase II. This emphasises on continuous efforts to reinforce the importance of adherence to the standard quality checklist at the department level. Subjective verification of refraction is an indicator of quality of life. A study by Aeenparast A et al., [9] suggested a simulation model approach to reduce the out patient waiting time. Sundresh NJ and Nagmothe RV [10] studied the determinants of long waiting period in OPD and recommendations were given on reducing the waiting period in a tertiary hospital. In all these studies, the barriers were identified and aimed to improve patient satisfaction.

A comparative study of refractive assessment by Bennett JR et al., [11] showed a good co-relation between wavefront aberrometer, subjective refraction and automated refractometer. Another study suggested that non cycloplegic refraction and subjective refraction are clinically accurate [12].

### Limitation(s)

The patient satisfaction feedback was not taken.

### CONCLUSION(S)

This study showed that counselling of Optometrists regarding the importance of correcting an individual's vision by performing subjective refraction, not only improves the quality of life but also prevents the complications of refractive errors if left untreated. Optometrists play an important role in eliminating visual impairment and avoidable blindness along with Ophthalmologists. Hence, an adequate standardised and regulated training of Optometrists is essential.

### REFERENCES

- [1] Khanna R, Schneider DM. Best uncorrected visual acuity and best corrected visual acuity-tears. *J Cataract Refract Surg.* 1998;24(10):1287-88.
- [2] Brodie S et al. *Clinical optics.* San francisco; CA: American Academy of Ophthalmology; 2019.
- [3] Smith FM, Kirchner J, West WD. Creating patients for life. *Optometry-J Am Optometris Assoc.* 2008;79:525-27.
- [4] Al-Harajin RS, Al-Subaie SA, Elzubair AG. The association between waiting time and patient satisfaction in outpatient clinics: Findings from a tertiary care hospital in Saudi Arabia. *J Fam Community Med.* 2019;26:17-22.
- [5] Al-Abri R, Al-Balushi A. Patient satisfaction survey as a tool towards quality improvement. *Oman Med J.* 2014;29(1):03-07.
- [6] Lamoureux EL, Saw SM, Thumboo J, Wee HL, Aung T, Mitchell P, et al. The impact of corrected and uncorrected refractive error on visual functioning: The Singapore Malay eye study. *Invest Ophthalmol Vis Sci.* 2009;50(6):2614-20.
- [7] Pesudovs K, Parker KE, Cheng H, Applegate RA. The precision of wavefront refraction compared to subjective refraction and autorefraction. *Optom Vis Sci.* 2007;84:387-89.
- [8] Sun J, Lin Q, Zhao P, Zhang Q, Xu K, Ch H, et al. Reducing waiting time and raising outpatient satisfaction in a Chinese public tertiary general hospital-An interrupted time series study. *BMC Public Health.* 2017;17:668.
- [9] Aeenparast A, Tabibi SJ, Shahanaghi K, Aryanejhad MB. Reducing outpatient waiting time: A simulation modeling approach. *Iran Red Crescent Med J.* 2013;15(9):865-69.
- [10] Sundresh NJ, Nagmothe RV. A study of determinant of long waiting period in outpatient department and recommendation on reducing waiting time in a superspecialty hospital. *JMSCR.* 2017,5(12):31491-99.
- [11] Bennett JR, Stalboerger GM, Hodge DO, Schornack MM. Comparison of refractive assessment by wavefront aberrometry, autorefraction and subjective refraction. *J Optom.* 2015;8(2):109-15.
- [12] Funarunart P, Tengtrisorn S, Sangsupawanich P, Siangyai P. Accuracy of noncycloplegic refraction in primary school children in southern Thailand. *J Med Assoc Thai.* 2009;92(6):806-11.

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