

COVID-19 pandemic learning: An opportunity for planning for the management of uncorrected refractive errors in rural India?

Hiral Korani¹, Prema Chande²

ABSTRACT

Background: COVID-19 pandemic posed challenges to carrying out primary eye care services which demanded modification to continue serving these underserved rural populations. **Objectives:** To understand challenges and opportunities for management of uncorrected refractive errors in rural Maharashtra post-unlock period. **Methods:** Retrospective analysis of data for an ongoing refractive errors management program in rural Maharashtra from January to March 2020 and 2021 of the same period was compared. The service delivery model pre-COVID-19 included vision screening, IOP measurement, and torchlight evaluation before referring for a comprehensive eye exam. Post unlocks, the protocol was altered by additionally dispensing ready readers on the spot and referral was for prescription refractive error and ocular morbidity. **Results:** Door-to-door screening showed 9% (p = 0.0003) increase in the number of people reached with the COVID-19 safety protocol. 177 more people were reached with 10 % lesser households in the post-unlock period. 18% increase in members screened per household was observed. The mean age of presentation during the door-to-door screening was (41.27±17.17) years pre-COVID-19 and 39.66 ± 16.94) years] post-unlock. The number of cataracts referred, pre-COVID-19 and post-unlock was 451 and 374 respectively. More male members were available for door-to-door screening (1: 1.7 before lockdown and 1:1.3 post-unlock). **Conclusion:** Due to reverse migration, younger people were more available in rural households post-unlock. The learning's can help in planning for primary eye care activities if the period of reverse migration can be mapped in advance.

Keywords: COVID-19, Uncorrected refractive error, Reverse migration, Door-to-door screening, Primary eye care services.

Introduction

Uncorrected refractive errors have been repeatedly cited as among the leading causes of vision impairment^{1,2}. It is a major public health issue in India and particularly in rural India largely due to economic reasons³. Lack of awareness, functional need for presbyopia, and lack of access to services have been cited as other barriers for the uptake of refractive error services^{3,4}. To reach out primary eye care services to the underprivileged and underserved rural population of India, several models of primary eye care service delivery have been reported⁵.

1 Assistant Professor, Lotus College of Optometry, 13th NS Road, Vithalnagar Society, JVPD, Juhu 400 049; **Email:** hiral@lcoo.edu.in

2. Head of Dept., Lotus College of Optometry, Lotus Eye Hospital, 13th NS Road, Vithalnagar Society, JVPD, Juhu 400 049; **Email:** prema@lcoo.edu.in

Corresponding Author: Dr. Hiral Korani, Lotus College of Optometry, 13th NS Road, Vithalnagar Society, JVPD, Juhu 400 049; **Email:** hiral@lcoo.edu.in ; Contact no: 09833099142

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Among the most traditional and long-term results-yielding strategies is to perform door-to-door vision screening, identify the cases who need to be referred to a camp for refractive errors management and refer the cataract cases to the base hospital^{6,7}.

The objective of this study was to evaluate the pre-COVID-19 and post-unlock change in door-to-door screening for the management of primary eye care services in rural Maharashtra, India.

The organization has an ongoing refractive errors program called “Aapli Drushti Aapla Wada” supported by Essilor Vision Foundation. The goal of the project is screening and management of uncorrected refractive errors and other primary eye care for a population of 1,00,000 adults in Wada Taluka of Palghar district of Maharashtra.

Methodology

A retrospective analysis of data was done for the ongoing refractive error management program in rural Maharashtra. “Aapli Drushti Aapla Wada” was launched in October of 2019 with an objective to screen a hundred thousand adults by way of door-to-door screening with the help of trained community eye health workers. Trained health workers started screening from November 2019. Pre-COVID-19 screening protocol included assessment of visual acuity for distance and near, followed by pinhole visual acuity, torchlight examination, and assessment of intraocular pressure (IOP) using a non-contact tonometer. Criteria for referral for comprehensive eye examination included distance visual acuity <6/12 and near acuity of <1M. External examination criteria included red-eye, white scar or opacity, abnormally positioned eyes, or small or large eyes. Those with repeated IOP measures over 22mm/Hg were also referred.

Comprehensive eye examination camps were held at regular intervals and those who failed the screening test during the door-to-door screening were referred to the eye camps. Eye examination was performed by a team of optometrists. Reading glasses were dispensed free of cost on the spot and prescription spectacles were provided one week later. Those who needed cataracts or management for other ocular morbidities were referred to the base hospital.

A nationwide lockdown was announced on March 20, 2020, and all community eye health activities were put on hold. Unlock was done with COVID-19 protocol in place, particularly for primary health care services by October 2020. For the post-unlock period, health workers had a refresher training to screen for temperature before vision screening and how to choose and prescribe readers at the time of door-to-door screening. Since collecting people for eye camps was still restricted, those whose distant visual acuity was >6/9 and only need was for presbyopia correction, readers were dispensed on the spot. From July 2021 post the second wave and completion of vaccination of health workers, eye camps were organized, and prescription glasses and management of other ocular morbidities were done.

The pre-COVID-19 screening data from January 22, 2020-March 14, 2020 and the post-unlock screening data from January 18th, 2021 to March 13th, 2021 were compared and analyzed. A retrospective analysis was done using weekly reports shared by the two health workers who were present during the pre-COVID-19 and post-unlock periods. To ensure consistency, the same senior optometrists performed the training and the refresher training programs. As this is a retrospective study from data of an existing project, as per the waiver policy of the Ethics Committee of Lotus Eye Hospital and College of Optometry, prior permission, and consent from patients and involved health workers were not needed as it does not violate the Declaration of Helsinki.

Statistical analysis

SPSS version 28.0.1.1 (IBM, Bengaluru, India) was used for carrying out the statistical analysis. Multifactorial ANOVA was run to understand the difference in means in screening numbers pre-COVID-19 and post-unlock in comparison to the numbers of households visited. Paired sample T-test was run to compare the means between the age

group pre-COVID-19 and post-unlock; to determine the increase/decrease in screening numbers pre-COVID-19 and post-unlock. Chi-Square was used to find any association between genders.

Results

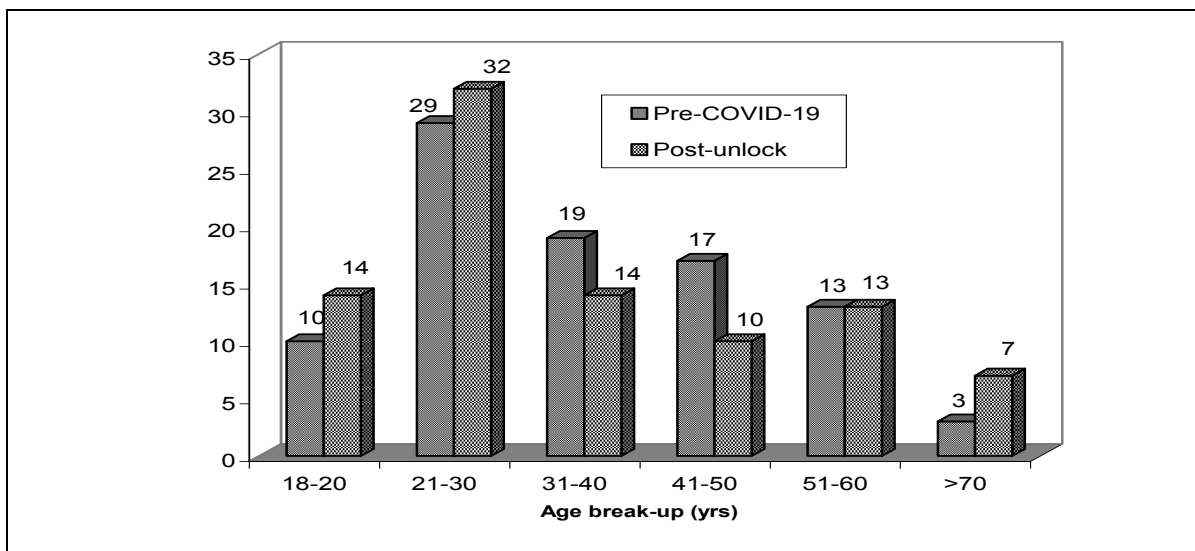
Data of adults screened pre-COVID-19, from January 22nd, 2020 to March 14th, 2020, and post-unlock from January 18th, 2021 to March 13th, 2021 was analyzed.

As demonstrated in table 1 total number of people screened door-to-door increased to 9% post-unlock. Pre-COVID-19, 1997 people were screened from 911 households, whereas post-unlock 2174 people were screened from 812 households. Although 177 more people were screened post-unlock, the total number of households visited was 10% less compared to pre-COVID-19.

Table-1: Tabulated representation of a retrospective comparison of data.

Parameter	Pre-COVID -19	Post -unlock	p-value
No. screened	1997	2174	0.0003
Mean Age (yrs)	41.27± 17.17	39.66±16.94	0.002
No. of Households visited	911	812	0.017
Population screened/ No. of households	2.19 persons per household	2.67 persons per household	----
Gender Ratio (Male: Female)	1:1.7	1:1.3	0.021
Number of people failing near acuity ≤ 4m	63%	13%	---

Figure- 1: Age distribution of patients availing door-to-door service



The mean age pre- COVID-19 and post-unlock was 41.27 ± 17.17 and 39.66 ± 16.94. A younger mean age group was found to be present at home for screening post unlock compared to the pre-COVID-19 period. The number of people who failed the screening test for near was more pre-COVID-19 phase than as compared to post-unlock. Gender analysis was done pre and post-unlock. The results showed that more males availed services as compared to females. This result was found to be statistically significant (Table- 1; Figure-1).

Discussion

Important findings of the study were-

1. A larger number of people were screened by the health workers post-unlock during door-to-door vision screening despite visiting a lesser number of households.
2. The younger age group (21-30 years) and male members availed more door-to-door services compared to other age groups and pre-COVID-19.

Pre-COVID-19 numbers for screening of adults showed that during door-to-door screening, the number of adults reached per household average was 2.19 persons, whereas the post-unlock period showed that an average of 2.67 persons per household were reached. Between every two households, one more additional member availed screening and this could be attributed to reverse migration. Several reports from Economic and Political Weekly^{8,9} and Vasudev et al.¹⁰ in 2020 have reported on the effects of lockdown and loss of jobs that had led to a large population of migrant workers heading back to villages leading to reverse migration. This probably explains that a larger population was screened by visiting fewer households when comparing the screening numbers to the pre-COVID-19 era.

Rathi et al. recommended the need for newer strategies to reach out services at primary eye care as numbers in the outpatient department, particularly for new patients had dropped to half during the pandemic¹¹. The pre-COVID-19 strategy was to focus on door-to-door screening and referral for comprehensive eye examinations to campsites. The post-unlock strategy focused on screening and provision of readers at door step as camps and movement to base hospitals were restricted.

Present study observed a decrease in the mean age of those who were screened at home. Abas M et al.¹² in their paper on Rural-Urban immigration have reported that younger people migrate to urban areas for work leaving an aging population behind. On the contrary, Rathi et al.¹¹ reported an increase in mean age among those who availed services at the tertiary care and centers of excellence. The study also observed lesser people failing the near vision test. This, suggests that in the present study younger people moved back to the villages which is described as reverse migration¹¹.

Similarly, the gender ratio in the pre-COVID-19 period was 1.7 females per male, and in the post unlock period 1.3 females per male were screened. Studies in India, as well as developing countries like Bangladesh, have reported that the males migrate from rural to urban areas in search of work, and women are left behind to farm and manage the households¹³⁻¹⁴. Three other studies that analyzed the impact of pandemic and gender also reported that more men accessed services^{11, 15, 16}. Studies also reported that refractive error services and elective surgeries were the least priority and ocular emergencies were among the chief reasons to present in ophthalmic outpatient departments in tertiary care centers^{16, 17}.

Holden et al, reported that uncorrected refractive error is a major public health issue and that lack of human resources and access to services are among the major barriers¹⁸. Maximizing service delivery and reaching out to services in pandemic times have been the need of the hour. The present study shows that if we map times when there is likely to be reverse migration, we can reach out to more people in remote and rural areas, thus improving the efficiency of service delivery.

Due to reverse migration, younger people were more available in rural household's post unlock. The learnings can help in planning for door-to-door screening and outreach activities. If the period of reverse migration can be mapped and services around those can be planned, programs will be able to render management of uncorrected refractive error across all age groups.

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