Original Article

Descriptive study of patient outcome and satisfaction with telemedicine and physical consultation during and after the COVID-19 pandemic

Ronak Asodariya, Kavita R Bhatnagar, Kirti Jaisingh, Manjari Tandon, Latika Pandey, Nikhil Agrawal, Sanjeev Misra[1]

Purpose: This study was conducted to assess patients' outcome and satisfaction with the eye care received with telemedicine and physical consultation at a tertiary care hospital during and after the coronavirus disease 2019 (COVID-19) pandemic. **Methods:** A descriptive study was carried out on 6052 patients who consulted for eye illness at a tertiary care hospital between April 2020 and December 2022. An outcome scoring system was developed and validated for the assessment of patient outcome after providing treatment on telemedicine consultation and physical consultation. Outcome scores for various symptoms were compared pretreatment and posttreatment. Telehealth Usability Questionnaire (TUQ) was used through an online survey to assess patients' satisfaction with teleophthalmology services during the COVID-19 pandemic. An 18-item Patient Satisfaction Questionnaire (PSQ-18) was used to assess the same with physical consultation. **Results:** A total of 6052 patients were included in the study. Physical consultation group had 2485 patients (41.06%) and the telemedicine group had 3567 patients (58.93%). Male patients constituted 63.11% and females were 36.89%. There was a significant improvement in outcome scores for pain and redness in both physical and telemedicine consultation groups ($P < 0.0001$). All subgroups of TUQ had significantly high scores (including usefulness, ease of use and learnability, interface quality, interaction quality, and satisfaction and future use), except one subgroup (reliability). Uneducated patients were significantly more satisfied with telemedicine compared to educated patients ($P = 0.044$). **Conclusion:** Majority of patients expressed satisfaction with teleophthalmology services. The recent pandemic paved the way for the future integration of telemedicine in ophthalmology, especially if virtual eye examinations attain a higher level of reliability.

Key words: COVID-19 pandemic, patient's satisfaction, Telehealth Usability Questionnaire, teleophthalmology

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The emergence of numerous viral infections has a significant impact on both our health and wealth. A few examples of catastrophic viral outbreaks include Crimean Congo hemorrhagic fever, Ebola Lassa fever, Marburg virus, Nipah virus, Zika virus, and coronavirus disease 2019 (COVID-19). The latter first emerged in Wuhan, China, in December 2019 and quickly spread throughout the world. As a result, on January 30, 2020, the World Health Organization (WHO) proclaimed COVID-19 a pandemic. More than 210 countries were infected by COVID-19. Due to the COVID-19 outbreak, major hospitals were converted to COVID hospitals, while all elective and nonemergency procedures were deferred. This led to finding alternative ways to reach out to patients with minimum exposure to hospitals or health-care professionals. Telemedicine emerged as a perfect substitute amidst the COVID restrictions.[1-6]

The WHO defines telemedicine as "The delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment, and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities."[7]

It has always been a challenge to deliver optimal health care to India's large population due to an overburdened health-care system. This was intensified during the COVID-19 pandemic. As an additional method of delivering health care, telemedicine has revolutionized medical services. In India, currently, 45% of the population has internet access and 79% use mobile phones.[8] This, along with the availability of economical internet connectivity, has further increased the use of telemedicine services. Patients in remote areas can have easy access to health care via telemedicine now.[9,10] It is frequently viewed as a cost-effective alternative to the more traditional types of visits between the patient and the

Department of Ophthalmology, All India Institute of Medical Sciences, Jodhpur, Rajasthan, [1]Department of Surgical Oncology, Vice Chancellor, Atal Bihari, Vajpayee Medical University, Lucknow, Uttar Pradesh, India

Correspondence to: Dr. Kavita R Bhatnagar, AIIMS, OPD Block, Room No. 421, Jodhpur, Rajasthan - 342 005, India. E-mail: rajankavita12@gmail.com

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health-care provider.[11,12] In this novel method, there is more control for accessing health care with the patients. Hence, the likelihood of adoptability of this method is on the rise. The best advantage of using telemedicine is that it overcomes two barriers: distance and time.[13-15] A telemedicine clinic has a variety of uses, including triaging urgent issues, improving patient adherence to drugs, reassuring patients, and promptly monitoring chronic illnesses.[16]

An accepted indicator of the performance of any health-care service is satisfaction. Patients' values and expectations regarding various aspects of health service are reflected by it. Patients are satisfied when there is a match between the care expected and the care received by them. Thus, the level of satisfaction heavily depends on the patient's actual experiences.[17]

This study was conducted to assess patients' outcome and satisfaction with the eye care they had received with telemedicine and physical consultation at a tertiary care academic institution during and after the COVID-19 pandemic.

Methods

This descriptive study was conducted following the tenets of the Declaration of Helsinki at a tertiary care academic institution after obtaining clearance from the Institutional Ethics Committee (IEC AIIMS/ICE/2021/3627). The study was conducted from April 2020 to December 2022. All patients seeking teleconsultation and physical consultation for any ocular complaint were enrolled in the study. Consent for study participation of telemedicine consultation patients was obtained through the digital platform (WhatsApp) via Google Form, which included details of the study in English and Hindi languages. Consent for physical consultation patients was obtained in person on physical paper.

Telemedicine consultation was done according to the appointment date and time for consultation. Appointment was taken by the patients online. At the appointment time, audio calls were made by junior residents to the patient's contact number. All patients were asked for verbal consent for teleconsultation and then were registered in the department panel. For all the participating patients, a detailed history regarding the onset of symptoms, duration, progression, any associated complaints, history of any medical illness or addiction, family history, and thorough treatment history was taken. If needed, visual images or video conferences for screening, diagnosis, treatment, and monitoring of disease were done. After a proper assessment of the history and images provided by patients, a probable diagnosis was made and treatment was offered accordingly. If required, physical visit was advised to patients with the proper prescription sent to the patient on electronic media. As per the diagnosis and treatment provided, the patient was put on either telemedicine follow-up or physical outpatient department (OPD) follow-up. If the patients did not attend calls made by the doctor, repeated calls were made twice at a 30-min interval. In case no response was obtained from the patient after repeated calls, the patient was put on telemedicine follow-up after 1-week duration.

Since the study was planned a few months after COVID-19 started, many patients were enrolled retrospectively. Detailed records of all such patients were extracted from the hospital's online system. Patient satisfaction questionnaires were filled both retrospectively and prospectively. The demographic details of all the participating patients were recorded.

Physical consultation patients visited the OPD of our institute. Detailed history taking, similar to the teleconsultation group, and a thorough ophthalmologic examination, including visual acuity, refraction, intraocular pressure measurement, and examination of the anterior segment and the posterior segment, were done for all patients. If needed, relevant investigations were ordered and diagnosis was made. According to the diagnosis, treatment was advised and patients were put on either physical OPD follow-up or telemedicine follow-up. These patients were further divided into two groups. The first group consisted of patients who were seen during high COVID time (from April 2020 to August 2021) and the second group consisted of patients who were seen when the peak of COVID decreased (from September 2021 to December 2022). The first group was named as retrospective physical consultation group and the second group as prospective physical consultation group.

The purpose of this study was to assess patient outcome and satisfaction with telemedicine consultation and physical consultation during and after the COVID-19 pandemic.

An outcome scoring system was developed and validated by the Department of Ophthalmology of the studying institute for assessment of patient outcome after treatment provided on telemedicine consultation as well as physical consultation. For physical consultation patients, it consisted of three parameters – pain, redness, and visual acuity. For telemedicine consultation patients, it consisted of two parameters – pain and redness. Visual acuity assessment could not be accurately done on a telemedicine consultation, so it was not included in the outcome scoring system for telemedicine patients.

Pain was graded as 0–3, viz., no pain, mild, moderate, and severe pain, respectively. Similarly, redness was graded as 0–3, viz., no redness, mild, moderate, and severe redness, respectively. However, vision was graded as 0 if there was no change in vision, 1 if there was worsening of vision, and 2 if there was an improvement in vision. These parameters were compared both pretreatment and posttreatment in both groups.

For obtaining patient satisfaction through telemedicine service, the Telehealth Usability Questionnaire (TUQ) was used.[18] It is a validated questionnaire that has six components (usefulness, ease of use and learnability, interface quality, interaction quality, reliability, satisfaction and future use). There are different questions under each component. The questions were explained to the patients in their local language by the doctor and their responses were recorded. The answers to TUQ were based on a 7-point Likert scale. The average score for each variable and each patient was calculated to determine telemedicine satisfaction and usability. The higher the overall average, the higher the usability of the telehealth system.

Similarly, to assess the patient's satisfaction with physical consultation, the 18-item Patient Satisfaction Questionnaire (PSQ-18) was used.[19] PSQ-18 has been validated for use in a variety of settings and has established internal consistency and reliability. It has seven components (general satisfaction, technical quality, interpersonal manner, communication, financial aspect, time spent with doctor, accessibility and convenience). There were different questions

under each component. The questions were explained to the patients in their local language and their responses were recorded. The answers to PSQ were based on a 5-point Likert scale. After item scoring, items within the same subscale were averaged together to create the seven-subscale score. The form was filled at the first follow-up.

Data was entered in an Excel sheet and analyzed using the Statistical Package for the Social Sciences (SPSS) version 25. All nominal variables were described using counts and percentages and analyzed using the Chi-square test or the Fischer's exact test. All ordinal variables were described using median and interquartile range and analyzed using the Mann–Whitney *U* test. All continuous variables were described using mean and standard deviation and analyzed using the independent sample *t*-test. A *P* value of less than 0.05 was considered statistically significant.

Results

In our study, patients were divided into two groups: Group I was the telemedicine consultation group and Group II was the physical consultation group. The physical consultation group was further divided into two groups: the retrospective physical consultation group, which included patients seen during COVID time, and the prospective physical consultation group, which included patients seen after COVID time.

A total of 5000 patients were consulted via telemedicine and 6000 patients were consulted in physical OPD, out of which only 6052 patients had given consent for study participation. The physical consultation group had a study population of 2485 patients (41.06%) and telemedicine consultation patients were 3567 (58.93%). The retrospective physical consultation group had a study population of 1242 patients (20.52%), and the prospective physical consultation group had 1243 patients (20.53%).

Out of the 1242 patients in the retrospective physical consultation group, 1013 patients (81.56%) were managed medically while 229 patients (18.43%) were managed surgically. The mean age of medically managed patients was 38.41 ± 18.70 years and surgically managed patients was 45.01 ± 20.55 years. The difference between both the groups was significant ($P < 0.0001$).

Majority of patients had refractive errors (26.65%), followed by allergic conjunctivitis (13.37%), cataract (13.04%), glaucoma (7.81%), and others. There was no significant difference in disease distribution between males and females.

Retrospective physical consultation patients were re-evaluated on a follow-up visit and an outcome score was given to each patient on parameters of pain, redness, and vision. Patients with some diseases who had a pretreatment score of zero were excluded from the analysis due to technical difficulties faced during comparison with posttreatment score. Significant reduction in pain and redness was noted after treatment in diseases like allergic conjunctivitis, anterior blepharitis, corneal ulcer, dry eyes, meibomian gland dysfunction, glaucoma, and refractive errors ($P < 0.0001$) [Table 1].

Prospective physical consultation patients' outcome scores for pain and redness also showed that there was a significant reduction in pain and redness after treatment in diseases like allergic conjunctivitis, dry eyes, meibomian gland dysfunction, corneal ulcer, glaucoma, and refractive errors [Table 2].

The total number of patients who consulted through telemedicine was 3567 during our study, who were further grouped according to their presenting symptoms and signs. Majority of patients presented with complaints of gradual diminution of vision (48.02%) followed by ocular pain/headache (9.78%), dryness of eyes (5.75%), itching (4.79%), and others. There was a significant number of patients who were lost to follow-up (14.89%).

These patients were re-evaluated on follow-up visit and an outcome score was given to each patient on parameters of pain and redness. There was a significant reduction in pain and redness after treatment in symptoms like itching, dryness of eyes, ocular pain/headache, and redness of eyes [Table 3].

After consulting 3567 patients through telemedicine, 2987 patients (83.71%) were asked to come to OPD for detailed assessment since 48.02% patients had the complaint of gradual diminution of vision. Apart from that, patients with any emergency conditions that needed further investigations were asked to come to physical OPD. The remaining patients (16.28%) were put on telemedicine follow-up.

Patient satisfaction among telemedicine consultation patients was assessed using the TUQ score. All subgroups had a significantly high score (usefulness, ease of use and learnability, interface quality, interaction quality, and satisfaction and future use) except one subgroup (reliability), which had a significantly low score [Table 4]. There was no significant difference between males and females with respect to the TUQ score.

On comparing these scores with respect to the educational status of the patient, uneducated patients showed significant level of satisfaction ($P = 0.044$).

Patients' satisfaction in the physical consultation group was assessed using PSQ-18. The form was filled by the patient at the first follow-up visit and a score was given to the questions provided. Questions were subdivided into seven groups. Analysis results were shown in subgroups only. The subgroup of time spent with the doctor had the best scoring (3.3453 ± 0.59), which denoted that most of the patients were highly satisfied with the amount of time spent on them in the clinic. This was followed by the financial aspect (3.0816 ± 0.47), interpersonal manner (3.0589 ± 0.37), and accessibility and convenience (3.0585 ± 0.37). Patients were least satisfied with the technical quality, which had a score of 2.4763 ± 0.42 in the study population [Table 5].

Discussion

This study was conducted to assess patient outcome and satisfaction from telemedicine consultation and physical consultation with the help of an outcome scoring system, which was assessed both pretreatment and posttreatment. TUQ was used through an online survey to assess patients' satisfaction regarding teleophthalmology experience during the COVID-19 pandemic. PSQ-18 was used to assess the same with physical consultation.

In our study, male patients constituted 63.11% and 36.89% were females. This ratio was maintained in all the groups, which suggested male patients' easy access to health-care

Table 1: Distribution of outcome scoring for pain and redness in various disease entities pretreatment and posttreatment in the retrospective physical consultation groups (*n*=1242)

Diagnosis	Cases	%	Pain		Mean difference	*P*
			Pretreatment (Mean±SD)	Posttreatment (Mean±SD)		
Outcome score for pain in retrospective physical consultation group (*n*=1242)						
Allergic conjunctivitis	166	16.39	1.21±0.88	0.44±0.63	0.771	**<0.0001**
Anterior blepharitis	7	0.69	1.28±1.11	0.42±0.78	0.857	**0.016**
Corneal ulcer	7	0.69	1.28±0.48	0.71±0.48	0.571	**0.030**
Dry eye	23	2.27	0.82±0.77	0.30±0.47	0.521	**0.0004**
Glaucoma	97	9.58	0.049±0.57	0.13±0.34	0.360	**<0.0001**
MGD	22	2.17	0.72±0.70	0.31±0.47	0.409	**0.001**
Optic neuritis	5	0.49	1.00±0.70	0.2±0.44	0.800	**0.016**
Refractive error	331	32.68	0.55±0.67	0.13±0.34	0.426	**<0.0001**
Uveitis	36	3.55	1.08±0.69	0.36±0.48	0.722	**<0.0001**
Outcome score for redness in retrospective physical consultation group (*n*=1242)						
Allergic conjunctivitis	166	16.39	1.53±0.65	0.48±0.52	1.054	**<0.0001**
Anterior blepharitis	7	0.69	1.28±0.48	0.42±0.53	0.857	**0.001**
Corneal ulcer	7	0.69	1.85±0.69	0.85±0.37	1.000	**0.003**
Dry eye	23	2.27	0.86±0.54	0.34±0.48	0.521	**<0.0001**
Glaucoma	97	9.58	0.25±0.43	0.14±10.33	0.113	**0.0007**
Refractive error	331	32.68	0.05±0.22	0.00±0.00	0.05	**<0.0001**
Uveitis	36	3.55	1.30±0.66	0.47±0.50	0.833	**<0.0001**

Statistically significant values have been given in bold. MGD= Meibomian Gland Dysfunction, SD=standard deviation

Table 2: Distribution of outcome scoring for pain and redness in various disease entities pretreatment and posttreatment in the prospective physical consultation groups (*n*=1243)

Diagnosis	Cases	%	Pain		Mean difference	*P*
			Pretreatment (Mean±SD)	Posttreatment (Mean±SD)		
Outcome score for pain in prospective physical consultation group (*n*=1243)						
Allergic conjunctivitis	173	24.20	1.36±0.72	0.46±0.63	0.884	**<0.0001**
Corneal ulcer	3	0.42	1.33±0.57	0.66±0.57	0.666	0.500
Dry eyes	20	2.80	0.95±0.68	0.25±0.44	0.700	**0.0002**
Glaucoma	117	16.36	0.47±0.58	0.12±0.33	0.344	**<0.0001**
MGD	29	4.06	0.62±0.67	0.31±0.47	0.310	**0.003**
Refractive error	344	48.11	0.59±0.69	0.13±0.34	0.453	**<0.0001**
Uveitis	3	0.42	1.33±0.57	0.66±0.57	0.666	0.500
Outcome score for redness in prospective physical consultation group (*n*=1243)						
Allergic conjunctivitis	173	24.20	1.40±0.72	0.41±0.49	0.944	**<0.0001**
Corneal ulcer	3	0.42	1.66±0.57	1.00±0.00	0.666	-
Dry eyes	20	2.80	1.05±0.5	0.45±0.51	0.600	**0.0005**
Glaucoma	117	16.36	0.26±0.44	0.13±0.34	0.125	**<0.0001**
MGD	29	4.06	0.34±0.48	0.20±0.41	0.137	0.125
Refractive error	344	48.11	0.046±0.21	0.00±0.00	0.046	-
Uveitis	3	0.42	1.00±0.00	0.66±0.57	0.330	-

Statistically significant values have been given in bold. SD=standard deviation

facilities compared to female patients. In the telemedicine group, 64.31% patients were males while 35.69% patients were females. A study conducted by Polinski *et al*.[20] had 54% females in telemedicine consulted patients, while a study conducted by Caycedo *et al*.[21] had 70% female patients in the telemedicine consultation group. This result contrasted with our study. The probable reason for this discrepancy was that our study was conducted in Rajasthan, where females have a low literacy rate as well as cultural rituals are strictly followed by females. This might be an obstacle for them to reach hospitals or other social places early in time, while the above studies were conducted in states with high female literacy.

Table 3: Distribution of outcome scoring for pain and redness in various disease entities pretreatment and posttreatment in the telemedicine consultation group (*n*=3567)

Diagnosis	Cases	%	Outcome score for pain: Pain		Mean difference	*P*
			Pretreatment (Mean±SD)	Posttreatment (Mean±SD)		
Itching	140	18.18	1.54±0.69	0.57±0.66	-0.97	**<0.0001**
Conjunctival mass	82	10.65	1.17±0.37	0.46±0.50	-0.71	**<0.0001**
Dryness of eyes	159	20.65	1.44±0.64	0.55±0.56	-0.89	**<0.0001**
Ocular pain/headache	349	45.32	1.55±0.66	0.74±0.62	-0.81	**<0.0001**
Red eyes	26	3.38	1.38±0.57	0.65±0.48	-0.73	**<0.0001**
Outcome score for redness						
Itching	165	28.11	1.57±0.60	0.46±0.52	-1.11	**<0.0001**
Conjunctival mass	117	19.93	1.14±0.50	0.47±0.50	-0.67	**<0.0001**
Dryness of eyes	189	32.20	1.61±0.66	0.48±0.57	-1.13	**<0.0001**
Ocular pain/headache	46	7.84	1.00±0.00	0.39±0.49	-0.61	-
Red eyes	59	10.05	1.74±0.68	0.81±0.54	-0.93	**<0.0001**
Watering	3	0.51	1.00±0.00	0.66±0.57	-0.34	-

Statistically significant values have been given in bold. SD=standard deviation

Table 4: Telemedicine consultation patients' Telehealth Usability Questionnaire score compared with individual symptoms (*n*=3567)

Questionnaire	Telehealth Usability Questionnaire score: Usefulness (Mean±SD)	Ease of use and learnability (Mean±SD)	Interface quality (Mean±SD)	Interaction quality (Mean±SD)	Reliability (Mean±SD)	Satisfaction and future use (Mean±SD)
Itching	6.14±0.56	5.80±0.59	5.80±0.56	5.73±0.61	2.87±0.82	5.98±0.47
Conjunctival mass	6.13±0.49	5.75±0.54	5.78±0.50	5.72±0.54	2.76±0.83	6.00±0.41
Deviation of eyeball	6.17±0.51	5.86±0.59	5.78±0.40	5.67±0.51	2.96±0.87	6.02±0.53
Dryness	6.15±0.56	5.83±0.60	5.83±0.55	5.77±0.56	2.90±0.94	6.01±0.47
Gradual diminution of vision	6.20±0.54	5.80±0.58	5.82±0.53	5.78±0.52	2.86±0.87	5.99±0.49
Lid swelling	6.17±0.53	5.79±0.54	5.80±0.57	5.67±0.54	2.80±0.95	5.97±0.52
Miscellaneous	6.14±0.55	5.76±0.57	5.82±0.52	5.81±0.50	2.79±0.84	6.05±0.38
Ocular pain/headache	6.14±0.55	5.84±0.58	5.82±0.48	5.72±0.54	2.75±0.87	5.97±0.46
Drooping of lid	6.02±0.68	5.69±0.59	5.72±0.37	5.75±0.43	2.91±1.11	5.91±0.41
Red eye	6.11±0.58	5.75±0.53	5.79±0.55	5.77±0.38	2.90±0.93	5.97±0.47
Routine check up	6.14±0.56	5.80±0.59	5.80±0.52	5.73±0.55	2.83±0.84	6.00±0.46
Sudden diminution of vision	5.97±0.57	5.62±0.50	5.76±0.39	5.83±0.46	2.58±0.61	5.93±0.42
Watering	6.23±0.47	5.75±0.57	5.92±0.51	5.83±0.47	2.85±0.80	6.05±0.49

SD=standard deviation

The outcome scoring revealed a significant reduction in symptoms of pain and redness in both telemedicine and physical consultation groups. This proved that telemedicine is an effective alternative to physical consultation in times of crisis, even in ophthalmology settings.

Telemedicine consultation patients were followed up either in physical OPD or on telemedicine only. Most of the patients (83.71%) were followed up in physical OPD, as they needed to be evaluated in person due to causes like refractive errors, glaucoma, retinal diseases, corneal ulcer, and emergency cases. Exactly 16.28% patients were continued on telemedicine follow-up. These included most cases with complaints of itching, watering, redness, and dryness of eyes. Our study result was comparable to the study conducted by Kapoor *et al.*[22] in which 82.52% patients needed to be converted to physical consultation from telemedicine consultation. Telemedicine was found to be useful in reducing patients' exposure to the hospital during the COVID-19 pandemic. Similar results were reported by Golash *et al.*[23]

In our study, we evaluated patients' satisfaction with telemedicine by using TUQ. We found an overall positive response from teleconsultation patients with a mean score of 5.40 out of 7. The study results corroborated with Polinski *et al.*,[20] where 95% patients were satisfied with telemedicine services. A similar positive response regarding telemedicine use was also found in a study conducted by Ceprnja *et al.*,[24]

Table 5: Comparison of PSQ-18 scoring in various subclasses of questionnaire between both the groups of the study population on 5-point Likert scale (*n*=2485)

Questionnaire	During COVID group (Mean±SD)	After COVID group (Mean±SD)	*P*
General satisfaction	2.8595±0.48	2.9143±0.38	**0.0016**
Technical quality	2.4144±0.38	2.5382±0.47	**<0.0001**
Interpersonal manner	3.0748±0.44	3.0430±0.31	**0.0374**
Communication	2.8526±0.52	2.9967±0.54	**<0.0001**
Financial aspects	3.0579±0.55	3.1053±0.4	**0.0141**
Time spent with doctor	3.1602±0.55	3.5305±0.63	**<0.0001**
Accessibility and convenience	3.1775±0.35	2.9396±0.39	**<0.0001**

Statistically significant values have been given in bold. COVID=coronavirus disease, PSQ-18=18-item Patient Satisfaction Questionnaire, SD=standard deviation

where they found a low score for reliability while all other subclasses had a significantly high score. These results provide insights into patients' motivations for using telehealth and factors associated with their preference for telehealth visits.

Telemedicine consultation group patients were further analyzed according to their education level, in which we found that illiterate patients were more satisfied with the care they received with telemedicine compared to literate patients. This could be attributed to lower expectations of illiterate people concerning access to health care amidst COVID mandates.

Patients' satisfaction with physical consultation was assessed using the PSQ-18 questionnaire, and the score of our study was found to be comparable with studies conducted by Peterson *et al*.[25] and Sakti *et al*.,[26] where across all dimensions of PSQ-18, patients were highly satisfied with the care they had received.

The above study reinstates the importance of incorporating telemedicine in routine ophthalmology practices. It also establishes the fact that patient satisfaction does not suffer whether the patient is seen online or physically. Moreover, like other domains of medicine, it can also assist in the successful triage of patients seeking ophthalmic services, along with monitoring the adherence and compliance of treatment by patients. It is not only an alternative to routine practices, but can also be used regularly as the primary mode of consultation in remotely inaccessible areas.

This study also brings out the shortcomings of telehealth system, which in turn will probably inspire innovations that will change the whole health-care delivery worldwide. This might lead to more adaptable and precise home testing in ophthalmology. We might be able to shift the point of care from hospitals to the community by bringing teleophthalmology services into optometry practices. Slit-lamp photography and the store-and-forward transmission of data from investigations, including optical coherence tomography scans and visual fields, will enhance the management decisions made in the community.[23]

Significant consideration and in-depth study are needed to get over obstacles relating to cost-effectiveness and ethical considerations for the data obtained and to successfully employ devices and implement programs.[27]

Limitations

This study has been conducted at a single tertiary care center; hence the results of our study cannot be generalized. In addition to this, our study did not include the cost-effectiveness of telemedicine, which could be an important contributory factor to assess satisfaction with telemedicine.

Conclusion

Telemedicine was proved to be an effective alternative to physical consultation during the pandemic. All subgroups of the TUQ had significantly high scores, except one subgroup, viz., reliability. Though physical consultations are irreplaceable, the recent pandemic paved the way for the future integration of telemedicine in ophthalmology, especially if virtual eye examinations attain a higher level of reliability.

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References

1. Kaushik S, Kaushik S, Sharma Y, Kumar R, Yadav JP. The Indian perspective of COVID-19 outbreak. Virusdisease 2020;31:146–53.
2. Rothan HA, Byrareddy SN. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. J Autoimmun 2020;109:102433.
3. Kalra G, Williams AM, Commiskey PW, Bowers EMR, Schempf T, Sahel JA, *et al*. Incorporating video visits into ophthalmology practice: A retrospective analysis and patient survey to assess initial experiences and patient acceptability at an academic eye center. Ophthalmol Ther 2020;9:549–62.
4. Al Owaifeer AM, Al-Swailem SA, Al Dehailan AM, Al Naim A, Al Molhim MF, Khandekar RB. Physician satisfaction with virtual ophthalmology clinics during the covid-19 pandemic: A tertiary eye care center experience. Cureus 2022;14:e23837.
5. De Lott LB, Newman-Casey PA, Lee PP, Ballouz D, Azzouz L, Cho J, *et al*. Change in ophthalmic clinicians' attitudes toward telemedicine during the coronavirus 2019 pandemic. Telemed E-Health 2021;27:231–5.
6. Saleem SM, Pasquale LR, Sidoti PA, Tsai JC. Virtual ophthalmology: Telemedicine in a COVID-19 Era. Am J Ophthalmol 2020;216:237–42.
7. Ryu S. Telemedicine: Opportunities and developments in member states: Report on the second global survey on eHealth 2009 (Global Observatory for eHealth Series, Volume 2). Healthc Inform Res 2012;18:153–5.
8. Galagali PM, Ghosh S, Bhargav H. The role of telemedicine in child and adolescent healthcare in India. Curr Pediatr Rep 2021;9:154–61.
9. Sommer AC, Blumenthal EZ. Telemedicine in ophthalmology in view of the emerging COVID-19 outbreak. Graefes Arch Clin Exp Ophthalmol 2020;258:2341–52.
10. Dhingra D, Dabas A. Global strategy on digital health. Indian Pediatr 2020;57:356–8.
11. de la Torre-Díez I, López-Coronado M, Vaca C, Aguado JS, de Castro C. Cost-utility and cost-effectiveness studies of telemedicine, electronic, and mobile health systems in the literature: A systematic review. Telemed E-Health 2015;21:81–5.
12. Sharma M, Jain N, Ranganathan S, Sharma N, Honavar SG, Sharma N, *et al*. Tele-ophthalmology: Need of the hour. Indian J Ophthalmol 2020;68:1328–38.
13. Portnoy JM, Pandya A, Waller M, Elliott T. Telemedicine and emerging

technologies for health care in allergy/immunology. J Allergy Clin Immunol 2020;145:445–54.

14. Gupta PC, Kumar MP, Ram J. COVID-19 pandemic from an ophthalmology point of view. Indian J Med Res 2020;151:411–8.
15. Newman-Casey PA, De Lott L, Cho J, Ballouz D, Azzouz L, Saleh S, *et al*. Telehealth-based eye care during the covid-19 pandemic: Utilization, safety, and the patient experience. Am J Ophthalmol 2021;230:234–42.
16. Tousif S, Hasaneen M, Mehta S, Mehta V, Natarajan, Hasan, *et al*. Utility of telemedicine in ophthalmology clinic during COVID-19 era. Hematol Res Rev 2021;3:46–9.
17. Yip MP, Chang AM, Chan J, MacKenzie AE. Development of the telemedicine satisfaction questionnaire to evaluate patient satisfaction with telemedicine: A preliminary study. J Telemed Telecare 2003;9:46–50.
18. Parmanto B, Lewis AN, Graham KM, Bertolet MH. Development of the Telehealth Usability Questionnaire (TUQ). Int J Telerehabilitation 2016;8:3–10.
19. Thayaparan AJ, Mahdi E. The patient satisfaction questionnaire short form (PSQ-18) as an adaptable, reliable, and validated tool for use in various settings. Med Educ Online 2013;18:21747.
20. Polinski JM, Barker T, Gagliano N, Sussman A, Brennan TA, Shrank WH. Patients' satisfaction with and preference for telehealth visits. J Gen Intern Med 2016;31:269–75.
21. Caycedo A, Serrano A, Ucrós A, Caycedo A, Serrano A, Ucrós A. Telemedicine and ophthalmology amidst covid-19: A descriptive study. Univ Medica 2022;63:1–9.
22. Kapoor S, Eldib A, Hiasat J, Scanga H, Tomasello J, Alabek M, *et al*. Developing a pediatric ophthalmology telemedicine program in the COVID-19 crisis. J Am Assoc Pediatr Ophthalmol Strabismus 2020;24:204-8.e2.
23. Golash V, Athwal S, Khandwala M. Teleophthalmology and COVID-19: The patient perspective. Future Healthc J 2021;8:e54–9.
24. Ceprnja D, Clark T, Young J, Lee R, Flynn K, Maka K. Evaluating experiences, usability and patient satisfaction with telehealth for tertiary outpatient physiotherapy services during COVID-19: A mixed-methods study. Physiother Theory Pract 2022;39:1929-37.
25. Peterson KM, Huisingh CE, Girkin C, Owsley C, Rhodes LA. Patient satisfaction with care in an urban tertiary referral academic glaucoma clinic in the US. Patient Prefer Adherence 2018;12:775–81.
26. Sakti DH, Firdaus AT, Utami TP, Jati KDP, Mahayana IT, Wardhana FS, *et al*. Patients' satisfaction with ophthalmology clinic services in a public teaching hospital. Patient Prefer Adherence 2022;16:723–35.
27. Nikolaidou A, Tsaousis KT. Teleophthalmology and artificial intelligence as game changers in ophthalmic care after the COVID-19 pandemic. Cureus 2021;13:e16392.