DOI: 10.14744/eer.2023.20592
Eur Eye Res 2024;4(1):24–29

EUROPEAN EYE RESEARCH

ORIGINAL ARTICLE

Opinions of Turkish ophthalmologists on telemedicine applications: A national, questionnaire-based survey

Gamze Karatas,[1] Mehmet Egemen Karatas[2]

[1]Department of Ophthalmology, Prof. Dr. Cemil Tascioglu City Hospital, Istanbul, Türkiye
[2]Department of Ophthalmology, Istanbul Training and Research Hospital, Istanbul, Türkiye

Abstract

Purpose: The study aims to determine the opinions of ophthalmologists about the use of telemedicine applications in the field of ophthalmology.

Methods: A standardized questionnaire consisting of 20 questions about demographic information and the use of telemedicine applications in ophthalmology was sent electronically to 110 ophthalmologists. The physicians were asked to answer the questionnaire, and the data were analyzed.

Results: Of the 110 physicians who received the questionnaire, 87 answered all the questions in the questionnaire, and the results were evaluated based on the answers of 87 physicians. Only 9 (11%) of the physicians stated that they had sufficient knowledge about telemedicine, and it was observed that all of these physicians were between the ages of 24–34. Fifty-eight (67%) of the physicians stated that telemedicine applications could be used, and 60 (69%) stated that the patients would also benefit from these applications. It has been observed that the rate of physicians who think that the patient-physician relationship will be affected by these practices is only 29 (33%). Sixty-two (74%) of the physicians stated that the telemedicine services to be provided through voice communication and video transmission in the field of ophthalmology would be insufficient, and they stated that video conversation would be appropriate.

Conclusion: The necessity of keeping up with the speed of technology development in health services will include telemedicine applications more in our lives. As a result of our study, we can predict that ophthalmologists will support this field if deficiencies are eliminated, and medicolegal regulations are made.

Keywords: Ophthalmology; pandemic; questionnaire; telemedicine.

Today, the rapid spread of online services has led to the development of applications that can significantly affect the roles of health-care beneficiaries and health-care providers. Telemedicine, as one of these applications, has taken its place in health services delivery processes. Telemedicine applications are gaining importance to increase the elderly population, prolong life expectancy, enable people to access health services quickly and reliably, and reduce health expenditure costs.[1]

It will be possible for patients to receive early diagnosis and treatment by providing fast and safe access to health services. In addition, accessibility to physicians in each re-

Cite this article as: Karatas G, Karatas ME. Opinions of Turkish ophthalmologists on telemedicine applications: A national, questionnaire-based survey. Eur Eye Res 2024;4:24-29.

Correspondence: Mehmet Egemen Karataş, M.D. İstanbul Training and Research Hospital, Istanbul, Türkiye
E-mail: egemenkaratas@gmail.com

Submitted Date: 17.05.2023 **Revised Date:** 03.07.2023 **Accepted Date:** 14.07.2023 **Available Online Date:** 20.03.2024

gion/country will speed up the time, cost, and treatment process. The application, which allows patients to receive opinions from one or more specialists during the treatment of their diseases, will shorten the waiting time.[2]

Telemedicine applications have benefits for patients, as well as benefits for health-care professionals and health-care organizations. It offers health-care professionals the opportunity to follow new developments, make correct and effective decisions, access patient information quickly, and improve their skills.[3]

In this study, we tried to reveal the knowledge and perspectives of ophthalmologists about telemedicine applications in ophthalmology and telemedicine applications of ophthalmologists.

Materials and Methods

A standardized questionnaire consisting of 20 questions about demographic information and the use of telemedicine applications in the field of ophthalmology was sent electronically to 110 physicians who are ophthalmologists in Turkey, and physicians were asked to answer the questionnaire. The questionnaire could be filled in anonymously and only one submission was allowed. The data were analyzed. The study was conducted in accordance with the tenets of the Declaration of Helsinki and was approved by the ethics committee of Istanbul Medipol University (approval ID: April 15, 2021/412) and adhered to the tenets of the Declaration of Helsinki.

The English version of the applied questionnaire is shown below.

1. **Your age?**
   - 24–34
   - 35–39
   - 40–44
   - 45–49
   - 50+
2. **Your gender?**
   - Woman
   - Man
3. **Select the type of hospital you work in…**
   - State Hospital
   - Training and Research Hospital
   - University Hospital
   - Private Hospital
4. **Your title?**
   - Resident
   - Specialist
   - Associate Professor Doctor
   - Professor Doctor
5. **Select the time you spent in your professional life…**
   - 0–4 years
   - 5–9 years
   - 10–14 years
   - 15–19 years
   - 20 + years
6. **Choose your interests… (you can choose more than one option)**
   - General Ophthalmology
   - Optical refraction (Contact lens applications, refractive surgery, etc.)
   - Anterior segment (Cornea, iris, lens diseases, etc.)
   - Retina
   - Glaucoma
   - Strabismus
   - Pediatric ophthalmology
   - Oculoplastic
   - Orbital diseases
   - Neuro-ophthalmology
   - Uvea
   - Other …(please specify)
7. **Do you think you have enough information about the use of telemedicine applications in the world?**
   - Yes
   - No
8. **Do you think that telemedicine applications can be used in our country?**
   - Yes
   - No
9. **Do you believe that patients will benefit from telemedicine applications?**
   - Yes
   - No
10. **Do you think telemedicine practices will harm the physician-patient relationship?**
    - Yes

No

11. Do you think that telemedicine applications can be used in the field of ophthalmology?

Yes

No

12. Do you think you will have difficulty getting used to the use of telemedicine applications?

Yes

No

13. Do you think you will have problems while suggesting examination and treatment with the help of telemedicine applications?

Yes

No

14. Do you think that if telemedicine applications start in the field of ophthalmology in our country, it will cause medicolegal problems?

Yes

No

15. Do you think that if telemedicine applications are started in the field of ophthalmology in our country, a significant decrease in the rate of hospital admissions will be achieved?

Yes

No

16. Which communication method do you think is appropriate for the use of telemedicine applications in the field of ophthalmology? (you can choose more than one option)

Voice communication

Photo use

Video usage

Video chat

Other …(please specify)

17. Which telemedicine applications do you think can be used? (you can choose more than one option)

In the emergency service and on duty calls

Elective outpatients

Post-operative patient follow-up

Chronic disease follow-up

Consultation services

None

Other …(please specify)

18. In which areas do you think telemedicine applications can be used? (you can choose more than one option)

Eyelid and orbital diseases

Conjunctiva and ocular surface diseases

Corneal diseases

Cataract and refractive surgery

Glaucoma

Retina

Uvea

Neuro-ophthalmology

Ocular oncology

Other…(please specify)

19. In which acute ophthalmological pathologies do you think telemedicine applications can be used? (you can choose more than one option)

Eyelid, and orbital infections

Conjunctival or scleral diseases

Corneal diseases

Presence of the foreign body

Blunt traumas

Penetrating-perforating traumas

Chemical injuries

Acute glaucoma

Acute, painless loss of vision

Acute, painful loss of vision

Other visual disturbances (photopsia, floaters, diplopia, etc.)

Other…(please specify)

20. What percentage of the ophthalmologic emergencies you encounter in your clinical practice do you think you can manage with the help of telemedicine applications?

0–24%

25–49%

50–74%

75–100%

Results

Of the 110 ophthalmologists who participated in the survey, 87 answered all the questions in the survey, and the

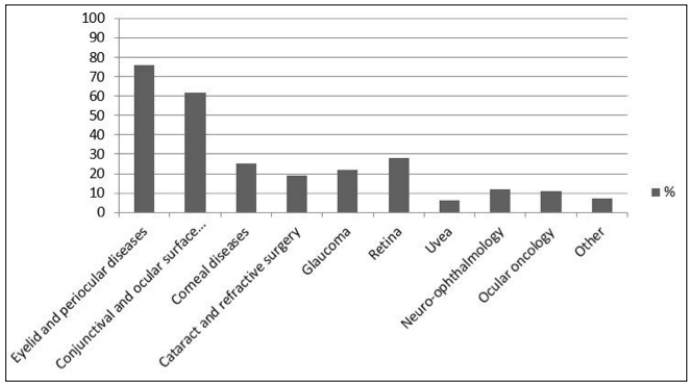

Fig. 1. Telemedicine availability graph in ophthalmology fields

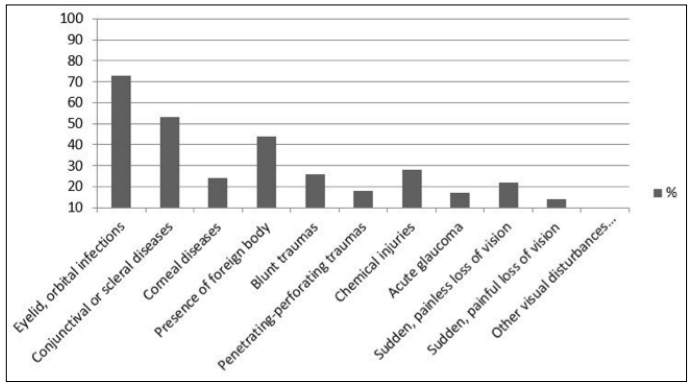

Fig. 2. Telemedicine applications graph in ophthalmological emergencies

results were evaluated based on the answers of 87 ophthalmologists.

When we look at the demographic results, 52 (59%) of the participants were 24–34 years old, 16 (18%) were 34–39 years old, 9 (11%) were 40–44 years old, 6 (7%) 45–49 years old, and 4 (5%) 50 years old and over.

Thirty-six (41%) were female, and 51 (59%) were male. Twenty-two (25%) of the participants were serving in public hospitals, 44 (51%) in training and research hospitals, 3 (4%) in university hospitals, and 18 (20%) in private hospitals. Fifty-six (65%) of the physicians were specialist doctors, and 31 (35%) were resident physicians. When we evaluate the professional experience of physicians over working years; 31 (35%) have served for 0–4 years, 37 (42%) for 5–9 years, 11 (13%) for 10–14 years, 4 (5%) for 15–19 years, 4 (5%) for 20 years or more.

Only 9 (11%) of the physicians stated that they had sufficient knowledge about telemedicine, and it was observed that all of these physicians were between the ages of 24–34. Only 22 (25%) of the physicians in this age group stated that they had sufficient knowledge about telemedicine.

Fifty-eight (67%) of the physicians stated that telemedicine applications could be used, and 60 (69%) stated that the patients would also benefit from these applications.

The rate of physicians who think that the patient-physician relationship will be affected by these practices is only 29 (33%).

Forty-nine (56%) of physicians think that telemedicine applications can be used in the field of ophthalmology.

Fifty-four (63%) of physicians think that they will have difficulty getting used to telemedicine applications, and 61 (70%) think that they will have problems while suggesting examination and treatment with the help of telemedicine applications. Seventy-three (84%) physicians stated that telemedicine practices would cause medico-legal problems.

Forty-two (48%) of the physicians stated that if telemedicine applications are used in the field of ophthalmology, they will provide a significant reduction in the rate of hospital admissions.

Sixty-two (74%) of the physicians stated that the telemedicine services to be provided through voice communication and video transmission in the field of ophthalmology would be insufficient, and they stated that video conversation would be appropriate.

The rate of physicians who think telemedicine applications will be appropriate in emergency services and on-duty calls, consultation services, and post-operative patient follow-up is below 35%. Nevertheless, 53 (62%) of physicians think that telemedicine applications are appropriate in the examination of elective outpatients, and 51 (59%) in the follow-up of patients with chronic diseases.

To the question in which areas ophthalmology telemedicine applications can be used, 66 (76%) of the physicians answered eyelid and periocular diseases, 53 (62%) as conjunctival and ocular surface diseases. The rates in other ophthalmology areas were below 30%. The telemedicine availability graph in ophthalmology fields is shown below (Fig. 1).

Sixty-three (73%) of the physicians stated that telemedicine applications can be used for eyelid and orbital infections, 46 (53%) for conjunctiva and sclera disease, 38 (44%) in the presence of the foreign body, and telemedicine applications for an eye emergency. The compliance rate for all other ophthalmological emergencies is below 30%. Sixty-one physicians (70%) think that they can manage 0–24% of ophthalmological emergencies with telemedicine applications. These ratios are shown in Figure 2 below.

Discussion

The desire of patients to receive quality health services quickly and reliably has included using information technologies in the health sector. We foresee that the telemedicine applications offered by technology will have many benefits. Telemedicine applications have benefits for patients and benefits for health-care professionals and health-care organizations.[4] It offers health-care professionals the opportunity to follow new developments, make correct and effective decisions, access patient information quickly, and improve their skills. In addition, previous studies have found that it is very difficult to provide health infrastructure in remote-rural areas and online health services are cost-effective.[5,6]

Telemedicine applications have become very widespread in many countries of the world in recent years and have begun to be used in ophthalmology. In the literature, there are many studies on this subject in ophthalmology.[7-9]

Our study revealed that ophthalmologists do not have enough knowledge about telemedicine applications. Only 9 (11%) of the physicians stated that they had sufficient knowledge about telemedicine, and it was observed that all of these physicians were between the ages of 24–34. The fact that young ophthalmologists are more familiar with telemedicine/online applications is a very predictable outcome in this digital age. Although 77% of the study consisted of physicians under the age of 40, only 9% had sufficient knowledge about telemedicine and this rate is very low. We think that the survey we conducted was effective in increasing the awareness of these young physicians, who are the future of ophthalmology. Thus, the spread of telemedicine applications will be under the leadership of young physicians. According to this, young ophthalmologists have more knowledge about telemedicine applications and think that they can be used.

In a previous study, physicians in different specialties were asked about their thoughts on telemedicine. About 42.9% of the participants think that the telemedicine application disrupts the doctor-patient relationship.[10] In our study, it was observed that the rate of physicians who thought that the patient-physician relationship would be affected was 33%. Although our results are close to the literature, it can be thought that the difference is due to the fact that different specialties answer the same questions.

Although most of the physicians are not in the management of patients with acute ophthalmological pathologies, consultation services, and surgery, it was seen that the use of telemedicine applications would be beneficial in the follow-up of patients with chronic diseases, the patient–physician relationship would not be affected, and the workload of hospitals would decrease.

How to make triage using telemedicine applications, maintain the patient–physician relationship online, and provide error-free follow-up and treatment of chronic and acute conditions should be developed. It is unknown how the medico-legal problems that may develop due to possible malfunctions and errors in these steps will result.[11] Our study also observed that most of the physicians were concerned about potential medico-legal problems and the healthy applicability of examination-treatment recommendations.

The social distancing rules, we have implemented with the effect of the pandemic have increased the importance of telemedicine applications. It is an effective screening and management tool for many adult and pediatric acute and chronic ocular conditions in ophthalmology. With the COVID-19 pandemic, rapid developments have occurred in teleophthalmology and artificial intelligence, and the diagnosis and early treatment of eye diseases have become possible through telemedicine.[12] Tele-ophthalmology will find greater use with advances in image processing and better integration of the patient's medical record.[13] Following the literature, according to our study, it is thought that telemedicine applications through video chat can be used in outpatient services if legal regulations are made and physicians are trained, taking into account the opinions of physicians working in the field of ophthalmology.

As the limitations of our study, we can show that the number of participants is small and the distribution of age groups of the participants is not similar. We believe that we have overcome these limitations as it is a prospective study and most of the participants are young ophthalmologists on a subject that can shape the future of ophthalmology.

It is thought that telemedicine will provide many quantitative and qualitative improvements in future health services. However, it is not known that there are no standards regarding telemedicine applications yet, and it is not known how the regulations and laws that have been issued in general will affect the processes for those who use the application.

Conclusion

Finally, it is thought that telemedicine applications will be a solution for accessing health services in regions where traditional health service delivery is lacking, and distance is a problem. In our study, most of the physicians stated that

telemedicine applications can be used in the field of ophthalmology and patients can also benefit from these applications. However, most physicians think that telemedicine applications will cause forensic medicine problems. After the standards related to telemedicine applications are provided and medico-legal regulation is made, it is necessary to plan educational activities regarding telemedicine applications and increase people's usage rates. This will reduce the loss of time to prevent congestion in health institutions. Our study revealed that Turkish ophthalmologists will actively use telemedicine when necessary regulations are provided.

Ethics Committee Approval: This study was approved by İstanbul Medipol University Ethics Committee (15/04/2021 date; number 412).

Peer-review: Externally peer-reviewed.

Authorship Contributions: Concept: G.K., M.E.K.; Design: G.K.; Supervision: G.K.; Resource: G.K.; Materials: M.E.K.; Data Collection and/or Processing: M.E.K.; Analysis and/or Interpretation: G.K.; Literature Search: G.K., M.E.K.; Writing: G.K., M.E.K.; Critical Reviews: G.K., M.E.K.

Conflict of Interest: None declared.

Use of AI for Writing Assistance: Not declared.

Financial Disclosure: The authors declared that this study received no financial support.

References

1. Smith CE, Fontana-Chow K, Boateng BA, Azzie G, Pietrolungo L, Cheng-Tsallis A, et al. Tele-education: Linking educators with learners via distance technology. Pediatr Ann 2009;38:550–6.
2. Liu W, Liu Y, Twum P, Li S. National equity of health resource allocation in China: Data from 2009 to 2013. Int J Equity Health 2016;15:68. [CrossRef]
3. Cui F, Ma Q, He X, Zhai Y, Zhao J, Chen B, et al. Implementation and application of telemedicine in China: Cross-sectional study. JMIR Mhealth Uhealth 2020;8:e18426. [CrossRef]
4. Host BK, Turner AW, Muir J. Real-time teleophthalmology video consultation: An analysis of patient satisfaction in rural Western Australia. Clin Exp Optom 2018;101:129–34. [CrossRef]
5. Malasanos TH, Burlingame JB, Youngblade L, Patel BD, Muir AB. Improved access to subspecialist diabetes care by telemedicine: Cost savings and care measures in the first two years of the FITE diabetes project. J Telemed Telecare 2005;11 Suppl 1:74–6. [CrossRef]
6. Elbert NJ, van Os-Medendorp H, van Renselaar W, Ekeland AG, Roijen LH, Raat H, et al. Effectiveness and cost-effectiveness of ehealth interventions in somatic diseases: A systematic review of systematic reviews and meta-analyses. J Med Internet Res 2014;16:e110. [CrossRef]
7. Saleem SM, Pasquale LR, Sidoti PA, Tsai JC. Virtual ophthalmology: Telemedicine in a COVID-19 era. Am J Ophthalmol 2020;216:237–42. [CrossRef]
8. Mazzuca D, Borselli M, Gratteri S, Zampogna G, Feola A, Corte MD, et al. Applications and current medico-legal challenges of telemedicine in ophthalmology. Int J Environ Res Public Health 2022;19:5614. [CrossRef]
9. Nelson LB. Telemedicine in pediatric ophthalmology. J Pediatr Ophthalmol Strabismus 2020;57:282. [CrossRef]
10. Ashfaq A, Memon SF, Zehra A, Barry S, Jawed H, Akhtar M, et al. Knowledge and attitude regarding telemedicine among doctors in Karachi. Cureus 2020;12:e6927. [CrossRef]
11. Gioia G, Salducci M. Medical and legal aspects of telemedicine in ophthalmology. Rom J Ophthalmol 2019;63:197–207.
12. Parikh D, Armstrong G, Liou V, Husain D. Advances in telemedicine in ophthalmology. Semin Ophthalmol 2020;35:210–5. [CrossRef]
13. Sommer AC, Blumenthal EZ. Telemedicine in ophthalmology in view of the emerging COVID-19 outbreak. Graefes Arch Clin Exp Ophthalmol 2020;258:2341–52. [CrossRef]