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Are Tele-Glaucoma and Virtual Clinics the Future of Eye Care? Patient Voices from a Systematic Review

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Abstract

***Background*:** Glaucoma is a chronic progressive optic neuropathy requiring lifelong monitoring and treatment. Traditional face-to-face clinic visits can pose challenges including long waiting times, transportation difficulties, and increasing service demands. Tele-glaucoma and virtual glaucoma clinics have emerged as innovative service delivery models aimed at improving access, efficiency, and patient satisfaction. ***Purpose*:** To synthesize and critically appraise evidence on patient satisfaction and experiences with tele-glaucoma and virtual glaucoma clinic models, and to identify factors influencing their acceptability. ***Methods*:** A systematic search of PubMed, Scopus, and Web of Science was conducted using predefined terms related to tele-glaucoma, virtual eye care, and patient-reported experiences in glaucoma. Reference lists of included articles were hand-searched. Eligible studies evaluated satisfaction, perceptions, or experiences of adults with glaucoma, ocular hypertension, or glaucoma-suspect status receiving care through tele-glaucoma, virtual clinics, remote monitoring, shared medical appointments, or related digital interventions. Two reviewers independently screened studies, extracted data, and assessed risk of bias using design-appropriate tools. ***Results*:** Of 225 records identified, seven primary studies specifically assessed tele-glaucoma or virtual glaucoma services within a broader review of 27 studies on glaucoma care satisfaction. All were conducted in high-income settings (United Kingdom, United States, Finland) and were mainly cross-sectional surveys, clinical audits, or pilot projects. Interventions included full virtual clinics with technician-led testing and asynchronous specialist review, small-scale tele-glaucoma pilots, shared medical appointments, educational interventions, and appointment/SMS reminder systems. Across studies, satisfaction with tele-glaucoma and virtual models was high (typically >85%), with many patients rating care as equivalent or superior to traditional clinics and expressing willingness to reuse or recommend services. Key positive drivers were convenience, structured scheduling, confidence in trained non-physician staff, and clear specialist oversight. Negative themes included inadequate explanation of results and prognosis, limited direct physician interaction, and communication concerns. ***Conclusions*:** Tele-glaucoma and virtual glaucoma clinics are generally well accepted and can achieve satisfaction comparable to in-person care when supported by robust education, clear communication pathways, and reliable technician-led data collection with visible specialist involvement. Further research using standardized outcome measures and more diverse settings is needed to optimize patient-centred tele-glaucoma models.

Keywords: Glaucoma, Tele-glaucoma, Virtual clinic, Patient satisfaction, Telemedicine, Ophthalmology.

INTRODUCTION

Glaucoma remains the leading cause of irreversible blindness worldwide and requires lifelong surveillance to prevent progressive visual loss. [1–3] Increasing patient numbers, workforce shortages, and the need for regular monitoring have placed significant pressure on glaucoma services. [4]

Recent advances in telemedicine have facilitated the development of virtual glaucoma clinics, remote monitoring pathways, shared medical appointments, and tele-glaucoma services. [5] These models aim to improve accessibility while reducing clinic burden and maintaining quality of care.

Patient satisfaction is an essential indicator of healthcare quality and is closely linked to treatment adherence, clinic attendance, and clinical outcomes. [6]

Understanding patient perspectives toward tele-glaucoma services is critical for informing future service development. [7] This review summarizes available evidence regarding patient experiences and satisfaction with tele-glaucoma and virtual clinic models.

METHODS

A systematic review of the literature was conducted using three electronic databases: PubMed, Scopus, and Web of Science. The search strategy combined terms related to tele-glaucoma and virtual eye care services with terms describing patient perspectives and experiences. The following search string was used:

('tele-glaucoma' OR 'teleophthalmology' OR 'tele-ophthalmology' OR 'virtual clinic*' OR 'virtual care' OR 'remote consultation*' OR 'remote monitoring' OR 'digital health' OR 'telemedicine' OR 'telehealth' OR 'glaucoma virtual clinic*')
AND
('patient perspective*' OR 'patient experience*' OR 'patient satisfaction' OR 'patient perception*' OR 'patient opinion*' OR 'patient preference*' OR 'patient attitude*' OR 'patient acceptance' OR 'acceptability' OR 'user experience' OR 'user satisfaction' OR 'consumer satisfaction' OR 'patient-reported outcome*')
AND
('glaucoma' OR 'primary open-angle glaucoma' OR 'POAG' OR 'primary angle-closure glaucoma' OR 'PACG' OR 'ocular hypertension' OR 'glaucoma suspect*').

Additional manual searches of reference lists from eligible studies were performed to identify relevant articles. Quality assessment and risk-of-bias evaluation were independently conducted by the principal investigator and a second reviewer using appropriate appraisal tools according to the study design. Data extracted included study design, sample size, intervention type, patient satisfaction outcomes, and key findings.

RESULTS

Table 1: Studies on Tele-Glaucoma and Virtual Clinics

Author	Country	Year	Study Design	Sample Size	Tele-Glaucoma Intervention	Main Findings
Tuulonen *et al.,* [8]	Finland	2000	follow-up	70	Tele-glaucoma clinic	96% preference for future teleconsultations; satisfaction comparable to in-person visits.
Jennifer H. Court *et al.,* [9]	UK	2015	Cross-sectional	135	Virtual glaucoma clinic	86% satisfaction; excellent understanding of diagnosis; >95% found information leaflets useful
Patrick J.G. Gunn *et al.,* [7]	UK	2020	Cross-sectional	148	Glaucoma Virtual Clinic (GVC)	High confidence in technicians (95%); >90% would recommend service to others
Spackman *et al.,* [10]	UK	2020	Cross-sectional	68	Tele-glaucoma clinic	98% rated virtual clinic as equal or better than traditional care; convenience and reduced waiting time major drivers of satisfaction
Aachal Kotecha *et al.,* [11]	UK	2015	Clinical Audit	1,575	Appointment scheduling and SMS reminder service	High patient satisfaction with appointment system and reminders
Emily K. Tam *et al.,* [12]	USA	2021	Cross-sectional	5	Shared Medical Appointment (SMA) model	Improved glaucoma knowledge and patient engagement
Julia K. Polat *et al.,* [13]	USA	2021	Pilot Study	20	Tele-glaucoma clinic	High satisfaction with virtual consultations and remote care delivery

Characteristics of Included Studies

The initial search yielded 225 records. Following screening and eligibility assessment, seven primary studies specifically evaluating tele-glaucoma or virtual glaucoma service models were included within a broader systematic review of 27 studies on glaucoma care satisfaction. All included studies were conducted in high-income settings, predominantly the United Kingdom and the United States.

Study designs were predominantly cross-sectional surveys, audits, and pilot projects. Interventions were heterogeneous, ranging from full virtual glaucoma clinics to administrative enhancements (appointment scheduling and SMS reminders), telephone-based psychosocial support, shared group education models, and small-scale tele-glaucoma pilots.

DISCUSSION

Across the included studies, patient satisfaction with tele-glaucoma and virtual care models was generally high, although levels varied by intervention type reported an overall satisfaction rate of 86% with their virtual glaucoma clinic. [9] Patients in this study also demonstrated an excellent understanding of their diagnosis, and more than 95% found written information leaflets useful. Similarly, Gunn *et al.,*(2020) found that over 90% of patients attending a Glaucoma Virtual Clinic would recommend the service to family and friends, indicating strong acceptance and perceived value. [7]

Polat *et al.,*(2021), in a small pilot tele-glaucoma clinic, reported high satisfaction with virtual consultations and remote care delivery. [13] These findings were similar to that of Spackman *et al.,*[10] The appointment scheduling and SMS reminder system evaluated by Kotecha *et al.,*(2015) was associated with high patient satisfaction, while Tam *et al.,*(2021) reported improved glaucoma knowledge and engagement among the small sample participating in shared medical appointments. [11,12] These findings suggest that when appropriately designed and implemented, tele-glaucoma and virtual models can achieve patient satisfaction levels that are at least comparable to traditional face-to-face services, though direct comparative data and standardized satisfaction measures were limited.

Confidence in Healthcare Personnel

A consistent finding across the virtual clinic studies was high patient confidence in non-physician personnel conducting clinical assessments. In the UK Glaucoma Virtual Clinic, over 94–95% of participants expressed confidence in the technicians and healthcare staff performing investigations. [7] Similarly, Court *et al.,* demonstrated that patients were comfortable with technician-led data collection followed by asynchronous specialist review. [9] This high degree of trust in trained staff appears to underpin acceptance of the virtual model, especially when patients are assured that their results will be reviewed by a glaucoma specialist.

Importance of Patient Education

Educational interventions emerged as a central determinant of positive patient experience. Court *et al.,* found that more than 95% of patients judged information leaflets to be useful, and that these materials contributed to an excellent understanding of their diagnosis. [9] Tam *et al.,* reported that shared medical appointments improved glaucoma knowledge and patient engagement, suggesting that structured education within either virtual or group formats is valued. [12] Across studies, personalized counselling, written information, and opportunities to ask questions contributed to better disease understanding and higher satisfaction. Conversely, inadequate explanation of test results and treatment options featured prominently among negative factors.

Convenience and Accessibility

Convenience was a major perceived advantage of tele-glaucoma and virtual services. Patients reported reduced travel burden, shorter waiting times, and greater flexibility in scheduling. The appointment and SMS reminder system described by Kotecha *et al.,* supported timely attendance and was well received. [11] Tele-based and virtual pathways allowed some patients to avoid the logistical and financial challenges of frequent hospital visits, an aspect that has particular relevance in settings where travel distances and clinic congestion are substantial. In addition, structured scheduling and reminder systems were consistently linked with positive experiences.

Perceived Efficiency and Continuity of Care

Patients attending virtual clinics valued the perceived efficiency of these services. The structured nature of visits, with pre-planned tests and streamlined pathways, contributed to the impression of organized and continuous care. [7,9] Many patients appreciated that their results would be reviewed by a glaucoma specialist even if the face-to-face component was with a technician or allied health professional.

Factors Associated with Patient Satisfaction

The review identified several factors associated with higher or lower satisfaction in tele-glaucoma and virtual models.

Positive Factors

- Personalized patient education. [9,12]
- Access to specialist review, even when mediated through virtual pathways.[7,9]
- Attendance at virtual clinics or tele-glaucoma services, which offered perceived efficiency and continuity.[8]
- Scheduled appointments and SMS reminders, supporting predictability and adherence.[11]
- Experienced technical staff, fostering confidence in test performance. [7]

Short waiting times, contributing to convenience and perceived respect for patients' time. Taken together, these elements suggest that satisfaction is maximized when technical quality, clear communication, logistical support, and specialist oversight are combined within virtual service models.

Negative Factors

Several negative factors were also consistently identified, regardless of the care model:

- Poor or insufficient counselling regarding diagnosis and prognosis. [7]

- Inadequate explanation of investigation results and their implications.[10]
- Poor communication about treatment options and management plans.[9]
- Weak physician–patient relationships or limited opportunities for direct interaction.[8]

Although these shortcomings are not unique to tele-glaucoma, they can be amplified in virtual environments if communication is not carefully structured. Some patients expressed a need for more reassurance regarding disease progression, indicating that virtual services must incorporate robust counselling and follow-up mechanisms to maintain confidence and adherence.[7]

CONCLUSION

The reviewed evidence indicates that tele-glaucoma and virtual glaucoma clinic models are generally well accepted, with high satisfaction reported in multiple studies, particularly those involving structured virtual clinics with technician-led testing and specialist oversight. Education, communication quality, logistical convenience, and psychosocial support are central determinants of positive patient experience. However, variability in satisfaction across different tele-mediated interventions, and the presence of communication-related concerns, highlight the need for careful design of virtual services to ensure that patient understanding, confidence, and continuity of care are preserved.

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