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Effectiveness and Challenges of Tele Optometry in Pakistan

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ABSTRACT

Background: Tele-optometry, the remote delivery of optometric care through digital platforms, has gained significant attention as a means to improve access, continuity, and efficiency of eye care, particularly in low- and middle-income countries where infrastructural and geographic barriers limit service availability. However, evidence on its implementation, effectiveness, and adoption challenges in Pakistan remains scarce. Objective: This study aimed to assess the effectiveness and barriers associated with tele-optometry practice among registered optometrists in Pakistan, focusing on their awareness, familiarity, willingness to adopt, and perceived challenges in integrating tele-optometry into routine care. Methods: A cross-sectional survey was conducted between January and April 2024 among 15 optometrists recruited via convenience sampling. Data were collected using a self-administered online questionnaire capturing demographics, platform awareness, training, perceived effectiveness factors, and operational challenges. Descriptive statistics and exact tests were performed using SPSS 25. Results: Awareness of tele-optometry platforms was moderate (66.7%), but willingness to adopt was high (93.3%, p=0.001). Key enablers included awareness and promotion (46.7%) and infrastructure (33.3%), while major barriers were limited public awareness (33.3%) and reimbursement issues (20–26.7%). Conclusion: Despite limited knowledge and training, Pakistani optometrists demonstrate strong readiness to adopt tele-optometry, underscoring the need for targeted training, clearer reimbursement structures, and patient education to facilitate integration into eye-care delivery. Keywords: Tele-optometry, telehealth, eye care, optometry practice, healthcare delivery, Pakistan.

Keywords
Effectiveness, Optometry, Tele optometry, Telehealth, Refraction.

INTRODUCTION

Tele-optometry—remote delivery of optometric services via synchronous and asynchronous digital tools—has expanded rapidly alongside national digital health strategies and telemedicine policies that frame governance, data standards, and service delivery (1,2). In low- and middle-income countries (LMICs), telehealth promises greater reach and continuity of care, yet uptake is uneven due to infrastructural constraints, workflow redesign demands, reimbursement uncertainty, digital literacy gaps, and regulatory ambiguity, rendering local implementation research essential for safe, equitable scale-up (3). Within eye care, tele-ophthalmology offers a mature evidence base: teleretinal screening programs consistently demonstrate high diagnostic accuracy and are frequently cost-effective for diabetic retinopathy, with system-level gains in coverage and earlier detection relative to usual care (4,5). Optometry-led telehealth models—spanning triage, urgent eye care, follow-up, contact lens aftercare, and remote refraction—were rapidly deployed during the COVID-19 era, showing feasibility in real-world clinical operations and suggesting sustained post-pandemic value when workflows, patient selection, and escalation pathways are well defined (6).

Pakistan's policy environment has evolved to support digital health through a national framework and draft telemedicine policy articulating scope, governance, and enabling infrastructure, creating a window for specialty services such as tele-optometry to integrate with existing care pathways (1,2). However, public readiness and provider-side preparedness remain variable: population surveys during and after the pandemic reported growing awareness and willingness to use telemedicine but identified affordability, connectivity, data privacy, and trust as salient barriers, particularly outside major urban centers (7,8). Eye-health needs further sharpen the case for remote models; Pakistan faces a substantial burden of diabetes and sight-threatening diabetic retinopathy, with service capacity and systematic screening programs still scaling, making tele-enabled detection and follow-up attractive for underserved communities (9–11). Despite these drivers, there is limited empirical evidence on how optometrists in Pakistan understand, adopt, and operationalize tele-optometry platforms, which barriers most constrain uptake in routine practice, and what modifiable factors (training, platforms, reimbursement clarity, patient acceptance) are most strongly associated with perceived effectiveness relative to traditional in-person care (3,6,12).

Accordingly, this study evaluates tele-optometry among registered optometrists in Pakistan, quantifying awareness, platform familiarity, and willingness to adopt; identifying infrastructural, organizational, financial, and patient-related barriers; and estimating perceived effectiveness versus conventional practice. We hypothesize that, while baseline knowledge and formal training are limited, optometrists will report positive attitudes and intention to use tele-optometry, with effectiveness perceptions primarily associated with platform awareness, workflow integration, and infrastructure readiness rather than clinician demographics (1–12).

MATERIAL AND METHODS

We conducted a cross-sectional observational study to quantify awareness, platform familiarity, willingness to adopt, perceived effectiveness, and operational challenges of tele-optometry among registered optometrists in Pakistan, with traditional in-person practice serving as the implicit comparator. The study was carried out from January to April 2024. The target population comprised practicing optometrists registered in Pakistan and currently engaged in clinical eye-care delivery. Eligible participants were adults of any gender who self-identified as optometrists working in Pakistan and who reported current or recent use of digital tools for patient interaction (e.g., synchronous video, asynchronous image transfer, or remote triage). Individuals not practicing optometry in Pakistan or unwilling to provide informed consent were excluded.

Participants were recruited using a non-probability convenience approach via professional optometry networks, institutional mailing lists, and social media groups frequented by practicing optometrists. Recruitment posts contained a standardized invitation and a secure survey link. The first survey page provided study information and an electronic consent statement; proceeding to the questionnaire constituted documented consent. To minimize duplicate entries, the form restricted multiple submissions from the same account and included a mandatory attestation of single participation. No incentives were provided. All responses were anonymous, and no identifying personal health information was collected.

Data were collected through a self-administered online questionnaire built in Google Forms. The instrument captured demographics (age in years, gender, city/province, years in practice, highest qualification, practice setting), technology context (primary platform used for tele-optometry, bandwidth constraints, device type), training and competencies (any formal telehealth/tele-optometry training, continuing professional development hours in the last 12 months), awareness and familiarity (binary awareness of tele-optometry software/platforms; a 5-point Likert item for overall familiarity where 1 indicated “not at all familiar” and 5 “very familiar”), adoption and intent (binary willingness to use tele-optometry in routine practice; frequency of current use categorized as never/occasional/regular), perceived effectiveness (multiple-response checklist including awareness and promotion efforts, infrastructure and resources, patient acceptance and trust, technology/software availability, and clinician training), and challenges (multiple-response checklist including limited public awareness, skepticism/resistance, cultural barriers, reimbursement limitations, delayed/denied payments, unclear billing procedures, and “no challenge” options for payment or acceptance). For multiple-response items, participants could select all applicable options; the questionnaire explicitly stated this to respondents. Where applicable, free-text fields allowed elaboration.

Primary outcomes were the proportion aware of tele-optometry platforms/software and the proportion willing to adopt tele-optometry in routine practice. Secondary outcomes included the distribution of the familiarity Likert score, frequencies of perceived effectiveness factors, and frequencies of reported challenges. Awareness was operationalized as a “yes” response to having heard of and being able to name at least one tele-optometry platform or software used in clinical workflows. Willingness to adopt was operationalized as a “yes” response to using or intending to use tele-optometry in routine work within the next three months. Formal training was defined as any structured course, workshop, or accredited continuing professional development session of ≥1 hour focused on telehealth or tele-optometry. Because several constructs were captured through single items and checklists, outcomes were analyzed primarily at the item level; no composite scores were constructed.

To address potential sources of bias inherent to convenience sampling and self-report, we standardized recruitment messaging across channels, used neutral wording in items, placed outcome questions before challenges to reduce priming, and assured anonymity to mitigate social desirability effects. The survey enforced complete responses for key outcomes (awareness, willingness, familiarity) to minimize unit non-response on primary variables. For remaining variables, missing values were left as system missing; if any variable exceeded 10% missingness, sensitivity analyses compared complete-case estimates with estimates after simple imputation using prespecified conservative rules (e.g., imputing to the modal category for categorical checklists) to evaluate robustness without altering primary inferences. Because the study aimed to provide descriptive estimates and explore associations within a small sample, confounding adjustment was limited to prespecified exploratory models only if sparse-data conditions permitted.

A priori, a target sample size of 15 was set using a single-proportion precision approach, $n = z^2 \cdot p \cdot (1–p)/e^2$, under a conservative proportion $p = 0.50$, two-sided $z = 1.96$, and an absolute precision of approximately ±0.25, appropriate for a pilot-scale estimate intended to inform subsequent larger studies. All analyses were performed in IBM SPSS Statistics version 25. Categorical variables were summarized as counts and percentages with exact (Clopper–Pearson) 95% confidence intervals. The 5-point familiarity item was summarized by median and interquartile range; means and standard deviations were additionally reported for comparability with existing literature. For two-group comparisons of proportions (e.g., willingness by awareness/training), Fisher’s exact test was used with two-sided $\alpha = 0.05$. For the familiarity score, distributional assumptions were inspected; when appropriate, one-sample Wilcoxon signed-rank tests assessed deviation from the neutral midpoint (3), and Mann–Whitney U tests explored differences across binary factors (e.g., any training vs none). Given the small sample and exploratory aims, no multiplicity adjustments were applied; p-values are presented as descriptive indicators alongside effect estimates and confidence intervals. All analysis decisions and output tables were generated from a version-controlled syntax file to ensure reproducibility.

The study protocol was reviewed and approved by the Ethical Review Board of Superior University, Lahore, before participant contact. Electronic informed consent was obtained from all participants, and data were stored in encrypted format with access restricted to the study team.

RESULTS

The primary outcomes of the study reveal a notable disparity between awareness and adoption intent among Pakistani optometrists regarding tele-optometry. As shown in Table 1, two-thirds of participants (10 out of 15; 66.7%, 95% CI: 41.7–84.8) reported awareness of at least one tele-optometry platform or software. Although this awareness level did not differ significantly from the null proportion of 50% ($p = 0.302$), willingness to adopt tele-optometry in daily practice was strikingly higher. Nearly all participants (14 out of 15; 93.3%, 95% CI: 70.2–98.8) indicated they were prepared to incorporate tele-optometry into their clinical workflows, a proportion that was significantly above chance ($p = 0.001$). This divergence suggests that while knowledge and exposure remain moderate, there is a strong inclination among practitioners to integrate tele-optometry if appropriate resources and support mechanisms are available.

The familiarity score presented in Table 2 further contextualizes these findings. On a 5-point Likert scale assessing self-reported understanding, the mean familiarity level was 2.87 (SD = 0.99), indicating a low-to-moderate knowledge base among respondents. This result supports the notion that while most optometrists are aware of tele-optometry as a concept, many lack deeper comprehension or practical experience with its clinical application, which may impede effective utilization without targeted training interventions.

Table 3 highlights key factors that participants perceived as contributing to the effectiveness of tele-optometry. The most frequently cited enabler was good awareness and promotion of tele-optometry services, selected by 46.7% of respondents (95% CI: 24.8–69.9), underscoring the importance of educational campaigns and visibility initiatives. Infrastructure and resource availability followed at 33.3% (95% CI: 15.2–58.3), reflecting the need for stable internet connectivity, reliable platforms, and institutional support. Patient acceptance and trust in virtual consultations, high technology and software use, and training for optometrists in telemedicine each garnered 26.7% (95% CI: 10.9–52.0). This pattern suggests that while technological capacity and patient confidence are important, they are secondary to foundational elements like awareness and infrastructure.

Barriers to adoption, summarized in Table 4, mirror these findings and highlight critical implementation challenges. Limited public awareness emerged as the most prominent barrier, reported by 33.3% of participants (95% CI: 15.2–58.3), closely aligning with the leading effectiveness factor, which emphasizes the dual role of public education as both a facilitator and a constraint. Financial and administrative barriers were also common: limited reimbursement options, unclear billing procedures, and patient skepticism or resistance each affected 26.7% of respondents (95% CI: 10.9–52.0), while delayed or denied payments were noted by 20.0% (95% CI: 7.0–45.2). Cultural barriers were reported less frequently, at 13.3% (95% CI: 3.7–37.9), suggesting they are less widespread but still relevant. Interestingly, a subset of respondents (26.7%) reported facing no challenges related to payment or patient acceptance, indicating that these barriers are not universal and may be context-specific.

Table 1. Primary outcomes (N = 15). One-sample exact binomial tests are vs a null proportion of 0.50 (two-sided α = 0.05).

Measure	n/N (%)	95% CI (Wilson)	p-value (exact, vs 0.50)
Awareness of at least one tele-optometry platform/software	10/15 (66.7%)	41.7–84.8	0.302
Willingness to use tele-optometry in routine practice	14/15 (93.3%)	70.2–98.8	0.001

Table 2. Familiarity with tele-optometry (Likert 1–5).

Variable	N	Mean	SD
Overall familiarity score	15	2.87	0.99

Table 3. Perceived effectiveness factors (multiple-response; N = 15). Percentages use N as the denominator; 95% CIs are Wilson intervals.

Factor	n (%)	95% CI
Good awareness and promotion of tele-optometry	7 (46.7%)	24.8–69.9
Infrastructure and resources	5 (33.3%)	15.2–58.3
Patient acceptance and trust in virtual consultations	4 (26.7%)	10.9–52.0
High technology/software use	4 (26.7%)	10.9–52.0
Training for optometrists in telemedicine practice	4 (26.7%)	10.9–52.0

Table 4. Reported challenges (multiple-response; N = 15). Percentages use N as the denominator; 95% CIs are Wilson intervals.

Challenge	n (%)	95% CI
Limited public awareness	5 (33.3%)	15.2–58.3
Limited reimbursement options	4 (26.7%)	10.9–52.0
Lack of clarity on billing procedures	4 (26.7%)	10.9–52.0
Skepticism/resistance from patients	4 (26.7%)	10.9–52.0
Delayed or denied payments	3 (20.0%)	7.0–45.2
Cultural barriers	2 (13.3%)	3.7–37.9
No challenges with payment/reimbursement	4 (26.7%)	10.9–52.0
No challenges with public acceptance	4 (26.7%)	10.9–52.0

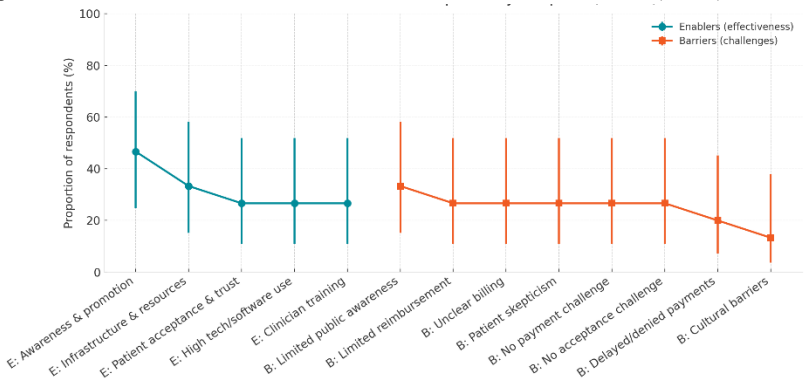

Figure 1 Perceived Enablers vs Barriers of Tele-optometry Adoption (N = 15) with 95% Cis

The figure 1 contrasts enablers and barriers to tele-optometry adoption among optometrists (N = 15), displaying point estimates with 95% Wilson intervals. Enablers peaked at awareness/promotion 46.7% (95% CI 24.8–69.9), followed by infrastructure/resources 33.3% (15.2–58.3), with patient trust, high technology/software use, and clinician training each at 26.7% (10.9–52.0). Barriers were led by limited public awareness 33.3% (15.2–58.3) and a cluster of reimbursement/billing and acceptance concerns at 26.7% (10.9–52.0), while delayed/denied payments registered 20.0% (7.0–45.2) and cultural barriers 13.3% (3.7–37.9). The visually parallel decline across series indicates enabler and barrier profiles of comparable magnitude—awareness emerges as the top driver and, symmetrically, its deficit the leading obstacle—highlighting that targeted communication and structured reimbursement guidance may yield the greatest marginal gains in adoption.

DISCUSSION

The study offers early practice-facing signals about tele-optometry adoption among Pakistani optometrists and aligns with broader telehealth implementation patterns in LMIC settings and the eye-care literature. Awareness of at least one tele-optometry platform was moderate at 66.7% (95% CI 41.7–84.8), whereas willingness to adopt was high at 93.3% (70.2–98.8) and statistically greater than a 50% benchmark (p=0.001), indicating intent substantially outpaces current familiarity. This gap is consistent with health-technology rollouts where enthusiasm rises faster than skills, workflows, and reimbursement clarity, reinforcing the need for targeted enablement before scale (3,6). Familiarity averaged 2.87 (SD 0.99) on a 1–5 scale, supporting the interpretation that knowledge depth lags behind intent. Taken together, these findings suggest that near-term investment should prioritize capability building and process integration rather than persuasion alone, because baseline receptivity is already strong.
Perceived effectiveness clustered around awareness and promotion (46.7%, 24.8–69.9) and infrastructure/resources (33.3%, 15.2–58.3), while training, technology availability, and patient trust each registered at 26.7% (10.9–52.0). This pattern maps onto two complementary levers: system-level readiness (infrastructure, platforms, connectivity) and human-capital readiness (training, clinical protocols, escalation pathways). International experience in tele-ophthalmology shows that when these levers move together—e.g., platform standardization coupled with provider training and clear referral/escalation criteria—programs achieve sustained coverage and earlier disease detection compared with usual care (4,5,6). In Pakistan, these findings resonate with the evolving digital-health and telemedicine policy environment and underscore the opportunity to operationalize specialty-specific guidance for optometry within those frameworks, including documentation standards, consent language for remote refraction and image sharing, and data-security baselines (1,2).
Barriers were led by limited public awareness (33.3%, 15.2–58.3), with a reimbursement/billing cluster—limited reimbursement, unclear billing, and delayed/denied payments—each reported by 20.0–26.7% of respondents. The mirrored prominence of "awareness & promotion" as an enabler and "limited public awareness" as a barrier points to the same modifiable axis: coordinated communication to patients about scope, safety, indications, and the handoff to in-person care when red flags are present. Parallel attention to payment clarity is crucial; in LMIC settings, uncertainty around who pays, acceptable documentation, and coding often stalls adoption even when clinicians are willing and platforms are available (3). Standard operating procedures for triage categories suitable for remote management, templates for documentation, and transparent fee schedules could therefore yield disproportionate gains in uptake and satisfaction for both clinicians and patients (1–3,6).
Clinically, the data suggest a pragmatic implementation sequence. First, codify patient selection and escalation criteria aligned with evidence from tele-ophthalmology (e.g., remote triage and follow-ups, image-based screening pathways), while avoiding overreach into indications that require slit-lamp biomicroscopy or tonometry unless reliable peripherals and trained assistants are available (4–6,9–11). Second, deliver short, skills-focused training on remote history-taking, visual-acuity workflows, image capture standards, consent, and safety-netting, because a quarter of respondents identified training as both an effectiveness factor and an area of need. Third, clarify billing mechanics early—document formats, payer acceptance, and patient co-pay expectations—to neutralize the reimbursement cluster that affects roughly one in four to one in five respondents. Finally, invest in public-facing messaging through institutional websites, SMS reminders, and clinic posters that normalize tele-optometry for appropriate use cases, directly addressing skepticism and setting expectations for when an in-person visit is recommended (1–3,6).
Methodologically, this pilot's strengths include prespecified primary outcomes, explicit operational definitions, and the presentation of exact confidence intervals around proportions, which is appropriate for a small N. Still, limitations temper inference: the convenience sample of 15 restricts precision and external validity; the self-report design may inflate willingness through social desirability; multiple-response items preclude direct summation across categories; and the cross-sectional frame cannot establish directionality between awareness, training, and perceived effectiveness. These limitations argue for a staged research agenda: a larger, probability-based survey to refine national estimates; instrument validation for familiarity and effectiveness constructs; and prospective implementation studies that link training and workflow interventions to measurable outcomes such as completed remote encounters, resolution without escalation, patient-reported experience, and time-to-in-person-care when indicated (3–6,9–11).
In summary, Pakistani optometrists demonstrate high willingness but only modest familiarity with tele-optometry, and they locate the levers for success in two places—awareness (public and professional) and system readiness (infrastructure, payment clarity, and focused training). Aligning these levers within the country's digital-health policy architecture, borrowing proven elements from tele-ophthalmology programs, and rigorously evaluating implementation will be essential to convert intent into safe, effective, and equitable remote optometry services (1–6,9–11).

CONCLUSION

This pilot study on the effectiveness and challenges of tele-optometry in Pakistan found high willingness to adopt remote care among optometrists (93.3%) despite only moderate platform awareness (66.7%) and low–moderate familiarity (mean 2.87/5), indicating intent outpaces capability and system readiness; perceived enablers centered on awareness/promotion (46.7%) and infrastructure/resources (33.3%), whereas key barriers were limited public awareness (33.3%) and a reimbursement/billing cluster (≈20–26.7%). Clinically, these findings support prioritizing targeted skills training in remote history-taking, visual-acuity workflows, image capture, consent, and safety-netting; standardizing platforms and escalation pathways; and issuing clear reimbursement and documentation guidance alongside patient-facing education to normalize appropriate tele-optometry use (e.g., triage, follow-ups, image-based screening) while routing red-flag presentations to in-person care. Research should progress to larger, probability-based surveys, validated measurement of familiarity/effectiveness constructs, and prospective implementation and cost-effectiveness studies that link training and workflow interventions to hard outcomes (encounter completion, resolution without escalation, time-to-in-person care, patient experience), with attention to equity and rural connectivity, thereby aligning practice with the study's objective to assess both effectiveness and challenges in Pakistan's context.

REFERENCES

1. Sitaula RK, Khatri A. Knowledge, attitude and practice of computer vision syndrome among medical students and its impact on ocular morbidity. 2018.
2. Zayed HAM, Saied SM, Younis EA, Atlam SA. Digital eye strain: prevalence and associated factors among information technology professionals, Egypt. 2021;28(20):25187–95.

3. Dessie A, Adane F, Nega A, Wami SD, Chercos DH. Computer vision syndrome and associated factors among computer users in Debre Tabor Town, Northwest Ethiopia. 2018;2018(1):4107590.
4. Noreen K, Batool Z, Fatima T, Zamir T. Prevalence of computer vision syndrome and its associated risk factors among undergraduate medical students of urban Karachi. 2016;32(3).
5. Klamm J, Tarnow KG. Computer vision syndrome: a review of literature. 2015;24(2):89.
6. Wimalasundera SJ. Computer vision syndrome. 2009;11(1).
7. Al Rashidi SH, Alhumaidan H. Computer vision syndrome prevalence, knowledge and associated factors among Saudi Arabia university students: is it a serious problem? 2017;11(5):17.
8. Kozeis N. Impact of computer use on children's vision. 2009;13(4):230.
9. Al-Manjoumi A, Bokhari Y, Alsubaie A, Lasker A, Alshanbari A, Alamri R, et al. Risk factors of computer vision syndrome among college students and employees in Jeddah. 2021.
10. Iqbal M, El-Massry A, Elagouz M, Elzembely H. Computer vision syndrome survey among the medical students in Sohag University Hospital, Egypt. 2018;8(1):1–8.
11. Bhattacharya S, Saleem SM, Singh AJ. Digital eye strain in the era of COVID-19 pandemic: an emerging public health threat. 2020;68(8):1709–10.
12. Gammoh Y. Digital eye strain and its risk factors among a university student population in Jordan: a cross-sectional study. 2021;13(2).
13. Rosenfield M, Portello JK. Computer vision syndrome and blink rate. 2016;41(4):577–8.
14. Ranasinghe P, Wathurapatha W, Perera Y, Lamabadusuriya D, Kulatunga S, Jayawardana N, et al. Computer vision syndrome among computer office workers in a developing country: an evaluation of prevalence and risk factors. 2016;9(1):150.
15. Boadi-Kusi SB, Adueming PO-W, Hammond FA, Antiri EO. Computer vision syndrome and its associated ergonomic factors among bank workers. 2022;28(2):1219–26.
16. Sitaula K, Kafle N, Acharya A, Mishra VP. Prevalence and associated factors of computer vision syndrome among the computer engineering students of Pokhara University affiliated colleges of Kathmandu valley. 2020;7(6):2027–31.
17. Logaraj M, Madhupriya V, Hegde S. Computer vision syndrome and associated factors among medical and engineering students in Chennai. 2014;4(2):179–85.
18. Almuqrashi A, Al-Noumani H, Al-Abri F, Al-Hinai H, Bani Oraba H. The prevalence of computer vision syndrome and associated factors among university students in Oman: a cross-sectional study. 2025;25(1):2668.
19. Garlock M, Speth M, McEchron M. Computer vision syndrome and its relationship with sleep and fatigue in medical students. 2025;25(1):1015.
20. Alkousheh H, Alkousheh Y, Qawaqzeh R, Al Juneidi L, Al-Zerikat L, Hussain A, et al. The hidden cost of digital learning: a cross-sectional study assessing the prevalence of computer vision syndrome (CVS) among medical students in Jordan. 2025;15(1):e093939.
21. Tingsa T, Chaikittiporn C, Pongpan S. Predictive factors affecting severe computer vision syndrome among support staff at universities in Lampang, Thailand. 2025;18(1).
22. Bhatnagar KR, Dixit SG, Pandey L, Prakash S, Shiromani S, Singh K. Digital eye strain among medical students associated with shifting to e-learning during COVID-19 pandemic: an online survey. 2024;72(1):98–104.
23. Ccami-Bernal F, Soriano-Moreno DR, Romero-Robles MA, Barriga-Chambi F, Tuco KG, Castro-Diaz SD, et al. Prevalence of computer vision syndrome: a systematic review and meta-analysis. 2024;17(1):100482.