Comparison of assessment and follow-up for benign eyelid lesions: Tele-oculoplastic application versus face-to-face visits in Thammasat hospital.

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Abstract

Objective: To evaluate the accuracy and feasibility of a tele-oculoplastic application for monitoring benign eyelid lesions compared with face-to-face outpatient follow-up.

Design: Prospective cohort pilot study.

Methods: Thirty adult patients diagnosed with benign eyelid lesions at the outpatient clinic of Thammasat Hospital between March 1st and August 31st, 2024 were prospectively enrolled. After diagnosis, patients were registered in a tele-oculoplastic application, and baseline lesion photographs were obtained. Follow-up assessments were conducted using both the application and in-person clinic visits. Within 24 hours before or after the clinic visit, patients submitted updated symptoms and photographs via the application. Two consultant oculoplastic surgeons independently evaluated the cases: one through face-to-face examination and the other through the application. Management decisions were categorized as discharge, continued follow-up, or surgery.

Results: Concordance between telemedicine-based and face-to-face assessments was observed in 25 of 30 patients (83.3%), while discordance occurred in 5 patients (16.7%). Patient satisfaction with symptom monitoring via the application was high (mean ± SD, 4.10 ± 0.85), and ease of use was rated favorably (mean ± SD, 3.90 ± 0.96).

Conclusion: This pilot study suggests that a tele-oculoplastic application is a feasible option for monitoring selected benign eyelid lesions and may reduce unnecessary outpatient visits. Larger, multicenter studies are required to validate these findings and assess broader applicability.

Keywords: Benign eyelid lesion, Oculoplastics, Pilot study, Telemedicine, Tele-ophthalmology

Introduction

Advanced technologies, combined with high-quality network services, allow individuals to enhance healthcare delivery and increase accessibility for a larger population. Telemedicine is a particularly advantageous technology, as it facilitates easier access to preventive care and supports long-term health management.[1]

In Thailand, telemedicine has been implemented by several hospitals. The COVID-19 pandemic further accelerated its adoption, as the public became more familiar with the technology and recognized the advantages of receiving remote medical consultations and services.[2]

Patients with benign eyelid lesions represent the majority group in oculoplastic services.[3] Oculoplastics, as a subspecialty, is particularly well-suited for telemedicine because of its visual nature, which relies heavily on the clinical history, observation-based examinations, and photographic documentation.[4]

According to data from the Thammasat Hospital Ophthalmology Department over the past year (January 1st, 2022 - December 31st, 2022), more than 50% of eyelid lesions were non-severe and could often be diagnosed through external observation. If a tele-oculoplastic application were used for follow-up in such cases,

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it could reduce the need for unnecessary travel, lower healthcare costs, and save time while still providing effective treatment comparable to in-person hospital visits. The primary aim of this study was to evaluate the accuracy and feasibility of this approach, comparing hospital-based and telemedicine-based services, and the secondary aim is to verify patient satisfaction with follow-up through the application.

Materials and Methods

Study Design and Participants

This prospective cohort pilot study was conducted at the outpatient ophthalmology clinic of Thammasat Hospital. Thirty patients aged 18 years or older who were diagnosed with benign eyelid lesions between March 1 and August 31, 2024 were consecutively recruited. Written informed consent was obtained from all participants. The study was approved by the Ethics Committee of the Faculty of Medicine, Thammasat University.

Inclusion Criteria

- Participants who have been diagnosed with a benign eyelid lesion such as hordeolum, chalazion, benign epidermal cyst, papilloma, blepharitis, benign nevus, xanthelasma, benign orbital neoplasm, Molluscum contagiosum, eyelid abscess, mucocele, dacryoadenitis, etc.
- Participants aged 18 years or older
- Participants with electronic communication devices (Android-based) capable of capturing photographs and supporting internet connectivity

Exclusion criteria

- Lesions that were not benign or presented with "red flag" signs, including bleeding, crusting, ulceration, skin cancer elsewhere, pigment changes, rapid growth (significant change over the last 6 weeks), lash loss, globe displacement, or a lump in the lacrimal gland area
- Lack of electronic communication devices capable of capturing photographs/videos or lacking internet connectivity

Withdrawal or Termination Criteria:

1. If a patient was re-diagnosed with a condition other than a benign eyelid lesion, no replacement subject was recruited.

2. If a patient requests to withdraw from the study after signing the consent form (e.g., due to inconvenience in following up through the application or relocation making it difficult to attend face-to-face clinic follow-ups at Thammasat Hospital), a replacement subject was recruited.

Tele-oculoplastic Application and Follow-up Process

At the initial visit, patients were registered in the tele-oculoplastic application, which recorded demographic and clinical information (Figure1). Baseline photographs of eyelid lesions were obtained at this visit. Patients were scheduled for follow-up using both the application and standard face-to-face outpatient visits.

Within a predefined 24-hour window before or after the scheduled clinic visit, patients uploaded their latest symptoms and lesion photographs through the application (Figure 2). This time window was selected to minimize potential changes in lesion status between assessments while maintaining feasibility for patient participation.

Clinical Assessment and Management

Interobserver agreement was assessed by comparing diagnostic and management decisions independently made by two consultant oculoplastic surgeons. One assessor performed a face-to-face clinical evaluation, while the second reviewed the clinical information and images submitted via the application. Both assessors were blinded to each other's findings. Agreement was quantified as the percentage of cases in which both assessors reached the same diagnostic and management decision. Discrepancies were resolved through consensus discussion.

Images submitted via the application were obtained according to a standardized imaging protocol. Minimum quality requirements included adequate focus and lighting, correct anatomical framing, and completion of predefined views. Cases with incomplete or suboptimal images were excluded or required resubmission prior to assessment.

Management decisions were categorized into three groups: discharge, continued follow-up, or surgical intervention (Figure 3 and 4).

Outcomes

The primary outcome was concordance between telemedicine-based and face-to-face assessments regarding diagnosis and management decisions. Secondary outcomes included patient satisfaction with follow-up through the application and ease of use of the application, measured using a 5-point Likert scale.

Statistical Analysis

Descriptive statistics were used to summarize demographic and clinical characteristics. Concordance was reported as a percentage. Continuous variables were presented as mean ± standard deviation (SD), and categorical variables as frequencies and percentages. As this was a pilot study, no formal sample size calculation or hypothesis testing was performed.

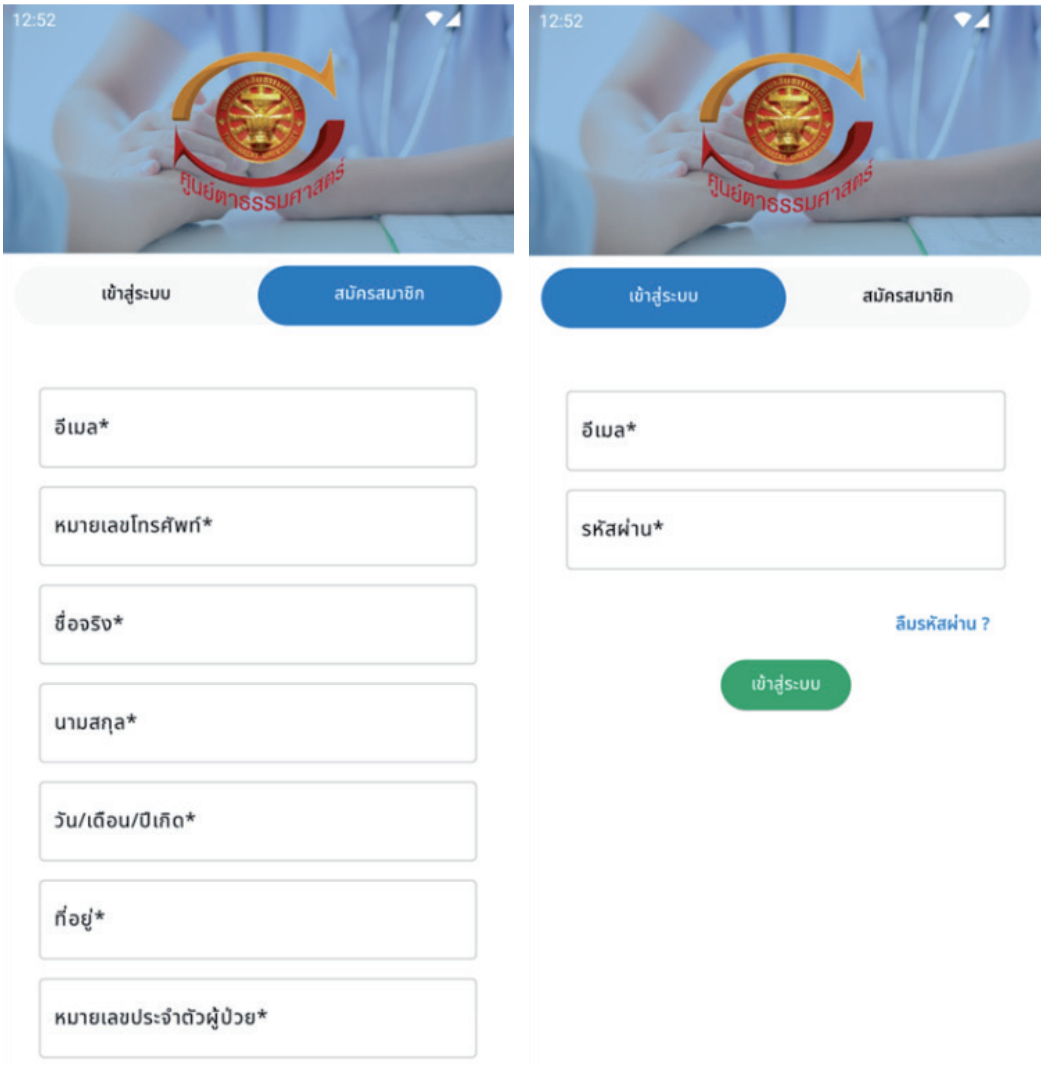


Figure 1: Application registration(left); patient information record including name, hospital number, date of birth, address, contact number, email and password. Application login(right); email and password using to log in

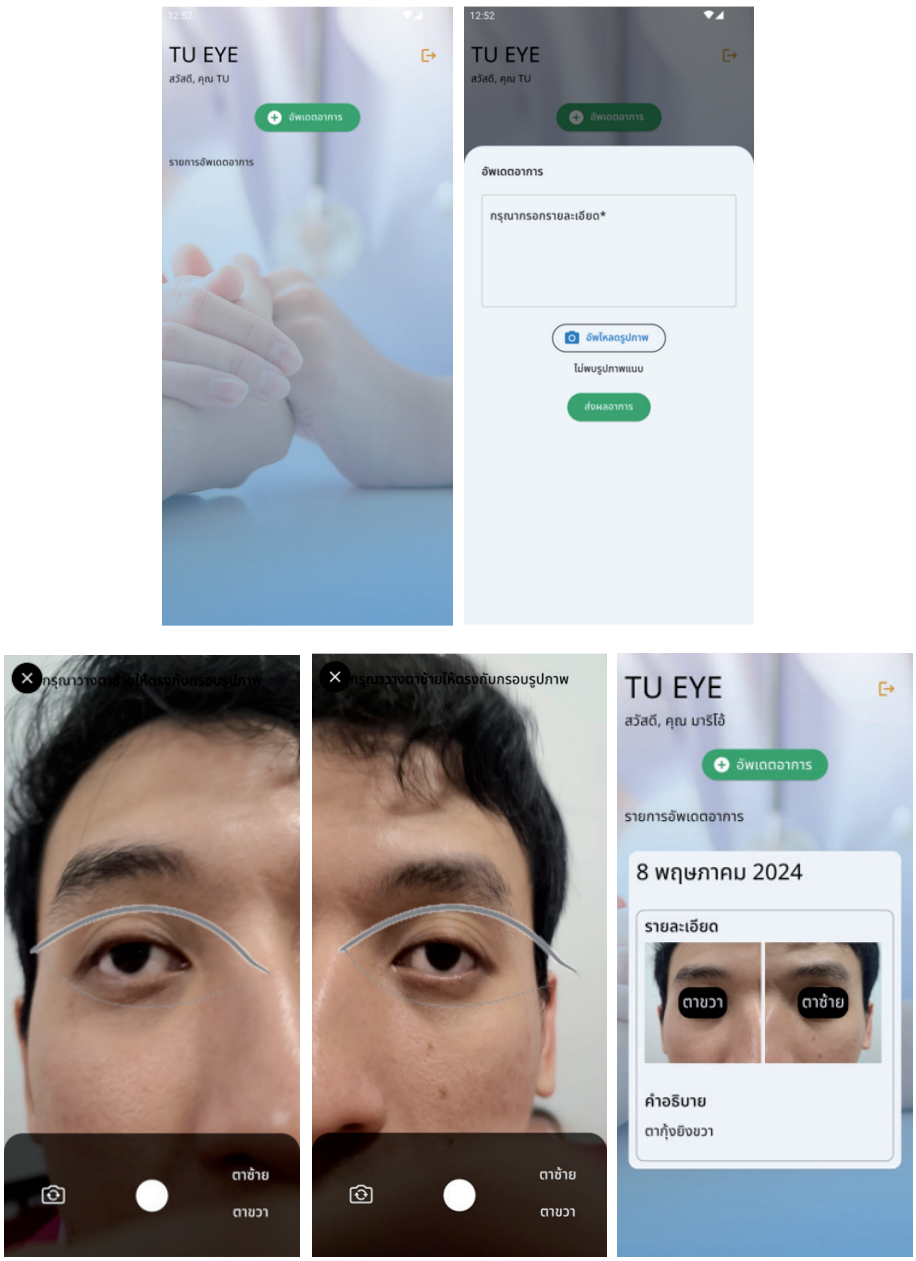


Figure 2: Latest symptom and photographs record

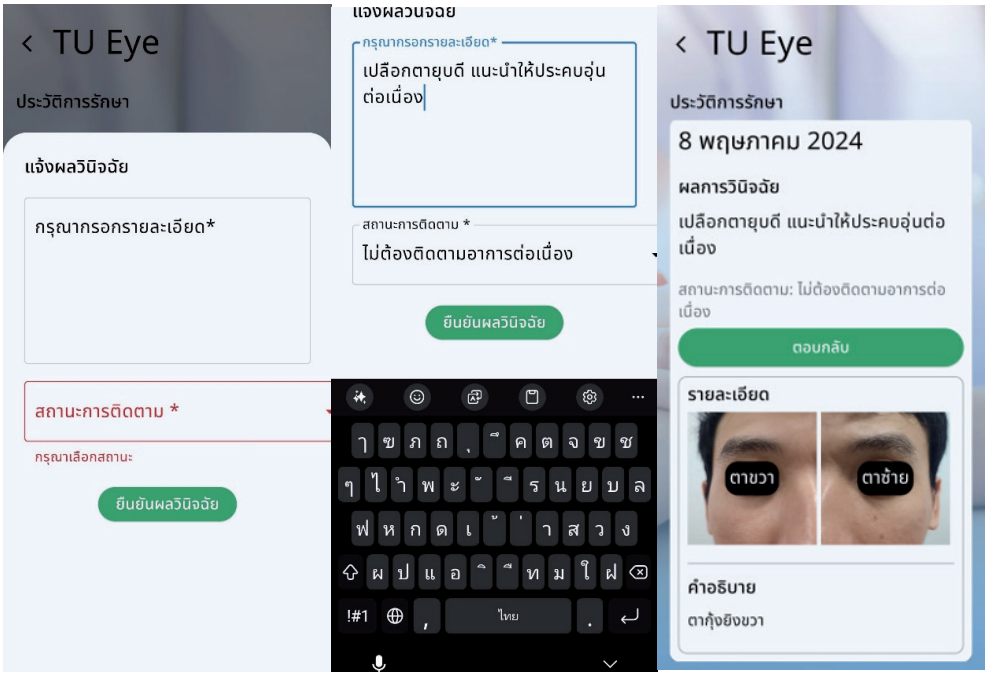


Figure 3: Reply the treatment plan by oculoplastic specialist

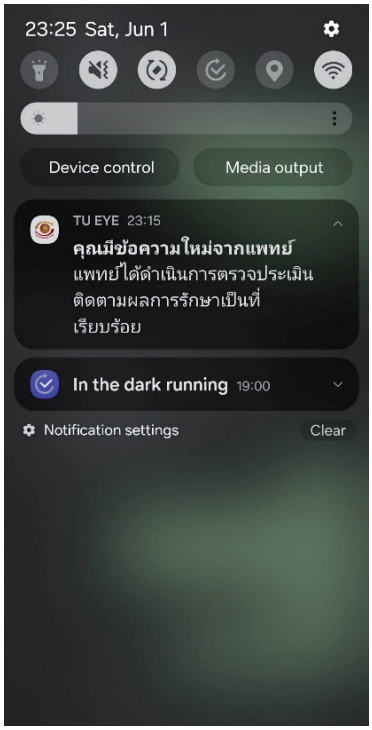


Figure 4: Application notification

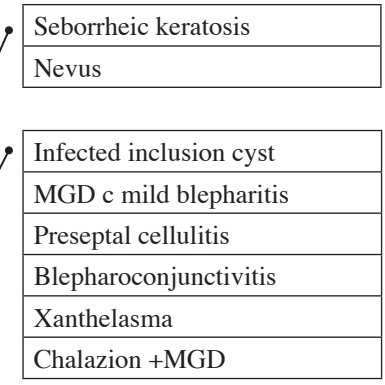
Results

The majority of participants were female (80%), with 50% aged under 30 years. The age group between 30–59 years accounted for 36.7%, while the remaining participants were over 60 years old. The mean age was 37.07 years (range: 18-73 years).

In this study, 18 participants (60%) were diagnosed with hordeolum. In the subgroup analysis, 5 participants (16.7%) had external hordeolum, 2 participants (6.7%) had internal hordeolum, and the remaining cases were unspecified. Additionally, 2 participants (6.7%) were diagnosed with pyogenic granuloma, and 4 participants (13.3%) had non-identified eyelid masses with differential diagnoses of nevus vs seborrheic keratosis. The remaining 6 participants (20%) presented with various conditions, including infected inclusion cyst, meibomian gland dysfunction (MGD) with mild blepharitis, preseptal cellulitis, blepharoconjunctivitis, xanthelasma, and inflamed chalazion with MGD (Table 1).

Table 1: Demographic characteristics of subject (n = 30)

Characteristics	Total (n = 30)	
	n	%
Gender		
Male	6	20.0%
Female	24	80.0%
Age (years)		
< 30	15	50.0%
30-59	11	36.7%
≥ 60	4	13.3%
Mean ± SD.	37.07 ± 17.58	
Min-max	18-73	
Diagnosis		
External hordeolum	5	16.7%
Hordeolum	11	36.7%
internal hordeolum	2	6.7%
Non-identify lid mass	4	13.3%
Pyogenic granuloma	2	6.7%
other	6	20%



The primary outcome was the accuracy of the application for monitoring symptoms. The results showed concordance between the application and outpatient clinic assessments in 25 participants (83.3%), with discordance in 5 participants (16.7%) (Tables 2, 3; Diagram 1). The secondary outcomes were patient satisfaction with symptom follow-up through the application was high, with a mean score of 4.10 ± 0.85. The ease of use of the application was also rated favorably, with a mean score of 3.90 ± 0.96 (Tables 2, 3; Diagrams 2 and 3).

Table 2: Outcome (n = 30)

	Total (n = 30)	
	n	**%**
Accuracy		
yes	25	83.3%
no	5	16.7%
Satisfaction in following up on symptoms through the application		
2 Fair	1	3.3%
3 Neutral	6	20.0%
4 Good	12	40.0%
5 Excellent	11	36.7%
Mean ± SD	4.10 ± 0.85	
Ease of use of Application		
2 Fair	2	6.7%
3 Neutral	9	30.0%
4 Good	9	30.0%
5 Excellent	10	33.3%
Mean ± SD	3.90 ± 0.96	

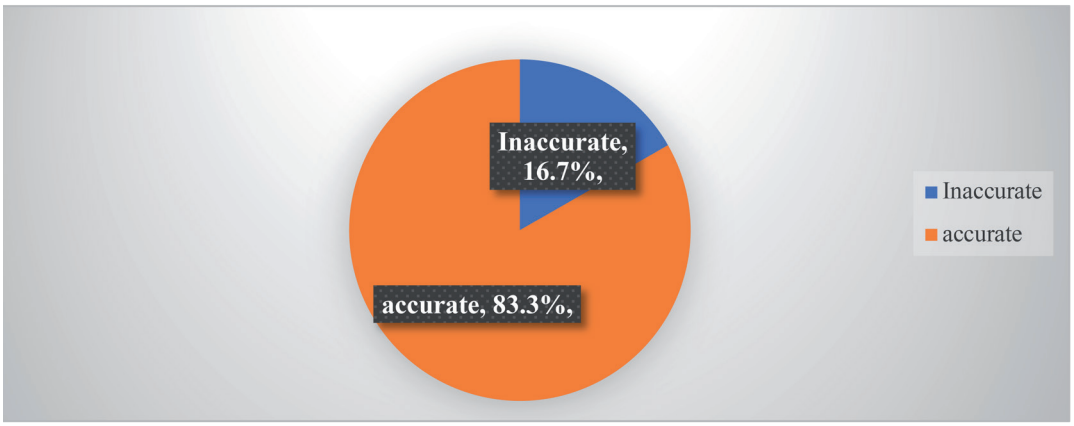


Diagram 1: Accuracy outcome compared between application and face-to-face clinic

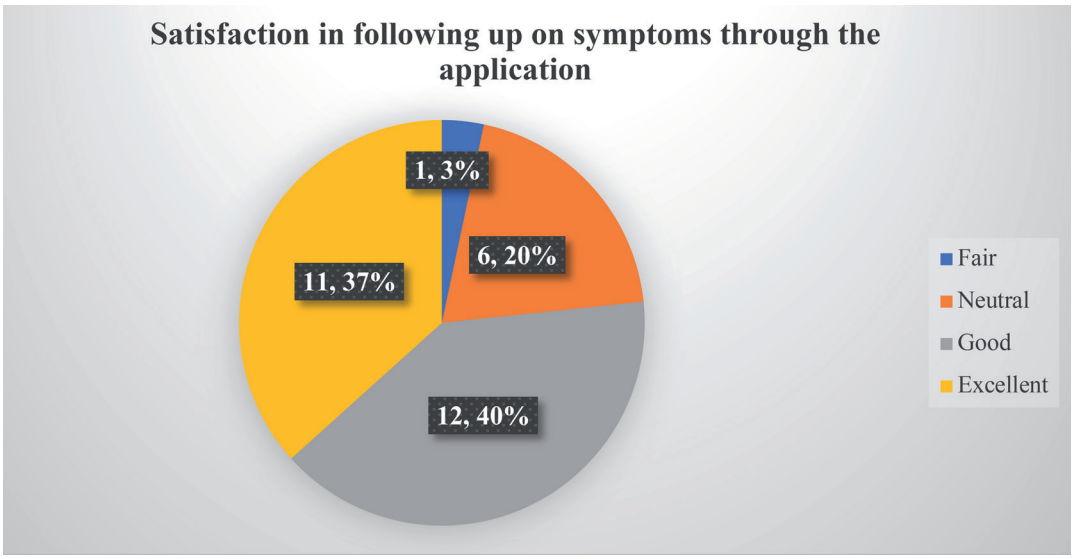


Diagram 2: Satisfaction in following up on symptoms through the application

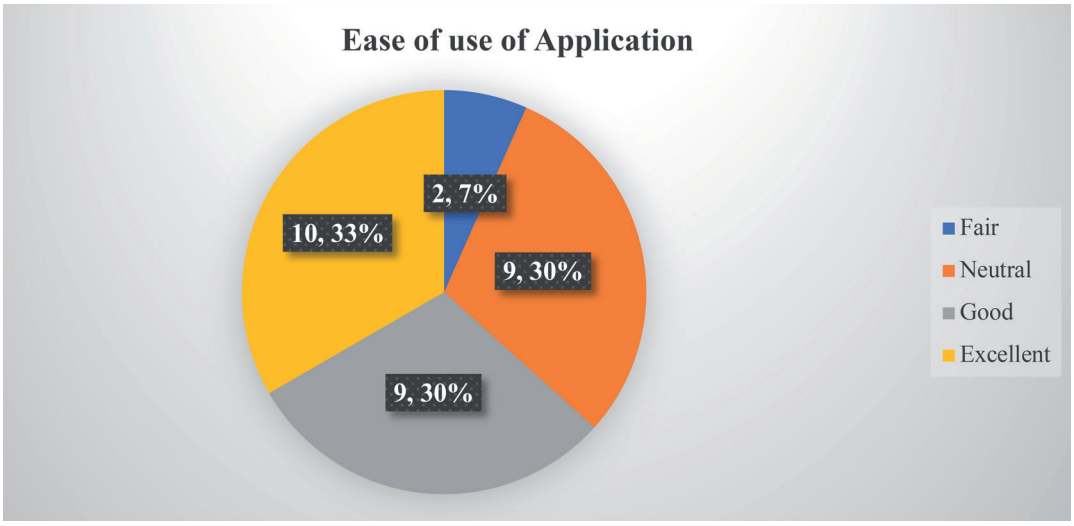


Diagram 3: Ease of use of Application

Table 3: Diagnosis & Management in first visit, Management plan in follow-up and Satisfaction score

Case	Sex	Age	Diagnosis	Follow-up		Satisfaction in following up on symptoms through the application (Score)	Ease of use of Application (Score)
				Management plan by Face-to-Face clinic	Management plan by Application		
1	F	58	LUL mass DDx Seb K	Discharge	Discharge	4	3
2	F	37	Internal hordeolum LUL	Discharge	Follow-up	5	3
3	F	32	Infected inclusion cyst LUL	Follow-up	Follow-up	4	4
4	M	22	External hordeolum RUL	Follow-up	Follow-up	5	4
5	M	58	LLL mass DDx Seb K, nevus	Surgery	Surgery	3	2
6	M	18	Hordeolum RLL	Discharge	Discharge	5	5
7	F	21	External hordeolum RUL+RLL	Follow-up	Follow-up	5	5
8	F	20	MGD c mild blepharitis	Discharge	Discharge	4	3
9	F	21	External hordeolum RUL	Discharge	Discharge	5	5
10	M	25	Preseptal cellulitis LE	Follow-up	Follow-up	4	5
11	F	40	Blepharoconjunctivitis LE	Follow-up	Follow-up	3	3
12	F	51	Hordeolum RLL	Discharge	Discharge	4	3
13	F	59	External hordeolum LLL	Discharge	Follow-up	4	4
14	F	18	External hordeolum LUL	Follow-up	Follow-up	4	5
15	F	20	Pyogenic granuloma c chalazion RLL	Follow-up	Follow-up	5	5
16	F	48	Xanthelasma BUL	Discharge	Surgery	5	4
17	F	73	RLL mass DDx Seb K	Follow-up	Follow-up	3	3
18	F	22	hordeolum LLL	Discharge	Discharge	4	5
19	F	26	Hordeolum RUL	Discharge	Discharge	5	4
20	M	28	Hordeolum RLL	Discharge	Discharge	5	5
21	F	66	LUL mass DDx nevus, seb K	Follow-up	Follow-up	3	3
22	F	62	Pyogenic granuloma RLL	Follow-up	Follow-up	3	2
23	F	19	Internal hordeolum LLL	Follow-up	Follow-up	4	5
24	F	65	Hordeolum RUL	Discharge	Follow-up	2	3
25	M	49	Inflamed chalazion +MGD RE	Discharge	Discharge	4	4
26	F	42	Hordeolum LUL	Discharge	Discharge	3	4
27	F	23	Hordeolum RLL	Follow-up	Discharge	5	4
28	F	19	Hordeolum RUL	Discharge	Discharge	5	5
29	F	29	Hordeolum RUL	Discharge	Discharge	4	4
30	F	41	Hordeolum RUL	Discharge	Discharge	4	3

F: female, M: male, LUL: left upper lid, LLL: left lower lid, RUL: right upper lid, RLL: right lower lid, RE: right eye, LE: left eye, BUL: both upper lid, DDx: differential diagnosis, Seb K: seborrheic keratosis, MGD: meibomian gland dysfunction, I&C: incisional and curettage, Dicloxa: dicloxacillin

Discussion

Telemedicine has rapidly become a key innovation in healthcare, accelerated by the COVID-19 pandemic, particularly in fields like oculoplastics, where visual diagnostics are crucial. The literature reports varying degrees of effectiveness of video consultations in assessment of eyelid lesions.[5,6] Smartphone-based image quality was assessed by Boissin et al.[7] found that smartphone images are of comparable quality to digital cameras in a masked trial. Images from smartphones were rated as "good" or "excellent," making them a viable alternative for medical teleconsultations.[8,9] Oculoplastic conditions, especially benign eyelid lesions, are well-suited for telemedicine due to their reliance on visual diagnostics. A pilot study by Hind J, et al. demonstrated substantial diagnostic agreement between image-based diagnoses and face-to-face consultation, noting that image review alone did not miss any cases of malignancy.[10] Furthermore, Kang S, et al. showed good agreement in diagnosis (91%) and management plan (82%) between face-to-face consultations and remote review.[3] The benefits of telemedicine including improved outcomes, cost and time-efficiency, and increasing access to healthcare, are well documented in ophthalmology.[11-13] Laura Ah-Kye, et al. highlights effectiveness of telemedicine in oculoplastics, particularly for benign eyelid lesions, regarding time efficiency, accessibility, operating room utilization, and safety. In their study, most patients who were referred for conditions such as chalazions, cysts, and nevi were accurately diagnosed and managed without the need for face-to-face consultations. A notable percentage of patients were safely discharged after their first virtual assessment, underscoring the ability of tele-oculoplastics to eliminate unnecessary visits. Moreover, this approach enables a more efficient patient journey, where non-essential visits are reduced, and patients requiring in-person appointments or surgical procedures are effectively triaged through the telemedicine platform. This results in a streamlined service and better resource management, allowing healthcare providers to focus on cases that truly require face-to-face care or surgical intervention.[14]

This prospective cohort pilot study demonstrated an overall concordance rate of 83.3% between tele-oculoplastic and face-to-face assessments for benign eyelid lesions. These findings suggest that selected benign eyelid conditions can be safely monitored using an image-based telemedicine approach. Hordeolum was the most common diagnosis in this study. These lesions typically present with characteristic external features, making them particularly suitable for image-based follow-up. No cases requiring urgent intervention were missed during telemedicine assessment. Patient-reported outcomes indicated high satisfaction and ease of use, supporting the acceptability of the tele-oculoplastic application. Although cost-effectiveness was not formally evaluated, reduced clinic visits may translate into indirect cost savings and improved clinic efficiency.

Several limitations should be acknowledged. This was a single-center pilot study with a small sample size, limiting generalizability. The application was restricted to Android devices, and patients with suspected malignant lesions were excluded. Discordance in 16.7% of cases highlights the limitations of image-based assessment and the need for careful patient selection.

Future multicenter studies with larger cohorts are required to validate these findings, assess interobserver agreement using formal statistical methods, and evaluate cost-effectiveness.

Conclusion

This pilot study suggests that telemedicine may be an effective monitoring option for benign eyelid lesions, particularly in the diagnosis of hordeolum to reduce unnecessary hospital visits, minimize travel-related burdens, and enhance healthcare accessibility. Despite some limitations, future research should include larger, multicenter trials to validate the findings of this pilot study and to assess the generalizability of telemedicine-based eyelid lesion assessment across different healthcare settings. Additional studies are warranted to optimize image acquisition protocols, evaluate diagnostic performance across a wider spectrum of eyelid pathology, and examine patient satisfaction, safety outcomes, and cost-effectiveness.

Conflicts of Interest

There is no conflict of interest regarding the publication of this paper.

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