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**Original Article**

# Development and Pilot Evaluation of SCABIESHEAL©: The World's First Multilingual Mobile Health Application for Scabies Education and Treatment Support

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## Abstract

***Background*** Scabies is a highly transmissible infestation. Inadequate disease knowledge and incorrect treatment practices contribute to treatment failure and reinfestation. Evidence concerning multilingual audiovisual interventions for scabies remains limited.

***Objective*** To develop and pilot-evaluate SCABIESHEAL©, a multilingual mobile health application designed to support scabies education and recommended treatment practices and to assess its usability among patients with clinically diagnosed scabies.

***Methods*** In this single-group pre-post pilot study at PAF Hospital Islamabad, 100 of 211 consecutively screened individuals were enrolled; 96 completed two-week follow-up and were analysed. SCABIESHEAL© provided multilingual education, audiovisual treatment guidance and automated reminders. Primary outcomes were changes in scabies-related and treatment-practice knowledge, assessed using a structured questionnaire pilot-tested in 30 patients (Cronbach's α=0.80). Usability was assessed using the System Usability Scale (SUS). Paired changes were analysed using the Wilcoxon signed-rank test.

***Results*** At two weeks, both primary outcomes increased significantly. Median scabies-related knowledge rose from 20.00% (IQR 0.00–40.00) to 80.00% (IQR 40.00–100.00; Z=−8.06, P<0.001, r=0.82); the mean paired increase was 46.88 percentage points (95% bootstrap CI 41.25–52.50). Median treatment-practice knowledge rose from 25.00% (IQR 12.50–50.00) to 83.33% (IQR 66.67–100.00; Z=−8.22, P<0.001, r=0.84); the mean paired increase was 48.09 points (95% bootstrap CI 42.71–53.47). Median SUS score was 72.50 (IQR 62.50–82.50), exceeding the reference value of 68; 59/96 participants (61.5%) scored at or above 68.

***Conclusion*** SCABIESHEAL© use was associated with increased short-term scabies-related and treatment-practice knowledge scores and a median SUS score above the reference value. Further controlled studies incorporating objective medication-use measures, clinical outcomes and longer follow-up are warranted.

***Keywords*** Scabies; Mobile health; Patient education; Multilingual application; System Usability Scale.

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## Introduction

Scabies is a highly contagious parasitic skin infestation caused by Sarcoptes scabiei var. hominis and affects more than 200 million people worldwide at any given time, with reported prevalence estimates ranging from 0.18% to 76.9% across populations and geographical settings.[1]

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Transmission occurs through prolonged direct skin-to-skin contact, particularly in overcrowded and resource-limited communities.[2] Diagnosis is largely clinical and may be made using the 2020 International Alliance for the Control of Scabies consensus criteria, which incorporate characteristic clinical features, lesion distribution, pruritus and relevant contact history.[3]

Despite the availability of effective topical and systemic treatments, successful scabies management may be compromised by inadequate patient education, incorrect or incomplete treatment practices, and persistent reinfestation.[2] A particularly important yet frequently overlooked barrier to successful scabies management is the communication gap between healthcare providers and patients. In busy dermatology outpatient departments, limited consultation time can restrict detailed counselling, particularly in multilingual populations where language barriers impair communication and patient understanding.[4] Culturally adapted educational interventions delivered in patients' preferred languages have demonstrated improvements in health literacy, while audiovisual educational tools may further enhance comprehension of treatment instructions.[5,6] Recognizing the substantial global burden of scabies, the World Health Organization has included it among the neglected tropical diseases and emphasized the need for scalable, cost-effective, and context-appropriate strategies for its control.[7] In Pakistan, a community-based study from rural Lahore reported a scabies prevalence of 8.8%, while only 46% of respondents had knowledge about the disease.[8] Such findings highlight the urgent need for innovative educational interventions capable of improving patient knowledge and supporting understanding of evidence-based treatment recommendations.

The rapid expansion of digital health technologies may help deliver standardized and accessible health information through mobile devices.[9] Mobile interventions incorporating education, reminders and audiovisual content have supported patient education and engagement in several medical conditions.[10] Published evidence specifically evaluating multilingual digital interventions for scabies remains limited.

To address this unmet need, SCABIESHEAL© was developed through collaboration between dermatologists of PAF Hospital Islamabad and software engineers of NUST. It integrates educational content in seven languages, step-by-step audiovisual instructions for permethrin 5% application, automated day-7 reminders, preventive guidance, and reinfestation-control measures within one platform.

Before finalizing the mHealth application and its novelty designation, the team of software engineers and both authors conducted a structured search of relevant scientific databases of, web-based resources, PubMed/MEDLINE, Scopus, Web of Science, Google Scholar, IEEE Xplore, Google Play Store and Apple App Store. The search examined whether any existing patient-facing scabies application combined multilingual audiovisual education, treatment-application guidance, automated reminders, progress tracking, and reinfestation-prevention information within a single platform. This integrated combination forms the basis for describing SCABIESHEAL© as the world's first application of its kind. The present study aimed to develop and pilot-evaluate SCABIESHEAL©, the world's first multilingual mobile health application for scabies, and assess its feasibility, usability and preliminary short-term changes in scabies-related knowledge and knowledge of recommended treatment practices among patients in Pakistan.

## Methods

A prospective single-group pre-post interventional pilot study using consecutive sampling was conducted at the Department of Dermatology, Fazaia Postgraduate Medical Institute (FPGMI), Pakistan Air Force Hospital, Islamabad. The multiphase

project included an 11-month application design and development phase at NUST, followed by internal content and usability evaluation and application refinement. The subsequent Phase III participant recruitment and pilot evaluation was conducted over six months at PAF Hospital Islamabad, with two weeks of follow-up for each participant. This was not a controlled effectiveness study. Ethical approval was obtained from the Ethical Review Committee of FPGMI (ERC/FPGMI/MED/41/2025, dated 10.09.2025). Written informed consent was obtained before enrolment, and participant confidentiality was maintained.

The sample size was calculated using the WHO sample-size calculator for estimation of a single proportion. Using an anticipated scabies-related knowledge proportion of 46% from a previous local study conducted in Pakistan,[8] a 95% confidence level and 10% absolute precision, the calculated sample was 96 participants. This calculation was not based on an anticipated paired intervention effect. Because this was an exploratory pilot evaluation, the sample was considered a pragmatic preliminary cohort; the same participants were assessed before and after application use and analysed as paired observations.

Adult patients aged between 18 and 60 years, presenting to the Dermatology Outpatient Department with a clinical diagnosis of scabies according to the International Alliance for the Control of Scabies (IACS) 2020 Consensus Criteria, who were willing and able to provide written informed consent, owned a smartphone with internet access, and could understand at least one of the seven languages supported by SCABIESHEAL© were included in the study. Whereas patients with other concurrent dermatological disorders that could interfere with assessment, pregnant or lactating women, and those with cognitive or physical impairment limiting independent use of mobile applications were excluded from the study.

***Development and Evaluation of SCABIESHEAL©***

The study was conducted in three sequential phases.

***Phase I: Application Design and Development***

SCABIESHEAL© was conceptualized and developed through multidisciplinary collaboration between dermatologists at FPGMI, PAF Hospital Islamabad and software engineers from NUST. The application was developed using React Native for cross-platform compatibility and Firebase for secure user authentication, cloud-based data storage, real-time database management, and automated reminder notifications.

The medical content was prepared by consultant dermatologists using Rook's Textbook of Dermatology and contemporary clinical guidance, including recommendations for permethrin 5% application, repeat treatment, household contact treatment, and environmental cleaning. Software engineers from the NUST Research and Innovation Centre developed the application. Multilingual translations were prepared by software engineers and the audiovisual digital developer with support of students from the relevant language departments at the National University of Modern Languages (NUML) Islamabad and reviewed by clinicians for consistency with the source medical content. Arabic was included to broaden potential accessibility beyond the immediate study population; however, Arabic and Balochi were not used by participants in the clinical pilot, and their usability was therefore not evaluated. The multilingual content underwent review and back-translation. The translated versions were subsequently reviewed by clinicians and users for linguistic accuracy, clarity, and cultural appropriateness; however, they were not subjected to a separate formal linguistic-validation study.

The definitive version of SCABIESHEAL© incorporated:

- Culturally adapted educational content in seven languages (Urdu, English, Punjabi, Pashto, Sindhi, Balochi, and Arabic).
- Step-by-step audiovisual demonstrations

illustrating the correct application of permethrin 5% cream.
- Automated reminders for repeat treatment on day 7.
- Guidance regarding prevention of reinfestation, environmental decontamination, and simultaneous treatment of household contacts.
- A simple, patient-friendly interface designed for users with varying educational backgrounds and levels of digital literacy.

***Phase II: Internal Usability Testing and Refinement*** Following application development, SCABIESHEAL© underwent Phase II content and usability evaluation involving 4 consultant dermatologists, 15 dermatology residents, and 30 volunteer patients with clinically diagnosed scabies. They assessed clinical accuracy, language clarity, cultural appropriateness, readability, navigation, audiovisual content, and reminder functionality. Feedback was incorporated before the clinical pilot. The translated content underwent review and back-translation but was not subjected to separate formal validation or standardized readability testing.

Participants evaluated application navigation, interface design, language clarity, translation accuracy, audiovisual content, reminder functionality, and overall performance. Feedback obtained during this phase was systematically reviewed by the development team and was only used to refine the mHealth app. Modifications included improvement of multilingual translations, simplification of navigation pathways, enhancement of font readability, and optimization of application performance across different smartphone devices. The finalized version of SCABIESHEAL© was subsequently deployed for patient pilot evaluation.

***Phase III: Pilot Clinical Evaluation*** Of 211 individuals screened, 100 were enrolled. The remaining 111 individuals were not enrolled because they did not meet the eligibility criteria or declined participation; however, category-wise numbers for the specific reasons for non-enrolment were not recorded and therefore could not be reported. Four enrolled participants did not complete the two-week follow-up, leaving 96 participants in the final paired analysis.

Baseline demographic information, including age, gender, educational status, occupation, household size, previous history of scabies, family history of scabies, previous treatment, province of residence, preferred language, and smartphone ownership, was recorded using a structured data collection form.

A newly developed structured questionnaire was administered at baseline. It comprised five items assessing scabies-related knowledge and six items assessing knowledge of recommended treatment practices. Each correct response received one point and each incorrect response received zero points, giving maximum raw scores of five and six, respectively; scores were converted to percentages. The questionnaire was pilot-tested in 30 patients with clinically diagnosed scabies. The questionnaire demonstrated acceptable internal consistency (Cronbach's $\alpha$=0.80). The complete questionnaire and scoring sheet are provided as an annexure.

Following baseline assessment, all participants received standard clinical care from the treating dermatologist, including confirmation of diagnosis, prescribed treatment and routine verbal counselling on correct permethrin application, repeat treatment, simultaneous treatment of household contacts and environmental cleaning. SCABIESHEAL© was then installed to reinforce these recommendations through repeated audiovisual content and reminders in the participant's preferred language. At two weeks, the same questionnaire was repeated, and usability was assessed using the SUS.[11] The application Medicine Progress Tracker allowed participants to self-report treatment completion by selecting the check option; this was digitally recorded.

The primary outcomes were within-participant changes in scabies-related knowledge and treatment-

practice knowledge scores after two weeks.

Secondary outcomes included SUS scores, participant-reported helpfulness, preferred language, and recorded engagement with application features. No objective clinical outcomes, including clinical clearance, persistent pruritus, treatment failure, retreatment or reinfestation, were assessed.

Data were analysed using SPSS version 27. Continuous variables were summarized as mean and standard deviation or median and interquartile range, as appropriate. For pre-post outcomes, normality was assessed for within-participant change scores using the Shapiro-Wilk test. Because change scores were not normally distributed, paired comparisons were performed using the Wilcoxon signed-rank test. Effect sizes were calculated as:

$$r = \frac{|Z|}{\sqrt{N}}$$

and 95% confidence intervals for mean paired changes were estimated by bootstrap resampling. The prespecified analyses comprised the knowledge and treatment-practice knowledge outcomes and descriptive SUS assessment. The age-SUS association was a secondary exploratory analysis. Categorical variables were summarized as frequencies and percentages and compared using chi-square or Fisher's exact test, as appropriate. A p-value <0.05 was considered statistically significant. The three-phase development and evaluation framework of SCABIESHEAL© is illustrated in **Figure 1**.

## Result

Phase I comprised application design and development over 11 months through collaboration between dermatologists at FPGMI and software engineers at the NUST Research and Innovation Centre. Phase II comprised internal content and usability evaluation and application refinement. Phase III recruitment and pilot evaluation occurred over six months, with two weeks of follow-up for each participant.

The application was developed using React Native with Firebase integration to ensure cross-platform compatibility, secure authentication, cloud-based data management, and automated reminder functionality. The definitive version incorporated culturally adapted educational content in seven languages (Urdu, English, Punjabi, Pashto, Sindhi, Balochi, and Arabic), step-by-step audiovisual demonstrations for the correct application of permethrin 5% cream, automated day-7 treatment reminders, and evidence-based guidance on environmental decontamination and reinfestation prevention. The principal features of SCABIESHEAL© are summarized in **Table 1**, and screenshots of the application interface are presented in **Figure 2**. During Phase II, 4 consultant dermatologists, 15 dermatology residents, and 30 volunteer patients assessed clinical accuracy, language clarity, cultural appropriateness, readability, navigation, audiovisual content, and reminder functionality. Feedback was used to refine translations, navigation, font readability, and performance before the pilot evaluation.

Feedback obtained during this phase facilitated refinement of multilingual translations, optimization of the user interface, simplification of navigation pathways, improvement in font readability, and enhancement of application performance across different smartphone devices. The revised version was finalized before commencement of patient pilot testing.

**Table 1** Key Features of the SCABIESHEAL© Mobile Application

| *Feature* | *Description* |
|---|---|
| Platform | React Native |
| Backend | Firebase |
| Supported languages | Urdu, English, Punjabi, Pashto, Sindhi, Balochi, Arabic |
| Educational content | Scabies overview, transmission, symptoms, prevention, and treatment |
| Audiovisual module | Step-by-step Permethrin 5% cream application |
| Reminder system | Automated Day-7 treatment reminders |
| Prevention module | Household treatment, environmental cleaning, and reinfestation prevention |

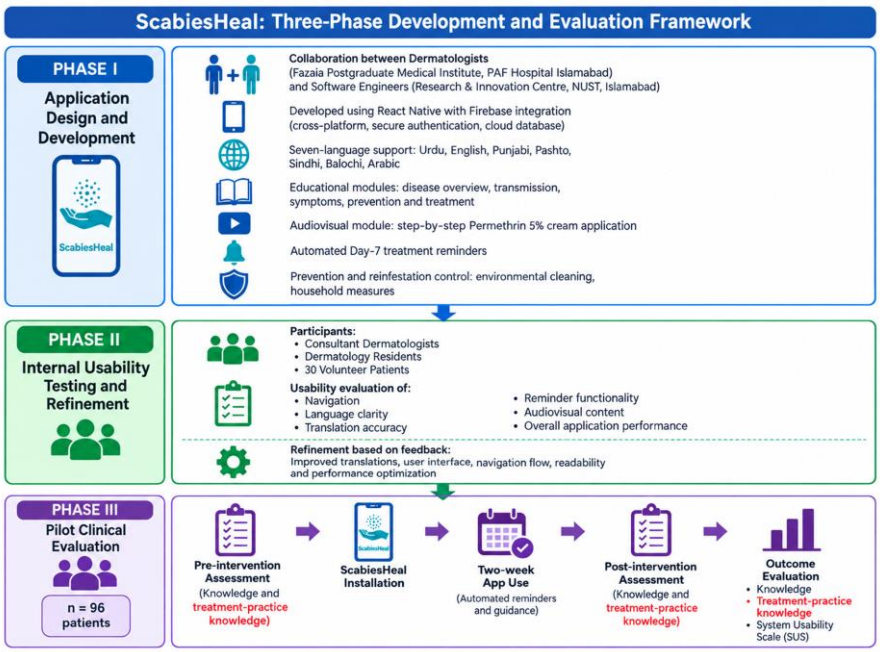



**Figure 1** Three-phase development and evaluation framework of SCABIESHEAL©.

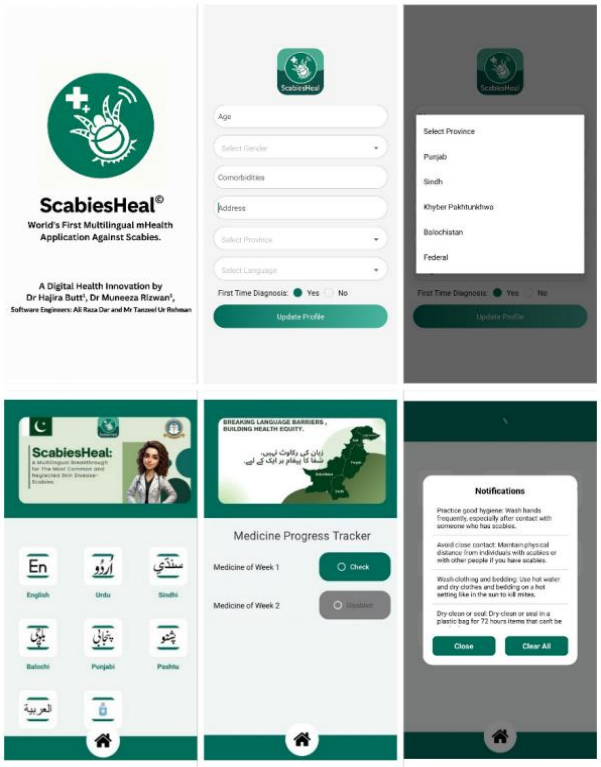



**Figure 2** Screenshots of the SCABIESHEAL© mobile application.

Of 211 individuals screened, 100 were enrolled in Phase III. Four participants did not complete follow-up, and 96 completed the two-week evaluation and were included in the paired analysis. Among those analysed, 55 (57.3%) were male and 41 (42.7%) were female. Median age was 35.00 years (IQR 27.00-42.50; range 18-60 years); 69 (71.9%) were younger than 40 years.

Participants were recruited from Islamabad (n=37; 38.5%), Punjab (n=34; 35.4%), Khyber Pakhtunkhwa (n=17; 17.7%), Sindh (n=3; 3.1%), Azad Jammu and Kashmir (n=3; 3.1%), and Gilgit-Baltistan (n=2; 2.1%). The median household size was 7.00 members (IQR 5.00–8.00). Secondary education was the most common educational level (n=26; 27.1%), followed by higher secondary education (n=22; 22.9%). Laborers or skilled workers and housewives each accounted for 21 participants (21.9%). A history of scabies during the preceding six months was reported by 27 participants (28.1%), and 59 participants (61.5%) reported scabies among family members. Baseline demographic and clinical characteristics are shown in **Table 2**.

Urdu was the most frequently selected application language (n=61; 63.5%), followed by Pashto (n=13; 13.5%), Punjabi (n=11; 11.5%), English (n=10; 10.4%), and Sindhi (n=1; 1.0%). Although Balochi and Arabic were available in SCABIESHEAL©, neither language was selected by a participant.

Median knowledge scores increased from 20.00% (IQR 0.00-40.00) at baseline to 80.00% (IQR 40.00-100.00) at two weeks (Z=-8.06, *P*<0.001, r=0.82). The mean paired increase was 46.88 percentage points (95% bootstrap CI 41.25-52.50). Median treatment-practice knowledge scores increased from 25.00% (IQR 12.50-50.00) to 83.33% (IQR 66.67-100.00; Z=-8.22, *P*<0.001, r=0.84); the mean paired increase was 48.09 percentage points (95% bootstrap CI 42.71-53.47). These findings represent short-term

**Table 2** Baseline demographic and clinical characteristics of study participants (n=96).

| *Characteristic* | *n (%) or median (IQR)* |
|---|---|
| Age, years | 35.00 (27.00-42.50) |
| Age range, years | 18-60 |
| Age group | |
| <40 years | 69 (71.9) |
| ≥40 years | 27 (28.1) |
| Sex | |
| Male | 55 (57.3) |
| Female | 41 (42.7) |
| Province/region of residence | |
| Islamabad | 37 (38.5) |
| Punjab | 34 (35.4) |
| Khyber Pakhtunkhwa | 17 (17.7) |
| Sindh | 3 (3.1) |
| Azad Jammu and Kashmir | 3 (3.1) |
| Gilgit-Baltistan | 2 (2.1) |
| Educational level | |
| Illiterate | 12 (12.5) |
| Primary | 18 (18.8) |
| Secondary | 26 (27.1) |
| Higher secondary | 22 (22.9) |
| Graduate/postgraduate | 18 (18.8) |
| Occupation | |
| Laborer/skilled worker | 21 (21.9) |
| Shopkeeper/business owner | 17 (17.7) |
| Student | 15 (15.6) |
| Government/private service | 9 (9.4) |
| Housewife | 21 (21.9) |
| Unemployed/other | 13 (13.5) |
| Household size | 7.00 (5.00-8.00) |
| History of scabies during past six months | |
| Yes | 27 (28.1) |
| No | 69 (71.9) |
| Family member with scabies | |
| Yes | 59 (61.5) |
| No | 37 (38.5) |
| Previous treatment for scabies | |
| Permethrin | 28 (29.2) |
| Oral ivermectin | 4 (4.2) |
| Home remedies | 29 (30.2) |
| None | 35 (36.5) |

*Values are n (%) unless otherwise stated.*

questionnaire score changes. The pre- and post-intervention score comparisons are presented in **Table 3**.

Participants accessed a median of four educational modules (IQR 3-4) and recorded a median of seven application sessions (IQR 5-9) during the two-week period. A session was defined as a separate recorded opening of the application. A module was recorded as accessed when opened; complete viewing of all content was not independently verified. Forty-five participants acknowledged both scheduled reminders, 48 acknowledged one and three acknowledged neither. These data represent user acknowledgement rather than independently verified delivery or opening of notifications. Detailed technical delivery analytics and reasons for non-acknowledgement were not collected. Reminders and audiovisual demonstrations were reported as helpful by 88 participants (91.7%).

The median SUS score was 72.50 (IQR 62.50-82.50), exceeding the commonly used reference value of 68. Fifty-nine participants (61.5%) scored at or above 68 and 37 (38.5%) scored below it; exceeding this reference value was not interpreted automatically as proof of good usability.

In a secondary exploratory analysis, 47/69 participants younger than 40 years (68.1%) and 12/27 aged 40 years or older (44.4%) achieved an SUS score of at least 68 (unadjusted OR 2.67, 95% CI 1.07-6.65; Fisher's exact *P*=0.038). This small subgroup finding was interpreted cautiously. The exploratory association between age group and the SUS reference benchmark is presented in **Table 4**.

**Table 3** Comparison of pre- and post-intervention knowledge and treatment-practice knowledge scores (n=96).

| *Outcome* | *Pre-intervention, median (IQR)* | *Post-intervention, median (IQR)* | *Wilcoxon result and effect estimate* |
|---|---|---|---|
| Scabies-related knowledge score (%) | 20.00 (0.00–40.00) | 80.00 (40.00–100.00) | Z=-8.06; p<0.001; r=0.82 |
| Treatment-practice knowledge score (%) | 25.00 (12.50–50.00) | 83.33 (66.67–100.00) | Z=-8.22; p<0.001; r=0.84 |

**Table 4** Association between age group and System Usability Scale benchmark (n=96).

| *Age group* | *SUS score <68, n (%)* | *SUS score ≥68, n (%)* | *Total* | *Exploratory estimate* |
|---|---|---|---|---|
| <40 years | 22 (31.9) | 47 (68.1) | 69 | OR 2.67 (95% CI 1.07-6.65); p=0.038 |
| ≥40 years | 15 (55.6) | 12 (44.4) | 27 | |
| Total | 37 (38.5) | 59 (61.5) | 96 | |

## Discussion

This study describes the development and single-group pilot evaluation of SCABIESHEAL©, a multilingual mobile health application for scabies education and treatment support.

The application combined multilingual educational content, audiovisual treatment instructions, reminders and preventive guidance. Its use was followed by increases in short-term knowledge and treatment-practice knowledge scores and by SUS scores above a commonly used reference value. Because the study lacked a comparator, these findings do not establish that the application caused the observed changes or improved clinical outcomes.

Scabies-related knowledge scores increased between baseline and the two-week assessment. The observed change followed introduction of the application; however, because participants also received routine clinical counselling and the study lacked a comparator, the extent to which the change can be attributed specifically to SCABIESHEAL© cannot be determined. Repeated administration of the same questionnaire may also have produced recall or testing effects. Accordingly, the findings indicate short-term score changes rather than long-term knowledge retention.

Scores concerning knowledge of recommended treatment practices also increased at two weeks. These items assessed understanding of recommended practices rather than objectively observed medication use and have therefore been described as treatment-practice knowledge. The Medicine Progress Tracker and reminder acknowledgements provided digitally recorded self-reports, but clinical medication use was not independently verified. The 91.7% helpfulness figure reflects participants' perceptions of reminders and audiovisual demonstrations and does not constitute an objective measure of medication use or treatment completion.

The median SUS score exceeded the commonly used reference value of 6812 which shows acceptable usability. The exploratory association between younger age and an SUS score of at least 68 had a wide confidence interval and should not be overemphasized. Further evaluation in larger and more diverse populations is required.

The multilingual design enabled participants to select Urdu, Pashto, Punjabi, English, or Sindhi during the pilot. This design may help address communication barriers, but the study did not compare multilingual with monolingual education or directly measure changes in communication barriers. No participant selected Balochi or Arabic; conclusions regarding these versions cannot therefore be drawn.

Study strengths included multidisciplinary development, multilingual content, clinician and patient involvement in refinement, a structured three-phase process and standardized usability assessment. These features support the feasibility of further evaluation but do not establish clinical effectiveness.

***Limitations of this study*** should be acknowledged. This was a single-centre, single-arm pilot study with a two-week follow-up and no comparator, limiting causal interpretation and assessment of long-term outcomes. Baseline clinical counselling, repeated questionnaire administration, and participant awareness may have influenced the findings. Restriction to smartphone owners may also have introduced selection bias. Treatment completion was self-reported, and objective medication-use measures and clinical outcomes were not assessed. Although the translated content underwent review and back-translation, the translated versions were not formally validated. Notification-delivery analytics and long-term application engagement were also not evaluated. Larger controlled studies with longer follow-up are required.

These preliminary findings support further evaluation of SCABIESHEAL© in controlled

studies. Future research should examine clinical outcomes, objective measures of medication use, costs, infrastructure, implementation, maintenance, sustainability, and acceptability at scale before broader deployment is considered.

## Conclusion

In this single-group pilot study, use of SCABIESHEAL© was associated with adequately improved short-term scabies knowledge and treatment-practice knowledge scores and demonstrated usability above a commonly used SUS reference value. Because participants also received standard counselling and no comparator was included, causality and clinical effectiveness cannot be established. Controlled, adequately powered studies incorporating objective medication-use measures, clinical outcomes and longer follow-up are required.

SCABIESHEAL© warrants further evaluation as a potentially scalable multilingual digital health intervention for scabies education and treatment support.

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***Prior Presentations and Intellectual Property*** Preliminary work from this study was presented at the American Academy of Dermatology Innovation Academy, Chicago, USA, on 10 July 2025, and at the 2nd International Conference on Tropical Dermatology, Sri Lanka, on 13 March 2026. These presentations are disclosed for transparency and are not presented as evidence of scientific validity or effectiveness. The submitted manuscript has not previously been published and does not substantially duplicate the prior presentations.

Intellectual property: The SCABIESHEAL© source code and user interface are registered with the Intellectual Property Organization of Pakistan under Registration Nos. 2025/1145 and 2025/1146. The registered copyright owners are Dr Hajira Butt and Dr Muneeza Rizwan. The authors report no commercial or financial interest arising from the application.

***Declaration of patient consent*** Authors certify that they have obtained all appropriate patient consent.

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***Conflict of interest*** The authors declare no conflict of interest.

***Author's contribution***

**HB:** Study conception and design; development and coordination of SCABIESHEAL©, data collection; data analysis and interpretation; final compilation and drafting of the manuscript.

**MR:** Study conception and design; development and coordination of SCABIESHEAL©; supervision, educational content validation; critical revision of the manuscript.

Every author has given final approval of the manuscript version to be published and agreed to be accountable for all aspects of the work.

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