

Symptom Tracking App. For Psoriasis Patient Ver.2

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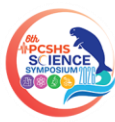
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Abstract

This research aims to develop and evaluate the effectiveness of version 2 of a psoriasis symptom-tracking application. This study presents the development and clinical evaluation of a cross-platform mobile application (Version 2) designed for psoriasis symptom tracking, aiming to overcome the precision limits and latency of its predecessor. Developed using Dart and the Flutter framework, the system leverages a Firebase real-time database to ensure immediate data synchronization. The application integrates three core modules: a self-assessment form utilizing a slider UI for Body Surface Area (%BSA) estimation alongside the Dermatology Life Quality Index (DLQI); an analytical dashboard visualizing symptom trends; and a secure chat system featuring keyword-based automated triaging coupled with teleconsultation and postal medication delivery. A 2-month randomized controlled trial was conducted with 60 moderate-to-severe psoriasis patients at the Southern Regional Institute of Dermatology, split equally into a control group (standard care, n=30) and an experimental group (app-assisted care, n=30). The experimental group demonstrated a statistically significant reduction in mean %BSA from 28.0% to 8.4%, remarkably outperforming the control group, which only decreased from 26.3% to 21.3%. Technical evaluations confirmed high computational efficiency, real-time data processing accuracy, and excellent user satisfaction scores. In summary, this research represents a remote healthcare initiative that enhances access to remote public health services and serves as a telemedicine model capable of being scaled up to manage other chronic diseases.

Keywords: *Psoriasis, Application, Database, Remote Health Care, Symptom Tracking*



Introduction

Psoriasis is a chronic inflammatory skin disease caused by immune system dysregulation and is one of the most common dermatological conditions in Thailand. Patients typically develop dry, erythematous, scaly plaques that significantly impair daily activities, self-confidence, and quality of life. Because psoriasis has no definitive cure, long-term treatment, regular follow-up, and continuous disease monitoring are essential.

The Southern Regional Hospital of Tropical Dermatology Trang Province is a specialized referral center serving patients from 14 provinces in southern Thailand. However, its psoriasis clinic operates only one day per week, limiting patient access. Many patients must travel long distances, leading to high transportation costs and interruptions in treatment. Hospital records from the past four years indicate that psoriasis is the third most common dermatological disease treated at the hospital, with approximately 78.9% of patients experiencing persistent disease. As disease activity is influenced by factors such as air pollution, heat exposure, inadequate sleep, and dietary habits, continuous monitoring is crucial for effective disease management.

To address these challenges, the Symptom Tracking System for *Psoriasis* Patient Ver.1 was developed to support symptom monitoring and patient management. Although it improved communication between patients and healthcare professionals, it could only identify lesion

locations and could not accurately assess disease severity. In addition, the growing number of patients made it difficult for healthcare professionals to respond promptly to patient inquiries.

Therefore, the Symptom Tracking System for *Psoriasis* Patient Version 2 was developed in collaboration with the Southern Tropical Dermatology Hospital, Trang Province. The enhanced application incorporates the Palm Method, Body Surface Area (%BSA) assessment, and the Dermatology Life Quality Index (DLQI) to improve disease evaluation. It also includes an automated chatbot, direct communication with healthcare professionals, and postal medication delivery to improve access to care. These features support continuous monitoring, reduce patients' travel burden, and enhance the efficiency and continuity of psoriasis management.

Methodology

2.1 Clinical Study

A field study was conducted at the Southern Tropical Dermatology Hospital, Trang Province, to investigate the clinical characteristics of psoriasis and identify the limitations and user requirements of the Symptom Tracking System for *Psoriasis* Patient Information was collected through discussions with healthcare professionals and end users to obtain feedback on the existing application. In addition, in-depth information regarding the characteristics of psoriasis, current treatment approaches, and challenges in long-term patient monitoring was gathered to guide the development of the enhanced application.

2.2 Application Design

The application was designed with three primary components: Self-Assessment Form, Dashboard, and Chat. Each module was developed as an independent subsystem to support patient data collection, symptom analysis, and communication between patients and healthcare professionals.

2.2.1 Self-Assessment Form

The Self-Assessment Form was designed to record patients' daily clinical information. Users select the assessment date and enter the affected Body Surface Area (%BSA) for each body region using slider controls. The system automatically calculates and displays the total %BSA. Patients also record their pain level using a slider, while the integrated Dermatology Life Quality Index (DLQI) questionnaire is completed on the same page. After completion, the application automatically calculates the total DLQI score and displays the corresponding quality-of-life impact level, enabling simultaneous assessment of disease severity and health-related quality of life.

2.2.2 Dashboard

The Dashboard was designed to present analytical data using graphical visualizations. Patient data are retrieved from the real-time database and organized chronologically. The dashboard displays a %BSA trend graph to illustrate changes in disease severity over time and a DLQI trend graph to demonstrate changes in the patient's quality of life.

The use of time-series visualization enables patients and healthcare professionals to monitor weekly symptom progression and evaluate the relationship between disease severity and quality-of-life outcomes within a single interface.

2.2.3 Chat System

The Chat module supports both real-time communication and automated responses. The Auto Chat system uses a keyword-based detection algorithm to match user messages with predefined responses, providing immediate answers to common questions about psoriasis, self-care, and application usage without requiring direct intervention from healthcare professionals. The application also includes a dedicated interface for healthcare professionals to review conversations, access patient messages, and provide personalized clinical advice when necessary.

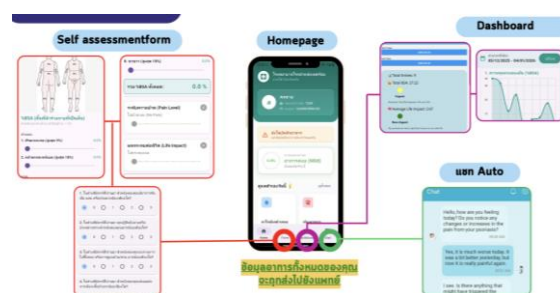


Fig.1 The overall of Application

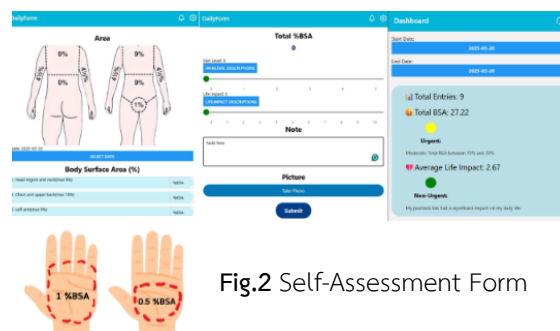


Fig.2 Self-Assessment Form

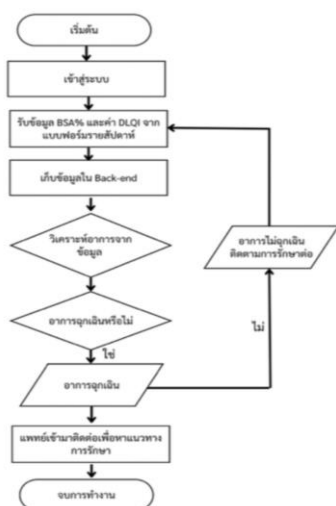


Fig.3 The Process of using Application

2.4 Data Collection

This study included 60 patients with moderate-to-severe psoriasis (25–35% Body Surface Area [%BSA] involvement) receiving treatment at the Southern Tropical Dermatology Hospital, Trang Province, Thailand. Eligible participants were 30–60 years of age, able to use a smartphone independently, and voluntarily enrolled after providing informed consent. Participants were allocated into two groups (n = 30 each).

The experimental group received standard treatment together with the Psoriasis Patient Monitoring Application Version 2. Patients completed the Self-Assessment Form once weekly, recording %BSA, Dermatology Life Quality Index (DLQI) scores, and photographs of psoriatic lesions for continuous disease monitoring.

The control group received standard clinical care without using the application. %BSA and DLQI data were collected during routine hospital follow-up visits according to standard clinical procedures.

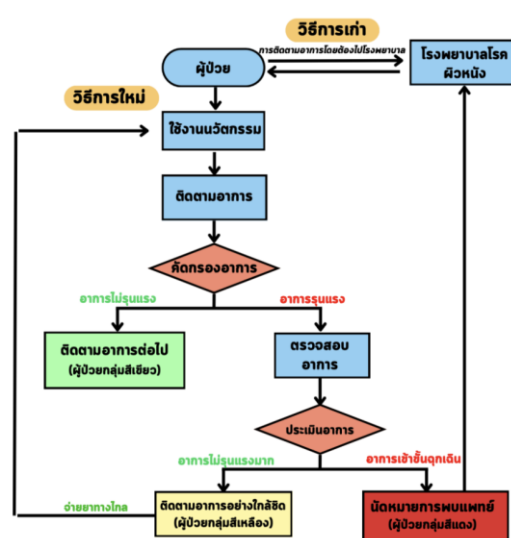


Fig.4 Implementation of the Innovation in Collaboration with the Southern Tropical Dermatology Hospital, Trang Province

2.5 System Evaluation

The proposed system was evaluated by comparing Body Surface Area (%BSA) and Dermatology Life Quality Index (DLQI) scores between the experimental and control groups (30 participants each). Data from the experimental group were collected through the application’s Self-Assessment Form, whereas control group data were obtained using the hospital’s standard clinical assessment procedures.

Changes in %BSA and DLQI before and after the follow-up period, as well as longitudinal trends, were analyzed to assess the effectiveness of the application for continuous symptom monitoring. The evaluation aimed to determine whether the application could improve patient management and reduce disease severity compared with standard clinical care alone.



Results

The performance of the Symptom Tracking System for Psoriasis Patients Ver. 2 was evaluated using Body Surface Area (%BSA) as the primary indicator of disease severity. The application monitors disease progression based on self-reported data collected through the integrated assessment form.

A total of 60 patients with comparable disease severity were divided into a control group and an experimental group (30 patients each). The control group received standard clinical care, whereas the experimental group received standard treatment supplemented with the application, following the workflow shown in Figure 3-4

The system was evaluated for its accuracy, consistency, and ability to continuously monitor disease progression. The results demonstrated that the application effectively tracked changes in patients' clinical conditions and was suitable for routine clinical use. A summary of the evaluation results is presented in Figure 5

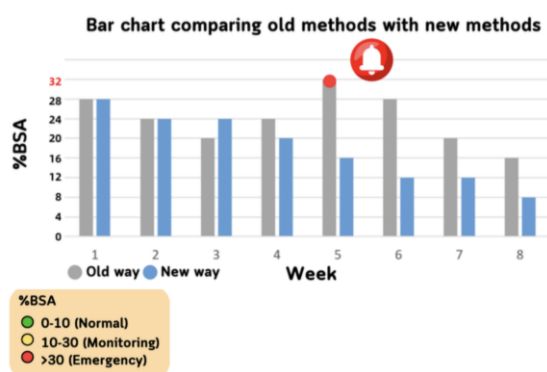


Fig 5. Comparison of treatment outcomes between conventional care without the application and application-assisted care.

Patients receiving conventional treatment without the application showed only modest improvement, with mean Body Surface Area (%BSA) decreasing from 28.3% at baseline to 21.3% after two months, suggesting limited disease control.

In contrast, patients using the Psoriasis Patient Monitoring Application Version 2 alongside standard care demonstrated markedly greater improvement. Continuous symptom monitoring enabled timely treatment adjustments, resulting in a reduction in mean %BSA from 28.0% to 8.4% after two months, with no disease recurrence observed during the follow-up period.

Result and Discussion

The objective of this study was to develop and evaluate the Psoriasis Patient Monitoring Application Version 2 in a real-world clinical setting. The application successfully recorded Body Surface Area (%BSA), Dermatology Life Quality Index (DLQI) scores, and clinical photographs, while accurately visualizing disease progression through trend graphs.

Compared with conventional care, patients using the application achieved greater clinical improvement, with mean %BSA decreasing from 28.0% to 8.4% after two months, whereas the control group improved from 28.3% to 21.3%. These findings indicate that continuous digital symptom monitoring can enhance clinical management and reduce disease severity.

Among 30 participants, the application achieved a mean user satisfaction



rating 4.35 out of 5, indicating good to very good satisfaction and demonstrating its usability in routine clinical practice. Beyond data collection and analysis, the application promoted continuous symptom monitoring, increased patients' awareness of their condition, and improved communication with healthcare professionals, all of which support long-term disease management.

Overall, the Psoriasis Patient Monitoring Application Version 2 demonstrated high effectiveness in system performance, symptom monitoring, clinical applicability, and user acceptance, fulfilling the objectives of this study.

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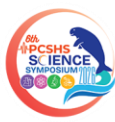
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