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Text Messaging for Cardiovascular Risk Prevention in Psoriasis
A Randomized Clinical Trial

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IMPORTANCE Cardiovascular disease (CVD) is the leading cause of mortality in patients with psoriasis, yet structured CVD prevention is not routinely embedded in dermatology care.

OBJECTIVE To evaluate the effectiveness of a text-messaging intervention in improving patient activation and cardiovascular risk factors among patients with psoriasis.

DESIGN, SETTING, AND PARTICIPANTS This single-center, parallel-group randomized clinical trial took place at a tertiary hospital dermatology clinic in Australia from February 2024 to February 2025. Adults with dermatologist-confirmed psoriasis were randomized 1:1 during outpatient dermatology visits between April and July 2024. Data were analyzed from February to April 2025.

INTERVENTION A 6-month text-messaging intervention (Tobacco, Exercise, and Diet Messages for Psoriasis [TEXTME PSO]), comprising 4 text messages per week, compared with standard care.

MAIN OUTCOMES AND MEASURES The primary outcome was score on the 13-item Patient Activation Measure. Secondary outcomes included Mediterranean Diet Score, physical activity, cardiometabolic measures, psoriasis-CVD knowledge, medication adherence, Psoriasis Area and Severity Index, Dermatology Life Quality Index, and user feedback. Analysis of covariance was used to adjust for baseline values under an intention-to-treat framework with multiple imputation.

RESULTS Among 111 participants (mean [SD] age, 51.8 [13.2] years; 71 [65.1%] male), the intervention showed a statistically significant improved patient activation at 6 months compared with usual care (adjusted mean difference, 10.8 points; 95% CI, 7.0-14.6 points; $P < .001$). Statistically significant improvements were also observed in Mediterranean diet adherence (adjusted mean difference, 1.7; 95% CI, 1.0-2.4; $P < .001$), medication adherence (adjusted mean difference, 1.6; 95% CI, 0.8-2.5; $P < .001$), and psoriasis-CVD knowledge (adjusted mean difference, 6.6; 95% CI, 4.7-8.4; $P < .001$). Minutes per week of physical activity increased (adjusted mean difference, 127.9; 95% CI, 21.9-234.0; $P = .02$), and body mass index, calculated as weight in kilograms divided by height in meters squared, decreased (adjusted mean difference, −1.0; 95% CI, −1.4 to −0.7; $P < .001$). No statistically significant between-group differences were observed for lipid parameters, hemoglobin A_{1c}, smoking behavior, dermatology-specific quality of life, or psoriasis severity.

CONCLUSIONS AND RELEVANCE In this randomized clinical trial, a text-messaging intervention improved patient activation and cardiovascular risk behaviors in adults with psoriasis. While biomarker changes were modest or not statistically significant, findings support digital tools as an adjunct to cardiovascular risk in dermatology care.

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Visual Abstract

Supplemental content

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Psoriasis is a chronic, multisystem inflammatory skin disease affecting 2% to 4% of the population and associated with an increased risk of cardiovascular disease (CVD), the leading cause of morbidity and mortality in this cohort.[1] Shared inflammatory pathways, genetics, and risk factors between psoriasis, atherosclerosis, and the metabolic syndrome contribute to this association.[2-4] This is compounded by a higher prevalence of traditional cardiovascular risk factors such as hypertension, diabetes, dyslipidemia, obesity, and smoking.[5-7] Psoriasis is now recognized as an independent risk factor for myocardial infarction, stroke, and cardiovascular mortality,[8,9] with severe disease associated with elevated 10-year major adverse cardiovascular events risk.[10,11] Although systemic treatments may modulate cardiovascular risk, randomized clinical trial data remain inconclusive.[12]

Given this uncertainty, lifestyle-based primary prevention is essential.[13,14] Effective CVD prevention relies on diet, physical activity, weight management, and control of cardiometabolic risk factors and, critically, on patient activation.[15-17] Defined as the knowledge, skills, and confidence to manage one's health, patient activation is strongly correlated with treatment adherence and engagement in health-promoting behaviors.[16-19] The 13-item Patient Activation Measure (PAM-13) categorizes individuals into 1 of 4 levels, from disengaged (level 1) to proactive self-managers (level 4),[16-19] with its utility well established across chronic disease cohorts including those with CVD, diabetes, and asthma, where higher activation has been associated with improved self-care, health behaviors, and in some settings, clinical outcomes.[19] Empowering patients to self-manage their cardiovascular health is central to improving long-term outcomes in this group.

Despite strong observational links between psoriasis and CVD, few interventions have targeted prevention or behavior change. Mobile health strategies like text messaging (TM) have shown cardiovascular benefits, as seen in the Tobacco, Exercise, and Diet Messages (TEXTME) trial.[20,21] TEXTME for Psoriasis (TEXTME PSO) adapts this model for psoriasis, using behaviorally informed messaging to improve activation and lifestyle behaviors.

CVD risk factors in psoriasis are frequently underdiagnosed and undertreated,[22] reflecting limited awareness among patients and clinicians, a skin-centric model of care, and lack of integrated multidisciplinary pathways. Engagement in healthy behaviors is also suboptimal: individuals with psoriasis report physical activity levels[23,24] and demonstrate poorer dietary quality.[24] Notably, adherence to the Mediterranean diet, rich in anti-inflammatory and antioxidant nutrients, has been associated with lower psoriasis severity and improved cardiovascular outcomes.[25]

Implementation of evidence-based prevention strategies in psoriasis care remains limited. The COVID-19 pandemic further highlighted the need for scalable, patient-centered, and remote models of care. This trial addresses that gap.

This study evaluates the impact of a TM-based intervention (TEXTME PSO) on patient activation and modifiable cardiovascular risk behaviors in adults with psoriasis. In the absence of definitive evidence that psoriasis therapies alone mitigate cardiovascular risk, interventions that support lifestyle modification, education, and self-management support may represent the most immediate and scalable opportunity to improving long-term cardiovascular outcomes in this high-risk population.

Key Points

Question In adults with psoriasis, does a 6-month lifestyle-focused text-messaging program improve patient activation compared with usual care?

Findings In this randomized clinical trial of 111 adults with psoriasis, participants receiving the text-messaging intervention had statistically significant higher 13-item Patient Activation Measure scores at 6 months than those receiving usual care.

Meaning Low-intensity text messaging may be a scalable adjunct to support cardiovascular risk self-management in adults with psoriasis.

Methods

Study Design

TEXTME PSO was a single-center, parallel-group, investigator-blinded randomized clinical trial conducted at a tertiary hospital dermatology clinic in Australia. The study evaluated the effect of a TM intervention on patient activation, self-management behaviors, and cardiovascular risk outcomes in adults with psoriasis.

Ethical approval was granted by the Western Sydney Local Health District Human Research Ethics Committee, in accordance with the Declaration of Helsinki, and the trial was prospectively registered with the Australian New Zealand Clinical Trials Registry. Informed consent was obtained from all participants prior to enrollment. The study was reported in accordance with the Consolidated Standards of Reporting Trials (CONSORT) reporting guidelines. Details of the trial protocol are outlined in Supplement 1.

Study Duration

The trial ran over 12 months, comprising a 6-month recruitment period and a 26-week follow-up. The full assessment and intervention schedule is outlined in eTable 1 in Supplement 2.

Participants

Eligible participants were adults (≥18 years old) with dermatologist-confirmed chronic plaque psoriasis. Inclusion criteria included mobile phone access, English proficiency, and willingness to participate. Psoriasis severity was not a criterion, and concurrent systemic therapy was permitted. Key exclusions included recent (<3 months) cardiovascular events (myocardial infarction, unstable angina, or stroke), pregnancy or lactation, and inability to complete follow-up due to physical, geographic, or psychosocial limitations.

Recruitment occurred during routine outpatient dermatology visits between April and July 2024. Screening procedures commenced in February 2024. Sex was self-reported by

participants and is reported as male or female in baseline characteristics. Ethnicity (country of birth) was self-reported using prespecified categories for descriptive purposes to characterize the study population and contextualize cardiovascular risk in a multicultural clinic cohort. These data were not used for eligibility, stratification, or analysis. No eligibility restrictions were applied based on body mass index (BMI).

Randomization and Allocation Procedures

Participants were randomized 1:1 using a computer-generated block randomization sequence prepared by a study statistician (S.M.), who was not involved in participant recruitment or assessment. Randomization was implemented centrally via the TextCare platform, a secure, automated messaging system for scheduled short message service delivery, ensuring allocation concealment. Investigators involved in recruitment and baseline assessment had no access to the randomization sequence.

Intervention delivery occurred automatically via the TextCare system and was independent of the clinical team. Clinicians and outcome assessors were not informed of participant allocation, and participants were instructed not to disclose their allocation during clinic visits. Participants were not blinded due to the nature of the intervention.

Intervention

Participants allocated to the intervention group received 4 semipersonalized text messages per week for 24 weeks. Messages targeted diet (aligned with Mediterranean dietary principles), physical activity, smoking cessation (where applicable), weight management, medication adherence, and cardiovascular and psoriasis education. The approximately 100-message library was evidence-based, developed with dermatology and cardiology input, and behaviorally framed to support motivation, self-efficacy, and action planning. The full text-message library is provided in the eAppendix in Supplement 2. Messages were delivered automatically via the TextCare platform. The platform supported centralized message scheduling, participant allocation, and automated delivery of intervention messages without direct clinician involvement.

Control Group

Control participants received standard dermatologic care and 3 generic, noninterventional text messages during the study period (eg, contact details and appointment reminders), with no educational or motivational content.

Sample-Size Justification

The study was powered for the primary outcome, in accordance with the prespecified statistical analysis plan (Supplement 3). Based on prior chronic disease data, a standard deviation of 14.4 points was assumed. A between-group difference of 8.4 points was considered clinically meaningful. Using a 2-sided α of .05, 80% power, and allowing for 10% attrition, a target sample size of 100 participants randomized 1:1 was required. Secondary outcomes were prespecified, but the study was not powered to detect differences in secondary end points.

Outcomes

The primary outcome was score on the PAM-13 (Insignia Health), a validated 13-item instrument assessing patients' knowledge, skills, and confidence for health self-management. Items are rated on a Likert scale and converted to a standardized score ranging from 0 to 100 using a proprietary algorithm. PAM-13 also categorizes participants into 4 validated activation levels reflecting readiness for self-management (eTables 2 and 3 in Supplement 2).

Secondary outcomes included diet quality assessed using the Mediterranean Diet Score (MDS); physical activity assessed using the International Physical Activity Questionnaire (IPAQ), reported as minutes per week and metabolic equivalent of minutes per week; BMI, calculated as weight in kilograms divided by height in meters squared; systolic blood pressure (SBP); cardiometabolic biomarkers (lipid profile and hemoglobin A_{1c} [HbA_{1c}]); medication adherence assessed using the 5-item Medication Adherence Report Scale (MARS-5; range, 5-25, with higher scores indicating greater adherence); psoriasis severity assessed using the Psoriasis Area and Severity Index (PASI); dermatology-specific quality of life assessed using the Dermatology Life Quality Index (DLQI; range, 0-30, with higher scores indicating worse quality of life); and user feedback. All secondary outcomes were assessed using established, validated instruments, unless otherwise specified.

Disease-specific knowledge was assessed using the Psoriasis-Cardiovascular Disease Knowledge Survey (PCVD-KS), an investigator-developed instrument currently undergoing formal validation. Adverse events were prospectively collected throughout the study and reviewed for potential relatedness to the intervention.

Statistical Analysis

Primary outcome analysis used analysis of covariance (ANCOVA) to compare 6-month PAM-13 scores between groups, adjusting for baseline PAM-13, as specified in the statistical analysis plan (Supplement 3). Secondary outcomes were analyzed using analogous ANCOVA models adjusting for the baseline value of each outcome. Exploratory subgroup analyses examined treatment effect heterogeneity using treatment-by-covariate interaction terms (Supplement 3).

Analyses followed the intention-to-treat principle. Missing data were handled using multiple imputation by chained equations, with sensitivity analyses using complete-case data supporting robustness. Statistical analyses were conducted in SPSS, version 30 (IBM), and cross-validated in R, version 4.4.3 (R Foundation for Statistical Computing). Two-sided $P < .05$ was considered statistically significant.

Baseline characteristics are reported descriptively by group, and no statistical hypothesis testing was performed for baseline comparisons, consistent with CONSORT recommendations. Effect sizes (partial η^2) were calculated for continuous secondary outcomes with statistically significant between-group differences to aid interpretation, acknowledging the exploratory nature of secondary analyses. Data were cleaned and analyzed from February to April 2025.

Results

Baseline Characteristics

A total of 111 participants were enrolled (mean [SD] age, 51.8 [13.2] years; 71 [65.1%] male). Early-onset psoriasis was reported in 88 participants (83.8%), family history in 55 (50.5%), and psoriatic arthritis in 44 (39.6%). Established cardiovascular disease was present in 13 participants (11.7%), and 53 (47.7%) had at least 1 cardiovascular risk factor at baseline (hypertension, hyperlipidemia, diabetes, smoking, or depression). Additionally, 83 participants (74.8%) were receiving biologic therapy, predominantly IL-23 inhibitors; baseline psoriasis treatments by allocation are shown in eTable 4 in Supplement 2. Baseline demographic, clinical, cardiometabolic, and treatment characteristics were similar between groups (**Tables 1** and **2**), with no statistical hypothesis testing performed, consistent with CONSORT recommendations.

Of 111 randomized participants, 10 discontinued the allocated intervention after randomization (3 in the intervention group and 7 in the control group), opting out following the welcome text message. Follow-up for the primary outcome (PAM-13) was complete in both groups, with no participants lost to follow-up. All randomized participants were included in the intention-to-treat analysis. The CONSORT flow diagram (**Figure**) reflects postrandomization discontinuation with complete follow-up for the primary outcome.

Primary Outcome: Patient Activation

At 6 months, the mean PAM-13 score was 64.2 (95% CI, 61.9-67.3) in the intervention group and 54.2 (95% CI, 51.1-56.5) in the control group. The adjusted mean difference, controlling for baseline PAM-13 using ANCOVA, was 10.8 points (95% CI, 7.0-14.6 points; $P < .001$; partial $\eta^2 = 0.222$; **Table 3**).

Subgroup Analyses and Heterogeneity

Adjusted mean differences represent between-group differences at 6 months derived from ANCOVA models, including the baseline value of each outcome as a covariate. Exploratory subgroup analyses showed no evidence of treatment effect heterogeneity across subgroups defined by sex, age, psoriasis duration, or cardiovascular risk factor status.

Exploratory Multivariable Regression

Exploratory multivariable linear regression analyses did not identify consistent baseline predictors of PAM-13 scores at 6 months.

Patient Activation Levels

By 6 months, 44 of 55 participants (80.0%) in the intervention group were classified as PAM level 3 (taking action) or level 4 (sustaining behaviors), compared with 28 participants (51.0%) at baseline. Among 56 participants in the control group, the proportion classified as level 3 or 4 declined from 28 (50.0%) at baseline to 24 (42.9%) at 6 months, while level 1 (disengaged) increased from 13 participants (23.2%) to 17 (30.4%) (eTable 3 in Supplement 2).

Secondary Outcomes

Secondary outcomes included measures of diet (MDS), physical activity (IPAQ), medication adherence (MARS-5), dermatology-specific quality of life (DLQI), disease-specific knowledge (PCVD-KS), smoking behavior, cardiometabolic parameters (BMI, SBP, lipid profile, and HbA_{1c}), and psoriasis severity (PASI) (**Table 4** and eTable 5 in Supplement 2). Data completeness was high for questionnaire-based outcomes but lower for cardiometabolic biomarkers, with approximately 25% to 30% missing data due to incomplete follow-up blood testing within the protocol-defined window. Smoking analyses were limited to 11 participants who reported currently smoking at baseline.

Diet

At 6 months, MDS was higher in the intervention group (adjusted mean difference, 1.7; 95% CI, 1.0-2.4; $P < .001$; partial $\eta^2 = 0.192$).

Physical Activity

Physical activity, based on the IPAQ, was higher in the intervention group at 6 months, including increased minutes per week (adjusted mean difference, 127.9; 95% CI, 21.9-234.0; $P = .02$; partial $\eta^2 < 0.01$) and metabolic equivalent of minutes per week (adjusted mean difference, 436.8; 95% CI, 146.2-727.4; $P < .001$; partial $\eta^2 < 0.01$).

Disease-Specific Knowledge

PCVD-KS scores were higher in the intervention group (adjusted mean difference, 6.6; 95% CI, 4.7-8.4; $P < .001$; partial $\eta^2 = 0.949$).

Medication Adherence

MARS-5 scores were higher in the intervention group (adjusted mean difference, 1.6; 95% CI, 0.8-2.5; $P < .001$; partial $\eta^2 = 0.114$).

Smoking

No statistically significant between-group differences were observed. Among current smokers, cigarette consumption over the prior 7 days did not meaningfully differ between groups.

BMI

BMI was lower in the intervention group (adjusted mean difference, −1.0; 95% CI, −1.4 to −0.7; $P < .001$; partial $\eta^2 = 0.011$).

Blood Pressure and Cardiometabolic Biomarkers

At 6 months, SBP was lower in the intervention group (adjusted mean difference, −6.0 mm Hg; 95% CI, −8.2 to −3.7 mm Hg; $P < .001$; partial $\eta^2 = 0.032$). No statistically significant between-group differences were observed for lipid parameters or HbA_{1c}.

Psoriasis Severity and Quality of Life

No statistically significant between-group differences were observed for PASI (adjusted mean difference, −1.4; 95% CI, −2.3 to 0.3; $P = .09$) or DLQI (adjusted mean difference, −0.7; 95% CI, −0.4 to 1.7; $P = .21$).

Table 1. Baseline Demographic and Medical Characteristics by Treatment Group

Demographic characteristics	No. (%)		
	Control (n = 56)	Intervention (n = 55)	Total (N = 111)
Age, y			
Mean (SD)	52.1 (13.5)	51.5 (13.1)	51.8 (13.2)
Median (IQR)	51.5 (19.5)	54.0 (22.0)	52.0 (22.0)
Sex			
Female	21 (37.5)	17 (30.9)	38 (34.9)
Male	35 (62.5)	38 (69.1)	71 (65.1)
Method of assessment			
Clinic	49 (96.1)	50 (96.2)	99 (96.1)
Telehealth	2 (3.9)	2 (3.8)	4 (3.9)
Employment status			
Employed	37 (67.3)	35 (63.6)	72 (65.5)
Unemployed	18 (32.7)	20 (36.4)	38 (34.5)
Living alone			
Yes	6 (11.1)	5 (9.1)	11 (10.1)
No	48 (88.9)	50 (90.9)	98 (89.9)
Regular help required in past 2 wk			
Yes	5 (9.4)	3 (5.6)	8 (7.5)
No	48 (90.6)	51 (94.4)	99 (92.5)
Ethnicity/country of birth[a]			
Aboriginal/Torres Strait Islander	1 (1.8)	1 (1.9)	2 (1.8)
Australia/New Zealand	27 (48.2)	22 (40.7)	49 (44.1)
East Asian	2 (3.6)	2 (3.7)	4 (3.6)
European	3 (5.4)	4 (7.4)	7(6.3)
Polynesian	2 (3.6)	0	7 (6.3)
Middle Eastern and North African	3 (5.4)	2 (3.7)	5 (4.5)
South Asian	6 (10.7)	14 (25.9)	20 (18)
Southeast Asian	12 (21.4)	8 (14.8)	20 (18)
Other	0	1 (1.9)	1 (0.9)
Missing	0	1	1
Highest formal education			
Completed high school (>12 y)	42 (77.8)	42 (82.4)	84 (80.0)
Did not complete high school	12 (22.2)	9 (17.6)	21 (20.0)
Medical characteristics			
Age at psoriasis diagnosis, y			
Mean (SD)	26.8 (15.5)	29.4 (15.2)	28.1 (15.3)
Median (IQR)	20.0 (18.5)	28.0 (16.5)	24.0 (17.5)
Early onset (age <18 y)			
Yes	45 (84.9)	43 (82.7)	88 (83.8)
No	8 (15.1)	9 (17.3)	17 (16.2)
Psoriasis duration, mean (SD), y	25.3 (15.8)	22.1 (14.4)	23.7 (15.1)
Family history of psoriasis			
Yes	25 (44.6)	30 (56.6)	55 (50.5)
No	31 (55.4)	23 (43.4)	54 (49.5)
Psoriatic arthritis			
Yes	24 (42.9)	20 (36.4)	44 (39.6)
No	32 (57.1)	35 (63.6)	67 (60.4)
Inflammatory bowel disease			
Yes	2 (3.6)	3 (5.5)	5 (4.5)
No	54 (96.4)	52 (94.5)	106 (95.5)
Metabolic liver disease (MASLD)			
Yes	21 (37.5)	21 (38.2)	42 (37.8)
No	35 (62.5)	34 (61.8)	69 (62.2)

(continued)

Table 1. Baseline Demographic and Medical Characteristics by Treatment Group (continued)

Demographic characteristics	No. (%) Control (n = 56)	Intervention (n = 55)	Total (N = 111)
Known cardiovascular disease (IHD/stroke/PVD)			
Yes	6 (10.7)	7 (12.7)	13 (11.7)
No	49 (87.5)	48 (87.3)	97 (87.4)
Missing	1 (1.8)	0	1 (0.9)
History of cardiovascular risk factors			
Yes	28 (50.0)	25 (45.5)	53 (47.7)
No	25 (44.6)	29 (52.7)	54 (48.6)
Missing	3 (5.4)	1 (1.8)	4 (3.6)
History of hypertension			
Yes	15 (26.8)	20 (36.4)	35 (31.5)
No	41 (73.2)	35 (63.6)	76 (68.5)
History of dyslipidemia			
Yes	16 (28.6)	23 (41.8)	39 (35.1)
No	40 (71.4)	32 (58.2)	72 (64.9)
History of diabetes			
Yes	19 (33.9)	16 (29.1)	35 (31.5)
No	37 (66.1)	39 (70.9)	76 (68.5)
Currently smoke			
Yes	6 (10.7)	6 (10.9)	12 (10.8)
No	50 (89.3)	49 (91.9)	99 (89.2)
Depression/anxiety/other psychological disorder[b]			
Yes	13 (21.4)	14 (25.5)	27 (23.4)
No	37 (66.1)	31 (56.4)	68 (61.3)
Missing	7 (12.5)	10 (18.2)	17 (15.3)

Abbreviations: IHD, ischemic heart disease; MASLD, metabolic dysfunction-associated steatotic liver disease; PVD, peripheral vascular disease.

[a] Ethnicity/country of birth was self-reported using prespecified categories. The other category includes responses not captured within the prespecified categories and participants who preferred not to specify.

[b] Composite psychological comorbidity variable defined as self-reported diagnosis of depression, anxiety, or other psychological disorder. Yes indicates presence of any, no indicates all 3 were reported as absent, and missing indicates no response to all 3 items.

Table 2. Baseline Cardiometabolic and Clinical Measures by Treatment Group[a]

Outcome	Control		Intervention	
	No. of participants	Mean (SD)	No. of participants	Mean (SD)
Mediterranean Diet Score	55	6.2 (2.7)	54	6.4 (2.3)
Medication adherence score (MARS-5)	55	22.7 (3.3)	55	22.9 (3.0)
Psoriasis-CVD Knowledge Survey score	56	41.8 (5.4)	55	41.1 (8.6)
BMI	56	31.6 (7.9)	55	29.8 (5.4)
Systolic blood pressure, mm Hg	56	133.2 (15.2)	55	132.0 (17.0)
LDL cholesterol, mg/dL	39	96.5 (34.8)	39	115.8 (42.5)
Hemoglobin A_{1c}, %	43	6.1 (1.3)	46	6.1 (1.1)
Psoriasis Area and Severity Index	50	2.3 (3.7)	51	4.1 (7.1)
Dermatology Life Quality Index	51	4.0 (6.6)	51	4.3 (6.9)

Abbreviations: BMI, body mass index (calculated as weight in kilograms divided by height in meters squared); CVD, cardiovascular disease; LDL, low-density lipoprotein; MARS-5, 5-item Medication Adherence Report Scale.

SI conversion factors: to convert LDL cholesterol to mmol/L, multiply by 0.0259; hemoglobin A_{1c} to the proportion of total hemoglobin, multiply by 0.01.

[a] No statistical hypothesis testing was performed for baseline comparisons, consistent with CONSORT recommendations.

Feasibility and User Feedback

Among the 35 intervention participants who completed feedback, 32 (91.4%) reported that the messages were helpful, 26 (74.3%) reported increased motivation, and 23 (65.7%) reported reading more than 90% of messages. Eighteen participants (51.4%) reported saving messages, and 9 (25.7%) reported forwarding them.

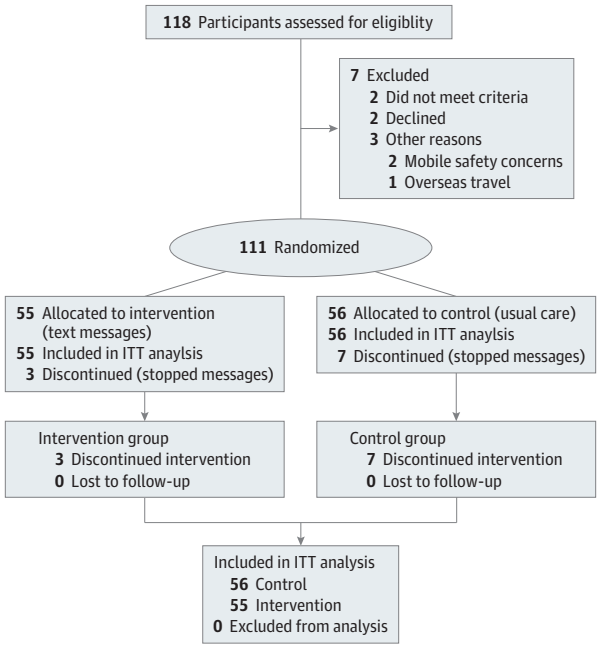
Sensitivity Analyses and Safety

Complete-case analyses were consistent with multiple imputation analyses No intervention-related adverse events were identified during the study period.

Discussion

This randomized clinical trial evaluated the impact of a low-intensity mobile health TM intervention (TEXTME PSO) on patient activation, lifestyle behaviors, and cardiovascular risk-related outcomes in adults with psoriasis. The intervention produced a clinically meaningful improvement in patient activation and was associated with improvements in diet quality, physical activity, disease-specific knowledge, medication adherence, and BMI. No statistically significant between-group differences were observed for lipid profiles,

Figure. CONSORT Flow Diagram



ITT indicates intention to treat.

HbA_{1c}, smoking behavior, dermatology-specific quality of life, or psoriasis severity.

Patient Activation and Behavioral Engagement

The improvement in PAM-13 scores supports the role of TM-based interventions in enhancing patients' knowledge, skills, and confidence for health self-management. These findings align with prior research demonstrating that higher patient activation is associated with improved adherence, self-efficacy, engagement in preventive behaviors, and health care utilization across populations with chronic disease.[16,19]

The adjusted mean increase of 10.8 points in the intervention group is both statistically and clinically meaningful. Prior studies suggest that a 4- to 6-point increase on the PAM-13 scale may correspond to a shift from disengaged or passive activation states (level 1) to proactive self-management (levels 3 and 4).[17,18] By 6 months, 80% of intervention participants were classified as PAM levels 3 or 4, indicating active engagement in health behaviors and capacity to sustain self-management over time, compared with 51% at baseline. In contrast, activation declined in the control group, with a greater proportion classified as disengaged. These shifts reflect increased readiness to act and are associated with improved health outcomes.[17]

In exploratory multivariable regression analyses, treatment allocation was the only independent factor associated with PAM-13 scores at 6 months. Concurrent improvements in disease-specific knowledge suggest that text-based interventions may enhance cognitive drivers of behavior change; however, as the PCVD-KS is an investigator-developed instrument currently undergoing validation, knowledge-related findings should be interpreted cautiously. Notably, these gains were achieved without face-to-face contact, underscoring the scalability of TM interventions in dermatology settings, where delivery of preventive care delivery is often constrained.

Lifestyle Modification and Disease-Specific Knowledge

The intervention improved adherence to the Mediterranean diet, an anti-inflammatory and cardioprotective dietary pattern with established relevance to psoriasis.[26,27] Although adherence remained moderate, the magnitude of change was comparable to that reported in other mHealth interventions.[28] Physical activity also increased; however, effect sizes were small, suggesting that changes in intensity or sustainability may have been insufficient to produce consistent downstream cardiometabolic effects within the study time frame.[29-32]

Concurrent improvements in PCVD-KS and medication adherence suggest that targeted educational messaging may support activation across multiple self-management domains. Effect sizes varied, with the largest effects observed for disease-specific knowledge, consistent with the intervention's educational focus. Moderate effects for patient activation, diet quality, and medication adherence indicate behavioral engagement beyond knowledge acquisition. While PCVD-KS is undergoing validation, the consistency of knowledge gains supports the role of structured educational messaging as a foundation for broader behavior change.

Clinical and Cardiometabolic Outcomes

Despite behavioral improvements, no statistically significant between-group differences were observed for lipid profiles or HbA_{1c}, likely reflecting the short duration and low intensity of the intervention, incomplete biomarker follow-up, and potential confounding from concurrent pharmacologic therapy, including biologic use.[33,34] A non–statistically significant difference in low-density lipoprotein cholesterol was observed; however, interpretation is limited by missing biomarker data and insufficient power for secondary outcomes.

A reduction in SBP was observed in the intervention group; however, this association cannot be attributed with certainty to the TM intervention. Unmeasured confounding factors, including medication initiation or titration (eg, antihypertensives, glucagon-like peptide-1 agonists) and increased health care engagement, may have contributed to this finding. The small effect size supports cautious interpretation and suggests that the intervention alone was unlikely to drive clinically meaningful blood pressure change within the study time frame.

BMI decreased modestly in the intervention group (-1.0), likely reflecting combined dietary and physical activity changes. Although effect sizes were small, even modest reductions may be clinically relevant if sustained. HbA_{1c} remained unchanged, consistent with evidence that glycemic indices are relatively insensitive to short-term behavioral interventions.[35-37]

No statistically significant between-group differences were observed for psoriasis severity or dermatology-specific quality of life at 6 months. These findings likely reflect low baseline disease burden and high biologic use, resulting in ceiling

Table 3. Primary Analysis of the 13-Item Patient Activation Measure (PAM-13) Activation Scores

Outcome	Treatment group		Mean difference (95% CI)[a]	*P* value
	Control	Intervention		
PAM-13 activation score at baseline				
No. of participants	56	55	NA	NA
Mean (SD)	56.8 (14.5)	55.4 (14.7)	−1.4 (−6.8 to 4.1)	.63
Median (IQR) [95% CI]	52.9 (47.4 to 68.5) [53.0 to 60.6]	56.4 (44.3 to 66.0) [51.6 to 59.3]	NA	NA
PAM-13 activation score at 6 mo				
No. of participants	56	55	NA	NA
Mean (SD)	54.2 (13.9)	64.2 (13.3)	10.0 (4.9 to 15.0)	<.001
Median (IQR) [95% CI]	51.4 (45.2 to 60.8) [50.5 to 57.8]	66.0 (56.4 to 70.8) [60.7 to 67.7]	NA	NA
Change in PAM-13 activation score from baseline to 6 mo				
No. of participants	56	55	NA	NA
Mean (SD)	−2.6 (10.2)	8.7 (12.9)	11.3 (7.0 to 15.7)	<.001
Median (IQR) [95% CI]	0.0 (−4.2 to 0.0) [−5.3 to 0.1]	9.0 (0.0 to 15.4) [5.3 to 12.1]	NA	NA
Adjusted analysis of PAM-13 scores at 6 mo				
Mean difference (95% CI)	NA	NA	10.8 (7.0 to 14.6)	<.001

Abbreviation: NA, not applicable.

[a] The mean difference is estimated using analysis of covariance with the baseline value as a covariate.

Table 4. Secondary Outcomes at 6 Months[a]

Outcome	Control		Intervention		Adjusted mean difference (95% CI)[b]	*P* value
	No. of participants	Mean (SD)	No. of participants	Mean (SD)		
Mediterranean Diet Score	55	5.8 (2.7)	50	7.8 (2.4)	1.7 (1.0 to 2.4)	<.001
Physical activity, MET-min/wk	54	542.8 (838.8)	54	818.8 (1119.2)	436.8 (146.2 to 727.4)	<.001
Medication adherence score (MARS-5)	56	22.6 (3.5)	54	24.3 (1.4)	1.6 (0.8 to 2.5)	<.001
Psoriasis-CVD Knowledge Survey score	56	41.8 (6.2)	55	48.0 (6.1)	6.6 (4.7 to 8.4)	<.001
BMI	53	31.6 (7.9)	56	29.5 (5.3)	-1.0 (-1.4 to -0.7)	<.001
Systolic blood pressure, mm Hg	56	135.2 (15.0)	53	128.6 (18.1)	-6.0 (-8.2 to -3.7)	<.001
LDL cholesterol, mg/dL	34	100.4 (38.6)	35	104.3 (46.3)	-15.4 (-30.9 to 0.0)	.06
Hemoglobin A_{1c}, %	37	6.1 (1.2)	37	6.4 (1.1)	0.0 (-0.3 to 0.3)	.89
Psoriasis Area and Severity Index	53	1.8 (3.4)	52	0.9 (1.1)	-1.4 (-2.3 to -0.4)	.008
Dermatology Life Quality Index	46	1.8 (3.1)	45	1.4 (2.3)	-0.7 (-1.7 to 0.4)	.21

Abbreviations: BMI, body mass index (calculated as weight in kilograms divided by height in meters squared); CVD, cardiovascular disease; LDL, low-density lipoprotein; MARS-5, 5-item Medication Adherence Report Scale; MET, metabolic equivalent.

SI conversion factors: to convert LDL cholesterol to mmol/L, multiply by 0.0259; hemoglobin A_{1c} to the proportion of total hemoglobin, multiply by 0.01.

[a] Detailed baseline, 6-month, and change data for all secondary outcomes are provided in eTable 5 in Supplement 1.

[b] Adjusted mean differences represent between-group differences in change from baseline to 6 months, estimated using analysis of covariance models adjusting for the baseline value of each outcome. No hypothesis testing was performed for baseline comparisons.

effects rather than absence of behavioral benefit. As the intervention did not target optimization of psoriasis treatment, meaningful dermatologic change was not expected.[38]

Implications for Dermatology Practice and Future Directions

While TM interventions can improve patient activation and lifestyle behaviors, clinically meaningful cardiometabolic effects may require a multimodal approach combining digital tools with structured lifestyle programs, medication review, and clinician reinforcement. Embedding such strategies into routine dermatology care may help address the persistent gap in cardiovascular prevention for patients with psoriasis.[1,3,14,39,40]

These findings support low-intensity digital interventions as scalable adjuncts to clinician-led care. In the absence of definitive evidence that systemic psoriasis therapies reduce cardiovascular events, patient-centered prevention strategies focused on activation, education, and behavior change represent a pragmatic complement to pharmacologic management.

Future studies should assess longer-term outcomes, incorporate objective behavioral measures (such as wearable activity tracking), and evaluate hybrid care models integrating digital interventions with periodic clinician reinforcement to support sustained behavior change and cardiovascular risk reduction.

Limitations

This single-center study limits generalizability. The modest sample size and 6-month follow-up reduced power for

secondary clinical outcomes, which were prespecified but exploratory. Although follow-up for the primary outcome (PAM-13) was complete, data completeness for some secondary outcomes, particularly cardiometabolic biomarkers, was lower due to incomplete blood testing.

Several secondary outcomes reached statistical significance, but effect sizes were small, limiting conclusions regarding clinical relevance. Reliance on self-reported measures introduces potential reporting bias, and medication changes during follow-up may not have been fully captured. Incomplete lipid and HbA_{1c} data further constrained interpretation.

Although a small number of participants discontinued the allocated intervention after randomization, this did not affect availability of the primary outcome, and all randomized participants were included in the intention-to-treat analysis. The absence of BMI-based eligibility criteria may have introduced heterogeneity in baseline motivation for weight-related behavioral change. PAM-13, while validated in chronic disease populations, has limited evaluation in psoriasis, and the investigator-developed PCVD-KS requires further validation.

Conclusions

This randomized clinical trial using the TEXTME PSO intervention showed improved patient activation, lifestyle behaviors, disease knowledge, and medication adherence in adults with psoriasis. Although cardiometabolic biomarker changes were modest or not statistically significant, the findings support the feasibility of low-intensity digital tools to enhance self-management and engagement. In the absence of definitive evidence that psoriasis therapies reduce cardiovascular risk, renewed emphasis on foundational prevention—centered on education, behavioral change, and patient empowerment—may offer the most immediate and effective pathway to cardiovascular risk reduction in this high-risk population.

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Acquisition, analysis, or interpretation of data: All authors.
Drafting of the manuscript: Smith, Zhang.
Critical review of the manuscript for important intellectual content: Smith, Dixit, Marschner, Min, Chow.
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REFERENCES

1. Vičić M, Kaštelan M, Brajac I, Sotošek V, Massari LP. Current concepts of psoriasis immunopathogenesis. *Int J Mol Sci*. 2021;22(21):11574. doi:10.3390/ijms222111574

2. Armstrong AW, Harskamp CT, Armstrong EJ. Psoriasis and metabolic syndrome: a systematic review and meta-analysis of observational studies. *J Am Acad Dermatol*. 2013;68(4):654-662. doi:10.1016/j.jaad.2012.08.015

3. Wu JJ, Kavanaugh A, Lebwohl MG, Gniadecki R, Merola JF. Psoriasis and metabolic syndrome: implications for the management and treatment of psoriasis. *J Eur Acad Dermatol Venereol*. 2022;36(6):797-806. doi:10.1111/jdv.18044

4. Orlando G, Molon B, Viola A, Alaibac M, Angioni R, Piaserico S. Psoriasis and cardiovascular diseases: an immune-mediated cross talk? *Front Immunol*. 2022;13:868277. doi:10.3389/fimmu.2022.868277

5. Sajja AP, Joshi AA, Teague HL, Dey AK, Mehta NN. Potential immunological links between psoriasis and cardiovascular disease. *Front Immunol*. 2018;9:1234. doi:10.3389/fimmu.2018.01234

6. Kommoss KS, Enk A, Heikenwälder M, Waisman A, Karbach S, Wild J. Cardiovascular comorbidity in psoriasis—psoriatic inflammation is more than just skin deep. *J Dtsch Dermatol Ges*. 2023;21(7):718-725. doi:10.1111/ddg.15071

7. Ryan C, Kirby B. Psoriasis is a systemic disease with multiple cardiovascular and metabolic comorbidities. *Dermatol Clin*. 2015;33(1):41-55. doi:10.1016/j.det.2014.09.004

8. Masson W, Lobo M, Molinero G. Psoriasis and cardiovascular risk: a comprehensive review. *Adv Ther*. 2020;37(5):2017-2033. doi:10.1007/s12325-020-01346-6

9. Gelfand JM, Neimann AL, Shin DB, Wang X, Margolis DJ, Troxel AB. Risk of myocardial infarction in patients with psoriasis. *JAMA*. 2006;296(14):1735-1741. doi:10.1001/jama.296.14.1735

10. Takeshita J, Grewal S, Langan SM, et al. Psoriasis and comorbid diseases: epidemiology. *J Am Acad Dermatol*. 2017;76(3):377-390. doi:10.1016/j.jaad.2016.07.064

11. Mehta NN, Krishnamoorthy P, Yu Y, et al. The impact of psoriasis on 10-year Framingham risk. *J Am Acad Dermatol*. 2012;67(4):796-798. doi:10.1016/j.jaad.2012.05.016

12. Kaiser H, Näslund-Koch C, Kvist-Hansen A, Skov L. Does systemic anti-psoriatic treatment impact the risk of cardiovascular disease? a review over cardiovascular imaging studies. *Dermatol Ther (Heidelb)*. 2024;14(2):303-321. doi:10.1007/s13555-024-01098-z

13. Elmets CA, Leonardi CL, Davis DMR, et al. Joint AAD-NPF guidelines of care for the management and treatment of psoriasis with awareness and attention to comorbidities. *J Am Acad Dermatol*. 2019;80(4):1073-1113. doi:10.1016/j.jaad.2018.11.058

14. Arnett DK, Blumenthal RS, Albert MA, et al. 2019 ACC/AHA guideline on the primary prevention of cardiovascular disease: executive summary: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Circulation*. 2019;140(11):e563-e595. doi:10.1161/CIR.0000000000000677

15. Hibbard JH, Mahoney ER, Stockard J, Tusler M. *Patient Activation Measure–13 Item Version (PAM-13)*. APA PsycTests; 2005.

16. Wilkinson TJ, Memory K, Lightfoot CJ, Palmer J, Smith AC. Determinants of patient activation and its association with cardiovascular disease risk in chronic kidney disease: a cross-sectional study. *Health Expect*. 2021;24(3):843-852. doi:10.1111/hex.13225

17. Greene J, Hibbard JH. Why does patient activation matter? an examination of the relationships between patient activation and health-related outcomes. *J Gen Intern Med*. 2012;27(5):520-526. doi:10.1007/s11606-011-1931-2

18. Hibbard JH, Mahoney ER, Stock R, Tusler M. Do increases in patient activation result in improved self-management behaviors? *Health Serv Res*. 2007;42(4):1443-1463. doi:10.1111/j.1475-6773.2006.00669.x

19. Newland P, Lorenz R, Oliver BJ. Patient activation in adults with chronic conditions: a systematic review. *J Health Psychol*. 2021;26(1):103-114. doi:10.1177/1359105320947790

20. Hall AK, Cole-Lewis H, Bernhardt JM. Mobile text messaging for health: a systematic review of reviews. *Annu Rev Public Health*. 2015;36:393-415. doi:10.1146/annurev-publhealth-031914-122855

21. Chow CK, Redfern J, Hillis GS, et al. Effect of lifestyle-focused text messaging on risk factor modification in patients with coronary heart disease: a randomized clinical trial. *JAMA*. 2015;314(12):1255-1263. doi:10.1001/jama.2015.10945

22. Martinez-Moreno A, Ocampo-Candiani J, Garza-Rodriguez V. Psoriasis and cardiovascular disease: a narrative review. *Korean J Fam Med*. 2021;42(5):345-355. doi:10.4082/kjfm.20.0053

23. Musumeci ML, Nasca MR, Boscaglia S, Micali G. The role of lifestyle and nutrition in psoriasis: current status of knowledge and interventions. *Dermatol Ther*. 2022;35(9):e15685. doi:10.1111/dth.15685

24. Yeroushalmi S, Hakimi M, Chung M, Bartholomew E, Bhutani T, Liao W. Psoriasis and exercise: a review. *Psoriasis (Auckl)*. 2022;12:189-197.

25. Phan C, Touvier M, Kesse-Guyot E, et al. Association between Mediterranean anti-inflammatory dietary profile and severity of psoriasis: results from the NutriNet-Santé cohort. *JAMA Dermatol*. 2018;154(9):1017-1024. doi:10.1001/jamadermatol.2018.2127

26. Martínez-González MA, Gea A, Ruiz-Canela M. The Mediterranean diet and cardiovascular health. *Circ Res*. 2019;124(5):779-798. doi:10.1161/CIRCRESAHA.118.313348

27. Berna-Rico E, Fernandez-Nieto D, Gonzalez-Cantero A. RF—role of the Mediterranean diet in the treatment of psoriasis. *Actas Dermosifiliogr*. 2023;114(2):152-155. doi:10.1016/j.ad.2021.11.011

28. Alnooh G, Alessa T, Hawley M, de Witte L. The use of Dietary Approaches to Stop Hypertension (DASH) mobile apps for supporting a healthy diet and controlling hypertension in adults: systematic review. *JMIR Cardio*. 2022;6(2):e35876. doi:10.2196/35876

29. Zangger G, Bricca A, Liaghat B, et al. Benefits and harms of digital health interventions promoting physical activity in people with chronic conditions: systematic review and meta-analysis. *J Med Internet Res*. 2023;25:e46439. doi:10.2196/46439

30. Sheppard R, Gan WK, Onambele-Pearson GL, Young HS. Using wearable technology to objectively investigate physical behaviour and determine health outcomes of a physical activity intervention in patients with psoriasis. *Skin Health Dis*. 2024;4(6):e473. doi:10.1002/ski2.473

31. Fletcher GF, Landolfo C, Niebauer J, Ozemek C, Arena R, Lavie CJ. Promoting physical activity and exercise: *JACC* health promotion series. *J Am Coll Cardiol*. 2018;72(14):1622-1639. doi:10.1016/j.jacc.2018.08.2141

32. Eijsvogels TMH, Thompson PD. Exercise is medicine: at any dose? *JAMA*. 2015;314(18):1915-1916. doi:10.1001/jama.2015.10858

33. Feingold KR. The effect of diet on cardiovascular disease and lipid and lipoprotein levels. In: Feingold KR, Anawalt B, Blackman MR, eds. *Endotext*. MDText.com; 2024.

34. Smith A, Karahasan A, Yi D, et al. Biologic therapy and cardiometabolic risk in psoriasis: a retrospective review. *Dermatol Ther (Heidelb)*. 2025;15(1):201-212. doi:10.1007/s13555-024-01327-5

35. Holloszy JO, Schultz J, Kusnierkiewicz J, Hagberg JM, Ehsani AA. Effects of exercise on glucose tolerance and insulin resistance: brief review and some preliminary results. *Acta Med Scand Suppl*. 1986;711:55-65. doi:10.1111/j.0954-6820.1986.tb08932.x

36. Gilbertson NM, Eichner NZM, Francois M, et al. Glucose tolerance is linked to postprandial fuel use independent of exercise dose. *Med Sci Sports Exerc*. 2018;50(10):2058-2066. doi:10.1249/MSS.0000000000001667

37. Solomon TPJ, Malin SK, Karstoft K, Haus JM, Kirwan JP. The influence of hyperglycemia on the therapeutic effect of exercise on glycemic control in patients with type 2 diabetes mellitus. *JAMA Intern Med*. 2013;173(19):1834-1836. doi:10.1001/jamainternmed.2013.7783

38. Balato N, Megna M, Di Costanzo L, Balato A, Ayala F. Educational and motivational support service: a pilot study for mobile-phone-based interventions in patients with psoriasis. *Br J Dermatol*. 2013;168(1):201-205. doi:10.1111/j.1365-2133.2012.11205.x

39. Smith A, Lai B, Zaman S, et al. Improving cardiovascular outcomes in the psoriasis cohort: psoriasis and cardiovascular disease-clinician knowledge, practice and perceptions. *Australas J Dermatol*. 2025;66(4):e187-e196. doi:10.1111/ajd.14436

40. Gustafson AC, Gelfand JM, Davies J, et al. Specialist and patient perspectives on strategies to improve cardiovascular disease prevention among persons living with psoriatic disease. *J Psoriasis Psoriatic Arthritis*. 2022;7(4):174-186. doi:10.1177/24755303221101848