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Online Care Versus In-Person Care for Improving Quality of Life in Psoriasis: A Randomized Controlled Equivalency Trial

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Abstract

This 12-month, pragmatic, randomized controlled equivalency trial evaluated whether an online, collaborative connected-health model results in equivalent improvements in quality of life compared with in-person care for psoriasis. Overall, 296 adults with physician-diagnosed psoriasis from ambulatory clinics were randomly assigned to either online or in-person care; all were analyzed for outcomes. In the online group, patients and primary care providers sought dermatologists' care directly and asynchronously online. The in-person group sought care face to face. Interventions did not allow blinding of participants; investigators were blinded during analysis. Across 12 months, for the online group, the mean ± standard deviation decline in Skindex-16 from baseline across follow-up visits was 9.02 ± 20.67 compared with 10.55 ± 23.50 for the in-person group. The difference in Skindex-16 between the two groups was −0.83 (95% confidence interval =−5.18 to 3.51), and this was within the equivalence margin (±7.0). For the online group, the mean ± standard deviation decline in Dermatology Life Quality Index was 1.64 ± 4.34 compared with 1.18 ± 4.77 for the in-person group. The difference in Dermatology Life Quality Index between the two groups was −0.45 (95% confidence interval =−1.29 to 0.38) and was within the equivalence margin (±2.5). In conclusion, the online model was as effective as in-person care in improving quality of life among psoriasis patients. This study was funded by the

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CONFLICT OF INTEREST

AWA serves as an investigator, consultant, advisor, and/or speaker to AbbVie, Janssen, Lilly, Novartis, Sanofi, Regeneron, Leo, Science 37, Modmed, Pfizer, Ortho Dermatologics, and Modernizing Medicine. JMG served as a consultant for Bristol-Myers Squibb, Coherus (Drug Safety Monitoring Board), Dermira, GSK, Janssen Biologics, Menlo Therapeutics, Novartis Corp, Regeneron, Dr. Reddy's Laboratories, Sanofi, and Pfizer Inc., receiving honoraria; receives research grants (to the trustees of the University of Pennsylvania) from AbbVie, Janssen, Novartis Corp, Regeneron, Sanofi, Celgene, Ortho Dermatologics, and Pfizer Inc.; and received payment for continuing medical education work related to psoriasis that was supported indirectly by Lilly, Ortho Dermatologics, and AbbVie. JMG is a co-patent holder of resiquimod for the treatment of cutaneous T-cell lymphoma. The remaining authors state no conflict of interest.

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INTRODUCTION

In the United States, access to dermatologists is limited in many regions, and this lack of access is especially pronounced among patients in underserved and rural communities (Craiglow et al., 2008; Glazer et al., 2017; Kimball and Resneck, 2008). Patients with chronic skin diseases often have difficulties obtaining dermatologist consultations and maintaining regular access to dermatologists for follow-up visits. As a result, these patients suffer from the physical and psychosocial consequences of their skin diseases and experience poor quality of life (Van Voorhees and Fried, 2009).

Teledermatology is a form of online care that leverages communication technology to enable remote diagnosis and treatment of patients' skin diseases; it has been used successfully to increase access in certain communities (American Telemedicine Association, 2018). The health care delivery models of teledermatology can be categorized into triage, consultation, or direct care (Pathipati et al., 2011). In the triage model, the specialist evaluates a case and determines its level of urgency for the next level of management. In the consultative model, which is a commonly practiced teledermatology model, the primary care provider (PCP) captures the skin images and clinical history and consults the dermatologist, without the dermatologist taking over direct care of the patient. In the direct care model, the dermatologist directly cares for the patient. Whether the online care is rendered asynchronously or synchronously depends on the communication technology that is used. That is, asynchronous teledermatology typically refers to store- and-forward teledermatology, where the capture of clinical data occurs at a different time from the specialist's evaluation. In contrast, synchronous teledermatology is synonymous with live-interactive teledermatology, where the provider-patient interactions are conducted in real time via video or web-based interfaces.

With the currently available imaging technology, evidence supports diagnostic accuracy and reliability of asynchronous teledermatology (Ekeland et al., 2010; Eminovic et al., 2007; Whited, 2006). However, the dissemination of asynchronous teledermatology has been limited, especially in its traditional, consultative form (Armstrong et al., 2012; Collins et al., 2004; Krupinski et al., 2002). In the traditional, consultative, asynchronous form, patients need to locate a primary care clinic that provides telemedicine service, where the clinic staff takes the photos and history of the patient and sends those to the dermatologists. The dermatologist then acts in a consultative role to the PCP and typically has no direct interaction with the patient. Challenges for disseminating consultative asynchronous teledermatology include the need for patients to locate a facility with telemedicine capabilities and the lack of collaborative and informed communication among patients, PCPs, and dermatologists. Thus, updated models of technology-enabled health care delivery are necessary to meet the evolving health care and communication needs of our patients (Armstrong et al., 2015; Chambers et al., 2012).

Another area of critical gap is in assessing health-related quality of life in patients cared for via teledermatology (Whited, 2015, Whited et al., 2013). Determining the impact of technology-enabled health care delivery models on patients' quality of life using validated instruments is paramount for evaluating patient-centered models (Kornmehl et al., 2017). Skindex-16 and the Dermatology Life Quality Index (DLQI) are two well-accepted instruments that evaluate dermatology-specific quality of life and are responsive to change over time. These two instruments have shown excellent content validity and reliability in the psoriasis population (AlGhamdi and AlShammari, 2007; El Fakir et al., 2014; Essa et al., 2018; Safikhani et al., 2013), and their use can comprehensively capture psoriasis patients' perspectives regarding their quality of life.

In this study, we evaluated an innovative collaborative connected-health model, where patients and PCPs could access dermatologists online both directly and asynchronously, via a pragmatic trial. We chose psoriasis as the disease model used to evaluate this telehealth delivery because psoriasis is a common, chronic inflammatory disease for which change in quality of life is a key measure of the effectiveness of the intervention (Chren et al., 1996). In addition, patients with psoriasis have a number of comorbid conditions, including inflammatory arthritis and cardiovascular diseases. Thus, successful management of psoriasis often requires a team-based approach, where the PCP and the dermatologist collaborate to evaluate and treat the patient.

RESULTS

Participant recruitment and study visits were conducted from February 2015 to August 2017. Three hundred patients were enrolled (Figure 1) and, of these, 296 patients were randomly assigned to either online (n = 148) or in-person interventions (n = 148), stratified by site and disease severity. Each participant was followed up for 12 months. Detailed baseline participant demographic and clinical characteristics are presented in Table 1. Briefly, the participants were 50% women and 63% white, with mean age of 49 years (standard deviation [SD] = 14). In this study, we examined the differences in the change in quality of life between the two arms, as measured by Skindex-16 and DLQI over 12 months.

Over the 12-month study period, the in-person group had a total of 315 in-person visits; the online group had 161 online visits. Given the pragmatic design of the study, the patients in the online group were allowed to seek in-person care for psoriasis at the discretion of the treating physician. During the study, the online group had eight in-person visits: three were for in-office procedures; two were for management of a comorbid condition; two were for in-person evaluation of psoriasis exacerbation; and one was for a drug-related adverse event (Ford et al., 2018). The changes in disease severity measures (Psoriasis Area and Severity Index, body surface area, and patient global assessment) (Armstrong et al., 2018) and distances traveled are reported elsewhere (Ford et al., 2018).

The total Skindex-16 scores declined from the baseline in both groups over 12 months (Figure 2a), showing improvement in quality of life. In the online group, the unadjusted mean decline in the total Skindex-16 score from baseline across follow-up visits was 9.02 (SD =20.67). In the in-person group, the mean decline from baseline across follow-up visits

was 10.55 (SD = 23.50). In the adjusted model using repeated measures analysis, the average difference in the total Skindex-16 scores between the two groups wase −0.83 (95% confidence interval [CI] = −5.18 to 3.51) (Figure 3), which was within the prespecified equivalence margin of ±7.0.

For Skindex-16, the responses were also categorized as Symptoms, Emotions, and Functioning subscales over 12 months (Figure 2b–d). Compared with the baseline, the Symptoms subscale score decreased by 1.79 (SD = 5.92) in the online group and by 2.63 (SD = 7.32) in the in-person group. The between-group adjusted difference in change was −0.32 (95% CI = −1.52 to 0.89), which shows equivalent impact on symptoms regardless of intervention. The Emotions subscale score declined by 4.75 (SD = 10.18) and 5.04 (SD = 11.54) in the online and in-person groups, respectively. The between-group difference in the change in Emotions subscale score was −0.64 (95% CI = −2.89 to 1.61), which shows equivalent impact on emotions regardless of intervention. The Functioning subscale score declined by 2.48 (SD = 7.02) and 3.04 (SD = 7.65) in the online and in-person groups, respectively. The between-group difference in the change in Functioning subscale score was −0.01 (95% CI =−1.34 to 1.32), which shows equivalent impact on functioning regardless of intervention.

The DLQI scores declined from the baseline in both groups (Figure 4), showing improvement in quality of life. In the online group, the unadjusted mean decline from baseline across follow-up visits was 1.64 (SD = 4.34). In the in-person group, themeandeclinefrombaselineacrossfollow-upvisitswas1.18 (SD = 4.77). In the adjusted model using repeated measures analysis, the average difference between the two groups in the DLQI was −0.45 (95% CI =−1.29 to 0.38) (Figure 3), which was within the prespecified equivalence margin of ±2.5.

DISCUSSION

Little is known about the effects of teledermatology on health-related quality of life (Whited et al., 2013). This pragmatic, randomized controlled equivalency trial is clinically relevant and innovative in two respects: (i) it evaluated a collaborative, asynchronous online model through which patients and PCPs could obtain dermatologists' expertise and (ii) it used validated dermatology-specific quality-of-life instruments to evaluate the effect of this telehealth intervention.

The dissemination and implementation of teledermatology have grown slowly over the past few decades (Armstrong et al., 2012; McKoy et al., 2016; Whited, 2015; Yim et al., 2018). With improvement in imaging and communications technology, the diagnostic accuracy of teledermatology has improved steadily. One key question facing clinicians, patients, and payers is whether patients cared for via certain teledermatology models have equivalent outcomes as those cared for in person. Determining whether equivalency exists via a real-world pragmatic trial has major implications on reimbursement and regulatory policies.

This study showed that online versus in-person care affected patients' symptoms, emotions, and functioning related to their psoriasis equivalently, as measured by Skindex-16. These

findings present evidence that psoriasis patients' emotional and functional needs related to their skin disease can be met to a similar degree by interacting with providers online as seeing them in person. With the online, collaborative model, some patients are highly engaged with the online clinical interaction because they need to image their skin lesions and provide information regarding their disease history and progression. These engagements may encourage patients to be more observant of their disease progression and more adherent to their medications, which in turn may affect their health-related quality of life.

The online patients also experienced overall equivalent improvement in health-related quality of life compared with the in-person group, as measured by the DLQI. This finding pertains to quality-of-life domains such as symptoms and feelings, daily activities, leisure, work and school, personal relationships, and treatment-associated quality of life. The patient responses to DLQI further confirm that when teledermatology is practiced in a patient-centered manner, improvements in quality of life occur to similar degrees in online and in-person care.

The effect of traveling or lack thereof likely affected the patients' overall experience with the health care process. At baseline, the distances from the patients' homes to their dermatologists' offices were comparable between the online and in-person arms. However, the near elimination of traveling for the online patients to obtain specialist care likely translated to time and cost savings, as well as high overall satisfaction with the health care process.

The online model also appeared to be beneficial for PCPs, who learned about psoriasis management. For example, PCPs who consulted dermatologists online experienced a learning curve where they grew in knowledge, experience, and confidence in managing their psoriasis patients; they typically did not ask the same questions over time. In addition, the PCPs who had online consultation with dermatologists generally referred fewer patients to dermatologists for direct management (median = 1 patient) as compared to PCPs who did not seek online consultations (median = 2 patients).

In addition to the quality of life outcomes reported in this article, we ascertained patient feedback on the online model through qualitative research methods with semistructured interviews (Ford et al., 2018). In general, patients randomly assigned to the online group found it to be safe, accessible, equitable, efficient, effective, and patient centered. Some patients noted some discomfort with obtaining photos of sensitive areas with psoriasis. The providers found the online model to be useful for providing psoriasis care and commented that adequate reimbursement is key to sustainability (Ford et al., 2018).

For such a technology-enabled health care delivery mechanism to be sustainable, several other considerations are critical. First, it is important that reimbursement mechanisms adequately reflect providers' effort. At the current time, teledermatology reimbursement is variable among the different states in the United States. However, there is a general trend in different regions and among large private payers toward reimbursing telehealth services that show value. We keenly recognize that the field of economic evaluation for telehealth models continues to evolve (Armstrong et al., 2007; Datta et al., 2015; de la Torre-Díez et al.,2015).

Future studies shall include cost analyses that evaluate the economic impact of telehealth interventions from a societal perspective. This is important because the sustainability of any health care model critically depends on aligning reimbursement with value and providing appropriate incentives of the stakeholders. Second, it is important to consider potential differences in patient outcomes depending on the type and expertise of providers participating in online care. Therefore, educating our providers not only in medical expertise but also in effective provision of care online and in person is important. Finally, it is critical to uphold transparency, choice, and coordination of teledermatology care to safeguard the quality of this health care delivery model (Resneck et al., 2016).

The limitations of this pragmatic trial include the slightly different retention rates between the two intervention groups (in-person = 91% vs. online = 89%). However, we performed intention-to-treat analyses and handled the missing data using mixed models for repeated measures, thereby minimizing potential bias from differential retention rates. Second, the baseline Psoriasis Area and Severity Index scores were lower than anticipated because many patients were receiving systemic therapies at enrollment, which reflects the real-world US ambulatory population. However, stratified analyses based on baseline severity showed no significant differences in quality-of-life outcomes between the in-person versus online groups.

In conclusion, the online, collaborative teledermatology model was equivalent to in-person care for improving health-related quality of life. Specifically, compared with psoriasis patients cared for in person, the psoriasis patients cared for online achieved similar improvements in emotions, symptoms, functioning, daily activities, leisure, work and school, and personal relationships. Thus, among psoriasis patients, a technology-enabled method of delivering dermatological care that emphasizes patient centeredness and coordination of care can achieve comparable improvements in health-related quality of life compared with in-person care.

MATERIALS AND METHODS

Study design

The PCORI Psoriasis Teledermatology Trial is a 12-month, pragmatic, randomized controlled equivalency trial with parallel group design that evaluated the impact of an online, collaborative connected-health model for psoriasis management compared with in-person care (Figure 5).

Participants and randomization

This study was approved by the University of Southern California Institutional Review Board (#HS-15-00417). All participants gave their written informed consent. The trial was registered with clinicaltrials.gov (NCT02358135).

We recruited from the general adult populations in northern California, southern California, and Colorado, with an emphasis on patients living in rural and medically underserved communities. To be eligible, participants needed to be age 18 years and older, have physician-diagnosed plaque psoriasis, have access to the internet and a digital camera or a

mobile phone with camera features, and have a PCP or the ability to establish primary care. Some patients who were initially screened were not eligible because the study team could not locate source documentation showing physician-diagnosed plaque psoriasis.

We enrolled 300 adults with psoriasis. Stratified randomization was performed using computer-generated random block sizes. The patients were randomized 1:1 to collaborative connected health (online intervention) or usual in-person care. Further stratified randomization was based on 1:1:2 stratification to mild (<3% body surface area), moderate (3%–10% body surface area), and severe (>10% body surface area or receiving phototherapy or systemic therapies) psoriasis groups. An independent statistician generated and concealed the randomization sequence and assigned the participants to the interventions.

Interventions

Online model—The online, collaborative connected-health model was designed such that any specialist services that usually occur in person could be delivered through asynchronous online health care in a flexible and prompt manner that fostered expedient multidirectional communication among patients, PCPs, and dermatologists. The online model enabled prompt receipt of dermatologist expertise and sharing of visit information among providers and patients. Additional descriptions of the interventions can be found elsewhere (Armstrong et al., 2018).

In this pragmatic trial, the PCPs could access the dermatologists online asynchronously via one of two ways: (i) consultation or (ii) requesting a dermatologist to assume care of a patient's psoriasis. In the consultation setting, similar to traditional asynchronous telemedicine, the PCP or office staff would take photos of the patient's skin and send digital photos and clinical history to the dermatologist online via a secure, web-based connected health platform (DirectDerm, 2018) compliant with the Health Insurance Portability and Accountability Act. Within 2 business days, the dermatologist would provide treatment recommendations and patient educational materials online to the PCP and, with the PCP's permission, to the patients.

In settings where the PCP wanted the dermatologist to assume longitudinal care of a patient's psoriasis, the PCP's office would first take photos of the patient's skin and then send these photos and the clinical history online to the dermatologist, who would evaluate the transmitted information. The dermatologist would then communicate recommendations, prescribe medications, and provide educational materials online asynchronously to the patient. The dermatologist would also share all visit information with the PCP. Additional follow-up questions with dermatologists were handled online or via telephone.

Patients randomly assigned to the online group had the option of accessing dermatologists online asynchronously. For example, if a patient desired to access a dermatologist, he or she could connect with a dermatologist online with the understanding that the dermatologist would share all visit information and communicate with the PCP. During an online visit, the patient would upload clinical images and history and transmit the information to the dermatologist. Using the telehealth platform, the dermatologist would review the transmitted information, make treatment recommendations, prescribe medications, and provide

educational materials to patients online asynchronously. In addition, the patients in the online group could also access their PCPs online for psoriasis management in the same manner.

In-person model (control arm)—Patients in the in-person group sought psoriasis care from PCPs or dermatologists in person.

Visit frequency of all patients in the online and in-person groups was based on medical necessity, as determined by joint decisions between the providers and patients. Because of the nature of the interventions, blinding of patients and providers was not possible. Blinding was preserved for analysis of outcomes.

Outcome measures

We aimed to determine whether the online model results in equivalent improvements in quality of life compared with in-person care, as measured by the DLQI and Skindex-16. Because the psychometric properties of the two instruments differ in some aspects, using both instruments enables comparison of study findings with previous work in dermatology (Finlay and Khan, 1994). Both the DLQI and Skindex-16 have been validated in psoriasis patients with low through high disease severities (AlGhamdi and AlShammari, 2007; El Fakir et al., 2014; Essa et al., 2018; Finlay and Khan, 1994; Mazzotti et al., 2003, 2005; Safikhani et al., 2013). The outcomes were the differences in the mean improvement in the DLQI and Skindex-16 averaged over 3, 6, 9, and 12 months between the two arms.

Skindex-16 is a validated and reliable instrument that comprehensively captures the effects of skin disease on health-related quality of life (Chren et al., 1996). It discriminates among patients with different effects and is responsive to clinical changes over time (Chren et al., 2001). Skindex-16 scores range from 0 (no effect) to 100 (effect experienced all the time), and the responses are aggregated in Symptoms, Emotions, and Functioning subscales. The improvement in Skindex-16 is defined as the difference in Skindex-16 scores between the baseline and each of the follow-up visits. The a priori determined equivalence margin for Skindex-16 was ±7.

The DLQI is a validated, dermatology-specific quality-of-life instrument that has been used in many psoriasis trials. DLQI scores range from 0 to 30, with higher scores indicating more negative impact on quality of life (Finlay and Khan, 1994). The DLQI assesses six domains including symptoms and feelings, daily activities, leisure, work and school, personal relationships, and treatment-associated quality of life. The improvement in DLQI is defined as the difference in DLQI scores between the baseline and each of the follow-up visits. The mean improvement across the four follow-up assessments was selected because (i) it would be sensitive to early improvements as well as later benefits and (ii) it is statistically more efficient than an end point based on a single assessment. The a priori determined equivalence margin between the two arms for the DLQI was ±2.5.

Statistical methods and sample size calculation

Intention-to-treat analyses were applied to test the equivalency hypotheses for this trial by using longitudinal linear mixed effects modeling. We compared the changes from baseline to

average of follow-up (3, 6, 9, and 12 months) between the groups, which allowed for intrasite variability to be accounted for in the estimates. Comparing the changes between the groups over 12 months leverages all data points and minimizes any imbalances in baseline severity between the two groups. The stratifying factor of disease severity was an a priori covariate in these models. This equivalency trial tests the null hypothesis (H_0: $\delta \leq \delta_L$ or $\delta \geq \delta_U$) against the two-sided alternative hypothesis (H_a: $\delta_L < \delta < \delta_U$) (Chambers et al., 2012). The equivalence margins were based on clinically meaningful differences and were determined a priori to maintain $\alpha = 0.05$. The equivalence margins in change were set a priori at ±7.0 for Skindex-16 and ±2.5 for the DLQI. These values allowed us to achieve power of 75%–99% for the DLQI and 83%–94% for Skindex-16, depending on σ and ρ, assuming attrition of 15%. We used mixed models for repeated measures as the primary analysis for handling missing data. All analyses were conducted using SPSS, version 24 (IBM, Armonk, NY).

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All statements in this report, including its findings and conclusions, are solely those of the authors and do not necessarily represent the views of the Patient-Centered Outcomes Research Institute (PCORI), its Board of Governors, or Methodology Committee.

Abbreviations

CI	confidence interval
DLQI	Dermatology Life Quality Index
PCP	primary care provider
SD	standard deviation

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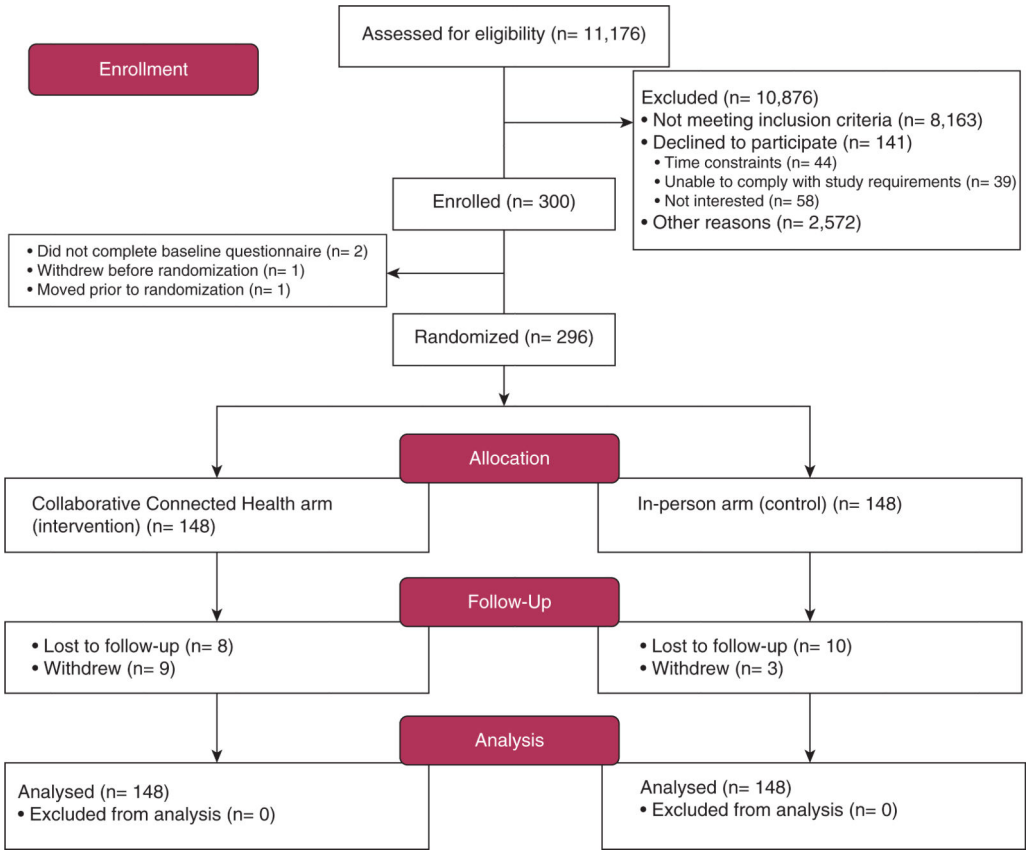

Figure 1. CONSORT participant flow diagram.

Participant flow through enrollment, allocation, follow-up, and analysis. CONSORT, Consolidated Standards of Reporting Trials.

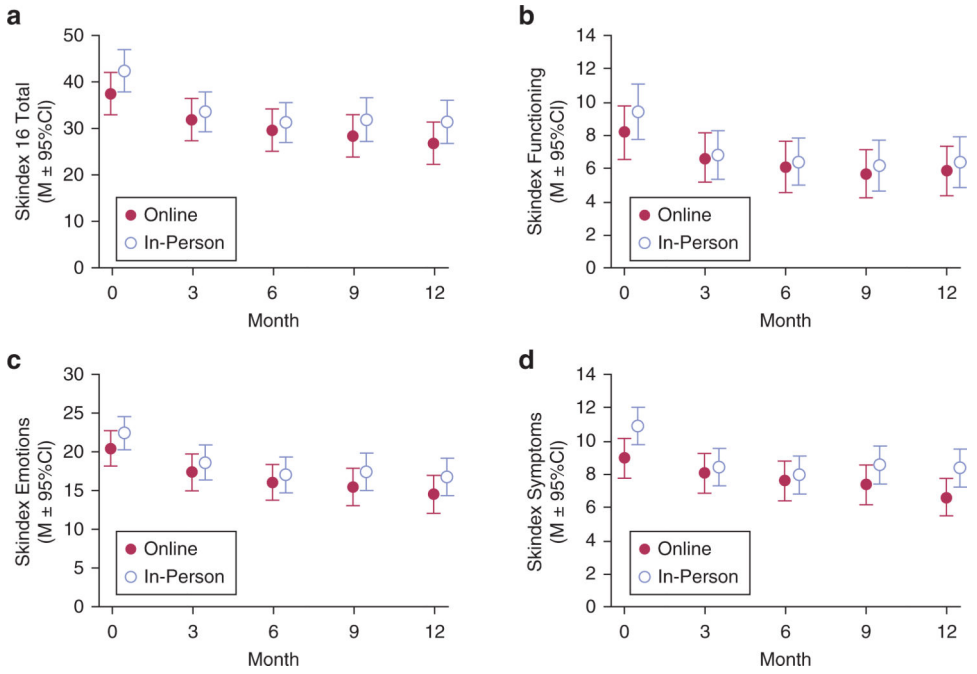

Figure 2. Skindex-16 outcome data.

(**a**) Changes in quality of life as measured by Skindex-16 total scores by group over 12 months. (**b**) Changes in quality of life as measured by Skindex-16 Functioning subscale scores by group over 12 months. (**c**) Changes in quality of life as measured by Skindex-16 Emotions subscale scores by group over 12 months. (**d**) Changes in quality of life as measured by Skindex-16 Symptoms subscale scores by group over 12 months. CI, confidence interval; M, mean.

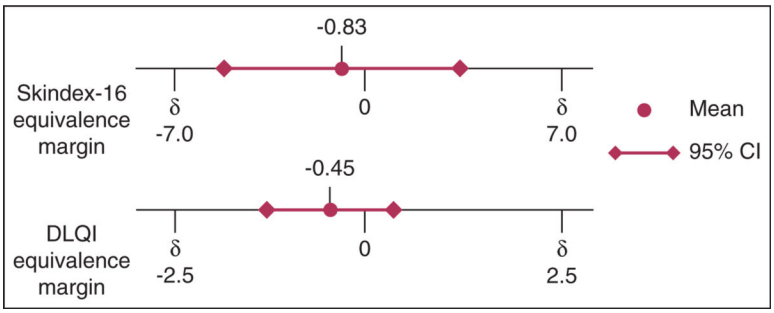

Figure 3. Summary data on equivalency evaluation.

Group differences and equivalence margins for Skindex-16 and DLQI. CI, confidence interval; DLQI, Dermatology Life Quality Index.

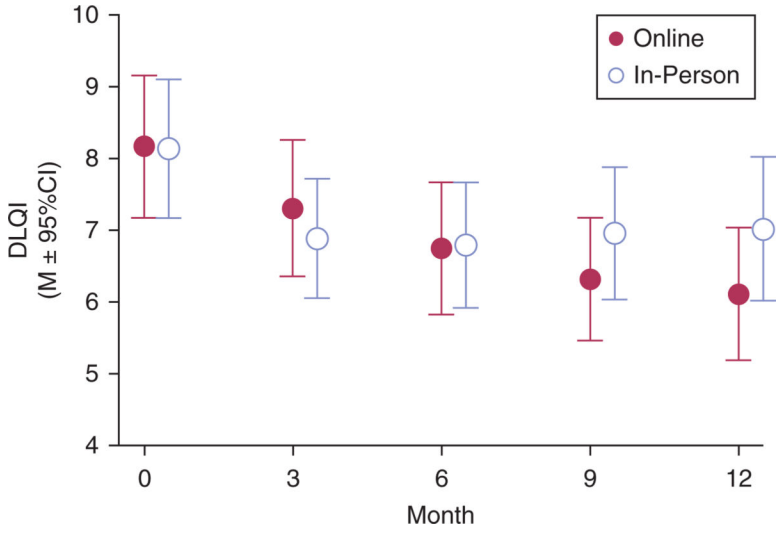

Figure 4. DLQI outcome data.

Changes in quality of life as measured by DLQI by group over 12 months. CI, confidence interval; DLQI, Dermatology Life Quality Index; M, mean.

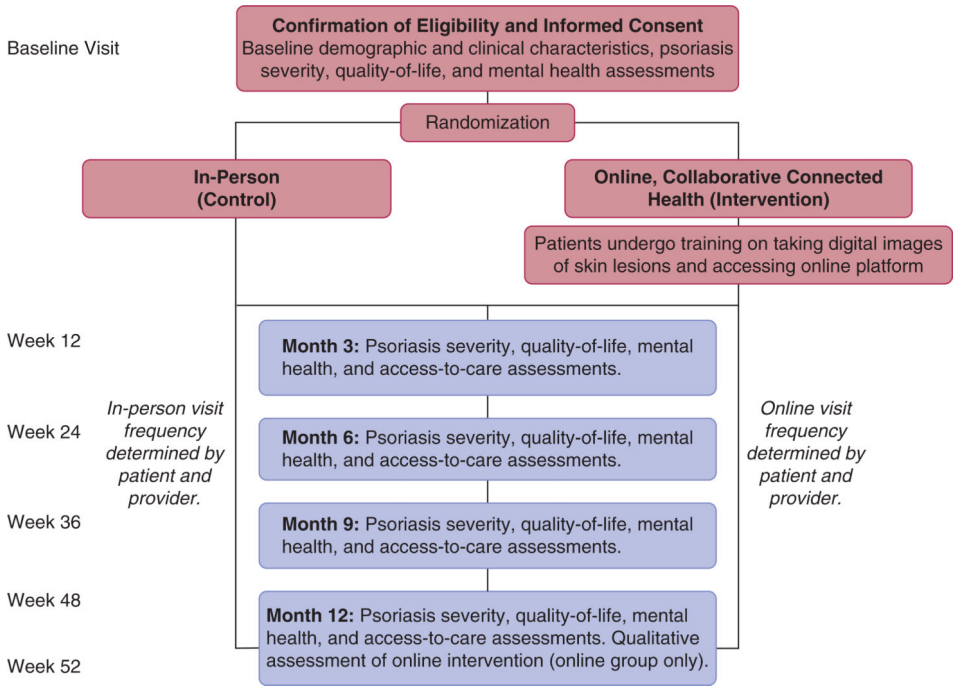

Figure 5. Study overview.

Overview of pragmatic randomized controlled trial comparing online versus inperson care in psoriasis.

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Table 1.

Participant demographic and clinical characteristics at baseline by study group

Characteristics	Online	In Person	Total
Sex, n (%)			
Male	75 (50.7)	74 (50.0)	149 (50.3)
Female	73 (49.3)	74 (50.0)	147 (49.7)
Race, n (%)[1,2]			
American Indian/Alaska Native	3 (2.0)	2 (1.4)	5 (1.7)
Asian	13 (8.8)	6 (4.1)	19 (6.4)
Black/African American	5 (3.4)	3 (2.0)	8 (2.7)
Pacific Islander	3 (2.0)	2 (1.4)	5 (1.7)
White	90 (60.8)	97 (65.5)	187 (63.2)
Other	36 (24.3)	36 (24.3)	72 (24.3)
Ethnicity, n (%)			
Hispanic or Latino	46 (31.1)	54 (36.5)	100 (33.8)
Prior psoriasis treatment, n (%)[2]			
Topical therapy	98 (66.2)	102 (68.9)	200 (67.6)
Light and laser therapy	52 (35.1)	53 (35.8)	105 (35.5)
Nonbiologic systemic therapy	54 (36.5)	60 (40.5)	114 (38.5)
Biologic therapy	32 (21.6)	27 (18.2)	59 (19.9)
Baseline psoriasis severity, mean (95% CI)			
PASI	4.68 (3.96–5.41)	4.40 (3.80–5.00)	
BSA	9.71% (7.35–12.07)	7.67% (6.14–9.21)	
PtGA	2.18 (2.00–2.35)	2.15 (1.98–2.32)	
Insurance type, n (%)[1]			
Private	77 (52.0)	78 (52.7)	155 (52.4)
Medicaid	28 (18.9)	34 (23.0)	62 (20.9)
Medicare	27 (18.2)	26 (17.6)	53 (17.9)
No insurance	8 (5.4)	5 (3.4)	13 (4.4)
Marital status, n (%)[1]			

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Characteristics	Online	In Person	Total
Single	48 (32.4)	56 (37.8)	104 (35.1)
Married	79 (53.4)	69 (46.6)	148 (50.0)
Divorced	10 (6.8)	7 (4.7)	17 (5.7)
Separated	5 (3.4)	5 (3.4)	10 (3.4)
Widowed	0 (0.0)	8 (5.4)	8 (2.7)
Tobacco use, n (%)[1]			
Never	81 (54.7)	84 (56.8)	165 (55.7)
Former	36 (24.3)	42 (29.1)	78 (26.4)
Current	24 (16.2)	18 (12.2)	42 (14.2)
Chewing tobacco	2 (1.4)	1 (0.7)	3 (1.0)
Working status, n (%)[1]			
Full time	73 (49.3)	67 (45.3)	140 (47.3)
Part time	26 (17.6)	17 (11.5)	43 (14.5)
Retired	13 (8.8)	18 (12.2)	31 (10.5)
Disabled	10 (6.8)	20 (13.5)	30 (10.1)
Homemaker	8 (5.4)	6 (4.1)	14 (4.7)
Other	8 (5.4)	7 (4.7)	15 (5.1)
Looking for employment	5 (3.4)	10 (6.8)	15 (5.1)
Alcohol use, n (%)[1]			
Never	36 (24.3)	33 (22.3)	69 (23.3)
Former	38 (25.7)	29 (19.6)	67 (22.6)
Current	69 (46.6)	83 (56.1)	152 (51.4)
Comorbidities, n (%)[2]			
Heart disease	5 (3.4)	7 (4.7)	12 (4.1)
Arthritis	32 (21.6)	45 (30.4)	77 (26.0)
Internal malignancies	4 (2.7)	8 (5.4)	12 (4.1)
Liver disease	4 (2.7)	8 (5.4)	12 (4.1)
Celiac disease	1 (0.7)	1 (0.7)	2 (0.7)
Stroke	2 (1.4)	3 (2.0)	5 (1.7)
Thyroid problems	12 (9.5)	12 (8.1)	24 (8.1)

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Characteristics	Online	In Person	Total
Vision problems	22 (14.9)	24 (16.2)	46 (15.5)
Tuberculosis	6 (4.1)	7 (4.7)	13 (4.4)
Inflammatory bowel disease	4 (2.7)	3 (2.0)	7 (2.4)
Basal cell carcinoma	4 (2.7)	5 (3.4)	9 (3.0)
Squamous cell carcinoma	1 (0.7)	2 (1.4)	3 (1.0)
Melanoma	0 (0.0)	2 (1.4)	2 (0.7)

Abbreviations: BSA, body surface area; CI, confidence interval; PASI, Psoriasis Area and Severity Index; PtGA, patient global assessment.

[1]Some participants declined to answer the questions regarding race (online, n = 1; in-person, n = 4), insurance type (online, n = 8; in-person, n = 5), marital status (online, n = 6; in-person, n = 3), tobacco use (online, n = 3; in-person, n = 3), working status (online, n = 5; in-person, n = 3), and alcohol use (online, n = 5; in-person, n = 3).

[2]Responses are not mutually exclusive.