

# There's an App for That!



## Utilization of a Smartphone App for Chronic Pain Care

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### Objectives

The overall aim of this study was to determine the effect of introducing a smartphone pain app, for both Android and iPhone devices, that enables chronic pain patients to assess, monitor, and communicate their status to their providers.

### Methods

This study recruited 105 chronic pain patients to use a smartphone pain app (Fig. 1) and half of the subjects (N=52) had 2-way messaging available through the app. All subjects completed baseline measures and were asked to record their progress every day for 3 months (Fig. 2), with the opportunity to continue for 6 months. All participants were supplied a Fitbit to track daily activity. Summary line-graphs were posted to each of the patients' electronic medical records and physicians were notified of their patient's progress.

### Results

Ninety patients successfully downloaded the pain app. Average age of the participants was 47.1 (range 18-72), 63.8% were female and 32.3% reported multiple pain sites. Adequate validity and reliability was found between the daily assessments and standardized questionnaires ( $r=0.50$ ) and in repeated daily measures ( $r=.69$  pain;  $r=0.83$  sleep). Patient satisfaction survey results showed that the app was easy to use, easy to navigate, and those subjects with more daily assessments were found to be more satisfied with the app compared with those who used the app less often ( $p<0.05$ ; Table 1). Those patients assigned to the 2-way messaging condition on average tended to use the app more and submit more daily assessments (95.6 vs. 71.6 entries), and found the app more appealing, easier to use and to navigate, and less bothersome than those without the 2-way messaging ( $p<0.05$ ; Table 2), but differences between groups in adherence to the pain app over time were not significant. Seven pain management physicians and 6 pain fellows completed an anonymous satisfaction survey at the end of the trial. Eighty-six percent reported being satisfied with the way the app was used in the clinic and 85.7% liked receiving the pain app summary messages. Also, 85.7% believed that using the app would improve their overall practice while none of the physicians felt that the pain app was an added burden to the clinic.

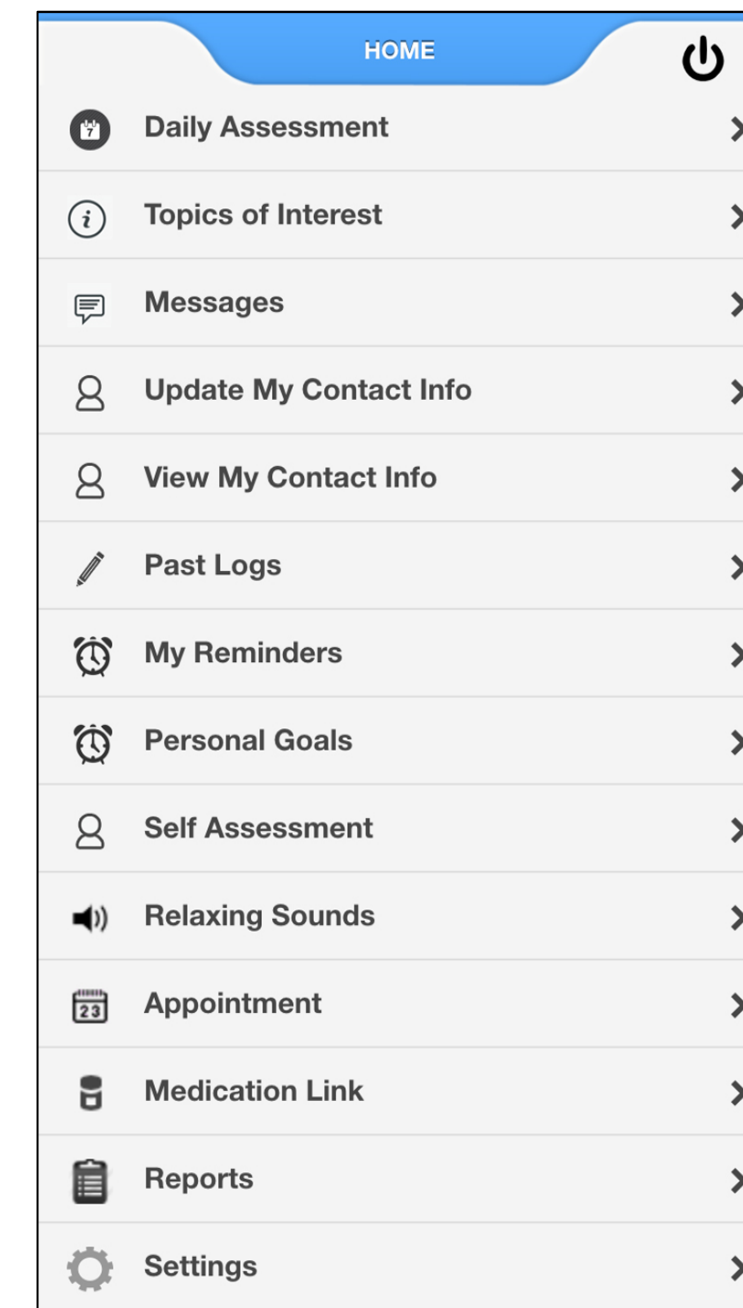


Figure 1: Pain App home page with links.

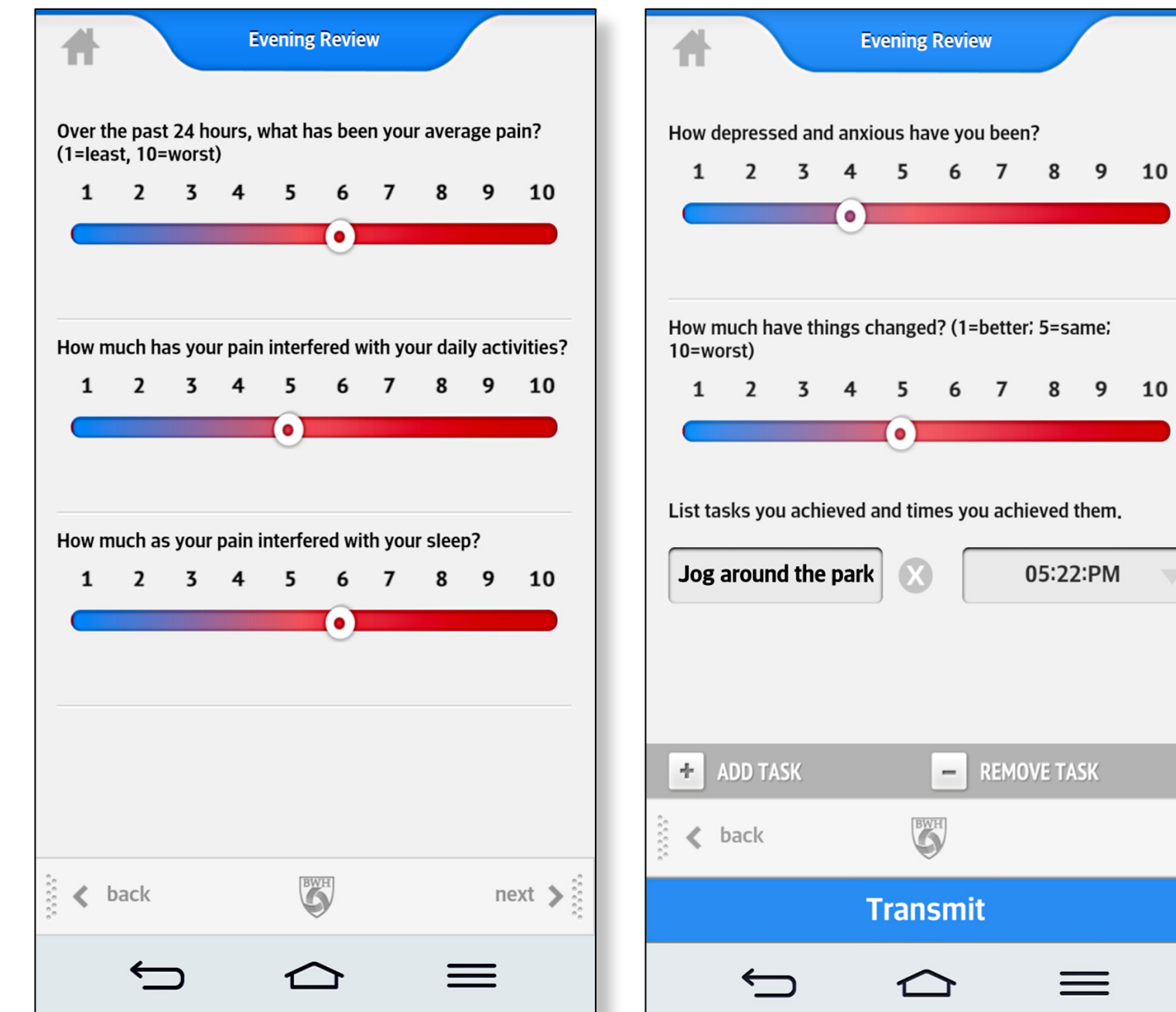


Figure 2: Pain App Daily Assessments.

Table 1: Patient post-study satisfaction questionnaire responses for those with 30 or less daily assessments and those with more than 30 daily assessments (N=63)

VARIABLE (0-10)	Total sample (N=63)	≤30 assessments (N=23)	>30 assessments (N=40)	p
How easy to use the program <sup>†</sup>	1.8±2.2	2.5±2.8	1.5±1.8	NS
How useful were the daily reports <sup>‡</sup>	3.6±3.5	4.3±3.6	3.3±3.4	NS
How appealing was the program to use <sup>†</sup>	2.9±2.8	4.3±3.3	2.3±2.3	<0.05
How bothersome were the daily prompts <sup>§</sup>	2.2±2.4	3.7±2.9	1.5±1.7	<0.05
How easy was the app to navigate <sup>†</sup>	2.5±2.9	2.7±3.3	2.4±2.7	NS
How willing to use the program every day <sup>§</sup>	2.3±2.8	3.1±3.3	2.0±2.6	NS
How easy to send a report <sup>†</sup>	1.5±2.6	3.2±3.4	0.9±2.0	<0.05
How responsive was your provider to the reports <sup>‡</sup>	3.7±4.0	3.0±3.9	3.9±4.1	NS
How helpful was the program in coping with your pain <sup>‡</sup>	4.7±3.4	5.0±3.3	4.5±3.5	NS

<sup>†</sup>0=very easy (appealing); 10=unusable; <sup>‡</sup>0=very helpful; 10=no help; <sup>§</sup>0=not bothersome; 10=very intrusive; <sup>¶</sup>0=very willing; 10=very unwilling; <sup>£</sup>0=very responsive; 10=very unresponsive

Table 2: Patient post-study satisfaction questionnaire responses for those with 2-way messaging (experimental) and those without 2-way messaging (controls; N=63)

VARIABLE (0-10)	Total sample (N=63)	Experimental (N=32)	Control (N=31)	p
How easy to use the program <sup>†</sup>	1.8±2.2	1.2±1.7	2.5±2.5	<0.05
How useful were the daily reports <sup>‡</sup>	3.6±3.5	3.3±3.1	3.9±3.7	NS
How appealing was the program to use <sup>†</sup>	2.9±2.8	2.4±2.7	3.3±2.8	<0.05
How bothersome were the daily prompts <sup>§</sup>	2.2±2.4	0.8±1.2	3.4±2.6	<0.001
How easy was the app to navigate <sup>†</sup>	2.5±2.9	1.5±2.3	3.4±3.1	<0.05
How willing to use the program every day <sup>§</sup>	2.3±2.8	2.0±2.7	2.7±3.0	NS
How easy to send a report <sup>†</sup>	1.5±2.6	1.8±3.2	1.2±1.7	NS
How responsive was your provider to the reports <sup>‡</sup>	3.7±4.0	5.3±4.5	2.4±3.1	<0.05
How helpful was the program in coping with your pain <sup>‡</sup>	4.7±3.4	4.5±3.5	4.8±3.4	NS
Mean daily assessments <sup>¶</sup>	69.3±71.8	80.9±88.2	59.2±52.9	NS
Average daily steps for one week - Week 1	5152.8±2743.0	5527.6±3048.9	4894.7±2318.1	NS
Average daily steps for one week - Month 3	5357.4±3064.4	5579.6±2627.4	5093.5±3586.6	NS

<sup>†</sup>0=very easy (appealing); 10=unusable; <sup>‡</sup>0=very helpful; 10=no help; <sup>§</sup>0=very helpful; 10=very intrusive; <sup>¶</sup>0=very willing; 10=very unwilling; <sup>£</sup>0=very responsive; 10=very unresponsive; <sup>¶</sup>Select if ≥ 1 daily assessment (range 1-426; Experimental=38; Control=44) unresponsive

### Discussion

This study highlights some of the challenges and benefits in utilizing smartphone apps to manage chronic pain patients, and provides insight into those individuals who might benefit from mHealth technology. Overall, the smartphone pain app was found to be usable, valid, reliable, and easily accepted among patients and providers alike. The 2-way messaging feature was also found to moderately improve compliance with daily assessments, although these differences were not significant. Mobile application technologies possess advantages and possibilities that have not previously existed and future studies are needed to address the best ways that mobile technologies might enhance health care management.

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