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ORIGINAL PAPER

Reduction of Burnout in Mental Health Care Providers Using the Provider Resilience Mobile Application

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Abstract This pilot study examined the usability, acceptability, and effectiveness of a free Provider Resilience (PR) mobile application (app) designed by the National Center for Telehealth and Technology to reduce provider burnout. Outpatient mental health providers (N = 30) used the PR app for 1 month. Participants rated the PR app on the System Usability Scale with an overall score of 79.7, which is in the top quartile for usability. Results of paired sample *t* tests on the Professional Quality of Life Scale indicated significant decreases on the Burnout ($t = 3.65$, $p < .001$) and Compassion Fatigue ($t = 4.54$, $p < .001$) subscales. The Provider Resilience app shows promise in reducing burnout and compassion fatigue in mental health care providers.

Keywords Burnout · Employee health · Mobile applications

Reduction of Burnout in Mental Health Care Providers Using the Provider Resilience Mobile Application

The prevalence of burnout has been reported to be as high as 67% among mental health professionals (Morse et al. 2012). Burnout is commonly defined as a condition resulting from difficult work conditions, which includes emotional exhaustion, cynicism, and reduced professional efficacy (Maslach et al. 2001). In addition to a range of common work-related stressors, mental health professionals are often exposed to traumatic content while working with clients, elevating their risk for compassion fatigue (Craig and Sprang 2010). Compassion fatigue is characterized by a gradual lessening of compassion over time, resulting from a combination of burnout and secondary traumatic stress related to vicarious traumatization from repeated exposure to traumatic material (Figley 2002). This compassion fatigue further reduces mental health providers' ability to be empathic and provide a compassionate response to the suffering of others (Figley 2002).

The impact of burnout and compassion fatigue can have implications for providers, the institutions in which they work, and also consumers. Burnout in mental health professionals is associated with higher rates of depression, anxiety, sleep problems, impaired physical health, increased substance use, and impaired memory (Morse et al. 2012; Paris and Hoge 2010). Higher rates of absenteeism and

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job turnover are also associated with burnout (Morse et al. 2012; Paris and Hoge 2010). Burnout also can impact the client by degrading the therapeutic relationship, affecting empathy, communication, therapeutic alliance, and consumer engagement (Salyers et al. 2015). This may result in low consumer satisfaction (Morse et al. 2012; Paris and Hoge 2010) and poorer consumer outcomes, including higher rates of hospitalization (Priebe 2004). In a recent survey by Garcia et al. (2016), 77% of mental health care providers reported that emotional exhaustion impacted their quality of care.

Several factors are related to higher levels of burnout in mental health care professionals. Large caseloads, having more work than can be accomplished, lack of control, organizational bureaucracy and politics, and time-consuming administrative requirements have all been linked to higher rates of burnout (Garcia et al. 2014). Although one study found that over half of providers were bothered by hearing traumatic content from their clients, patient characteristics such as malingering and personality disorders were more associated with burnout than exposure to trauma content (Garcia et al. 2016).

Recent research suggests that mobile device software applications (apps) may assist in the prevention and treatment of behavioral health issues (Bush et al. 2015). Smartphone ownership is on the rise, with 64% of the general U.S. population and 84% of individuals with higher levels of education and income, owning a smartphone in 2015 (Smith 2015). Smartphone interventional apps have the benefit of consistent availability, accessibility, convenience, and privacy (Bush et al. 2015). Moreover, mental health care apps designed by the Department of Defense (DoD) National Center for Telehealth and Technology (T2) and the VA National Center for PTSD have shown promise in being acceptable, usable, and effective (Bush et al. 2015; Kuhn et al. 2014; Possemato et al. 2016).

Mobile apps have been used with some success in employee wellness programs, though none have been specifically designed for addressing burnout in mental health providers. One such employee wellness program, which utilized a mobile app as a follow-up supplement to a face-to-face intervention, found that users of the mobile technology showed greater improvement on weight management and participated in more intervention meetings (Mattila et al. 2013). A similar study of an in-person intervention to reduce employee work-related stress followed by a supplemental mobile app, found that depression scores were reduced, though measures of burnout did not show improvement (Lappalainen et al. 2013). Both of the above studies used a general workforce population of individuals living in Finland. To date, there have been no studies looking at the impact of a mobile app alone to reduce burnout in mental health care providers.

The Provider Resilience app (Provider Resilience 2016) was created by T2 specifically for mental health professionals, and was designed to reduce compassion fatigue and provider burnout. It is currently available for free download for Android and iOS operating systems. The Provider Resilience (PR) app includes two assessment tools to help increase self-awareness of current levels of burnout: the Professional Quality of Life Scale (ProQOL) and the Burnout Visual Analog Scale. The home screen of the PR app provides an overall graphic of the user's current resilience rating (a summary score of the individual's ProQOL and Burnout scores), a "Rest and Relaxation Clock", which counts down the number

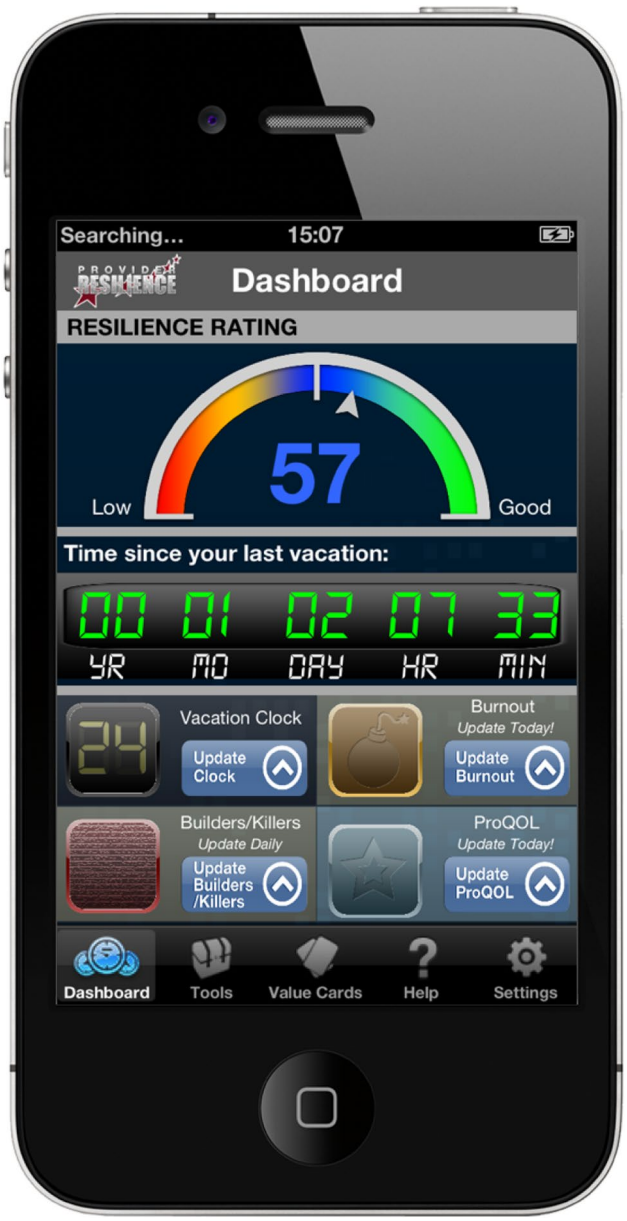

Fig. 1 Home screen of the Provider Resilience application

of days since the user's last vacation day, and customizable resilience "Builders" and "Killers", which encourages users to be aware of factors that both increase and decrease their resilience (see Fig. 1). The PR app also includes several "Tools" to help enhance resilience and reduce burnout, including "I Need a Laugh" (humorous cartoons), "Physical Exercise" (stretching exercises that can be done at a desk), "Virtue Cards" (inspirational cards with motivational quotes), "Remind Me Why I do This" (videos of consumers indicating how their treatment impacted their lives), and "Videos" (provides video information on compassion fatigue).

The current pilot study examined the usability, acceptability, and effectiveness of the Provider Resilience app. Exploratory analyses were conducted to determine if the app was associated with changes in resilience and overall distress. It was hypothesized that mental health providers would find the app easy to navigate and use, perceive it as acceptable and beneficial, and find it effective in reducing burnout and compassion fatigue.

Methods

Participants

Participants were outpatient mental health care professionals from the VA Puget Sound Health Care System who provided written informed consent. All procedures were approved by the VA Puget Sound Health Care System Institutional Review Board and Research and Development Office. Exclusionary criteria included current participation in any other program to reduce burnout. After signing consent, baseline measures were completed, and participants were then guided to download the free Provider Resilience (PR) app to their personal smartphones. Study staff provided a brief tutorial of the PR app. Participants were asked to use the PR app "regularly" as an analog of typical real-life use. After 1 month, participants met again with researchers to complete follow-up questionnaires. Participants were provided with a $25 gift card to reimburse them for their time.

Measures

Usability was measured using the System Usability Scale (SUS; Sauro 2011), a 10-item questionnaire with a 5-point Likert scale. The SUS has been used extensively to provide feedback on usability and user satisfaction of systems and mobile applications (Bangor et al. 2008) and has shown good internal consistency ($\alpha = 0.91$; Bangor et al. 2008). Acceptability was measured using the Provider Resilience Questionnaire (PRQ), which was designed for this study to capture both quantitative and qualitative information about provider's feedback regarding the app. It consisted of a 29-item, closed and open-ended questionnaire to obtain user feedback on experiences with the app. Questions included ratings on how easy or difficult it was to use each feature of the app and the perceived benefit of each feature. The PRQ also had an open-ended comment section for each element of the PR app, allowing for further user feedback. Both the SUS and the PRQ were administered once at the end of the study.

The primary outcome measure for effectiveness was the Professional Quality of Life-Revision IV (ProQOL; Stamm 2005), a 30-item self-report measure with a 5-point Likert scale, resulting in three subscales: Burnout, Compassion Fatigue/Secondary Trauma, and Compassion Satisfaction. The ProQOL has shown good internal consistency on all three subscales: Compassion Satisfaction ($\alpha = 0.87$); Burnout ($\alpha = 0.90$); and Compassion Fatigue ($\alpha = 0.97$). Additionally, using the multi-trait multi-method mode for convergent and discriminant validity, the ProQOL has demonstrated that the scales measure different constructs (Stamm 2005). The ProQOL has been used in previous studies to measure the effectiveness of programs designed to reduce burnout in mental health professionals (Weidlich and Ugarriza 2015). In this study, the ProQOL was administered twice, at baseline and after 1 month of app use.

Additional outcome measures included the Outcome Questionnaire 45 (OQ-45; Lambert et al. 1996) a 45-item self-report measure that captures functioning in three domains, all of which have shown good internal consistency: Symptom Distress (e.g. anxiety and depression; $\alpha = 0.91$); Interpersonal Functioning ($\alpha = 0.74$); Social Role Functioning ($\alpha = 0.71$), and a Total score ($\alpha = 0.93$). Additionally, the Connor-Davidson Resilience Scale (CD-RISC; Connor and Davidson 2003), was administered. The CD-RISC is a 25-item self-report measure that uses a 5-point Likert to evaluate overall resilience and has shown good internal consistency ($\alpha = 0.89$), test–retest reliability with an intraclass correlation coefficient of 0.87, and convergent validity when compared to another measure of hardiness ($r = .83$, $p \leq .0001$; Connor and Davidson 2003). Both the OQ-45 and CD-RISC were administered at baseline and after 1 month.

Data Analysis

To evaluate usability, the mean score of the SUS was compared to national norms. Additionally, usability and acceptability were evaluated by tallying participant responses on the PRQ. For readability and uniformity, the original PRQ Likert scales were collapsed into four categories: Easy to Use/Beneficial, Neutral, Not Easy to Use/Not Beneficial, and Not Used. Subjective comments on the PRQ were

sorted into similar categories and summarized. To evaluate effectiveness, paired-sample *t* tests were conducted using SPSS19 (IBM Corp. 2010) on the ProQOL, OQ-45, and CD-RISC.

Results

A total of 32 mental health providers provided written informed consent for participation. One participant was unable to participate because the individual did not have a mobile device compatible with the Provider Resilience app (the PR app is available on two platforms, iOS and Android). Another participant withdrew from participation due to time constraints. The remaining 30 providers (77% female) completed the study.

The participants ranged from 25 to 64 years of age ($M = 42.5 \pm 12.0$ years). They had an average of 12.5 ± 9.4 years working in the mental health field, and 5.6 ± 6.8 years working at the VA. Participants included psychologists (43%), social workers (30%), psychiatric nurses (13%), psychiatrists (7%) and other mental health care providers (7%). The sample was 80% Caucasian, 7% Asian, 7% African American, 3% Hispanic and 3% Multiethnic. Participants' marital status was as follows: 61% married; 19% never married; 13% living with a partner; and 3% divorced.

As an analog of "real-life" use patterns, participants were instructed to use the app "regularly". All participants reported using the Provider Resilience app with 40% using it once or twice a week, 33% using it 2–4 times per week, and 27% reporting daily use. The participant group was divided into these three user groups to determine if frequency of use impacted outcome on the ProQOL. These analyses were non-significant both on the Burnout scale ($F = 0.34$) and the Campassion Fatigue scale ($F = 0.47$), indicating no differences between the frequency of user groups on ProQOL outcomes. None of the participants engaged in any other employee program to reduce burnout during the time of assessment, thus, the results from this study should be reflective of the utility of the PR app.

Participants rated the usability of the PR on SUS with an overall score of 79.7 ± 14.19, which is in the top quartile for usability (Bangor et al. 2008). According, to Sauro (2011), this score would be considered "Excellent" and would be given a grade of A- with a percentile rank of 88%. In addition, over 80% of participants found the Dashboard, Resilience Ratings, and ProQOL Ratings easy to use, and 97% of respondents indicated that the Tools were easy to use (see Table 1).

On the PRQ, 77% of participants rated the overall appearance of the app as somewhat or very appealing, 60% of participants endorsed they were somewhat or very likely to use the app in the future, and 67% reported they were

Table 1 Provider Resilience outcome data

Quantitative measures	Baseline		One month		df	p	d
	Mean ± SD	N	Mean ± SD	t			
ProQOL[a]							
Compassion satisfaction	39.41 ± 5.34	29	38.59 ± 6.78	1.08	28	0.29	0.20
Burnout	16.97 ± 5.86	29	14.19 ± 6.26	3.65	28	<0.001	0.68
Compassion Fatigue/Secondary Traumatization	11.62 ± 6.20	29	8.90 ± 5.75	4.54	28	<0.001	0.84
Outcome Questionnaire[b]							
Symptom distress	23.23 ± 10.33	30	22.87 ± 10.12	0.29	29	77	0.05
Interpersonal relations	8.53 ± 5.85	30	9.53 ± 6.38	−2.18	29	0.04	0.40
Social role	8.97 ± 4.67	30	9.07 ± 3.49	−0.17	29	0.86	0.03
Total	40.73 ± 18.26	30	41.47 ± 18.65	−0.43	29	0.67	0.08
Connor-Davidson Resilience Scale[c]	76.47 ± 10.09	30	75.33 ± 9.6	0.70	29	0.49	0.13
System Usability Scale[d]			79.7 ± 14.19				

[a] *ProQOL* Professional Quality of Life. Each of the ProQOL subscales (Compassion Satisfaction, Burnout, and Secondary Trauma/Compassion Fatigue) range from 0 to 50, with higher scores indicating greater levels of the construct being measured

[b] The Symptom Distress subscale of the Outcome Questionnaire (OQ-45) ranges from 0 to 100 with higher scores indicating more distress. The Interpersonal Relations subscale of the OQ-45 ranges from 0 to 44 with higher scores indicating more clinically relevant symptoms. The Social Role subscale of the OQ-45 ranges from 0 to 36 with higher scores indicating more distress. The OQ-45 Total Score ranges from 0 to 180 with higher scores indicating more distress

[c] The Connor-Davidson Resilience Scale ranges from 0 to 40 with higher scores reflecting greater resilience

[d] The System Usability Scale ranges from 0 to 100 with higher scores indicating better usability

Table 2 Provider Resilience Questionnaire Data on Usability and Acceptability

PRQ data on usability[a]	Easy	Neutral	Difficult	Never used
Dashboard	87%	10%	3%	0%
Resilience Ratings	84%	7%	7%	3%
ProQOL Ratings	87%	3%	0%	10%
Tools	97%	0%	0%	3%
PRQ data on perception of benefit	Beneficial	Neutral	Not beneficial	Never used
Resilience ratings	67%	23%	7%	3%
ProQOL ratings	59%	17%	3%	10%
Countdown clock	57%	17%	13%	13%
Humor	34%	47%	17%	3%
Compassion fatigue videos	24%	10%	13%	53%
Physical excercise	30%	30%	7%	33%
"Why I do this" videos	23%	27%	20%	30%
Virtue cards	23%	53%	17%	7%

PRQ qualitative data Summary of similar comments	Number of similar comments
Vacation Clock: rather have it coutdown to next vacation	4
Humor: jokes outdated or did not appreciate the humor	4
Videos: not used due to concerns of costs related to data streaming	4
General recommendation: add the ability to customize, such as add your own reminder of why do this, own pictures, personal statements	4
General recommendation: add push notifications	3
General recommendation: add mindfulness tools for stress reduction	3
Resilience rating: would like more information on the interpretation of results, rather than just a number	2
Resilience builders/killers: didn't know there was the ability to customize	2
Value cards: would like to have the ability to sort	2
Remind me why I do this: videos didn't match topic/didn't like	2
Remind me why I do this: present information in a non-video format	2

[a] *PRQ* Provider Resilience Questionnaire

somewhat or very likely to recommend the app to a fellow provider. PRQ results on the usability and perceived benefit of the different elements of the PR app are presented in Table 2. The subjective comments on the PRQ were reviewed, and a summary of similar statements written by two or more participants is presented in Table 2.

Baseline mean scores on the ProQOL revealed Compassion Satisfaction ($M = 39.41 \pm 5.34$) was in the average range (between 33 and 42), Burnout ($M = 16.97 \pm 5.86$) was in the low range (<18), and Compassion Fatigue/Secondary Trauma ($M = 11.62 \pm 6.20$) was in the average range (8–17; Stamm 2005). Results of a paired samples *t* test on the subscales of the ProQOL indicated significant decreases in both the Burnout and the Compassion Fatigue/Secondary Trauma subscale (see Table 1). The Compassion Satisfaction subscale did not significantly change over time. Means and *t* test results for the OQ-45 and the CD-RISC are presented in Table 1.

To compensate for multiple analyses, Bonferroni corrections were conducted. After the adjustment, Burnout and Compassion Fatigue/Secondary Trauma subscales of the ProQOL remained significant at the $p < .01$ level. Initially, the Interpersonal Relations subscale score of the OQ-45 appeared to be significantly different between pre and post observation, however, after Bonferroni corrections were calculated, this trend was no longer significant.

Discussion

Overall, this sample of mental health professionals appeared to be psychologically healthy, endorsing low levels of Burnout and average levels of Compassion Satisfaction and Compassion Fatigue/Secondary Trauma. There may have been a self-selection bias, however, in that providers who were more likely to volunteer to participate in a research study, may also have been providers who were feeling less burnt out and more available to engage in an additional activity (i.e. the research study).

A potential issue with sampling a relatively healthy population is that a potential effect of the intervention may not be seen if improvements are not needed. The PR app, however, still showed promise as a tool to reduce burnout and compassion fatigue, even in a sample of mental health care professionals who did not report high levels of distress. The decline in average scores on the Compassion Fatigue/Secondary Trauma subscale were almost (within one point) of moving from the "average" range to the "low" range (Stamm 2005). Effect sizes on the reduction in burnout and compassion fatigue were robust ($d = 0.68, 0.84$, respectively), indicating the potential for a significant treatment effect related to use of the Provider Resilience app. However, there was no relationship found between frequency of use of the PR app and outcome on the ProQOL, though the small sample size may not have allowed enough power to find significance. Future studies should include a larger participant sample.

The Provider Resilience app also showed good usability, with an overall SUS scale in the "excellent" range (Sauro 2011). In addition, the majority of users reported they found the app appealing, planned to use it in the future, and would recommend it to a friend. The most beneficial features of the app were the ratings of burnout and resilience, followed by the countdown clock, which indicated time since last vacation. Both of these features in the app are designed to increase the provider's awareness of their own level of burnout and how long it had been since they had taken a break. Considering the finding that features related to boosting awareness were rated as the most beneficial, it may be that simply raising the provider's awareness of their own level of burnout may motivate the provider to improve self-care, reducing burnout and compassion fatigue.

In contrast, providers reported little use of the videos due to data streaming cost concerns. Since these features were rarely used and received some of the lowest scores in perceived benefit, future versions of the PR app may wish to present the information in a non-video format to reduce concerns regarding streaming costs. A review of similar comments by participants indicated an interest in modifying the countdown clock to countdown to next vacation rather than from the previous vacation, and a number of providers indicated an interest in being able to further customize the app. Future modifications to the PR app may wish to incorporate these suggestions.

Limitations of this study include a small sample size, lack of control group, and a relatively psychologically healthy participant population. The small sample size did not allow for secondary analyses on the impact of demographic factors such as gender, ethnicity, profession, or age on the potential treatment effect. Additionally, the ProQOL was used in the mobile app to increase awareness as well as an outcome measure in this study, which may have confounded results. Other measures of resilience and psychological distress did not change over time, indicating the ProQOL may have been influenced by practice effects. However, another study of an in-person class to reduce burnout in military health care providers (Weidlich and Ugarriza 2015), also found reductions on the ProQOL without reductions in resilience and other measures, so these constructs may function independently. Future studies should include additional measures of burnout.

One potential benefit of the PR app is its unique delivery platform. Most programs designed to reduce burnout require the individual to attend a workshop or seminar, which necessitates taking time from an already busy schedule. For providers who are feeling overwhelmed with

their work responsibilities, finding time to attend a workshop may feel like an added burden, rather than beneficial. Thus, individuals who might most benefit from programs designed to reduce burnout, may be the least able to access these programs. The Provider Resilience app, with its unique delivery platform, can provide consistent availability, accessibility, and convenience, which can reach overburdened providers who would most benefit from the intervention. The results from this study suggest that using a mobile app may have similar effectiveness as attending a seminar in terms of reducing burnout and compassion fatigue, though this requires further investigation.

Overall, the Provider Resilience app appears to fall within the "excellent" range of usability, shows evidence of being acceptable, and has initial data suggesting efficacy in reducing burnout and compassion fatigue/secondary traumatization in mental health care providers. Future studies should include a larger sample size, a control group design, providers with more significant levels of burnout and compassion fatigue, and additional measures of burnout beyond the ProQOL.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Informed Consent Informed consent was obtained from all individuals included in the study.

Research Involving Human Participants All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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