B·RIGHT: Usability and satisfaction with a mobile app for self-managing emotional crises in patients with borderline personality disorder

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Abstract

Objective: Borderline personality disorder (BPD) is a severe mental disorder characterized by emotional crises. To date, crisis interventions for BPD have been conducted via telephone calls and emergency units, which are associated with an extra amount of resources. The aim of this research was to test the usability and satisfaction with a psychotherapeutic mobile app for self-managing crises in BPD.

Method: The B·RIGHT app was designed based on Artificial Intelligence psychotherapeutic algorithms. Usability and satisfaction with the app were assessed in 25 outpatients diagnosed with BPD (84% female, mean age=35.80 years) using the System Usability Scale (SUS) and other questionnaires. Clinical features were assessed using the Borderline Symptom List, the Difficulties in Emotion Regulation Scale and Beck's Depression Inventory.

Results: Patients with BPD considered the app user-friendly (mean total score=4.03) and highly satisfactory (mean total score=4.02), resulting in a positive user experience (mean total score=4.09). Total usability was negatively associated with age (r=-.44), positively

associated with educational level (*rho*=.47) and with overall emotion dysregulation (*r*=.51), and negatively associated with depression severity (*r*=-.47).

Conclusions: The usability and satisfaction testing of the B·RIGHT app showed promising findings, which warrant further research in order to validate its effectiveness.

Keywords: mobile app, borderline personality disorder, emotional crises, satisfaction, usability.

Introduction

Borderline personality disorder (BPD) is a severe mental disorder that affects 2% of the general adult population[1]. Emotional crises are the most typical expression of emotion dysregulation[2]. Emotional crises negatively affect the course of treatment and result in greater use of extra healthcare resources[3]. There are some empirically validated therapies (e.g., Dialectical Behavior Therapy) that seek to reduce the risk of emotional crises by treating underlying emotion dysregulation and/or, directly, by including additional therapeutic measures for crises (e.g., phone calls)[4]. Regarding the implementation of these crisis interventions, there has been little empirical research on their effectiveness for BPD[5]. In addition, crisis interventions have been inefficient because of the extra human and economic resources required[6].

Making available a therapeutic application could potentially be a good way to address the additional needs of care for BPD patients in crisis. Since the start of the 21st century, there has been an increase in use of therapeutic apps as part of intervention programs for mental health in general[7]. However, there has been very little empirical testing of therapeutic apps in the treatment of BPD, although two studies by Rizvi[8,9] found that the

DBT implemented through a mobile app was effective in reducing substance use and non-suicidal self-harm. Also, a study by Prada[10] found that DBT delivered through an app was effective in reducing aversive tension. In spite of their promising findings, these investigations had serious methodological limitations, including small sample size and lack of a control group. In addition, the apps tested were not explicitly designed for self-monitoring of emotional crises in BPD and there is no data available on whether their use reduced psychiatric emergencies.

Taking into consideration the limitations cited above, we developed the Rapid Intervention Guidelines using Health Technology for Borderline personality (B·RIGHT) project. The main aim of the current pilot study was to assess the usability and satisfaction with the B·RIGHT app in a sample of patients with BPD.

Methods

Participants

Twenty-five adult outpatients diagnosed with DSM-5 BPD criteria[11] were recruited from the Adult Mental Health Center of Mataró (Spain) in November 2018. Patients were recruited from naturalistic group treatments based on schema-focused therapy. Selected patients did not meet criteria for psychotic disorder, pervasive developmental disorder, intellectual disability, and/or intoxication or substance withdrawal. The study was approved by the hospital's Institutional Review Board.

Measures

To confirm BPD diagnoses all patients were interviewed at the recruitment using the Spanish translation of the Structured Clinical Interview for Axis II personality disorders

(SCID-5-PD)[12]. The clinical severity of borderline symptoms was assessed after app testing with a validated Spanish version of the Borderline Symptom List-Short Form (BSL-23)[13,14]. This version has excellent psychometric properties (*Cronbach´s alpha*=.95). Emotion dysregulation was assessed after app testing with a validated Spanish version of the Difficulties in Emotion Regulation Scale (DERS)[15,16]. This version has excellent psychometric properties (*Cronbach´s alpha*=.93). Severity of depressed mood was assessed after app testing with a validated Spanish version of the 13-item short form of the Beck Depression Inventory (BDI)[17,18]. This version has good psychometric properties (*Cronbach´s alpha*=.89). The System Usability Scale (SUS)[19] was used to assess the usability of the app after the testing. The Satisfaction Survey is a specially designed self-report questionnaire that was used to evaluate satisfaction with the app after the testing. The Emotional Evaluation Survey is a specially designed self-report questionnaire that was used to evaluate users' emotional experience with the app.

Smartphone app (B·RIGHT)

The conceptualization of the B·RIGHT app was based on Ekman's theory of discrete emotions[20]. The app used second- and third-wave cognitive-behavioral techniques. The functioning of the B·RIGHT was based on psychotherapeutic Artificial Intelligence algorithms. The graphical user interface (see Figure 1) had the following components: i) "I need help"; ii) My habits; and iii) My profile (see Figure 2). At that moment, there was only a Spanish version of the app.

Procedure

Patients received the app in a group session and were asked to use it during one month. One month later, the patients attended to the group session and completed several questionnaires.

Data analysis

Pearson's correlation (*r*), point-biserial correlations (r_{pb}) or Spearman's correlation coefficient (*rho*) were used to detect associations between sociodemographic or clinical variables and app-related variables. All *p*-values are for 2-tailed tests with α=.05. Statistical analyses were performed using the SPSS for Windows, Version 22.0.

Results

Sociodemographic characteristics in patients with BPD at the time of the recruitment

The majority of our sample of patients with BPD was female (*n*=21, 84%); the mean age of participants was 35.80 years (range=18-56, *SD*=9.90); most were educated to secondary (*n*=13, 52%) or tertiary level (*n*=10, 40%). Roughly half of the participants were single (*n*=14, 56%) and unemployed (*n*=12, 48%).

Clinical characteristics in patients with BPD after the app testing

The sample reported moderate levels of borderline symptoms (meanBSL-23=48.16, *SD*=21.02) and moderate emotion dysregulation symptom severity (mean DERS=56.13, *SD*=28.36). The participants also had moderate levels of depressive symptoms (mean BDI=19.96, *SD*=4.77).

App-related variables in patients with BPD after the app testing

Detailed usability data are given in Table 1. Overall usability scores were high, with the highest scores on item 7 ("*I think people will learn quickly how to use it*") and item 4 ("*I would not need an expert to help use it*"). Detailed satisfaction data are depicted in Table 2. Patients with BPD reported high overall satisfaction with the app, with the highest scores for item 6 ("*Would you use the B•RIGHT App frequently at the crisis moments?*") and item 1 ("*Was the B-Right App intuitive?*"). Detailed data on emotional experience are given in Table 3. Overall patients reported a positive emotional experience with the app, particularly in item 3 ("*Soothing*")anditem 1 ("*Confident*").

Relationship between sociodemographic/clinical features and app-related characteristics

Bivariate analyses showed that higher overall usability was negatively associated with age (r=-.44, p=.03) and depression severity after app testing (r=-.47, p=.02) and positively associated with having educational level (rho=.47, p=.02) and emotion dysregulation after app testing (r=.51, p=.01). Overall satisfaction with the app was negatively correlated with age (r=-.49, p=.02) and depression severity after app testing (r=-.44, p=.03) and positively correlated with educational level (rho=.50, p=.01). Positive emotional experience with the app was negatively associated with age (r=-.49, p=.02) and depression severity after app testing (r=-.51, p=.01) and positively associated with educational level (rho=.43, p=.04) and borderline symptom severity after app testing (r=.48, p=.02).

Discussion

The aim of this study was to evaluate usability and user satisfaction of the B·RIGHT app in a sample of patients with BPD. Patients found the app user-friendly and highly satisfactory.

Our findings suggest that depressed mood may affect the extent to which patients use the app. Because depressed mood was only measured after app testing, it is unclear whether patients with BPD improved, worsened, or remained stable due to the use of this psychotherapeutic tool. Our results also imply that age and educational level may affect use of the app. This is consistent with earlier research on use of other types of medical apps[21]. Cohort effects may account for the aged-related variations in usability and satisfaction that we observed. Younger generations tend to be enthusiastic about apps, interact frequently with them and find their design intuitive. Our findings also suggest that patients with more severe borderline symptoms may be heavier users of the app than patients with less severe borderline symptoms. According to Winnicott[22], this may be because the therapeutic app may work as a transitional or replacement object beyond its psychotherapeutic contents, that

would help patients with additional needs of psychological care and bonds during their emotional crises.

The current pilot study had several limitations. First, the usability and satisfaction findings should be treated with caution because of the moderate time period of assessment. Second, the generalization of the findings is limited because the sample predominantly consisted of women. Third, the current findings need further support from a clinical trial focused on the efficacy of the app among patients with BPD that cope with emotional crises.

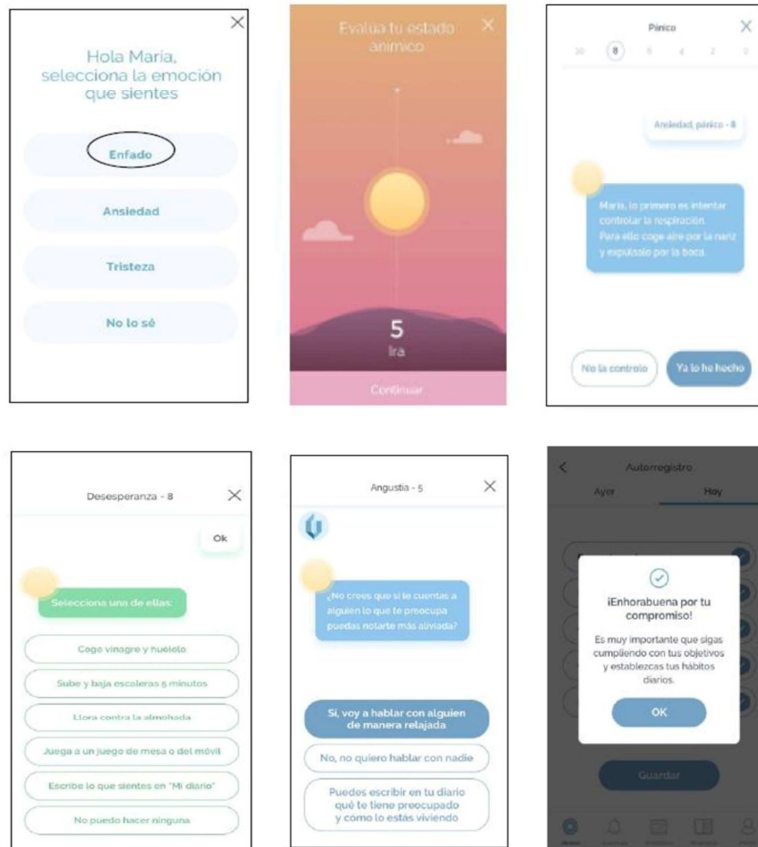Figure 1. Graphical user interface and mark of the proof-of-concept B·RIGHT App

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Figure 2. Screen flow templates (from top-to-bottom, left-to-right) for the proof-of-concept B·RIGHT App when self-managing emotional crises (section "I need help")

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Conflict of interest

The authors declare that there is no conflict of interest.

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Table 1

Usability (SUS) with the B·RIGHT app in patients with BPD (N=25)

	Mean (SD)
I think I will use this App *(1-5)*	4.15 (1.11)
I think I will use it at the moments of crisis*(1-5)*	4.09 (1.20)
I think the App was clear and easy to use*(1-5)*	3.99 (1.23)
I would not need an expert to help use it *(1-5)*	4.27 (1.38)
I think the features of the App were well integrated *(1-5)*	4.18 (1.44)
I would use the App to control medication adherence *(1-5)*	3.85 (1.37)
I think people will learn quickly how to use it *(1-5)*	3.90 (1.01)
I found it very easy to use*(1-5)*	4.36 (1.21)
The App gave me confidence *(1-5)*	3.75 (1.01)
I did not need to learn a lot before using it *(1-5)*	3.84 (1.56)
Total Usability *(average score)*	4.03 (1.25)

BPD, borderline personality disorder; B·RIGHT, Rapid Intervention Guidelines using Health Technology for Borderline personality; SUS, System Usability Scale.

Table 2

Satisfaction (SS) with the mobile app (B·RIGHT) in patients with BPD (N=25)

	Mean (SD)
Was the B-Right App intuitive?*(1-5)*	4.22 (0.87)
Has it been easy to complete the tasks of the testing?*(1-5)*	4.13 (1.45)
Did you like your first impression of the B-Right App? (*1-5*)	3.83 (1.22)
Did you consider useful the self-registering of the B·RIGHT App? (*1-5*)	3.75 (1.36)
Did you consider "I need help" as a comprehensible guide?*(1-5)*	3.89 (1.41)
Would you use the B·RIGHT App frequently at the crisis moments?*(1-5)*	4.23 (1.11)
How do you evaluate the B·RIGHT App? (*1-5*)	4.15 (1.45)
How useful would this App be for you?*(1-5)*	3.99 (1.42)
Total Satisfaction *(average score)*	4.02 (1.28)

BPD, borderline personality disorder; B·RIGHT, Rapid Intervention Guidelines using Health Technology for Borderline personality; SS, Satisfaction Survey

Table 3

Emotional evaluation (EES) of the B·RIGHT app in patients with BPD (N=25)

	Mean (SD)
I think the App seemed…	
Confident *(1-5)*	4.34 (1.01)
High-quality *(1-5)*	4.15 (1.22)
Soothing *(1-5)*	4.36 (1.34)
Familiar *(1-5)*	3.88 (1.67)
Concise *(1-5)*	3.95 (1.82)
Attractive *(1-5)*	4.29 (0.27)
Innovative *(1-5)*	4.01 (1.38)
Clear *(1-5)*	4.10 (1.23)
Close *(1-5)*	3.76 (1.57)
Enjoyable *(1-5)*	4.09 (1.62)
Total Emotional Evaluation *(average score)*	4.09 (1.31)

BPD, borderline personality disorder; B·RIGHT, Rapid Intervention Guidelines using Health Technology for Borderline personality; EES, Emotional Evaluation Survey.