

Personalized **eating disorder treatment** on your phone?

Digital interventions and eating disorders: a state-of-the-art review

m-HEALTH

Dr Saman Khan
NHS Lanarkshire

RCPsych Faculty of Eating Disorders Psychiatry
Online Conference
5-6 November 2020

With the development of digital technology, another important concept has emerged



using mobile communications, such as mobile phones and smartphones for health services and information (Vital Wave Consulting, 2009).

A report on the economics of mHealth applications stated that 45,000 app publishers are responsible for some 165,000 mHealth apps available on the market (Research 2 Guidance, 2020).

Applications aimed at optimizing health and fitness are among the most frequently used categories of applications in the current mobile applications market (Krebs & Duncan, 2015).

Almost one fifth of smartphone users thought to have at least one health related app on their phone.

To date, only a few studies have described in detail the users of mHealth applications



M-Health apps are more likely to be used by younger people and by those with higher education.

An insightful **categorization** of mHealth apps was developed by Olla and Shimskey (2015), based on the existing literature.

- Wellness apps
- Instructional apps
- Efficiency and productivity apps
- Patient monitoring apps
- Compliance or adherence apps
- Behavior modification apps
- Environmental health apps

Another **categorization** by Vital Wave Consulting (2009) describes mHealth especially in the context of its potential benefits for developing countries.

- Education and awareness
- Remote data collection
- Remote monitoring
- Disease and epidemic outbreak tracking
- Diagnostic and treatment support

Considerably more attention has been given to the app use in relation to **eating habits**:

- Interventions and treatment of obesity and overweight.
- Weight management.

Until now, two reviews were published, aimed at identifying available apps for **eating disorders** treatment.

EMPIRICAL ARTICLE

Apps and Eating Disorders: A Systematic Clinical Appraisal

Christopher G. Fairburn, FMedSci*
Emily R. Rothwell

(Int J Eat Disord 2015; 48:1038–1046)

The present study had three aims.

1. To identify all available apps (in English) that are primarily designed for people with eating disorders or for professionals helping people with eating disorders.
2. To assess their popularity and to characterize and evaluate them on the basis of the functions that they claimed to serve.
3. To conduct a systematic appraisal of the clinical utility of the apps including those designed for use by clinicians.

1. Eight hundred and five apps were identified in the first step, the main source being the Google Play store.

TABLE 1. Eating disorder apps and their source

	Apps Designed Primarily for People with an Eating Disorder	Apps Designed for Professionals	Excluded Apps ^a
Amazon	10	1	28
Blackberry	3	0	140
GooglePlay	32 ^b	3	557
iTunes	47	5	30
Nokia	13	0	13
Windows	30	0	26
Total ^c	39	5	781

^aIncluding duplicates across stores.

^bOne app was excluded as it failed to download.

^cEach app is counted only once (i.e., duplicates have been excluded).

2.a Download data could be obtained on 41 of the 44 identified apps. The apps differed greatly in their number of downloads (see Table 2). Thirty-three (80.5%) had been barely used (5,000 downloads) whereas two (4.9%) had been downloaded over 50,000 times.

2.b

- Provision of Information (33.3%)
- Self-Assessment (12.8%)
- Self-Monitoring (10.3%)
- Provision of Advice or Treatment (61.5%)
- Additional Functions (e.g. These included being supplied with daily images of “real girls”; allowing users to write to other people with eating disorders; and providing information about nearby sources of treatment) (12.8%).

3. The authors, at the time, identified only 2 apps providing good information, and 2 providing good self-assessment tools.

The most common app being the provision of advice. Often the advice was less than satisfactory and in some instances it was potentially harmful.

Next most common was the provision of information and this varied greatly in quality.

Five apps allowed users to assess the presence and severity of any eating disorder psychopathology, but only two used methods that would generally be viewed as reliable.

Utility For CLINICIANS

Could the conventional method of self-monitoring using written records or questionnaires be replaced by app-based recording, and if so does this apply equally to psychopathology tracking and psychopathology analysis?

The user experience was not as positive as we had expected.

While it was convenient not having to carry a monitoring record, recording using an app was in most instances no faster and it was frustrating in many ways. The apps were largely **inflexible** in the way that information had to be entered and pre-set options sometimes prevented an accurate description of associated thoughts, feelings, and circumstances.

The relative pros and cons of written versus app based recording therefore depends largely upon its purpose. If the goal is psychopathology tracking or in recording solely what the person is eating (i.e., the goal is to obtain “food records”), then app based recording has some advantages over written recording. The converse applies to psychopathology analysis.

The second set of conclusions concerns researchers. [Apps need investigating](#). Apps provide a new means of assessing psychopathology, either on an ongoing basis or at intervals. The validity and clinical utility of these assessments need to be determined. The same is for the therapeutic effects of any of these apps.

Apps could be used in treatment in various ways; for example, they could augment face-to-face treatments by making them more effective or efficient, or they could possibly deliver an entire personalized (tailored) intervention. This latter possibility is especially interesting as it would have enormous advantages in terms of scalability and access.

The final conclusion concerns organizations serving those with eating disorders. A useful additional service that they could provide would be to maintain an up-to-date list of the leading eating disorder apps in which their strengths, weaknesses, and potential risks are specified. This would be of great value to users and clinicians alike.

What about
TREATMENT?

Smartphone apps could increase access to treatment

Many individuals with EDs, especially those with AN, express ambivalence to change. Furthermore, there are a number of practical reasons that prevent those with EDs from receiving the proper treatment including but not limited to cost, hassle and shame, and lack of treatment providers.

Smartphone apps may address limitations of current treatments

Homework encourages generalization of treatment skills outside of the therapy office by providing a venue for patients to practice, generalize, and maintain therapeutic skills.

Self-monitoring, one of the core drivers of behavior change in CBT-E, could be enhanced if completed via smartphone, as entry and storage are simpler than pen-and-paper methods.

Smartphones could also provide in-the-moment interventions directly during times of need.

Risks and challenges of using smartphone apps for the treatments of EDs

Although apps could increase access to treatment, availability of treatment programs via apps could possibly lead individuals to avoid seeking professional in-person treatment even when it is available and warranted.

Second, utilization of apps could detrimentally interfere with concurrent in-person treatment; for example, an individualized treatment plan from an in-person treatment provider could include recommendations (e.g. frequency of eating) that are conflicting with that of app recommendations, perhaps causing confusion and interference with treatment. Another potential problem is the advice or feedback patients may receive via social forums built into apps; patients could receive unhelpful or even detrimental advice from other individuals using the app.

Review of Smartphone Applications for the Treatment of Eating Disorders

Adrienne S. Juarascio*, **Stephanie M. Manasse**, **Stephanie P. Goldstein**, **Evan M. Forman**,
and **Meghan L. Butryn**

Drexel University Department of Psychology, Philadelphia, USA

Eur Eat Disord Rev 2015

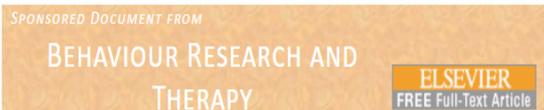
The current review sought to examine existing smartphone apps that delivered eating disorder interventions. After an exhaustive search, 20 apps were identified that directly targeted EDs. Only **six** of these 20 were designed to provide intervention.

A wide range of treatment procedures were delivered, some derived from evidence-based interventions (particularly CBT) and others not, but the interventions were perfunctory in nature comprising a few sentences of standard text.

Even if they had been more sophisticated in form, their likely effectiveness may be questioned as the evidence-based psychological treatments from which they were drawn are not a mere hodgepodge of techniques; rather, the procedures are designed to be personalized and used sequentially in a systematic way. As regards the apps' use of modern smartphone technology, Juarascio et al. concluded that their functionality was "very limited".

The authors signaled out **Recovery Record** as the app delivering the most empirically supported content.





Behav Res Ther. 2014 Dec; 63: 122–131.

doi: [10.1016/j.brat.2014.09.011](https://doi.org/10.1016/j.brat.2014.09.011); [10.1016/j.brat.2014.09.011](https://doi.org/10.1016/j.brat.2014.09.011)

PMCID: PMC4271736

PMID: [25461787](https://pubmed.ncbi.nlm.nih.gov/25461787/)

E-therapy in the treatment and prevention of eating disorders: A systematic review and meta-analysis

[Christina E. Loucas](#),^{a,*} [Christopher G. Fairburn](#),^b [Craig Whittington](#),^a [Mary E. Pennant](#),^a [Sarah Stockton](#),^a and [Tim Kendall](#)^a

In total, 20 RCTs (published in 21 papers) were included in the review. Outcomes in 14 of the 20 studies could be appropriately combined in a meta-analysis. Seventeen of the 20 studies evaluated cognitive behavioural interventions. Sixteen studies used the internet as the primary means of delivering the intervention. The remaining four used CD-ROMs.

None of the studies evaluated the use of mobile-device app-delivered interventions.

Overall, although some positive findings were identified, the value of e-therapy for eating disorders must be viewed as uncertain. Further research, with improved methods, is needed to establish the effectiveness of e-therapy for people with eating disorders.

REVIEW

Curr Opin Psychiatry 2019, 32:498–503

DOI:10.1097/YCO.0000000000000542



Treatment delivery strategies for eating disorders

Paulo P.P. Machado and Tânia F. Rodrigues

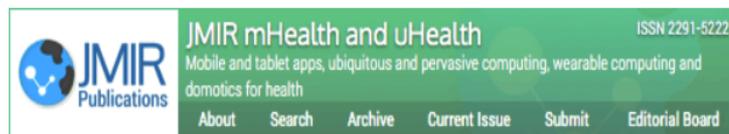
Hildebrandt and colleagues tested the efficacy of using a smartphone app ([Noom Monitor](#), Noom Inc., New York, USA), developed to facilitate CBT by simplifying and digitizing self-monitoring records, on study retention, adherence, and eating disorder symptoms compared to traditional CBT.

[Patients receiving CBT and Noom](#) experienced a greater reduction in binge and purging than in standard CBT by end-of treatment. However, remission rates and binge frequency were not significantly different at 6 month follow-up and there were no significant effects on abstinence rates.

In another study, Lyzwinski and colleagues tested the effectiveness, acceptability, and feasibility of a student-tailored mindfulness app for weight, weight related behaviors, and stress, comparing it to a control condition – use of a behavioral self monitoring electronic diary for diet and exercise.

Results showed that the app assisted with some weight related behaviors, including emotional eating and binge eating, as well as with increasing mindfulness, mindful eating, and reducing stress in adherers.

Although this study did not include participants with an eating disorder, it might shed some light on the use of apps based on approaches that depart from traditional CBT.



JMIR Mhealth Uhealth. 2019 Jun; 7(6): e12920.

Published online 2019 May 31. doi: 10.2196/12920: 10.2196/12920

PMCID: PMC6592393

PMID: [31199329](#)

Mobile Health Adoption in Mental Health: User Experience of a Mobile Health App for Patients With an Eating Disorder

Monitoring Editor: Gunther Eysenbach

Reviewed by Pii Lindgreen and Christine Jacob

[Dimitra Anastasiadou](#), PhD,^{1,2} [Frans Folkvord](#), PhD,^{2,3} [Eduardo Serrano-Troncoso](#), PhD,^{4,5} and [Francisco Lupiañez-Villanueva](#), PhD^{1,2}

This study aimed (1) to investigate attitudes of health care providers and mHealth experts toward mHealth tools in the health context in general, and this study aimed (2) to test the acceptability and feasibility of a specific mHealth tool for patients with an eating disorder (ED), called **TCApp**, among patients and ED specialists.

Received: 9 December 2019 | Revised: 21 April 2020 | Accepted: 21 April 2020

DOI: 10.1002/eat.23286

**ORIGINAL ARTICLE**International Journal of
EATING DISORDERS WILEY

An mHealth intervention for the treatment of patients with an eating disorder: A multicenter randomized controlled trial

Dimitra Anastasiadou PhD^{1,2} | Frans Folkvord PhD^{2,3} | Agostino Brugnera PhD⁴ |

Objective: The current multicentre randomized controlled trial assessed the clinical efficacy of a combined mHealth intervention for eating disorders (EDs) based on cognitive behavioral therapy (CBT).

Method: A total of 106 ED patients from eight different public and private mental health services in Spain were randomly assigned to two parallel groups.

Patients of the experimental group (N = 53) received standard face-to-face CBT plus a mobile intervention through an application called “**TCApp**,” which provides self-monitoring and an online chat with the therapist. The control group (N = 53) received standard face-to-face CBT only.

Patients completed self-report questionnaires on ED symptomatology, anxiety, depression, and quality of life, before and after treatment.

Results: Significant reductions in primary and secondary outcomes were observed for participants of both groups, with no differences between groups. Results also suggested that the frequency with which patients attended their referral mental health institution after the intervention was lower for patients in the experimental group than for those in the control group.

Discussion: The current study showed that CBT can help to reduce symptoms relating to ED, regardless of whether its delivery includes online components in addition to traditional face-to-face treatment. Besides, the additional component offered by the TCApp does not appear to be promising from a purely therapeutic perspective but perhaps as a **cost-effective tool**, reducing thus the costs and time burden associated with weekly visits to health professionals.

To this purpose, we conducted an explorative qualitative study with 4 in-depth group discussions with several groups of stakeholders:

The focus groups showed that health care providers and mHealth experts reported **barriers** for mHealth adoption more often than facilitators, indicating that mHealth techniques are difficult to obtain and use. Most barriers were attributed to external factors relating to the human or organizational environment (ie, lack of time because of workload, lack of direct interest on a legislative or political level) rather than being attributed to internal factors relating to individual obstacles. The results of the mHealth intervention study indicate that the TCApp was considered as easy to use and useful, although patients and the ED specialists monitoring them on the Web reported different adoption problems, such as the inability to personalize the app, a lack of motivational and interactive components, or difficulties in adhering to the study protocol

In general, this paper indicates that both health professionals and patients foresee difficulties that need to be addressed before comprehensive adoption and usage of mHealth techniques can be effectively implemented. Such findings are in line with previous studies, suggesting that although they acknowledge their possible benefits and cost-effectiveness, health care providers are quite resistant and conservative about integrating mHealth technologies in their daily practice.



J Med Internet Res. 2016 Jan; 18(1): e7.

Published online 2016 Jan 11. doi: 10.2196/jmir.4972: 10.2196/jmir.4972

PMCID: PMC4726867

PMID: [26753539](#)

A Guided Online and Mobile Self-Help Program for Individuals With Eating Disorders: An Iterative Engagement and Usability Study

Monitoring Editor: Gunther Eysenbach

Reviewed by Floor Sieverink and Rebecca Shingleton

[Martina Nitsch](#), Dr Phil,^{1,2} [Christina N Dimopoulos](#), BA,³ [Edith Flaschberger](#), Dr Phil,^{2,4} [Kristina Saffran](#), BA,³ [Jenna F Kruger](#), MPH,³ [Lindsay Garlock](#), MA,⁵ [Denise E Wilfley](#), PhD,⁶ [Craig B Taylor](#), MD,^{3,7} and [Megan Jones](#), PsyD^{3,5}

Numerous digital health interventions have been developed for mental health promotion and intervention, including eating disorders. Efficacy of many interventions has been evaluated, yet knowledge about reasons for dropout and poor adherence is scarce.

Most digital health intervention studies lack appropriate research design and methods to investigate individual engagement issues. User engagement and program usability are inextricably linked, making usability studies vital in understanding and improving engagement.

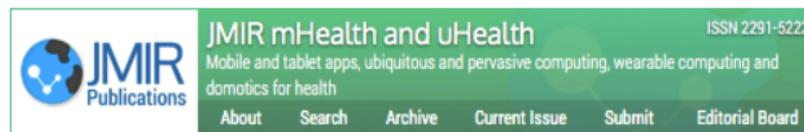
We conducted an iterative usability study based on a mixed-methods approach, combining cognitive and semistructured interviews as well as questionnaires, prior to program launch. Two separate rounds of usability studies were completed, testing a total of 9 potential users. Thematic analysis and descriptive statistics were used to analyze the think-aloud tasks, interviews, and questionnaires.

Participants were satisfied with the overall usability of the program.

The analysis of the qualitative data revealed five central themes: layout, navigation, content, support, and engagement conditions.

The first three themes highlight usability aspects of the program, while the latter two highlight engagement issues.

An easy-to-use format, clear wording, the nature of guidance, and opportunity for interactivity were important issues related to usability. The coach support, time investment, and severity of users' symptoms, the program's features and effectiveness, trust, anonymity, and affordability were relevant to engagement.



JMIR Mhealth Uhealth. 2019 Jun; 7(6): e14239.

Published online 2019 Jun 18. doi: 10.2196/14239: 10.2196/14239

PMCID: PMC6604512

PMID: [31215514](https://pubmed.ncbi.nlm.nih.gov/31215514/)

Understanding the Role of Healthy Eating and Fitness Mobile Apps in the Formation of Maladaptive Eating and Exercise Behaviors in Young People

Monitoring Editor: Gunther Eysenbach

Reviewed by Gabriel Signorelli

[Mahsa Honary](#), PhD,^{#1} [Beth T Bell](#), PhD,^{#2} [Sarah Clinch](#), PhD,^{#3} [Sarah E Wild](#), BSc,^{#2} and [Roisin McNaney](#), PhD^{#4}

Healthy eating and fitness mobile apps are designed to promote healthier living. However, for young people, body dissatisfaction is commonplace, and these types of apps can become a source of maladaptive eating and exercise behaviors. Furthermore, such apps are designed to promote continuous engagement, potentially fostering compulsive behaviors.

Participants were aged between 18 and 25 years and had current or past experience of using healthy eating and fitness apps. Almost half of our survey participants indicated that they had experienced some form of negative experiences and behaviors through their app use. Our findings indicate a wide range of concerns around the wider impact of healthy eating and fitness apps on individuals at risk of maladaptive eating and exercise behavior, including (1) guilt formation because of the nature of persuasive models, (2) social isolation as a result of personal regimens around diet and fitness goals, (3) fear of receiving negative responses when targets are not achieved, and (4) feelings of being controlled by the app.

Do mental health mobile apps work: evidence and recommendations for designing high-efficacy mental health mobile apps

Pooja Chandrashekar

School of Engineering and Applied Sciences, Harvard University, Cambridge, MA, USA

Correspondence to: Pooja Chandrashekar. School of Engineering and Applied Sciences, Harvard University, 29 Oxford Street, Cambridge, MA 02138, USA. Email: pchandrashekar@college.harvard.edu.

Received: 19 February 2018; Accepted: 28 February 2018; Published: 23 March 2018.

What makes them work

High patient engagement

(I) real-time engagement

(II) usage reminders

(III) gamified interactions

Simple user interface (UI) and experience

(I) the use of pictures rather than text

(II) reduced sentence lengths

(III) inclusive, nonclinical language

Transdiagnostic capabilities

Self-monitoring features

App-based features that enable users to self-monitor their emotions by periodically reporting their thoughts, behaviors, and actions can increase emotional self-awareness (ESA).

- Most people with eating disorders in need of specialized mental health services receive no treatment.
- The traditional model of treatment delivery for eating disorders significantly impacts access to care.
- Alternate models of treatment delivery and care are available and can increase the impact and reach of evidence-based psychological interventions (EBPIs).
- Guided self-help, internet-based interventions, and use of mobile apps help reach those in need who are unlikely to get treatment
- Given the global shortage of psychiatrists and the lack of mental health care access in rural regions, apps have emerged as a viable tool to bridge the mental health treatment gap.

Despite this promise several **challenges** and **risks** of integrating technology into ED treatment must be acknowledged.

- Availability of treatment programs via apps could possibly lead individuals to avoid seeking professional in-person treatment even when it is available and warranted.
- Utilization of apps could detrimentally interfere with concurrent in-person treatment; for example, an individualized treatment plan from an in-person treatment provider could include recommendations (e.g. frequency of eating) that are conflicting with that of app recommendations, perhaps causing confusion and interference with treatment.
- Another potential problem is the advice or feedback patients may receive via social forums built into apps; patients could receive unhelpful or even detrimental advice from other individuals using the app
- Furthermore, within the field of EDs, published studies on smartphone apps for patients with BN and BED far out-number studies of smartphone apps for patients with AN. However, given the specific treatment recommendations for AN (e.g. weight regain), it is possible that apps may not serve as a viable stand-alone intervention for this specific diagnosis.
- Smartphone apps currently on the market do not make use of recent technological advancements that could enhance effectiveness of treatment
- There is a paucity of data on the feasibility and acceptability of therapeutic smartphone apps among ED users. For instance, there are little empirical data that are available regarding patient perceptions on levels of intrusion, such as message frequency, geolocation, and other context-aware systems. Users may be unlikely to report revealing and stigmatized medical information using smartphone applications given concerns about potential interceptions of digital data from third parties.

Solutions

Any available apps should include built-in messages to encourage users to seek treatment (especially when endorsing high levels of symptoms) and links to websites with ED referrals..

Clinicians, before assigning use of apps as part of treatment should thoroughly review the app treatment components, and clearly communicate to patients any differing treatment recommendations, as well as caution them against taking treatment advice from other users.

More empirically grounded approach to mHealth technology development. One effective approach endorsed by experts is to adapt existing EBTs into technology-based interventions that either take the place of or augment conventional outpatient psychotherapy.

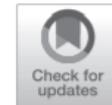
Researches demonstrate that improvements in usability and engagement can be achieved by testing and adjusting intervention design and content prior to program launch.

An area for future investigation is whether specific diagnoses, severity levels, or ED behaviors (e.g. binge eating), are more well-suited for smartphone-enhanced or smartphone-only treatment compared to others.

Future apps will need to address privacy and HIPPA concerns to ensure these treatments are acceptable to patient users. Additionally, further research should assess the potential risk apps pose to individuals pursuing in-person treatment, as well as ways in which apps could interfere with in-person treatment (e.g. conflicting recommendations, harmful advice from other apps users) via social media portals or forums.

There is a call within the field of health behavior change for developers to begin utilizing varying methods of both input and output functionalities to personalize therapeutic apps and increase the likelihood of behavior change.

Use of Technology in the Assessment and Treatment of Eating Disorders in Youth



Shiri Sadeh-Sharvit, PhD^{a,b,*}

Child Adolesc Psychiatric Clin N Am 28 (2019) 653–661
<https://doi.org/10.1016/j.chc.2019.05.011>
1056-4993/19/© 2019 Elsevier Inc. All rights reserved.

Therapists delivering treatment remotely should treat **collaboration** and **routine check-ins with parents**, as well as parental counseling sessions, as an imminent part of the intervention, similarly to what they would do in a face-to-face delivery.

Collaborating with physicians, dietitians, teachers, coaches, and other significant individuals in the young person's life remains an essential part of treatment, even when it is delivered remotely.

Another important prerequisite to practicing with digital tools is educating the client about confidentiality and privacy and their limitations.

Current treatment should focus on deterring youth from online communication and prevent additional use of electronic and social media; inviting children and adolescents to include technology in their treatment has the potential to reinforce fewer face-to-face interactions and increase youth's vulnerability to harmful online content.

Furthermore, there is a significant research-to-practice gap in the study of technologies to aid clients with additional feeding and eating disorders, such as avoidant/restrictive food intake disorder or pica, who could benefit from such services.

Thank you!

Questions?