How can digital interventions and new models of interventions help address the treatment gap for patients with eating disorders and help with their recovery?

Introduction

Eating disorders (EDs) affect an estimated 1.25 million people in the UK[1] and are among the most challenging mental health conditions, carrying the highest mortality rates of all psychiatric illnesses[2]. These complex conditions are characterised by disturbances in eating behaviours that interfere with physical health and result in psychosocial dysfunction[3,4]. Despite these alarming statistics, a disparity exists between the number of individuals who require care for EDs and those who receive it, known as the treatment gap[5]. Fewer than one-third of those affected by EDs would consider seeking help[6] and only half are appropriately referred for treatment[7]. This highlights significant gaps in help-seeking, referral and access to ongoing care. The National Institute for Health and Care Excellence (NICE) has begun exploring the use of digital tools in ED care[1]. However, their approach concentrates on the delivery of digital cognitive behavioural therapy (CBT) overlooking opportunities to implement digital tools at other stages of the care continuum. Grounded in the Stepped System of Care for Eating Disorders[8], this essay examines how NICE's plan to integrate digital CBT effectively addresses the treatment stage of the ED care pathway but also considers how digital tools can be used to improve other stages of the continuum.

Identifying Treatment Gaps Through the Stepped System of Care

NICE has recently published preliminary reports on integrating CBT through an app or web platform into treatment pathways[1]. This reflects the growing recognition of digital tools as valuable resources for addressing the treatment gap in EDs. However, this approach focuses on treatment delivery, overlooking other essential stages of the care pathway.

To unlock the full potential of digital health technologies, it is necessary to adopt a more holistic approach. As illustrated in Figure 1, the Stepped System of Care for Eating Disorders developed by the National Eating Disorders Collaboration (NEDC), an Australian government initiative, offers a comprehensive framework that spans the full continuum of care, from early detection to sustained recovery[8,9].

Figure 1: Stepped System of Care for Eating Disorders. Adapted from the National Eating Disorders Collaboration[9].

This essay focuses on three stages in the care journey where the treatment gap is prominent:

1. Identification – recognising early symptoms
2. Treatment – accessing effective therapeutic care
3. Psychosocial and Recovery Support – sustaining recovery and psychosocial wellbeing

The ED Stepped System of Care provides a useful structure to examine how digital interventions can be strategically embedded to address unmet needs across various stages of the ED care pathway.

Digital CBT and Treatment Delays

One major barrier at the treatment stage of the ED Stepped System of Care is the lengthy waiting time for specialist services[10]. There is an imbalance between the demand for ED treatment and the availability of services, with referrals to specialist ED services increasing by 20% since the pandemic[10]. As a result, long waiting lists have developed, with priority given to those with more severe cases of EDs. Unfortunately, this leaves patients with mild or moderate EDs untreated for extended periods[11]. This is particularly concerning as a longer duration of the disorder is a predictor of poorer outcomes[12]. Additionally, delays in treatment have been associated with the highest mortality rates in patients with anorexia nervosa[13], underscoring the life-threatening consequences of deferred care.

As previously mentioned, NICE is currently investigating the use of digital CBT to facilitate earlier intervention and reduce the burden on overstretched specialist services[1]. Delivering CBT via mobile apps and web-based platforms offers several advantages[11]. With 95% of the UK population owning a smartphone[14] and 90% of UK households having access to a computer[15], digital CBT is widely accessible. In addition, these platforms provide anonymity[11] and can be accessed in the comfort of one's home, which can help mitigate the stigma that is often associated with seeking in-person treatment[16]. Digital CBT also allows users to complete the sessions at their own pace, thereby promoting a sense of autonomy over their treatment journey[16].

Digital CBT has been shown to be effective in reducing the core clinical symptoms of EDs, and a meta-analysis found these outcomes to be comparable to face-to-face CBT[17]. Supporting this, a randomised clinical trial conducted by Pruessner et al.[18] demonstrated that individuals with binge eating disorder who completed a 12-week web-based CBT programme showed a significant reduction in binge eating episodes, whereas those on the waiting list, without intervention, did not. In the future, a triage system could be introduced that assesses whether a person is suitable for digital CBT or whether they would benefit more from face-to-face CBT. This approach could help streamline care pathways and reduce the burden on in-person services. Another solution would be to offer digital CBT to everyone on waiting lists as a way to provide immediate support. This has the potential to prevent the escalation of symptoms during long waits for treatment.

Given the increasing burden on ED services[10] and the growing body of evidence supporting the use of digital interventions for EDs[17], digital CBT represents a highly promising approach. NICE's initiative to integrate digital CBT into the ED care pathway is an important advancement in reducing treatment delays. However, as the next section will explore, addressing other stages of the care pathway is equally critical.

Predictive Identification and Early Outreach

One of the most pressing challenges in ED care is that those affected do not seek treatment, and among those who do, many delay seeking help for many years[19]. A key factor that contributes to this delayed identification is low mental health literacy[20]. Mental health literacy refers to one's understanding of mental health conditions which influences their ability to recognise, manage or prevent them[21]. Individuals with low mental health literacy may fail to detect the early signs of EDs, misunderstand the severity of symptoms or feel unsure about how to seek support[20,21]. Another barrier to early identification is stigma, with one study highlighting it as the greatest obstacle to seeking treatment for EDs[22].

99% of 16–24-year-old internet users report using social media apps[23], an age-range that coincides with the typical onset of EDs[24]. This overlap presents a unique opportunity to deliver digital interventions through platforms that are already embedded in the daily routines of this population. A recent study found that advertisements that used keywords related to body image and eating concerns were effective in reaching adolescents at high risk of EDs[25]. These individuals were invited to download an app which included 6 CBT modules, illustrating the potential for targeted digital outreach through social media[25]. To raise greater awareness of EDs, a national public health campaign could be launched implementing a similar strategy to the *Every Mind Matters* campaign[26]. This campaign was centred on a web resource designed to raise mental health awareness and was promoted through social media advertisements[27]. A large-scale ED web- or app-based campaign, promoted similarly, could significantly increase awareness, reduce stigma and reach at-risk populations on social media where they already spend much of their time[23].

Machine learning is a branch of artificial intelligence that analyses large datasets to detect patterns and make accurate predictions[27]. By training algorithms on these datasets, the models improve their accuracy over time through continuous learning[27]. Studies have demonstrated that machine learning can identify ED status with high accuracy (70-91%) using self-reported data[28]. Machine learning can also analyse passive digital data, which is information collected without any active effort from the user, such as browsing history or social media activity, to identify individuals who have or are at high risk of EDs[29].

Building on this, there is growing potential for machine learning to not only address the identification stage of the ED Stepped System of Care but also the treatment stage. While this application is still emerging, algorithms could one day deliver personalised digital interventions based on user behaviour[30](see Figure 2). For example, algorithms could detect when users repeatedly engage with social media content related to body dissatisfaction or unhealthy eating patterns, and a discreet prompt could be displayed, guiding them to resources such as digital CBT or direct links to NHS guidance on accessing face-to-face help[30]. This way, machine learning essentially serves as a digital "lighthouse", guiding at-risk individuals toward tailored support.

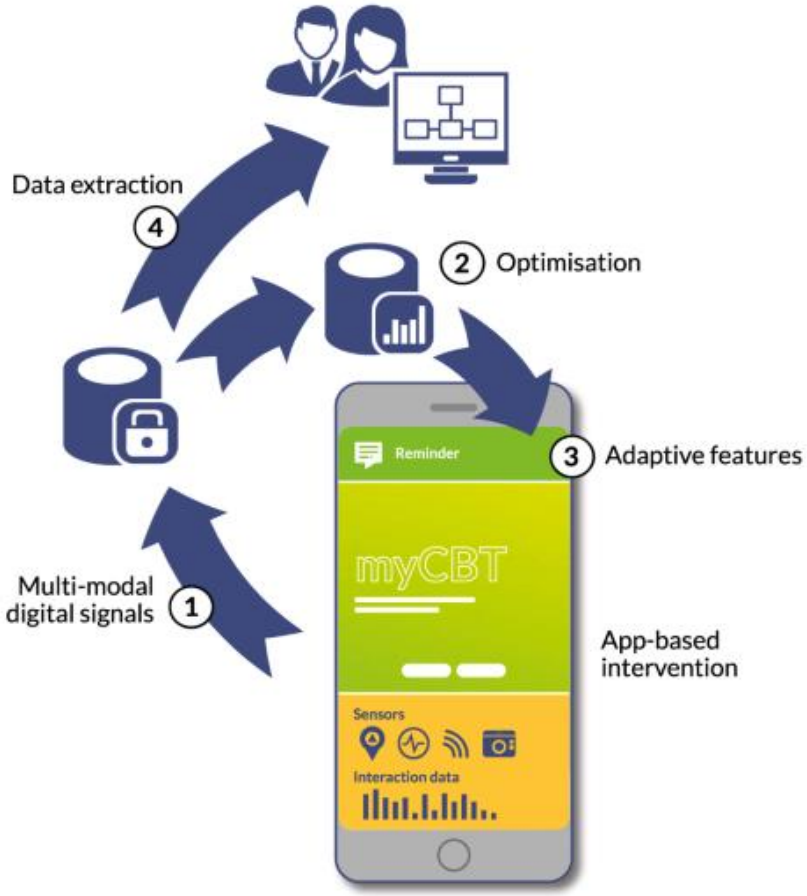

Figure 2: Continuous learning framework for an app-based intervention that uses machine learning to deliver personalised content. Adapted from Huckvale et al.[30].

(1) The system collects signals from the user's device (e.g., location and sleeping patterns).
(2) The data is put through machine learning models.
(3) The app then delivers features and personalised content aligned with the user's mood.
(4) Data extraction enables continuous learning and refinement of the intervention.

Sustaining Recovery Through Online Support Groups

Psychosocial and Recovery Support plays an essential role in sustaining long-term recovery from EDs beyond initial treatment[31]. Despite its importance, patients and their carers frequently report a lack of consistent support following discharge from services[32].

To address gaps in traditional support, online peer support offers significant advantages in maintaining momentum in recovery[33,34]. For example, Beat Eating Disorders offers a range of live, moderated chat rooms at scheduled times, allowing individuals to share experiences and coping strategies with others facing similar challenges[35]. Online forums offer another form of peer support that allows users to engage asynchronously[33]. As depicted in Figure 3, when important elements such as anonymity, fair moderation and minimisation of distressing content are present, these forums can create a supportive environment and enhance engagement in recovery[33]. In contrast, the SharED programme adopts a more individualised approach to peer support, matching participants with a trained befriender who has been in sustained recovery for at least two years[34]. The SharED programme has shown positive outcomes, including improved wellbeing and social connectedness among participants[34].

However, not all patients with EDs may be aware of these online support groups[36]. To bridge this gap, a novel opportunity lies in using machine learning-based algorithms to analyse content on widely used platforms such as Reddit and Twitter[37]. These algorithms could be trained to firstly identify those who are recovering from EDs and then promote recovery-oriented online discussions, particularly content created by healthcare professionals, to these individuals.

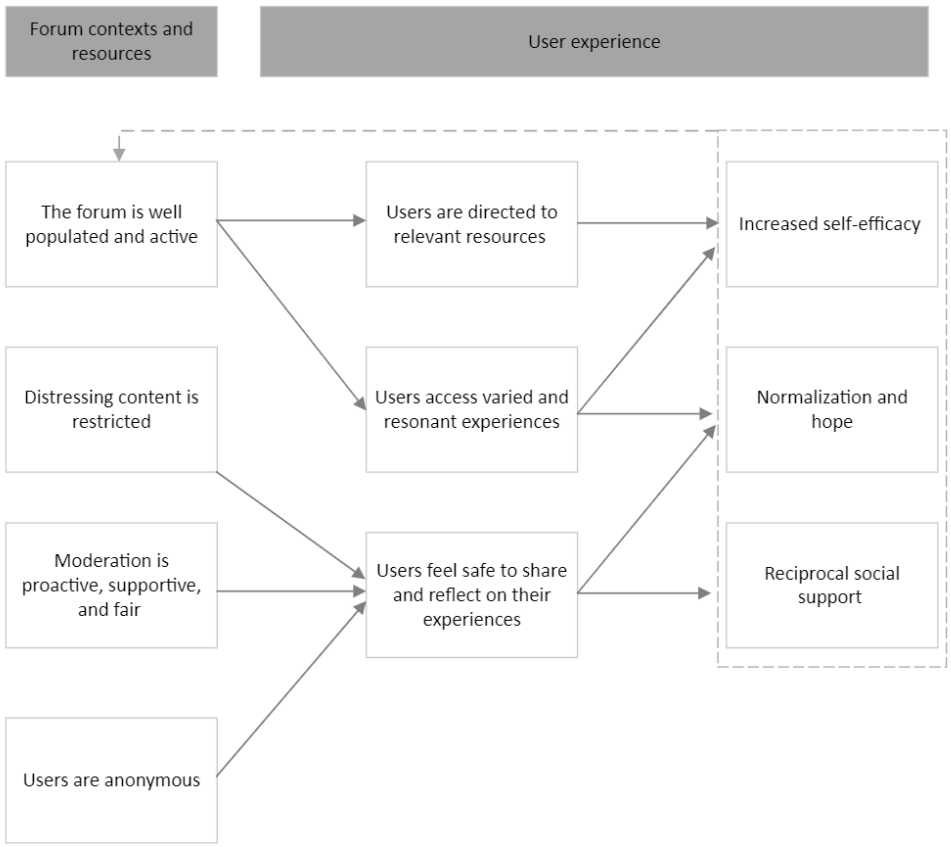

Figure 3: Factors influencing user experience in online forums for eating disorders. Taken from Marshall et al.[33].

Limitations

While digital interventions hold great promise for addressing the treatment gap in EDs, it is necessary to acknowledge their limitations. One major concern is user engagement, with research showing particularly high dropout rates within digital CBT programmes[38]. Limited interactivity with professionals, which reduces support and motivation, alongside difficulty navigating the programmes, were cited as key reasons[39]. Data privacy is another critical issue, with users concerned about how sensitive data will be collected, stored and shared[11]. For machine learning, there are additional concerns regarding how informed consent is obtained for data use in predictive models[28]. Moreover, these models rely on the data used to train them. If this data lacks diversity, the models may only offer recommendations suited to individuals similar to participants in the original dataset[28]. Finally, digital self-help programmes may not be appropriate for everyone, such as individuals with learning disabilities, issues with manual dexterity or limited experience with digital technologies[1].

Conclusion

In an era defined by remarkable technological advancements, there is a pivotal opportunity to harness these tools to reduce the treatment gap and improve outcomes for those living with EDs. NICE's guidance on digital CBT, expected to be published later this year, marks an important first step towards embracing digital innovation in ED care. While the implementation of digital CBT can effectively target the treatment stage of the care pathway, there is potential for other digital innovations such as targeted advertising on social media, machine learning and online peer support groups to address other stages. A comprehensive digital approach that spans the entire ED Stepped System of Care is crucial for transforming ED management, providing timely, targeted, and tailored support at every stage of the recovery journey.

[Word Count excluding the title, diagrams and references: 1962]

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