

Transforming Treatment: An Integrative Review of Telemedicine and Its Impact on Pediatric Eating Disorders

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Abstract

Background: Eating Disorders (EDs) among children and adolescents, such as Anorexia Nervosa (AN), Bulimia Nervosa (BN), and Binge Eating Disorder (BED) present significant clinical challenges due to their complexity. Traditional treatment approaches often encounter barriers including limited accessibility, high costs, and logistical constraints. Telemedicine has emerged as a promising alternative to conventional in-person treatment, offering potential benefits in accessibility and convenience.

Objective: This integrative review aims to evaluate the efficacy, benefits, and challenges of telemedicine interventions in the treatment of EDs among children and adolescents.

Methods: A comprehensive literature search was conducted according to Whittemore and Knaff's integrative review framework across multiple databases to identify studies assessing telemedicine interventions for EDs in children and adolescents. A quality assessment was conducted on the included studies and key outcomes were systematically analyzed.

Result: Eight studies met the inclusion criteria, showcasing a range of telemedicine interventions. Six studies focused exclusively on video telemedicine, providing virtual therapy and monitoring. One study utilized a combination of video telemedicine and telecommunications, while another implemented app-based monitoring with therapeutic sessions. Virtual intensive treatment programs were highlighted in one study, offering structured daily therapeutic activities. Home-based hospitalization, observed in one study, provided intensive virtual care replicating inpatient treatment. The review found that telemedicine interventions yielded positive clinical outcomes, including symptom reduction, weight stabilization, and psychological improvements. Patient and family engagement were high, enhancing accessibility and convenience. However, challenges such as technological barriers, privacy concerns, and maintaining therapeutic rapport were identified.

Conclusion: Telemedicine presents a viable and effective alternative for treating EDs in children and adolescents, offering significant advantages in accessibility and patient engagement. Despite certain limitations, telemedicine interventions can effectively complement traditional treatment modalities. Future research should focus on refining telemedicine approaches, exploring hybrid care models, and investigating long-term outcomes to optimize the integration of telemedicine into eating disorder treatment.

Keywords: Telemedicine; Eating disorders; Children; Adolescents; Video telemedicine; Virtual therapy; Telehealth; Family therapy

Background

Eating disorders among children and adolescents represent a significant public health concern, characterized by severe disruptions in eating behaviors leading to physical and mental health deterioration [1]. Among the most prevalent disorders are anorexia nervosa, bulimia nervosa, and binge eating disorder, among others. Anorexia Nervosa (AN) is a psychiatric disorder with one of the highest mortality rates, marked by severely restricted eating, an intense fear of gaining weight, and a distorted body image, often leading to severe weight loss and malnutrition [2]. Bulimia Nervosa (BN) involves cycles of binge eating and

compensatory behavior (e.g., self-induced vomiting or “purging”, overexercising, restrictive eating) alongside the overappraisal body shape and weight to prevent weight gain [3]. Binge Eating Disorder (BED) is characterized by recurrent episodes of eating large quantities of food, often rapidly and to the point of discomfort, accompanied by feelings of loss of control and distress, but without regular compensatory behaviors as in BN [4].

Pediatric eating disorders present a critical public health issue, with substantial prevalence and disease burden. Epidemiological studies of U.S. adolescents aged 13 to 18 years indicate the lifetime prevalence of eating disorders was nearly 3%, with prevalence rates of AN, BN, and BED were 0.3%, 0.9%, and 1.6%, respectively [5]. These disorders frequently emerge during adolescence, a pivotal period marked by significant physical, psychological and social development [1]. The disease burden associated with eating disorders in this age group is profound, affecting physical health, psychological well-being, and social functioning. Adolescents with eating disorders often experience severe medical complications, including malnutrition, electrolyte imbalances, and cardiovascular issues, which can have long-term health consequences [6]. Psychologically, these disorders are linked to high levels of comorbidity with psychiatric disorders such as depression, anxiety, and obsessive-compulsive disorder, further complicating treatment and prognosis [7]. Socially, eating disorders can disrupt academic performance, peer relationships, and family dynamics, leading to isolation and reduced quality of life [1,8]. Despite the significant impact on affected individuals and their families, there are often delays in diagnosis and treatment, exacerbating the disease burden and highlighting the need for more accessible and effective intervention strategies [1].

Traditional treatment approaches for these disorders typically include a combination of psychological therapy, nutritional counseling, and medical monitoring [9-11]. However, these methods present notable challenges, especially for younger populations. Access to specialized care can be limited by geographic location, socioeconomic factors, and the availability of trained professionals [1]. Additionally, the stigma associated with mental health and eating disorders can deter youth and their families from seeking help. Adolescents in particular may face unique barriers such as school commitments, reliance on parental support, and a need for age-appropriate engagement strategies [12]. The intensive nature of conventional treatments often requires frequent in-person visits, which can be logistically and financially burdensome, thereby hindering consistent and comprehensive care.

Significance of Telemedicine

Telemedicine refers to the use of digital communication technologies to deliver healthcare services remotely. It encompasses a variety of modalities, including video conferencing, telephone consultations, and online therapy platforms [13]. Telemedicine allows healthcare providers to diagnose, treat, and monitor patients through digital means, facilitating continuous care outside traditional clinical settings. The components of telemedicine extend

beyond mere consultations to include remote monitoring, online resources, and digital tools for patient education and engagement.

For pediatric and adolescent populations, telemedicine offers several advantages. It can enhance access to specialized care for those in remote or underserved areas, reducing the need for travel and associated costs [14]. Telemedicine also provides a level of flexibility that can accommodate the schedules of young patients and their families, thereby improving adherence to treatment protocols. Moreover, the use of familiar digital platforms can increase engagement among tech-savvy adolescents, making the treatment process more relatable and less intimidating [15]. By integrating telemedicine into the care continuum, healthcare providers can offer a more personalized and responsive approach to managing eating disorders, which is particularly beneficial in maintaining therapeutic relationships and ensuring continuity of care during critical stages of recovery.

Objectives of the Review

The primary objective of this integrative review is to evaluate the efficacy, benefits, and challenges associated with the use of telemedicine in the treatment of eating disorders among children and adolescents. Specifically, this review aims to analyze the current evidence on how telemedicine compares to traditional in-person treatments in terms of clinical outcomes, patient engagement, and accessibility. It will explore various telemedicine modalities to determine their effectiveness in delivering psychological therapy, nutritional counseling, and ongoing support for this population. Additionally, the review seeks to identify potential barriers and limitations of telemedicine, including technological issues, privacy concerns, and the feasibility of remote assessments. By synthesizing findings from existing studies, this review intends to provide comprehensive insights into the role of telemedicine in improving treatment access and outcomes for pediatric and adolescent patients with eating disorders, offering recommendations for best practices and future research directions.

Methods

Whittemore and Knaf’s integrative review methodology was used to guide the review of the literature on the use of telemedicine for pediatric eating disorders. This methodology consists of five steps: 1) identification of the research problem 2) conducting the literature search 3) evaluating the data 4) analyzing the data 5) presenting the results [16].

Search strategy

A comprehensive review of the literature was conducted in June 2024. Four online databases (PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), PsycINFO, and Web of Science (WoS)) were searched using Medical Subject Headings (MeSH) terms relevant to the research question. Keyword searches reflected the use of telemedicine in pediatric eating disorders, including terms such as “eating disorder*”, “anorexia”, “bulimia”, and “binge eating disorder”. The population aspect was added using phrases such as “children”, “youth”, “adolescent*”, and

“pediatric*”, and connected using Boolean operators. The initial search identified 105 articles (see Figure 1, PRISMA flow diagram). After duplicates were deleted (n=14), 91 records were screened at

the title and abstract level, and ancestry searching was performed from the reference list.

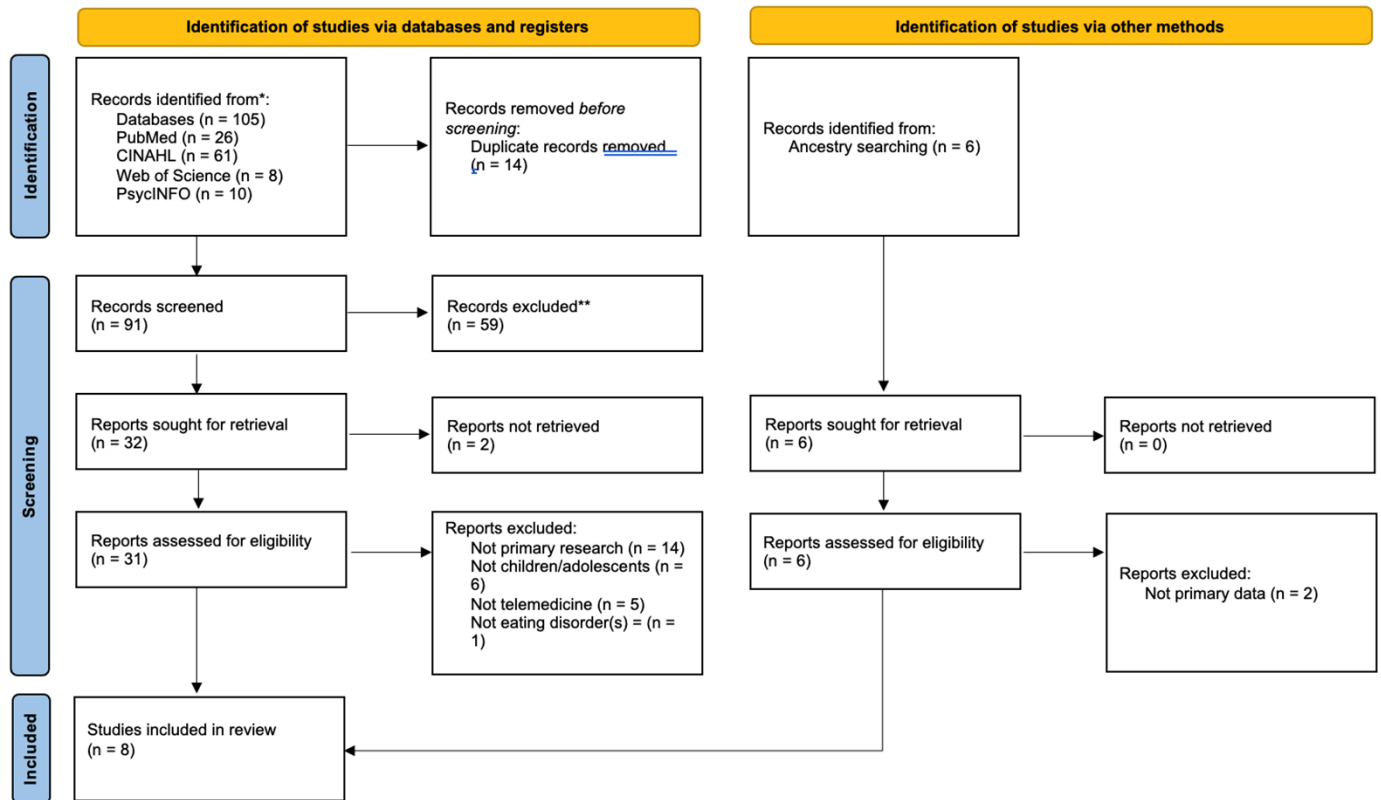


Figure 1: PRISMA flow diagram of included studies.

Inclusion and exclusion criteria

Publications that were written in English with the full text available, featured child and/or adolescent participants, examined treating eating disorders with telemedicine, and were primary research studies published in the past 5 years were included in this review. There were no restrictions placed on country or participant gender. Studies that featured adult participants, dissertations or theses, and grey literature were excluded.

Data evaluation

Included studies were evaluated using the Critical Appraisal Skills Programme (CASP) checklist [17]. The CASP checklist is a

tool designed to systematically evaluate the quality and validity of research studies by guiding users through a series of questions focused on study design, data analysis, and the applicability of findings. This systematic approach ensures that only high-quality evidence is included in the review.

Data analysis

After identifying eight studies for inclusion, data were organized by aims, study design, key demographics, population, type of telemedicine, intervention description, measured outcomes, results, and limitations. A table was created to succinctly display findings (Table 1).

Table 1: Characteristics of Included Studies. ABBREVIATIONS: AN=Anorexia Nervosa; BAS=Burden Assessment Scale; BDI-II=Beck Depression Inventory-II; BN=Bulimia Nervosa; CBT=Cognitive Behavioral Therapy; ED=Eating Disorders; EDE-Q=Eating Disorder Examination Questionnaire; EDE-QS=Eating Disorder Examination-Questionnaire Short Form; ETW=Estimated Target Weight; FBT=Family-Based Treatment; FBT+=Innovative Enhanced Family-Based Treatment; GAD-7=Generalized Anxiety Disorder Questionnaire; ITP=Intensive Treatment Program; NIAS=Nine Item Avoidant/Restrictive Food Intake Disorder Screen; NPS=Net Promoter Score; PHQ-9=Patient Health Questionnaire; PVA=Parents Versus Anorexia Scale; RCT=Randomized Controlled Trial; SEED=Short Evaluation Of Eating Disorders; STAI=State-Trait Anxiety Inventory.

Study Country Sample Size at Baseline	Study Design Aims	Population M age (yrs) (% female)	Intervention Description Setting	Measured Outcomes	Results	Strengths and Limitations
Anastasiadou et al. [20] Spain n=106	RCT 1. Assess clinical efficacy of a combined intervention that includes a mobile intervention plus standard face-to-face CBT	Adolescents 18 (91.4%)	Mobile health intervention Outpatient	<ul style="list-style-type: none"> · EDE-Q · SEED · BDI-II · STAI · EuroQoL · #Emergency visits 	<ul style="list-style-type: none"> · No significant difference between control and experimental groups on EDE-Q scores; AN and BN total severity index of the SEED · Significantly lower # of emergency visits in experimental group · Significant reduction of BDI-II and STAI, suggesting decreased depression and anxiety 	<p>Strengths:</p> <ul style="list-style-type: none"> · Inclusion of an active control group · Rigorous assessment of sample <p>Limitations:</p> <ul style="list-style-type: none"> · Small sample size · Some analyses underpowered
Brothwood et al. [22] United Kingdom n=79	Mixed Methods 1. Understand the experience of young people and their parents participating in ITP online during the COVID-19 pandemic	Adolescents 12-18 (93%)	Online ITP Outpatient	<ul style="list-style-type: none"> · 10-point Likert scale on overall experience of ITP, treatment quality, comfortability in an online environment, and impact of technology on treatment experience · Specific treatment components (meal support, individual/family sessions, medication reviews) in-persons vs virtual · Free text questions on experience of online therapy 	<ul style="list-style-type: none"> · Online ITP rated positively by youth and parents · Parents felt more comfortable in online groups than youth · Youth generally found online components of treatment less helpful than in-person · Youth prefer online medication sessions and dietetic appointments 	<p>Strengths:</p> <ul style="list-style-type: none"> · Mixed-methods allows for richer understanding of subjective experience · Large sample size <p>Limitations:</p> <ul style="list-style-type: none"> · Low response rate · Possible selection bias (due to email surveys) · Possible thematic bias in qualitative analysis

<p>Graell et al. [21]</p> <p>Spain</p> <p>n=365</p>	<p>Retrospective Chart Review</p> <p>1. Describe adaptations made to treatment protocols in an ED unit during the COVID-19 confinement period</p> <p>2. Describe profile of children and adolescents with ED receiving care in outpatient and partial hospitalization programs</p> <p>3. Analyze characteristic of inpatient ED admissions compared to 2019</p>	<p>Children and adolescents</p> <p>(Partial hospitalization: 13.2; outpatient clinic 14.7)</p> <p>(Partial hospitalization: 93%; outpatient 87.3%)</p>	<p>Virtual appointments (telephone & videoconferencing)</p> <p>Inpatient, partial hospitalization, outpatient</p>	<ul style="list-style-type: none"> · # inpatient hospitalization admissions · Reactivation of ED symptoms · Perceived family relationships 	<ul style="list-style-type: none"> · School-age children received only virtual services more frequently than adolescents · More visits were held during virtual period than same period of the previous year · 41.9% of patients reported a reactivation of ED symptoms · 80% of patients report family 	<p>Strengths:</p> <ul style="list-style-type: none"> · Efficient use of existing data · Large sample size · Longitudinal data availability <p>Limitations:</p> <ul style="list-style-type: none"> · Potential bias and confounding factors due to no control group · Inability to establish causal relationship
<p>Latzer et al. [18]</p> <p>Israel</p> <p>n=20</p>	<p>Descriptive Case Report Study</p> <p>1. Describe specifically developed online therapy model created for Ultra-Orthodox Jewish women</p>	<p>Children and adolescents</p> <p>14.2</p> <p>(100%)</p>	<p>Teleconference & Videoconference</p> <p>Home-based hospitalization</p>	<ul style="list-style-type: none"> · Subjective experiences of Ultra-Orthodox Jewish women receiving ED treatment 	<ul style="list-style-type: none"> · Online therapy as a barrier to treatment progress: <ul style="list-style-type: none"> - Multiple interruptions - Lack of parental meal supervision and nutritional monitoring · Online therapy as an impetus for progress and breakthrough in treatment: <ul style="list-style-type: none"> - Physical distance and degree of closeness with being on camera comfortable - Control gained over exposure created a safe, protective environment 	<p>Strengths:</p> <ul style="list-style-type: none"> · Rich qualitative data · Understudied population <p>Limitations:</p> <ul style="list-style-type: none"> · Small sample size · No qualitative analysis

<p>Pereira et al. [24] Canada <i>n</i>=20</p>	<p>Non-Experimental Exploratory</p> <p>1. Explore the impact of transitioning from in-person family therapy to virtual therapy</p>	<p>Children and adolescents</p> <p>Virtual: 14.3 (100%) In-person: 13.6 (100%)</p>	<p>Videoconference (virtual FBT) Outpatient</p>	<p>· PvA</p> <p>· Weight change at 1 month</p> <p>· % ETW at 3 and 6 months</p>	<p>· No significant difference in weight restoration at 1 month between virtual and in-person groups (<i>M</i>=1.99kg, <i>SD</i>=1.25 and <i>M</i>=1.51kg, <i>SD</i>=0.86, respectively)</p> <p>· No significant difference in %ETW 3 months post treatment between virtual and in-person groups (<i>M</i>=94.97%, <i>SD</i>=3.73 and <i>M</i>=92.80%, <i>SD</i>=2.91, respectively) with a medium effect size (<i>d</i>=0.65)</p> <p>· No significant difference in %ETW 6 months post treatment between virtual and in-person groups (<i>M</i>=96.37, <i>SD</i>=2.99 and <i>M</i>=96.20, <i>SD</i>=1.84, respectively)</p> <p>· 70% of patients in each treatment platform group achieved remission weight (> 95% ETW) 6 months post-treatment</p>	<p>Strengths:</p> <ul style="list-style-type: none"> · Longitudinal study allows for better observation of effects <p>Limitations:</p> <ul style="list-style-type: none"> · Does not account for ED psychopathology (excessive exercising, calorie restriction, body dysmorphia, etc.) · Small sample size · In-person data collected retrospectively via chart reviews
<p>Steinberg et al. [14] United States <i>n</i>=210</p>	<p>Pre/post Observational Cohort Study</p> <p>1. Describe FBT+</p> <p>2. Highlight preliminary outcomes of virtual FBT</p> <p>3. Discuss implications for future ED treatment</p>	<p>Children and adolescents</p> <p>16.1 (83%)</p>	<p>Videoconference (virtual FBT) Outpatient</p>	<p>· Weight</p> <p>· EDE-QS</p> <p>· NIAS</p> <p>· PHQ-9</p> <p>· GAD-7</p> <p>· BAS</p> <p>· PvE</p> <p>· NPS</p>	<p>· Average adjusted weight change post-intervention was 11.3lbs.</p> <p>· 80% of participants on weight restoration plan achieved 95% of ETW by 16 weeks</p> <p>· EDE-QS scores declined weekly over treatment</p> <p>· Depression and anxiety scores decreased over treatment</p> <p>· Caregiver burden decreased and self-efficacy increased over time</p>	<p>Strengths:</p> <ul style="list-style-type: none"> · Large sample size increases generalizability · Measures adequately capture research aims <p>Limitations:</p> <ul style="list-style-type: none"> · Pre/post observational design · Limited variability in participants · Possible self-selection bias

<p>Stewart et al. [22,23] United Kingdom n=53</p>	<p>Mixed Methods</p> <p>1. Explore the experience of youth, parents, and clinicians when treatment transitioned to virtual during the March 2020 COVID-19 lockdown</p>	<p>Children and adolescents > 18</p>	<p>Videoconference Outpatient</p>	<ul style="list-style-type: none"> · Likert scales assessing overall treatment experience · Preference for treatment once restrictions eased · Impact of transition on therapeutic relationship, quality of therapy, perceived benefit, and impact on recovery · Open-ended questions asking about losses and gains from the move to online treatment 	<ul style="list-style-type: none"> · Overall experience was positive, low impact of technology on treatment experience · New patient ratings of perceived treatment benefit and degree important issues can be addressed virtually significantly higher than existing patients · Little impact of virtual care on therapeutic relationship · Four qualitative themes: 1) making it work, 2) home as a therapeutic space, 3) disrupted connection, 4) into the future 	<p>Strengths:</p> <ul style="list-style-type: none"> · Mixed methods provides rich data · Relatively large sample size <p>Limitations:</p> <ul style="list-style-type: none"> · Limited generalizability · Does not address variation in clinical outcomes between in-person and virtual therapy · No demographics collected
<p>Yaffa et al. [19] Israel n=4</p>	<p>Case Series</p> <p>1. Analyze data about the management of adolescent patients with Eds during the COVID-19 pandemic</p> <p>2. Describe four female adolescents with AN treated in different ED settings</p>	<p>Adolescents 14.8 (100%)</p>	<p>Videoconference Home-based telemedicine</p>	<ul style="list-style-type: none"> · Subjective experiences of adolescent females receiving virtual ED treatment 	<ul style="list-style-type: none"> · All treatments were carried out online · Concerns about privacy, particularly in adolescents with AN · Telemedicine interventions were flexible, easily and quickly arranged, and allowed for more accessible treatment hours · Adolescents with AN can be managed with telemedicine in pandemic quarantine conditions 	<p>Strengths:</p> <ul style="list-style-type: none"> · Rich qualitative data <p>Limitations:</p> <ul style="list-style-type: none"> · Limited generalizability due to homogeneity of sample · Small sample size

Result

Setting, samples, and design

The eight studies included in this review were published between 2020 and 2023. Two studies featured Israeli participants [18,19]. An additional two studies were conducted in Spain [20,21], and two in the United Kingdom [22,23]. One study each was conducted in Canada and the United States, respectively [14,24]. The eight studies described 853 participants, with sample sizes ranging from four to 365. The studies featured predominantly female adolescents, with samples between 83% and 100% female.

The most common design type was mixed-methods studies (n=2) [22,23]. Two studies selected case reports by way of descriptive case reports study [18] and case series [19]. One study examined data through a retrospective chart review [21]. One study was an observational cohort study [14], and one was an exploratory non-experimental study [24]. Finally, only one study was a randomized controlled trial [20]. In terms of setting, the majority of studies (n=5) contained participants engaging in treatment in the outpatient setting exclusively [14,20,22-24]. Two studies used a home-based hospitalization setting [18,19]. Only one study used multiple levels of care [21] included participants in inpatient, partial hospitalization, and outpatient settings.

Quality assessment

Studies included in this integrative review were assessed using the Critical Appraisal Skills Programme (CASP) checklist (Critical Appraisal Skills Programme, 2018). The CASP checklists for randomized controlled trials were used, as well as the Joanna Briggs Institute (JBI) checklists for case reports, case series, and cohort studies (Joanna Briggs Institute, 2017). The Mixed Methods Appraisal Tool (MMAT) was used for mixed methods studies (Hong et al. 2018). All eight studies were identified as high quality. Collectively, these studies offer a well-rounded, high-quality body of evidence, supporting the efficacy and adaptability of telemedicine for treating eating disorders in youth, while highlighting cultural and situational nuances that influence treatment outcomes during global crises.

Telemedicine interventions

Types of interventions: The reviewed studies employed a range of telemedicine modalities to address eating disorders in children and adolescents, showcasing the diversity of approaches in this evolving field. Six studies focused exclusively on video telemedicine interventions, where sessions were conducted through video conferencing platforms to deliver therapy, nutritional counseling, and monitoring [14,19-21,23,24]. These interventions aimed to replicate traditional in-person treatment by enabling real-time visual and verbal interaction between patients and healthcare providers, thereby maintaining the therapeutic relationship and allowing for visual assessment of physical and psychological states.

One study [18] combined video telemedicine with telecommunications such as phone calls to provide a more flexible and accessible approach. This hybrid method allowed for continuous support and follow-up outside scheduled video sessions, catering to the varying needs and preferences of patients and families and providing culturally informed care. Another innovative approach involved online intensive programming, which included structured, multi-component treatment modalities accessed through a web-based platform [22]. This comprehensive program offered a blend of video sessions and communication with care teams, designed to provide intensive support and address the multifaceted nature of eating disorders. Collectively, these interventions demonstrate the potential of telemedicine to offer diverse, adaptable solutions for treating eating disorders in young populations, while addressing barriers associated with traditional, in-person care.

Description of interventions: Studies included in this review encompassed a variety of telemedicine interventions tailored to the complex needs of children and adolescents with eating disorders. One study [20] employed personal monitoring via a smartphone application (“app”) combined with regular sessions with therapists, where the app was used for daily self-monitoring of symptoms, mood, and eating patterns, supplemented by periodic virtual therapy sessions to provide individualized feedback and support. Another study [22] focused on virtual Intensive Treatment Programs (ITP), offering a structured and immersive approach that included daily therapeutic activities, psychoeducation, and group support sessions delivered entirely through a digital platform.

A different approach was observed in a study utilizing virtual therapy [21], which consisted of scheduled video sessions with therapists to deliver psychotherapy and nutritional counseling, mirroring traditional outpatient care in a virtual setting. One particularly innovative intervention was home-based hospitalization for Ultra-Orthodox Jewish women [18], where patients received intensive virtual care including daily video check-ins with a multidisciplinary team, continuous remote monitoring, and real-time adjustments to treatment plans, effectively replicating inpatient care in the home environment. Additionally, four studies [14,19,23,24] integrated virtual family therapy, recognizing the critical role of family dynamics in eating disorder treatment. These interventions involved family-based therapy sessions conducted via video conferencing, aiming to engage family members in the treatment process, enhance communication, and provide support in managing the ED at home. Together, these interventions highlight the adaptability of telemedicine to provide diverse, effective, and accessible treatment options for young individuals struggling with EDs.

Key outcomes: Overall, studies indicated positive results both quantitatively and qualitatively. In the Anastasidou study (2020), there was no significant difference between the experimental group receiving both face-to-face therapy and a mobile health intervention and the control group receiving face-to-face therapy only on Eating Disorder Examination Questionnaire (EDE-Q) scores, reflecting the presence and severity of ED psychopathology. Additionally, they found a significantly lower number of emergency department visits, as well as decreased Beck Depression Inventory (BDI) and State-Trait Anxiety Inventory (STAI) scores, suggesting decreased depressive and anxiety symptoms. Additionally, Steinberg and colleagues (2022) identified 80% of participants receiving virtual family-based therapy reached 95% of their Estimated Target Weight (ETW) by 16 weeks of treatment, as well as decreases in EDE-Q scores weekly and depressive and anxiety symptoms, as well as decreased caregiver burden, which lends credibility to the efficacy of virtual health interventions. Another quantitative study [24] found no significant difference in weight restoration in adolescents receiving virtual therapy when compared to those receiving in-person care, as well as meeting 95% of their ETW at 3 months and 6 months post-treatment. Finally, results from Graell et al.’s study [21] found that more visits were held during the COVID-19 lockdowns necessitating virtual care than at the same time the previous year; however, there was a 41.9% reactivation of ED symptomatology, suggesting negative effects of the pandemic on the mental health of young people. Encouragingly, 80% of patients report that family relationships either remained stable or improved with the use of virtual therapies.

Qualitative and mixed-methods studies also suggested telemedicine shows great promise in the treatment of pediatric EDs. Participants in Brothwood’s [22] study rated online ITP positively by youth, however, they felt that online therapy was generally less helpful than in-person. When asked on their preference of continuing virtual care or returning to face-to-face visits, adolescents preferred in-person visits for individual and family therapy sessions, but felt that medication management and

dietetic appointments would be as equally effective if kept virtual. Latzer's [18] study found two main themes: online therapy could be either a barrier to progress in therapy, or an impetus for progress and breakthrough depending on multiple individual and familial factors. Stewart & Colleagues [22,23] found that youth receiving virtual family-based therapy felt online care was positive and reported a low impact of technology on their treatment experience, as well as on the therapeutic relationship. Finally, Yaffa's [19] study suggested some concerns about privacy, particularly in adolescents with AN. However, participants shared that telemedicine visits were flexible, easy, and quickly arranged, which allows for more accessibility to treatment. These results underline the efficacy and acceptability of telemedicine for pediatric EDs.

Discussion

This integrative review evaluated the effectiveness of telemedicine interventions for treating eating disorders in children and adolescents, revealing several significant insights into how digital health technologies can be adapted to meet the complex needs of this population. Findings indicate that telemedicine, including video telemedicine, app-based monitoring, virtual intensive treatment programs, and home-based hospitalization holds substantial promise as a viable alternative to traditional in-person treatment modalities. Studies highlighted that telemedicine can effectively deliver key therapeutic components such as Cognitive-Behavioral Therapy (CBT), nutritional counseling, and Family-Based Therapy (FBT), comparable to traditional care. Studies focusing on video telemedicine reported similar, if not enhanced, clinical outcomes including symptom reduction, weight stabilization, and improved psychological well-being. For instance, patients receiving app-based monitoring combined with therapist sessions demonstrated high adherence to self-monitoring, which correlated with significant improvements in managing symptoms and mood [20]. Virtual ITP also showed positive outcomes, offering structured support that maintained treatment intensity and provided comprehensive care remotely [22]. Moreover, home-based hospitalization allowed for intensive care in a less restrictive environment, yielding positive clinical outcomes while minimizing the disruption to the patient's daily life and family dynamics, allowing for culturally considerate care [18].

Engagement levels with telemedicine interventions were generally high, with several studies reporting increased accessibility and convenience as major advantages [19,20,22,23]. The flexibility of telemedicine allowed patients and families to access care without the logistical challenges associated with traditional in-person visits, such as travel time and geographic barriers. Virtual family therapy in particular enhanced family involvement in the treatment process, facilitating better communication and support within the family unit. These findings underscore the potential of telemedicine to enhance patient and family engagement, a critical factor in the successful management of pediatric EDs.

Challenges and limitations

Despite these promising results, this review also identified notable challenges associated with telemedicine interventions.

Technological issues, including connectivity problems and the need for reliable internet access presented as common barriers that could hinder the effective delivery of telemedicine services. Privacy and security concerns were also significant, as the sensitive nature of eating disorder treatment requires stringent measures to ensure confidentiality. Additionally, maintaining therapeutic rapport and monitoring physical symptoms remotely posed challenges, particularly in severe cases where in-person assessment might be critical. Some studies reported difficulties in achieving the same depth of therapeutic interaction through virtual means as compared to face-to-face sessions.

Methodological considerations

The methodological quality of the included studies varied. While studies were all rated highly by standardized quality assessment checklists, some studies exhibited strong designs such as randomized controlled trials while others were limited by small sample sizes and lack of control groups. The heterogeneity in study designs and outcome measures also posed challenges for synthesizing findings. Future research should aim to standardize outcome measures and incorporate larger, more diverse samples to enhance the generalizability of results.

Conclusion

The findings of this review suggest that telemedicine can be a valuable component of a comprehensive treatment strategy for pediatric eating disorders. Its ability to provide flexible, accessible, and effective care makes it a particularly suitable option in contexts where traditional treatment approaches are limited or unavailable. However, addressing technological and methodological limitations is crucial for optimizing the delivery and efficacy of telemedicine interventions. Future research should focus on refining telemedicine models, exploring hybrid approaches that combine digital and in-person care, and investigating long-term outcomes to better understand the sustainability and impact of telemedicine on patient recovery.

In conclusion, telemedicine presents a promising avenue for treating eating disorders in children and adolescents, offering a range of benefits including enhanced accessibility, patient engagement, and the potential for effective clinical outcomes. While challenges remain, particularly concerning technology and privacy, the integration of telemedicine into eating disorder care holds potential for improving treatment delivery and addressing barriers associated with traditional in-person care. Ongoing research and innovation will be essential to fully realize the benefits of telemedicine and ensure that it can effectively complement and, in some cases, replace traditional treatment modalities.

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