

# Review of Telehealth in Obesity Management

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## ABSTRACT

Telehealth has emerged as an essential strategy for delivering obesity management services, particularly as global obesity rates continue to rise and access to evidence-based care remains limited for many populations. This narrative review synthesizes evidence on the modalities, components, effectiveness, challenges, and future priorities of telehealth in obesity management. Telehealth interventions, including synchronous, asynchronous, and hybrid models, facilitate remote delivery of behavioral counselling, dietary support, physical-activity guidance, and self-monitoring. Evidence across multiple trials demonstrates that telehealth produces weight-loss outcomes and improvements in cardiometabolic risk factors comparable to traditional in-person care, with mean reductions of 2.6–3.6 kg and sustained  $\geq 5\%$  weight loss in more than half of participants after 12 months. Telehealth also enhances patient satisfaction, improves accessibility for underserved groups, and supports long-term adherence through technology-enabled behavior-change strategies. However, disparities in digital access, methodological heterogeneity, limited economic evaluations, and persistent privacy concerns present challenges to widespread adoption. Future directions emphasize technology innovation, rigorous evaluation of hybrid models, improved equity in access, and standardized reporting frameworks. Overall, telehealth represents a viable, scalable, and acceptable approach to obesity management, with the potential to strengthen prevention and chronic disease care across diverse populations.

**Keywords:** Telehealth, Obesity Management, Behavioral Interventions, Digital Health Equity, and Weight Loss Outcomes.

## INTRODUCTION

Obesity is a complex, multifactorial condition and a chronic disease. If left untreated, it is associated with significant health, economic, and psychosocial burdens [1]. The World Health Organization estimated that obesity caused 2.8 million deaths annually worldwide and increased the risk of serious diseases, such as type 2 diabetes, cardiovascular diseases, cancer, and musculoskeletal disorders [2]. Obesity is classified as a national health epidemic and defined as abnormal or excessive fat accumulation that may impair health. Approximately 2.4 billion adults are classified as overweight, out of which 868 million are estimated to be obese [2, 4]. Telehealth interventions increase access to evidence-based obesity care. Telemonitoring, telephone consultations, and mobile applications have been used to deliver lifestyle change programs and enhance weight loss through self-regulation. Interventions have extended care access to underserved populations, such as patients without local obesity programs or limited transport options. Telehealth programs apply the same principles as in-person treatment patterns, delivering effective care remotely on a variety of platforms [1].

### Conceptual Framework and Rationale for Telehealth in Obesity Management

Weight gain results from an energy imbalance between caloric intake and caloric expenditure. Even modest weight loss can lead to improvements in long-term health [3]. Weight-related behaviors such as eating, physical activity, sleep, and emotional health are crucial targets for interventions to manage weight [2]. Telehealth can facilitate obesity management by addressing patient needs when and where they arise, helping to promote change. Incorporating telehealth can increase the efficiency and effectiveness of interventions [1, 4]. In the USA, around 93 million adults experience obesity, along with 25 million children, indicating the pervasive nature of the condition. Evidence-based interventions exist, yet adaptation is necessary to interface with the population.

Clinicians adopted telehealth during the COVID-19 pandemic based on four key factors [5]. The first factor was existing supply. Many people were already familiar with telehealth technologies for other health concerns [6]. Second, it reduced barriers such as limited access to sessions or time constraints. Third, meetings often outweighed the additional burden of adhering to a health-related framework. Finally, behavioral health professionals recognized substantial health and psychosocial issues stemming from the pandemic, influencing the decision to arrange telehealth provision [1, 5].

### **Telehealth Modalities and Intervention Components**

Telehealth in obesity management encompasses a spectrum of approaches, each characterized by diverse telehealth modalities and intervention components [4]. Telehealth modalities can be systematically categorized according to the type of communication (synchronous or asynchronous) and the format of the interaction (e.g., audiovisual, written, or sensor data) [1, 5]. These modalities correspond to barriers targeted by a range of behavior change techniques, which are based on established theoretical frameworks and align with the concepts of telehealth frameworks [7]. Telehealth modalities refer to the specific technologies or channels used to conduct distance interventions [1, 5]. To maximize reach and engagement, obesity telehealth programs can use several communication modalities, drawing from the behavioural and social sciences [4]. Obesity telehealth interventions generally adopt either a synchronous or an asynchronous approach, and the choice of modality can influence both intervention strategies and expected outcomes [8]. Synchronous communication incorporates real-time interaction between the patient and a provider, whereas in asynchronous communication, the two parties do not interact in real time; the provider transmits messages to the patient when convenient, and the patient responds when convenient [6]. An added layer occurs when the telehealth intervention operates over several visits, with specified activities between the sessions that may include tables, questionnaires, or behaviour tracking via apps, websites, or data transmission [7].

### **Synchronous Technologies**

Telehealth interventions may be delivered to groups or individuals. Group interventions allow individuals to receive instruction and support from multiple practitioners, and encourage sharing of motivation, experience, and compliance strategies with peers [2]. These group sessions may follow a synchronous (real-time) or asynchronous (store-and-forward) model, with feasibility, acceptability, and efficiency remaining uncertain for high-frequency, synchronous telehealth-based programs [1]. Individualized telehealth programs deliver tailored counselling and facilitation by a single practitioner or team in a serial, or multi-stage, format [3]. Compared with standard care, an eight-session, individualized telehealth program delivered by a dietitian in a serial format improved key mail-based measures of dietary intake, eating behaviour, and barriers within a structured obesity prevention framework [5]. Additional telehealth sessions did not further enhance dietary intake or behaviour, suggesting a preliminary eight-session telehealth programme could be effective in this context and substantive gains have already been achieved [3].

### **Asynchronous Technologies**

Telehealth encompasses a range of technologies that enable real-time and asynchronous communication between patients and clinicians [3]. The former includes video calls or audio interactions at scheduled times, while the latter consists of pre-recorded messages, photographs, text-based exchanges, health-data transmission, or mobile applications that allow patients to self-manage between sessions [10]. With asynchronous technologies, clinicians initiate contact with patients outside fixed appointments. Communications often involve advice and encouragement tailored to health data or established goals, enabling more responsive care [4]. Remote global positioning system access can indicate patient activity levels, which informs clinician-provided support [1]. Automated reminders sent directly to patients also feature in some interventions.

### **Hybrid Models**

Hybrid models combine synchronous and asynchronous approaches, allowing greater flexibility and a nuanced balance of clinician and patient control [6]. Care pathways typically consist of a combination of synchronous and asynchronous sessions in cycles [2]. During the initial in-person visit, the care team gathers comprehensive data. Initial synchronous telehealth sessions, focusing on education and monitoring, support the establishment of client goals, review of food and activity data, troubleshooting, and encouragement [3]. Subsequent asynchronous exchanges enable continued signaling of non-verbal support while freeing the clinician to examine additional cases. Shared applications and recorded messages enhance the value of the information transmitted and add flexibility to scheduling [5, 6].

### **Behavioral and Clinical Interventions**

Video-based consultations and applications for remote data collection constitute widely studied telehealth modalities for managing pediatric obesity [3]. Telehealth can significantly improve intensive, multidisciplinary dietary and physical activity programs among children at elevated risk of obesity and weight-related comorbidities [3]. Modality demonstrates reduced attrition and comparable change in z-body mass index (zBMI) during

maintenance phases for rural patients [2]. Telephone-based nutrition support further facilitates post-bariatric weight management, increasing satisfaction with the program and enabling patients to adhere more frequently to behavioral recommendations. Lifestyle-oriented interventions form the most important category of obesity management based on telehealth delivery [7]. They incorporate high-level behavior change techniques, including goal setting and action planning, usually combined with counselling focused on nutrition, physical activity, and sleep. Behavioral self-monitoring and feedback are standard applications of telehealth are frequently included [5].

#### **Evidence Synthesis: Effectiveness of Telehealth in Obesity Management**

Obesity and obesity-related chronic diseases are associated with excess mortality and reduced quality-adjusted life years [1]. Despite the widespread availability of obesity management services, access to care appears limited, particularly for those living in rural and remote communities [5]. Telehealth technologies, defined as the remote delivery of health care using telecommunication technologies, can facilitate access to behaviour-based obesity management by enabling the remote delivery of synchronous (real-time) and asynchronous (store-and-forward) communication modalities and a range of clinical, counselling, and self-monitoring components [6]. Multiple reviews suggest telehealth-based obesity management produces weight loss and improvements in cardiometabolic risk factors similar in magnitude and durability to those attained with in-person care [7]. Available multicomponent trials indicate comparable outcomes with telehealth versus standard in-person treatment.

#### **Weight Loss and Weight Maintenance Outcomes**

Evaluation of telehealth's effect on weight loss and weight maintenance reveals a consistent mean reduction of 2.6 kg and an overall mean difference of -2.8 kg comparable to standard care in 20 studies (n = 5,289) involving 15 discrete telehealth interventions [11]. The median weight change at endpoint assessment from 16 observational studies is -3.6 kg (range: -0.3 to -14.5 kg) with 10-kg or higher loss attained by 11.6% of participants at 12 months. Similarly, 59.6% of the cohort sustained weight loss of  $\geq 5\%$  from baseline after 12 months [11]. Evaluations involving exclusively electronically delivered interventions and direct comparison against in-person modalities report end-of-study participants maintaining substantial reductions [13]. A hybrid intervention approach, which coordinates nutrition and exercise support across telehealth and in-person channels, further illustrates the durability of observed effects and parallels outcomes of in-person care [6]. Some prospective trials and retrospective reviews from weight management programs that originally adopted telehealth as an emergency transitional measure also described sustained improvements in body weight and cardiometabolic risk factors while providing direct comparisons to traditional approaches [8]. Adopting telehealth within behavioural weight management across both pandemic-related adjustments and subsequent periods of ongoing restriction has consequently been associated with similar and in some instances superior weight-loss outcomes when assessed either at intervention conclusion or at long-term follow-up compared to the corresponding standard of care [8].

#### **Cardiometabolic Risk Factors**

Weight loss is among the most commonly adopted goals in telehealth-supported obesity interventions, and reductions in BMI, body weight, waist circumference, and/or percentage of body fat collectively constitute the primary outcome [9]. Yet, telehealth delivery of dietary and lifestyle counseling can also reduce obesogenic behaviors and modify cardiometabolic risk factors, such as blood pressure, lipids, glucose, insulin resistance, and other biomarkers, even without substantial weight loss [10]. Cardiometabolic parameters that may be targeted through telehealth interventions include blood pressure, lipids (including total cholesterol, low-density lipoprotein cholesterol, and triglycerides), glucose levels (including fasting glucose and HbA1c), and indicators of insulin resistance (such as HOMA-IR) [10]. Among the few trials of telehealth obesity management to formally assess this cluster of risk factors, changes of various magnitudes have been observed [8].

#### **Behavioral Health and Adherence**

The current obesity epidemic has caused increased interest in simplifying interventions and extending scalability, which directly influence adherence to healthy behaviors [10]. The potential role of technology in maintaining weight-loss motivation and further facilitating treatment or prevention studies has also been widely investigated [11]. The increased availability of different telehealth modalities and various technologies affords interactive, behavior-centric approaches tailored to patients' everyday lives [11]. The COVID-19 pandemic magnified the requirement for innovative and resilient solutions across diverse disciplines, sparking increased exploration of telehealth, remote interventions, and self-management [10]. For self-directed efforts that follow prior structured telehealth programs, layering augmented reality and gamification principles together with advanced messaging capabilities into predictive systems that trigger motivation-enhancing and nudging messages based on individual inactivity during high-risk time frames serves as a focal area of interest [6].

#### **Safety, Acceptability, and Patient Satisfaction**

Few adverse events were reported in telehealth interventions for obesity. Available evidence suggests a lack of safety signals for telehealth approaches alone or integrated with other care modalities [3]. Surveys of participants in telehealth obesity interventions note overall intervention acceptability scores above the midpoint on 5-point

scales. Although telehealth is not universally embraced, participants generally judged telehealth-based strategies as useful, acceptable, and satisfactory [1]. Various telehealth weight-loss interventions yielded overall functional satisfaction scores exceeding 90% on 5-point Likert scales [6]. High teleconsultation satisfaction scores remain consistent before and after the onset of the COVID-19 pandemic.

#### **Access, Equity, and Implementation Challenges**

Implementing telehealth for obesity management raises distinct access and equity challenges that deserve dedicated exploration [12]. Disparities based on age, socioeconomic status, race/ethnicity, and urban versus rural residence, coupled with varying levels of digital literacy, substantially limit uptake in diverse populations. Moreover, economic considerations influence implementation, sustainability, and access [14]. The cost-effectiveness of telehealth remains uncertain due to a lack of extensive economic evaluations in the obesity domain. Furthermore, reimbursement policies and ongoing coverage of telehealth modalities directly affect care availability [12]. Finally, the COVID-19 pandemic has underscored the urgent need for secure data practices that protect patient privacy while allowing remote access to care [13]. Access in diverse populations is particularly critical for candidates likely to benefit from telehealth. For example, telehealth has enhanced participation in rural weight-management programs, yet obesity prevalence remains higher among rural than urban veterans [13]. High patient satisfaction accompanies telemedicine delivery in these areas, but weight-management outcomes have not improved. Similarly, veterans seeking assistance face varied obstacles, including insufficient nearby programs, family support, workforce shortages, and time constraints hindering video visits [14].

#### **Access in Diverse Populations**

Access, equity, and implementation challenges represent key barriers to telehealth adoption across diverse populations [11]. Telehealth access is unequal for age groups, socioeconomic status, race/ethnicity, and rurality versus urbanity [12]. Patients from historically marginalized groups, including older individuals and those with lower incomes, education, and digital literacy, tend to report lower telehealth access [14]. Telehealth has become increasingly challenging for certain patients with complex needs and housing instability, as rural patients struggle to secure broadband internet and urban patients without a permanent address have difficulty obtaining telehealth services [15]. Older participants have also expressed concerns regarding the safety of online video platforms and have reported technology learning curves that are time-consuming and problematic [8].

#### **Economic Considerations and Health Care Utilization**

Providing body weight management services through telehealth may confer efficiency and cost benefits [2]. Economic analyses of telehealth interventions for obesity management in adults have demonstrated accumulated savings from reduced health services use and health care-related travel, leading to improved overall cost-effectiveness [7]. Despite studies investigating the economic aspects of telemedicine interventions, comprehensive evaluations remain limited [9]. A systematic review of adult obesity interventions indicated that although logistical costs, staff-level investments, and session frequency remain poorly documented, the majority of programs report some level of health insurance reimbursement. Telehealth obesity services currently function most effectively as adjuncts to standard care within traditional clinical settings [13]. An individualized motivation-based telehealth intervention tackling obesity, built upon existing resources embedded within a typical clinic workflow, demonstrated economic advantages alongside clinical outcomes. The cost-effectiveness model estimated average total intervention costs of approximately \$700 over 18 months across clinics in diverse settings [13]. At 12 months, estimated weight loss per participant across all clinics exceeded 7.5 kg, and incremental cost-effectiveness ratios fell below the ranges reported for several insurance classes [12]. In addition to facilitating economic assessments, straightforward mathematical models based on readily accessible clinical variables have emerged to quantify, analyze, and illustrate patterns of obesity-related health care utilization under different intervention scenarios [14].

#### **Data Privacy and Security**

The implementation of telehealth for the management of obesity and associated lifestyle and clinical risk factors may expose data and images collected to unintended disclosure [13]. In recent years, the expansion of telehealth across a multitude of stakeholders and settings has contributed to an increase in potential risks [12]. Unregulated modes of telehealth delivery have expanded the types of interactions, participants, and broadcast capabilities, heightening privacy concerns and chances for unintentional, inappropriate, and unnecessary disclosure [12]. The facilitation of connected health using online consumer tools without mature health information (HI) exchange capabilities has raised similar concerns, as tools that do not accommodate HI exchange may lead users to engage in behaviours that expose personal health information unwittingly [14]. Although the HI patterns associated with connected health are ubiquitous and often unrecognized, their prevalence has naturally attracted the attention of services that deliver connected health based on widely distributed HI [13].

### **Integration with Traditional Care and Care Coordination**

Significant weight loss often requires multifaceted treatment approaches, yet many patients cannot access them [12]. Programs to change dietary habits, physical activity, and behavioral patterns are commonly offered in person as part of weight-loss interventions or treatments to prevent weight gain or regain after dieting [14]. Referral pathways allow patients who require multidisciplinary approaches to access supportive services not otherwise available within their primary care clinic [13]. Coordination of telehealth weight-management services with traditional in-person care through shared care-team dashboards, direct-chat capabilities, and telehealth video links can be beneficial [15]. Integration into workflows ensures timely follow-up for patients, optimizes telehealth treatment, and maximizes forum and channel options [12].

### **Gaps in Evidence and Methodological Considerations**

The existing literature on telehealth in obesity management has some methodological limitations. Most studies are unblinded, uncontrolled, and of similar design, raising the possibility of systematic bias [15]. Studies also exhibit considerable heterogeneity in intervention designs, modes of service delivery, and behavioural targets [12]. The lack of standard reporting for either the study methodology or the intervention itself diminishes the capacity to draw firm conclusions [14]. Additionally, measurement of outcomes remains inconsistent across studies, with several key telehealth outcome measures yet to be investigated [12]. There is also very limited reporting of independent replicability and conceptual fidelity concerning the delivered telehealth format, further compounding the issue [13].

### **Future Directions and Research Priorities**

A comprehensive synthesis of data collected during the past two decades identified nine priority research areas to enhance telehealth services for obesity management [14]. The need for additional evidence to support the implementation of obesity telemanagement programs remains urgent, even as solutions continue to evolve. In addition to clarifying clinical and economic effectiveness and documenting the experiences of specific populations [1], the following foci highlight avenues for innovation [15] and methodological rigor [15]. Which innovative telehealth tools and modalities can shape the future landscape of obesity care? Emerging devices and methods warrant attention. Examples include tone-based feedback, voice-transcribed journaling, connected community resources, and new-generation apps designed for previously underserved populations such as patients living in crisis or communities that care [15-18]. What is the clinical and economic impact of telehealth for obesity management in comparison with standard in-person approaches? The relative effectiveness of contemporary telehealth solutions, including hybrid approaches and technology-assisted interventions across diverse populations and behaviors, remains unclear. In which additional populations can telehealth improve obesity care? Pediatric groups or mobile-skills communities have been suggested as valuable foci [14]. Commercially and privately funded programs that allow for healthy population monitoring also merit exploration. Which methods of evidence synthesis adequately capture the diversity of telehealth solutions for obesity management? Approaches such as the traditional systematic review and realist synthesis might be appropriate [15]. What constitutes an effective and efficient economic evaluation of obesity telehealth? The range of tools and procedures will depend on the methodology used to assess health, but it is likely to extend beyond the traditional cost-effectiveness analysis [19-21].

### **CONCLUSION**

Telehealth has become a transformative tool in the management of obesity, offering a scalable, patient-centered, and flexible approach that aligns with contemporary healthcare demands. The evidence synthesized in this review demonstrates that telehealth modalities, including synchronous, asynchronous, and hybrid models, can achieve clinically meaningful weight loss, support weight maintenance, and improve cardiometabolic health outcomes at levels comparable to traditional in-person interventions. These approaches also enhance behavioral adherence through real-time feedback, continuous monitoring, and personalized goal setting. Despite these benefits, telehealth implementation is not without challenges. Persistent disparities in digital literacy, broadband access, socioeconomic status, and technological readiness continue to limit equitable uptake, particularly among older adults, rural populations, and socioeconomically disadvantaged groups. Furthermore, gaps in methodological rigor, inconsistent outcome reporting, and insufficient economic evaluations constrain the ability to draw definitive conclusions about long-term cost-effectiveness and sustainability. Privacy and data-security concerns remain central barriers that must be addressed through stronger regulatory standards and secure telehealth infrastructures. Looking ahead, the future of telehealth in obesity management will depend on innovation, integration, and inclusivity. Hybrid care models that seamlessly combine remote and in-person services may optimize outcomes by leveraging the strengths of both modalities. Advanced technologies, including gamification, sensor-based monitoring, predictive analytics, and culturally tailored platforms, offer promising avenues for improving engagement and long-term adherence. Expanding research to underserved, pediatric, and high-risk populations, along with the development of standardized frameworks for evaluating telehealth interventions, will

be crucial. In conclusion, telehealth is a powerful and increasingly indispensable component of modern obesity care. When integrated into coordinated, multidisciplinary frameworks, it can expand access, improve health outcomes, and contribute significantly to global efforts aimed at reducing the burden of obesity and related chronic diseases.

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