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Review

Exploring the Effectiveness of Supporting Dietary Weight Loss Interventions with Health Coaching and Telemonitoring: An Integrative Nutrition Approach

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Abstract: Health coaching and telemonitoring are both considered a growing healthcare strategy that focuses on a patient-centered motivational approach to support behavior change and enhance adherence to health goals including dietary interventions. This review aimed to define and describe both health coaching and telemonitoring in weight management interventions, including a literature review on the effectiveness of incorporating health coaching and telemonitoring into dietary weight loss interventions, addressing the ongoing global challenge of obesity and its associated health risks, including diabetes and cardiovascular disease. Traditional dietary interventions often yield initial weight loss, however sustaining these results remains difficult due to factors associated with lifestyles and motivation. Health coaching offers a personalized support and guidance to help clients establish and maintain healthier habits by setting achievable foals and building self-efficacy and fostering accountability, whereas telemonitoring via digital tool such as mobile apps and wearable devices provided tracking dietary and health measures allowing continuous monitoring and self-awareness. Our review of randomized controlled trials (RCTs) from the past decade confirms that combining health coaching with telemonitoring improves weight loss outcomes, enhance adherence to lifestyle changes and positively impact chronic condition markers such as blood pressure and HbA1C levels. These integrated interventions also show promise in boosting mental well-being and enhance the quality of life. Findings highlights the potential of such integrative approaches in creating a sustainable, accessible, and scalable weight management in particularly for individuals at risk of obesity related health issues. Future research should focus on optimizing health coaching and telemonitoring tools to accommodate diverse populations for a long-term adherence.

Keywords: RCT; weight loss; telenutrition; health coaching; telemonitoring; integrative nutrition

1. Introduction

Obesity is still considered a major global burden, where rates are increasing over the past decades as seen in the world health statistics [1]. The WHO estimates that there are around 650 million people that are classified as obese, Furthermore, several health issues are associated with obesity which include diabetes[2], cardiovascular diseases [3] and certain cancers [4], highlighting the importance of conducting sustainable weight loss programs [5]. The main approach in weight loss programs involves dietary interventions, which aim to reduce caloric intakes micronutrition composition and metabolic health while evidence consistently supports the efficiency of dietary interventions in promoting short term weight reductions [6]. While these interventions have been showing effective weight reductions, long-term weight loss remains challenging for many individuals [7]. Numerous studies confirm the efficiency of dietary interventions in achieving initial weight loss. For instance, meta-analysis of randomized controlled trials (RCTs) has demonstrated that both calorie restriction and low carbohydrate diets can lead to clinically significant weight loss

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over short periods (3 to 6 months) [8,9]. Furthermore, intervention such as intermittent fasting and meal replacement have shown promise in specific populations, such as those with metabolic syndrome and insulin resistance[10]. Studies also show that dietary interventions can improve cardiovascular markers such as cholesterol and blood pressure, blood glucose and overall metabolic health [11]. Thus, limitations and challenges have been defined in such interventions, despite the initial success. Firstly, adherence to dietary interventions often declines over time due to various factors, including lifestyle demands, food environment, and psychological factors such as stress or emotional eating [12]. Many individuals struggle to sustain restrictive diets or maintain weight loss once the intervention period ends [13]. This suggests that without continuous support, even individuals with string motivation may find it difficult to sustain in new eating patterns in long term weight management programs. Given these challenges, new research has been directed towards exploring new strategies to improve effectiveness of dietary interventions, among those strategies, are health coaching and telemonitoring, which have gained evident attention. Health coaching, which involves personalized guidance and motivation aims to facilitate behavior changes by addressing individuals' barriers and fostering self-efficiency in dietary and lifestyle modifications [14]. Health coaches who may be dietitians, nurse or any trained wellness professional works closely with clients to set achievable goals, monitor progress and offer support as they enhance engagement to the weight loss program [15]. Telemonitoring on the other hand may also be considered a supportive strategy via digital health technologies, such as mobile apps, wearable devices and online platforms to monitor health metrics remotely. The method enables continuous tracking of dietary habits, physical activity and other health indicators allowing both clients and healthcare provides to assess progress and make a positive reflection on weight loss interventions due to continuous monitoring and motivation [16]. The integration of health coaching and telemonitoring into dietary interventions may offer promising approach for enhancing weight loss outcomes [17,18]. This literature examines the current evidence on the effectiveness of these combined strategies in supporting dietary weight loss interventions, with an emphasis on understanding their individual and synergistic impacts. By exploring studies on the standalone and combined roles of health coaching and telemonitoring, this review aims to clarify their potential as tools for facilitating sustained weight loss and improved health outcomes.

2. Materials and Methods

A comprehensive literature search was carried out using the keywords "RCT", "weight loss", "Diet", "health coaching", and "telemonitoring". The selected strategy was directed towards defining/describing mechanisms of support systems to dietary interventions, which included health coaching and telemonitoring integrated in weight management intervention for weight loss and improving chronic conditions markers. We also aimed to provide a constructive analysis of (31) previous randomised controlled trials (RCTs) carried on health coaching and/or telemonitoring for weight management. Full texts of published articles were reviewed for the past 10 years (2014-2024) via PubMed and Google Scholar databases and duplicate articles were excluded from the research findings.

3. Results

3.1. Health Coaching as a Support for Weight Loss Interventions

Health coaching is an emerging strategy in healthcare that emphasize a patient-centered, motivational approach to facilitate behaviors change and improve adherence to health-related goals. In the context of dietary weight loss interventions, health coaching services as a form of structures support that helps individuals develop and maintain sustainable dietary habits, overcome barriers to change, and improve their confidence in managing their health. Studies have showing that health coaching has consistently demonstrated positive impact on dietary adherable , weight loss and lifestyles when compared to interventions without health coaching [19]. In the study 44 obese

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participants have enrolled being randomly divided into two groups health coaching group HC (n = 22) or control (n = 22) groups. By providing personalized guidance, health coaches can significantly enhance the effectiveness of dietary interventions where 15.7% of weight loss was seen in HC group compared to 2.5% seen in control group for a total of 12 weeks. Health Coaching is an effective approach that integrates formal education with health treatment in weight loss journey. Yet more randomized studies are required to confirm its impact on chronic disease markers [20]. In addition to the cost that may encounter hiring health coaches, specifically in low-source settings or for individuals without comprehensive health insurance coverage additionally, the effectiveness of health coaching may vary fur to coaches training and client-coach relationships and individuals differences in motivation and readiness for a change [21,22]. There are several mechanisms that are involved in health coaching which is described in three steps [23];

- Goal setting and personalization enable clients to set realistic, achievable goals that align with improving their lifestyles to be able to lose weight.
- Motivational support and self-efficiency help clients overcome struggle sand build confidence in their ability to adhere to dietary changes. Coaches use motivational interviewing to encourage clients to expose reasons for wanting to lose weight.
- Behavior reinforming and accountability by providing regular feedback, encouragement, and reinforming, which may help client to adhere to their diet over a longer period of tie.
- Problem solving and coping strategies by addressing obstacles to dietary adherence and finding suitable solutions for clients, which include emotional earing, social pressure or lack of meal planning skills.

3.2. Telemonitoring as a Support for Weight Loss Interventions

Telemonitoring refers to the use of digital health technologies that remotely monitor and manage health status. In weight loss interventions, telemonitoring acts as a tool to provide a continuous assessment for weight measures, dietary adherence and lifestyle changes such as physical activity. This approach is believed to enhance motivation through reflection and continuous monitoring. Numerous studies have examined the impact of telemonitoring on dietary adherence and weight loss outcome. In the Active Body Control Program ABC have shown significant impact on weight loss, which is a telemonitoring based program [24]. A systematic review have examined studies on self-monitoring or so called telemonitoring on diet, exercise and self-weighting from 1993 to 2009 showed that there is a strong link between self-monitoring and weight loss [25]. While Telemonitoring holds promise as a supportive tool in weight loss, it is not without challenges. Main limitation is the technical barrier and digital literacy [26], where it requires a specific level of familiarity with technology, which may be a struggle to the elderly [27], where it requires support of care givers or members of the family. Also access to smartphones or wearable devices may be expensive to be adapted as part of the routine [28]. Thus, engagers and sustainable users are considered major limitation, where literature have shown that clients respond to telemonitoring well at the initial period of the weight loss intervention and then with time, clients lose interest and motivation, where response rate becomes so low[29]. Mechanisms associated with such positive outcome include the following:

- Continuous tracking and real-time feedback which enables clients to track their dietary and exercise behaviors daily as it creates a greater awareness of their eating patterns.
- Data-driven personalization which allows personalized feedback and intervention adjustment. This enables health professionals and health coaches to monitor trends in the day as any changes that happen in physical activity for example results in tailored recommendation as well.
- Support for long-term behaviors change which may establish health habits by making behaviors tracking a routine part of the day to day lives.

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3.3. Integrative Approaches: Combining Health Coaching and Telemonitoring

Combining health coaching with telemonitoring represents a promising approach to improving the efficiency of dietary weight loss interventions. Each approach has a unique strength, where health coaching offers personalized guidance and motivational support, while telemonitoring provides continuous feedback and accountability. Together, these methods address both the behaviors and logistical barriers to sustained dietary adherence, making it easier for clients to implement and maintain dietary changes over time. According to previous research, promising outcomes have been revealed showing that an integrative approach supports weight loss for a longer period. A study have aimed to examine adherence to remote monitoring devised and weekly rate of weight loss (RWL) in a 12 week online weight management combined with weekly video based health coaching, showed a significantly greater weight loss compared to the control group [30]. Kepm et al (2019) have compared between the effect of a telemedical coaching (TMC) with or without telemonitoring on weight loss among occupational healthcare professionals in a three-armed randomised controlled trial. Results have showed significant support to weight reduction with an added improvements when both strategies are combined [17].

3.4.Effectiveness of Randomized Controlled Trials (RCT) Supported with Telemonitoring and Health Coaching on Weight Loss and Related Chronic Conditions Risk Factors

Table 1 demonstrates Randomized Controlled Trials (RCT) conducted between 2014-2024 to evaluate the effectiveness of interventions on weight loss and related risk factors. Studies have implemented different models such as telemedical support, mobile apps and self-monitoring tools. While populations across the studies also varied(prediabetic patients, type 2 diabetic patients, hypertension patients and obese patients and specific type of groups, which included pregnant women and young adults that are at higher risks of obesity). Duration times were between 12 weeks and 24 months. Short term interventions have focused on immediate outcomes, such as weight loss, waist circumference and dietary improvements, while long term interventions have measured improvements in chronic conditions such as blood pressure and HbA1c levels. Accordingly, we have divided our data to four categories:

- Weight loss and physical activity, showing significant weight loss and increased physical activity particularly with using video conferencing, telehealth or app-based coaching.
- Health and behavior markers, such as HBA1c, blood pressure and lifestyles factors (dietary adherence and sleep), were reported to be improved.
- Diabetes and gestational health were shown in some studies to support blood glucose control and reduce neonatal complications.
- Mental health and self-efficiency where some interventions showed an enhance life satisfaction, mood and self-efficiency, especially with those incorporating motivational interviewing and coaching support.

Table 1. Published interventions on dietary weight loss programmes [supported with telemonitoring and/or health coaching].

Citation	Year	Population	Intervention	Duration	Outcomes
1. [31]	2014	101 adults with diabetes in rural communities	Nurse telehealth coaching/ motivational interviewing vs. usual care	9 months	Higher self-efficacy scores in the intervention group with positive impact on long-term behavioral change
2. [32]	2014	212 primary care patients with BMI ≥ 25 kg/m2	MyFitnessPal app usage with support vs. usual care	6 months	Minimal weight change with no significant difference between groups
3. [33]	2014	18 low-income, obese mothers within 1 year postpartum	Technology-based with self-monitoring, biweekly counseling, and Facebook group	14 weeks	Significant weight loss in intervention group (-2.9 kg) compared to control; 33% of intervention group lost >5% of initial weight
4. [34]	2014	404 overweight/obese college students	Social and mobile media-based intervention vs. informational web-based program	24 months	Short-term weight loss at 6 and 12 months in intervention; no significant difference at 24 months
5. [35]	2014	404 overweight/obese college students	Facebook-based weight loss content and support group	21 months	Varied engagement; higher interaction with polls and photos; weight loss engagement diminished over time
6. [36]	2015	154 adults, BMI 25-45 kg/m2	Internet-based behavioral weight-loss program	6 months	Significant weight loss in intervention group compared to control; 5% body weight loss in 48% of intervention
7. [37]	2015	339 individuals with prediabetic range fasting glucose or HbA1c	Automated behavioral intervention (Alive-PD) with web/ mobile support	6 months	Significant reductions in HbA1c, body weight, BMI, waist circumference, and TG/HDL ratio
8. [38]	2015	205 obese men in worksite weight loss program	Tailored text-messaging + 4 education sessions + monthly counseling vs. education alone	6 months	No significant difference in weight loss between intervention and control groups

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9. [39]	2015	365 young adults aged 18-35, BMI ≥ 25 kg/m2	mHealth intervention via smartphone vs. personal coaching	24 months	Significant weight loss in personal coaching group at 6 months; no difference at 24 months
10. [40]	2015	138 patients with type 2 diabetes.	Participants received a health coaching intervention with and without mobile phone monitoring in supporting health behavior change and HbA1c reduction	6 months	Significant reductions in HbA1c, weight and waist circumference. Both groups improved mood, life satisfaction, and quality of life
11. [41]	2016	Chronically ill patients across three campaigns (chronic disease, heart failure, mental health)	Telephone-based health coaching with motivational interviewing and shared decision-making	2 years	Reduced mortality in chronic and heart failure groups; increased hospital readmission in some subgroups
12. [42]	2016	54 women with BMI ≥ 27.5 and elevated breast cancer risk	MyFitnessPal + Fitbit for tracking, with 12 coaching calls vs. usual care	6 months	Significant weight loss and increased physical activity in the intervention group
13. [43]	2016	351 obese adults aged 21-65 with comorbidities	Digital health intervention with self-monitoring and regular coaching vs. usual care	12 months	Improved health markers including weight, BP, HbA1c; ongoing follow-up for sustainability analysis
14. [44]	2016	Overweight/obese college students, 18-35 years old	SMART program with social and mobile media elements	24 months	Limited short-term weight loss; no sustained reduction at 24 months
15. [45]	2017	62 young adults aged 18-25 with BMI 28.5 kg/m2	Smartphone app + health coaching vs. control group	3 months	Significant reductions in weight, BMI, and waist circumference in intervention group
16. [46]	2017	54 overweight or obese pregnant women	SmartMoms lifestyle intervention via mobile app or in-person vs. usual care	Until childbirth	Reduced likelihood of exceeding weight gain guidelines in intervention groups; remote intervention cost-effective
17. [47]	2017	120 patients with T2DM and abdominal obesity	Fully automated ANODE program for diet and physical activity vs. general advice	16 weeks	Improved diet quality index, body weight, waist circumference, and HbA1c in intervention group

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18. [48]	2017	25 obese adults	Telehealth-based weight loss with video coaching vs. control	12 weeks	Significant weight loss in intervention group (7.3 kg vs 1.2 kg_
19. [49]	2018	180 overweight employees	Telemedical coaching with monitoring vs. control	12 weeks & 12 months follow-up	Long-term weight reduction and improved cholesterol and blood pressure
20. [50]	2018	30 adults with BMI ≥30 kg/m², indicating obesity	Health coaching delivered through either videoconferencing or in-person sessions.	12 weeks	Significant weight loss and increased steps/day in the VC group compared to the other groups
21. [17]	2019	Overweight employees	Telemedical coaching with telemonitoring vs. control groups	12 months	Significant weight loss sustained at 12 months in telemedical group; reduced BMI and improved behavior
22. [51]	2019	105 adults with overweight or obesity (BMI 25-45 kg/m2)	MyFitnessPal app for weight and diet self-monitoring	12 weeks	No difference in weight change between groups
23. [52]	2020	319 adults with type 2 diabetes	Nurse coaching + mHealth technology vs. usual care	9 months	Improved diabetes self-efficacy and physical activity; short-lived decrease in depressive symptoms
24. [53]	2020	297 adults with uncontrolled hypertension	AI-based smartphone coaching app vs. tracking app	6 months	No significant difference in blood pressure reduction; slight improvement in blood pressure self-efficacy
25. [54]	2020	116 overweight/obese adults aged 19-65	Enhanced m-health (physical activity, diet, sleep) vs. traditional m-health vs. control	12 months	Increased resistance training and reduced energy intake in intervention groups; no significant difference in weight loss compared to control

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26. [55]	2021	340 women with gestational diabetes	Habits-GDM app for lifestyle monitoring vs. usual care	Gestational period	Reduced glucose readings in intervention; lower neonatal complications in intervention group
27. [56]	2023	1163 type-2 diabetec patients	Telemedical Lifestyle Intervention Program (TeLIPro)	12 months	Significantly improvements in HbA1c, body weight, body-mass-index, quality-of-life, and eating behaviour in the TeLIPro group.
28. [57]	2024	50 overweight/obese adults	Telenutrition with telemonitoring and health coaching vs. diet alone on the weight and body composition	6 months	Significant reduction in weight, BMI, fat % in intervention group; improvement sustained at 6 months
29. [58]	2024	50 overweight/obese adults	Telenutrition with telemonitoring and health coaching vs. diet alone on the GNKQ scores	6 months	Significant increases in overall nutrition knowledge and specific areas such as the diet-disease relationship and weight management and a significant negative association with BMI and visceral fat percentage
30. [59]	2024	50 overweight/obese adults	Telenutrition with telemonitoring and health coaching vs. diet alone on the DASS scale	6 months	Significant decrease in anxiety scales when compared and a moderate significant positive correlation between changes in waist circumference and depression sclaes.

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Discussion

Among all the reviewed studies, the 12-week telehealth-based weight loss program using conferencing health coaching had the highest weight loss rate, where significant average weight loss of 7.3 kg (about 7.16% of body weight), compared to 1.2kg in the control group, with 69% of participant achieving clinically significant weight loss. The weight loss rate was notably higher than other interventions in terms of percentage of body weight lost over a short period of time. This program highlights the effectiveness of frequent, structured video coaching sessions with health professionals in promoting substantial weight loss withing a short time frame [48]. This is explained due to the fact that health coaching has a strong impact on particioants' motivation and commitment to follow a specific diet. According to a previous study, particioants who received health coaving have rated that program they joined is highly in motivation, concept, acceptance and feasability[60], including health coaching approaches in changing behaviour using different models, wuch as behaviour change techniques (BCTs), which has been proved previously to reduce HBA1C and risks of chronic diseases [61]. On the other hand, long term RCTs have shown more promising results not only with weight loss but also with other health measures. For example, when digital self-monitoring combined with regular coaching to improve diet, physical activity and health behavior, results revealed significant impacts not only on weight loss but also on blood pressure and HBA1c. [43]. Which is explained due to the involvement of self-monitoring component that support participant engagement and self-efficacy which are both critical for sustaining lifestyle changes. Yet, while the study demonstrates effective weight loss and health improvements, the reliance on digital self-monitoring may limit accessibility for individuals with lower technological literacy or limited access to devices [17,49,56]. Our latest reported RCt was a pilot Telenutrition weight loss program, which was conducted between 2022 and 2023 have introduced an innovative health coaching model called "Integrative Nutrition" approach, which was provided on a monthly basis by an integrative nutrition health coach to tackle component of the circle of life [62]. This approach was never tracked before, where only weight and health metrics are commonly tracked in telemonitoring. Eid et al (2024), developed, validated and translated a new tool to assess the "Circle of Life" satisfaction levels, providing insight into the challenges that participants face in adhering to dietary interventions [63]. The pilot study outcomes were shared in the Clinical Nutrition ESPEN congress in Milan [64], where significant improvements were seen in weight, BMI, waist circumference and overall life satisfaction. Additionally, participants showed an enhanced general nutrition knowledge compared to the control group, in particularyly in weight management and diet related diseases, alongside with improving the quality of life with significant reductions in anxiety levels, a factor contributing to improving wellbeing [57–59]. Accordingly, the research team run by Eid, et al (2024) have designed a novel weight loss program, a 6-month Telenutrition weight loss program supported by weekly telemonitoring and monthly integrative nutrition health coaching that targets obese and overweight adults, for weight loss and improving health and wellbeing by assessing the general nutrition knowledge, eating behaviors, Sensory modalities and hunger, and stress [65]. Still, several limitations have been identified in the pilot study, where the small sample size was the major limitation, where a large sample size is necessary to have more reliable results.

To maximize the effectiveness and feasibility of combined health coaching and telemonitoring interventions, several strategies are considered by Integration with primary care, where both health coaching and telemonitoring may improve accessibility and reduce costs on clients. Also Tailored intervention design that consider preferences, access to technology and readiness for change can enhance adherence and engagement. Thus, focusing on sustainability to ensure long-term success is key for weight management achievement. Overall, an integrative approach offers a powerful tool as evident in the literature for weight loss interventions by addressing both behaviors and practical barriers. There are several measures that must be considered in future research, such as adherence rate, behaviors change psychological measures, biometric and clinical markers. Several strengths were identified in the reviwe, which is worth mentioning such as the extended engagement in all interventions have been seen specially with programs that persisted for 12 months, which is essential

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in maintaining a behavior change. furthermore, technology-enhanced monitoring and use of digital platforms for telemonitoring provides real-time feedback, convenient tracing and increase accessibility for participants in remote and busy areas. Thus, interventions had diverse health targets which is applicable in telemedicine. While the integrative approach in weight loss programs showed promising outcomes, several limitations are identified in the literature such as technological barriers, cost of telemonitoring devices and digital platforms, and engagement challenges which is difficult to maintain over 12 months period without face to face communication as observed in the mHealth study [39].

5. Conclusions

In Conclusion, this review highlights the efficacy and adaptability of dietary weight loss interventions implemented through randomized controlled trials (RCTs). Interventions incorporating telemonitoring and personalized health coaching have been seen to encounter a significant impact on weight loss, chronic conditions markers and mental health when compared to usual or traditional care. The diverse approaches across studies from shirt term, intensive weight reduction programs to long0term chronic condition management have demonstrated the benefits of tailoring interventions to participants needs, risk profiles, and access to resources. However, the effectiveness of these interventions often varies due to challenges in long term adherence technological access, and participant engagement, suggesting that sustained support is essential for lasting impact.

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