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Research Article

Online-Based Dietary Interventions as a Strategy for Overweight and Obesity Management

(A Systematic Review)

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Abstract. Background: Wrong One of the current global public health challenges is obesity. This requires preventive efforts considering that obesity not only impacts health problems, but also social and economic problems. For these preventive efforts to be targeted, it is necessary to identify conventional and online obesity management. As time goes by, improving dietary patterns through behavior accompanied by effective online interventions can reduce the burden of disease. This study aims to see the effectiveness of online diets on weight loss. Methods: This study used a *Systematic Review* method approach to 18 articles selected through an electronic search in the form of Pubmed with keywords in the literature search using *Medical subject headings* (MeSH) with inclusion criteria: must include BMI measurements, participants in healthy conditions (not under treatment/having a disease) and received online diet intervention. Results: Online diet patterns are proven to reduce weight by 3-5% of the initial body weight or 3-6 kg from the initial body weight, meaning that each participant given online diet intervention is proven effective. Conclusion: weight loss programs through online media have been proven to be effective in reducing body weight if the intervention is given more frequently and for longer, which means that participants who visit the website more frequently to follow instructions on diet patterns and comply with the rules given will have a more significant weight loss rate.

Keywords: Obesity Management; Online Dietary Intervention; Overweight; Systematic Review; Weight Loss.

1. BACKGROUND

Overweight and obesity are growing global public health problems and are major risk factors for various non-communicable diseases, such as type 2 diabetes mellitus, cardiovascular disease, hypertension, and several types of cancer. The World Health Organization (WHO) reports that the global prevalence of obesity has nearly tripled since 1975, and this trend is expected to continue unless effective prevention and control efforts are implemented (Sudargo *et al.* , 2018).

In Indonesia, the problem of overweight and obesity also shows a worrying trend. Based on data from the Basic Health Research (Riskesdas) and the Indonesian Nutritional Status Survey (SSGI), the prevalence of obesity in adults has increased significantly over the past decade. This condition not only increases the burden of disease but also has implications for rising healthcare costs, decreased work productivity, and increased economic burdens on households and the nation (Arif *et al.* , 2020) .

Weight loss through dietary management is a key strategy for managing overweight and obesity. However, conventional face-to-face dietary interventions often face various challenges, such as limited healthcare personnel, relatively high costs, limited participant time, and low long-term compliance. These conditions often result in suboptimal effectiveness of conventional interventions, especially when applied to a population scale. (Sari & Yunus, 2025)

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Advances in information and communication technology have opened up new opportunities for implementing health interventions, including weight management. Online dietary interventions, whether through websites or smartphone apps, offer a more flexible, accessible approach with the potential to reach a wider population. Through digital platforms, participants can receive nutrition education, dietary guidance, food intake monitoring, and ongoing feedback without having to physically attend a health facility (GG Bennett & RE Glasgow, 2009; Michie *et al.* , 2017) .

Beyond accessibility, online-based diet interventions also allow for more intensive monitoring of eating behavior and weight. Self-recording features, reminders, and personalized feedback can help participants increase dietary awareness and encourage more consistent behavior changes. Several studies have shown that this approach can improve participant adherence compared to conventional methods, particularly in the productive age group who are familiar with digital technology (Solihin *et al.* , 2023) .

However, research on the effectiveness of online-based diet interventions still shows variation, both in terms of the magnitude of weight loss, duration of intervention, and level of participant engagement (Health & Welfare, 2017; Kalisch, 2015; Swinburn *et al.* , 2011) . Differences in study design, participant characteristics, and the type of platform used are factors that influence intervention outcomes. Therefore, a systematic review is needed to summarize and analyze the available scientific evidence to obtain a more comprehensive picture of the effectiveness of online-based diet interventions for weight loss (Mulyani *et al.* , 2020) .

A previous *systematic* review by Young *et al.* (2019) demonstrated that online interventions can be successful in achieving dietary behavior change across a range of defined populations. However, varying *levels* of engagement and limited reporting of intervention disuse rates limited analysis of which behavior change techniques were most effective in achieving these changes. This study focused solely on RCT data. The results only mentioned dietary behavior change but did not assess weight loss.

This systematic review is expected to contribute to the development of overweight and obesity control strategies, particularly in utilizing digital technology as an alternative or complement to conventional interventions. Furthermore, the study's findings are expected to provide a basis for program planners and policymakers in designing more effective, efficient, and sustainable digital-based interventions in public health.

2. RESEARCH METHODS

Data source

This study used the *Systematic Review method* . The literature search was conducted using an electronic search in the form of Pubmed. Keywords in the literature search used *Medical subject headings* (MeSH). The literature searched based on keywords related to "online" obtained 97,483 literatures, for keywords related to "weight loss" obtained 211,039 literatures and for keywords related to "diet" obtained 315,403. Then for all keywords combined and obtained 147 literatures. Related keywords in the search are listed in table 1.

Next, a selection of the most recent literature from the past 10 years was conducted, resulting in 99 articles. From this collection, a selection was made based on relevant titles and abstracts, resulting in 18 articles.

Table 1. Search Keywords.

NO	Scope	Keywords Used
1.	**Diet**	Diet, Western diet, Paleolithic diet, High fat diet, Ketogenic diet, Gluten-free diet, Carbohydrate-restricted diet, Mediterranean diet, Protein restricted diet, Fat-restricted diet, Vegetarian diet, Reducing diet, Cariogenic diet
2.	**Weight Loss**	Weight loss, Anti-Obesity agent, Weight reduction programs, Body-weight trajetery, Diet reducing
3.	**On line**	Online system, social networking, education distance, Internet based intervention

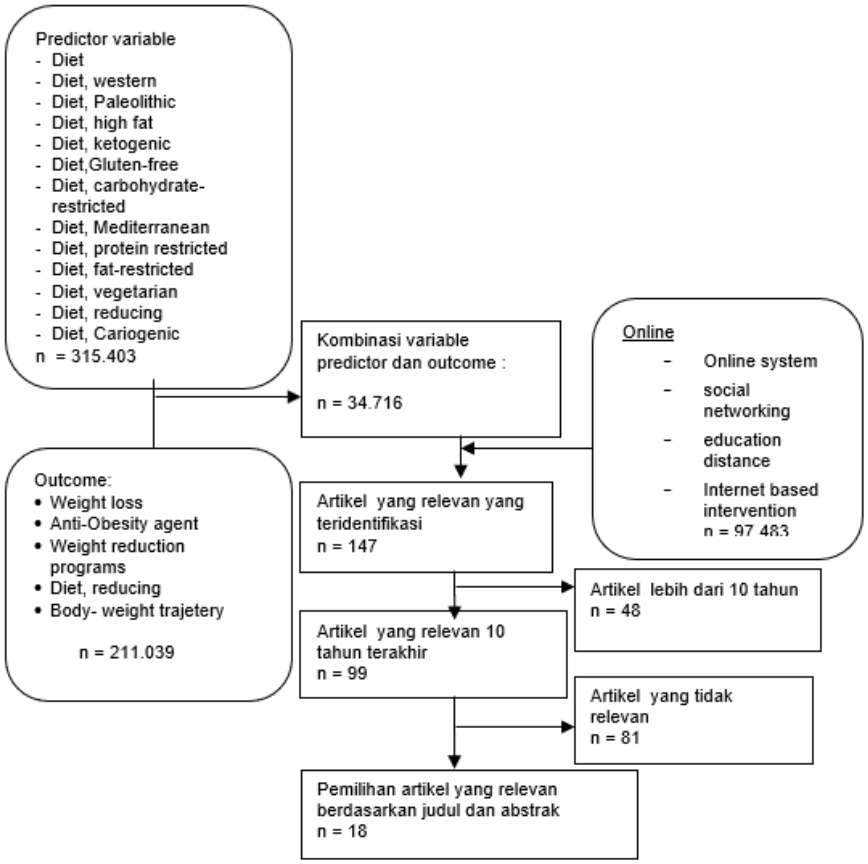

Figure 1. Article Search Flow Chart.

Inclusion Criteria

To obtain good research results, it is necessary to look for articles that meet the inclusion criteria that can describe the effect of online dieting on weight loss.

The article being searched for must include a BMI measurement, which indicates a person's weight. The BMI measurements that can be analyzed are overweight or obesity, according to WHO criteria, where a BMI of 25.0–29.9 kg/m2 is considered overweight and a BMI of 30.0–39.9 kg/m2 is considered obese (BMI, 1998) .

Furthermore, the sample sought was healthy participants, meaning they were not suffering from any disease. Throughout the article, data was selected that included participants in good health, which met the inclusion criteria, or participants undergoing treatment for a disease, which met the exclusion criteria. This meant that the entire sample studied consisted of healthy participants.

If the article states that the patient is undergoing treatment, then it will not be included in the article to be analyzed.

The criteria included in this research data collection were samples receiving dietary interventions. Interventions must be delivered online, which can be through a website, chat, phone, or smartphone app. Articles involving face-to-face interventions or monitoring were not included in the data calculations.

After the intervention, participants were further assessed for weight loss. The results of the weight loss measurements can be a percentage of weight loss from baseline or a numerical weight loss calculated in kg or lbs.

3. RESEARCH RESULT

Data Characteristics

Once the data is obtained, data extraction is performed based on the desired characteristics. Table 2 shows several similarities in the characteristics of the articles, and Table 3 describes the characteristics of the data in detail.

In the data characteristics, it was found that most of the studies that had been conducted used an RCT research design (n = 15) where each group was given an intervention and compared with a comparison group. To then measure the results of the intervention that had been carried out. The total number of samples was 65,591 samples where the samples consisted of men and women where the largest sample was in the study (Hendrie *et al.* , 2021) which amounted to 59,686 samples using a cohort research design, and the smallest sample was in the study (Delamater *et al.* , 2013) with a total of 24 samples. Some articles studied only men (n = 1) or only women (n = 2), but most articles had samples of both men and women (n = 15).

Table 2. Data Characteristics.

Characteristics	Amount
Types of research	Cohort (n=1) RCT (n=15)
Number of samples	Total number 65,591
Gender	Male (n= 1) Women (n=2) Male, Female (n=15)
Age	8 – 70 years old
BMI	Overweight (n=5) Obesity (n=5) Overweight, obesity (n=7)
Intervention	Web (n=12) Applications (n=6) Telephone (n=0) Chat (n=0) Email (n=0)
Results	3-5% of initial body weight (n=5) 3-6 kg from initial body weight (n=4) Weight loss (n=9)

The sample selected was in the age range of 8-70 years, which means that this age is still in the productive age category.

In some studies, BMI was measured before intervention. BMI was categorized into overweight and obesity, with a BMI range of 25–45 kg/ m^2.

Intervention on Sample

In the articles obtained, various interventions were examined. Interventions in the form of dietary management through online systems were found to be the most common, with web-based interventions (n=12), followed by smartphone applications (n=0).

Before receiving the intervention, participants entered baseline data on the provided website or app. This included age, gender, weight, height, and *informed consent*.

Table 3. Data Description.

No.	Author Name	Title	Year	Types of research	Number of Samples	Age	Gender	BMI	Type of Intervention	Research result
1.	(Hendrie *et al.* , 2021)	Weight Loss and Usage of an Online Commercial Weight Loss Program (the CSIRO Total Wellbeing Diet Online) Delivered in an Everyday Context: Five-Year Evaluation in a Community Cohort	2014-2019	cohort	59,686 samples	< 50 years	Woman Man	32.2 kg/m ²	Application	3.1%-5.3% of Initial BB
2.	(Ross *et al.* , 2020)	Food reward sensitivity, impulsivity, and weight change during and after a 3-month weight loss program	2020	Randomized Controlled Trial (RCT)	75 samples	18-70 years	Woman Man	31.2 kg/m ²	Web	6 kg
3.	(A. Beleigoli *et al.* , 2020)	Personalized Web-Based Weight Loss Behavior Change Program With and Without Dietitian Online Coaching for Adults With Overweight and Obesity: Randomized Controlled Trial	2020	Randomized Controlled Trial (RCT)	1298 samples	18-60 years	Woman Man	>25 kg/m ²	Web	5% of Initial BB
4.	(Delamater *et al.* , 2013)	Web-Based Family Intervention for Overweight Children: A Pilot Study	2013	Randomized Controlled Trial (RCT)	24 samples	8-12 years	Man Woman	>30 kg/m ²	Web	BMI reduction was significantly greater in participants who frequently used the web.
5.	(Cadmus-Bertram *et al.* , 2013)	Web-based self-monitoring for weight loss among overweight/obese women at increased risk for breast cancer: the HELP pilot study	2012	Randomized Controlled Trial (RCT)	50 samples	45-47 years old	Woman	27.5 kg/m ²	Web	4% of Initial Weight.
6.	(Webber & Rose, 2013)	A Pilot Internet-Based Behavioral Weight Loss Intervention with or without Commercially Available Portion-Controlled Foods	2013	Randomized Controlled Trial (RCT)	50 samples	25-65 years	Woman Man	30-45 kg/m ²	Web	2.9 – 5.5 Kg
7.	(Mehring *et al.* , 2013)	Effects of a general practice guided web-based weight reduction program - results of a cluster-randomized controlled trial	2013	Randomized Controlled Trial (RCT)	186 samples	>40 years	Woman Man	33.7 kg/m ²	Web	4.2 kg
8.	(Rimmer *et al.* , 2013)	Telehealth Weight Management Intervention for Adults with Physical Disabilities A Randomized Controlled Trial	2013	Randomized Clinical Trial (RCT)	102 samples	12-47 years	Woman Man	32.0 kg/m ²	Application	5.0-5.5 kg
9.	(Hageman *et al.* , 2019)	User Engagement Associated with Web Intervention Features to Attain Clinically Meaningful Weight Loss and Weight Maintenance in Rural Women	2019	Randomized Controlled Trial (RCT)	201 samples	40-69 years	Woman	28-45 kg/m ²	Web	≥5% of Initial BB
10.	(MJ Hutchesson *et al.* , 2016)	Enhancement of Self-Monitoring in a Web-Based Weight Loss Program by Extra Individualized Feedback and Reminders: Randomized Trial	2016	Randomized Controlled Trial (RCT)	301 samples	18-60 years	Woman Man	25-40 kg/m ²	Web	2.1-3.1% of Initial BB
11.	(Burke *et al.* , 2022)	The Effect of Tailored, Daily, Smartphone Feedback to Lifestyle Self-Monitoring on Weight Loss at 12 Months: the SMARTER Randomized Clinical Trial	2022	Randomized Clinical Trial (RCT)	502 samples	18 years	Male Female	27-43 kg/m ²	Application	Clinically Significant Weight Loss In More Than 25% of Participants.
12.	(Gregoski *et al.* , 2016)	Effective weight loss using e-health delivered physical activity and dietary intervention: A federal credit union pilot study	2015	Pilot study	54 samples	24-58 years	Woman Man	27-35 kg/m ²	Web	10.13 lbs

13.	(Blomfield *et al.* , 2014)	Impact of self-help weight loss resources with or without online support on the dietary intake of overweight and obesity: The SHED- IT randomized controlled trial	2013	Randomized Clinical Trial (RCT)	159 samples	46-48 years old	Man	25-40 kg/m ²	Application	2.6 Kg-5.3 Kg From Initial BB
14.	(Dunn *et al.* , 2014)	Using Synchronous Distance-Education Technology to Deliver a Weight Management Intervention	2014	Synchronous	1,711 samples	22-82 years	Man Woman	≥32 kg/m ²	Web	Significant reduction in BMI, weight, and waist circumference
15.	(Boh *et al.* , 2016)	An Ecological Momentary Intervention for weight loss and healthy eating via smartphones and Internet: study protocol for a randomized controlled trial	2016	Randomized Controlled Trial (RCT)	134 samples	18-60 years	Man Woman	>25 kg/m ²	Application	Weight loss was more significant in the intervention group compared to the control group.
16.	(JL Unick *et al.* , 2015)	Examination of whether early weight loss predicts 1-year weight loss among those enrolled in an Internet-based weight loss program	2015	Randomized Controlled Trial (RCT)	181 samples	18-70 years	Male Female	≥25 kg/m ²	Application	Respondents Who Infrequently Log Into Their Weight Loss Websites Were Fewer (-0.78 ± 1.1%) Compared With Respondents Who Actively Log Into Their Websites (-4.02 ± 1.3%, P<0.001).
17.	(Dennison *et al.* , 2014)	Does Brief Telephone Support Improve Engagement With a Web-Based Weight Management Intervention? Randomized Controlled Trial	2014	Randomized Controlled Trial (RCT)	786 samples	>40 years	Man Woman	≥27.5 kg/m ²	Web	Greater Weight Loss Than Control Group.
18.	(Steinberg *et al.* , 2013)	The efficacy of a daily self-weighing weight loss intervention using smart scales and email	2013	Randomized Controlled Trial (RCT)	91 samples	18-60 years	Man Woman	25-40 kg/m ²	Web	5% of Initial BB

Discussion

A systematic review of 18 articles showed that online dietary interventions consistently had a positive impact on weight loss in overweight and obese participants. In general, weight loss ranged from 3–5% of initial body weight, or approximately 3–6 kg. This is considered clinically meaningful weight loss, as previous studies have shown that a weight loss of at least 5% can provide significant health benefits, such as improved metabolic profiles, reduced risk of cardiovascular disease, and improved quality of life.

The effectiveness of online dietary interventions is inseparable from the characteristics of digital media, which enable interventions to be delivered in a sustainable, flexible, and accessible manner. Participants can access diet materials, meal guides, and feedback at any time without having to visit a health facility in person. This is a major advantage over conventional approaches, especially for individuals with time, distance, or

financial constraints (Neherta & Refnandes, 2024) . These findings align with research by Gary G. Bennett & Russell E. Glasgow (2009) , which states that internet-based interventions have great potential to reach a wide population at a relatively low cost.

Furthermore, participants' level of engagement in using online platforms is a key factor in successful weight loss. Research by Curtis *et al.* (2021) showed that frequency of platform use was the strongest predictor of weight loss magnitude. Participants who accessed the app or website more frequently tended to experience greater weight loss than those who accessed it less frequently. This suggests that program success is determined not only by the type of intervention provided, but also by participants' level of adherence and active participation in the program.

The duration of the intervention also plays a significant role in determining weight loss outcomes. Research by Alline Beleigoli *et al.* (2020) found that participants who received a 24-week intervention experienced greater weight loss than those who received only a 12-week intervention. This finding indicates that changing eating behavior requires time and repeated reinforcement to form sustainable new habits. Short-term interventions tend to produce temporary changes, while longer interventions allow for more stable behavioral adaptations.

From a behavioral perspective, most of the online interventions reviewed in this study integrated self-monitoring, feedback, and reminder strategies. These strategies have been shown to be effective in helping participants become more aware of their eating patterns and increasing self-control over food intake. Research by Melinda Jane Hutchesson *et al.* (2016) showed that providing personalized, regular feedback can improve participants' adherence to a diet program, ultimately resulting in more significant weight loss.

The study also showed that smartphone app-based interventions produced comparable results to web-based interventions. Apps have the advantage of portability and ease of use, allowing participants to record food intake, weight, and physical activity in real time. However, the effectiveness of an app depends on its design and the extent to which it maintains user engagement. Participants who rarely open the app or do not regularly record data tend to show less weight loss, as reported by (Jessica L Unick *et al.* , 2015) .

Although the results of this study demonstrate the effectiveness of online diet interventions, several limitations warrant consideration. First, most studies used RCT designs with relatively variable intervention durations, thus limiting direct comparisons between studies. Second, most weight data were obtained through participant self-reports, potentially introducing reporting bias. Third, the majority of studies were conducted in developed countries, so generalizing the results to populations in developing countries requires caution.

Furthermore, variations in participant characteristics, such as age , gender, education level, and initial motivation, can also influence intervention outcomes. Several studies have shown that participants with high motivation and good digital literacy tend to achieve more optimal outcomes. Therefore, future development of online diet programs needs to consider the personalization of interventions to suit individual needs and characteristics.

Overall, the findings of this systematic review indicate that online diet interventions are an effective and promising alternative for weight loss in overweight and obese individuals. This approach can complement or replace conventional interventions, particularly in the context of limited resources and the increasing use of digital technology in everyday life. With structured program development, ongoing monitoring, and adequate support, online diet interventions have the potential to have a significant impact on obesity prevention and control at the population level.

4. CONCLUSION

From 18 relevant articles, it was concluded that online weight loss programs have been proven to be effective in reducing body weight if the intervention is given more frequently and for a longer period, which means that participants who visit the website more frequently to follow instructions on diet patterns and comply with the rules given will have a more significant weight loss rate.

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