

Original Article

Effectiveness of the Online Weight Reduction Program KiloCoach™ and Comparison with Other Evaluated Commercial Direct Intervention and Online Programs

Rita Longin^a Marina Grasse^b Rosa Aspalter^a Karin Waldherr^b

^aKiloCoach e.U., ^bLudwig Boltzmann Institute Health Promotion Research, Vienna, Austria

Key Words

Weight loss · Online program · Internet program · Obesity · Overweight

Abstract

Objective: Preliminary results indicated effectiveness of the online weight reduction program KiloCoach. The current study presents a large collection of user data and compares KiloCoach with other evaluated commercial weight loss programs. Furthermore, potential factors influencing the effectiveness of internet weight loss programs should be identified.

Method: 4,310 data sets of KiloCoach users were available, 3,150 of them were suitable for further analysis. 946 program users were considered completers (at least 60 days of continuous protocol). For comparison with other programs, different subsamples were drawn that matched to the inclusion criteria of reference studies. **Results:** On average, KiloCoach overweight and obese completers lost 4.5 % of initial body weight. KiloCoach was as effective as the commercial program Weight Watchers® after 1 year (6.4% vs. 5.3% weight loss; $p = 0.11$) and 2 years (5.1% vs. 3.2% weight loss; $p = 0.15$). KiloCoach proved to be more effective than other online programs (Viktklubb, eDiets.com) as well as an in-person behavioral program, but less effective than Vtrim®, an online behavioral program providing intensive support.

Conclusion: In comparison to reference programs, KiloCoach proved to be effective for weight reduction. The effect of online weight reduction programs seems to depend on methods and features applied.

Copyright © 2012 S. Karger GmbH, Freiburg

Dr. Karin Waldherr
Ludwig Boltzmann Institute Health Promotion Research
Untere Donaustraße 47/3
1020 Vienna (Austria)
Tel. +43 1 2121 493 25, E-Mail Karin.Waldherr@lbg.ac.at

Introduction

Although in-person treatment is considered to be the ‘gold-standard’ in weight loss, it is limited in regard to availability, accessibility, and costs [1]. Internet-based weight loss programs are new approaches to embark the growing obesity epidemic. They offer the possibility for a broader outreach as the vast majority of the population now uses the internet also for health information [1]. Preference to lose weight without having to participate in a structured face-to-face treatment program has been observed in some studies [2, 3]; thus, for those who cannot or do not want to attend in-person programs the internet is an option to approach their weight problem. Moreover, this approach may be less time-consuming and resource-intensive than in-person interventions. Although conclusion regarding cost-effectiveness of internet-based programs is currently elusive, preliminary research shows lower costs for internet-based obesity treatment [4]. It would be likely that the long-term costs of internet programs are lower than in-person interventions [1]. However, a recent review [5] found the effect of internet-based interventions not to be uniform. Reviewed studies showed weight losses from 0 to 7.6 kg. The authors noted that interventions differed considerably in their approach, and study populations as well as study durations were highly variable. Therefore, in addition to the comparison of KiloCoach with other online programs regarding effectiveness, we analyzed aspects of the programs that could explain different results.

Participants and Methods

KiloCoach Program Description

The KiloCoach program is a commercial internet-based weight loss program available in the German-speaking countries Germany, Austria, and Switzerland (www.kilocoach.de, www.kilocoach.at, www.kilocoach.ch). It is designed as a widely accessible, low-barrier, and low-cost self-management tool that aims to improve eating habits and increase physical activity. Prices are based on membership length and range from EUR 29,00 for 1 month to EUR 159,00 for 1 year. Students are granted discounted memberships. Members are advised to record eating behavior and physical activity daily for at least 2 months. Based on anthropometric data (body weight, height) as well as age, gender and a weight reduction goal, the recommended and individualized calorie intake is calculated. Recommended calorie intake is based on a weight loss of 0.5–1 kg/week. Energy and nutrient intake are calculated directly by the program based on the daily protocols and a nutrient database for more than 30,000 items including convenience foods. Furthermore, energy expenditure due to physical activity is calculated. Analysis of participants records provides them feedback in regard to their eating and activity behavior, e.g. macronutrient balance or top calorie suppliers. In addition, users are supported by an expert team including nutritionists, sports experts, a physician as well as coaching experts. The website offers a community forum for communication with the expert team and other participants. To encourage users throughout program use, automatic e-mails according to elaborated algorithms are sent, e.g. a brief analysis of their food diary after the first 3 days.

KiloCoach Data

4,310 data sets of KiloCoach users which participated in the program from June 2007 to May 2010 were available. 809 data sets had to be excluded for the following reasons: membership shorter than 2 months (n = 434), unclear or unrealistic data (n = 58), test data sets created by the KiloCoach team or technical staff (n = 68), no daily records available (n = 58), age below 18 years (n = 20), no age provided (n = 171). Also excluded from further analysis were user with diabetes mellitus, nursing and pregnant women who used the program not for weight reduction but for weight control, obese participants with a history of medical operation for weight reduction as well as users with limited mobility (n = 351). Of the remaining 3,150 users 70.2 % were female (n = 2,211) and 29.8 % were male (n = 939). Age was 42.7 ± 11.4 years on average. Men were significantly older than women (44.5 ± 11.8 vs. 41.9 ± 11.1 years; $p < 0.001$). Mean BMI at program start was 29.1 ± 6.1 kg/m². Women had a significant lower BMI than men (28.6 ± 6.7 vs. 30.3 ± 4.3 kg/m²; $p < 0.001$). KiloCoach usage was 183 ± 271 days on average. Males used KiloCoach

significantly longer than women (211 ± 323 days vs. 171 ± 244 days; $p < 0.001$). For data analysis, subjects with at least 60 days of continuous daily protocol were considered ‘completers’ ($n = 946$; 66.4% female, 33.6% male, mean usage 339 ± 297 days), whereas subjects with less than 60 days of daily protocol were categorized as ‘non-completers’ ($n = 2,204$; 71.8% female, 28.2% male). Therefore, 946 data sets were considered suitable for comparison with reference data.

Design

The current study was a retrospective study of the effectiveness of KiloCoach. Therefore, a one-group pretest-posttest design was chosen. The difference between initial weight and weight at the end of program usage was calculated for all KiloCoach users, and differences between completers and non-completers as well as female and male users were analyzed. Furthermore, the results of KiloCoach were compared with published studies on the effectiveness of commercial weight loss programs which served as reference levels. Different samples were drawn from the population of KiloCoach completers that matched those of the selected reference studies at inclusion time regarding gender, age, initial BMI class, and duration of study/program usage. Differences between initial weight and weight at different time intervals according to those given in the reference studies were calculated. The mean weight differences reported in the reference studies were compared with the results of the respective KiloCoach sample.

Selection of Reference Studies

A literature search was conducted to identify relevant studies on commercial weight loss programs. For in-person weight loss programs only randomized controlled trials (RCTs) on the effectiveness of commercial weight loss programs in adult populations (>18 years) were considered. For internet-based programs also studies with less rigorous study designs were allowed due to scarcity of RCTs. Studies with patients with diabetes mellitus or other diseases and weight loss programs using meal replacement formula were excluded. Therefore, studies evaluating the commercial program Weight Watchers® [6, 7], the internet-based weight loss club Viktklubb [8], the online structured behavioral weight loss website Vtrim® [9], the commercial weight loss website eDiets.com [9, 10], and a behavioral modification program conducted by a professional therapist [11, 12] acted as references. An overview of selected reference studies is given in table 1.

Statistical Analysis

Data were analyzed using SPSS software (version 15.0, SPSS, Inc., Chicago, IL, USA). Multi-way ANOVA was used to examine differences between gender groups, completers and non-completers, initial BMI classes (normal weight, overweight, obesity), and interaction effects. To control for possible age influences, age at program start was used as covariate. Mean weight differences of KiloCoach users (completers) for various time intervals were compared with published results of completers analyses of reference programs by means of one-sample t-tests. $\alpha = 0.05$ was chosen as significance level.

Results

Total Results for KiloCoach Users

Weight reduction in KiloCoach users was significant for the total sample, for completers only and also if stratified for gender ($p < 0.001$ for each group) (fig. 1a, b). The total of KiloCoach users (completers and non-completers) showed a mean weight loss of 1.7 ± 4.1 kg or $1.9 \pm 4.5\%$ of their initial body weight. Completers ($n = 946$) showed a mean weight loss of 3.7 ± 5.2 kg or $4.1 \pm 5.5\%$ of their initial body weight which was significantly higher than that of non-completers (0.8 ± 3.2 kg or $0.9 \pm 3.7\%$; $p < 0.001$; fig. 1b, c). Male completers ($n = 317$) lost more weight than female completers ($n = 629$; 4.9 ± 5.7 kg vs. 3.1 ± 4.9 kg ($p < 0.001$) or $4.9 \pm 5.4\%$ vs. $3.7 \pm 5.5\%$ ($p = 0.002$)) which however was caused by the fact that there were much more females with initial BMI ≤ 25 kg/m² ($n = 170$) than males ($n = 17$). Overweight or obese KiloCoach completers ($n = 759$) lost on average 4.2 ± 5.5 kg or $4.5 \pm 5.5\%$ ($p < 0.001$) (fig. 1c). Stratified by gender, mean weight loss in percent of initial weight was comparable for overweight and obese males ($n = 300$; $4.9 \pm 5.4\%$) and females

Table 1. Characteristics of reference studies for comparison with KiloCoach (n.a. = not applicable)

| | Weight Watchers [6] | Weight Watchers [7] | Vikt klubb [8] | Vtrim [9] | eDiets.com [9] | eDiets.com [10] | Behavioral therapy program [12] |
|--|--|--|---|---|--|--|--|
| Number of subjects | 40 | 211 | 37,521 | 62 | 62 | 23 | 73 |
| Number of women (%) | 40 (100) | 173 (82) | 32,268 (86) | 48 (77) | 53 (86) | 23 (100) | not specified |
| Age, years (inclusion criteria, mean ± SD) | 20–49 (37.4 ± 7.9) | 18–65 (45 ± 10) | n.a. (40.3 ± 11.5) | >18 (46.5 ± 10.7) | >8 (48.9 ± 9.9) | 18–65 (44.2 ± 9.3) | n.a. (45.6 ± 10.6) |
| BMI, kg/m ² (inclusion criteria, mean ± SD) | n.a. (31.1) | 27–40 (33.8 ± 3.4) | >20 (29.3 ± 5.1) | 25.1–39.9 (32.3 ± 3.9) | 25.1–39.9 (32.5 ± 4.2) | 27–40 (33.9 ± 3.2) | not specified |
| Duration | 3 months | 2 years | 6 months | 1 year | 1 year | 1 year | 1 year |
| Study design | single-center randomized controlled trial | multicenter randomized controlled trial | feasibility study | randomized controlled trial | randomized controlled trial | randomized controlled trial | controlled trial |
| Data reference | completers analysis | intent-to-treat-and completers analysis | completers analysis | baseline-carried-forward, completers analysis | baseline-carried-forward, completers analysis | last-observation-carried-forward, baseline-carried-forward, completers analysis | completers analysis |
| Number of dropouts (%) | 10 (25%) | 63 (29.9%) | 33,312 (88.8%) | 22 (35.5%) | 14 (22.6%) | 8 (34.8%) | 28 (38%) |
| Program characteristics (features) | <ul style="list-style-type: none"> – hypocaloric diet – self-selected, self-prepared meals – self-selected exercise plan – food diary – education regarding behavior modification techniques and problem solving and coping skills – weekly group meetings | <ul style="list-style-type: none"> – food plan – activity plan – behavior modification plan focused on cognitive restructuring – weekly group meetings | <ul style="list-style-type: none"> – menu suggestions – personal calorie plan – food and physical activity diary with calorie counter – chat with peers and experts – coach letters – automatically sent by e-mail – behavior modification tools | <ul style="list-style-type: none"> – weekly online therapist-led sessions – behavior modification lessons mediated by the therapist – homework questions – weekly self-report of weight – hypocaloric diet – online food diary with calorie counter and weekly feedback on entries by therapist | <ul style="list-style-type: none"> – ‘prescribed’ calorie goal and meal plan – fitness plan – weekly self-report of weight – automated feedback for weight loss progression – professional-facilitated online meetings – chat – discussion boards | <ul style="list-style-type: none"> – ‘prescribed’ diet – fitness plan – food diary – online bulletin board – online meetings with professionals – consultation available with nutritionists/dieticians – automated program and goal reminders sent by e-mail – participants could e-mail with a ‘buddy’ – meal delivery available | <ul style="list-style-type: none"> – weekly meetings conducted by psychiatrists or a clinical psychologist – 2–3 behavior modification techniques introduced at weekly meetings – record of food intake |

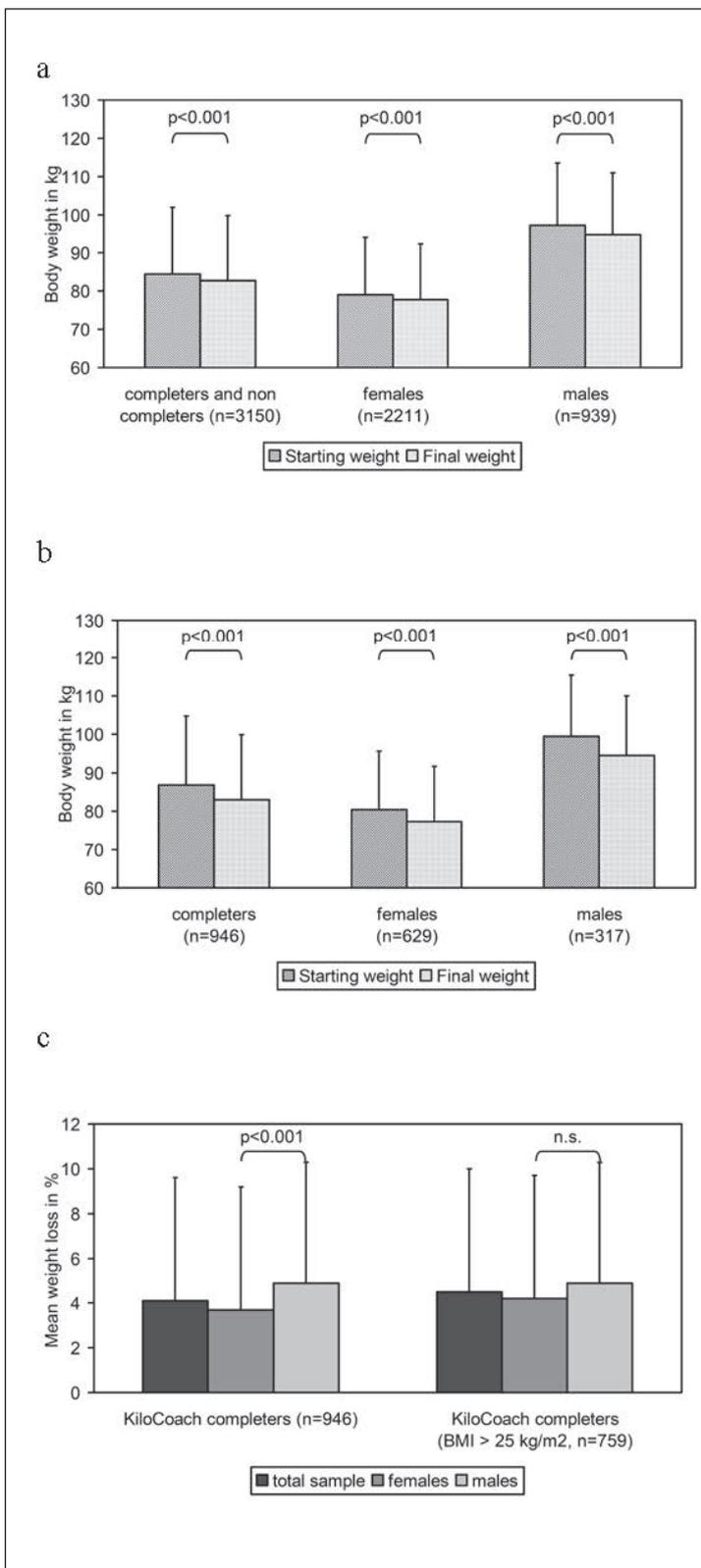


Fig. 1. Overall weight loss for KiloCoach users. **a** Completers and non-completers, **b** completers only, **c** total completers and overweight/obese completers, all groups also stratified for gender.

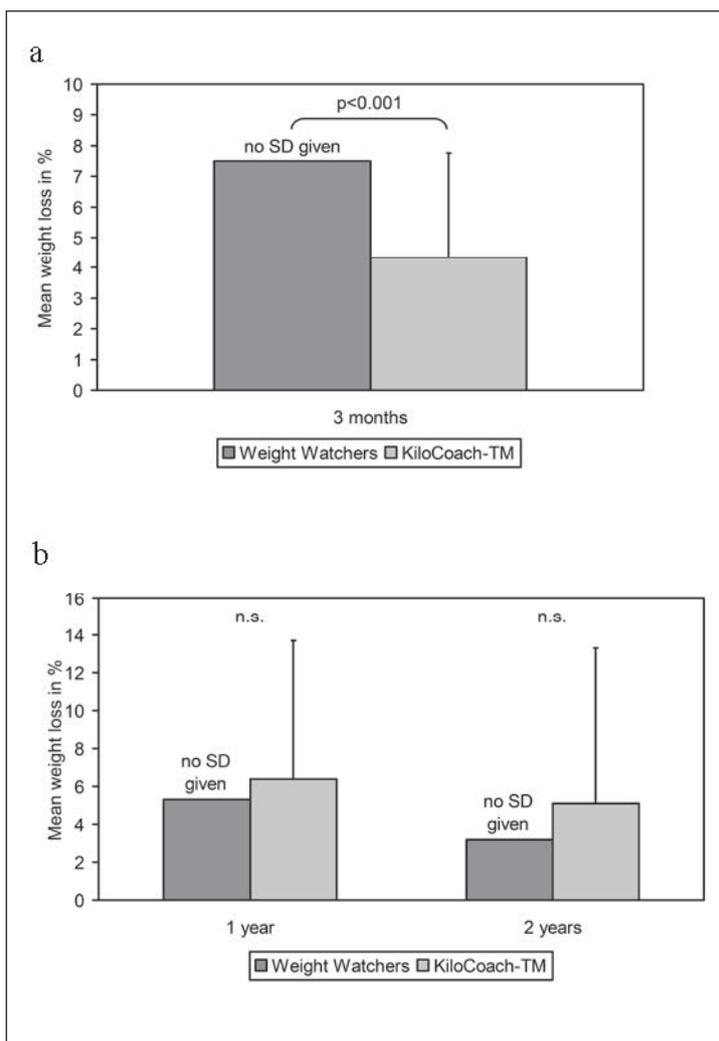


Fig. 2. a Mean weight loss in % of initial body weight for Weight Watchers and KiloCoach users at 3 months [6]. **b** Mean weight loss in % of initial body weight for Weight Watchers and KiloCoach users at 1 and 2 years [7].

(n = 459; $4.2 \pm 5.5\%$; p = 0.18) though males lost significantly more weight than females (5.0 ± 5.8 kg vs. 3.7 ± 5.2 kg; p = 0.01). Independent of gender, weight loss was significantly higher for obese completers (n = 428; 5.0 ± 6.3 kg or $4.9 \pm 5.9\%$ on average) than for overweight completers (n = 331; 3.2 ± 3.9 kg (p < 0.001) or $3.9 \pm 4.9\%$; (p = 0.03)). Weight loss was however independent of age of users (p > 0.05 for covariate age at program start in all analyses).

Comparison with Weight Watchers

Two studies (one long-term and one short-term study) evaluated the commercial weight loss program Weight Watchers. In an RCT, Rippe and colleagues [6] studied overweight or obese women using the Weight Watchers method. The 30 completers achieved a mean weight loss of 6.1 ± 4.0 kg (7.5% of initial body weight, no SD given) after 3 months. In comparison female overweight or obese KiloCoach users (n = 210) lost 3.5 ± 2.9 kg or $4.3 \pm 3.4\%$ of initial body weight after 3 months, which is significantly less (p < 0.001) (fig. 2a). However, BMI at baseline was significantly lower for KiloCoach users compared to Weight Watchers (29.1 ± 2.6 vs. 31.1 kg/m² (no SD given); p < 0.001).

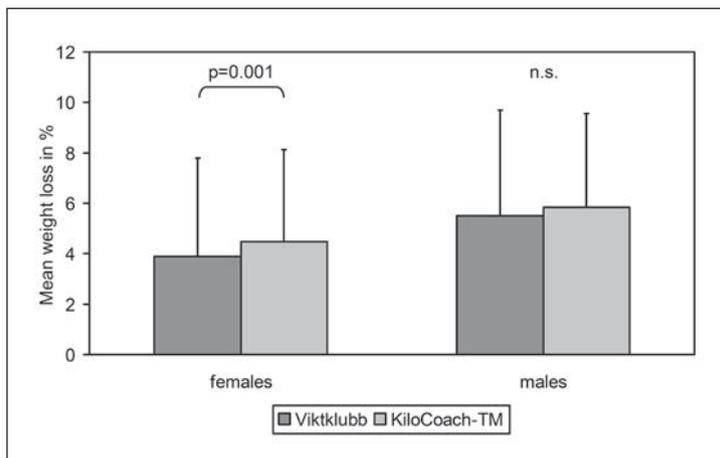


Fig. 3. Mean weight loss in % of initial body weight for Viktklubb and KiloCoach users at 3 months, stratified by gender [8].

In a multicenter RCT of Heshka et al. [7] with an observation period of 1 and 2 years, the study population consisted of 211 adults between 18 and 65 years (82% females) with a BMI between 27 and 40 kg/m². 148 subjects were considered as completers. For comparison KiloCoach users with at least a 1- and 2-year-long continuous food and exercise diary (n = 104 and n = 38, respectively) and the same BMI classes and age groups were selected. The male proportion in KiloCoach users was higher at 1 year (49%) and after 2 years (55%; 21 men, 17 women). However, for KiloCoach users, no significant difference in weight loss between men and women after 1 year or 2 years (6.5 ± 7.8 vs. 6.4 ± 6.8% (p = 0.94) and 4.9 ± 8.1% vs. 5.4 ± 8.5% (p = 0.880)) was found. Therefore, the total sample was compared with the study population of Heshka et al. [7]. Study populations were comparable in age; however, the Weight Watchers study population had a higher initial BMI (33.8 ± 3.4 vs. 31.7 ± 3.1 kg/m²; p < 0.001). At 1 year and after 2 years mean weight loss did not differ significantly between KiloCoach users and participants using the Weight Watchers program. Mean weight loss of KiloCoach users was 6.2 ± 7.1 kg at 1 year compared to an average loss of 5.0 ± 0.5 kg in Weight Watchers participants (p = 0.08). Mean weight loss at the end of 2 years was 5.0 ± 7.9 kg for KiloCoach users and 3.0 ± 0.6 kg for Weight Watchers participants (p = 0.14). This translates to an average weight loss of 6.4 ± 7.3% of initial body weight for KiloCoach users after 1 year and 5.1 ± 8.2% after 2 years, while subjects participating in Weight Watchers had 5.3% less body weight after 1 year and 3.2 % after 2 years on average (no SD given; p = 0.11 and p = 0.15) (fig. 2b).

Comparison with Viktklubb

The study of Jonasson et al. [8] investigated 3,618 women and 591 men (86% female) showing a BMI > 20 kg/m² and using the Swedish internet-based weight loss program Viktklubb. Therefore, KiloCoach users with a BMI > 20 kg/m² and at least 3 months of continuous protocol were considered comparable (n = 665). On average KiloCoach users were 1 year older than Viktklubb users, and age differed significantly for women (42.9 ± 11.7 vs. 44.1 ± 11.0 years; p = 0.03) but not for men (47.1 ± 11.5 vs. 46.1 ± 11.8 years; p = 0.18).

After 3 months, male KiloCoach users (n = 244) had a mean weight loss of 5.9 ± 4.1 kg (5.9 ± 3.7% of initial body weight) which is comparable to a weight loss of 5.6 ± 4.4 kg (5.5 ± 4.2% of initial body weight) in male Viktklubb participants (p = 0.25). However, female KiloCoach users (n = 421) lost significantly more weight than female participants in Viktklubb (p = 0.001). Weight loss for female KiloCoach users was 3.8 ± 3.3 kg (4.5 ± 3.7% of initial body weight) whereas women using Viktklubb achieved a weight loss of 3.2 ± 3.3 kg (3.9 ± 3.9% of initial body weight) (p = 0.001) after 3 months (fig. 3).

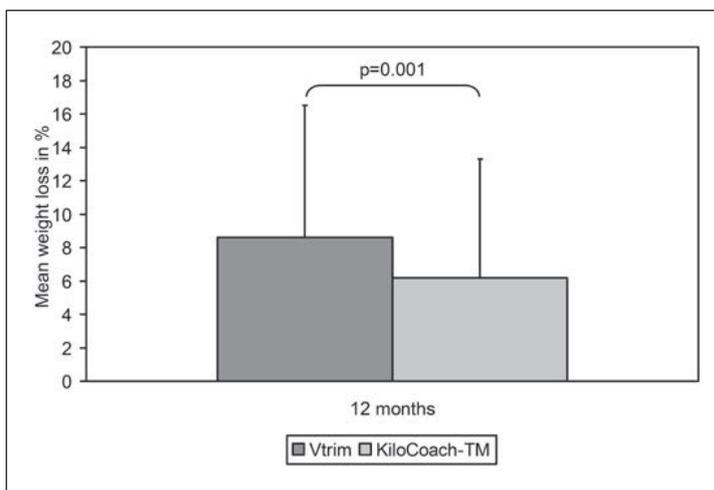


Fig. 4. Mean weight loss in % of initial body weight for Vtrim and KiloCoach users at 12 months [9].

Comparison with Vtrim

In an RCT, overweight subjects 18 years and older with a BMI >25 and <40 kg/m² were assigned to use the structured online behavioral intervention Vtrim (n = 62) or eDiets.com (n = 62) for 1 year [9]. For comparison with Vtrim, KiloCoach users with at least 1 year of continuous food protocol and the same initial BMI between 25.1 and 39.9 kg/m² were selected (n = 113). At 12 months 40 Vtrim completers showed a significantly higher weight loss (7.8 ± 7.5 kg or 8.6 ± 7.9%) than KiloCoach users (6.0 ± 7.0 kg (p = 0.006) or 6.2 ± 7.1% (p = 0.001)). However, mean initial BMI of KiloCoach users (30.6 ± 3.4 kg/m²) was significantly lower than that of Vtrim users (32.3 ± 3.9 kg/m²; p < 0.001) (fig. 4).

Comparison with eDiets.com

In the above mentioned study by Gold et al. [9], the control group was eDiets.com (n = 62). Comparing results of this study, the reported mean weight loss after 1 year for 113 KiloCoach users (6.0 ± 7.0 kg or 6.2 ± 7.1%) was significantly higher compared to eDiets.com (3.4 ± 5.8 kg (p < 0.001) or 3.7 ± 6.0% (p < 0.001)). Again, mean initial BMI of KiloCoach users (30.6 ± 3.4 kg/m²) was significantly lower than that of eDiets.com users (32.5 ± 4.2 kg/m²; p < 0.001).

For another RCT of eDiets.com by Womble et al. [10], inclusion criteria were age between 18 and 65 years and a BMI between 27 and 40 kg/m². In total 47 women with a mean age of 43.7 ± 10.2 years and a BMI of 33.5 ± 3.1 kg/m² at baseline participated. At week 16, the mean weight loss of eDiets.com completers (n = 15) was 1.3 ± 3.3% of initial weight. After 1 year, participants in eDiets.com (n = 15) lost 2.1 ± 3.1% of initial body weight on average. Mean weight loss for comparable KiloCoach users (n = 53) with at least 1 year of continuous food and exercise diary was 6.7 ± 3.8 % at week 16 and 6.3 ± 7.0% after 1 year (fig. 5). Therefore, KiloCoach users lost significantly more weight than participants in eDiets.com at week 16 (p < 0.001) and after 1 year (p < 0.001, fig. 5).

Comparison with a Behavioral Therapy Program

Levitz and Stunkard [11, quoted in 12] evaluated a behavioral therapy program with behavioral instructions delivered by a professional therapist. After 3 months, participants in the behavioral therapy program (n = 73) showed a weight loss of 2.3%, whereas KiloCoach users (n = 568) achieved a significantly greater weight loss of 5.2% of body weight (p < 0.001) (fig. 6).

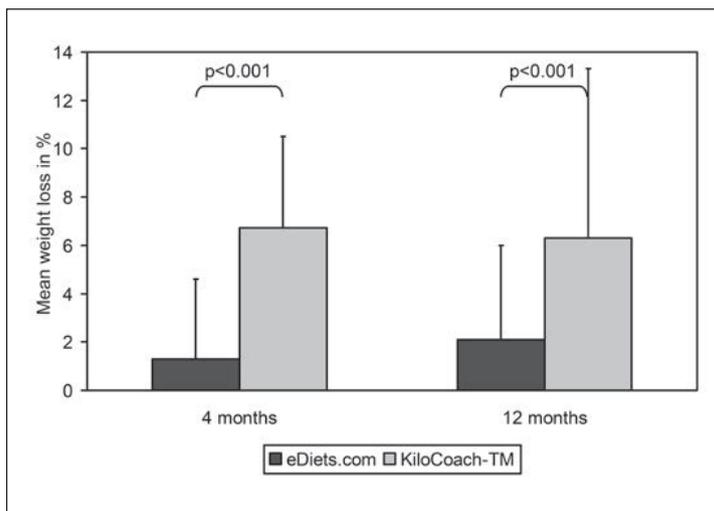


Fig. 5. Mean weight loss in % of initial body weight for eDiets.com and KiloCoach users at 4 and 12 months [10].

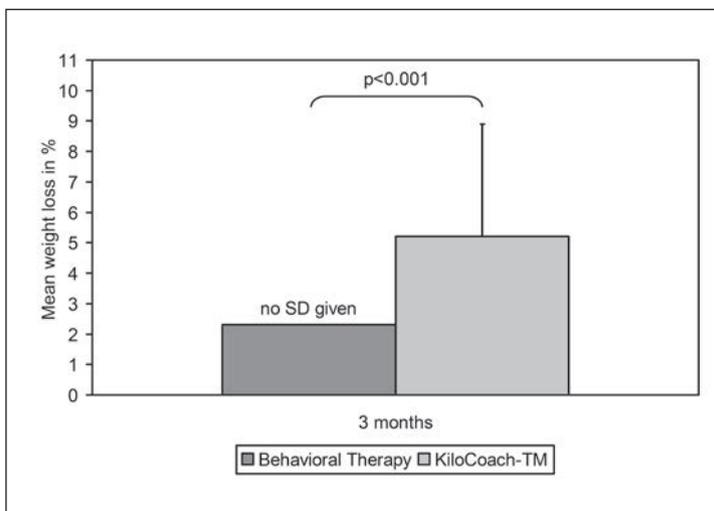


Fig. 6. Mean weight loss in % of initial body weight for participants in a behavioral therapy program and KiloCoach users at 3 months [11, 12].

Discussion

In this study the effectiveness of the internet-based weight loss application KiloCoach as a total collective as well as in relation to evaluated programs was investigated. It is important to note that KiloCoach results were not obtained in an academic or research setting but in the context of the ongoing use of the internet platform. Data were self-reported. Clinical weight measurement may be considered as advantageous but self-reported data over the internet have shown to be comparable to observed measures [1].

All KiloCoach samples selected for comparison with reference programs, except for a 3 months usage, showed a mean weight loss of at least 5 %. For completers KiloCoach is as effective as the popular commercial weight loss program Weight Watchers [7] after 1 and 2 years and more effective as a face-to-face therapist-led behavioral program [11, 12] after 3 months.

KiloCoach data were also compared with published data of the internet-based weight loss programs Viktklubb, eDiets.com, and Vtrim. Female KiloCoach users lost significantly

more weight than female participants in Viktklubb [8] after 3 months. A significant higher weight loss was achieved by KiloCoach users in comparison to users of eDiets.com [9, 10] after 4 months and after 1 year. Vtrim users [10] showed a significantly greater weight loss than KiloCoach users, but it has to be noted that Vtrim participants had a significantly higher BMI at baseline. Vtrim is a structured therapist-led behavioral web program and offers a high level of online support; e.g., in weekly online lessons participants got individual feedback to their food diary and therapist-led online chats were offered once a week. This intensity in support may be responsible for the high weight loss shown in the Vtrim participants.

Weight loss in internet interventions mostly remains behind results usually achieved in behavioral weight control programs [1]. A weight loss goal for internet programs of 5% could prove to be clinically relevant and feasible [5] as even weight losses of 5% of initial weight have shown improvement in cardiovascular risk factors [13]. Internet interventions also show positive results in weight maintenance [14–16], although not consistently in all studies [17].

We studied program aspects that could explain the diverging effects of internet interventions observed [5]. Dynamic, frequently updated, interactive websites providing feedback to participants increase log-in frequency and appear to be more effective [18, 19]. Reproducing components of behavioral therapy like self-monitoring, behavioral skill training, and reinforcement and feedback from a trained professional in online interventions leads to greater weight losses [1] than simply providing information [2]. Contact with a trained professional is another component of many successful weight management programs, and online counseling via e-mail also proves to be effective [20]. These features are also found in the KiloCoach program: individual weight goal setting, self-monitoring via a daily food and activity protocol with immediate calorie feedback; reinforcing automatic feedback messages in defined situations (e.g. high fruit or vegetable consumption, high activity or high fat intake); easy-to-use tools for analysis and search for alternatives as well as online expert support.

In all internet interventions, relatively high attrition rates can be observed. The dropout rate in the Swedish online weight club was extremely high with 89% at 6 months [8]. The main reason for high attrition rates in online programs may be due to the absence of any selection at the starting point, making comparison of dropout rates with clinical settings in RCTs difficult. However, a further analysis and understanding of reasons for dropout might contribute to improve the effectiveness of online programs. A preliminary analysis of KiloCoach non-completers showed that female and younger users are more prone to attrition.

Interestingly, the outcome of weight loss in KiloCoach users was independent of age. This is in accordance with another study that showed that also people > 65 years actively use internet programs and achieve weight loss at least as high as younger program users [21].

In conclusion, the effects found for online programs seem to depend not only on the study design, as the RCTs performed revealed very conflicting results. Rather, characteristics such as methods and features applied, i.e. the extent of how helpful, practical and acceptable the program appears to the client, seem to be relevant. This supports the bottom-up evaluation approach according to the integrative validity model for program evaluation [22] which prefers to test practical viability first before testing efficacy. Viability of KiloCoach is perpetually enhanced on the basis of clients' feedback. After this retrospective evaluation of effectiveness a prospective trial as well as a survey on time-out and dropout reasons are currently performed as next steps, and daily protocols of completers and non-completers are analyzed in more detail.

Acknowledgements

We thank Michaela Schmöger and Karl-Ralf Swazina at Ludwig Boltzmann Institute for their help with data analysis.

Disclosure Statement

Rita Longin is an employee of KiloCoach e.U. Rosa Aspalter is owner and manager of KiloCoach e.U. Researchers from KiloCoach e.U. declare that data were transferred to Ludwig Boltzmann Institute without any modification or pre-selection. Researchers from Ludwig Boltzmann Institute state that evaluation was carried out without the influence of KiloCoach e.U. staff.

References

- 1 Krukowski RA, West DS, Harvey-Berino J: Recent advances in internet-delivered, evidence-based weight control programs for adults. *J Diabetes Sci Technol* 2009;3:184–189.
- 2 Tate DF, Wing RR, Winnett RA: Using internet technology to deliver a behavioral weight loss program. *JAMA* 2001;285:1172–1177.
- 3 Sherwood NE, Morton N, Jeffery RW, French SA, Neumark-Sztainer D, Falkner NH: Consumer preferences in format and type of community-based weight control programs. *Am J Health Promot* 1998;13:12–18.
- 4 Krukowski RA, Tilford JM, Harvey-Berino J, West S: Comparing behavioral weight loss modalities: incremental cost-effectiveness of an internet-based versus an in-person condition. *Obesity (Silver Spring)* 2011; 19:1629–1635.
- 5 Arem H, Irwin M: A review of web-based weight loss interventions in adults. *Obes Rev* 2011;12:e236–e243.
- 6 Rippe JM, Price JM, Hess SA, Kline G, DeMers KA, Damitz S, Kreidieh I, Freedson P: Improved psychological well-being, quality of life, and health practices in moderately overweight women participating in a 12-week structured weight loss program. *Obes Res* 1998;6:208–218.
- 7 Heshka S, Anderson JW, Atkinson RL, Greenway FL, Hill JO, Phinney SD, Kolotkin RL, Miller-Kovach K, Pi-Sunyer FX: Weight loss with self-help compared with a structured commercial program: a randomized trial. *JAMA* 2003;289:1792–1798.
- 8 Jonasson J, Linne Y, Neovius M, Rössner S: An internet-based weight loss programme – a feasibility study with preliminary results from 4209 completers. *Scand J Public Health* 2009;37:75–82.
- 9 Gold BC, Burke S, Pintauro S, Buzzell P, Harvey-Berino J: Weight loss on the web: a pilot study comparing a structured behavioral intervention to a commercial program. *Obesity (Silver Spring)* 2007;15:155–164.
- 10 Womble LG, Wadden TA, McGuckin BG, Sargent SL, Rothman RA, Krauthamer-Ewing ES: A randomized controlled trial of a commercial internet weight loss program. *Obes Res* 2004;12:1011–1018.
- 11 Levitz LS, Stunkard AJ: A therapeutic coalition for obesity: behavior modification and patient self-help. *Am J Psychiatry* 1974;131:423–427.
- 12 Tsai AG, Wadden TA: Systematic review: an evaluation of major commercial weight loss programs in the United States. *Ann Intern Med* 2005;142:56–66
- 13 Pasanisi F, Contaldo F, de Simone G, Mancini M: Benefits of sustained moderate weight loss in obesity. *Nutr Metab Cardiovasc Dis* 2001;11:401–406.
- 14 Harvey-Berino J, Pintauro S, Buzzell P, Gold EC: Effect of internet support on the long-term maintenance of weight loss. *Obes Res* 2004;12:320–329.
- 15 Harvey-Berino J, Pintauro SJ, Gold EC: The feasibility of using internet support for the maintenance of weight loss. *Behav Modif* 2002;26:103–116.
- 16 Svetkey LP, Stevens VJ, Brantley PJ, Appel LJ, Hollis JF, Loria CM, Vollmer WM, Gullion CM, Funk K, Smith P, Samuel-Hodge C, Myers V, Lien LF, Laferriere D, Kennedy B, Jerome GJ, Heinith F, Harsha DW, Evans P, Erlinger TP, Dalcin AT, Coughlin J, Charleston J, Champagne CM, Bauck A, Ard JD, Aicher K: Comparison of strategies for sustaining weight loss: the weight loss maintenance randomized controlled trial. *JAMA* 2008; 299:1139–1148.
- 17 Harvey-Berino J, Pintauro S, Buzzell P, DiGiulio M, Casey GB, Moldovan C, Ramirez E: Does using the internet facilitate the maintenance of weight loss? *Int J Obes Relat Metab Disord* 2002;26:1254–1260.
- 18 Funk KL, Stevens VJ, Appel LJ, Bauck A, Brantley PJ, Champagne CM, Coughlin J, Dalcin AT, Harvey-Berino J, Hollis JF, Jerome GJ, Kennedy BM, Lien LF, Myers VH, Samuel-Hodge C, Svetkey LP, Vollmer WM: Associations of internet website use with weight change in a long-term weight loss maintenance program. *J Med Internet Res* 2010;12:e29.

- 19 Krukowski RA, Harvey-Berino J, Ashikaga T, Thomas CS, Micco N: Internet-based weight control: the relationship between web features and weight loss. *Telemed J E Health* 2008;14:775–782.
- 20 Tate DF, Jackvony EH, Wing RR: A randomized trial comparing human e-mail counseling, computer-automated tailored counseling, and no counseling in an Internet weight loss program. *Arch Intern Med* 2006;166:1620–1625.
- 21 van der Mark M, Jonasson J, Svensson M, Linne Y, Rössner S, Trolle Lagerros Y: Older members perform better in an internet-based behavioral weight loss program compared to younger members. *Obes Facts* 2009;2:74–79.
- 22 Chen HT: The bottom-up approach to integrative validity: A new perspective for program evaluation. *Evaluation and Program Planning* 2010;33:205–214.