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Pedometers Are Perceived as Useful Tools for Weight Loss

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Abstract: Pedometers are used as motivational tools to encourage physical activity through Extension educational contacts. In conjunction with a community campaign, subjects (N = 60) enrolled in a weight-loss study were provided with pedometers. Participants recorded steps and responded to an evaluation. Step counts increased from baseline through 9 weeks ($P \leq 0.018$) and correlated with goals ($P \leq 0.038$). Participants who reported that the pedometer helped them achieve goals had greater fat and less fat-free mass at baseline than those who did not find it helpful. Pedometers benefit individuals by increasing activity and being perceived as useful for weight-loss.

Introduction

Physical activity is important for health. Among obese individuals who are trying to enhance or maintain weight loss efforts, moderate-intensity physical activity for 60-90 minutes/day may be required (Hill & Wyatt, 2005). Pedometers have been used as tools to measure ambulatory activity and to motivate individuals to be more active. Wearing a pedometer can be an effective way to increase awareness (Rooney, Smalley, Larson, & Havens, 2003). A goal of 10,000 steps/day has been recommended for healthy adults seeking to attain or maintain an active lifestyle (Tudor-Locke & Basset, 2004). Long-term increases in step counts and improved body mass index and lower extremity function have been achieved by individuals using pedometers (Villanova, Pasqui, Burzacchini, Forlani, Manini, Suppini, Melchionda, & Marchesini, 2006; Toole, Thorn, Panton, Kingsley, & Haymes, 2007).

Most studies assessing pedometers as a tool for enhancing weight loss and physical activity require participants to report step counts over a short time. The evaluation reported here examined perceived usefulness of pedometers as a tool for achieving weight-loss or activity goals over 1 year. The study was conducted in conjunction with a statewide community nutrition and health campaign that included promoting increased physical activity by providing pedometers through Extension outreach efforts (Wisconsin Nutrition Education Network, 2004). Over 1,000 pedometers were provided to Wisconsin residents through educational contacts.

Population

Participants (N = 60, Table 1) were asked to use pedometers to monitor ambulatory activity. Subjects were concurrently enrolled in a study examining two dietary strategies: 1) reduction of caloric intake and consumption of $\leq 25\%$ kcal from fat or 2) consumption of 4 cups vegetables and 1-1.5 cups of fruit/day. Body composition (BOD POD[®], Life Measurements, Inc., Concord, CA, USA), weight, and body mass index were obtained before baseline step counts and at 3 months and 1 year.

Table 1.
Baseline Characteristics of Participants (N = 60)

Age (year)	33.6 \pm 8.6 ¹
Body mass index (kilograms/meter ²)	33.6 \pm 3.6
Weight (kilograms)	95.3 \pm 15.7
Fat mass (kilograms)	39.5 \pm 10.0
Fat-free mass (kilograms)	55.6 \pm 11.8
% Fat mass	41.6 \pm 7.5 44.8 \pm 4.4 (females) 32.6 \pm 6.9 (males)
% Fat-free mass	58.4 \pm 7.5 55.2 \pm 4.4 (females) 67.4 \pm 6.9 (males)
¹ Mean \pm SD.	

Using and Evaluating the Tool

Participants were provided with Accusplit X 120 Activity Pedometers (San Jose, CA), which have face plates and anchor cords, after piloting by investigators. To standardize pedometer performance, participants were told to press the "reset" button in the morning, clip it to a firm waistband or belt, and wear it on the same location.

Participants were given log sheets and asked to record daily steps for 3 days to obtain baseline counts. From the baseline value, participants calculated a 10% increase in steps and used this daily goal for the remainder of the week. A weekly 10% increase was repeated until the step count reached an individually appropriate value. Most participants were aware of the 10,000 steps/day recommendation (Tudor-Locke & Basset, 2004)

and adopted this goal. Participants were asked to record daily steps for the first 10 weeks and for 3 days at 1 year.

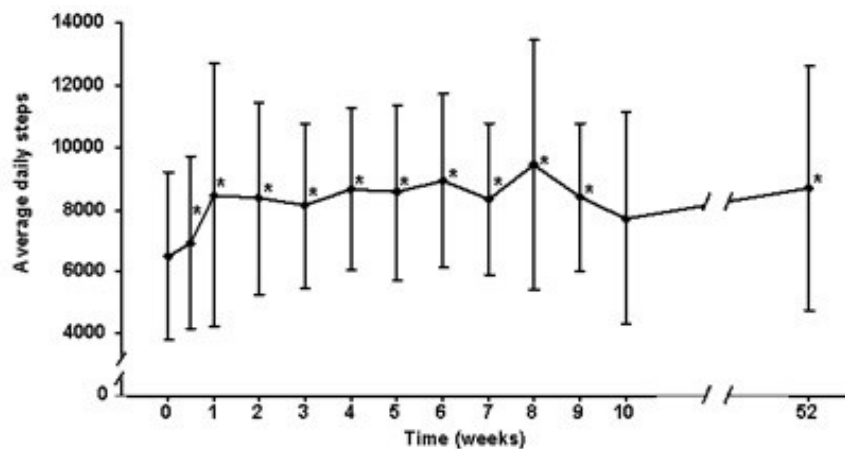
At 7-9 months after baseline, three evaluation questions were asked:

1. Are you still wearing your pedometer? If so, how often, and how many steps/day do you average? If not, when did you stop and why?
2. Did you have any trouble with your pedometer functioning properly? If so, describe.
3. Do you feel that your pedometer helped or is helping you to achieve your weight-loss goals?

Response and Findings

At 3 months and 1 year, 54 and 45 participants were still enrolled, respectively. At baseline, week 4, and week 10, 70%, 48.3%, and 15% of participants, respectively, recorded steps for at least 2 days. Step counts increased from baseline by 1947 ± 710 steps (Figure 1), and the increase was sustained at 1 year. Reported goals often correlated with steps achieved.

Figure 1.
Daily Steps of Participants over Time¹



¹ Data are means \pm SD. Values marked by an asterisk (*) indicate a difference ($P \leq 0.030$) from baseline when an outlier is removed. $N = 41, 40, 39, 35, 32, 28, 25, 21, 21, 18, 15, 8,$ and 18 for baseline through 52 weeks, respectively.

Forty-seven of 54 participants responded to the evaluation questions. Over 20% were regularly or sometimes wearing their pedometer. The three most common reasons for not continuing to wear the pedometers were:

- Forgot

- Have a good sense of daily steps
- Lost it

Baseline characteristics did not differ between those who responded and those who did not. Baseline differences did exist between responders who felt that the pedometer helped or was helping them achieve their weight-loss goals compared with those who reported that they were unsure or thought it did not help (Table 2). Those who reported that the pedometer was helpful weighed more and had greater fat mass and lower fat-free mass at baseline.

Table 2.
Differences between Follow-up Survey Respondents

Baseline Characteristic	Pedometer Helpful ¹	Pedometer Not Helpful ²	<i>P</i> -value
Weight (kilograms)	97.1 ± 17.6	89.8 ± 8.8	0.015
Fat mass (kilograms)	42.1 ± 10.3	33.6 ± 7.7	0.026
Fat-free mass (kilograms)	55.0 ± 11.4	56.2 ± 14.9	0.051
¹ N = 35; 28 female, 7 male. Respondents who reported that a pedometer was helpful or sometimes helpful in achieving weight-loss goals. ² N = 12; 7 female, 5 male. Respondents who did not find the pedometer helpful or were unsure.			

Conclusions

The evaluation reported here corroborates previous findings observed in individuals using pedometers (Clarke, Freeland-Graves, Klohe-Loehman, Milani, Nuss, & Laffrey, 2007; Toole, Thorn, Panton, Kingsley, & Haymes, 2007; Villanova, Pasqui, Burzacchini, Forlani, Manini, Suppini, Melchionda, & Marchesini, 2006). Goals were generally not different from actual step counts, suggesting that goal setting may be an effective way to methodically increase steps. Responders (75%) said the pedometer was helpful for achieving weight-loss although many were no longer using them at follow-up.

The decline in pedometer use over time may suggest that pedometers are most helpful over the short-term for gaining information and providing motivation to increase physical activity. Participants who reported that the pedometer was helpful weighed more at baseline and had greater fat mass and less fat-free mass than those who did not. Heavier participants may be more likely to increase physical activity through walking, as opposed to other higher intensity activities. Pedometers may be perceived as useful by individuals who are likely to benefit from and sustain increases in low-impact and low- to moderate-intensity activity, such as walking.

The modern environment is not conducive to incorporating physical activity, and so continued encouragement through educational contacts is needed. As few as 30 minutes of moderate-intensity physical activity, such as increased walking, can increase fitness and improve health. Physical activity can prevent

age-related weight gain and weight regain in previously obese and overweight individuals (Hill & Wyatt, 2005). Pedometers not only played a role in increasing daily ambulatory activity, but the perception from the majority of users was that the pedometer was helpful for achieving goals. Pedometers as a motivational tool may offer physical and mental benefits to a large portion of individuals seeking to lose weight through diet and exercise.

Acknowledgements

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