ORIGINAL ARTICLE

Achieving the daily step goal of 10,000 steps: The experience of a Canadian family attached to pedometers

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Abstract

Background: Health experts recommend daily step goals of 10,000 steps for adults and 12,000 steps for youths to achieve a healthy active living. This article reports the findings of a Canadian family project to investigate whether the recommended daily step goals are achievable in a real life setting, and suggests ways to increase the daily steps to meet the goal. The family project also provides an example to encourage more Canadians to conduct family projects on healthy living.

Methods: This is a pilot feasibility study. A Canadian family was recruited for the study, with 4 volunteers (father, mother, son and daughter). Each volunteer was asked to wear a pedometer and to record daily steps for three time periods of each day during a 2-month period. Both minimal routine steps, and additional steps from special non-routine activities, were recorded at work, school and home.

Results: The mean number of daily steps from routine minimal daily activities for the family was 6685 steps in a day (16 hr, approx 400 steps/hr). There was thus a mean deficit of 4315 steps per day, or approximately 30,000 steps per week, from the goal (10,000 steps for adults; 12,000 steps for youths). Special activities that were found to effectively increase the steps above the routine level include: walking at brisk pace, grocery shopping, window

shopping in a mall, going to an entertainment centre, and attending parties (such as to celebrate the holiday season and birthdays).

Discussion: To increase our daily steps to meet the daily step goal, a new culture is recommended: “get off the chair”. By definition, sitting on a chair precludes the opportunity to walk. We encourage people to get off the chair, to go shopping, and to go partying, as a practical and fun way to increase the daily steps. This paper is a call for increased physical activity to meet the daily step goal.

Keywords: Daily step goal, Pedometer, Healthy living, Physical activity, Walking

In Canada, information booklets are available from the federal government, provincial ministries of health, city public health departments, public libraries, doctors' offices, drug stores and other places to promote the health benefits of physical activity¹⁻⁵ and the use of a pedometer (step-counter).^{3,4} One message reads, “change your life by putting your best foot forward and walk more often!”⁴ Another message reads, “walk away from diabetes, cancer, and heart disease!”⁵ These booklets and

other online sources recommend daily step goals of 10,000 steps for adults and 12,000 for youths,^{4,6,7} based on accumulated research.⁸⁻¹⁰

The questions for an average Canadian family are: How achievable is the 10,000 daily step goal? Are there already sufficient steps from the routine daily activities at work, home or school in our everyday life to meet the daily step goals? If not, how many more steps are needed to reach the daily step goals? What are the effective activities to increase the daily steps?

This pilot study reports the results of a family project on healthy living. The objectives of this study were to collect information on whether the daily step goals are achievable in a real life setting, based on the experience of a Canadian family, and to provide some suggestions on possible ways to increase the daily steps to meet the daily step goals.

Methods

A Canadian family was recruited for this pilot feasibility study, with 4 volunteers – a male adult (Father) who works in an office setting, a female adult (Mother) who works in the home, a male youth (Son) who goes to school in Grade 11, and a female youth (Daughter) who goes to school in Grade 8. Each volunteer was asked to wear a pedometer (Yamax Digiwalker, <http://www.digiwalker.com>, available on loan from local public libraries) over an 8-week period in November and December. Daily steps were recorded for three time periods of a day (Period 1, morning routine, 7:00 am to 8:00 am including breakfast; Period 2, work/home/school routine, 8:00 am to 6:00 pm including lunch; Period 3, evening routine, 6:00 pm to bedtime including dinner). In addition, types of activities involved were recorded for each time period.

Daily steps were recorded for a typical day with minimal but necessary activities at work, home and school. Thus, the morning routine included: getting up, personal hygiene, breakfast, and preparation for work, school or the day. The office routine included: driving children to school and then to work, using a computer, searching files and folders, reading and intellectual work, lunch at work, consulting with co-workers, and attending meetings. The home routine

included: cleaning and tidying things around the house, laundry, lunch at home, reading and intellectual work, using a computer, and preparation of family meals. The school routine included: classes, lunch at school, activities during recess, and taking bus home. The evening routine included: dinner at home, fixing minor problems at home, school work, office work brought home, reading, watching television, leisure activities, and personal hygiene.

Routine daily steps did not include special activities that were above and beyond the routine minimal daily levels. Steps were recorded separately for these special activities, which included: atypical work activities such as full-day workshops, conferences, and company retreats held off-site; additional activities around the home such as occasional shopping and grocery shopping, preparation of meals for special occasions and festivals, weekly house cleaning, yard work, snow shovelling, workouts such as treadmills, and major activities such as home renovation projects; physical education classes at school – the Grade 8 student had three 1-hr gymnasium sessions each week, the Grade 11 student had none in his course load; as well as special evening events such as school concerts, jogging, sports, eating out, and holiday parties and dinners.

Results

Table 1 shows the average number of steps registered by the pedometer for a typical day with minimal but necessary activities at work, home and school. The office worker walked an average of 5434 steps a day, the home worker 6489 steps a day, the Grade 11 student 7638 steps a day, and the Grade 8 student 7178 steps a day. The mean daily steps from routine minimal daily activities for all four volunteers was 6685 steps per day (16 hr), or approximately 400 steps/hr (7 steps/min). Deficit of steps from daily guideline of the four volunteers ranged from 3511 steps to 4822 steps, with a mean deficit of 4315 steps per day, or approximately 30,000 steps per week. The deficit of daily steps found in this study must be gained from additional more rigorous activities.

TABLE 1. Average number of steps registered by a pedometer ($\pm$ standard error) in a typical day with routine (minimal but necessary) activities at work, home and school for a family of four volunteers in Canada

Routine activities	Office worker, male adult (Father)	Home worker, female adult (Mother)	Grade 11 student, male youth (Son)	Grade 8 student, female youth (Daughter)
Period 1 7:00 am-8:00 am (Breakfast)	Home (1) 421 $\pm$ 38.8 (n=12)	Home (1) 582 $\pm$ 22.6 (n=14)	Home (1) 314 $\pm$ 18.3 (n=14)	Home (1) 551 $\pm$ 33.5 (n=10)
Period 2 8:00 am-6:00 pm (Morning, Lunch, After-noon)	Office (2) 3701 $\pm$ 190.6 (n=12)	Home (3) 4259 $\pm$ 205.1 (n=8)	School/Home (4) 5417 $\pm$ 402.9 (n=13)	School/Home (4) 5270 $\pm$ 187.5 (n=9)
Period 3 6:00 pm-11:00 pm (Dinner, Evening)	Home (5) 1312 $\pm$ 108.2 (n=14)	Home (5) 1648 $\pm$ 114.9 (n=15)	Home (5) 1907 $\pm$ 227.9 (n=14)	Home (5) 1357 $\pm$ 43.5 (n=12)
Total steps (6)	5434 $\pm$ 326.1	6489 $\pm$ 350.4	7638 $\pm$ 664.5	7178 $\pm$ 258.4
Daily step goal (7)	10,000	10,000	12,000	12,000
Deficit of steps from goal	4566 $\pm$ 326.1	3511 $\pm$ 350.4	4362 $\pm$ 664.5	4822 $\pm$ 258.4
Percent of daily step goal achieved	54%	65%	64%	60%

(1) Morning routine.

(2) Office routine.

(3) Home routine.

(4) School routine (Grade 11 school hours from 8:50 am to 3:10 pm; Grade 8 school hours from 8:00 am to 2:30 pm).

(5) Evening routine.

(6) Mean daily steps of the four volunteers = 6685 steps per day (16 hours), or approximately 400 steps per hour from routine minimal daily activities.

(7) Guidelines for daily step goals: adults 10,000 steps; youths 12,000 steps.⁴ Mean deficit of steps from guideline of the four volunteers = 4315 steps per day.

Table 2 shows the average number of steps (X) for selected additional activities that could increase the daily steps above and beyond the minimal activities. Duration of each selected additional activity was recorded, and was used to estimate the number of steps (Y) expected from minimal routine activities for the same time period, based on 400 steps per hour (from Table 1). Additional steps gained in an activity was estimated as the difference between the total number of steps from the activity and the estimated steps had the individual not performed the activity and remained at baseline minimal level for the same duration (X-Y).

In terms of effective activities to increase the daily steps, from our list of selected activities (Table 2), walking at a brisk pace (100 steps/min) for half an hour each day is one of the most effective activities.

Otherwise, grocery shopping (40 steps/min), shopping in a mall (40 steps/min), going to an entertainment centre (30 steps/min) and birthday parties (25 steps/min), attending holiday evening parties – standing (15 steps/min) or sitting (10 steps/min), attending company retreats (10 steps/min), and having pot-luck lunches with co-workers (10 steps/min) are also good activities.

Discussion

This pilot feasibility study provides a detailed breakdown of the daily activities and the average number of steps, with standard errors, for various activities in a Canadian family. Our results indicate that the daily step goal of 10,000 steps for adults and 12,000 steps for youths is not normally achievable based on daily

TABLE 2. Average number of steps registered by a pedometer ($\pm$ standard error) and estimated additional steps gained in selected special activities associated with the office, home and school.

Special activities	Average number of steps from activity (X)	Steps expected for the same time period from minimal activity (7) (Y)	Additional steps gained in activity, rounded to nearest hundred (X-Y)
A. Office			
Lunch-time walking at brisk pace (1) (0.5 hr) (n=5)	3093 $\pm$ 357.9	200	2900
Company retreat (2) (8 hr) (n=1)	5422	3200	2200
Pot-luck lunch (3) (1 hr) (n=2)	653 $\pm$ 103.0	400	300
B. Home			
Grocery shopping in a supermarket (2 hr) (n=5)	4450 $\pm$ 175.1	800	3700
Shopping in a shopping mall (1 hr) (n=10)	2244 $\pm$ 227.8	400	1800
Extended shopping in a shopping mall (2 hr) (n=15)	3522 $\pm$ 251.5	800	2700
Attending an evening party with food at home or a friend's home, mostly standing (4) (3 hr) (n=5)	2815 $\pm$ 397.5	1200	1600
Attending an evening party with food at home or a friend's home, sit down dinner (5) (3 hr) (n=5)	1668 $\pm$ 81.9	1200	500
Preparing dinner for a special event at home or friend's home (5 hr) (n=4)	1989 $\pm$ 167.6	2000	0
C. School			
Playdium (6) (2 hr) (n=1)	3794	800	3000
Birthday party playing mini-golf (2 hr) (n=1)	2848	800	2000
Attending a school concert in the evening (1.5 hr) (n=2)	365 $\pm$ 43.5	600	-200

(1) Lunch-time walk outside the office building, when weather or schedule permits.

(2) An all day retreat at an off-site conference facility for employees of the company to discuss and plan company business.

(3) Pot-luck lunch at work to celebrate the holiday season, retirement of a co-worker, etc.

(4) Evening party (standing), with finger food and wine, mostly standing, talking in a background of music.

(5) Evening party with a sit-down dinner to celebrate the holiday season, birthdays, etc.

(6) Playdium is a high-tech, interactive and virtual entertainment centre, which includes over 200 arcade games, sports simulators, and attractions such as Go-karts and Mini-Golf.

(7) From Table 1, the number of steps expected from minimal activity is approximately 400 steps per hour.

routine activities at the office, home, or school. Only about 54% to 65% of the daily step goal was achieved by our four volunteers. On average, there was a deficit of about 4300 steps per day.

Our study finding is consistent with other reports. The University of Colorado step-counting project regis-

tered an average of 5310 steps a day in participants 13 years and older (7036 steps a day in participants 13-17 years old).¹¹ Richardson et al reported an average of 6019 steps per day for their participants in a program at baseline.¹² The Pedestrian and Bicycle Information Center estimates that in normal daily activity most peo-

ple cover about 4000 to 6000 steps in a day, and they need to come up with another 4000 to 6000 steps in a day to reach 10,000.⁶ Stanten estimates that most people walk about 4000 steps doing regular daily activities, and there is a need to add 6000 steps a day.⁷

Canadian families are encouraged to conduct family projects on healthy living. This study provides an example of how such a family health project can be done. We found that a family project gels family members through working towards a common goal, increases health knowledge through library and Internet searches and health literature reading, as well as improves expertise and skills in project design, data analysis and report writing.

Our pilot feasibility study has limitations. Our results were based on the experience of four volunteers and therefore cannot represent the daily steps pattern of the Canadian general population. Because the study was carried out over an 8-week period during November and December, it may not be representative of what can happen in the rest of the year. However, it was impossible for this study to continue beyond the 8-week period. Towards the end of the study period, some volunteers had had enough of the pedometer routine and simply refused to wear the instrument. We figured that eight weeks' worth of detailed records (3 times a day; 7 days a week) were perhaps appropriate for a study of this kind. There may also have been instrument errors, as pedometers are not a scientifically precise instrument; there were times when steps were not registered, or one step was registered as two.

The key to achieving the daily step goal is simply getting off the chair. By definition, sitting on a chair means no opportunity to walk. From our study, attending a party that involves standing gained about 3 times more steps (1600 steps) than attending a seated dinner party (500 steps), during a 3-hour session. Attending a concert which is seated most of the time in fact incurred loss of steps compared to baseline minimal activity level. Ideas to get off the chair at work, at home, and at school have been suggested elsewhere.¹³

A new office, home and school culture is recommended – “get off the chair”. Walking is a practical and fun way to change our modern sedentary life style and to improve the health of the nation. Let's get going – get off the chair, and go walking, go shopping, and go partying. And remember: "seven days without exercise makes one weak".¹⁴

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