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Education

A SEDENTARY JOB? MEASURING THE PHYSICAL ACTIVITY OF EMERGENCY MEDICINE RESIDENTS

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□ **Abstract—Background: The debate on the quality of health care provided in the United States has continued to be waged as concerns have grown over the years. Stress, sleep deprivation, poor diet, and lack of exercise may lead to inadequate work performance by physicians. Objective: This study was undertaken to determine whether Emergency Medicine (EM) residents satisfy daily recommendations for total number of steps taken per day set forth by the Centers for Disease Control and Prevention and Surgeon General in a 12-h shift. Methods: An observational prospective cohort study was conducted between August 2009 and November 2009 at an urban Level I trauma center with an annual census of over 165,000 Emergency Department (ED) visits per year. The mean number of steps taken by EM residents during 12-h shifts was measured. Results: Mean steps taken during a shift were 7333 (95% confidence interval 6901–7764). Only nine (9.9%) pedometer readings reached the target level of 10,000 (10 K) steps or above. A *t*-test was used to compare steps with the hypothesized 10 K steps target. Recordings of 10 K steps or greater were not correlated with ED sections ($p = 0.60$) shift (medical vs. surgical, $p = 0.65$) or ED census ($r^2 < 0.0017$). Conclusion: A majority of residents (90%) did not meet the target number of steps for shifts. More rigorous charting needs, overcrowding, or even spatial limitations may explain this. This warrants further investigation to determine if some daily physical activity regimens may help improve the overall well-being of EM residents.** © 2013 Elsevier Inc.

□ **Keywords—wellness; resident training; pedometer; steps**

INTRODUCTION

Physician wellness is an issue that has become more prominent in medicine in the last few years. The performance of health care systems can be suboptimum when physicians are unwell (1,2). Stress, sleep deprivation, poor diet, and lack of exercise may lead to inadequate work performance, as well as increase health care provider turnover rates (3,4). The Joint Commission on Accreditation of Healthcare Organizations has mandated that all hospitals have a process to address physician well-being, separate from disciplinary processes to help combat the problem; some hospitals have implemented their own policies to deal with physician well-being (5).

In terms of exercise, studies have shown that taking about 10,000 (10 K) steps a day helps to lower blood pressure, increase weight loss, and maintain a healthy lifestyle (5–7). A study conducted by Le Masurier et al. (2003) demonstrated that individuals who accumulate 10,000 steps/day are more likely to meet the current physical activity guidelines promoted by organizations such as the Centers for Disease Control and Prevention, the American College of Sports Medicine, and the U.S. Surgeon General (8–10). The Emergency Department (ED) is a chaotic and busy environment; one that is not conducive to a sedentary physician. This study was

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undertaken to determine whether Emergency Medicine (EM) residents satisfy this daily recommendation in a 12-h shift. We hypothesized that due to the busy environment, EM residents would easily meet this recommendation.

METHODS

Study Design and Population

We conducted an observational prospective cohort study of EM residents working in an inner-city hospital. After obtaining informed consent, we observed and recorded the number of steps taken by these residents from August 1, 2009 to November 31, 2009 using a pedometer. Inclusion criteria for this study were any EM resident scheduled to work in the adult medical (MER) or surgical (SER) ED. Residents were excluded if they did not provide consent to participate, had a physical disability, were on an off-service rotation, or working in the pediatric ED, psychiatric ED, or Fast Track.

Thirty residents were enrolled in the study and each used a pedometer (Sportline 347, EB Brands, Yonkers, NY). The Sportline series has been validated in several studies to estimate the number of steps taken (11). At the beginning of each 12-h shift, before rounds, the resident would take a pedometer from the designated area in the resident lounge where all pedometers were kept, and place it on their scrubs drawstrings (i.e., belt), as indicated in the directions of the Sportline manual. They would then fill out a log indicating the date, whether they were working in the MER or SER, and time they placed the pedometer on and started their shift. At the completion of their shift, they filled out the same log, indicating the time they finished and took the pedometer off. The layout of the Adult ED (7620 total square feet) is a 15-bed Surgical ER (2302 square feet) with two trauma bays, and a 45-bed Medical ER (4318 square feet) with seven beds dedicated to critical care, one medical resuscitation room, and an asthma room of 15 chairs. The ED services anywhere between 204 and 470 patients per 12-h shift. This study was approved by the Institutional Review Board.

Outcome Measures

At the end of each shift, the resident completed an anonymous questionnaire asking how many steps were taken during the shift and whether the shift was a day or night shift. The total patient census for that particular shift was obtained from patient registration logs. Demographic data of the study participants were not recorded, as Institutional Review Board approval was contingent upon blinding of the authors to this information.

Statistical Analyses

Statistical analyses were performed using the SPSS 16.0 (2007; IBM, Armonk, NY) statistical computer software package. The mean number of steps was calculated and compared using Student's *t*-test, with statistical significance set at the $p < 0.05$ level. Correlation coefficient (r^2) was calculated to determine the relationship between number of steps and number of patients visited during shifts.

RESULTS

During the study period, 91 readings were recorded. Mean steps taken during a shift were 7333 (95% confidence interval 6901–7764). The overall range of number of steps taken during shifts was 2,323 to 12,923. Only nine (9.9%) pedometer readings reached the target or above level of 10 K steps. Forty-three (47.2%) shifts were in Surgical and 48 (52.7%) in Medical sections of the ED ($p = 0.45$). Forty-five (49.4%) of the shifts were during the day and 46 (50.5%) were at night ($p = 0.99$). Recordings of 10 K or greater were not correlated with shift worked, day vs. night ($p = 0.65$). There was no correlation between shift census and number of steps taken ($r^2 < 0.00017$).

DISCUSSION

Contrary to what we predicted, a majority of EM residents did not meet the target number of steps for shifts. The values reflect that only 9.9% of the residents on their 12-h shift had reached the target of 10 K steps or more for sufficient physical activity. This may be due to more rigorous charting needs (i.e., computerized records requiring multiple steps to complete notes), overcrowding, or even spatial limitations. There are many other factors that can influence the number of steps taken per day and include day of week, race, age, education, income, and body mass index (12). In a study conducted to determine the number of steps taken per day in 1 year, it was found that the spring and fall had higher means than the summer and winter (13). Our study was done over a certain time of year from summer to fall, and pedometers were not worn all day. However, if the number of steps taken per resident outside of the ED was known, the cohort might have reached the target of 10 K. The study by Le Masurier et al. demonstrated that not every participant reached the 10 K target, but that those who came close satisfied the guidelines for daily activity (8). Another study in which participants wore the pedometer continually for 1 week demonstrated that those subjects who walked to work were more likely to achieve the 10,000 daily steps than those that did not (14). In