Sit-Stand Desks and Physical Self-care Behaviors in a Family Medicine Residency

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Abstract

Introduction: More than 50% of primary care physicians' practice involves sedentary desk work. Growing evidence suggests a link between sedentary workplace behaviors and increased morbidity and mortality. Research on the effects of sit-stand desks in the workplace suggests that sit-stand desks reduce sedentary behaviors. This study examined the use and satisfaction of adjustable desks with a height of sit-stand and their association with physical self-care behaviors among family medicine residents.

Methods: We conducted a longitudinal cohort survey study at a 9-9-9 family medicine residency after the clinic installed height-adjustable sit-stand desks in January 2020. Standardized questions about the use and satisfaction of adjustable sit-stand desks and physical self-care behaviors were administered in June 2020, December 2020, and December 2021. The survey also included an open text box for feedback.

Results: Median time spent standing at the sit-stand desks was 55.0%. The percentage of time standing was similar across June 2020, December 2020, and December 2021. The average satisfaction rate with the desks across all time points was 71.4%. We did not observe significant differences in the proportion of residents' satisfaction with the adjustable desks over time. Residents who reported standing at the adjustable desk reported increased satisfaction with the desks (Kendall's τ=.38, P<.001) and with physical self-care behaviors (Kendall's τ=.25, P<.05). Themes associated with desk dissatisfaction revolved around limited desktop space.

Conclusion: Over a nearly 1.5-year period, more than half of family medicine residents reported standing at their adjustable desks and being satisfied with them. Residents who reported standing at adjustable desks also reported increased physical self-care behaviors. Residency programs investing in sit-stand desks may consider options that allow for increased desktop surface space.

Introduction

Sedentary behavior is a well-documented independent risk factor influencing health outcomes,[1] and growing evidence suggests a link between sedentary workplace behaviors and increased morbidity and mortality.[2] More than 50% of primary care physicians' practice involves electronic health record work,[3,4] and includes sedentary desk work during and outside work hours.[5] Furthermore, recent research suggests that residents exercise less compared to other health care workers, including medical students and attending physicians.[6] To mitigate the

risks of sedentary workplace behaviors, our study examined family medicine residents' use of adjustable sit-stand desks, their satisfaction with sit-stand desks, and whether their use was associated with physical self-care behaviors.

Methods

As part of the Mayo Clinic's Joy in the Workplace Initiative, the residency's Well-Being Committee submitted a grant to provide height-adjustable sit-stand desks to all the 27 family medicine resident workstations in our program. Our residents have a communal workspace with a dedicated workstation for which a personal adjustable desk was installed in 2020. The height-adjustable sit-stand desks allow for a sit function (Figure 1A) and a stand function (Figure 1B) while working. Our residency purchased the Ergotron WorkFit-S, Single HD Workstation with Worksurface.

Ergonomics staff provided guidance and education to residents on desk setup and use of height-adjustable sit-stand desks. As part of well-being monitoring, our residency's health psychologist sends periodic surveys to residents and added items pertaining to the use and satisfaction of the sit-stand desks. Well-being surveys were administered in June 2020, December 2020, and December 2021. Postgraduate year (PGY) status was collected. No demographic characteristics were collected in the entire survey, allowing all responses to be anonymous. The institutional review board at the Mayo Clinic deemed our study exempt (IRB Application #20-001046).

We assessed residents' use of the height-adjustable sit-stand desks with the question, "In the past month while at the family medicine residency clinic, on average, what percentage of the time did you spend standing at your desk?" Respondents were allowed to enter responses from 0% to 100%.

We assessed residents' satisfaction with the standing desk with the questions, "Overall, how satisfied are you with the residency's standing desks?" Response options included a 5-point Likert scale (1-Very Dissatisfied, 2-Dissatisfied, 3-Neutral, 4-Satisfied, 5-Very Satisfied). For simplicity of interpretation, we generated a binary categorical variable, with responses of 4 or greater coded as "satisfied with standing desks" and responses 3 or less coded as "neutral/dissatisfied with standing desks."

We assessed residents' physical self-care behaviors with the physical care subscale of the Mindful Self-Care Scale (MSCS).[7,8] The physical care subscale scale includes eight items that assess the frequency of self-care physical behaviors in the past week; examples of questions include, "I exercised at least 30 to 60 minutes," "I planned/scheduled my exercise for the day," and "I ate a variety of nutritious foods." Response options included a 5-point Likert scale: "1-never (0 days)," "2-rarely (1 day)," "3-sometimes (2-3 days)," "4-often (3-5 days)," and "5-regularly (6-7 days)." We averaged items in this subscale, with higher scores suggesting a higher frequency of engaging in physical self-care behaviors. In our sample, internal consistency estimates for the subscale (using McDonald's ω) was .79.

Data Analysis

We calculated descriptive statistics for the study's variables (Table 1). To evaluate differences across time points for medians, we employed Kruskal-Wallis tests. To evaluate differences in frequencies across the time points, we employed χ^2 tests. The nonparametric correlation test, Kendall's τ, assessed associations among continuous variables. All statistical analyses used a two-tailed test (α=.05). We conducted all analyses using jamovi[9] and R.[10] For the open-text analysis, all authors reviewed the comments for common themes.

Results

The average response rate for the survey across observation periods ranged from 55% to 78% (June 2020, 15/27 [55%]; December 2020, 21/27 [78%]; and December 2021, 20/27 [74%]).

Across the three time points, the median time standing at the adjustable desk was 55.0%. Time spent standing at the sit-stand desks was similar across June 2020, December 2020, and December 2021 (70.0%, 50.0%, 42.5%, respectively; χ^2=3.41, P=.18). No significant differences were observed between PGY and time spent standing at the sit-stand desks (χ^2=2.83, P=.24).

Using the binary categories of satisfaction with sit-stand desks, the average satisfaction rate across all time points was 71.4%; no significant differences were observed in the proportion of residents reporting satisfaction with the desks across time points (Table 2). No significant differences were observed between PGY and proportions of satisfaction with the desks (χ^2=1.14, P=.57).

The residents' self-reported time standing at the sit-stand desks was associated with increased satisfaction with the sit-stand desks and increased self-reported physical self-care behaviors (Table 3).

A review of the submitted text about the sit-stand height adjustable desks identified recurring concerns over limited desktop space.

Discussion and Conclusion

Our study's results suggest that our family medicine residents use and remain satisfied with height-adjustable sit-stand desks over a nearly 1.5-year period. Though not statistically significant, there was a downward trend in the time residents reported spending standing at their desks during the June 2020-December 2021 timeline. Moreover, our study preliminary identified an association between the use of the stand function at sit-stand desks and reporting increased physical self-care behaviors among our family medicine residents. While no causal inference can be made about the directionality of the variables, nonetheless, our results suggest that the measure of physical self-care behaviors may have convergent validity. Our results suggested that it is likely that residents who value engaging in physical self-care behaviors are more likely to use the stand function of the desks and vice-versa. Future research may disentangle this relationship. Another main finding suggested that residents' dissatisfaction with the height-adjustable sit-stand desks was related to limited desktop space. In the future, considering adjustable desks that move the entire tabletop as a unit may increase satisfaction.

Limitations of our study include the small sample size, selection bias, lack of internal validity in measuring sedentary behaviors, and limited generalizability due to the single-site sample. Despite these limitations, our study provides preliminary data to guide other residency programs and more extensive studies on sit-stand desks.

Reducing sedentary behaviors through workplace environment changes is likely to prove cost-effective for organizations.[12] While our study did not aim to measure objective health outcomes of our residents, longitudinal studies have identified that the use of standing desks and workplace modifications likely serve as effective interventions to reduce health risks through the reduction of sedentary workplace behaviors.[11] Certainly, burnout, wellness, and clinician care are multifactorial; however, implementing simple systems to encourage physician wellness can mitigate these issues. The installation of height-adjustable sit-stand desks in our residency was a small and cost-effective intervention that demonstrated consistent use of its stand function over a nearly 1.5-year period, and its use was associated with increased physical self-care behaviors.

Tables and Figures

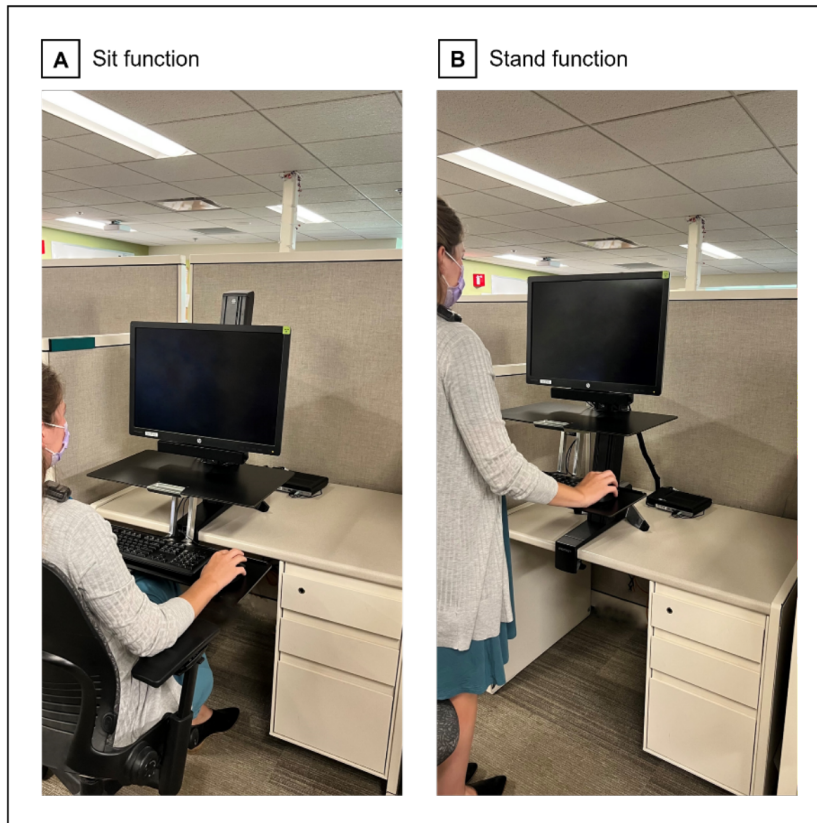**Figure 1: Height-Adjustable Sit-Stand Desk**

Table 1: Longitudinal Outcomes of Continuous Variables: Satisfaction With Sit-Stand Desk, Time Spent Standing at Sit-Stand Desks, and Scores on Physical Self-Care

Continuous Variable	Time Point			P Value
	June 2020 (n=15)	December 2020 (n=21)	December 2021 (n=20)	
	Median (IQR)	Median (IQR)	Median (IQR)	
1. Satisfaction with sit-stand desk (1-Very Dissatisfied; 2-Dissatisfied; 3-Neutral, 4-Satisfied; 5-Very Satisfied)	5.0 (1)	4.0 (1)	4.0 (1)	.43
2. Percent time spent standing at sit-stand desk	70 (20)	50 (35)	42.5 (30)	.18
3. Physical self-care (Mindful Self-Care Scale) [1-Never (0 days); 2-Rarely (1 day); 3-Sometimes (2-3 days); 4-Often (3-5 days); 5-Regularly (6-7 days)]	2.88 (.94)	2.88 (.75)	2.25 (.78)	.29

Abbreviation: IQR, interquartile range.

Table 2: Longitudinal Outcomes of Binary Variable: Satisfied With Sit-Stand Desks

Binary Variable	Time Point			P Value
	June 2020 (n=15)	December 2020 (n=21)	December 2021 (n=20)	
	% (n)	% (n)	% (n)	
1. Satisfied with sit-stand desk ("satisfied" or "very satisfied")	80.0 (12)	66.7 (14)	70.0 (14)	.67

Table 3: Correlation Coefficients Between Satisfaction and Time Standing at Sit-Stand Desks and Scores on Physical Self-care

Continuous Variable	Satisfaction With Sit-Stand Desk	Time Standing at the Sit-Stand Desk	Physical Self-care
1. Satisfaction with the sit-stand desk	-		
2. Time standing at the sit-stand desk	.38***	-	
3. Physical self-care	.12	.25*	-

* $P<.05$.
*** $P<.001$.

Acknowledgments

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