



Impact of Occupational Therapy Intervention on Sedentary Behaviors Among Office

Workers

Student Researcher: Logan Willhite

Faculty Mentors: Dr. Allison Naber & Dr. Whitney Lucas Molitor

BACKGROUND & PURPOSE

Office workers spend more time completing sedentary behavior now than ever before¹⁻³. Sedentary behavior has been associated with diseases like diabetes mellitus, cancer, obesity, cardiovascular problems, and musculoskeletal disorders (MSDs)⁴⁻⁷. Additionally, office workers are prone to risk factors such as static posturing, contact stress, repetitive motions, and poor posturing due to the tasks and activities associated with their job⁸. Reductions in sedentary behavior and ergonomic education and interventions have been shown to reduce adverse health outcomes and risk factors associated with office work^{7,9,10}. Occupational therapy can play a vital role in improving the health and well-being of this population due to their guiding theories and knowledge in biomechanics, anatomy, physiology, and ability to analyze tasks. Additionally, the scope and aim of the profession of occupational therapy aligns with this specific practice area¹¹.

THEORETICAL FOUNDATION

Person-Environment-Occupation Model (PEO)

The PEO model suggests that occupational performance occurs through the dynamic relationship between the person, environment, and occupation¹². As the degree of overlap between the person, environment, and occupation increases, occupational performance increases as a result¹². This dynamic relationship changes throughout the lifespan¹². Within this study, each office worker had unique physical and cognitive abilities, as well as different attitudes, preferences, and roles. Additionally, the office-environment consisted of the physical, social, cultural, and socio-economic factors. In the occupation domain, each participant had different duties, routines, and abilities required to perform their occupation. Occupational therapy intervention looked to increase occupational performance through client-centered goals and ergonomic changes to the environment. **Biomechanical and Rehabilitative Frames of Reference**

The basic concepts of the Biomechanical FOR include range of motion, kinematics, torque, strength, and endurance¹³. The workstation assessment utilized anthropometrics and observation to identify forces that may cause dysfunction. The aim of the Rehabilitative FOR is to utilize compensatory techniques to address environmental factors that result in dysfunction¹³. Following the ergonomic assessment, the environment was modified to promote occupational performance through compensatory techniques. These FORs were used in conjunction for the creation of client-centered goals and implementation of ergonomic recommendations and modifications.

STUDY PURPOSE

Due to the poor health outcomes and risk factors associated with office work, the purpose of this study was to examine the impact of occupational therapy intervention on the perceived health and well-being among office workers in order to promote occupational performance. Occupational therapy intervention included client-centered goals along with ergonomic recommendations and modifications.

METHODS

Design

- One group, pre-test/post-test

Participants

- 17 office workers were recruited from a Midwestern university
- Convenience sampling

Procedure

- 6 weeks
 - Week 1: Pre-test assessments, workstation assessment, observation, actigraphy implementation, XSENSOR
 - Week 2: Ergonomic intervention, goal setting
 - Week 3: Goal tracking
 - Week 4: Goal tracking
 - Week 5: Goal tracking, actigraphy implementation
 - Week 6: Post-test assessments

Instruments/Assessments

- Workstation assessment, Pre/Post Survey
- Numeric Pain Rating Scale (NPRS)
- RAND Short Form-36 (SF-36)
- Pittsburgh Sleep Quality Index (PSQI)
- Sedentary Behavior Questionnaire (SBQ)
- Actigraphy activity tracker
- XSENSOR

Data Analysis

- SPSS V25.0
- Descriptive statistics and frequencies
- Parametric: Paired T-Test; $p < 0.05$
- Non-parametric: Wilcoxon Signed Ranks Test; $p < 0.05$

RESULTS

Analysis of the demographic information indicates that there were eight males and nine females who completed the six-week study. These participants had an average age of 44.6 years and self-reported sitting at their workstation for approximately 6.2 hours each workday.

- Survey results indicate a greater number of participants were satisfied with their activity during work and reported more opportunities to be active; however, fewer participants reported they believed work to be good for their health.
- Goals were categorized as either increasing physical activity (16), reducing sedentary behavior (11), or increasing personal health (4). A majority of participants indicated they had fully met their goal(s), were satisfied with their goal(s), and planned to continue with their goal(s) following the study.
- SBQ results show a decrease in weekday sedentary hours from pretest ($M=10.47$, $SD=2.79$) hours to posttest ($M= 9.16$, $SD = 3.82$); $t(16)=1.29$, $p = .217$. SBQ results show increase in weekend day sedentary hours from pretest ($M=8.66$, $SD = 2.42$) to posttest ($M=9.46$, $SD = 3.87$); $t(16)=-.76$, $p = .457$.
- Participants had taken an average of 33,134 ($SD = 10,881$) steps and burned 1,245 ($SD = 983$) calories at pretest and had taken 39,070 ($SD = 8,010$) steps and burned 1,743 ($SD = 695$) calories at posttest. Due to inconsistencies in the carryover of actigraphy protocol, multiple participants had missing data. To address this concern, researchers identified days in which the majority of participants had a complete data set at pretest and posttest. At day two, participants had taken an average of 5,590 ($SD = 2,924.89$) steps and burned 195.79 ($SD = 148.35$) calories at pretest and had taken an average of 4,990 ($SD = 2,111.70$) steps and burned 212.69 ($SD = 144.56$) calories at posttest. Day six pretest scores showed, participants had taken an average of 4,286 steps ($SD = 2,356.25$) and burned 153.96 ($SD = 99.20$) calories and posttest had taken an average of 6,154 ($SD = 2751.06$) steps and burned 267.11 ($SD = 161.70$) calories at posttest. Statistical significance was found in calories burned during day six..
- Statistical significance was found in two scaled scores of the RAND SF-36 including energy/fatigue and emotional well-being. Additionally, positive trends were found in all other scaled scores, except for social functioning.
- Prior to intervention, office workers had a mean global PSQI score of 6.29 ($SD = 4.12$) while at posttest participants' mean PSQI score was 4.88 ($SD = 4.09$), resulting in a 22.4% reduction in overall global PSQI; $Z = -2.79$, $p < .05$.
- No statistically significant reductions were noted in results of NPRS. Mean subjective pain intensity at pretest was 1.41 ($SD = 2.21$), while at posttest, participants' mean pain had dropped to 1.29 ($SD = 1.83$). No XSENSOR/NPRS correlation was noted.

DISCUSSION/IMPLICATIONS

Discussion

Office workers in this study self-reported sitting for about 78% of the day which is in accordance with another study that found office workers were sedentary for about 82% of their workday⁶. Furthermore, sedentary behavior completed during the workday was only a portion of the total time spent completing sedentary behavior throughout the weekday, with results from the SBQ indicating participants completed sedentary activities for approximately 10.5 hours during a typical weekday. Findings indicate creating client-centered goals and ergonomic recommendations and modifications had a positive impact on the perceived health and well-being as indicated by increased scores on nearly all outcome measures and statistically significant changes in subjective sleep quality, energy/fatigue, emotional well-being, and calories burned. Additionally, survey results indicate participants may have gained additional insight regarding the impact of sedentary behavior on their health and well-being.

Limitations

Due to the small sample size, statistical power was decreased. A small sample size also allows large outliers to skew mean assessment scores. Additionally, multiple assessments were not sensitive enough to find change. Specifically, multiple participants were at the ceiling of multiple scaled-scores of the RAND SF-36 and on the NPRS, leaving no room to improve. Finally, weather conditions throughout the course of the study may have contributed to a greater number of sedentary habits occurring at pretest.

Implications

This study demonstrates that occupational therapists can assist office workers in creating meaningful change in their lives through the promotion of health and well-being. The use of occupational therapists to implement ergonomics and client-centered goals is a cost effective way for companies to improve the health and well-being of their employees. Due to the limited amount of occupational therapy specific research in this practice area, future research is necessary to demonstrate occupational therapy's role in this area of practice.

REFERENCES

1. Owen, N., Sparling, P. B., Healy, G. N., Dunstan, D. W., & Matthews, C. E. (2010). Sedentary behavior: Emerging evidence for a new health risk. *Mayo Clinic proceedings*, 85(12), 1138-1141. doi:10.4065/mcp.2010.0444
2. McCrady, S. K., & Levine, J. A. (2009). Sedentariness at work: How much do we really sit? *Obesity*, 17(11), 2103-2105. doi:10.1038/oby.2009.117
3. Waters, C. N., Ling, E. P., Chu, A. H. Y., Ng, S. H. X., Chia, A., Lim, Y. W., & Müller-Riemenschneider, F. (2016). Assessing and understanding sedentary behaviour in office-based working adults: A mixed-method approach. *BMC Public Health*, 16, 360-360. doi:10.1186/s12889-016-3023-z
4. Ford, E. S., & Caspersen, C. J. (2012). Sedentary behaviour and cardiovascular disease: A review of prospective studies. *International journal of epidemiology*, 41(5), 1338-1353. doi:10.1093/ije/dys078
5. Healy, G. N., Dunstan, D. W., Salmon, J., Cerin, E., Shaw, J. E., Zimmet, P. Z., & Owen, N. (2007). Objectively measured light-intensity physical activity is independently associated with 2-h plasma glucose. *Diabetes Care*, 30(6), 1384-1389. doi:10.2337/dc07-0114
6. Parry, S., & Straker, L. (2013). The contribution of office work to sedentary behaviour associated risk. *BMC Public Health*, 13, 296-296. doi:10.1186/1471-2458-13-296
7. Diaz, K. M., Howard, V. J., Hutto, B., Colabianchi, N., Vena, J. E., Safford, M. M., . . . Hooker, S. P. (2017). Patterns of sedentary behavior and mortality in U.S. middle-aged and older adults: A national cohort study. *Annals of Internal Medicine*, 167(7), 465-475. doi:10.7326/M17-0212
8. Cellk, S., Celik, K., Dirlimes, E., Tasdemir, N., Arik, T., Büyükkara, I., . . . Büyükkara, İ. (2018). Determination of pain in musculoskeletal system reported by office workers and the pain risk factors. *International Journal of Occupational Medicine & Environmental Health*, 31(1), 91-111. doi:10.13075/ijomh.1896.00901
9. Genin, P. M., Dessenne, P., Finaud, J., Pereira, B., Dutheil, F., Thivel, D., & Duclos, M. (2018). Effect of work-related sedentary time on overall health profile in active vs. inactive office workers. *Frontiers in Public Health*, 6, 279-279. doi:10.3389/fpubh.2018.00279
10. Green, N., Sigurdsson, S., & Wilder, D. A. (2016). Decreasing bouts of prolonged sitting among office workers. *Journal of Applied Behavior Analysis*, 49(3), 717-722. doi:10.1002/jaba.309
11. Gainer, R. D. (2008). History of ergonomics and occupational therapy. *Work*, 31(1), 5-9.
12. Law, M., Cooper, B., Strong, S., Stewart, D., Rigby, P., & Letts, L. (1996). The Person-Environment-Occupation Model: A transactive approach to occupational performance. *Canadian Journal of Occupational Therapy*, 63, 9-23.
13. Cole, M. B., & Tufano, R. (2008). *Applied theories in occupational therapy: A practical approach*. Thorofare, NJ: Slack, Inc.

CONCLUSION

Occupational therapy intervention, through client-centered goals and ergonomic recommendations and modifications, can have a positive impact on the perceived health and well-being of office workers and their overall occupational performance. Statistically significant increases were found in subjective sleep quality, energy/fatigue, emotional well-being, and calories burned. Furthermore, positive trends were found in nearly all other outcome measures. These findings shed new light into the use of a multi-component intervention strategy aimed at the prevention of poor health outcomes associated with sedentary behavior in office workers. Future research is necessary to build off of these findings to promote the health and well-being of this at-risk population.