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Impact Of Long Computer Working Hours On Fine And Motor Gross Skills, Manual Dexterity And Cognition, Posture In Nosologist

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Abstract:
Throughout development, we gain increasing control over our bodies, allowing us to move around our environment and manipulate and use objects. This developing motor control is key to our understanding of the properties of our environment. The development of motor skills can therefore be viewed as part of an interactive developmental process with perceptual, social, and cognitive abilities (1), which is subject to the constraints of the body and the environment. A sample size calculation was conducted based on effect size estimates from preliminary data or existing literature to ensure adequate statistical power. A total of 30 participants were selected according to the inclusion and exclusion criteria This experimental design aims to elucidate the impact of prolonged computer working hours on nosologists' cognitive, motor skills, and posture. The use of a randomized controlled trial allows for controlled exposure to computer usage, enabling a clearer understanding of the effects and potential implications for this professional cohort.

Introduction

Throughout development, we gain increasing control over our bodies, allowing us to move around our environment and manipulate and use objects. This developing motor control is key to our understanding of the properties of our environment. The development of motor skills can therefore be viewed as part of an interactive developmental process with perceptual, social, and cognitive abilities (1), which is subject to the constraints of the body and the environment.

Fundamental or gross motor skills (GMS)are the foundation for many sports and physical activities. From a health perspective, higher levels of GMS are associated with lower body mass index (2) better cardio-respiratory fitness and physical activity as well as enhanced cognitive development (3) social development and language skills.

In the contemporary era, technological advancements have ushered in a digital revolution, reshaping the landscape of various professions. Among these, the field of nosology, the science of classifying diseases, has significantly evolved with the integration of computer technology.

Nosologists, dedicated to the intricate task of disease classification, often spend extended hours working on computer systems, engaging in precise cognitive (4) and motor activities essential to their profession.

The prolonged use of computers in professional settings has sparked inquiries into its potential impact on the cognitive and motor skills, manual dexterity, and posture of nosologists. This research endeavors to explore the multifaceted consequences of extended computer usage on these vital aspects among nosologists, employing a diverse set of assessment tools to comprehensively evaluate these effects.

The primary focus of this investigation revolves around understanding the implications of prolonged computer working hours on cognitive abilities. The Mini-Mental State Exam (MMSE), a widely utilized tool for cognitive assessment, will serve as a benchmark to gauge cognitive functions among nosologists subjected to prolonged computer use. This examination aims to discern any potential alterations in cognitive performance attributable to extended computer engagement. (5)
Additionally, the research aims to evaluate the impact on motor skills and manual dexterity among nosologists. The Box and Block Test, a standardized assessment tool for manual dexterity, will be employed to measure any possible changes in fine motor skills resulting from extended computer-related activities. (6) This examination intends to elucidate the correlation between prolonged computer usage and alterations in manual dexterity.
Furthermore, the study will delve into the realm of posture, considering the prevalence of forward head posture among individuals engaged in prolonged computer work. Through a comprehensive assessment of forward head posture and utilizing various motor assessment scales(7), the research aims to identify any deviations in posture among nosologists.

The significance of this research lies not only in understanding the potential effects of prolonged computer work on nosologists but also in elucidating potential preventive measures or interventions. By comprehensively assessing cognitive, motor, and postural aspects, this study endeavors to provide insights that may inform ergonomic practices, interventions, or training programs aimed at mitigating any adverse effects associated with extended computer usage among nosologists. It seeks to bridge the gap in

Statement of question

understanding the consequences of prolonged computer engagement on the cognitive, motor, and postural aspects of nosologists.
(8) The utilization of diverse assessment tools will enable a nuanced exploration of the multifaceted impact of long working hours with computers, paving the way for informed strategies to promote the well-being and efficiency of professionals in the field of nosology.
Some studies have demonstrated that long work hours contribute to psychological stress and work stress Working 10 or more hours per day ,40 or more overtime hours per month [9], and 60 or more hours per week [11] tended to create stressful feelings. Lee et al. [10] found that working more than 45 h per week decreased the risk of psychological stress. The relationship between working long hours and work stress requires more investigation.

Where there is any Impact of long computer working hours on fine and motor gross skills, manual dexterity, cognition, posture in nosologist?
The need of the study indicates to find out the Impact of long computer working hours on fine and motor gross skills, manual dexterity, cognition, posture in nosologist.
Aim and objective of the study is: To investigate the impact of long computer working hours on motor gross skills, manual dexterity, cognition and posture in nosologist and furtheremore,

- To investigate the impact of long computer working hours on manual dexterity in nosologist
- To investigate the impact of long computer working hours on cognition in nosologist
- To investigate the impact of long computer working hours on forward head posture posture in nosologist
- To investigate the impact of long computer working hours on motor gross skills in nosologist

Methodology

This study will employ an experimental design to examine the effects of prolonged computer working hours on the fine and gross motor skills, manual dexterity, cognition, and posture of nosologists.
Participants
a. Sample Size Determination: A sample size calculation was conducted based on effect size estimates from preliminary data or existing literature to ensure adequate statistical power. A total of 30 participants were selected according to the inclusion and exclusion criteria i.e. Inclusion Criteria

- Nosologist Specialist
- Age: 19-31 years
- Willing to participate in research study.
- Available at the time of data collection. Exclusion criteria
- Non medical person

- Age :<19 or >3

Who are not willing to participate in research study.

Participants were randomly allocated into two groups: the intervention group (exposed to prolonged computer working hours) and the control group (limited computer usage).
Intervention Group: Participants in this group will be required to work on computers for extended hours (e.g., 8 hours per day) for a predetermined duration (e.g., 4 weeks).
Control Group: Participants in this group will adhere to their regular work schedule without any additional computer-related tasks beyond standard working hours.

a. Mini-Mental State Exam (MMSE): This tool will assess cognitive functions, evaluating orientation, attention, memory, language, and visual-spatial skills before and after the intervention.
b. Box and Block Test: Manual dexterity and fine motor skills will be measured using this standardized test, conducted before and after the intervention.
c. Forward Head Posture Analysis: Postural assessment will be performed using standardized methods to measure any deviations in posture pre- and post-intervention.
d. Motor Assessment Scales: Various motor assessment scales will be employed to comprehensively evaluate motor skills and functional abilities before and after the intervention.

DATA COLLECTION

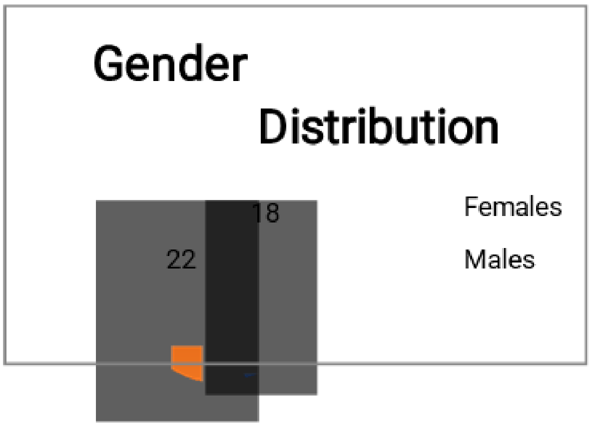
a. Baseline Assessment: Participants' demographic information and baseline measurements for cognitive, motor skills, and posture will be recorded.
b. Pre-Intervention Assessment: All participants will undergo initial assessments using the MMSE, Box and Block Test, forward head posture analysis, and motor assessment scales.
c. Intervention Period: The intervention group will engage in prolonged computer work while the control group maintains regular work activities.
d. Post-Intervention Assessment: After the intervention period, both groups will undergo reassessment using the same tools to measure changes in cognitive, motor skills, and posture.

Data analysis

Statistical analysis, such as paired t-tests for within-group comparisons and independent t-tests for between-group comparisons, was employed to analyze pre- and post-intervention measurements for each assessment tool. Correlation analyses may be conducted to explore relationships between computer usage duration and observed changes. Data Collected was entered into MS excel sheets. Microsoft Excel 2010 was used for data analysis. Descriptive analysis was done using calculation of mean and standard deviation. Further data was analysed using Pearson’s Correlation coefficient. Level of significance was 0.05.
A total of 40 participants were recorded which included 18 females and 22 males. Table 5.1- Demographic details of study population

Demographic details	Mean ±S.D.
Age (in years)	68.7±7
BMI (kg/m$^{2)}$	25.5±0.85
Gender distribution	Males (n=22); Females (n=18)

The present study included 40 subjects with mean age 68.7±7 years and mean BMI 25.5±0.85 kg/m^2. Out of 40 subjects 22 were males and 18 were females as shown in graph 5.1. Demographic characteristics showed that most of knee OA patients were overweight.

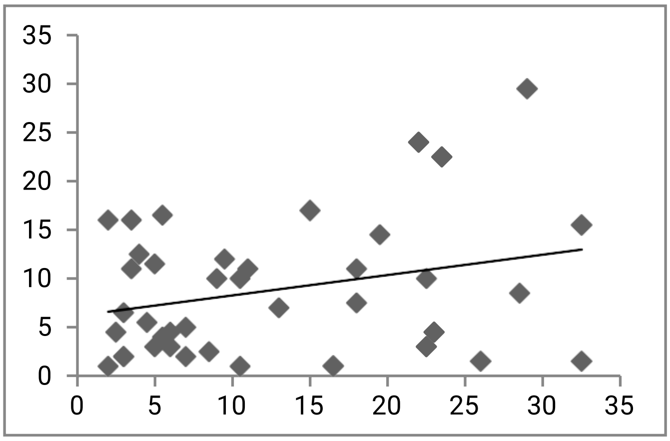


Graph 5.1- Gender Distribution

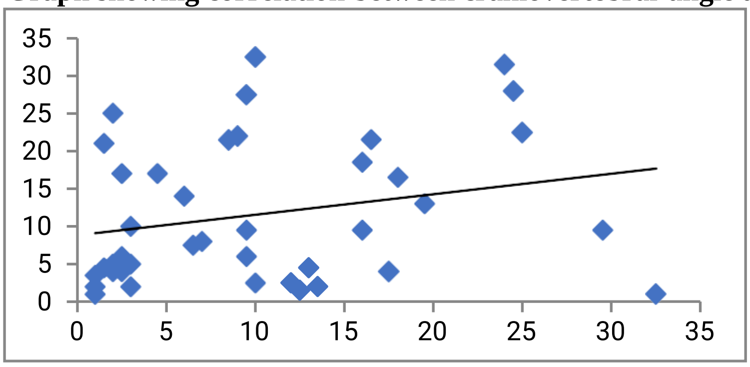
Pearson's correlation coefficient was used to measure the strength of linear association between
Table 5.3- Correlation of Lower Limb biomechanical alignment and body structure and function component of Cognition and posture status, Fine and gross motor skills and Forward Head posture

Parameters	R value	p- value
Craniovertebral angle	-0.070	0.66 (NS)
BBT	-0.101	0.95 (NS)
MMSE	-0.278	0.537 (NS)

NS- Non Significant; S- Significant



Graph 5.2- Graph showing correlation between craniovertebral-angle and MMSE



Graph 5.3- Graph showing Correlation between craniovertebral angle and BBT

The study will adhere to ethical guidelines, including informed consent procedures, participant confidentiality, and approval from relevant ethics committees.

Discussion

To provide a thorough understanding of how dexterity declines in normal aging, we considered necessary to follow up this investigation by analyzing movements of both hands, especially since most daily activities require both hands for efficient performance. At present, there are limited investigations of bimanual object manipulation relevant for real life activities. A search in the literature shows that most studies of bimanual movements have used tasks like circle tracing or finger tapping (17) which are of little relevance for daily actions that require manipulation of objects.
However, a few exceptions exist: for example, Mason and Bryden (2007) investigated bimanual reaching and grasping of cubic objects in young adults and found that synchronous bimanual movements are performed in a manner similar to unimanual movements. A few studies have also compared bimanual object manipulation in young and older adults. Examples include Bernard and Seidler (2012) and Serbruyns et al. (2013), who compared young and older adults' performance on the bimanual tasks of the Purdue Pegboard Test (Tiffin, 1968; Tiffin & Asher, 1948) for reaching, grasping, transporting, and inserting pegs under different conditions. In both studies (Bernard & Seidler, 2012; Serbruyns et al., 2013), the older groups manipulated fewer pegs than younger adults, which provides evidence of age-related deficits in bimanual object manipulation. However, neither Bernard and Seidler (2012), nor Serbruyns et al. (2013) measured kinematics, and therefore, these studies could not provide detailed information about how bimanual object manipulation changes with advanced age. At present, there are no detailed descriptions of age-related dexterity changes that include both hands in unimanual and bimanual tasks and thus, a comprehensive assessment of performance on tasks that are relevant for daily living should be conducted.

Limitation

Potential limitations may include variations in individual work habits, compliance with intervention protocols, and the inability to control all external factors affecting participants' daily activities.

Conclusion

This experimental design aims to elucidate the impact of prolonged computer working hours on nosologists' cognitive, motor skills, and posture. The use of a randomized controlled trial allows for controlled exposure to computer usage, enabling a clearer understanding of the effects and potential implications for this professional cohort.

References

1. Adolph K. E., Joh A. S. (2007). Motor development: how infants get into the act, in Introduction to Infant Development, 2nd Edn., eds Slater A., Lewis M. (New York, NY: Oxford University Press;
2.), 63–80.
3. American Psychiatric Association (2013). DSM-5: Diagnostic and Statistical Manual of Mental Disorders, 5th Edn. Washington, DC: American Psychiatric Press.
4. Bock A. M., Gallaway K. C., Hynd A. M. (2015). Specifying links between executive functioning and theory of mind during middle childhood: cognitive flexibility predicts social understanding. J. Cogn. Dev. 16, 509–521. 10.1080/15248372.2014.888350
5. Campos J. J., Anderson D. I., Barbu-Roth M. A., Hubbard E. M., Hertenstein M. J., Witherington D. (2000). Travel broadens the mind. Infancy 1, 149–219. 10.1207/S15327078IN0102_1
6. Cummins A., Piek J. P., Dyck M. J. (2005). Motor coordination, empathy, and social behaviour in school-aged children. Dev. Med. Child Neurol. 47, 437–442. 10.1017/S001216220500085X
7. Debrabant J., Gheysen F., Caeyenberghs K., Van Waelvelde H., Vingerhoets G. (2013). Neural underpinnings of impaired predictive motor timing in children with Developmental Coordination Disorder. Res. Dev. Disabil. 34, 1478–1487. 10.1016/j.ridd.2013.02.008
8. Diamond A. (2000). Close interrelation of motor development and cognitive development and of the cerebellum and prefrontal cortex. Child Dev. 71, 44–56. 10.1111/1467-8624.00117
9. Diamond A. (2013). Executive functions. Annu. Rev. Psychol. 64, 135–168. 10.1146/annurev- psych-113011-143750
10. Green D., Baird G., Sugden D. (2006). A pilot study of psychopathology in developmental coordination disorder. Child Care Health Dev. 32, 741–750. 10.1111/j.1365-2214.2006.00684.x

11. Hill E. L. (2001). Non-specific nature of specific language impairment: a review of the literature with regard to concomitant motor impairments. Int. J. Lang. Commun. Disord. 36, 149–171.
12. 10.1080/13682820010019874
13. Hughes C., Ensor R. (2007). Executive function and theory of mind: Predictive relations from ages 2 to 4. Dev. Psychol. 43, 1447–1459. 10.1037/0012-1649.43.6.1447
14. Hyde C., Wilson P. H. (2011). Dissecting online control in developmental coordination disorder: a kinematic analysis of double-step reaching. Brain Cogn. 75, 232–241.
15. 10.1016/j.bandc.2010.12.004
16. Iverson J. M., Thelen E. (1999). Hand, mouth and brain. The dynamic emergence of speech and gesture. J. Conscious. Stud. 6, 19–40.
17. Kashiwagi M., Iwaki S., Narumi Y., Tamai H., Suzuki S. (2009). Parietal dysfunction in developmental coordination disorder: a functional MRI study. Neuroreport 20, 1319–1324. 10.1097/WNR.0b013e32832f4d87
18. Koziol L. F., Budding D. E., Chidekel D. (2012). From movement to thought: executive function, embodied cognition, and the cerebellum. Cerebellum 11, 505–525. 10.1007/s12311-011-0321-y
19. Leonard H. C., Bernardi M., Hill E. L., Henry L. A. (2015). Executive functioning, motor difficulties, and developmental coordination disorder. Dev. Neuropsychol. 40, 201–215.
20. 10.1080/87565641.2014.997933
21. Leonard H. C., Hill E. L. (2015). Executive difficulties in developmental coordination disorder: methodological issues and future directions. Curr. Dev. Disord. Rep. 2, 141–149.
22. 10.1007/s40474-015-0044-8