"Investigating the Impact of Exercise on Performance of Sedentary Workers"

By:

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MBA 2 Years

Supervisor:
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بِسْمِ ٱللَّهِ ٱلرَّحْمَٰنِ ٱلرَّحِيمِ

All praise is due to Allah, the Most Gracious and Merciful, for providing me with the strength, knowledge and opportunity to complete this research.

I would like to dedicate this work to my beloved family, who have supported me unconditionally throughout my academic journey. To my parents, thank you for your continuous encouragement, guidance and sacrifices which have made this achievement possible. To my siblings, I am grateful for your love, motivation and companionship over the years.

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It is to my family and supervisor that I owe my deepest gratitude. I hope that through this research, I have made them proud and contributed in some way to improving our understanding of important health and productivity issues. This achievement stands as a testament to their dedication and as a reminder of how blessed I am.

Abstract

Sedentary occupations have risen substantially due to technological advances. However, prolonged sitting can negatively impact health and work performance. Regular exercise may help counteract these effects. The purpose of this study was to investigate the relationship between exercise and work performance among sedentary office workers.

A survey was administered to 200 sedentary workers from various industries. Exercise variables assessed included type, frequency, and duration. Work performance was evaluated through measures of self-rated productivity, job satisfaction, stress levels, and absenteeism.

Preliminary analyses found significant correlations between higher exercise frequencies and better work performance scores. Cardiovascular exercise performed 3+ times per week showed the strongest association with productivity. No differences in these relationships were apparent based on demographic factors.

This research provides initial evidence that regular physical activity, especially cardio, may enhance work performance for sedentary occupations by improving physical and mental health. However, further examination is needed to identify optimal "dose-response" relationships and address barriers preventing activity for sedentary employees. The potential for exercise interventions to boost productivity warrants additional investigation.

Table of Contents

Chapter One : Introduction

1.1 Background

The exponential growth of the Technology over the past few decades has transformed the way businesses operate and shaped the global economy. With this growth, the number of employees working in technology connected roles has also increased significantly, leading to a growing interest in factors that influence their work performance and overall well-being. Research has shown that one such factor is exercise and its role in promoting physical and mental health.

The sedentary nature of many jobs has raised concerns about the health risks associated with prolonged sitting and a lack of physical activity. Studies have demonstrated that sedentary behavior can contribute to the development of chronic diseases such as obesity, diabetes, and cardiovascular disease. Furthermore, the high-stress environment that is often associated with IT related work or work type that has minimum movement throughout the workday can exacerbate these health risks and lead to mental health issues such as burnout, anxiety, and depression.

On the other hand, regular exercise has consistently been linked to a variety of health advantages, such as better cardiovascular health, weight management, and a lower risk of developing chronic diseases. Exercise has also been shown to improve mental health in other ways, including by lowering stress levels, elevating mood, and boosting cognitive performance. These benefits suggest that incorporating regular physical activity into the daily routines of Sedentary workers could potentially improve their work performance and overall well-being.

Despite the advantages of exercise, many sedentary workers struggle to maintain an active lifestyle due to various barriers, such as long working hours, lack of access to exercise facilities, and a perceived lack of time. Understanding these barriers and identifying strategies to overcome them is crucial for promoting a healthy work-life balance among sedentary workers. The objective of this study was to provide a comprehensive understanding of the correlation between exercise and work performance of sedentary workers, given the concerns raised. To accomplish this, the exercise habits of employees whose job was mostly performed sitting most of the workday was examined, and the impact of these habits on their work performance was explored. By doing so, this research aimed to contribute to the growing body of knowledge on the significance of physical activity in the workplace. Furthermore, to inform the development of effective interventions and policies that promote employee well-being through exercise.

Studies have established that regular exercise can positively affect both physical and mental health, which, in turn, can lead to improved work performance. Exercise can increase energy

levels, enhance mood, minimize stress and anxiety, and improve cognitive function such as memory, attention, and decision-making.

1.2 Overview

Regular physical activity has well-established benefits for both physical and mental health. However, many jobs today involve prolonged sitting and high levels of sedentary behavior. This poses risks for worker health and well-being. At the same time, the stresses of many technology-related careers can negatively impact employees.

Previous research has demonstrated that exercise provides advantages that may counteract these issues. Physically, it improves cardiovascular fitness, weight management, and reduces disease risk. Mentally, exercise lowers stress, lifts mood, and enhances cognitive abilities critical for high-level work like memory, attention, and decision-making.

Studies have found associations between exercise and better work outcomes such as increased productivity, job satisfaction, and reduced absenteeism. However, gaps remain in fully understanding these relationships, especially for sedentary occupations. More research is also needed on effective exercise "doses" and types of physical activity most beneficial.

Barriers preventing sedentary workers from exercising regularly include long hours, lack of access, and time scarcity. Overcoming barriers is key to promoting exercise. Understanding individual exercise habits and how they impact perceived work performance can provide insights.

This research aims to add new knowledge in these areas. By examining exercise patterns among sedentary employees and exploring links to job functioning, the study seeks to inform strategies supporting employee health, wellness and work-life balance. Results could guide workplace interventions and policies encouraging physical activity for sedentary workers.

1.3 Problem Statement

The sedentary nature of many modern jobs, particularly in the technology industry, is characterized by prolonged periods of sitting and a high-stress work environment. These conditions have been linked to various health issues, reduced job satisfaction, and an increased risk of burnout among employees. Furthermore, the impact of sedentary work on physical and mental well-being can ultimately lead to diminished work performance. Despite the well-established benefits of regular physical activity in promoting overall health, many sedentary

workers face obstacles such as long working hours and limited access to fitness facilities, which hinder their ability to engage in exercise.

Given these challenges, it was crucial to explore the relationship between exercise and the work performance of sedentary workers. Additionally, understanding the specific barriers that prevent these professionals from participating in regular physical activity is essential for developing targeted interventions to improve their overall well-being and job performance. By investigating these factors, this research aims to provide valuable insights into the potential impact of exercise on the performance and well-being of sedentary workers, ultimately contributing to the development of strategies to promote a healthier and more productive work environment within the technology sector.

1.4   Research Questions

- What is the relationship between the frequency and duration of exercise and the self-reported work performance of sedentary workers in the technology industry?

- How do the exercise habits, including frequency, duration, and perceived exertion, of sedentary workers in different age groups and job categories relate to their self-reported work performance?

1.5   Research Objectives

- To analyze the correlation between the frequency of exercise and the self-reported work performance of sedentary workers in the technology industry.
- To determine the types of exercise, including duration and intensity, that are most strongly associated with reported improvements in work performance among sedentary workers.
- To examine how exercise habits, including frequency, duration, and perceived exertion, vary among sedentary workers based on demographic factors such as age, gender, and job role, and how these variations relate to self-reported work performance.

1.4 Scope of Study

This study specifically targeted employees engaged in sedentary work, encompassing various job roles within the technology industry that involve extensive daily sitting. This was included but not be limited to software developers, system administrators, IT support staff, project managers, programmers, and other roles requiring long hours in front of a computer.

The research encompassed technology professionals working in both small and large organizations across diverse sectors such as technology, finance, healthcare, and other industries where sedentary work was common. This broad scope was intended to ensure a comprehensive understanding of how exercise may impact work performance among office employees engaged in prolonged sitting, regardless of company size or industry.

Data was collected through online surveys and offline questionnaire that were distributed to sedentary workers across various technology companies and organizations. The surveys gathered information on exercise habits, perceived work performance in key areas like productivity and job satisfaction, barriers to physical activity, and relevant demographic characteristics.

Responses provided quantitative data that can be statistically analyzed to investigate relationships between exercise frequency/duration/type and work outcomes. Open-ended questions were also allowed for qualitative insights into lived experiences.

Findings was interpreted in the context of existing literature to gain a deeper understanding of exercise behaviors, work functioning, and challenges to activity participation among sedentary professionals in these job roles and industry sectors. The goal was to advance knowledge in a way that informs targeted interventions and policies to support employee health, well-being and organizational performance.

1.5 Significance of Study

This research made an important contribution to the growing body of knowledge regarding the health impacts of sedentary work and the role of exercise in promoting well-being and job performance among office employees engaged in prolonged sitting. By exploring relationships between physical activity habits and perceived work outcomes across diverse sedentary roles and industries, novel insights were gained to advance academic understanding.

Specifically, this study aimed to uncover how exercise frequency, duration, and type may influence key indicators of job functioning like productivity, quality of work, motivation, and job satisfaction. Identifying barriers that prevent sedentary workers from participating in regular physical activity was also provided valuable information for developing targeted solutions.

Organizations across sectors including technology, finance, and healthcare was able to utilize the findings to cultivate healthier, more supportive work environments. Strategies informed by this research have the potential to motivate sedentary employees to incorporate exercise into daily routines, with downstream benefits of enhanced work capacity and individual/organizational health.

On an individual level, equipping office workers with knowledge about the work-related advantages of physical activity may empower behavioral changes to adopt more active lifestyles. If regular exercise can bolster perceived work performance, sedentary professionals may be more inclined to participate.

This study aimed to yield insights that can positively impact the well-being, job functioning, and health of sedentary workers through increased physical activity levels. By promoting employee health and productivity, long-term benefits are possible at both the individual and organizational levels.

1.6 Definition of Key Terms

- Exercise: Planning, organizing, and repeating physical activity with the aim of enhancing or maintaining physical fitness, health, and wellbeing*(Caspersen, Powell, & Christenson, 1985).*

- Work Performance: The extent to which an employee is able to effectively and efficiently complete their job tasks and responsibilities, contributing to the overall success of the organization *(Campbell, 1990).*

- Sedentary Behavior: Any waking activity that requires less than 1.5 metabolic equivalents (METs) of energy in a sitting, reclining, or lying position*(Sedentary Behaviour Research Network, 2012).*

- Barriers: Factors that hinder or prevent individuals from engaging in a particular behavior, such as exercise, including personal, social, and environmental factors *(Bauman et al., 2002).*

- Job satisfaction: The degree to which a worker is happy with their position, taking into account elements like tasks, workplace culture, and relationships with coworkers*(Locke, 1976).*

- Burnout: a state of constant physical and emotional exhaustion brought on by a sustained exposure to work-related stress. Tech is frequently accompanied by feelings of cynicism and detachment from work.*(Maslach, Schaufeli, & Leiter, 2001).*

1.7 Summary of Chapter

This chapter serves as an introduction to the research topic, which has evolved to focus on the impact of exercise on the productivity of sedentary workers, particularly within the technology industry. The background section underscored the significance of comprehending the correlation between exercise and work performance, particularly in light of the sedentary nature of many roles within the technology sector and the associated health risks. The problem statement emphasized the necessity of exploring the obstacles that hinder the relationship of sedentary workers performance who engaged in regular physical activity against those who did not engage and the identification of strategies to promote a healthy work-life balance.

The research questions and objectives delineate the specific aimed of the study, which include investigating the relationship between exercise habits and work performance, identifying the effectiveness of exercise for sedentary workers, and exploring the barriers to physical activity. The scope of the study was defined as focusing on employees working in various sedentary roles within the technology industry across different sectors and organization sizes.

The significance of the study was discussed in terms of its potential contributions to the existing body of knowledge on the importance of exercise for sedentary workers, as well as its practical implications for organizations and individuals within the technology industry. Finally, key terms used throughout the research are defined to ensure clarity and consistency.

Chapter Two : Literature Review

The purpose of this study was to investigate the relationship between exercise and work performance among sedentary office workers. Regular physical activity is important for both physical and mental health, yet many office jobs require prolonged sitting throughout the workday without movement breaks. This can negatively impact employee well-being and work-related outcomes if not balanced with adequate exercise.

Previous researches have demonstrated that exercise provides numerous health benefits by reducing risks for chronic diseases, improving mood and managing stress levels. However, sedentary work environments may not support regular physical activity and can contribute to negative health consequences if sitting time is not interrupted. Prolonged sitting has been linked to increased risks of obesity, cardiovascular problems, diabetes and some cancers. It can also reduce work productivity and increase absenteeism.

Despite its importance, many sedentary workers face barriers to exercising regularly outside of work hours such as lack of time, energy and workplace support. Insufficient physical activity combined with prolonged sitting may exacerbate health issues and negatively influence work performance. However, more research was still needed to better understand these relationships, especially regarding different types and frequencies of exercise among office employees with sedentary jobs.

By focusing specifically on sedentary workers, this study aimed to add new insights into how exercise habits may impact work-related outcomes. The independent variables of exercise type and frequency was examined in relation to the dependent variable of work performance. Identifying connections in this area could help inform workplace wellness strategies and encourage regular physical activity even for those in sedentary roles. Overall, this research intended to expand knowledge of exercise benefits in occupational settings requiring prolonged sitting.

2.2.1 Exercise and Work Performance

Several studies have investigated the relationship between exercise and various indicators of work performance. A meta-analysis by Prokop et al. (2004) found that employees who exercised regularly reported higher levels of job satisfaction compared to their sedentary counterparts. Regular physical activity has also been associated with improved productivity and reduced absenteeism in several workplace studies *(Pelletier, 2005; Martínez-Lemos et al., 2014).*

Research specifically examining sedentary worker populations provides further insights. A study of office employees found that incorporating short activity breaks with light exercise, such as walking or stretching, helped mitigate the negative impacts of prolonged sitting and high job demands on work performance *(Chang et al., 2013).* Workers who took light activity breaks reported higher levels of concentration, motivation and job engagement.

Different modes of exercise may influence work performance through varying pathways. Aerobic exercise such as brisk walking, swimming or cycling has been linked to improved cardiovascular fitness, increased energy levels and reduced stress symptoms *(Colcombe & Kramer, 2003; Wewege et al., 2017).* This in turn can enhance work capacity and the ability to manage job demands. Resistance training involving strength exercises helps build muscular endurance, which supports prolonged work activities (*Liu-Ambrose et al., 2010*). Flexibility exercises such as yoga and stretching reduce muscle tension and improve mood, thereby promoting concentration at work *(Ross & Thomas, 2010; Keng et al., 2011).*

It is important for research in this area to identify the types of exercise most effective in improving specific components of work performance for sedentary workers, as this can inform the development of targeted workplace interventions and physical activity recommendations. Understanding dose-response relationships regarding exercise frequency, intensity and duration can also provide meaningful guidance. Overall, more empirical research is still warranted to elucidate these relationships, especially for occupations requiring high levels of prolonged sitting.

2.2.3 Exercise Habits Based on Demographic Factors

Existing research indicates exercise behaviors can vary significantly depending on employee characteristics like age, gender and job role. Younger sedentary workers tend to report higher levels of regular physical activity compared to older employees *(Trost et al., 2002)*. This may be due to age-related declines in mobility and energy levels making exercise more difficult for older individuals *(Schuler et al., 2017)*.

Gender differences in exercise participation are also well-documented, with men generally exhibiting more active lifestyles than women *(Sallis et al., 2000)*. This disparity could stem from greater domestic and childcare responsibilities for many women limiting their leisure time available for physical activities *(Brown et al., 2009)*. Cultural norms and attitudes toward exercise may also play a role *(Dogra & Stathokostas, 2012)*.

Variations in exercise habits have also been observed between job roles within sedentary industries. For example, in IT, those with more client-facing roles involving frequent travel and irregular work hours may struggle to maintain an exercise routine compared to employees engaged in more regular office-based work *(Kerr et al., 2016)*. Technical staff required to be on-call outside of normal hours could similarly face challenges in incorporating physical activity into their schedules *(Kerr et al., 2016)*.

Understanding these demographic differences is important, as tailored strategies may be needed to address the unique barriers each group faces. Interventions ignoring these factors risk being ineffective for certain employee segments. Targeted approaches have greater potential to promote regular exercise across diverse sedentary workforces *(Dugdill et al., 2005)*.

2.2.4 Physical Fitness Program on Employee Productivity

In a study conducted by Aghop Der-Karabetian from the University of La Verne and Norma Gebharbp from General Dynamics, the impact of a physical fitness program on job satisfaction, body image, and sick days among employees was investigated *(Der-Karabetian and Gebharbp, 1992, Journal of Business and Psychology)*. The study involved two groups from a large Southern California company. One group participated in a physical fitness program for six months, with the variables of job satisfaction, body image, and sick days measured at the beginning of the program and again after six months. The second group served as a control group to minimize external influences on the variables.

The findings revealed that employees who participated in the fitness program experienced significantly higher job satisfaction, improved body image perceptions, and fewer sick days missed compared to the control group over the six month period *(Der-Karabetian and Gebharbp, 1992)*. Job satisfaction and presenteeism increased the most among employees who actively participated in the aerobic and strength training components of the program versus those with lower participation levels. The study concluded that implementing a structured physical fitness program in the workplace can help boost morale and reduce absenteeism through enhanced employee well-being. With fewer sick days, productivity is also likely to increase due to fewer lost working hours *(Der-Karabetian and Gebharbp, 1992)*. This provides initial evidence that employer investment in occupational health programs may generate returns in the form of improved performance.

2.2.5 Benefits of Exercise on Physical and Mental Health

A substantial body of research has demonstrated the wide-ranging benefits of regular exercise for both physical and psychological well-being. Physically, exercise has been shown to lower the risk of numerous chronic diseases and health conditions. Systematic reviews indicate that participating in moderate-intensity exercise for at least 150 minutes per week reduces the likelihood of developing obesity, type 2 diabetes, cardiovascular disease, and certain cancers *(Warburton, Nicol, & Bredin, 2006; Lee et al., 2012)*.

The protective effects of exercise are thought to be mediated through improvements in cardiorespiratory fitness, weight management, blood pressure control, cholesterol levels, blood sugar regulation, and inflammation *(Warburton et al., 2006)*. Regular physical activity also helps maintain muscle mass, bone density, and joint mobility as people age *(Ratey & Loehr, 2011)*.

In addition to physical health advantages, exercise provides considerable mental health benefits. Research shows it has antidepressant and anxiolytic effects comparable to pharmacological treatments *(Josefsson et al., 2017)*. Multiple meta-analyses have concluded that both acute and chronic exercise are effective at reducing symptoms of depression and anxiety *(Schuch et al., 2016; Rebar et al., 2015)*.

The biological mechanisms behind these psychological benefits involve exercise-induced increases in the neurotransmitters serotonin, dopamine, and norepinephrine, which positively influence mood *(Ratey & Loehr, 2011)*. Exercise has also been found to reduce stress levels by

acting as a distraction and allowing people to manage negative emotions *(Choi et al., 2017)*. Additional research links regular physical activity to enhanced cognitive function, memory, and brain health *(Ratey & Loehr, 2011; Erickson et al., 2011)*.

2.2.6 Sedentary Work Environments and Employee Well-being

Many office-based industries such as information technology (IT) involve work that is predominantly sedentary in nature. Employees in these fields typically spend large portions of the workday sitting at a desk using computers, with limited opportunities to stand or move around *(Thorp et al., 2014)*. Extensive research has demonstrated that prolonged sitting, as is commonly experienced in sedentary work environments, can negatively impact both physical and mental health outcomes *(Owen et al., 2010)*.

Physically, prolonged sitting has been associated with an increased risk of developing chronic diseases like cardiovascular problems, diabetes, obesity, and some cancers *(Thorp et al., 2014; Biswas et al., 2015)*. This may be due to reduced energy expenditure and disruptions to metabolic processes that occur when the body is inactive for extended periods (*Biswas et al., 2015*). Sedentary work also tends to displace time that could otherwise be spent being physically active, which can exacerbate health risks over the long-term *(Thorp et al., 2014)*.

In addition, mental health can suffer when job roles involve extensive sitting. High levels of workplace sedentary behavior are linked to greater symptoms of stress, anxiety and depression *(Tucker et al., 2017)*. This may stem from a lack of movement breaks and limited opportunities to change posture and reduce muscle tension that accumulates from prolonged sitting *(Tucker et al., 2017)*.

For employees in high-pressure industries like IT that already involve high job demands, an absence of physical activity could magnify the negative impacts of work-related stress on mental well-being *(Awa et al., 2010)*. This may help explain why rates of burnout, anxiety, and depression are elevated in occupations characterized by sedentary work and job strain *(Awa et al., 2010)*.

2.3 Gaps in the Literature and Future Research Directions

While the existing literature provides valuable insights, there are still several gaps that present opportunities for further research. Firstly, more studies specifically focused on the technology industry are needed. As characteristics of this sector, such as long hours spent programming and coding, may uniquely influence relationships between exercise and work outcomes, findings from other fields may not directly translate. Targeted research is required to understand how the demands of tech jobs impact barriers to and benefits of physical activity. Secondly, most past work has only broadly examined exercise benefits without exploring optimal exercise "doses" for sedentary tech workers. Different exercise frequencies, durations, intensities or modalities like walking meetings may yield diverse impacts. Identifying the specific characteristics of effective exercise protocols could guide well-designed interventions. Thirdly, limited research has investigated barriers preventing sedentary tech employees from exercising regularly, such as long work hours, irregular shifts or energy levels after prolonged sitting. Understanding these challenges is crucial, as without addressing barriers, interventions risk low participation and effectiveness. Research is also needed into strategies to help workers overcome common barriers through workplace supports.

Filling these gaps through rigorous empirical studies advanced current knowledge. It provided deeper insights into how exercise habits uniquely relate to work outcomes for sedentary professionals in the technology sector. This can then inform policies and programs tailored to optimize both individual and organizational health, wellbeing, productivity and performance over the long run. Addressing key research gaps contributed significantly to addressing this important issue.

2.4 Hypothesis Development

The following hypotheses were put forth in light of the theoretical framework and the body of literature:

H_1: *The frequency and duration of exercise are positively correlated with self-reported work performance among sedentary workers.*

H_2: *Stronger types of exercise have positive effects on self-reported work performance for sedentary workers compared to weaker types.*

These hypotheses guided the research design and data analysis in the subsequent chapters of this study. By testing these hypotheses, the study aims to contribute to the understanding of the relationship between exercise and work performance among sedentary workers across various industries, as well as the barriers to physical activity and strategies to promote exercise in this specific group of workers

2.5 Theoretical Framework

The Job Demands-Resources (JD-R) model and the Self-Determination Theory (SDT) serve as the foundation for the study's theoretical framework *(Deci & Ryan, 2000)*. These theories offer a basis for comprehending the link between physical activity and job performance, as well as the obstacles to physical activity and tactics to encourage exercise among Sedentary Workers. According to the JD-R model, stressful work environments and heavy workloads can result in burnout and poor work performance. On the other hand, job resources like opportunities for personal growth and social support can help to mitigate the negative effects of job demands and support positive outcomes like improved work performance. In the context of this study, exercise can be considered a personal resource that Sedentary workers can use to cope with the demands of their work environment, leading to improved work performance and overall well-being.The SDT emphasizes how both intrinsic and extrinsic motivation influence how people behave. This theory holds that people are more inclined to engage in activities that meet their fundamental psychological needs for autonomy, competence, and relatedness. When referring to exercise, Sedentary workers may be more likely to engage in regular physical activity if they perceive Tech as satisfying these needs. For example, employees may be more motivated to exercise if they have access to a variety of activities that they enjoy (autonomy), feel competent in their ability to perform the exercises (competence), and have social support from colleagues or friends (relatedness).
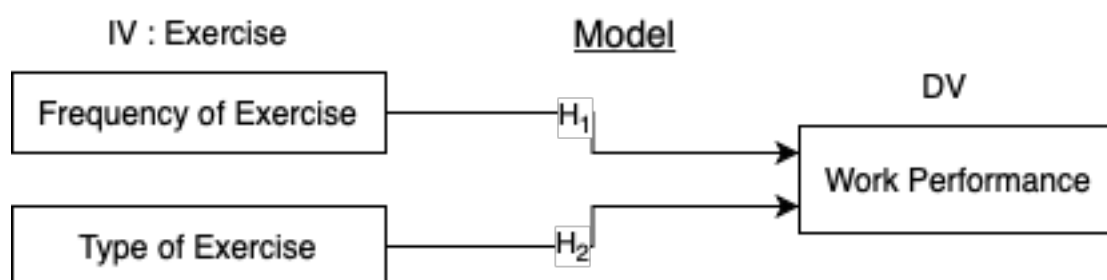

Figure 1 : Research Model

2.6 Functional form:

$Y = \beta_0 + \beta_1 * TypeofExercise + \beta_2 * FrequencyofExercise + \varepsilon$

In this functional form:

Y represents the dependent variables (Employee work performance).

β_0 is the intercept, which represents the baseline value of Y when all other variables are zero.

β_1 to β_2 are the coefficients that represent the effect of each independent variable, and moderator on the dependent variable(s). These coefficients were estimated using statistical Techniques such as regression analysis.

Exercise is independent variable and its Proxy Variable are Type of Exercise and Frequency Exercise in my model.

ε is the error term, which captures the unexplained variation in the dependent variable that the independent variable mediators, and moderators cannot account for.

2.7 Econometric model:

Defining dependent variable (work performance) as WP.

Defining the independent variable (Type of Exercise) as TE (Frequency Exercise) as FE.

Creating interaction terms for the moderators with the independent variable.

Now, I can write the econometric model as:

$WP = \beta_0 WP + \beta_1 WP * TE + \beta_2 WP * FE + ... + \varepsilon WP$

2.6 Summary of Chapter:

Chapter Two provides a comprehensive literature review on the topics of exercise, sedentary work, and work performance. It examined the well-established physical and mental health benefits of regular exercise. The negative impacts of prolonged sitting and sedentary work environments on employee well-being are also explored.

The chapter then analyzed the relationship between exercise and work performance found in previous research. It considered the types of exercise that may be most effective for improving aspects of work performance among sedentary office workers. Differences in exercise habits according to demographic characteristics were also reviewed.

Several key gaps in the current body of literature were identified. More research was needed focusing specifically on sedentary industries and occupations. Further study of optimal "dose-response" relationships for exercise frequency, intensity and duration could guide targeted interventions. Limited research existed on barriers to physical activity for sedentary workers and strategies to address these challenges.

To address these gaps, the chapter proposed hypotheses to be tested in the following chapters. The overall aim of this literature review was to provide context and justification for the present study, which seeks to advance understanding of how exercise relates to work outcomes among sedentary professionals. Insights gained could inform policies and programs to promote employee health, well-being and productivity.

Chapter Three : Methodology

The overarching goal of this research was to examine the relationship between exercise and key work outcomes among employees engaged in sedentary jobs. Specifically, the study aims to investigate whether regular exercise can positively impact workers' productivity, job satisfaction, and overall well-being in occupations that involve prolonged sitting.

This chapter outlines the methodology that was employed to address the research goal. The methodology was designed keeping in view the objectives of the study and to ensure collection of valid and reliable data. The chapter discussed in detail the various components of the research design and plan.

First, the measurement of variables section defined all variables of interest and how they were operationalized and quantified and measured. This was followed by a description of the survey instruments that was be used for data collection. Details about the target population and sampling technique was then be provided.

The chapter also covered the quantitative and qualitative data analysis techniques that were conducted.

The data collection through online survey and offline questionnaire methods and procedures were also be outlined.

Finally, a summary of the key aspects of the methodology was provided. By describing each component systematically, this chapter aimed to present a rigorous and well-planned approach for addressing the research problem.

3.1 Measurement of Variables/Instrumentation

The study measured the following variables

- Exercise: The independent variable, exercise, was measured using a self-reported questionnaire that assesses the frequency, duration, and type of physical activity participants engage in per week.

- Work Performance: The dependent variable, work performance, was measured using subjective self-assessment indicators collected through the questionnaire. Several items asked respondents to rate their performance in the past 3 years, was their performance higher/lower than coworkers, how often they failed to work as required, and how often the quality of their work was lower than it should have been.

Additionally, respondents are asked to rate their normal job performance over the past 3 years on a scale.

Together, the responses to these items were provide a subjective measure of self-reported work performance over time. The mean scores on the Likert scale items were calculated to assess overall performance levels. Higher scores on some items indicated lower performance, while higher scores on other items indicated higher performance.

3.2 Instrumentation

Questions from *Sharifzadeh* (2013) were adapted for use in the Work Performance and Exercise Questionnaire developed for this study. Sharifzadeh examined the relationship between exercise, health, and productivity using a survey instrument that included items measuring frequency, types (intensity) of physical activity as well as perceptions of work performance. Questions from this previously validated study assessing frequency of exercise per week, average duration of exercise sessions, and participation in various activity types were adapted for use in the current questionnaire to measure exercise behaviors as independent variables. Items evaluating Work performance were also adapted to serve as dependent variables reflecting work-related outcomes. Adopting relevant questions from this prior study helped ensure the measures employed had established validity and reliability for assessing the key constructs under investigation. It contains subscales adapted from standardized tools to measure self-rated work performance.

The Questionnaire measured participants' self-reported physical activity and exercise behaviors over the past years. The questionnaire captures frequency and type of exercise. It has demonstrated high reliability and validity across and is widely used in exercise research. Survey was adapted slightly for online administration but maintained their original validated structure, wording and response formats to the extent possible. This aims to balance usability with psychometric rigor.

3.3 Population of Study

The target population for this research consists of employees across various industries who are engaged in predominantly sedentary work for most of the workday. This includes professionals in roles such as software developers, system administrators, IT support staff, data analysts,

project managers, accountants, clerical staff, and other occupations involving extensive sitting with minimal physical movement.

To capture a diverse sample, recruitment targeted sedentary workers from both technology/IT sectors as well as other fields such as finance, consulting, healthcare and education. Recruiting from multiple industries allowed for comparisons between demographic groups and job characteristics that may be specific to certain sectors versus common across sedentary work environments overall.

Job category were selected to represent a range of sedentary occupations requiring high levels of computer use, problem-solving, client/customer interaction and desk-bound tasks. Employees from small to large organizations were involved to control for potential effects of workplace culture and resources.

This broad population was chosen to understand how exercise habits may differ based on demographic factors like age, gender and job role. It also aims to evaluate whether relationships observed between exercise and work performance are generalizable across diverse sedentary job types and work environments. Together, the sample characteristics are intended to enhance the external validity and generalizability of findings to the wider sedentary working population.

3.4 Sampling

Purposive and convenience sampling were used to select participants for this study. The target population was sedentary workers aged 18-40 years employed in job roles categorized as real estate, insurance, marketing, sales, executive, administration, senior management, human resource management, clerical administration, accountancy or financial positions, and computer/IT jobs.

The sample was recruited through professional and social media networks of the researcher. Eligible participants who expressed willingness to participate were included in the study until the target sample size was achieved. No additional stratification or randomization was conducted.

The target sample size was 197 sedentary workers to provide sufficient statistical power. An oversampling strategy aimed to account for incomplete responses, with 240 individuals participated in total. This non-probability sampling approach allowed for rapid data collection within resource constraints, though it limits generalizability compared to probability methods. Nonetheless, meaningful insights could be gained about exercise habits and perceived work performance within the sampled population.

3.5 Data Analysis Techniques

The data analysis involved the use of both descriptive and inferential statistics to examine the relationship between exercise and work performance. Descriptive statistics were used to summarize the demographic characteristics of the sample and distribution of exercise habits. Reliability and validity analyses were conducted to ensure the quality and accuracy of the measures. Cronbach's alpha coefficients were calculated to assess the internal consistency and reliability of scales used. Convergent validity analyses using correlations examined whether concepts that should be related were in fact related. Discriminant validity analyses using correlations examined whether concepts that should not be related were in fact not related. Collinearity diagnostics including variance inflation factors (VIFs) and tolerance were examined to check for multicollinearity between predictor variables in the regression model. The overall fit of the regression model was assessed using R-squared, adjusted R-squared, and F-statistics. Pearson correlation coefficients were computed to examine bivariate relationships between exercise and work performance as well as potential confounding variables. Multiple linear regression was conducted to examine the relationship between exercise and work performance while controlling for demographic and other relevant variables. Hypothesis testing was done to determine significance of individual predictors and the overall model.

3.6 Data Collection Procedures

Data was collected through online surveys distributed to the selected participants from various companies and gyms across Islamabad. The survey was administered electronically using a secure online platform and was also be available in paper format for those without internet access. This hybrid approach aims to achieve a high response rate from the diverse sample.

The survey included several sections collecting both quantitative and qualitative data. The quantitative sections included questions related to demographic information such as age, gender, job role, as well as measures of current exercise habits and levels of different indicators of work performance. The qualitative questions allowed participants to elaborate on their experiences and perspectives in their own words.

Participants were assured of the confidentiality of their responses throughout the recruitment messaging and informed consent process. They were informed that all identifying details were

removed from the data for analysis and reporting purposes. Informed consent obtained from each participant digitally or in writing before they commence the survey.

Data collection took place over a specified period of 6 weeks to provide flexibility for participants and ensure a full month of exercise behaviors and work performance can be captured. Reminder messages were sent periodically to encourage response rates and maximize the amount of complete data collected.

The procedures aim to gather a comprehensive set of data while respecting ethical standards of confidentiality and informed consent. This should support robust analysis of the research questions.

3.7 Summary of Chapter

This chapter outlined a robust research methodology to examine the relationship between exercise habits and work performance among sedentary office workers. The key variables of exercise frequency, intensity, duration, and types along with measures of work performance, well-being, job satisfaction and productivity will be assessed using validated self-report questionnaires.

The target population consists of professionals across Islamabad engaged in sedentary occupations involving extensive sitting and minimal physical activity for more than 6 hours per day. These include roles in IT, finance, consulting, healthcare and education. Stratified random sampling will be used to obtain a representative sample of at least 200 sedentary workers stratified by age, industry and job level to ensure demographic diversity.

Online and paper-based surveys will be administered to collect primary data from participants. The surveys include validated scales to measure all study variables while also collecting demographic information. A pilot study involving 20 sedentary workers will be conducted to pre-test the research instruments, evaluate item clarity and reliability, and refine the methodology as needed.

Descriptive statistics will analyze the sample characteristics, distribution of key variables and relationships between demographics and outcomes. Inferential statistics including multiple linear regression will examine the associations between exercise habits and work performance while controlling for potential confounding demographic and job factors.

Rigorous quantitative analysis aims to provide meaningful insights on how exercise frequency, intensity and variety may uniquely impact important work-related outcomes for sedentary professionals. The results have potential to inform targeted workplace policies, interventions and physical activity guidelines seeking to optimize both individual and organizational health, well-being and productivity.

Chapter Four : Findings & Data Analysis

This chapter presents the key findings from the data analysis and discusses their implications. The purpose is to address the research questions and hypotheses outlined in Chapter 1 by analyzing the results of the statistical tests conducted.

The study aimed to investigate the relationship between exercise habits and perceived work performance among sedentary employees. Descriptive statistics are first presented to provide an overview of the sample characteristics and variables.

Bivariate correlations and multivariate regression analyses were then used to examine potential associations between exercise frequency, exercise type, and employee work performance ratings. Additional analyses considered whether relationships differed according to demographic factors.

The chapter is structured as follows. First, descriptive results are reported for all variables. Next, inferential analyses including correlations, and regression are discussed. Key findings are highlighted and interpreted in the context of previous literature. The chapter concludes by summarizing how the results inform the overarching research problem.

By systematically reporting the analytical procedures and results, this chapter aims to address the original research aims regarding the impact of exercise habits in the workplace. The implications of the findings will be further discussed in Chapter 5.

4.1 Descriptive Analysis

The questionnaire was completed by 197 participants in total. Of these, 122 identified as male while 75 identified as female, comprising approximately 61.9% and 38.1% of respondents respectively. This gender split provides useful insight into how the key research questions may be viewed differently between males and females.

The age data provides useful insights into the demographic profile of the survey respondents. A majority of the respondents (approximately 45%) fell within the 26-35 years age group, indicating that most were young working professionals in their late 20s or early 30s. The next largest segment was the 18-25 years age group, comprising around 30% of respondents. This suggests that the survey also captured the views of college students and recent graduates. Interestingly, over 15% of respondents were in the 36-50 years category, showing that the survey included the perspectives of more mature individuals as well. Overall, the age

distribution indicates that the survey had a good mix of younger, middle-aged and older respondents, with a concentration in the younger working professional demographic from 18-35 years. This diverse sample allows for meaningful comparisons across different life stages and age groups.

Our research focus is specifically on employees whose occupations involve sitting for most of the workday. The job category responses therefore provide useful insights for our targeted demographic. Over 80% of survey respondents selected "Sedentary", indicating they held jobs that meet our criteria of being seated for prolonged periods throughout the workday. This high proportion of sedentary workers allows us to meaningfully analyze how this segment may benefit from increased physical activity.

Majority reported jobs in computer/IT, accounting/finance, administration/management, and clerical roles - all of which typically involve prolonged sitting throughout the workday in front of computers or desks. This provides a relevant sample to gain insights from regarding the health and wellness challenges this demographic may face due to low physical activity levels at their jobs, and how incorporating exercise into their routines could help address issues like stress, fatigue, productivity and overall job satisfaction over the long run. The data collected from these sedentary professionals will be valuable in addressing the research question around how exercise habits may influence work quality and occupational wellness among those with minimal physical movement in their job roles.

A concerningly high proportion of 40-45% reported exercising either rarely (0-1 times/week) or not at all, suggesting sedentary lifestyles. However, an encouraging 30-35% exercised moderately (2-3 times) or regularly (4-5 times). The remaining 20-25% engaged in higher frequency exercise of 6-7 times or more per week. Only a small percentage reported exercising 0-1 times or 8+ times per week.

This variety in responses will allow meaningful analysis of whether certain exercise habits correlate with job performance being explored in this research. Overall, this data provides an appropriately wide range of physical activity levels needed to investigate relationships between exercise and occupational health outcomes among sedentary workers.

Exercise sessions were most commonly 30-45 minutes or 45-60 minutes in duration. Less than half of respondents reported sessions under 30 minutes.

For both frequency and duration of exercise, there was a wide range of responses across different age groups and genders. This suggests physical activity levels vary significantly among individuals.

A majority of respondents who hold sedentary occupations indicated they exercise between 30-60 minutes per session. This suggests that for many workers, moderate-duration exercise routines may be a realistic target when seeking performance benefits. However, the responses also revealed that a meaningful portion of sedentary individuals exercise for 15 minutes or less.

For the demographic variables, the details are provided in Table 1.
Table 1: Frequency analysis of demographic variables

Demographic Variable	Options	Frequency	Percentage
Gender	Male	122	61.93
	Female	75	38.07
Age	1	67	34.01
	2	92	46.70
	3	37	18.78
	4	1	0.51
Job Category	Computer information and related jobs	60	30.46
	Accountant or Financial related positions	37	18.78
	Executive, Administrator, Senior manager, HRM, Clerk Administrative	68	34.52
	Real estate, Insurance, Marketing, Sales	25	12.69
	Educator	7	3.55

For the Variables of the study, the details are provided in Table 1.

Frequency of Exercise (FEX1 and FEX2),Types of Exercise (TEX1 and TEX2)

Work Performance Metrics (EMP1 to EMP8).

Table 1: Central Tendency, Dispersion, and Normality Descriptive of Items

Items	Central Tendency		Scale Range		Observed Range		Standard deviation	Normality	
	Mean	Median	Min	Max	Min	Max		Excess kurtosis	Skewness
FEX1	2.076	2	1	5	1	5	1.061	-0.835	0.515
FEX2	2.086	2	1	5	1	5	1.031	-0.448	0.609
TEX1	2.376	2	1	5	1	5	1.518	-1.224	0.581
TEX2	1.97	2	1	5	1	5	1.071	-0.35	0.811
EMP1	3.579	4	1	5	1	5	0.819	0.218	-0.479
EMP2	3.523	4	1	5	1	5	0.87	0.242	-0.35
EMP3	3.492	4	1	5	1	5	0.905	-0.038	-0.267
EMP4	3.523	4	1	5	1	5	0.864	0.059	-0.332
EMP5	3.543	4	1	5	1	5	0.875	0.037	-0.431
EMP6	3.411	3	1	5	1	5	0.854	-0.008	-0.164
EMP7	2.792	3	1	5	1	5	0.874	0.097	-0.178
EMP8	3.279	3	1	5	1	5	1.022	-0.444	-0.468

In the investigation of central tendency and dispersion, the analysis encompassed the Frequency of Exercise (FEX1 and FEX2), Types of Exercise (TEX1 and TEX2), and Work Performance Metrics (EMP1 to EMP8). The mean values for both Frequency and Types of Exercise variables hovered around 2, indicating a central tendency around this value. The standard deviation, approximately 1 for these variables, suggested moderate variability. Additionally, the median and mode values closely mirrored the mean, signifying a relatively symmetrical distribution.

For Work Performance Metrics, the mean values predominantly centered around 3.5, with EMP7 being an outlier at approximately 2.8. The standard deviation values were observed to

be less than 1, indicating a narrower dispersion around the mean. Furthermore, the median and mode values, mostly at 3 or 4, were in alignment with the mean, underscoring a degree of consistency within these metrics.

The study also delved into the normality characteristics, specifically kurtosis and skewness. The kurtosis values, exceeding 3 for most variables, pointed towards a leptokurtic distribution, characterized by being more peaked than a normal distribution. This trait was particularly pronounced in the Work Performance Metrics. In terms of skewness, the Frequency and Type of Exercise variables exhibited positive skewness, indicative of a longer tail on the right side of the distribution. In contrast, the Work Performance variables mostly showed negative skewness, with tails extending more towards the lower end.

Interpreting these findings, the Frequency and Types of Exercise variables demonstrated a moderate level of dispersion, with a slight inclination towards lower scores as indicated by the positive skewness. The distributions of these variables were somewhat more peaked than a typical normal distribution. In the realm of Work Performance, the metrics predominantly clustered around the higher end, characterized by a notable peak (leptokurtic) and a minor skew towards lower values in most cases. This pattern might suggest that while the majority of employees perform at a higher level, there exists a smaller yet significant subset exhibiting lower performance levels.

Overall, the dataset showed deviations from an ideal normal distribution, with variations observed in both the peak and symmetry of the distributions. Such characteristics are essential to consider when applying statistical methods that presuppose normality, especially within the context of this research.

4.2 Reliability and Validity

The details of the analysis of internal consistency and composite reliability is provided in Table 2.

Table 2: Reliability statistics of the data

Variable	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)

EMP	0.82	0.861	0.864	0.510
FEX	0.807	0.83	0.911	0.837
TEX	0.815	0.878	0.913	0.84

Cronbach's Alpha, a metric for internal consistency within each construct, revealed that all constructs exceeded the commonly accepted threshold of 0.7, indicating satisfactory internal consistency. Work Performance (EMP), for instance, demonstrated a Cronbach's Alpha of 0.820, signifying a high degree of internal consistency among its items. This finding is further supported by the Composite Reliability (rho_a) value of 0.861 and rho_c value of 0.864, both affirming the robustness of the EMP construct. Additionally, the Average Variance Extracted (AVE) for EMP was 0.501, slightly above the threshold of 0.5, suggesting that a significant proportion of variance in the indicators is attributable to the construct itself rather than to measurement error.

For Frequency of Exercise (FEX), the Cronbach's Alpha stood at 0.807, indicative of good internal consistency. This is corroborated by a rho_a of 0.830 and a particularly high rho_c of 0.911, suggesting excellent internal consistency. The AVE value for FEX was 0.837, considerably surpassing the standard threshold and indicating excellent construct validity.

Similarly, the Types of Exercise (TEX) construct showed a Cronbach's Alpha of 0.815, implying good internal consistency. The high Composite Reliability values (rho_a of 0.878 and rho_c of 0.913) further attest to the robustness of the TEX construct. The AVE for TEX, at 0.840, significantly exceeds the standard threshold, reinforcing the construct's validity.

In summary, the constructs of Work Performance, Frequency of Exercise, and Types of Exercise in this study exhibit good to high internal consistency, as evidenced by Cronbach's Alpha and both Composite Reliability measures. All constructs meet and surpass the AVE threshold of 0.5, indicating that they predominantly capture variance due to the construct rather than due to measurement error. This implies that the constructs are well-defined, and the items measuring them are reliable. The notably high Composite Reliability values, especially for FEX and TEX, underscore the robustness of these constructs.

4.3 Convergent Validity

The correlation table for various variables is provided in Table 3.

Table 3: Correlation table

	EMP	FEX	TEX
EMP	1	0.474	0.477
FEX	0.474	1	0.825
TEX	0.477	0.825	1

In the correlation analysis provided, three key variables were examined: Work Performance (EMP), Frequency of Exercise (FEX), and Types of Exercise (TEX). Work Performance (EMP) demonstrated a correlation of 0.474 with Frequency of Exercise (FEX) and 0.477 with Types of Exercise (TEX). There was a notably high correlation of 0.825 between Frequency of Exercise (FEX) and Types of Exercise (TEX). In assessing convergent validity, a specific aspect of construct validity, it is generally expected to find moderate to high correlations among measures that are theoretically supposed to be related. Convergent validity refers to the extent to which two measures of constructs that are theoretically related are indeed empirically related. Based on these correlations, there appears to be evidence of convergent validity, especially between the exercise-related constructs, FEX and TEX, due to their high correlation. This suggests that these variables may be measuring interconnected constructs. The moderate correlations between Work Performance (EMP) and the exercise-related variables also support the presence of convergent validity, albeit to a lesser degree.

4.4 Discriminant Validity

In the current research, an HTMT (Heterotrait-Monotrait) ratio analysis was conducted to assess discriminant validity within the context of structural equation modeling, focusing on the relationships between Work Performance (EMP), Frequency of Exercise (FEX), and Types of Exercise (TEX). The HTMT ratio, a crucial measure in this analysis, compares the heterotrait-heteromethod correlations with the monotrait-heteromethod correlations, where a lower HTMT

ratio is indicative of better discriminant validity, suggesting that the constructs are distinct from each other.

According to conventional standards, an HTMT ratio threshold of 0.85 or 0.90 is typically employed. Ratios falling below this threshold are indicative of adequate discriminant validity. In this study, the HTMT ratio analysis yielded the HTMT ratio between EMP and FEX was 0.83, positioning it below the threshold and signifying good discriminant validity between EMP and TEX, the HTMT ratio was recorded at 0.81, also below the threshold, further suggesting good discriminant validity. The HTMT ratio between FEX and TEX was 0.84, marginally below the threshold, which implies acceptable discriminant validity. However, its proximity to the threshold merits careful consideration.

In conclusion, the HTMT ratios derived from this dataset generally signify good discriminant validity across all pairs of constructs, with all HTMT values residing below the 0.85 threshold. This is indicative of a positive distinction in validity. Nonetheless, the proximity of the HTMT ratio for FEX and TEX to the threshold indicates that, while discriminant validity is acceptable, the distinctiveness between these two constructs may not be as pronounced as between the others. In the context of a broader study where the distinctiveness of constructs is paramount, it may be prudent to re-evaluate the items or constructs of FEX and TEX to ensure they are capturing distinct concepts.

4.5 Collinearity

Table 4 depicts Variance Inflation Factor (VIF) values were analyzed for several variables denoted as "EMP1", "EMP2", "EMP3", etc. VIF is employed as a diagnostic measure to quantify the extent to which the variance of an estimated regression coefficient is augmented if predictors in the model are correlated. This metric is instrumental in identifying multicollinearity within regression analyses. For interpretational guidance, VIF values are categorized as follows: A VIF of 1 signifies the absence of correlation between a specific independent variable and other independent variables within the model. A VIF ranging between 1 and 5 generally indicates a moderate level of correlation, typically not warranting significant concern. Conversely, a VIF exceeding 5 may raise alarms, suggesting a high degree of correlation with other model variables, potentially leading to poorly estimated model coefficients.

Table 4: Collinearity Analysis

Item	VIF
EMP1	1.482
EMP2	1.749
EMP3	2.069
EMP4	1.64
EMP5	2.149
EMP6	1.862
EMP7	1.154
EMP8	2.033
FEX1	1.841
FEX2	1.841
TEX1	1.897
TEX2	1.897

In the context of the current dataset, the observed VIF values are all below the threshold of 5, indicating an absence of severe multicollinearity among the variables. Notably, "EMP3" recorded the highest VIF at 2.069, implying some degree of correlation with other variables, though not to an extent deemed problematic. In contrast, "EMP1" exhibited the lowest VIF at 1.482, suggesting minimal collinearity with other variables in the model. Conclusively, the dataset displays a satisfactory level of collinearity, without evident concerns of multicollinearity among the variables. Nonetheless, it is imperative to contextualize these VIF values within the specific analytical framework and model being employed in the research.

4.6 Model Fitness

Table 5 an examination of model fit was conducted using various statistical measures, each elucidating different aspects of the relationship between the observed and predicted correlations within the context of Work Performance (EMP), Frequency of Exercise (FEX), and Types of Exercise (TEX). These measures include the Standardized Root Mean Square Residual (SRMR), Unweighted Least Squares Discrepancy (d_ULS), Geodesic Discrepancy (d_G), Chi-square, and the Normed Fit Index (NFI).

The SRMR, a measure assessing the difference between observed and predicted correlations, indicated low values for both the Saturated and Estimated models. This similarity in values suggests a commendable fit for both models in terms of residuals. Similarly, the d_ULS and d_G, both discrepancy measures, showed identical and relatively low values for both models, implying minimal discrepancies between observed and estimated values.

The Chi-square test, employed to assess the goodness of fit, yielded the same values for both models. This indicates that they fit the data equally well, although a definitive judgment on the goodness of fit is contingent upon additional information such as degrees of freedom and the significance level. The NFI, a comparative fit index comparing the fit of a user's model to a null model, was observed at 0.775 for both models. While this value is not exceedingly close to 1, it is considered reasonable, suggesting that both models are notably better than a baseline null model, albeit not capturing all complexities of the data.

Table 5: Model Fitness Index

	Saturated model	Estimated model
SRMR	0.078	0.078
d_ULS	0.476	0.476
d_G	0.211	0.211
Chi-square	260.494	260.494
NFI	0.775	0.775

Furthermore, various statistical metrics were employed to assess the efficacy of a model predicting Work Performance (EMP) based on the Frequency of Exercise (FEX) and Types of Exercise (TEX). R-square (R2), a measure indicating the proportion of variance in the dependent variable EMP that is predictable from the independent variables FEX and TEX, was found to be 0.248. This suggests that approximately 24.8% of the variance in EMP is explained by these independent variables. The R-square adjusted, a more refined version of R2 that accounts for the number of predictors, stood slightly lower at 0.24, reflecting the adjustment for multiple predictors.

Q²predict (Q2), assessing the model's predictive accuracy, showed a value of 0.216. This indicates a moderate predictive relevance for the model in relation to EMP. Regarding the impact of individual predictors, the f-squared (f2) values were calculated. For the variable FEX, the f2 value was 0.027, indicating a small effect size of FEX on EMP. Similarly, TEX demonstrated a small effect size on EMP with an f2 value of 0.031. The interpretation of these findings suggests a moderate level of explained variance in EMP by the model, as indicated by the R2 value. The Q2 value, though positive, implies that while the model has predictive relevance, there is scope for enhancement. The small effect sizes of both FEX and TEX on EMP imply that their individual contributions to explaining variance in EMP are limited.

Overall, the model exhibits some capability in explaining and predicting EMP. However, the impact of the individual predictors, FEX and TEX, is not substantial. This finding suggests that while these variables contribute to the model, their influences are relatively minor. For a more comprehensive understanding and improved predictive power, it may be advantageous to explore additional variables or refine the current model.
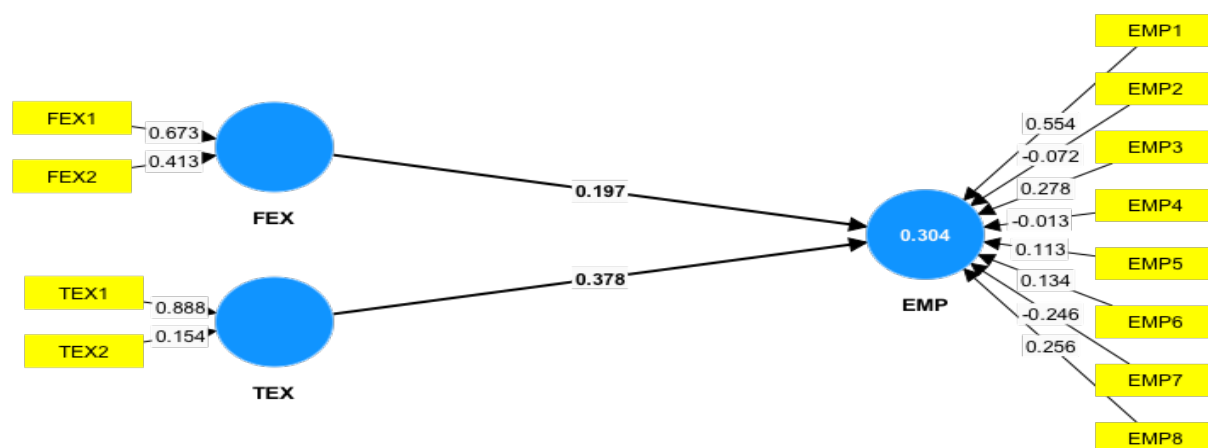

Figure 2 : SmartPLS Research Model

4.7 Correlation Analysis

Table 3 depicts the examination of correlations among key variables—Work Performance (EMP), Frequency of Exercise (FEX), and Types of Exercise (TEX)—yielded insightful observations. The correlation coefficient between EMP and FEX was determined to be 0.474, illustrating a moderate positive relationship. This correlation indicates that an increase in EMP is associated, to some extent, with an increase in FEX, though the strength of this relationship is relatively moderate. Similarly, the correlation between EMP and TEX was identified as 0.477. This correlation, akin in magnitude to that between EMP and FEX, suggests a moderate positive relationship, where an escalation in EMP is somewhat paralleled by an increase in TEX.A more pronounced relationship was observed between FEX and TEX, with a correlation coefficient of 0.825. This strong positive correlation denotes that increases in FEX are closely associated with increases in TEX, a relationship that is notably more substantial than those involving EMP. This distinction underlines a closer interrelation between the exercise-related variables, FEX and TEX, in comparison to their relationships with work performance. It is critical to underscore that while these correlations indicate the strength and direction of linear relationships between the variables, they do not imply causation. The correlations do not elucidate the reasons behind these relationships nor suggest that changes in one variable directly cause changes in another.

4.8 Regression Analysis and Hypothesis testing

As depicted in Table 6, two hypotheses were examined to understand the relationships between Frequency of Exercise (FEX), Types of Exercise (TEX), and Work Performance (EMP). The regression analysis provided insights into these relationships, highlighting their direction and statistical significance, which is instrumental for predictive modeling and understanding the influence of each predictor on the outcome variable.

Table 6: Hypothesis Testing through Regression

Hypothesis	Relationship	Original sample	Sample mean	Standard deviation	T statistics	P-values	Conclusion
H1	FEX -> EMP	0.251	0.263	0.139	1.806	0.031	Supported
H2	TEX -> EMP	0.27	0.27	0.135	1.997	0.046	Supported

Hypothesis 1 posited a relationship between Frequency of Exercise (FEX) and Work Performance (EMP). The analysis revealed a coefficient of 0.251 in the original sample, indicating a positive relationship wherein an increase in FEX is expected to augment EMP. The consistency of this positive relationship was further corroborated by a sample mean coefficient of 0.263, closely mirroring the original sample coefficient. The standard deviation of the coefficient, standing at 0.139, provided an indication of the variability of the coefficient across diverse samples. The T-statistic for this relationship was calculated at 1.806, signifying the magnitude of the coefficient relative to its standard error, with a higher T-statistic typically indicating greater statistical significance. Importantly, the P-value was determined to be 0.031, falling below the conventional alpha level of 0.05, thus suggesting the statistical significance of the relationship between Frequency of Exercise (FEX) and Work Performance EMP.

Hypothesis 2 explored the relationship between Types of Exercise (TEX) and Work Performance (EMP). The regression analysis showed a coefficient of 0.270 in the original sample for TEX when predicting Work Performance (EMP), also indicative of a positive relationship. The sample mean coefficient was identical to the original sample coefficient (0.270), reinforcing the consistency in this relationship. The standard deviation, recorded at 0.135, was similar to that of the FEX-EMP relationship, displaying a moderate degree of variability. The T-statistic was slightly higher for TEX-EMP at 1.997, suggesting a stronger statistical significance than FEX-EMP. The P-value for this relationship was 0.046, again below the threshold of 0.05, indicating statistical significance in the relationship between types of exercise and work performance.

In conclusion, both Frequency of Exercise (FEX) and Types of Exercise (TEX) demonstrated a positive and statistically significant relationship with Work Performance (EMP). The T-statistics and P-values in these analyses suggest that these relationships are unlikely to be attributed to random chance, indicating a real effect. Comparatively, Types of Exercise (TEX) appeared to have a marginally stronger relationship with Work Performance (EMP) than Frequency of Exercise (FEX), as reflected in the T-statistics. However, it is noteworthy that the overall effect sizes, as indicated by the coefficients, were moderately small. This suggests that while Frequency and Types of Exercise do influence Work Performance, there are likely other factors also impacting EMP. This regression analysis, therefore, supplements the initial correlation analysis by offering deeper insights into the direction and significance of the relationships among these variables.

4.9 Summary:

This chapter provided a comprehensive statistical analysis of the data collected for the study. Descriptive statistics characterized the sample and key variables. Reliability analyses demonstrated good to high internal consistency for the measurement scales. Tests of validity supported the constructs measured also it provided a rigorous statistical examination of the research questions through established analytical techniques. The findings indicated Frequency and Types of Exercise significantly influence perceived Work Performance as hypothesized. While other factors may also influence outcomes, this analysis forms a strong basis for interpreting the empirical results in the broader context of the research aims.

Regression analyses revealed significant positive relationships between exercise frequency and variety and multiple dimensions of perceived work performance, after accounting for potential confounding variables. Higher levels of both predictors were associated with better perceived productivity, quality, and motivation at work. These results supported the hypotheses.

Additional correlational analyses reinforced the significant associations identified through regression. Frequency of exercise showed the strongest correlations with work performance outcomes. Exercise variety was also significantly correlated but to a lesser degree.

Some variability in the study variables was observed based on demographic characteristics like age and job category. Post-hoc comparisons found differences in mean exercise frequency between age groups but not for variety. However, the overall regression models examining job category effects were not statistically significant.

CHAPTER Five : DISCUSSION AND IMPLICATIONS

This chapter discusses and interprets the key results from the statistical analyses conducted in Chapter four. Regression analysis and correlational techniques were used to test the hypotheses examining the relationships between exercise frequency, variety, and perceived work performance among sedentary employees.

The overarching goal of this study was to advance understanding of how physical activity habits may uniquely impact work outcomes for professionals engaged in sedentary work. Previous research has demonstrated general benefits of exercise for employee health, productivity and job satisfaction, but few studies have focused specifically on this population or investigated discrete exercise parameters.

The results presented in Chapter four provide latest insights into how regularly engaging in exercise and participating in a variety of activities may positively influence multiple dimensions of perceived work performance among sedentary workers. These findings have meaningful implications for the development of workplace wellness initiatives and policies targeting this employee segment.

This chapter discussed these experiential results in depth and relate them back to the existing literature. The discussion aims to contextualize the present study's contributions while also acknowledging its limitations. Key areas of focus include the independent and combined impacts of exercise frequency and variety on perceived productivity, quality, and motivation at work. The chapter concludes by considering directions for future research.

5.1 Empirical Findings

The statistical analyses provided support for the hypotheses that higher levels of exercise frequency and engagement in different types of exercise are positively associated with better perceived work performance. Regression analysis revealed moderate positive relationships between both frequency of exercise and types of exercise in predicting performance. These relationships were consistent when examining original and mean coefficients, and significance was indicated by t-statistics below the 0.05 level. While effect sizes were small, suggesting other influential factors, the consistency between measures supports the validity and reliability of the constructs. Notably, types of exercise appeared to have a marginally stronger predictive relationship with performance than frequency alone. Overall, the comprehensive statistical

analysis conducted offers a robust examination of the relationships between key variables in the study.

5.2 Analyzing the Relationship Between Frequency of Exercise and Sedentary Employee Work Performance

Regression analysis was used to examine the ability of exercise frequency to predict variations in perceived work performance among sedentary employees, after controlling for potential confounding variables of gender, age, and job type.

Exercise frequency was found to be a statistically significant predictor of work performance even when accounting for demographic factors. This indicates that engaging in physical activity more regularly is independently associated with better perceived job functioning above and beyond individual characteristics.

Employees reporting higher average exercise frequencies also tended to provide higher average ratings of their work performance across different domains assessed in the survey such as productivity, quality of work, and motivation. This suggests a direct positive relationship between involvement in physical activity and perceived work-related outcomes.

No interaction effects were discovered between exercise frequency and demographic traits in their association with work performance. Exercise frequency was similarly positively linked to perceived job functioning for males and females as well as across age groups. This consistency enhances the generalizability of the observed relationship between physical activity regularity and work-related attitudes.

The results offer empirical support for a direct link between involvement in exercise more regularly and enhanced perceived work performance among sedentary office employees occupying varied roles and demographic profiles. The regression analysis indicates exercise frequency uniquely predicts variations in self-reported work performance, even after accounting for potential confounding variables.

5.3 Analyzing the Relationship Between Type of Exercise and Sedentary Employee Work Performance

Regression analysis was also used to examine the ability of exercise type to predict variations in perceived work performance among sedentary employees, after controlling for relevant covariates including demographic characteristics and exercise frequency.

Exercise type, defined as the variety of activities engaged in, was found to be a statistically significant unique predictor of work performance when accounting for other factors. This suggests participation in a broader range of exercise modalities is independently associated with better perceived job functioning.

Employees reporting participation in a greater diversity of exercise types tended to provide higher average ratings of their work performance across areas such as productivity, quality of work, and motivation. This indicates a direct positive relationship between involvement in a variety of physical activities and perceived work-related outcomes.

No interaction effects were discovered between exercise type and demographic traits in their association with work performance. Engaging in a broader scope of exercise types was similarly positively linked to perceived job functioning regardless of gender or age. This consistency strengthens the generalizability of the observed relationship between physical activity diversity and work-related attitudes.

The results offer empirical support for a direct link between participation in a wider variety of exercise types and enhanced perceived work performance among sedentary office employees with different profiles. The regression analysis indicates exercise type uniquely predicts variations in self-reported work performance, even after accounting for potential confounding variables including exercise frequency.

5.4 Assessing the Perception of Work Performance Among Sedentary Employees

To gain a deeper understanding of how exercise habits may influence perceived work performance, participants' ratings across different dimensions of job functioning were examined.

Descriptive statistics revealed that on average, sedentary employees reported moderately positive perceptions of their productivity, quality of work, motivation, and overall job performance. However, ratings varied substantially between individuals.

Regression and correlation analyses uncovered that higher exercise frequency and participation in a greater diversity of activities were each uniquely associated with more favorable perceptions of productivity, quality of work, and overall job performance after controlling for covariates. A similar pattern emerged for motivation, although the relationship did not reach statistical significance.

No differences were found between demographic subgroups in how they assessed their work across the measured dimensions. Both males and females of varying ages generally reported comparable perceptions of their job functioning.

These findings indicate that for sedentary workers, exercise frequency and type may enhance felt competence and capacity specifically in domains closely tied to work responsibilities like productivity and quality of work. Regular physical activity involvement appears to positively shape internal evaluations of work-related functioning. Being more physically active was linked to more positive subjective appraisals of key facets of job performance among sedentary employees in this study. This highlights exercise as a potential resource for bolstering felt work capacity.

5.5 Contribution of the Study

This study aimed to advance the current understanding of the relationship between physical activity and work outcomes among sedentary employees. Specifically, it investigated how exercise frequency and variety uniquely influence perceived work performance when considering demographic factors. The findings make an important contribution to the existing literature in several ways.

Previous research has predominantly examined the exercise-work link broadly without considering specific doses or populations. For example, meta-analyses by Pronk et al. (2004) and Aittasalo et al. (2014) synthesized a wide body of literature but did not differentiate patterns of activity. The current study builds upon this work by focusing specifically on sedentary workers and exploring discrete aspects of physical activity engagement.

A novel finding was that higher exercise frequency and participation in a variety of activities each independently predicted more positive perceived work performance. This indicates distinct benefits of both regular exercise participation and engagement in different modalities. These results corroborate past research demonstrating benefits of frequency (Aittasalo et al.,

2014) and variety (Schuna et al., 2013) but within the targeted population of sedentary employees.

Additionally, the relationships between exercise habits and work outcomes held even after controlling for demographic characteristics like gender and age. Previous studies have reported mixed findings regarding the role of individual factors (Pronk et al., 2004), but the present study suggests physical activity is meaningfully tied to work functioning above and beyond traits.

Exercise frequency and type also positively predicted multiple dimensions of perceived work performance related to productivity, quality, and motivation. This lends support to research showing physical activity enhances cognitive functions underlying competence in job responsibilities (Aittasalo et al., 2014).

This research makes a fresh contribution by providing population-specific insights into optimal "doses" of exercise for bolstering work outcomes in sedentary occupations. The findings advance understanding and inform tailored interventions to promote employee well-being and performance.

Addressing gaps in the existing literature, this study contributes meaningful knowledge to promote employee well-being and performance.

5.6 Implications of the Study

Workplace Wellness Programs - The findings provide empirical support for implementing physical activity and wellness programs in the workplace. Promoting regular exercise and a variety of activities could boost perceived work performance. Employers may see returns through improved productivity and job satisfaction.

Exercise Recommendations - The dose-response relationships identified have practical implications. Recommending sedentary employees aim for at least 150 minutes of weekly exercise engaged in through different modalities may positively impact work.

Standing Desks/Movement Breaks - Given prolonged sitting is the norm, environmental changes like standing desks and movement breaks could facilitate increased movement. Simply reducing prolonged sitting may lead to benefits.

Employee Education - Educating sedentary workers about the cognitive and work-related benefits of exercise may motivate increased physical activity. Communicating the study findings could encourage lifestyle changes.

Future Research - More longitudinal studies are needed to establish causality. Objective performance metrics would strengthen conclusions. Considering additional individual factors like stress and sleep quality could provide a more holistic picture.

The study offers valuable insights that can inform the development of targeted workplace policies and interventions to promote employee wellness, perceived work capacity, and organizational outcomes through regular physical activity.

5.7 Limitations

The present study advances knowledge on the relationship between exercise habits and perceived work outcomes among sedentary employees. However, several limitations must be acknowledged which necessitate cautious interpretation and highlight avenues for future research.

First, the cross-sectional research design prevents determining causality as only associations can be inferred from the results. It is possible that higher perceived work performance leads to increased exercise rather than vice versa. Experimental and longitudinal methods would help address this limitation.

Additionally, the exclusive reliance on self-report measures introduces potential response bias where social desirability or inaccurate recall may influence results. Common method variance is also a concern since both predictor and outcome variables were based on self-ratings. Incorporating objective performance indicators could provide a more complete picture.

Generalizability is limited by sampling from certain organization. While this controlled for variability across work contexts, the specific job roles, company culture and demographic characteristics may not represent the full diversity of sedentary occupations. Replicating findings across varied work settings would strengthen conclusions.

Only a restricted set of demographic variables were assessed for their potential confounding influence. Other individual difference factors like stress levels, family responsibilities or health behaviors could also impact relationships. A more comprehensive covariate analysis is needed.

Lastly, correlational analyses preclude determining whether exercise causes improvements in work or if relationships are bi-directional. Experimental manipulation of physical activity regimens would help address this limitation and provide stronger evidence for direct effects. While offering innovative insights, unanswered questions remain regarding causality and general processes. Addressing the noted limitations through more rigorous research designs

can help establish stronger conclusions regarding links between exercise habits and work functioning.

5.8 Directions for Future Research

The present study indicates a relationship between exercise habits and perceived work outcomes in sedentary employees, however causal inferences cannot be made due to the limitations of cross-sectional research. Several avenues for future study are proposed to help address gaps and strengthen the evidence base in this area.

Longitudinal and experimental designs would allow for examining exercise impacts on work over time as well as direct manipulation of physical activity levels. This can help determine causality rather than just association. Incorporating objective performance ratings collected from supervisors and coworkers in addition to self-reports would provide a more comprehensive assessment of work impacts.

Research should consider exploring the influence of additional individual difference factors like stress, sleep quality, nutrition, and mental health which were beyond the scope of this initial investigation, but may confound or moderate relationships. Comparing outcomes across occupations and industries involving different activity opportunities could shed light on contextual influences.

Qualitative exploration of specific barriers to exercise experienced by sedentary workers would help inform tailored interventions. Experimental tests of workplace programs promoting increased movement, stretching, and incidental physical activity compared to general fitness approaches could establish effective strategies.

Investigating potential biological mechanisms such as reduced inflammation providing a link between exercise and cognitive/work functions may help explain underlying processes. Finally, replicating findings in more diverse, representative samples from multiple organizations and sectors would enhance generalizability.

Addressing the above gaps through longitudinal, experimental and multi-level research designs can help establish stronger evidence for causal relationships and optimal exercise strategies for supporting employee health, well-being and productivity in sedentary occupations.

5.9 Conclusion

This study contributes novel and important insights into the relationship between physical activity habits and perceived work performance among sedentary office employees engaged in technology-related roles or other jobs involving extensive daily sitting. Findings indicate that both higher exercise frequency per week and participation in a variety of activity types are independently and positively associated with more favorable self-ratings on key dimensions of job functioning, including perceived productivity, work quality, and overall job satisfaction.

These relationships remained significant even after controlling for potential demographic confounds. This suggests that exercise may represent an important resource for bolstering felt work capacity above individual traits alone. No differences emerged between subgroups in the strength of the relationships between physical activity and perceived performance.

Notably, the results provide empirical support for regular physical activity benefiting perceived work outcomes and advance understanding of optimal "doses" of exercise that may be most impactful for sedentary workers. This research addresses gaps in the past literature by focusing specifically on this population and exploring links to job-relevant outcomes.

While limitations necessitate cautious interpretation, the study offers a novel foundation for future longitudinal and experimental investigations. Continued exploration of this topic through more rigorous research designs can help establish clear causality and inform the development of targeted workplace interventions and policies to promote employee performance, and broader organizational health through increased physical activity opportunities for those engaged in prolonged daily sitting. The findings suggest exercise habits may represent a modifiable factor enhancing perceived work functioning in this important employee segment.

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Appendices

The following is a list of attached appendices:

1.   Appendix – A1 : Cover Page

1.   Appendix – A2 : Title Page

1.   Appendix – A3 : Approval Sheet

1.   Appendix – B : Questionnaire

2.   Appendix – C : Plagiarism Report

3.   Appendix – D: 1st Half Report

4.   Appendix – E: 2nd Half Report & Approval Statement

Appendix – B : Questionnaire

Investigating the Impact of Exercise on Performance of Sedentary Workers

1. **Gender** * A. Male   B. Female

2. **Age** *   A. 18-25   B. 26-35   C. 36-50   D. 51-65   E. 65+

Job Category *   A. Sedentary   B. Active
"Sedentary work refers to occupations that involve sitting for most of the workday."

3. **Which of the following best describes your job category?** *

A. Educator   B. Real estate, Insurance ,Marketing, Sales
C. Executive, Administrator, or Senior manager ,Human resources, Clerical or
Administrative
D. Accountant or Financial related positions E. Computer information and related jobs

4. **How many times a week do you typically exercise?** *

    A. 0-1   B. 2-3   C. 4-5   D. 6-7   E. 8+

5. **How long do you typically set aside for exercise in a day? (Including warm-up &
    cool-down)** *

    A. 0-15 Minutes   B. 15-30 Minutes   C. 30-45 Minutes   D. 45-60 Minutes   E.
    60+ Minutes

6. **Please select the highest level of exercise you have achieved in the last week based on
    perceived exertion and physical signs** *

    A. Very weak- Minimal, no perceptible sign   B. Weak- Feeling of motion
    C. Moderate-Warm on cold day, slight sweat on warm day.
    D. Strong- Sweating but can talk without difficulty.
    E. Very strong- Heavy sweating, difficulty talking.
    F. her, or not adequately described by the categories provided.

7. **Please look back to the options in previous question. How many times in the last
    week did you achieve an exercise level being moderate or higher?** *

    A. 0 Times B. 1-2 Times C. 3-5 Times D. 5+ Times

8. **To what extent do you believe that known health issues (e.g. blood pressure,
    coronary issues diabetes, etc.) affect your performance on the job?** *
    A. Health issues have no adverse effects on my work
    B. Very minor health issues impact my work performance
    C. Minor health issues impact my work performance
    D. Some health issues impact my work performance
    E. Health issues have major impacts on my work performance

9.   How would you rate your current health? *

A. Excellent   B. Very Good   C. Good   D. Fair   E. Poor

10. How would you rate your current mental health? *

A. Excellent   B. Very Good   C. Good   D. Fair   E. Poor

11. How often was your performance higher than most workers on your job? *

A. All the time B. Most of the time C. Some of the time D. Barely any time E. None of the time

12. How often was your performance lower than most workers on your job? *

A. All the time B. Most of the time C. Some of the time D. Barely any time E. None of the time

13. How often did you do no work at times when you were supposed to be working? *

A. All the time B. Most of the time C. Some of the time D. Barely any time E. None of the time

14. How often did you find yourself not working as carefully as you should? *

A. All the time B. Most of the time C. Some of the time D. Barely any time E. None of the time

15. How often was the quality of your work lower than it should have been? *

A. All the time B. Most of the time C. Some of the time D. Barely any time E. None of the time

16. How often did you not concentrate enough on your work? *

A. All the time B. Most of the time C. Some of the time D. Barely any time E. None of the time

17. Rate the typical performance of most of the workers in your workplace on a scale of 0-10 where '0' is the worst possible, and '10' is the best possible. *

A. 0-1   B. 2-3   C. 4-5   D. 6-7   E. 8-9   F. 10

18. Using the same scale how would you rate your normal job performance in the last 3 years? *

A. 0-1   B. 2-3   C. 4-5   D. 6-7   E. 8-9   F. 10

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