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THE 3S OF LIFESTYLE CHOICES: HOW SCREENS, SLEEP, AND SWEAT INFLUENCE MENTAL HEALTH OF THE FORMAL WORKFORCE IN MALAYSIA'S CAPITAL CITY

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Abstract:
The purpose of this research is to analyse the impact of three lifestyle factors, which are screen time, sleep quality, and physical activity, on the mental health of formal employees in Malaysia. The data for this study comes from 336 employees in Kuala Lumpur. A self-administered questionnaire was used to collect data. The response rate was 87.5%. The results show that there is a significant positive relationship between these factors and mental health. In particular, sleep quality is the most important factor in relation to an employee's mental health, followed by physical activities and screen time. The study reveals the importance to mental well-being of having balanced screen time, getting enough sleep and taking regular physical exercise. Additionally, this research adds to a collection of useful materials that benefit public administration authorities, entrepreneurs, scholars and businesses in designing strategies and policies to enhance the mental welfare of employees amidst the changing work environment in Kuala Lumpur. In addition, the study finds that workplace wellness programs must incorporate these elements into their design if they are going to address mental health problems. The results provide a strong basis for interventions that promote healthier lifestyles which will, in turn benefit formal employee's mental health and work-life balance.

Keywords: mental health, screen time, sleep quality, physical activities, formal employees

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1. Introduction

Mental health is a significant global concern and is influenced by lifestyle factors such as screen time, sleep quality, and physical activity (Cheah *et al.*, 2022; Nagasu & Yamamoto, 2020; Nagasu *et al.*, 2019; Woo *et al.*, 2010). In Malaysia, these factors are compounded by socio-economic conditions and cultural influences, especially among formal workers who face unique occupational stressors that can worsen mental health issues. Excessive screen time, particularly during the COVID-19 pandemic, has been linked to increased anxiety and depression, with research indicating that high screen time, disrupted sleep, and low physical activity can lead to chronic health problems (Olive *et al.*, 2022).

Sleep quality is crucial, as poor sleep is associated with heightened stress and anxiety, creating a bidirectional relationship where mental health issues can disrupt sleep and vice versa. In Malaysia, long working hours exacerbate this issue. A study by (Yusof *et al.*, 2017) shows that sleep disturbances correlate with anxiety and depression symptoms.

Physical activity is vital for mental well-being, as regular exercise can alleviate anxiety and depression symptoms. Although specific studies on physical activity and mental health in Malaysia are limited, it is generally accepted that active individuals report better mental health. With sedentary lifestyles on the rise among Malaysian formal workers, promoting physical activity is essential for mitigating the negative effects of screen time and poor sleep.

Migrant workers in Malaysia face additional mental health challenges, including job insecurity and social isolation, which increase their risk for mental health issues (Uddin *et al.*, 2020). Addressing their needs requires a comprehensive approach that improves access to mental health services.

The Malaysian government has initiated programs to enhance mental health literacy and service access, but gaps remain, particularly for formal workers, regarding the impacts of lifestyle factors on mental health (Chong *et al.*, 2013). Integrating mental health education into workplace wellness programs could significantly promote healthier lifestyles among formal workers.

Screen time, sleep quality, physical activity, and mental health are, therefore, complex among formal workers in Malaysia. Research by (Moitra & Madan, 2022; Saxena *et al.*, 2021; Ineçli & Ziyagil, 2017; Christensen *et al.*, 2016; Bai *et al.*, 2016; Rosen *et al.*, 2014; Carson *et al.*, 2014) have discovered various ill effects of deprived screen time, sleep quality, and physical activity on the general and mental health of workers, children, adolescents, and families. Therefore, addressing these factors is crucial for improving mental health outcomes and necessitates collaboration among policymakers, employers, and mental health professionals to foster healthier lifestyle choices and reduce the burden of mental health disorders.

1.1 Research Problem Statements

The existing research on the effects of screen time, sleep quality, and physical activity on mental health, especially among formal employees, has revealed several critical gaps, particularly in the context of Malaysia. Previous studies have consistently shown that these lifestyle factors significantly impact mental well-being. However, the relationship between these variables is far from conclusive.

Research on screen time has provided contrasting views, with some scholars associating high screen time with lower psychological well-being, citing negative outcomes such as anxiety, depression, and social isolation (Twenge & Campbell, 2018; Lucena *et al.*, 2022). Conversely, others argue that not all screen time is detrimental, especially when it is used for constructive purposes, such as social connection or skill development (Kracht *et al.*, 2023; Fitzpatrick *et al.*, 2022; Chase *et al.*, 2022). This indicates a lack of consensus on the exact nature of the relationship between screen time and mental health, which calls for further investigation within specific populations, such as formal employees in Kuala Lumpur, Malaysia.

Similarly, the relationship between sleep quality and mental health has shown inconsistencies. While poor sleep is widely associated with increased anxiety and depression (Gruber *et al.*, 2020), other studies have suggested that sleep quality may function as a moderating factor, rather than a direct cause of mental health issues (Diestel *et al.*, 2015; Hwang *et al.*, 2020). Moreover, factors such as emotional labour, work-life balance, and environmental conditions have been identified as additional influences on sleep quality (Choi *et al.*, 2020; Zhu *et al.*, 2023), further complicating the relationship. The limited focus on Malaysian formal employees and their unique occupational stressors exacerbates the need to explore this relationship more comprehensively in this demographic.

Physical activity is another lifestyle factor that has shown strong links to mental health, with a general consensus that regular physical activity improves psychological well-being and reduces symptoms of anxiety and depression (Healy *et al.*, 2023; Puig-Ribera *et al.*, 2020). However, certain studies have questioned the universal applicability of these findings, suggesting that the benefits of physical activity may vary depending on the intensity, type, and individual context (Li *et al.*, 2022; Pasco *et al.*, 2010). In Malaysia, where sedentary lifestyles are becoming more prevalent among formal employees, understanding this relationship is crucial to designing effective interventions. Therefore, the implications of not conducting this research are significant. Without a deeper understanding of how screen time, sleep quality, and physical activity affect mental health in the context of formal employees in Kuala Lumpur, Malaysia, interventions may remain ineffective or misdirected. This could lead to a continued rise in mental health issues such as anxiety, depression, and reduced workplace productivity. Moreover, this can negatively affect both the well-being of employees and the overall economic health of Malaysians. Furthermore, without tailored policies that consider the unique socio-cultural and occupational factors of formal workers in Malaysia, mental

health programs may fail to adequately address the underlying causes of poor mental health, exacerbating the public health burden.

1.2 Research Question

RQ1: Is there a significant relationship between screen time and the mental health of formal employees in Kuala Lumpur, Malaysia?
RQ2: Is there a significant relationship between sleep quality and the mental health of formal employees in Kuala Lumpur, Malaysia?
RQ3: Is there a significant relationship between physical activities and the mental health of formal employees in Kuala Lumpur, Malaysia?

1.3 Research Objectives

RO1: To examine if there is a significant relationship between screen time and the mental health of formal employees in Kuala Lumpur, Malaysia.
RO2: To scrutinize if there is a significant relationship between sleep quality and the mental health of formal employees in Kuala Lumpur, Malaysia.
RO3: To analyze if there is a significant relationship between physical activities and the mental health of formal employees in Kuala Lumpur, Malaysia.

2. Literature Review and Hypothesis Development

The following sub-sections focus on the underpinning theory, literature, and hypothesis developed regarding the relationships between screen time, sleep quality, physical activities, and mental health.

2.1 Underpinning Theory

This study centres around Albert Bandura's Social Learning Theory (SLT) (Bandura, 1977) and (Engel, 1977) Biopsychosocial Model. According to Bandura, "*people learn and behave through their social interactions, which are then understood, structured and maintained through this process*". Additionally, (Hiremath, 2019) study discusses how technology affects our mental health. The SLT mainly emphasizes the contribution of pleasant experiences and social engagement to behaviour and mental health. In comparison, Engels' Biopsychosocial Model uses three factors to explain any human's state. In (Marcelo, 2023) study, an investigation of the impact of physical activity on Brazilian adult's mental health was carried out. A comparison of the final and initial results revealed that there was a positive result, meaning that the more often adults do physical exercises, the more mental health they have. Thus, this theoretical foundation makes it easier for researchers to look at the issue of the impact of physical exercises on mental health. Thus, these theories act as the theoretical framework for this study illuminating the complicated relationship between physical conditions (screen time, sleep quality, physical activities) and mental health of formal workers in Kuala Lumpur, Malaysia.

2.2 Mental Health

Mental health is the mental state that allows a person to manage life challenges, recognise their strengths, study, work, and contribute to the community. Mental diseases and psychosocial difficulties can cause distress, incapacity to function, and self-harm. According to (Dunne, 2023), one in five workers suffer poor mental health, a rising trend. World Health Organisation lists workload, control, support, relationships, and change as causes of poor mental health at work (Hacking H. R., 2023). Poor employee mental health impairs focus, performance, and relationships. Bad mental health can lead to low productivity, absenteeism, and excessive turnover. Companies depend on their workers, and understanding of how mental health affects productivity is growing. Flexible working hours, mental health tools, and meditation apps are being implemented to improve employee well-being (McLaren, 2020).

Companies try to reduce the risk of mental health deterioration in employees, yet some individuals are still reluctant to seek medical care. Employees feared stigma or discrimination from supervisors and co-workers if they disclosed their mental health concerns (Corporate Wellness Magazine, n.d.). Thus, employees have adopted self-coping measures for mental health. A study indicated that mindfulness-based stress reduction (MBSR) improved mental health in employees (Janssen *et al.*, 2018). Meditation while sitting or standing, focusing on bodily sensations, and light movement exercises like walking were used. Stress is the body's response to physical, mental, or emotional change, whereas perceived stress is how a person feels about lack of control and unpredictability (Health Assured, 2019).

2.3 The Relationship between Screen Time and Mental Health

The significant relationship between screen time and mental health has been of considerable interest among the scientific community and scholars, and this relationship is complex. Some scholars state that higher screen time causes lower psychological well-being (Lucena *et al.*, 2022) but other scholars noted that higher screen time does not lead to lower psychological well-being (Juan *et al.*, 2022).

Additionally, Research by (Twenge & Campbell, 2018; Li, 2021) highlights concerns over the psychological effects of digital media use, particularly noting the association between excessive screen time, high social media use, and an increase in depressive symptoms among young adults. These studies indicate the potential negative outcomes of prolonged screen engagement, emphasizing the need for interventions to mitigate these effects on mental health. Additionally, (Lucena *et al.*, 2022) clarify that sedentary behaviour, frequently linked to heightened screen time, can adversely impact the health-related quality of life. The study revealed that heightened recreational screen time is associated with reduced subjective psychological well-being, mostly due to a decline in excitement for social contact with peers, potentially impacting mental health.
Moreover, (Khan *et al.*, 2022) illuminate the negative repercussions of excessive screen time on adolescents, establishing a clear association with psychosomatic complaints and unhealthy lifestyle behaviours, including physical inactivity, poor sleep patterns, and

suboptimal dietary choices. Their research shows that screen time leads to adverse health outcomes. This body of evidence supports that higher screen time is associated with undesirable health conditions.

Furthermore, (Eirich *et al.*, 2022) found evidence to support that increased screen duration is associated with more behavioural problems, highlighting the potential negative impacts of prolonged screen exposure on psychological well-being.

In examining the broader implications of screen time on mental health, it is crucial to consider the role of social media. According to (Aschbrenner *et al.*, 2019), excessive social media use has been linked to increased anxiety, depression, and social isolation.

However, the conversation around screen time is not uniformly negative. According to (Kracht *et al.*, 2023; Fitzpatrick *et al.*, 2022; Santiago *et al.*, 2022), the effects of screen time on mental health vary significantly based on the content and context of screen use. They differentiate between interactive screen activities, such as video conferencing and online collaboration, and passive screen activities, like scrolling through social media, which is linked to higher levels of depression and anxiety. This distinction shows the importance of considering the nature of screen engagement when evaluating its impact on mental health.

In line with this, (Chase *et al.*, 2022) challenge the predominant narrative that screen time has solely negative effects on mental health by highlighting the potential benefits of digital engagement. Through their research, they demonstrate how digital platforms can serve as valuable tools for providing social support, educational resources, and relaxation opportunities, thereby enhancing mental well-being. This indicates that (Chase *et al.*, 2022) study exhibits that when digital technology is used for constructive activities, such as maintaining social connections or learning new skills, it can have a positive impact on psychological health. These findings encourage a re-evaluation of the role of screen time in our lives, suggesting that the context and content of digital engagement are crucial in determining its effects on mental health.

Moreover, (Orben *et al.*, 2019; Mheidly *et al.*, 2020; Misra *et al.*, 2019) suggest a differentiated approach to screen time's impact, focusing on content and context. They argue against a one-size-fits-all approach, highlighting passive consumption's potential harm and interactive activities' varying effects. Additionally, (Primack *et al.*, 2021; Panova & Lleras, 2019) suggest that the specific nature of digital media activities, whether for social media use, entertainment, or productive collaboration, can influence mental health outcomes in distinct ways, highlighting the need for targeted interventions that address the complexities of digital media use and its impact on mental health.

Likewise, (Craig *et al.*, 2020) mention that some social media users who spend large amounts of screen time have found it to be a valuable tool for connection and support, mitigating feelings of isolation, while others may experience detrimental effects due to cyberbullying or social comparison. This dichotomy suggests that the impact of screen time on mental health is not uniform; rather, it is shaped by individual differences and contextual factors.

According to (Rabbani *et al.*, 2022), higher screen time is strongly related to lower psychological well-being, but their study conceded and cited other studies that prove that screen use does not influence mental health. This duality in findings suggests that the effects of screen time on mental health may vary based on individual circumstances, such as age, context of use, and the nature of the content consumed. A study by (Anderl *et al.*, 2023) recognizes that the impact of screen time on mental health does not universally apply to all individuals or contexts. Their study focused on the net effects of smartphone screen time rather than specific usage types, indicating that the quality of screen time may be more significant than the quantity. This suggests that not all screen time is inherently harmful; rather, the context and manner in which it is used play crucial roles in determining its impact on mental health.

Therefore, there are contrasting findings on the relationship between screen time and mental health. These conflicting views and findings have led to the development of the following hypothesis:

H1: There is a significant relationship between screen time and the mental health of formal employees in Kuala Lumpur, Malaysia.

2.4 The Relationship between Sleep Quality and Mental Health

The relationship between sleep quality and mental health among workers has gained significant attention from the scientific community and organisations. Recent research has highlighted the intricate and bidirectional relationship between sleep quality and mental health, emphasizing the necessity of optimal sleep for psychological well-being. A study conducted by (Gruber *et al.*, 2020) provided robust evidence of the negative impacts of poor sleep quality on mental health, particularly regarding anxiety and depression. Similarly, (Semenza *et al.*, 2021) demonstrated a significant association between longer sleep duration and reduced depressive mood indicators among adolescents, reinforcing the importance of adequate sleep for youth mental health.

On a broader scale, (Liu *et al.*, 2018) identified a U-shaped relationship between sleep duration and mental health in the general population, indicating that both insufficient and excessive sleep correlate with higher rates of psychiatric and substance use disorders. This suggests a need for public health interventions that address both extremes of sleep duration. Longitudinal studies by (Breslau *et al.*, 2019; Barros *et al.*, 2019) further explored the long-term effects of sleep disturbances on mood disorders, revealing how factors like employment status can influence sleep quality and mental health.

Additionally, (LeBourgeois *et al.*, 2017) examined the impact of pre-sleep screen time on adolescents' sleep patterns, utilizing a mixed-methods approach to better understand this relationship. Meanwhile, (Austin-Zimmerman *et al.*, 2022) conducted a genetic analysis to uncover the genetic factors linking sleep duration and mental health, highlighting the complex interplay of genetic and environmental influences.

During the silent enemy pandemic COVID-19, many industries and workers have been impacted by various factors, including sleep disorders (Kanapathipillai, 2020;

Marelli *et al.*, 2020). Similarly, (Yılmaz *et al.*, 2021) found that healthcare workers experienced significantly poorer sleep quality, worsened by social isolation and job-related stress. The study highlighted the importance of social support from family and friends in alleviating some negative impacts on sleep quality, indicating that emotional connections are vital for mental health in high-stress jobs. Additionally, (Bozan *et al.*, 2021) reported that healthcare workers encountered increased mental health issues, including sleep disturbances and post-traumatic stress symptoms, due to the extraordinary demands of the pandemic.

Furthermore, emotional labour is a substantial stressor that adversely affects sleep quality and mental health across many industries. According to (Choi *et al.*, 2020), who observed customer service employees subjected to elevated emotional labour were more prone to report diminished sleep quality because of recurrent interactions with irate customers and workplace harassment. Such conditions adversely affect sleep quality and reduce the overall productivity of workers and organisations, therefore impacting the mental health of the workers.

Recent studies have concentrated on the impact of work-life balance and telecommuting on sleep quality. Research by (Iswahyudi, 2023) indicates that remote work arrangements may enhance sleep quality by minimising commute durations and facilitating more flexible schedules, thereby reducing stress and improving mental well-being. This is especially pertinent in light of the ongoing transformations in work environments resulting from the pandemic, during which numerous employees have shifted to remote work. The research indicates that organisations ought to adopt flexible work arrangements to enhance employees' mental health by improving sleep quality.

Moreover, environmental factors significantly influence sleep quality and, consequently, mental health. A study conducted by (Zhu *et al.*, 2023) examined the correlation between metropolitan living surroundings and sleep quality, revealing that substandard environmental conditions may adversely impact both sleep and mental health. This emphasizes the need to evaluate workplace and household settings when tackling sleep-related concerns among workers. Enhancing these factors may result in improved sleep quality and augmented mental wellness.

Sleep disorders have repercussions that go beyond personal health, impacting organisational productivity and general workplace morale. Evidence indicates that inadequate sleep quality correlates with diminished productivity and heightened susceptibility to mental health issues (Nakada *et al.*, 2018). This highlights the need to address sleep quality not merely as a mental health concern but also as a vital determinant of organisational success and employee effectiveness. Moreover, a study by (Han & Kim, 2020) suggests that variability in sleep patterns, particularly between weekdays and weekends, can lead to increased depressive symptoms among workers, indicating the influence of sleep quality on the mental health of workers.

Based on the above scholars' findings, it is crucial to acknowledge that sleep quality significantly influences mental health. Conversely, (Diestel *et al.*, 2015) discovered that although sleep quality may not directly precipitate mental health problems, it can

affect employees' ability to cope with emotional difficulties in the workplace. According to their study, sleep quality functions as a protective resource in the emotional labour process, indicating that improved sleep can mitigate unpleasant emotional states encountered throughout the workday. Research conducted by (Hwang *et al.*, 2020) indicates that sleep quality may not have a direct effect on mental health. Their study indicates that emotional labour and workplace disagreements might elicit bad moods that impair concentration and contribute to conditions such as anxiety and depression. Moreover, the results from (Bergman *et al.*, 2020) emphasize that job strain, frequently associated with inadequate sleep quality, is a significant determinant of employees' health and well-being. However, it does not directly influence workers' mental health.

Another study by (Sianoja *et al.*, 2020) examined the correlation between a leader's support and a worker's sleep, revealing that high-stress professions are especially vulnerable to sleep disturbances. The study found that the psychosocial attributes of employment, including demands and support, are more pivotal in affecting sleep quality and, subsequently, mental health. This indicates that enhancing employment conditions may significantly influence mental health more than solely concentrating on sleep quality.

Therefore, there are conflicting findings on the relationship between sleep quality and mental health. These opposing views and findings have led to the formulation of the following hypothesis:

H2: There is a significant relationship between sleep quality and the mental health of formal employees in Kuala Lumpur, Malaysia.

2.5 The Relationship between Physical Activities and Mental Health

Physical activities provide numerous benefits, including mental health, to various demographics such as working adults, old and young adults, adolescents, and children. The mechanisms through which physical activity enhances mental health are varied and complex. Based on the findings of (Healy *et al.*, 2023), physical activity initiatives can foster connectedness and community among individuals with mental health challenges, which in turn supports recovery and enhances overall well-being. Furthermore, the empowerment and identity restoration associated with physical activity, as noted by (Healy *et al.*, 2023), can contribute to a more positive self-image and greater optimism about the future, which are critical components of mental health.

Previous research also indicates that physical action is positively correlated with mental health outcomes. A study by (Abu-Omar *et al.*, 2004) stresses that leisure-time physical activity yields mental health benefits. According to (Biddle *et al.*, 2021), physical activities such as aerobics and strength training, significantly reduce symptoms of anxiety, stress, and depression while enhancing mood, self-esteem, and cognitive functioning. Moreover, (Puig-Ribera *et al.*, 2020; Schuch *et al.*, 2019) further emphasize the positive effects of physical activity interventions on depression and workplace mental

health, showing that even moderate-intensity exercise can alleviate depression symptoms and improve mental health among working adults.

Another past study by (Hassmén *et al.*, 2000), who conducted a population study in Finland, found a strong association between physical exercise and psychological well-being, reinforcing the idea that regular physical activity is essential for maintaining mental health. The previous study can be corroborated by a recent finding by (Muminović *et al.*, 2022), who argue that physical inactivity is a leading cause of declining mental health and quality of life, emphasizing the urgent need for interventions that encourage physical activity as a means of improving mental health.

Furthermore, (Kandola & Stubbs, 2020; Vanderlinden *et al.*, 2020) explore how physical activity serves as a protective factor against mental health challenges, with (Kandola & Stubbs, 2020) highlighting its role in reducing anxiety symptoms and (Vanderlinden *et al.*, 2020) focusing on improved sleep quality in older adults which sustains good mental health. Parallel to these findings, (Naczenski *et al.*, 2020; Stillman *et al.*, 2020) investigate the benefits of physical activity in the workplace, finding that it can prevent burnout and enhance mental function.

Similarly, (Ineçli & Ziyagil, 2017) discovered a significant positive association between physical activity levels and mental health scores among adolescents, reinforcing the notion that increased physical activity is associated with improved mental health. These findings are corroborated by (Huang *et al.*, 2021), who reported that higher levels of physical activity are associated with better mental health, indicating that regular involvement in physical activity can mitigate symptoms of anxiety and depression.

Additionally, the intensity of physical activity also plays a significant role in its effectiveness in promoting mental health. According to (Watanabe & Tsutsumi, 2023; Mawer *et al.*, 2022), low-intensity activities, such as walking, may not provide the same cognitive and mental health benefits as moderate or vigorous physical activities. This finding suggests that for optimal mental health outcomes, individuals may need to engage in higher-intensity physical activities. In line with this, a previous study by (Soundy *et al.*, 2014) revealed a diverse range of benefits from physical activity across various health domains, including psychological well-being.

Despite the overwhelming evidence supporting the positive impact of physical activity on mental health, some studies suggest that the relationship may not be universally applicable. In their research (Li *et al.*, 2022) note that the effects of physical activity on mental health can vary based on contextual factors, such as the type of physical activity and individual circumstances. Additionally, (Neill *et al.*, 2020) revealed mixed results regarding the effectiveness of physical activity interventions on mental health outcomes among, suggesting that not all physical action interventions yield significant benefits. This complexity indicates the need for tailored approaches to physical activity interventions, particularly for younger and working populations.

Additionally, (Pasco *et al.*, 2010) found non-linearity between physical activity and mental health. They found that while habitual physical activity is associated with a reduced risk of depressive and anxiety disorders, the therapeutic effects of exercise are

not universally applicable to all individuals, particularly those with pre-existing severe mental health conditions. This suggests that while physical activity can be a valuable component of mental health treatment, it should not be viewed as a remedy.

Furthermore, a study by (Connolly *et al.*, 2023) reveals that as symptoms of mental ill health increase, so do the barriers to engaging in physical activity, indicating that individuals with higher levels of anxiety and depression may find it increasingly difficult to participate in exercise. This highlights the need for tailored interventions that address both mental health symptoms and the specific barriers to physical activity that individuals may face.

Therefore, while the evidence supports the positive impact of physical activity on mental health, there are variabilities. Thus, the following hypothesis was formed to investigate the relationship between physical activities and mental health among formal workers in Malaysia.

H3: There is a significant relationship between physical activities and the mental health of formal employees in Kuala Lumpur, Malaysia.

2.6 Proposed Conceptual Framework

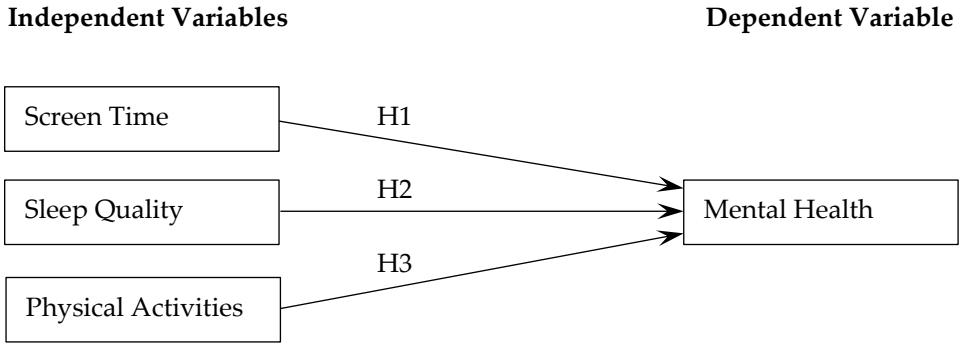

Figure 2.1: Proposed Conceptual Framework

3. Methodology

The following section provides the reliability analysis, population, sampling, and measurements used in this research.

3.1 Population, Sampling and Measurements

The research population comprises formal employees in Kuala Lumpur, Malaysia. According to (DOSM, 2024), the total number of formal employees in Malaysia is approximately 6.7 million, with approximately 1.4 million located in the capital city of Malaysia (Kuala Lumpur).

The (Krejcie & Morgan, 1970) tabulation was used to determine the sample size for a population of 1.4 million formal workers. The adequate sample size is 384. To obtain the required sample size, 500 questionnaires in total were distributed. 388 responses were

received. 52 responses were incomplete. Therefore, a total of 336 questionnaires provided the data for the analysis. This is approximately a 67.2% response rate. Based on (Fincham, 2008), response rates approximating 60% for most research should be the goal of researchers and certainly are the expectation of the journal's editors.

Simple random sampling was chosen for this study due to the large population of formal workers in Kuala Lumpur, Malaysia, and its cost-effectiveness and simplicity. To apply this sampling technique, the researchers distributed the questionnaire through Google Forms and social media platforms to the formal workers in the capital city of Malaysia.

The questionnaire is divided into five sections to assess the independent variables (screen time, sleep quality, and physical activities) and the dependent variable of (mental health). The demographic profile of respondents, including gender, age, education level, and years of employment, was also gathered. The survey employs the Likert scale ranging from 1 (Strongly disagree) to 5 (Strongly agree) as responses.

4. Findings and Interpretation

In this section, reliability analysis, normality test, respondents' demographic profiles, descriptive statistics, correlation analysis, regression analysis, and the summary of the hypothesis are presented.

4.1 Reliability Analysis

Table 4.1: Reliability Analysis (N = 336)

Variables	Cronbach's Alpha	N of Items
Screen Time (SC)	0.895	5
Sleep Quality (SQ)	0.893	5
Physical Activities (PA)	0.923	5
Mental Health (MH)	0.927	7

Based on Table 4.1, the value of Cronbach's Alpha for Screen Time (SC) is 0.895 with 5 items. The Cronbach's alpha values of Sleep Quality (SQ), Physical Activities (PA), and Mental Health (MH) are 0.893 (5 items), 0.923 (5 items), and 0.927 (7 items), respectively. All these Cronbach's alpha values have shown values of more than 0.8, which means the construct is excellent for this research.

4.2 Normality Test

To test the normality of variables like screen time, sleep quality, and physical activity in relation to mental health, the Q-Q Plot, skewness, and kurtosis were used. The Q-Q Plot compares data distribution to a normal distribution, where data points lining up along a straight line indicate normal distribution. Deviations from this line suggest non-normality, pointing to possible outliers or an uneven data spread.

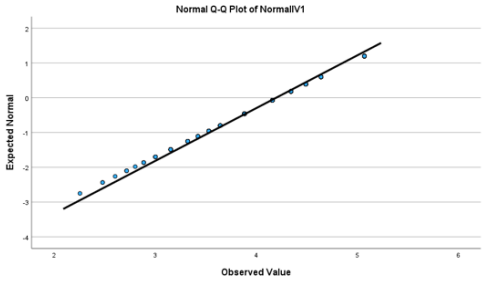

Figure 4.2.1: Q-Q Plot for Screen Time

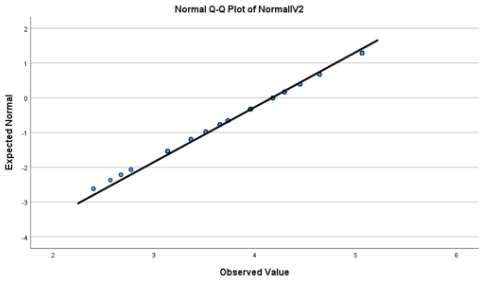

Figure 4.2.2: Q-Q Plot for Sleep Quality

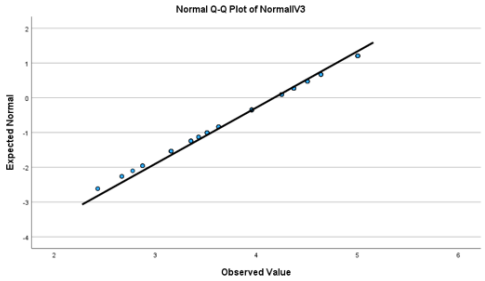

Figure 4.2.3: Q-Q Plot for Physical Activity

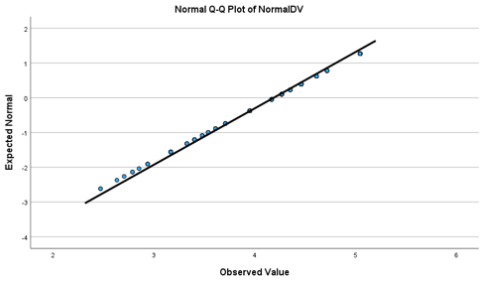

Figure 4.2.4: Q-Q Plot for Mental Health

The results presented in Figures 4.2.1 – 4.2.4 reveal that all the variables under examination display characteristics of a normal distribution. Given this demonstration of normality, the Pearson Correlation Coefficient was utilized to assess the correlation between the variables screen time, sleep quality, physical activity, and mental health.

4.3 Demographic Profile of Respondents

Table 4.2: Demographic Profile of Formal Workers (N = 336)

Variables	Description	Frequency	Percentage (%)
Gender	Male	150	44.6
	Female	186	55.4
Age	Below 30 years	112	33.3
	30 - 44 years	149	44.3
	45 and above	75	22.4
Educational Level	SPM/ STPM	13	3.9
	Diploma	13	3.9
	Bachelor's Degree	260	77.4
	Master's Degree	50	14.9
Years of Employment	0 – 5 years	111	33.0
	6 – 10 years	85	25.3
	11 – 15 years	36	10.7
	16 – 20 years	39	11.6
	Above 20 years	65	19.3
Sector of Employment	Government	21	6.3
	Private	288	85.7
	Own business	27	8.0

Job Position	Non-executive	60	17.9
	Executive	154	45.8
	Middle Management	67	19.9
	Senior Management	55	16.4

Table 4.2 shows a total of 336 responses were collected. In terms of gender, the majority of the respondents are females, accounting for 55.4% (186). Based on age, the largest group falls within the 30 to 44 years range, making up 44.3% (149) of the respondents. The educational background of participants predominantly consists of Bachelor's Degree holders at 77.4% (260). When looking at years of employment, those with 0 to 5 years of experience are the majority, representing 33.0% (111) of the responses, highlighting a relatively young workforce in terms of service years. The vast majority of respondents, 85.7% (288), are employed in the private sector. Regarding job positions, the largest segment is executives, accounting for 45.8% (154) of the participants, indicating a study sample with a significant representation of professional roles.

4.4 Descriptive Statistics

Table 4.3: Descriptive Statistics (N = 336)

Factors	Mean	SD	Min	Max
Screen Time (SC)	4.211	0.711	1	5
Sleep Quality (SQ)	4.181	0.681	1	5
Physical Activities (PA)	4.188	0.672	1	5
Mental Health (MH)	4.199	0.661	1	5

Table 4.3 Descriptive Statistics reveals that the formal employees in Kuala Lumpur, Malaysia, generally report high screen time, good sleep quality, frequent physical activity, and good mental health. The mean score of 4.211 indicates high screen time with moderate variability. The mean score of 4.181 suggests most employees rate their sleep quality positively, while the mean score of 4.188 indicates frequent physical activity. The mean score of 4.199 indicates that most employees perceive their mental health positively, with little variation. The data suggests that these factors are generally consistent, but some employees experience more extreme values.

4.5 Pearson's Correlation Coefficient Analysis

Table 4.4: Pearson's Correlation Matrix (N = 336)

Factors	ST	SQ	PA	MH
Screen Time (SC)	1			
Sleep Quality (SQ)	0.796**	1		
Physical Activity (PA)	0.744**	0.839**	1	
Mental Health (MH)	0.735**	0.832**	0.801**	1
**Correlation is significant at 0.01 level (2-tailed)				

Table 4.4 Pearson's Correlation Matrix illustrates the association between screen time (SC), sleep quality (SQ), physical activity (PA), and mental health (MH) among 336 formal employees in Kuala Lumpur, Malaysia. The matrix shows that all factors have significant correlations with each other at the 0.01 level (2-tailed), indicating that these relationships are statistically significant.

Screen time (SC) is positively correlated with sleep quality (SQ) at (r = 0.796), with physical activity (PA) at (r = 0.744), and with mental health (MH) at (r = 0.735). These strong positive correlations suggest that higher screen time is associated with better sleep quality, higher physical activity, and better mental health.

Sleep quality (SQ) also shows strong positive correlations with physical activity (PA) at (r = 0.839) and with mental health (MH) at (r = 0.832). This indicates that better sleep quality is associated with higher levels of physical activity and improved mental health. Similarly, physical activity (PA) is strongly correlated with mental health (MH) at (r = 0.801), implying that more frequent physical activity is linked to better mental health outcomes.

Moreover, the Pearson's Correlation Matrix indicates that there are significant and strong positive associations between screen time, sleep quality, physical activity, and mental health. These findings indicate that these factors are closely related, and improvements in one may contribute to positive changes in the others. In particular, better sleep quality and increased physical activity are highly associated with improved mental health among formal employees in Kuala Lumpur.

4.6 Multiple Regression Analysis

Regression analysis is the statistical method used in this research to estimate the relationships between the independent variables and a dependent variable.

4.6.1 Model Summary

Table 4.5: Model Summary

R	R Square	Adjusted R Square	Std. Error Est.
0.857[a]	0.734	0.732	0.342
a. Predictors: (Constant), Screen Time (SC), Sleep Quality (SQ), Physical Activity (PA) b. Dependent Variable: Mental Health (MH)			

Table 4.5 Model Summary from the regression analysis reveals a strong positive correlation between screen time, sleep quality, and physical activities on the mental health of formal employees in Kuala Lumpur, Malaysia.

The model's (R = 0.857) indicates a strong positive correlation between these factors and mental health outcomes. The (R^2 = 0.734) explains 73.4% of the variance in mental health, with screen time, sleep quality, and physical activity as predictors. The (Adjusted R^2 = 0.732) is slightly lower, indicating that the model is suitable for predicting mental health outcomes. The Standard Error of the Estimate is 0.34189, indicating a better fit of the model. The model explains a substantial portion of the variance in mental health

among formal employees in Kuala Lumpur, with screen time, sleep quality, and physical activity being significant predictors. The model's strong predictive power and low standard error make it a robust tool for understanding the effects of these factors on mental health outcomes.

4.6.2 ANOVA

Table 4.6: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	**Regression**	107.354	3	306.143	306.143	0.001[b]
	Residual	38.807	332	0.117		
	Total	146.162	335			
a. Predictors: (Constant), Screen Time (SC), Sleep Quality (SQ), Physical Activity (PA) b. Dependent Variable: Mental Health (MH)						

Table 4.6 ANOVA evaluates the statistical significance of the regression model examining the effects of screen time, sleep quality, and physical activities on mental health among formal employees in Kuala Lumpur, Malaysia. The model has (Sum of Squares = 107.354), indicating the variance in mental health explained by the independent variables. The (Residual sum of squares = 38.807), representing the variance not explained by the model. The (Total sum of squares = 146.162), combining both explained and unexplained variances. The degrees of freedom (df = 3), with the (mean squares = 306.143; 0.117) respectively. The (F-statistic = 306.143), indicating that the model explains a significant portion of the variance in mental health compared to the residual or unexplained variance. The (p = 0.001), indicating that the independent variables, screen time, sleep quality, and physical activity, significantly predict mental health outcomes among the employees in the sample.

4.6.3 Regression Coefficient

Table 4.7: Regression Coefficient

Model 1	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	**Std. Error**	**Beta**		
(Constant)	0.507	0.124		4.078	< 0.001
Screen Time (SC)	0.125	0.045	0.134	2.801	0.005
Sleep Quality (SQ)	0.447	0.057	0.461	7.815	< 0.001
Physical Activity (PA)	0.310	0.052	0.315	5.898	< 0.001

Table 4.7 Regression Coefficient illustrates the relationships between screen time (SC), sleep quality (SQ), physical activities (PA), and mental health (MH) among formal employees in Kuala Lumpur, Malaysia. It presents both unstandardized and standardized coefficients, along with their respective significance levels, to understand the relative importance and strength of each predictor in the regression model.

The constant value (B = 0.507, p < 0.001) represents the intercept of the regression equation, which is the predicted value of mental health when all independent variables (screen time, sleep quality, and physical activity) are equal to zero. This constant suggests that, even in the absence of screen time, sleep quality, and physical activity, there is still a baseline level of mental health of approximately 0.507 on the scale used.

For screen time (SC), the unstandardized coefficient (B = 0.125, p = 0.005) indicates that for every unit increase in screen time, mental health increases by 0.125 units, holding all other variables constant. The standardized coefficient (Beta = 0.134) shows the relative strength of screen time in predicting mental health. Although screen time has a positive and significant effect, its impact is smaller compared to the other predictors, as indicated by the lower Beta value.

The sleep quality (SQ) variable has the highest impact on mental health. The unstandardized coefficient (B = 0.447, p < 0.001) suggests that for every unit increase in sleep quality, mental health improves by 0.447 units, holding other factors constant. The standardized coefficient (Beta = 0.461) highlights that sleep quality is the strongest predictor of mental health in this model, with a significant and substantial positive effect. Similarly, physical activity (PA) is also a significant predictor, with an unstandardized coefficient of (B = 0.310, p < 0.001), meaning that a one-unit increase in physical activity results in a 0.310 increase in mental health, assuming other variables remain constant. The standardized coefficient (Beta = 0.315) shows that physical activity has a moderately strong effect on mental health, though not as large as sleep quality.

Therefore, the regression analysis demonstrates that all three variables independent variables (screen time, sleep quality, and physical activity) have a statistically significant positive effect on mental health. Sleep quality has the strongest impact, followed by physical activity, and then screen time. The significance levels are all below 0.05, indicating that these relationships are not due to chance, and the model provides a robust explanation of how these factors influence mental health outcomes in this population.

4.7 Linear Regression Equation

MH = 0.507 + 0.125 (SC) + 0.447 (SQ) + 0.310(PA)

Where;
MH = Mental Health,
SC = Screen Time,
SQ = Sleep Quality,
PA = Physical Activity,
0.507 is the constant or y-intercept.

The model predicts mental health scores based on the levels of Screen Time (SC), Sleep Quality (SQ), and Physical Activity (PA). The constant y-intercept (0.507) indicates

that when all independent variables are equal to zero, the predicted mental health score is 0.507. Screen time has a small positive effect on mental health, while sleep quality has the largest impact, with each unit increase in SC increasing mental health by 0.125 units. Physical activity also contributes positively to mental health, but its effect is smaller compared to sleep quality. The regression equation reveals that sleep quality has the strongest positive effect on mental health, followed by physical activity and screen time.

4.8 Summary of Hypothesis Test

Table 4.8: Summary of Hypothesis Test

No	Hypothesis	p-value	Result
H1	There is a significant relationship between screen time and mental health of formal employees in Kuala Lumpur, Malaysia.	0.005	Accepted
H2	There is a significant relationship between sleep quality and mental health of formal employees in Kuala Lumpur, Malaysia.	< 0.001	Accepted
H3	There is a significant relationship between physical activities and mental health of formal employees in Kuala Lumpur, Malaysia.	< 0.001	Accepted

Table 4.8 Hypothesis Summary outlines the results of testing three hypotheses regarding the relationships between screen time, sleep quality, physical activity, and mental health among formal employees in Kuala Lumpur, Malaysia.

Firstly, Hypothesis (H1), states that there is a significant relationship between screen time and mental health, ($p = 0.005$). This indicates that there is a statistically significant relationship between screen time and mental health. Therefore, screen time has a measurable effect on the mental health of the formal employees in Kuala Lumpur. Secondly, Hypothesis (H2), which proposes a significant relationship between sleep quality and mental health, ($p < 0.001$). This confirms that sleep quality has a strong and statistically significant effect on the mental health of the formal employees in this research.

Thirdly, Hypothesis (H3), which suggests a significant relationship between physical activity and mental health, ($p < 0.001$). This proves that physical activity positively and significantly affects the mental health of the formal employees in this study.

Hence, the results of the hypothesis tests reveal that all three predictor variables (screen time, sleep quality, and physical activity) have significant relationships with the outcome variable (mental health) of formal employees in Kuala Lumpur. Each of these variables contributes meaningfully to mental health outcomes, with sleep quality and physical activity showing particularly strong significance based on the ($p < 0.001$).

5. Discussion

The aim of this research is to investigate the relationships between screen time, sleep quality, physical activities, and the mental health of formal employees in Kuala Lumpur,

Malaysia. This section revolves around answering the research questions and evaluating the corresponding hypotheses based on the regression analysis results.

The first research question sought to determine whether there is a significant relationship between screen time and mental health. The findings revealed a positive, significant relationship, as indicated by (B = 0.125; p = 0.005). This finding supports hypothesis (H1). The outcome suggests that for every one-unit increase in screen time, mental health increases by 0.125 units. However, while screen time was found to positively affect mental health, its impact is relatively small compared to other factors. This outcome is consistent with findings from (Lucena *et al.*, 2022), who associated increased screen time with poorer psychological well-being, primarily through reduced social interaction and increased sedentary behaviour.

However, the modest effect size aligns with studies such as (Chase *et al.*, 2022), which argue that not all screen time is detrimental, particularly when used for positive activities like social engagement or skill development. These mixed findings align with the duality in the literature, where a past study by (Twenge & Campbell, 2018) emphasize the negative impacts of excessive screen time, while others suggest that the context and nature of digital engagement determine its effects on mental health.

The second research question focused on the relationship between sleep quality and mental health. The results showed a strong, significant positive relationship, as reflected by (B=0.447; $p < 0.001$). This finding supports hypothesis (H2). This implies that for every one-unit increase in sleep quality, mental health improves by 0.447 units, making sleep quality the strongest predictor of mental health in this study.

These findings are in line with earlier research (Gruber *et al.*, 2020; Semenza *et al.*, 2021), which established that better sleep quality is associated with lower levels of anxiety and depression. The significant effect of sleep quality reinforces the idea that sleep plays a crucial role in emotional regulation and mental well-being. This is particularly crucial among formal employees in Kuala Lumpur. Additionally, this result supports studies by (Yılmaz *et al.*, 2021), which demonstrated how poor sleep quality, exacerbated by occupational stress and isolation, negatively affects mental health.

However, the findings challenge the previous research by (Diestel *et al.*, 2015), which suggested that sleep quality may function as a moderating factor rather than a direct cause of mental health problems. Despite this, the strong predictive power of sleep quality in this study highlights its importance as a key determinant of mental health, suggesting that workplace interventions focused on improving sleep may significantly enhance mental health.

The third research question explored whether there is a significant relationship between physical activities and mental health. The regression results revealed a positive, significant relationship between physical activities and mental health, with (B = 0.310; $p < 0.001$). This result supports hypothesis (H3). The outcome indicates that for every one-unit increase in physical activity, mental health improves by 0.310 units, making physical activity a significant that impacts mental health.

These results are consistent with the established literature, such as (Healy *et al.*, 2023; Puig-Ribera *et al.*, 2020), which demonstrated that regular physical activity improves psychological well-being by reducing symptoms of anxiety and depression. Furthermore, this study corroborates the findings by (Muminović *et al.*, 2022), which emphasized that increased physical activity is crucial for mitigating the negative mental health effects of inactive lifestyles, particularly among the working populations.

Despite the positive relationship between physical activities and mental health, studies by (Li *et al.*, 2022) suggest that the benefits of physical activity may vary based on individual context or activity type. The current study demonstrates a clear and significant positive relationship between physical activities and mental health among formal employees. This indicates that physical activity interventions should be encouraged as part of workplace wellness programs to promote better mental health outcomes.

6. Conclusion

The first research objective sought to explore the relationship between screen time and mental health. This study confirmed a significant yet moderate positive relationship between screen time and mental health. This study partially bridges the gap in the literature that presented mixed findings. While some prior studies (Twenge & Campbell, 2018; Lucena *et al.*, 2022) emphasize the negative effects of excessive screen time, other researchers (Fitzpatrick *et al.*, 2022; Chase *et al.*, 2022) highlighted its benefits when used constructively. The Social Learning Theory (Bandura, 1977) supports the latter by illustrating that not all screen time is detrimental, and its impact depends largely on how screen time is utilised. Thus, this study aligns with previous findings that distinguish between passive and interactive screen time, suggesting the need for a better understanding of digital usage in the context of mental health.

The second research objective addressed the relationship between sleep quality and mental health. This study found sleep quality to be the strongest predictor of mental health, significantly reinforcing existing research that links poor sleep with mental health issues such as anxiety and depression (Gruber *et al.*, 2020; Semenza *et al.*, 2021). By applying the Biopsychosocial Model (Engel, 1977), this study demonstrates how psychological well-being is closely tied to physiological factors like sleep. This insight adds depth to the literature by not only confirming but extending prior knowledge specific to Malaysian formal employees, whose unique occupational stressors exacerbate sleep disturbances. This study also challenges (Diestel *et al.*, 2015) findings by showing that sleep quality has a direct, rather than merely moderating, effect on mental health, further highlighting its importance for targeted workplace interventions.

Finally, the third research objective sought to analyse the relationship between physical activity and mental health. This study shows that physical activity has a substantial positive effect on mental health, which corroborates previous findings (Healy *et al.*, 2023; Puig-Ribera *et al.*, 2020). Grounded in the Biopsychosocial Model (Engel, 1977), this research enhances the understanding of how regular physical activity can reduce

symptoms of anxiety and depression among employees. Although a study by (Li *et al.*, 2022) noted that the effectiveness of physical activity can vary depending on individual contexts, this research provides robust evidence that physical activity consistently enhances the mental health of Malaysian formal employees. This study, therefore, supports workplace wellness initiatives that incorporate physical activity as a significant component of mental well-being.

Hence, this research has successfully bridged key gaps in the literature by validating and expanding upon previous findings. By using theories such as the Social Learning Theory (Bandura, 1977) and Biopsychosocial Model (Engel, 1977), this study has strengthened the argument that mental health among formal employees in Kuala Lumpur is deeply influenced by screen time, sleep quality, and physical activity. These findings will provide essential insights for scholars, policymakers, and corporations looking to implement effective mental health and wellness programs tailored to the needs of Malaysia's formal workforce.

7. Limitations and Further Research

The study concentrated only on formal employees in the capital city of Malaysia. Therefore, it cannot be generalized to all types of workers. Additionally, most of the respondents were from the private sector, who are professionals with comparable lifestyles. Moreover, time constraints may have limited the study's scope and execution, lowering its thoroughness. However, the researchers' capability did not alter the study's outcome. If a longer time period and additional manpower had been allowed, a more detailed study would have emerged.

Future research could significantly broaden its impact by including non-formal employees and expanding the sample size. By doing so, researchers can gain a more comprehensive understanding of how different work environments and job roles can affect mental health, and potentially inform more targeted interventions.

This study used only quantitative methods. Therefore, using mixed methods in future studies would yield a better understanding of workers' mental health concerns. In particular, studying respondents' perspectives and experiences would reveal how workers view and manage mental health.

Future researchers can boost statistical power by expanding sample size to make findings more robust and less susceptible to random variability or chance. They can also better account for sample heterogeneity, such as socio-demographic factors, and include occupational functions. Varying job responsibilities carry varying workloads, hours, and intensities, which might impair workers' mental health. This element would enable more complex analyses and improve study findings.

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Conflict of Interest Statement

The authors affirm that they possess no affiliations or involvement with any organisation or entity that has any financial interests (including honoraria, educational grants, participation in speakers' bureaus, membership, employment, consultancies, stock ownership, or other equity interests; as well as expert testimony or patent-licensing arrangements) or non-financial interests (such as personal or professional relationships, affiliations, knowledge, or beliefs) related to the subject matter or materials addressed in this research paper.

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