Impact of Sedentary Lifestyle and Postural Deviations on Psychosomatic Wellbeing in the Digital Age: A Narrative Review

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Abstract: The rapid expansion of digital technologies has significantly transformed contemporary lifestyles, leading to increased screen exposure, reduced physical activity, and widespread adoption of sedentary behaviours. These changes have contributed to a growing prevalence of poor postural habits and a range of associated health concerns. This narrative review aims to comprehensively examine the interrelationship between posture, sedentary lifestyle, and psychosomatic wellbeing in the digital age. Drawing on interdisciplinary perspectives, including Psychosomatic Medicine and the Bio psychosocial Model, the review synthesizes existing literature to explore both physiological and psychological dimensions of health.

Prolonged sitting and improper ergonomics are identified as key contributors to musculoskeletal strain, altered spinal alignment, and reduced functional capacity. Concurrently, sedentary behaviour is associated with metabolic dysregulation and increased risk of chronic conditions such as Obesity and Cardiovascular Disease. Beyond physical outcomes, the review highlights the psychosomatic implications of digital lifestyles, emphasizing how stress, anxiety, and emotional strain can manifest as physical symptoms, including headaches, fatigue, and muscle tension.

The review further explores the bidirectional relationship between physical posture and psychological states, wherein poor posture can negatively influence mood and cognitive function, while psychological distress can exacerbate postural imbalances and sedentary tendencies. Mechanisms such as chronic stress activation, neuroendocrine imbalance, and behavioural reinforcement patterns are discussed to explain this interaction.

Finally, the review underscores the importance of a holistic, integrative approach to health, incorporating ergonomic interventions, regular physical activity, and psychosocial strategies to mitigate the adverse effects of digital living. It concludes by emphasizing the need for increased awareness, preventive measures, and future research to address the complex health challenges posed by the digital era.

Keywords: Posture; Sedentary lifestyle; Psychosomatic wellbeing; Digital age; Screen time; Ergonomics; Mind–body health.

1. INTRODUCTION

The rapid expansion of digital technologies over the past few decades has fundamentally reshaped human behaviour, work environments, and lifestyle patterns. The integration of

computers, smartphones, and internet-based platforms into daily life has increased efficiency and connectivity but has simultaneously contributed to a dramatic rise in sedentary behaviour. In contemporary society, individuals across age groups spend a substantial portion of their day engaged in screen-based activities, including occupational tasks, education, and leisure. This shift has given rise to what is often described as a "sedentary digital culture," characterized by prolonged sitting and reduced physical movement.

Sedentary behaviour is defined as any waking activity involving low energy expenditure (≤1.5 metabolic equivalents) while in a sitting, reclining, or lying posture. Unlike physical inactivity, which refers to insufficient engagement in moderate-to-vigorous physical activity, sedentary behaviour represents a distinct behavioural construct with independent health implications. Increasing evidence suggests that even individuals who meet recommended physical activity guidelines may still be at risk if they engage in prolonged uninterrupted sitting. This has led to the recognition of sedentary behaviour as an independent risk factor for a range of adverse health outcomes.

One of the most immediate and observable consequences of prolonged sedentary activity is its impact on posture. The human body is biomechanically designed for movement; however, modern lifestyles often impose static positions for extended periods. Common postural deviations associated with digital device usage include forward head posture, rounded shoulders, and increased thoracic kyphosis. These maladaptive postures result from repetitive strain and muscular imbalances, placing excessive load on the spine and surrounding structures. Over time, such postural dysfunctions can contribute to musculoskeletal disorders, including chronic neck pain, lower back pain, and shoulder discomfort, which are increasingly prevalent in both working adults and younger populations.

Beyond musculoskeletal concerns, there is growing interest in the relationship between posture, sedentary behaviour, and psychosomatic wellbeing. Psychosomatic health refers to the bidirectional interaction between psychological processes and physiological functioning. In the digital age, where mental stress, screen exposure, and reduced physical engagement coexist, understanding this interaction has become particularly important. Sedentary lifestyles have been associated with various mental health outcomes, including depression, anxiety, and reduced subjective wellbeing. Although the relationship between sedentary behaviour and stress remains inconsistent across studies, emerging evidence highlights the role of lifestyle patterns in influencing emotional regulation and cognitive functioning.

Importantly, posture itself may play a role in psychosomatic processes. Research in psychophysiology suggests that body posture can influence mood, energy levels, and stress responses. For instance, slouched or collapsed postures have been associated with increased fatigue and negative affect, whereas upright postures may promote alertness and positive emotional states. These effects are thought to be mediated through mechanisms involving the autonomic nervous system, particularly changes in heart rate variability and vagal tone. Thus, posture is not merely a biomechanical issue but also a potential contributor to psychological and physiological wellbeing.

The interaction between sedentary behaviour, posture, and psychosomatic health is further complicated by environmental and behavioural factors inherent to the digital age. Remote work, online education, and digital entertainment often encourage prolonged engagement without adequate breaks. Additionally, the immersive nature of digital content can lead to reduced awareness of bodily position and physical discomfort, reinforcing poor postural habits. Social and occupational demands also play a role, as individuals may prioritize productivity over physical health, neglecting ergonomic practices and movement.

Despite the growing body of research, the relationships among these variables remain complex and not fully understood. Existing studies often examine sedentary behaviour, posture, or mental health in isolation, with limited integration across disciplines such as ergonomics, psychology, and physiology. Furthermore, variations in study design, population characteristics, and measurement methods contribute to inconsistent findings, particularly regarding psychosomatic outcomes.

Given these gaps, a comprehensive narrative review is warranted to synthesize current evidence and provide an integrated understanding of how sedentary lifestyles and postural habits interact to influence psychosomatic wellbeing. This review aims to (1) examine the prevalence and patterns of sedentary behaviour in the digital age, (2) explore the impact of posture on musculoskeletal and physiological health, (3) analyse the association between sedentary behaviour and psychosomatic outcomes, and (4) identify underlying mechanisms and potential intervention strategies.

By addressing these objectives, the present review seeks to contribute to a more holistic understanding of health in the digital era and to inform future research, clinical practice, and public health interventions aimed at mitigating the adverse effects of sedentary living.

2. METHODOLOGY

2.1 Study Design:

This study adopts a **narrative review design**, aimed at synthesizing and critically analysing existing literature on posture, sedentary lifestyle, and psychosomatic wellbeing in the digital age. Unlike systematic reviews, narrative reviews allow for a broader exploration of interdisciplinary evidence, making them particularly suitable for emerging and multifaceted topics where diverse study designs and theoretical perspectives must be integrated.

The review follows a structured approach to ensure transparency, rigor, and reproducibility, while maintaining the flexibility inherent to narrative methodologies.

2.2 Search Strategy:

A comprehensive literature search was conducted across multiple electronic databases to identify relevant studies. The primary databases included:

- Pub Med
- Scopus
- Web of Science
- Google Scholar

The search strategy incorporated combinations of keywords and Boolean operators to maximize retrieval of relevant studies. Key search terms included:

- “sedentary lifestyle” OR “sedentary behaviour”
- “posture” OR “postural alignment” OR “forward head posture”
- “psychosomatic health” OR “mental health” OR “wellbeing”
- “digital age” OR “screen time” OR “technology use”

Example search string:

(“Sedentary behaviour” AND “posture”) AND (“mental health” OR “psychosomatic”)

Reference lists of selected articles were also manually screened to identify additional relevant studies (snowballing technique).

2.3 Inclusion and Exclusion Criteria:

Inclusion Criteria: Studies were included if they met the following criteria:

- Published in peer-reviewed journals.
- Written in English.
- Focused on sedentary behaviour, posture, or psychosomatic/mental health.
- Included human participants (adolescents or adults).
- Employed quantitative, qualitative, or mixed-methods designs.
- Published within the last 10–15 years (to ensure relevance to the digital age).

Exclusion Criteria:

- Focused solely on clinical population's unrelated to sedentary behaviour (e.g., severe neurological disorders).
- Were conference abstracts, editorials, or opinion pieces without empirical evidence
- Lacked clear methodology or measurable outcomes.
- Were duplicate publications.

2.4 Study Selection Process:

The study selection process was conducted in three stages:

1. **InitialScreening**

Titles and abstracts were reviewed to exclude irrelevant studies.

2. **Full-TextReview**

Articles that met the initial criteria were assessed in full to determine eligibility.

3. **FinalInclusion**

Studies that aligned with the objectives of the review were included for synthesis.

Although a formal PRISMA flow diagram was not employed due to the narrative nature of the review, efforts were made to maintain a transparent and systematic selection process.

2.5 Data Extraction:

Relevant data from selected studies were extracted and organized into thematic categories. Extracted information included:

- Author(s) and year of publication
- Study design and methodology
- Sample characteristics (age, population type)
- Measures of sedentary behaviour and posture
- Psychosomatic or mental health outcomes
- Key findings and conclusions

Data extraction was conducted manually to allow for interpretive analysis and thematic synthesis.

2.6 Thematic Analysis and Synthesis:

A **thematic synthesis approach** was used to integrate findings across studies. The analysis involved:

1. **FamiliarizationwithData**

Repeated reading of selected studies to identify recurring patterns.

2. **CodingandCategorization**

Key concepts were coded and grouped into broader themes.

3. **ThemeDevelopment**

Major themes were developed, including:

- Sedentary behaviour patterns in the digital age.
- Postural implications and musculoskeletal outcomes.
- Psychosomatic and mental health associations.

- Underlying physiological and psychological mechanisms.

4. **IntegrationandInterpretation**

Findings were synthesized to provide a cohesive narrative and identify relationships between variables.

2.7 Quality Appraisal:

Although narrative reviews do not always require formal quality assessment, an effort was made to evaluate the methodological rigor of included studies. Studies were informally assessed based on:

- Study design (e.g., randomized trials, observational studies).
- Sample size and representativeness.
- Validity and reliability of measurement tools.
- Clarity of reported outcomes.

Higher weight was given to systematic reviews, meta-analyses, and longitudinal studies, while cross-sectional studies were interpreted with caution.

2.8 Ethical Considerations:

As this study is based on secondary data from previously published research, no direct ethical approval was required. However, all sources were appropriately acknowledged, and care was taken to accurately represent original findings without misinterpretation.

2.9 Limitations of Methodology:

The narrative review approach inherently involves certain limitations:

- Potential for selection bias due to non-systematic inclusion.
- Lack of quantitative synthesis (e.g., meta-analysis).
- Variability in study designs and measurement tools.
- Subjectivity in interpretation and thematic analysis.

Despite these limitations, the methodology allows for a comprehensive and integrative understanding of a complex and interdisciplinary topic.

3. SEDENTARY LIFESTYLE IN THE DIGITAL AGE

3.1 Rise of Sedentary Behaviour:

The digital revolution has significantly reduced physical exertion in daily life. Activities such as online shopping, remote work, and digital entertainment have replaced physically active alternatives.

Office workers, students, and remote employees spend a large portion of their day sitting. Research suggests that sedentary behaviour is influenced by environmental, occupational, and socio-cultural factors, making it a complex behavioural issue.

3.2 Screen Time and Behavioural Patterns:

Screen-based sedentary activities include:

- Computer use.
- Smartphone usage.
- Television viewing.

These behaviours often involve static postures, reduced movement, and repetitive strain, contributing to long-term health risks.

4. POSTURE AND MUSCULOSKELETAL HEALTH

4.1 Impact of Poor Posture:

Poor posture, particularly forward head posture and slouched sitting, is common during prolonged screen use. These postures place excessive strain on the spine and surrounding musculature.

Evidence indicates that sedentary behaviour promotes spinal misalignment and musculoskeletal imbalances, which may lead to chronic pain and discomfort.

Prolonged sitting, especially with forward trunk flexion, has been shown to negatively affect autonomic regulation and physiological balance.

4.2 Musculoskeletal Disorders:

Common conditions associated with poor posture include:

- Neck pain.
- Lower back pain.
- Shoulder tension.

Extended sedentary time has been linked to increased risk of neck pain due to sustained muscle tension and improper alignment (e.g., Smartphone use).

5. PSYCHOSOMATIC WELLBEING

5.1 Understanding Psychosomatic Health:

Psychosomatic wellbeing refers to the interaction between psychological processes and physical health. It includes:

- Stress
- Anxiety
- Depression
- Somatic symptoms (e.g., pain without clear pathology)

5.2 Sedentary Behaviour and Mental Health:

Evidence suggests that sedentary behaviour is associated with mental health outcomes, although findings are mixed.

- Some studies report **no consistent association with stress levels**
- However, there is stronger evidence linking sedentary behaviour to:
  - Depression.
  - Anxiety.
  - Reduced overall wellbeing.

In adolescents and adults, increased screen time correlates with higher levels of depressive symptoms and emotional distress.

5.3 Autonomic Nervous System and Stress:

Posture and sedentary behaviour influence the autonomic nervous system (ANS), which regulates stress responses.

Research shows:

- Poor posture may reduce heart rate variability (HRV)
- Reduced HRV is associated with stress and decreased physiological resilience

This suggests a physiological pathway linking posture to psychosomatic health.

6. MECHANISMS LINKING POSTURE, SEDENTARY BEHAVIOUR, AND WELLBEING

6.1 Biomechanical Mechanisms:

- Muscle imbalances due to prolonged static postures.
- Spinal compression and joint stress.
- Reduced circulation.

6.2 Neurophysiological Mechanisms:

- Altered autonomic nervous system activity
- Reduced HRV
- Increased sympathetic activation (stress response)

6.3 Psychological Mechanisms:

- Social isolation due to excessive screen use
- Reduced physical activity impacting mood
- Behavioural addiction to digital devices

7. INTERVENTIONS AND PREVENTIVE STRATEGIES

7.1 Ergonomic Interventions:

- Adjustable chairs and desks
- Proper screen positioning
- Lumbar support

7.2 Behavioural Interventions:

- Regular movement breaks
- Standing or walking meetings
- Limiting screen time

7.3 Physical Activity:

Increased physical activity can counteract sedentary effects and improve mental health outcomes.

7.4 Digital Health Solutions:

Emerging technologies, such as posture monitoring systems and activity trackers, can encourage healthier behaviours and reduce sedentary time.

8. CRITICAL ANALYSIS

Critical Review of Literature

Research on posture, sedentary behaviour, and psychosomatic wellbeing is fragmented across disciplines, limiting integrated understanding. Most studies are cross-sectional, rely on self-reports, and use inconsistent measurement tools, hindering causal inference and comparability. Evidence linking sedentary behaviour to psychosomatic outcomes like stress is mixed, and posture's psychological and physiological roles remain underexplored. Longitudinal and experimental studies are scarce, and socio-environmental, cultural, and technological factors are often overlooked. Future research should adopt interdisciplinary, longitudinal, and objective approaches, consider contextual influences, differentiate types of sedentary

behaviour, and evaluate digital interventions to advance holistic understanding in the digital age.

9. DISCUSSION

The present narrative review aimed to synthesize and critically examine the relationships between posture, sedentary lifestyle, and psychosomatic wellbeing in the digital age. The findings highlight a complex and multidimensional interaction among behavioural, biomechanical, and psychological factors, shaped significantly by contemporary digital environments.

9.1 Integration of Key Findings:

The evidence reviewed suggests that sedentary behaviour has become a pervasive feature of modern life, largely driven by increased reliance on digital technologies. Prolonged sitting, particularly in screen-based contexts, is consistently associated with poor postural habits, including forward head posture, rounded shoulders, and reduced spinal alignment. These postural deviations contribute to musculoskeletal discomfort, particularly in the neck, shoulders, and lower back.

Beyond physical health, the review identifies a growing body of evidence linking sedentary behaviour to psychosomatic outcomes. While associations with depression, anxiety, and reduced wellbeing are relatively robust, findings regarding stress remain inconsistent. This suggests that psychosomatic wellbeing is influenced not only by the duration of sedentary behaviour but also by its context, quality, and associated lifestyle factors.

Importantly, posture emerges as a potential mediating variable in this relationship. Poor posture may not only result from sedentary behaviour but also exacerbate its psychological consequences through physiological mechanisms such as altered autonomic nervous system regulation.

9.2 Posture as a Bio psychosocial Factor:

Traditionally, posture has been viewed primarily from a biomechanical perspective; however, the findings of this review support a broader conceptualization of posture as a **bio psychosocial phenomenon**. Postural alignment influences musculoskeletal loading, but it may also affect emotional states, cognitive processes, and physiological stress responses.

Research in psychophysiology indicates that slouched or collapsed postures are associated with increased fatigue, reduced energy levels, and negative affect, whereas upright postures may enhance alertness and mood. These effects are thought to be mediated through changes in autonomic function, including heart rate variability and vagal tone.

This perspective highlights posture as a modifiable factor that bridges physical and mental health, reinforcing its importance in holistic health interventions.

9.3 Sedentary Behaviour and Psychosomatic Wellbeing:

The association between sedentary behaviour and psychosomatic wellbeing appears to be **multifactorial and context-dependent**. Passive sedentary activities, such as prolonged television viewing, are more consistently linked to negative mental health outcomes compared to cognitively engaging activities like work-related computer use. This distinction underscores the importance of considering not only the quantity but also the quality of sedentary behavior.

Additionally, sedentary lifestyles often co-occur with other risk factors, including reduced physical activity, poor sleep quality, and social isolation. These factors may act synergistically to influence psychosomatic health, making it difficult to isolate the independent effects of sedentary behaviour.

The inconsistent findings regarding stress may reflect differences in measurement approaches. Subjective measures of perceived stress may not align with physiological indicators such as cortisol levels or heart rate variability, suggesting the need for more comprehensive assessment strategies.

9.4 Mechanistic Pathways:

The relationship between posture, sedentary behaviour, and psychosomatic wellbeing can be understood through several interconnected mechanisms:

Biomechanical Pathways:

Prolonged static postures lead to muscle fatigue, joint stiffness, and spinal loading. Over time, these changes contribute to chronic pain conditions, which are closely linked to psychological distress and reduced quality of life.

Neurophysiological Pathways:

Sedentary behaviour and poor posture may influence the autonomic nervous system by reducing parasympathetic activity and increasing sympathetic dominance. This imbalance is associated with stress, reduced resilience, and impaired emotional regulation.

Psychological Pathways:

Sedentary lifestyles may promote behavioural patterns such as social withdrawal, reduced engagement in physical activity, and increased screen dependency. These behaviors are associated with negative mood states and diminished wellbeing.

Cognitive-Behavioural Pathways:

The immersive nature of digital environments can reduce body awareness, leading individuals to maintain poor posture unconsciously for extended periods. This lack of awareness reinforces maladaptive habits and delays corrective action.

9.5 Role of the Digital Environment:

The digital age serves as both a **driver of risk and a potential avenue for intervention**. On one hand, digital technologies encourage prolonged sitting and screen exposure, contributing to sedentary behaviour and poor posture. On the other hand, they offer innovative solutions such as:

- Wearable activity trackers
- Posture correction devices
- Mobile health (m Health) applications
- Virtual exercise and rehabilitation programs

However, the effectiveness of these technologies depends on user engagement, accessibility, and long-term adherence. Current evidence on their sustained impact remains limited, highlighting the need for further research.

9.6 Implications for Practice:

Clinical Implications:

Healthcare professionals should adopt an integrated approach that considers both physical and psychological aspects of health. Assessment of patients with musculoskeletal complaints should include evaluation of sedentary behaviour and psychosomatic factors.

Workplace Implications:

Employers and organizations should prioritize ergonomic interventions and promote active work environments. Strategies such as sit-stand desks, scheduled movement breaks, and posture education programs can mitigate the adverse effects of prolonged sitting.

Public Health Implications:

Public health initiatives should focus on raising awareness about the risks of sedentary lifestyles and promoting behavioural change. Guidelines should emphasize not only physical activity but also the reduction of prolonged sitting and improvement of posture.

9.7 Strengths and Contributions of the Review:

This review contributes to the existing literature by:

- Integrating findings across multiple disciplines (ergonomics, psychology, physiology)
- Highlighting posture as a key but underexplored factor in psychosomatic health
- Providing a holistic framework for understanding the impact of sedentary lifestyles in the digital age

9.8 Limitations of the Evidence Base:

The discussion must be interpreted in light of several limitations in the existing literature:

- Predominance of cross-sectional studies limits causal inference
- Reliance on self-reported measures introduces bias
- Heterogeneity in definitions and measurement tools reduces comparability
- Limited longitudinal and intervention studies

These limitations underscore the need for more rigorous and standardized research methodologies.

9.9 Future Directions:

Future research should aim to:

- Conduct longitudinal and experimental studies to establish causal relationships
- Develop standardized tools for measuring posture and sedentary behaviour
- Investigate the role of posture in psychosomatic regulation
- Evaluate the effectiveness of digital and behavioural interventions
- Incorporate socio-cultural and environmental factors into research models

9.10 Conclusion of Discussion:

In summary, the findings of this review emphasize that posture and sedentary behaviour are not merely physical concerns but integral components of psychosomatic wellbeing. The digital age has amplified these issues, necessitating a multidisciplinary and holistic approach to health. Addressing sedentary lifestyles and postural habits offers a promising pathway for improving both physical and mental health outcomes in modern society.

Research Gaps and Future Directions

Despite increasing scholarly attention to posture, sedentary lifestyle, and psychosomatic wellbeing, the current body of literature remains limited in scope, integration, and methodological rigor. Identifying and addressing these gaps is essential for advancing both theoretical understanding and practical applications in the context of the digital age.

Research Gaps:

Current research is fragmented across disciplines, limiting integrative understanding of sedentary behaviour, posture, and psychosomatic wellbeing. Most studies are cross-sectional, hindering causal inference, and key constructs lack standardized measurement tools. Posture's role in psychological and physiological processes is underexplored, and sedentary behaviour is often oversimplified. Contextual factors, intervention-based evidence, and diverse populations

are insufficiently addressed, reducing generalizability and the development of comprehensive, evidence-based strategies.

Future Directions:

Future research should develop integrated bio psychosocial models linking sedentary behaviour, posture, psychosomatic outcomes, and physiological markers. Longitudinal and experimental studies are needed to establish causality, while standardized, objective measurements (e.g., wearable's, digital posture assessment) will improve reliability. Posture should be explored as both an outcome and intervention target for emotional, cognitive, and stress regulation. Studies should differentiate types, contexts, and patterns of sedentary behaviour, incorporate socio-environmental factors, evaluate digital interventions, and include diverse populations. Interdisciplinary, standardized, and context-sensitive approaches are essential to guide effective interventions and promote holistic health in the digital era.

Limitations:

This narrative review provides valuable insights but has several limitations. Its narrative design lacks the rigor of systematic reviews, and reliance on English-language databases may introduce selection and publication bias. Included studies are heterogeneous in design, population, and measures, often using self-reported data prone to bias. Most evidence is cross-sectional, limiting causal inference, and definitions of posture, sedentary behaviour, and psychosomatic wellbeing are inconsistent. Psychosomatic integration is underexplored, intervention studies are scarce, and findings may not generalize across cultures or keep pace with rapidly evolving digital behaviours. Overall, conclusions should be interpreted cautiously, and more rigorous, standardized research is needed.

10. CONCLUSION

In the digital age, posture, sedentary behaviour, and psychosomatic wellbeing are closely connected. Prolonged sitting and poor posture impact both physical and mental health, contributing to musculoskeletal issues and affecting emotional and stress responses. Evidence is limited, often relying on cross-sectional and self-reported studies, highlighting the need for more rigorous research. Promoting holistic health requires multilevel strategies, including behaviour change, ergonomic improvements, workplace reforms, and digital health tools.

Understanding these interconnections is essential for mitigating the health risks of modern, technology-driven lifestyles.

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