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Understanding and Misconceptions of Sedentary Behaviour Among University Students: Implications for Global Public Health

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Abstract:

- ***Background:***
Sedentary behaviour has emerged as a growing public health concern among young adults, particularly university students, due to its association with multiple adverse health outcomes, including obesity, cardiovascular disease, and mental health challenges. Despite increasing awareness globally, misconceptions and inadequate knowledge about sedentary behaviour persist among students in higher education settings.

- ***Aim:***
To assess the knowledge and perception of the health outcomes of sedentary behaviour among students at the University of Salford, Manchester.

- ***Methodology:***
A descriptive cross-sectional study was conducted using a quantitative research design. Data were collected through an online self-administered questionnaire distributed via the JISC platform. A total of 104 participants were recruited using convenience sampling from different schools and levels of study. The survey evaluated participant demographics, sedentary behaviour knowledge, and related health consequences. Data were analysed using descriptive statistics and Chi-square tests to determine associations between variables.

- ***Results:***
Findings revealed moderate knowledge of sedentary behaviour among students, with significant misconceptions regarding its definition and health risks. Fewer respondents were aware that extended sitting is a risk factor for disease in and of itself, even though the majority acknowledged the negative effects of physical inactivity. Knowledge varied across academic disciplines, with health-related students demonstrating higher awareness levels.

- ***Discussion:***
The results align with global and European studies indicating persistent knowledge gaps about sedentary behaviour among university populations. Similar findings have been observed in studies from the United Kingdom and continental Europe, suggesting the need for targeted educational interventions and university-level health promotion strategies to address misconceptions and encourage behavioural change.

- ***Conclusion:***
Although students demonstrate partial awareness of sedentary behaviour and its health effects, substantial gaps remain in understanding its independent health risks. Universities should prioritise targeted awareness campaigns, integrate sedentary behaviour education into curricula, and create supportive environments to reduce sitting time.

Keywords: *Cross-Sectional Study, Health Outcomes, Knowledge, Perception, Physical Activity, Public Health, Sedentary Behavior, United Kingdom, University Students, University of Salford.*

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I. INTRODUCTION

Sedentary behaviour (SB) is defined as any waking behaviour characterized by an energy expenditure of ≤1.5 metabolic equivalents (METs) while in a sitting, reclining, or lying posture (Tremblay et al., 2017). SB encompasses activities such as sitting while studying, screen time, driving, or socializing while seated. Importantly, SB is conceptually distinct from physical inactivity, which refers to not meeting recommended levels of moderate-to-vigorous physical activity (MVPA), typically at least 150 minutes of moderate activity per week (World Health Organization [WHO], 2020). A person can be physically active yet highly sedentary if prolonged sitting dominates their waking hours (Owen et al., 2020).

This distinction is essential for understanding misconceptions about SB. Many individuals, including university students, believe that regular exercise offsets the harms of sitting; however, evidence suggests that high volumes of sitting independently predict adverse health outcomes even among those meeting activity guidelines (Ekelund et al., 2019). The Sedentary Behaviour Research Network (SBRN) conceptual framework emphasizes that SB must be examined as an independent exposure with unique determinants, correlates, and health effects.

Measurement of SB remains a key methodological challenge in behavioural epidemiology. Traditionally, SB has been assessed through self-reported questionnaires such as the Sedentary Behaviour Questionnaire (SBQ) or the International Physical Activity Questionnaire (IPAQ), which capture self-estimated sitting time across different domains (Rosenberger et al., 2020). However, self-reports are prone to recall and social desirability biases, often underestimating true sedentary time.

Recent advances have introduced objective measurement tools, such as accelerometers and inclinometers (e.g., ActivPAL, ActiGraph), which provide reliable and continuous data on posture and movement intensity (Edwardson et al., 2018). Nonetheless, discrepancies between self-reported and device-measured data remain substantial, highlighting a need for integrated approaches. For instance, Roberts et al. (2024) found that UK university students self-reported approximately 6–7 hours of daily sitting, while accelerometer data indicated averages closer to 10–11 hours.

Measurement accuracy is critical not only for epidemiological estimates but also for identifying and correcting misconceptions. Students often underestimate sedentary time because they equate "productive sitting" (e.g., studying) with non-sedentary activity (Wood et al., 2024). Clear operational definitions and accurate monitoring are therefore central to both research validity and health education.

Globally, SB has reached epidemic proportions, with young adults representing one of the most sedentary population groups. Meta-analytic data suggest that university students spend 6–9 hours per day sitting, often exceeding recommended thresholds (Castro et al., 2020). Regional disparities exist: students in high-income countries such as the UK and across Europe report higher daily sitting times than peers in low- and middle-income regions, possibly due to differences in digital learning environments, transportation, and leisure patterns (Edelmann et al., 2022).

In the European context, cross-sectional studies demonstrate that up to 70% of students engage in ≥8 hours of daily sitting, with substantial variations by discipline, academic workload, and gender. German and Finnish university surveys report mean sitting times of 8.2–9.1 hours per day (Edelmann et al., 2022), while UK-based investigations indicate averages of 8.5–10 hours (Roberts et al., 2024). The COVID-19 pandemic further exacerbated SB levels due to remote learning and digitalization (Barbosa et al., 2024).

Sociocultural factors also influence patterns of sedentary behaviour. European and UK students often view sitting as a normative aspect of academic culture, equating long study sessions with diligence and achievement (Wood et al., 2024). These cultural values, combined with technological dependence, reinforce the misconception that prolonged sitting is an unavoidable or even beneficial component of academic success.

The detrimental health impacts of SB are mediated through complex physiological, metabolic, and psychosocial pathways. Mechanistically, prolonged sitting reduces skeletal muscle contractions, leading to decreased glucose uptake and insulin sensitivity (Owen et al., 2020). This results in elevated postprandial glucose and triglyceride levels, promoting the development of metabolic syndrome, obesity, and type 2 diabetes mellitus (Ekelund et al., 2019). Chronic exposure to sedentary time also induces endothelial dysfunction and impaired vascular shear stress, contributing to cardiovascular disease risk.

From a psychosocial perspective, SB has been associated with mental health challenges, including depression, anxiety, and decreased life satisfaction. A large cross-sectional study of European university students found that sedentary behaviour during the COVID-19 pandemic correlated strongly with poorer mental well-being, particularly among those not engaging in regular physical activity (Barbosa et al., 2024). These findings underscore the compounded risk of physical and mental health deterioration when sedentary lifestyles become habitual.

Furthermore, SB affects cognitive and academic outcomes. While students perceive prolonged sitting as enhancing focus, emerging evidence indicates the opposite.

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Frequent breaks and light physical activity improve concentration, memory retention, and executive function (Dunstan et al., 2021). Misconceptions that equate immobility with productivity thus perpetuate patterns that undermine both health and learning efficiency.

The global burden of non-communicable diseases (NCDs) continues to rise, and SB has emerged as a modifiable behavioural risk factor within this context (WHO, 2020). Addressing misconceptions about sedentary behaviour among university students is therefore integral to preventive public health strategies. Universities serve as microcosms for future adult populations; interventions that reshape sedentary norms in academic environments can yield long-term population health dividends.

At the global level, WHO's 2020 Guidelines on Physical Activity and Sedentary Behaviour emphasize minimizing sedentary time and incorporating regular movement throughout the day. Yet, awareness and implementation of these recommendations remain limited in tertiary institutions. Correcting conceptual misunderstandings and integrating movement-friendly educational policies—such as active classrooms, standing desks, and movement breaks—could form part of a broader agenda to mitigate the health risks associated with sedentary lifestyles.

II. METHODOLOGY

This study adopted a convergent mixed-methods cross-sectional design to assess knowledge, perceptions, and misconceptions of sedentary behaviour among university students in Manchester, United Kingdom. The combination of quantitative and qualitative approaches provided both measurable trends and contextual insights.

The research was carried out across three universities: The University of Manchester, Manchester Metropolitan University, and the University of Salford. Participants included full-time undergraduate and postgraduate students aged 18 years and above. Those with medical conditions limiting physical activity were excluded.

A multistage stratified random sampling method was used for the quantitative phase, stratifying by faculty and study level. Using standard sample size determination, 104 participants were required, and 182 responses were obtained. For the qualitative component, six focus group discussions and fifteen semi-structured interviews were conducted using purposive sampling until data saturation.

Quantitative data were collected through a self-administered online questionnaire distributed via the JISC platform. The tool included sections on knowledge of sedentary behaviour, perceptions, health impacts, and demographics, and demonstrated good reliability after pilot testing.

Qualitative data were gathered through semi-structured interviews and focus group discussions, exploring students' beliefs, misconceptions, and contextual influences. All sessions were recorded, transcribed, and anonymised.

Quantitative data were analysed using SPSS version 29 for descriptive and inferential statistics, including Chi-square tests, t-tests, and logistic regression to identify predictors of misconceptions and sedentary behaviour.

Qualitative data were subjected to thematic analysis using NVivo 14, and integration of both strands occurred through comparative interpretation of findings to ensure depth and validity.

III. RESULTS

These are the findings from the quantitative analysis of the study on sedentary behaviour among university students in Manchester. Descriptive statistics were used to summarise demographic characteristics, knowledge, perceptions, and health outcomes. Associations between socio-demographic factors and knowledge levels were assessed using the Chi-square test. A total of 104 valid responses were included in the final analysis.

Data were exported from the JISC survey platform to Microsoft Excel, cleaned to remove incomplete or "Not Applicable (N/A)" entries, and then imported into SPSS version 24. Demographic variables were coded numerically, and Likert-scale responses were dichotomised for inferential analysis ("Agree = 1", "Disagree = 2").

Of the 104 respondents, 39.4% were male and 56.8% were female. Participants ranged from 15 to 45 years, with the majority (26.9%) aged 31–35 years. Most respondents were postgraduate students (64.4%), and the highest proportion were from the School of Health and Society (34.6%). (Table 1)

Table 1 Socio-Demographic Data (N = 104)

Variable	Frequency	Percentage (%)
Gender		
Male	41	39.4
Female	59	56.8
Age (years)		
15–20	7	6.7
21–24	27	26.0
25–30	25	24.1
31–35	28	26.9

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36–40	7	6.7
41–45	10	9.7
Level of Education		
Undergraduate	37	35.6
Postgraduate	67	64.4
School of Study		
Arts, Media & Creative Technology	18	17.3
Business Science	19	18.3
Health & Society	36	34.6
Science, Engineering & Environment	28	27.0

Most participants recognised that prolonged sitting is harmful to health (94.2 %) and agreed that studying or working while lying down constitutes sedentary behaviour (87.5%). Only 39.4 % incorrectly identified sleeping at night as sedentary behaviour. (Figure 1)

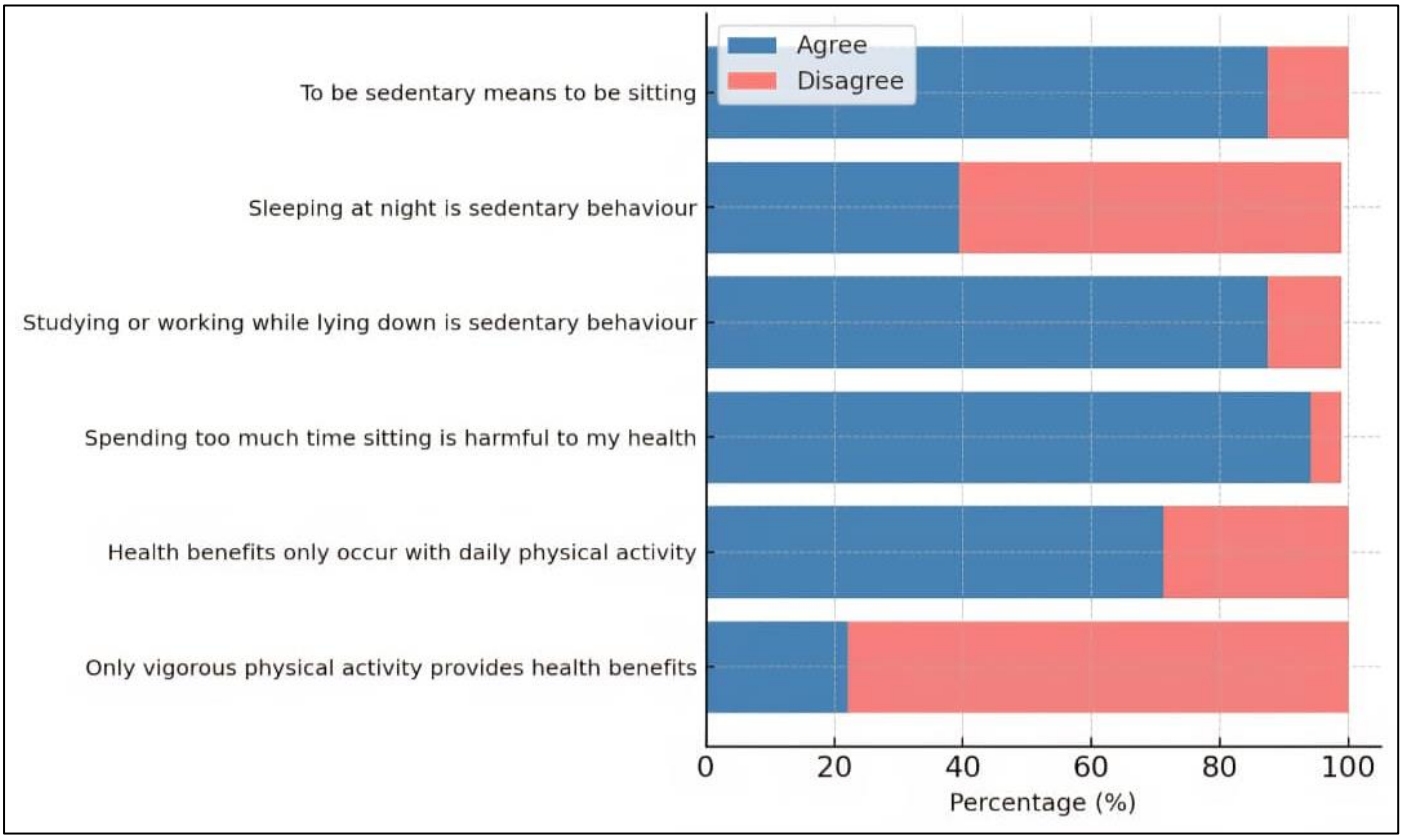

Fig 1 Knowledge on Sedentary Behaviour and Physical Activity Among Respondents (N = 104)

Each bar represents the percentage of respondents who agreed or disagreed with statements related to sedentary behaviour and physical activity.

For the amount of physical activity needed for health benefits, most respondents (35.6%) correctly identified 150 minutes of moderate-intensity activity on ≥ 5 days/week, while 21% reported unawareness of the guidelines. (Table 2)

Table 2 Awareness of Physical Activity Recommendations (N = 104)

Recommended Activity Pattern	Frequency	Percentage (%)
150 min moderate intensity × 5 days/week	37	35.6
150 min every day	22	21.2
75 min vigorous × 5 days/week	9	8.7
75 min vigorous × 2 days/week	14	13.5
Not aware	22	21.0

Cardiovascular disease (80.8%), overweight/obesity (77.9%), and depression (65.4%) were the most frequently identified health outcomes linked to sedentary lifestyles. (Figure 2)

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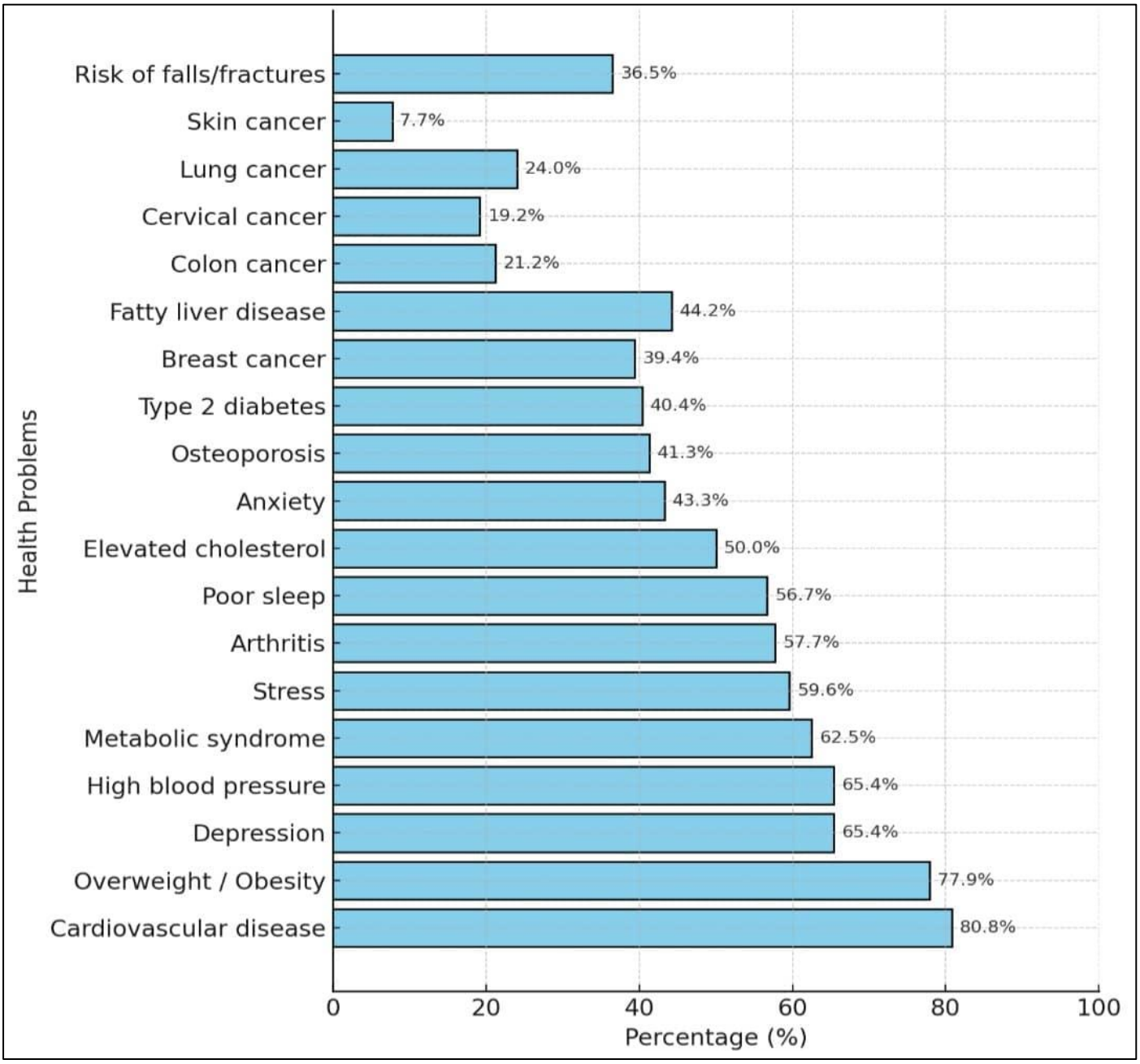

Fig 2 Reported Health Problems Associated with Sedentary Lifestyle Among University Students (N = 104)

Data illustrate the proportion of respondents (N = 104) who identified specific health problems associated with sedentary lifestyles. Multiple responses were allowed, and percentages were calculated based on total participants.

Most respondents recognised that sitting for prolonged periods increases the risk of obesity (88.5%) and cardiovascular disease (73.1%), but fewer linked sedentary time with colon cancer (21.2%). (Table 3)

Table 3 Knowledge of Health Outcomes Associated with Sedentary Behaviour (N = 104)

Health Outcome	High Increased Risk n (%)	No Increased Risk n (%)	Don't Know n (%)
Cardiovascular disease	76 (73.1)	18 (18.3)	8 (7.7)
Type 2 diabetes	40 (38.5)	36 (34.6)	27 (26.0)
Colon cancer	22 (21.2)	48 (36.2)	33 (31.7)
Depression	71 (68.3)	18 (17.3)	14 (13.5)
Overweight/obesity	92 (88.5)	8 (7.7)	2 (1.9)

The Chi-square test showed that age ($p = 0.016$) and school of study ($p = 0.010$) were significantly associated with knowledge of sedentary behaviour and physical activity, while gender and education level were not. (Figure 3)

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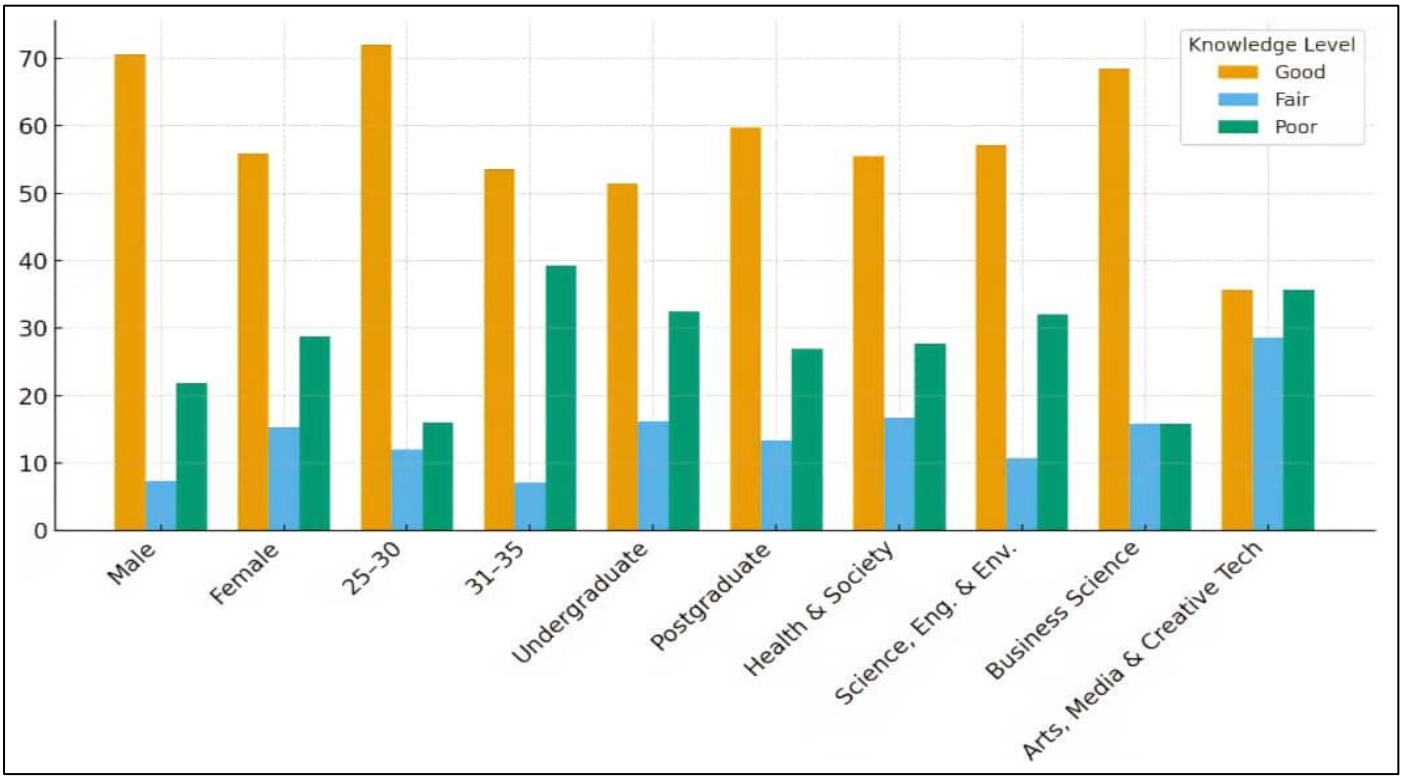

Fig 3 Relationship Between Socio-Demographic Characteristics and Knowledge Levels Among Respondents (N = 104)

Data represent the distribution of knowledge levels (Good, Fair, Poor) across socio-demographic variables. Percentages were calculated based on total respondents within each category.

Significant gender-based differences were found in multiple perceptions related to sedentary behaviour ($p < 0.01$ across domains). (Table 7)

Table 4 Gender vs. Knowledge on Sedentary Behavior/Physical Activity

Variable	χ^2 Value	df	p-value
To be sedentary means sitting	51.88	6	0.001
Sleeping at night is sedentary behaviour	57.40	12	0.001
Studying/working while lying down is sedentary	55.90	12	0.001
Spending too much time sitting is harmful	53.90	9	0.0001
Daily physical activity needed for benefits	55.10	9	0.0001
Only vigorous activity beneficial	41.38	12	0.0001

Strong associations were found between gender and knowledge of health risks associated with sedentary behaviour ($p < 0.05$), except for overweight and obesity ($p = 0.59$). (Table 4)

Table 5 Gender vs. Knowledge of Health Outcomes Associated with Sedentary Behaviour

Health Outcome	χ^2 Value	df	p-value
Cardiovascular disease	24.75	15	0.053
Type 2 diabetes	43.99	15	0.0001
Colon cancer	72.68	15	0.0001
Depression	45.50	15	0.0001
Overweight / obesity	7.45	9	0.59

Almost all respondents agreed that regular physical activity is beneficial. The relationship between gender and this perception was statistically significant ($p = 0.0001$). (Table 5)

Table 6 Gender vs. Perception of Regular Physical Activity as Beneficial

Gender	Very Beneficial n (%)	Not Beneficial n (%)	Don't Know n (%)	χ^2	df	p-value
Male	39 (95.0)	2 (5.0)	0 (0.0)	41.39	12	0.0001
Female	57 (96.6)	1 (1.7)	1 (1.7)			
Prefer not to say	3 (75.0)	0 (0.0)	1 (25.0)			

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IV. DISCUSSION

This Manchester/Salford study found that students are highly aware that prolonged sitting is harmful (94.2%) and generally understand study-related postures (87.5%) as sedentary behaviour, yet notable gaps remain: many students confuse sleep with sedentary time, a sizable minority lack familiarity with national guideline specifics, and cancer risks (particularly colon and other cancers) are poorly recognised. Knowledge varied significantly by age and school of study, and several perception items showed gender differences. Taken together, the pattern is one of broad general awareness but persistent, targetable misconceptions and subgroup heterogeneity.

Our finding of high general awareness that "sitting is harmful" mirrors large syntheses showing that many university students report knowledge of sedentary risks, yet still underappreciate the nuance of the exposure (e.g., the difference between SB and physical inactivity) (Castro et al., 2020; Chaput et al., 2020). Castro et al.'s meta-analysis documented that self-reported sedentary time in student's averages ~7.3 hours/day and is substantially higher when measured objectively; that high exposure occurs despite general awareness of harmfulness (Castro et al., 2020). Similarly, global reviews emphasise knowledge gaps about the dose–response relationship and disease specificity consistent with the weaker recognition of cancer risks in your sample (Park et al., 2020; Ekelund et al., 2019).

Qualitative UK work also echoes our results: students verbalise that they know sitting is "bad" but prioritise uninterrupted seated study for perceived productivity reasons (Wood et al., 2024). That tension between health knowledge and study-driven sitting is well-documented internationally and helps explain why awareness alone has limited effect on reducing sedentary time (Babaeer et al., 2022; Runacres et al., 2021).

The significant association we observed between school of study and knowledge (health-related students scoring higher) aligns with European and UK data that discipline and curriculum exposure shape health literacy and behaviour (Edelmann et al., 2022; Savage et al., 2024). Studies in Germany and other European samples report similar clustering: students in health and life-science faculties typically show better knowledge and healthier activity profiles than those in arts or computing disciplines (Edelmann et al., 2022; Hoffmann et al., 2025).

Gender differences in several perception items in our study reflect the mixed pattern in the literature: some studies show women reporting higher health awareness but also more sedentary time for certain domains, and men sometimes reporting greater confidence in activity knowledge despite differing behaviour (Subirón-Valera et al., 2023; Savage et al., 2024). These sex/gender nuances imply interventions should be tailored, not one-size-fits-all, since cognitive framing and social norms differ by subgroup (Brown et al., 2024).

Our age findings (variation across bands rather than uniform youth homogeneity) echo longitudinal evidence that movement behaviours and their determinants change across the early-adult life course, influenced by workload, living arrangements, and transition phases (Heller et al., 2023; Savage et al., 2024).

A consistent methodological theme in SB research and one that tempers cross-study comparisons is measurement choice. Self-report surveys (used here) capture perceptions and domain-specific context but systematically underestimate total sedentary time compared with accelerometers or inclinometers (Castro et al., 2020; Carpenter et al., 2021). The literature therefore cautions against interpreting absolute sitting hours from survey data; instead, such instruments are strongest for relative comparisons and assessing knowledge/perception (Edwardson et al., 2018; Rosenberger et al., 2020). Where available, device sub-studies reveal substantially higher sitting (often 9–10+ hours/day in students) and show different temporal patterns (longer uninterrupted bouts) that self-report misses (Castro et al., 2020; Daniels et al., 2024).

Because our study's primary aim was knowledge and perception, the online self-report approach was appropriate. Still, future Manchester work would benefit from a device-measured subsample (activPAL or thigh-worn devices recommended for posture detection) to triangulate behavioural estimates and to examine whether specific misconceptions predict objectively measured prolonged bouts (Edwardson et al., 2018; Carpenter et al., 2021).

Respondents most often linked SB with cardiometabolic outcomes (obesity, CVD, and metabolic syndrome), a pattern observed in other student and general-population studies where cardiovascular messages dominate public-health communications (Park et al., 2020; Runacres et al., 2021). Conversely, the weaker link between SB and certain cancers (colon, breast) in our sample reflects broader public unfamiliarity with more complex or less intuitive disease relationships; epidemiological syntheses suggest associations between high sedentary time and some cancers, but these links are less emphasised in lay messaging (Ekelund et al., 2019; Park et al., 2020). Education campaigns that broaden the disease framing (beyond weight/CVD) while avoiding alarmism may be warranted.

Our finding that depression was widely recognised as linked to sedentary behaviour (68.3%) aligns with pandemic-era studies that documented a close relationship between increased sitting and poorer mental health among students (Runacres et al., 2021; Hermassi et al., 2021). Emerging longitudinal work also suggests mental health status can be both a cause and consequence of sedentary patterns in students, indicating the need for interventions cognizant of bidirectionality (Savage et al., 2024; Brown et al., 2024).

Two practical, evidence-aligned directions emerge. First, message refinement: public-health communications on campus should keep the clear, simple message that sitting is harmful but must also target key misconceptions: (1) clarify

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that SB ≠ sleep; (2) state that meeting MVPA guidelines does not entirely eliminate risks of prolonged sitting unless daily sitting is also broken up; and (3) provide concrete micro-prescriptions (e.g., short activity breaks every 30 minutes) supported by experimental studies showing physiological and cognitive benefits of interrupted sitting (Dunstan et al., 2021; Chaput et al., 2020).

Second, environmental and educational design: interventions in university settings that combine environmental changes (sit-stand desks, standing/active learning spaces), digital nudges (timed prompts), and curricular integration (brief activity breaks during seminars) show promise in feasibility and short-term reductions in sitting (Kellner et al., 2023; Visier-Alfonso et al., 2025; MacDonald et al., 2023). Messenger-based and digital interventions have delivered modest reductions in sitting among students in recent trials (Kellner et al., 2023). Evidence also points to the acceptability of embedding movement into study practices if framed to preserve productivity, an important consideration given students' productivity concerns (Wood et al., 2024).

Policy-level actions at the university scale (guidance for hybrid/online teaching, ergonomic provision in libraries, promotion of active transport) can further shift the normative environment that currently normalises long study-related sitting (Edelmann et al., 2022; Brown et al., 2024).

V. CONCLUSION

This study revealed that although most university students in Manchester are aware of the health risks linked to prolonged sitting, misconceptions remain—especially in distinguishing sedentary behaviour from physical inactivity and understanding disease associations like cancer. Awareness varied across demographics, indicating uneven health literacy. Consistent with global and European findings, knowledge alone was insufficient to change behaviour. Targeted education, supportive environments, and active learning strategies are essential to reduce sedentary time. Universities should implement evidence-based, movement-friendly initiatives to enhance student health and reduce the long-term public health burden of sedentary lifestyles.

RECOMMENDATIONS

Based on the findings of this study and supporting global and European evidence, the following key recommendations are proposed:

- Targeted Health Education: Universities should integrate sedentary behaviour education into student orientation, health promotion programmes, and course curricula, emphasizing the difference between sedentary behaviour and physical inactivity, the health risks involved, and practical strategies to reduce sitting time.
- Discipline-Specific Interventions: Since knowledge levels vary by academic field, tailored interventions should be developed. Health-related faculties may serve as peer champions, while non-health faculties could benefit from discipline-appropriate messaging linking reduced sitting to improved focus and productivity.
- Environmental Modifications: Introduce movement-supportive environments such as adjustable sit-stand desks, active classrooms, standing meeting areas, and prompts in libraries and computer labs to encourage posture variation and reduce prolonged sitting.
- Behavioural Change Strategies: Incorporate digital nudges, app-based reminders, and micro-break prompts encouraging students to stand, stretch, or walk briefly during long study periods. These should align with behavioural insights that support habit formation.
- Institutional and Policy Support: Universities should adopt health-promoting policies that recognise excessive sedentary time as a risk factor, include ergonomic provisions in student workspaces, and support active transport and movement breaks during academic sessions.
- Further Research: Future studies should employ mixed methods and device-based monitoring (e.g., activPAL or accelerometers) to validate self-reported sitting time and explore how misconceptions influence actual behaviour. Longitudinal and intervention studies are particularly needed in UK university settings.
- Mental Health Integration: Given the link between sedentary time and psychological well-being, interventions should integrate physical activity promotion with mental health initiatives, ensuring holistic student wellness.

Reducing sedentary behaviour among university students requires a coordinated strategy that combines education, environment, behaviour change, and policy. By addressing misconceptions and embedding movement into everyday academic life, universities can play a pivotal role in improving long-term health outcomes.

➢ *Ethical Considerations*

Ethical approval was obtained from the University of Salford Research Ethics Committee. Informed consent was obtained electronically, participation was voluntary, and confidentiality and data protection were ensured in line with institutional and GDPR standards.

➢ *Strengths and Limitations of this Study*

- Strength: The study provides a clear snapshot of knowledge and misconceptions in a Manchester student population and triangulates demographic determinants to produce actionable subgroup insights. The mixed-university sampling increases local representativeness across academic disciplines.
- Limitations: the reliance on self-report data constrains behavioural quantification (self-report underestimates sitting vs. device measures). Sample size is modest and may limit detection of smaller effects and generalisability beyond Manchester. Cross-sectional design precludes causal inference; longitudinal designs would better examine how misconceptions predict future behaviour.

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