

THE ASSOCIATION BETWEEN SCREEN TIME,
PERCEIVED STRESS, MINDFUL EATING AND BODY
MASS INDEX (BMI) AMONG AEROSPACE ENGINEERING
STUDENTS IN UNIVERSITY SAINS MALAYSIA.

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by

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Dissertation submitted in fulfilment
of the requirements for the degree
of Bachelor of Health Science (Honour) (Dietetics)

June 2026

ACKNOWLEDGEMENTS

In the name of Allah, the Most Gracious and the Most Merciful.

First and foremost, I would like to express my deepest gratitude to Allah SWT for His blessings, strength, and guidance throughout the completion of this thesis.

I would like to extend my sincere appreciation to my supervisor, Dr. David Joseph Pereira for his invaluable guidance, patience, encouragement, and continuous support throughout the research process. His insightful comments and constructive suggestions have greatly contributed to the successful completion of this study.

I would also like to express my sincere gratitude to all respondents who willingly participated in this study. Their cooperation and valuable contribution made this research possible. In addition, I would like to extend my heartfelt appreciation to my friend, Thinej A/L Thiagarajan, for his invaluable assistance in collecting data from respondents from the School of Aerospace Engineering. His support and cooperation greatly contributed to the successful completion of this study.

Special thanks are extended to my beloved family for their endless love, prayers, understanding, and unwavering support throughout this journey. Their encouragement has been a constant source of strength and motivation.

Last but not least, I wanna thank me. I wanna thank me for believing me. I wanna thank me for doing all this hard work, I wanna thank me for having no days off, I wanna thank me for never quitting, I wanna thank me for always being a giver and trying to give more than I receive, I wanna thank me for trying to do more right than wrong, I wanna thank me for just being me all time.

May Allah SWT bless everyone who has contributed directly or indirectly to the completion of this study.

Thank you.

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LIST OF ABBREVIATIONS

BMI Body Mass Index

DV Dependent Variable

IV Independent Variable

JEPeM Human Research Ethics Committee Universiti Sains Malaysia

MEQ Mindful Eating Questionnaire

PSS Perceived Stress Scale

SD Standard Deviation

SPSS Statistical Package for the Social Sciences

USM Universiti Sains Malaysia

WHO World Health Organization

**HUBUNGAN ANTARA MASA SKRIN, TEKANAN YANG DIRASAI,
PEMAKANAN BERKESADARAN DAN INDEKS JISIM BADAN (BMI)
DALAM KALANGAN PELAJAR KEJURUTERAAN AEROSPACE DI
UNIVERSITI SAINS MALAYSIA**

ABSTRAK

Obesiti dalam kalangan pelajar universiti telah menjadi isu kesihatan awam yang semakin membimbangkan disebabkan oleh pelbagai faktor tingkah laku dan psikologi yang boleh mempengaruhi berat badan. Oleh itu, kajian ini bertujuan untuk menentukan hubungan antara masa skrin, tekanan yang dirasakan, pemakanan berkesedaran dan indeks jisim badan (BMI) dalam kalangan pelajar Kejuruteraan Aeroangkasa di Universiti Sains Malaysia, Kampus Kejuruteraan. Kajian keratan rentas ini melibatkan seramai 98 orang pelajar prasiswazah. Data dikumpulkan menggunakan soal selidik atas talian yang ditadbir sendiri yang merangkumi maklumat sosiodemografi, penilaian masa skrin, *Perceived Stress Scale* versi Bahasa Melayu (PSS-10), dan *Mindful Eating Questionnaire* versi Bahasa Melayu (MEQ-M). Berat badan dan ketinggian dilaporkan sendiri oleh responden dan digunakan untuk mengira BMI. Statistik deskriptif digunakan untuk menghuraikan ciri-ciri responden, manakala analisis korelasi Spearman digunakan untuk menentukan hubungan antara pemboleh ubah kajian. Purata umur responden ialah 22.47 ± 1.12 tahun dengan purata BMI sebanyak 23.21 ± 4.88 kg/m². Kebanyakan responden terdiri daripada pelajar lelaki (60.2%), berbangsa Melayu (43.9%), dan berada dalam Tahun 3 pengajian (56.1%). Lebih separuh daripada responden mempunyai BMI normal (51.0%). Purata skor tekanan yang dirasakan, skor masa skrin dan skor pemakanan berkesedaran masing-masing ialah 18.86 ± 4.82 , 19.04 ± 7.47 dan 70.61 ± 6.07 . Terdapat hubungan positif yang signifikan antara masa skrin dan tekanan yang dirasakan ($r_s = 0.338$, $p < 0.001$). Sebaliknya, tiada hubungan yang signifikan ditemui antara masa skrin dan pemakanan berkesedaran ($r_s = -0.154$, $p = 0.131$), masa skrin dan BMI ($r_s = -0.095$, $p = 0.353$), tekanan yang dirasakan dan pemakanan berkesedaran ($r_s = -0.100$, $p = 0.329$), serta pemakanan berkesedaran dan BMI ($r_s = -0.041$, $p = 0.688$). Walau bagaimanapun, tekanan yang dirasakan didapati mempunyai hubungan negatif yang signifikan dengan BMI ($r_s = -0.276$, $p = 0.006$), menunjukkan bahawa responden yang mempunyai skor tekanan yang dirasakan lebih tinggi cenderung mempunyai nilai BMI yang lebih rendah. Kesimpulannya, tekanan yang dirasakan mempunyai hubungan yang signifikan dengan BMI dalam kalangan pelajar Kejuruteraan Aerospace, manakala masa skrin dan pemakanan berkesedaran tidak menunjukkan hubungan yang signifikan dengan BMI. Selain itu, peningkatan masa skrin dikaitkan dengan tahap tekanan yang dirasakan yang lebih tinggi. Dapatan kajian ini menekankan kepentingan mempertimbangkan faktor psikologi dalam memahami status berat badan dalam kalangan pelajar universiti dan dapat menyumbang kepada pembangunan strategi promosi kesihatan yang disasarkan kepada populasi ini.

THE ASSOCIATION BETWEEN SCREEN TIME, PERCEIVED STRESS, MINDFUL EATING AND BODY MASS INDEX (BMI) AMONG AEROSPACE ENGINEERING STUDENTS IN UNIVERSITY SAINS MALAYSIA.

ABSTRACT

Obesity among university students has become an important public health concern due to various behavioural and psychological factors that may influence body weight. Therefore, this study aimed to determine the associations between screen time, perceived stress, mindful eating, and body mass index (BMI) among Aerospace Engineering students at Universiti Sains Malaysia, Engineering Campus. A cross-sectional study was conducted among 98 undergraduate students. Data were collected using a self-administered online questionnaire consisting of sociodemographic information, screen time assessment, the Malay version of the Perceived Stress Scale (PSS-10), and the Mindful Eating Questionnaire-Malay version (MEQ-M). Body weight and height were self-reported and used to calculate BMI. Descriptive statistics were used to describe the characteristics of the respondents, while Spearman's rank correlation analysis was performed to examine the correlation between the study variables. The respondents had a mean age of 22.47 ± 1.12 years and a mean BMI of 23.21 ± 4.88 kg/m². Most respondents were male (60.2%), Malay (43.9%), and Year 3 students (56.1%). More than half of the respondents had normal BMI (51.0%). The mean perceived stress score, screen time score, and mindful eating score were 18.86 ± 4.82 , 19.04 ± 7.47 , and 70.61 ± 6.07 , respectively. A significant positive correlation was observed between screen time and perceived stress ($r_s = 0.338$, $p < 0.001$). In contrast, no significant associations were found between screen time and mindful eating ($r_s = -0.154$, $p = 0.131$), screen time and BMI ($r_s = -0.095$, $p = 0.353$), perceived stress and mindful eating ($r_s = -0.100$, $p = 0.329$), and mindful eating and BMI ($r_s = -0.041$, $p = 0.688$). However, perceived stress was significantly negatively associated with BMI ($r_s = -0.276$, $p = 0.006$), indicating that respondents with higher perceived stress scores tended to have lower BMI values. In conclusion, perceived stress was significantly associated with BMI among Aerospace Engineering students, whereas screen time and mindful eating were not significantly associated with BMI. Furthermore, higher screen time was associated with higher perceived stress levels. These findings highlight the importance of considering psychological factors in understanding body weight status among university students and may contribute to the development of health promotion strategies targeting this population.

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Computers, tablets, and mobile phones have become part of university students' daily lives and were widely used for education, online activities, social media engagement, and gaming. Technology has provided many benefits for learning and communication. However, prolonged screen use has contributed to sedentary lifestyles and has been associated with health issues such as eye strain, sleep disturbances, and poorer mental well-being (Mokhtari et al., 2021; Kaur et al., 2023). Excessive screen time has also been linked to poor dietary habits because screen use during meals may distract individuals from eating mindfully, leading to overeating and excessive weight gain (Deliens et al., 2019; Lopez-Martínez et al., 2022). Previous studies reported that students spent more than six hours per day using screens, which may have affected their lifestyle, stress levels, and dietary behaviours (Mokhtari et al., 2021; Kaur et al., 2023).

Perceived stress was another important factor affecting students' physical and emotional well-being. It referred to an individual's appraisal of how stressful a situation was, regardless of the actual severity of the stressor (Lazarus & Folkman, 1984). University life often involved academic demands, financial difficulties, and social expectations, which could contribute to elevated stress levels (El Ansari et al., 2020). Previous research showed that stress could lead to unhealthy eating behaviours, such as emotional eating and eating without awareness. These behaviours may influence BMI through increased food cravings and disruption of hunger and satiety cues (Mikolajczyk et al., 2009; Bennett et al., 2021).

Mindful eating referred to the practice of paying full attention to the eating experience, including the taste, texture, and aroma of food, as well as internal sensations of hunger and fullness (Framson et al., 2009). It promoted slower eating and healthier food choices. However, practising mindful eating could be difficult for university students who frequently multitasked or used screens while eating (Dutt et al., 2019). Despite these challenges, mindful eating had been shown to reduce emotional eating and improve dietary quality (Mason et al., 2016).

Many Malaysian university students also spent long hours using social media, contributing to their overall screen exposure. A recent study reported that students commonly spent more than five hours per day on platforms such as Instagram for entertainment, communication, and academic purposes (Noratikah Nordin, 2025). Such extensive social media use may have increased digital engagement and influenced stress levels, mental well-being, and eating behaviours. These findings highlighted concerns that excessive screen use could affect students' lifestyle choices and emotional health in various ways.

Although previous Malaysian studies had examined screen time, perceived stress, mindful eating, and body weight, most studies investigated these variables independently rather than within an integrated framework (Gan et al., 2023; Manaf & Saravanan, 2022; Ganasegeran et al., 2023). Evidence regarding the combined effects of these factors remained limited, particularly among students enrolled in academic programmes requiring prolonged screen exposure, such as engineering. This knowledge gap limited understanding of how behavioural and psychological factors interacted and how they collectively related to BMI (Motamed-Gorji et al., 2019; Twenge et al., 2020).

Therefore, this study aimed to investigate the relationships between screen time, perceived stress, mindful eating, and BMI among university students. The findings were

important because they helped identify modifiable behavioural risk factors and provided evidence to support the development of targeted health interventions for university students (Deliens et al., 2019; Mason et al., 2016).

1.2 Problem Statement

University students today spent long hours using digital devices for both academic purposes and social activities. Although digital tools provided many benefits for learning, excessive screen time had been associated with distracted eating, poor sleep quality, and reduced physical activity. In Malaysia, previous studies reported that almost all adolescents spent more than four hours per day using screens, and this behaviour was associated with emotional and external eating patterns that may contribute to weight gain (Gan et al., 2023). At the same time, many university students experienced high levels of stress arising from academic demands and personal responsibilities. Stress could interfere with healthy eating behaviours by triggering emotional or mindless eating, leading to increased consumption of energy-dense foods and potentially contributing to higher BMI (Al-Dubai et al., 2013; Manaf et al., 2022). Although mindful eating had been identified as a strategy that may reduce stress-related overeating, many students found it difficult to practise mindful eating consistently because of academic pressure and frequent screen distractions (Ganasegeran et al., 2023).

Existing studies conducted in Malaysia had examined screen time, perceived stress, mindful eating, and BMI separately rather than simultaneously. This limited the understanding of how these factors interacted in real-life settings (Gan et al., 2023; Manaf & Saravanan, 2022; Ganasegeran et al., 2023). Similar patterns had been observed in international studies, where these behavioural and psychological variables were often investigated independently rather than as interconnected factors (Motamed-Gorji et al., 2019; Twenge et al., 2020). Consequently, evidence regarding the combined influence of

screen time and stress on eating behaviour and BMI remained limited, particularly among students who spent prolonged periods using digital devices for academic purposes, such as engineering students.

Therefore, this study was conducted to address this gap by investigating the relationships among screen time, perceived stress, mindful eating, and BMI among university students. These behaviours are common aspects of student life, and when poorly managed, they may contribute to unhealthy eating habits, weight gain, and reduced well-being (Deliens et al., 2019; Lopez-Martínez et al., 2022; Bennett et al., 2021). Understanding how these factors operated together provided a clearer insight into the behavioural patterns that may place students at risk of unhealthy weight status and offered evidence that could support the development of appropriate health promotion strategies for university students.

1.3 Research Questions

1. What are the levels of screen time, perceived stress, mindful eating, and body mass index (BMI) among Aerospace engineering students?
2. What is the relationship between screen time and perceived stress among Aerospace engineering students?
3. What is the relationship between screen time and mindful eating among Aerospace engineering students?
4. What is the relationship between screen time and BMI among Aerospace engineering students?
5. What is the relationship between perceived stress and mindful eating among Aerospace engineering students?
6. What is the relationship between perceived stress and BMI among Aerospace engineering students?

7. What is the relationship between mindful eating and BMI among Aerospace engineering students?

1.4 Research Objectives

General Objective

The general objective of this study is to examine the relationships between screen time, perceived stress, mindful eating, and body mass index (BMI) among university students.

Specific Objectives

1. To determine level screen time, perceived stress, mindful eating, and body mass index (BMI) among university students.
2. To examine the correlation of perceived stress levels across screen time categories among university students.
3. To examine the correlation of mindful eating levels across screen time categories among university students.
4. To examine the correlation of BMI categories across screen time categories among university students.
5. To examine the correlation of mindful eating levels across perceived stress levels among university students.
6. To examine the correlation of BMI categories across perceived stress levels among university students.
7. To examine the correlation of BMI across levels of mindful eating among university students.

1.5 Research Hypotheses

Relationship between Screen Time and Perceived Stress

H01: There is no significant relationship between screen time and perceived stress among university students.

HA1: There is a significant relationship between screen time and perceived stress among university students.

Relationship between Screen Time and Mindful Eating

H02: There is no significant relationship between screen time and mindful eating among university students.

HA2: There is a significant relationship between screen time and mindful eating among university students.

Relationship between Screen Time and BMI

H03: There is no significant relationship between screen time and BMI among university students.

HA3: There is a significant relationship between screen time and BMI among university students.

Relationship between Perceived Stress and Mindful Eating

H04: There is no significant relationship between perceived stress and mindful eating among university students.

HA4: There is a significant relationship between perceived stress and mindful eating among university students.

Relationship between Perceived Stress and BMI

H05: There is no significant relationship between perceived stress and BMI among university students.

HA5: There is a significant relationship between perceived stress and BMI among university students.

Relationship between Mindful Eating and BMI

H06: There is no significant relationship between mindful eating and BMI among university students.

HA6: There is a significant relationship between mindful eating and BMI among university students.

1.6 Justification of Study

This study provides a deeper understanding of the relationships among screen time, perceived stress, mindful eating, and body mass index (BMI) among university students in Malaysia. Although previous studies had examined these variables individually, limited research had investigated all four factors within a single analytical framework, particularly within the Malaysian university context (Suchert et al., 2015). By analysing these variables collectively, the present study offered a more integrated perspective on lifestyle behaviours that influence students' physical and mental well-being (Adam & Epel, 2007).

The findings of this study are beneficial to universities and health educators in designing more targeted and evidence-based health-promotion programmes. If high screen time and perceived stress were associated with poorer mindful eating behaviours and higher BMI, institutions could consider interventions such as stress-management initiatives, reduction of screen-based eating, and mindful eating education (Deliens et al., 2019; Lopez-Martínez et al., 2022). Mindfulness-based eating practices have been shown to reduce emotional eating and improve dietary choices (Daubenmier et al., 2011; Warren et al., 2017), while long-term weight regulation may also be supported through mindful eating approaches (Tapper, 2017). Similarly, stress-reduction strategies may help mitigate

stress-related overeating and improve self-regulation of food intake (Tomiyaama, 2019; Manzoni et al., 2015).

Beyond the university setting, this study also has broader public health relevance. University students represent young adults who will eventually enter the workforce, and lifestyle habits developed during this period may influence long-term health outcomes (Ng et al., 2014). Early identification of modifiable risk factors, such as excessive screen time, high stress levels, and unhealthy eating behaviours, may help inform preventive strategies aimed at reducing the risk of obesity and other non-communicable diseases later in life (Jayawardena et al., 2020).

This study is particularly relevant to students from non-health-related programmes, such as Aerospace Engineering, who are generally not exposed to formal health or nutrition education within their academic curriculum (Alsaffar, 2012). Although Universiti Sains Malaysia, as an APEX university, admits academically capable students, higher educational attainment does not necessarily translate into healthier eating practices (Kamaruzaman & Hamid, 2019; Li & Powdthavee, 2015). Previous evidence suggested that engineering students may demonstrate lower nutrition knowledge and poorer eating habits despite their academic strengths (Alsaffar, 2012). In addition, Aerospace Engineering is a demanding programme that requires extensive engagement in computer-aided design (CAD), engineering simulations, and other technical tasks, which may contribute to prolonged screen time, increased perceived stress, and distracted eating behaviours (Rosen et al., 2014; Stiglic & Viner, 2019). Therefore, examining screen time, perceived stress, and mindful eating among this group provided valuable insights for developing targeted health-promotion strategies for students in non-health disciplines.

Overall, this study contributes meaningful insights for students, universities, and health professionals by identifying behavioural factors associated with mental well-being,

eating behaviour, and weight management among young adults in Malaysia. The findings may serve as a basis for future research and support the development of effective health-promotion strategies aimed at improving students' overall well-being.

1.7 Conceptual Framework

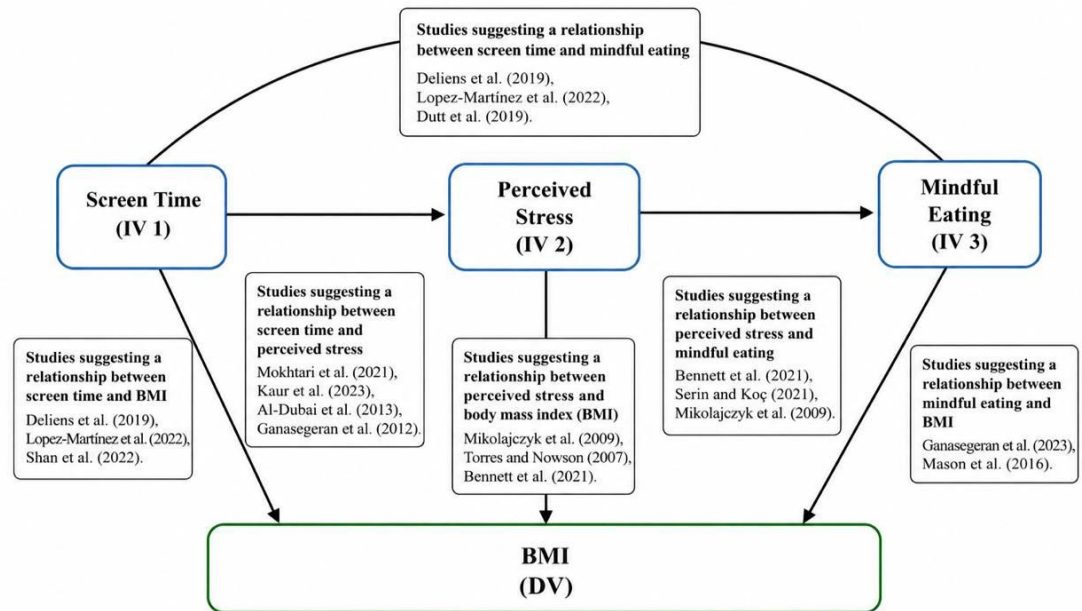


Figure 1.7.1 Conceptual Framework Illustrating the Relationships among Screen Time, Perceived Stress, Mindful Eating and Body Mass Index (BMI)

The conceptual framework of this study illustrates the relationships among screen time, perceived stress, mindful eating, and body mass index (BMI) among undergraduate students. In this framework, screen time (IV1), perceived stress (IV2), and mindful eating (IV3) are conceptualised as independent variables, while BMI serves as the dependent variable. Screen time and perceived stress are linked by a bidirectional relationship, indicating that prolonged screen use may increase stress levels due to academic demands, digital fatigue, and reduced psychological well-being, whereas higher stress levels may also lead to increased screen engagement as a coping mechanism. This reciprocal relationship is supported by previous studies (Mokhtari et al., 2021; Kaur et al., 2023; Al-Dubai et al., 2013; Ganasegeran et al., 2012).

The framework further proposes that screen time and perceived stress influence mindful eating behaviour. Excessive screen exposure may contribute to distracted eating and reduced awareness of hunger and satiety cues, thereby lowering mindful eating practices (Deliens et al., 2019; Lopez-Martínez et al., 2022; Dutt et al., 2019). Similarly, higher levels of perceived stress are associated with emotional and mindless eating patterns, which may impair mindful eating behaviour (Bennett et al., 2021; Serin & Koç, 2021; Mikolajczyk et al., 2009). In addition, each independent variable was hypothesised to have a direct association with BMI. Higher screen time may contribute to increased BMI through sedentary behaviour and increased caloric intake (Deliens et al., 2019; Lopez-Martínez et al., 2022; Shan et al., 2022), whereas perceived stress may influence BMI through stress-related eating behaviours and altered appetite regulation (Mikolajczyk et al., 2009; Torres & Nowson, 2007; Bennett et al., 2021). Mindful eating was expected to be inversely associated with BMI, as greater awareness during eating has been linked to healthier dietary behaviours and improved weight regulation (Ganasegeran et al., 2023; Mason et al., 2016).

Overall, this conceptual framework highlights the interconnected roles of digital behaviour, psychological stress, and eating behaviour in shaping BMI among university students. Understanding these pathways provides a basis for examining how lifestyle and psychological factors collectively influenced weight status in this population.

CHAPTER 2

LITERATURE REVIEW

2.1 Screen Time and Health Impacts

Screen time refers to the amount of time spent using digital devices such as smartphones, laptops, tablets, and televisions, and it has increasingly shaped the behaviour of young adults worldwide. Numerous studies have demonstrated that high levels of screen use were associated with sedentary lifestyles, lower energy expenditure, and reduced participation in physical activity (Motamed-Gorji et al., 2019; Suchert et al., 2015). These behavioural changes were particularly evident among university students who frequently relied on screens for academic activities and social engagement. Prolonged screen exposure was also associated with distracted eating patterns, whereby individuals consumed food mindlessly and failed to regulate their intake, contributing to excessive calorie consumption and weight gain over time (Shan et al., 2022; Lopez-Martínez et al., 2022). In addition, extended screen use was linked to poorer mental health outcomes, including stress, anxiety, and emotional exhaustion, which may further influence eating behaviour and overall well-being (Twenge et al., 2020; Motamed-Gorji et al., 2019). Collectively, these findings suggested that screen time played a multidimensional role in influencing lifestyle behaviours, psychological health, and diet quality among young adults.

2.2 Perceived Stress Among University Students

Perceived stress refers to an individual's appraisal of life demands and the extent to which they feel unable to cope with these pressures (Lazarus & Folkman, 1984). Previous research consistently demonstrated that university students experienced high levels of perceived stress due to academic workload, examinations, financial strain, and social expectations (Al-Dubai et al., 2012; Bennett et al., 2021). Elevated stress was found

to activate physiological pathways, including increased cortisol secretion, which enhanced appetite and promoted preferences for energy-dense foods high in fat and sugar, thereby contributing to weight gain (Adam & Epel, 2007; Torres & Nowson, 2007). From a psychological perspective, stress was associated with emotional eating and reduced self-regulation, causing individuals to rely on food for comfort rather than responding to physiological hunger cues (Manaf & Saravanan, 2022; Serin & Koç, 2021). Stress may also interfere with attention and awareness during meals, reducing the ability to practise mindful eating and increasing the likelihood of overeating (Ong et al., 2021). Collectively, these findings suggested that perceived stress influenced both psychological and behavioural pathways that contributed to changes in eating patterns and BMI among university students.

2.3 Mindful Eating

Mindful eating is a behavioural approach that involves paying deliberate attention to the sensory and emotional aspects of eating, including taste, texture, hunger, and fullness cues (Kristeller & Wolever, 2011). Previous research demonstrated that individuals who practised mindful eating exhibited greater self-regulation, lower levels of emotional eating, and improved dietary quality (Beshara et al., 2013; Moor et al., 2013). Among student populations, mindful eating was associated with healthier food choices and better weight management, as individuals became more aware of internal cues rather than relying on external triggers such as stress or screen distractions (Mason et al., 2016; Dutt et al., 2019). Several Malaysian studies also indicated that mindful eating reduced overeating and supported healthier BMI levels by promoting awareness and encouraging slower eating practices (Ganasegeran et al., 2023; Basir et al., 2021). In addition, mindful eating may buffer the negative effects of stress, as individuals who eat mindfully are better able to regulate cravings and emotional responses during challenging

situations (O'Reilly et al., 2014). Overall, the available evidence suggested that mindful eating served as a protective factor against maladaptive eating behaviours commonly observed among university students.

2.4 Body Mass Index (BMI)

Body Mass Index (BMI) is widely used as an indicator of weight status and is calculated based on an individual's height and weight. In large-scale epidemiological and online-based studies, BMI has commonly been obtained through self-reported measures, which have been shown to provide acceptable accuracy for classifying weight status among young adults (Larsen et al., 2020; Sherry et al., 2007). Although minor discrepancies may occur due to underreporting or overreporting of body weight, studies conducted among university populations demonstrated that self-reported BMI remained a reliable method for estimating weight categories when direct anthropometric measurements were not feasible (Ng et al., 2011; Pursey et al., 2014). The use of self-reported BMI also facilitated efficient data collection in large samples and reduced participant burden.

Therefore, in the present study, BMI was calculated based on participants' self-reported height and weight, consistent with the methodology adopted in previous studies involving young adult populations.

2.5 Relationship Between Variables

2.5.1 Levels of Screen Time, Perceived Stress, Mindful Eating, and BMI

University students commonly experienced high screen exposure, varying stress levels, and inconsistent eating behaviours, which together may influence body mass index (BMI). Previous studies reported that young adults spent several hours daily on digital devices for academic and leisure activities, contributing to sedentary behaviour and altered eating patterns (Stiglic & Viner, 2019; Shan et al., 2022). At the same time,

university students frequently reported moderate to high perceived stress due to academic workload, examinations, and time pressure (El Ansari et al., 2020). Mindful eating levels among students also varied, with lower mindfulness being linked to distracted and emotional eating (Mason et al., 2016). BMI among university populations ranged from underweight to overweight, reflecting differences in lifestyle behaviours and stress management (Ganasegeran et al., 2023). Collectively, these findings provided an important baseline for understanding health-related behaviours among university students.

2.5.2 Relationship Between Screen Time and Perceived Stress

Screen time and perceived stress were closely related through both academic and psychological mechanisms. Prolonged screen use, especially for academic tasks and social media engagement, was associated with higher stress due to digital fatigue, cognitive overload, and reduced recovery time (Mokhtari et al., 2021; Kaur et al., 2023). Excessive screen exposure may disrupt sleep and increase mental strain, thereby elevating stress levels among students (Twenge et al., 2020). Conversely, students experiencing higher stress often increased screen use as a coping strategy, such as engaging in online entertainment or social media to reduce negative emotions (Al-Dubai et al., 2013). These findings suggested a reciprocal relationship between screen time and perceived stress.

2.5.3 Relationship Between Screen Time and Mindful Eating

High screen time was found to negatively influence mindful eating behaviour. Screen use during meals diverted attention away from the eating experience, reducing awareness of taste, portion size, and internal hunger and satiety cues (Deliens et al., 2019). Among university students, eating while using smartphones or laptops was common, particularly during busy academic schedules (Dutt et al., 2019). This distracted eating pattern may have led to faster eating and increased food intake without conscious

awareness (Lopez-Martínez et al., 2022). Over time, frequent screen-based eating reduced mindful eating practices and promoted mindless food consumption. Therefore, previous studies suggested that higher screen exposure was associated with lower levels of mindful eating among students.

2.5.4 Relationship Between Screen Time and BMI

Screen time was consistently associated with BMI through behavioural and lifestyle pathways. Prolonged screen use contributed to sedentary behaviour and reduced physical activity, thereby increasing the risk of weight gain over time (Stiglic & Viner, 2019). Screen-based activities were often accompanied by snacking and the consumption of energy-dense foods, resulting in higher total caloric intake (Lopez-Martínez et al., 2022). Studies among young adults demonstrated a positive association between screen time and overweight or obesity, particularly when screen use replaced active behaviours (Shan et al., 2022). In addition, screen exposure disrupted normal eating routines and sleep patterns, indirectly influencing body weight (Carson et al., 2016). These findings suggested that excessive screen time contributed to higher BMI among university students.

2.5.5 Relationship Between Perceived Stress and Mindful Eating

Perceived stress was found to negatively affect mindful eating behaviour. When individuals experienced psychological stress, their attention and self-regulation abilities were reduced, making it difficult to remain aware during eating (Ong et al., 2021). Stress triggered emotional or automatic eating, whereby food was consumed in response to emotions rather than physiological hunger (Bennett et al., 2021). Among university students, academic stress was linked to irregular eating patterns and reduced eating awareness (Mikolajczyk et al., 2009). Stress also increased reliance on convenience foods, which further reduced mindful engagement during meals (Serin & Koç, 2021).

Therefore, previous findings suggested that higher perceived stress was associated with lower levels of mindful eating.

2.5.6 Relationship Between Perceived Stress and BMI

Perceived stress played an important role in influencing BMI through both physiological and behavioural mechanisms. Stress activated the hypothalamic–pituitary–adrenal (HPA) axis, resulting in increased cortisol levels that stimulated appetite and preferences for foods high in fat and sugar (Van der valk et al., 2018). Behaviourally, stressed individuals were more likely to engage in emotional eating and overeating, contributing to weight gain (Torres & Nowson, 2007). Among university students, higher stress levels were associated with higher BMI and an increased risk of overweight (Bennett et al., 2021). Academic stress also disrupted regular meal patterns and sleep, further affecting weight status (Manaf & Saravanan, 2022). These findings suggested a positive association between perceived stress and BMI.

2.5.7 Relationship Between Mindful Eating and BMI

Mindful eating was consistently associated with healthier BMI and better weight regulation. Individuals who practised mindful eating tended to eat more slowly, recognise satiety cues, and reduce impulsive or emotional eating behaviours (Beshara et al., 2013). This increased awareness during eating helped regulate food intake and prevent overeating (Mason et al., 2016). Among university students, higher mindful eating scores were linked to healthier dietary patterns and lower BMI (Ganasegeran et al., 2023). Mindful eating also improved self-control and reduced stress-related eating, thereby supporting weight management. Therefore, previous evidence suggested that mindful eating served as a protective behavioural factor against unhealthy weight gain.

CHAPTER 3

METHODOLOGY

3.1 Research Design

The research design used in this study was a cross-sectional study. This design was appropriate because it allowed the assessment of associations between screen time, perceived stress, mindful eating behaviour, and BMI at a single point in time. Cross-sectional designs are commonly used in behavioural and public health research as they enable researchers to examine relationships among variables within specific populations efficiently and effectively.

3.2 Location of the Study

This study was conducted online among undergraduate students at Universiti Sains Malaysia (USM), Engineering Campus, Nibong Tebal, Penang. The respondents consisted of Year 3 and Year 4 students from the School of Aerospace Engineering. The School of Aerospace Engineering was selected because its students represent a non-health-related population with demanding academic workloads that involve extensive computer-based learning, making them an appropriate population for examining screen time, perceived stress, mindful eating, and body mass index (BMI). Furthermore, limited studies have specifically investigated these behavioural factors among Aerospace Engineering students in Malaysia. The USM Engineering Campus was also easily accessible to the researcher, facilitating purposive recruitment and increasing the likelihood of obtaining complete and reliable data. This study employed a questionnaire-based survey, and all responses were collected online through a Google Form link distributed via WhatsApp.

3.3 Study Population

The study population consisted of Year 3 and Year 4 undergraduate students from the School of Aerospace Engineering at Universiti Sains Malaysia (USM), Engineering Campus, Nibong Tebal, Penang. The Engineering Campus was selected because it primarily comprised students from non-health-related disciplines, who were generally not exposed to formal health or nutrition education as part of their academic curriculum. This made the population suitable for examining lifestyle-related behaviours such as screen time, perceived stress, mindful eating, and body mass index (BMI).

This study specifically focused on Aerospace Engineering undergraduates to ensure the recruitment of a relatively homogeneous group of participants. Selecting participants from the same field of study helped minimise variation related to academic structure, workload, and learning environment, thereby improving the internal consistency of the findings (Palinkas et al., 2015). Engineering students are known to experience high academic demands and prolonged screen exposure due to coursework involving simulations, programming, and technical design, which may influence stress levels and eating behaviours (Kumar et al., 2019; Kaur et al., 2023). Therefore, Aerospace Engineering undergraduates represented a relevant and appropriate population for investigating the relationships among digital behaviour, psychological stress, eating behaviour, and BMI.

3.4 Sample Size Calculation

Sample size calculation was conducted based on the inferential objectives of this study. Objectives 2 to 7 aimed to examine correlations between continuous variables, namely screen time, perceived stress, mindful eating, and body mass index (BMI). Correlation analysis required a sample size that was determined by the statistical test used

and its assumptions, rather than by the number of objectives or specific variable pairs examined (Cohen, 1988; Hulley et al., 2013).

The sample size calculation was performed using Fisher's Z transformation method, which is recommended for correlation studies in health and behavioural research (Cohen, 1988; Hulley et al., 2013). The calculation assumed a 90% confidence level ($\alpha = 0.10$), 80% statistical power, and a small-to-moderate expected correlation coefficient ($r = 0.25$). The choice of $r = 0.25$ was based on Cohen's conventional classification of effect sizes for correlation analyses, where values around 0.10 are considered small, 0.30 moderate, and 0.50 large (Cohen, 1988).

The formula used is as follows:

$$n = \left(\frac{Z_{\alpha/2} + Z_{\beta}}{0.5 \times \ln \left(\frac{1+r}{1-r} \right)} \right)^2 + 3$$

Where:

n = required sample size

$Z_{\alpha/2} = 1.645$ (90% confidence level)

$Z_{\beta} = 0.84$ (80% statistical power)

r = expected correlation coefficient

Substituting the values:

$$0.5 \times \ln \left(\frac{1 + 0.25}{1 - 0.25} \right) = 0.255$$

$$n = \left(\frac{1.645 + 0.84}{0.255} \right)^2 + 3$$

$$\mathbf{n = 97.6 \approx 98}$$

Thus, the minimum required sample size for Objectives 2 to 7 was approximately 98 respondents. The estimated accessible population for this study consisted of

approximately 130 undergraduate students from the School of Aerospace Engineering, Universiti Sains Malaysia. Therefore, the target sample size for this study was set at 98 participants to account for non-response and incomplete data.

Objectives 2 to 7 in this study all involved correlation analyses between continuous variables and were analysed using the same inferential approach (Pearson's or Spearman's correlation). Because these objectives shared the same statistical test and assumptions, performing separate sample size calculations for each objective would have yielded the same required sample size and would not have altered the final sample size determination (Cohen, 1988; Hulley et al., 2013). Therefore, one correlation-based sample size calculation was applied consistently across Objectives 2 to 7 to ensure adequacy and methodological consistency.

3.5 Selection Criteria

The inclusion and exclusion criteria of the sample unit are shown as below:

Inclusion Criteria:

1. Undergraduate students, age between 19 to 24 years old.
2. Students enrolled in the School of Aerospace Engineering at Universiti Sains Malaysia, Engineering Campus, Nibong Tebal.
3. Malaysian citizens.

Exclusion Criteria:

1. Students with diagnosed with serious mental health issue that may influence perceived stress, screen time, or eating behaviour.
2. Students who have deferred, postponed, or are on leave from their studies.
3. Students who are following strict, medically prescribed, or therapeutic diets that may affect normal eating patterns.

3.6 Sampling Method

Purposive sampling was used to select respondents from undergraduate students in the School of Aerospace Engineering at the USM Engineering Campus. This sampling method was chosen because it enabled targeted recruitment of students across different academic years who met the specific characteristics required for this study (Etikan et al., 2016). It was also practical for accessing students quickly and efficiently within a short period while minimising cost, which is a common advantage of purposive sampling in behavioural and public health research (Palinkas et al., 2015).

The questionnaire was distributed online using a Google Form link shared through WhatsApp and Telegram. Online distribution is widely recognised as an efficient approach for reaching university students and achieving higher response rates in digital survey environments (Van Mol, 2017). The contact information of the class representatives was obtained with permission from the programme administration, after which they assisted in distributing the questionnaire link through the official class WhatsApp and Telegram groups, and only students who provided informed consent were permitted to proceed with the questionnaire. All completed responses were screened, and only those that fulfilled the inclusion criteria were included in the final analysis.

3.7 Research Instruments

The online questionnaire was prepared in the Malay language and consisted of four main parts, which assessed sociodemographic characteristics, screen time behaviour, perceived stress, mindful eating, and BMI. These instruments were selected because they are widely used and have demonstrated acceptable reliability and validity in Malaysian populations, particularly the Malay versions of the Perceived Stress Scale (PSS-10) (Al-Dubai et al., 2012) and the Mindful Eating Questionnaire (MEQ-M)

(Basir et al., 2021). All sections were combined into a single Google Form to ensure consistency in data collection and to allow participants to respond at their own pace. The use of these instruments enabled the study to measure behavioural, psychological, and lifestyle factors associated with screen time, stress, mindful eating, and weight status among Aerospace Engineering students.

3.7.1 Sociodemographic Information

Part A collected information such as age, gender, ethnicity, year of study, and digital device usage. These sociodemographic variables were included to describe the characteristics of the respondents and to allow comparison across subgroups within the study population. Digital device usage was added to complement the screen time section and provide additional context for interpreting device-related behaviour, as device ownership and usage patterns have been shown to affect students' screen exposure and digital habits (Twenge & Campbell, 2018; Boer et al., 2020).

All items in this section were self-reported by participants to ensure convenience and feasibility of online data collection. This section served as the foundation for understanding potential differences in screen time, perceived stress, mindful eating, and BMI across student subgroups.

3.7.2 Screen Time

Screen time was measured using six adapted items based on Motamed-Gorji et al. (2019), which assessed the average duration of screen use on smartphones, computers/laptops, and gaming devices separately for weekdays and weekends. As no validated Malay version of this screen time questionnaire was identified, the items were translated and adapted into Malay for use in this study. The adapted items were pilot-tested prior to the main data collection to ensure clarity and suitability for the study population.

Participants reported their average screen exposure separately for weekdays and weekends to obtain a more accurate estimate of their daily screen-use patterns.

Measuring weekday and weekend screen time separately is consistent with recommended practices in digital behaviour research because screen engagement often varies across the week (Stiglic & Viner, 2019; Twenge et al., 2019).

These items were selected because they have been used internationally and have demonstrated good stability and acceptability for capturing digital habits among student populations (Boer et al., 2020; Rideout & Robb, 2018). Higher reported hours indicated greater screen exposure and potential sedentary behaviour relevant to this study.

3.7.3 Perceived Stress (PSS-10, Malay Version)

Perceived stress was measured using the validated Malay version of the Perceived Stress Scale (PSS-10), which contains 10 items assessing how often individuals feel stressed, overwhelmed, or unable to control events in their lives over the past month. Responses ranged from 0 (never) to 4 (very often), resulting in a total score representing overall stress levels. The Malay PSS-10 has been validated among Malaysian students and has demonstrated acceptable reliability, with Cronbach's alpha values ranging from 0.64 to 0.77 in local studies (Al-Dubai et al., 2012; Al-Dubai, 2015). Its inclusion in the questionnaire allowed the study to evaluate psychological stress levels among Aerospace Engineering undergraduates.

3.7.4 Mindful Eating (MEQ-M, Malay Version)

Mindful eating was measured using the Malay Mindful Eating Questionnaire (MEQ-M), which consists of 28 items across multiple domains, including awareness, emotional response, disinhibition, and external cues. Items were rated on a 4-point Likert scale from 1 (never/rarely) to 4 (usually/always), with higher scores indicating greater mindfulness during eating. The MEQ-M has demonstrated acceptable

psychometric properties in Malaysian samples, with Cronbach's alpha values ranging from 0.54 to 0.70 (Basir et al., 2021). Using the MEQ-M in this study allowed examination of how mindful eating interacted with stress and screen time among students.

3.7.5 Body Mass Index (BMI)

BMI was assessed using participants' self-reported height (cm) and weight (kg). BMI was calculated using the standard formula of weight (kg) divided by height squared (m^2). Self-reported BMI is commonly used in large-scale and online surveys because of its convenience, and previous studies among young adults have shown that it provides reasonably accurate weight status classifications (Pursey et al., 2014). BMI was included to explore how screen time, stress, and mindful eating behaviours related to students' weight status.

3.7.6 Validity and Reliability of Instruments

The questionnaire administered in this study consisted of the validated Malay versions of the Perceived Stress Scale (PSS-10) and the Mindful Eating Questionnaire (MEQ-M), while the screen time items, adapted from Motamed-Gorji et al. (2019), were translated into Malay to ensure consistency with the other sections of the questionnaire and improve participants' understanding. The PSS-10 and MEQ-M have been previously validated and widely used in Malaysian populations. As no validated Malay version of the screen time questionnaire was identified, the adapted screen time items were pilot-tested to assess their clarity, suitability, and comprehensibility for the study population.

Prior to the main data collection, a pilot study was conducted among approximately 30 undergraduate students who met the inclusion criteria but were not included in the final sample. The pilot study evaluated the clarity of questionnaire items,