Abstracts

Abstracts of Theses Approved for the PhD/MMed/MSc at the School of Medical Sciences, Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia

THE EFFECTS OF BRIEF MINDFULNESS-BASED INTERVENTION ON STATE MINDFULNESS AND ATTENTION REGULATION AMONG UNIVERSITY STUDENTS IN MALAYSIA

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Introduction: The cascade of events that happened due to the outbreak of Coronavirus disease (COVID-19) has brought to light the dilemmas faced by university students who are physically constrained by the lockdown and resulted in virtual learning for the past two years. There is growing evidence that practicing mindfulness brings positive outcomes for both clinical and non-clinical populations which piques an interest in the effectiveness of an online, brief mindfulness intervention that can be easily accessible and feasible for university students during a global crisis.

Objectives: Hence, the present study explored the potential impact of a two-week brief mindfulness-based intervention (MBI) on state mindfulness and attention regulation among university students in Malaysia. Specifically, the hypotheses examined if the brief MBI can significantly increase state mindfulness, reduce attention deficit, and increase selective attention after the two-week intervention.

Methods: Fifty-three students were allocated to either the experimental group ($n = 28$) to immediately start the brief MBI or into the waitlist control group ($n = 25$). Measures of state mindfulness (MAAS), attention deficit (ASRS), and selective attention (Computerised Stroop Task) were administered before and after the intervention/waiting period.

Results: Based on a mixed factorial ANOVA analysis, participation in the brief MBI identified significant improvement in attention deficit ($P = 0.01$) and selective attention ($P = 0.01$) after the two weeks as compared to the waitlist control group. However, state mindfulness was significantly increased ($P = 0.03$) across all participants after the two weeks.

Conclusion: This provides further insight on the effectiveness of digital, audio-guided mindfulness interventions that are brief and can be embedded in university courses or counselling programs to promote positive outcomes for students in those challenging environments.

Supervisor:
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Co-supervisor:
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DIFFERENTIAL TRACTOGRAPHY PIPELINES STUDY IN ASYMPTOMATIC INDIVIDUALS WITH CEREBRAL SMALL VESSEL DISEASE

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Introduction: Cerebral small vessel disease (CSVD) is frequently discovered as an asymptomatic ('silent') finding during magnetic resonance imaging (MRI) brain scanning. Diffusion-based MRI, such as diffusion tensor imaging (DTI), is an emerging neuroimaging technique to detect and evaluate the CSVD manifestations, such as white matter hyperintensities (WMHs). DTI has been used progressively, but there is no gold standard for optimising the DTI pipeline processing, especially in the CSVD study. Therefore, to make the best use of DTI, several technical and methodological considerations must be made.

Objective: The goal of this study is to establish a series of DTI pipeline processing either in a single or a combination of multiple well-established software packages in order to study their compatibility, reproducibility, and reliability in the assessment of white matter ischaemic integrity in asymptomatic CSVD.

Methods: Sixty ($n = 60$) asymptomatic people (mean age = 39.82 [11.32] years old) were recruited and had their brains scanned with a 3T MRI scanner. Twenty ($n = 20$) of the participants had WMHs. Four pipeline processing were established: P1(MedINRIA), P2 (DSI Studio), P3 (DTI Toolkit and TrackVis), and P4 (3Dslicer).

Results: Each established DTI pipeline processing profile and user interface differences were discussed, including the programming language used, estimated total processing times, and their strengths and weaknesses. The comparison between each of the DTI pipelines processing was determined to be P2 as the best among the other

pipelines processing used in this study based on the highest relative score of user interface differences. P2 also has a good reliability score (α = 0.86). xxiv

Conclusion: This study established the compatibility, reproducibility, and reliability of established DTI pipelines in the assessment of white matter ischemic integrity in apparently asymptomatic CSVD. It provides a comprehensive analysis that can improve and standardise the identification of WMHs and allow for a more robust white matter integrity assessment. Our findings show that the acceptable reliability score in the established DTI pipelined processing is P2 (DSI Studio), which can serve as an ideal pipeline processing to assess white matter tractography in CSVD.

Supervisor:
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THE RELATIONSHIPS OF MINDFULNESS, GRATITUDE AND RISK-BASED DECISION MAKING AMONG UNDERGRADUATE STUDENTS

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Introduction: Risk-based decision making refers to a process that usually ensures optimal choices are chosen and are in line with the goals and perceptions of those concerned. People tend to use inaccurate information to make their decisions quickly. Past research found mindfulness and gratitude led individuals to become reluctant to take higher risks. It was highlighted in many of the limitations that studies did not look at student groups despite being at risk of making rash decisions considering they are at the starting stage for their development and career growth.

Objectives: Therefore, this study aims to examine the relationships between mindfulness, gratitude and risk-based decision making among undergraduate students.

Methods: Undergraduate students (N = 164) from the School of Health Sciences, Medical Sciences and Dental Sciences, Universiti Sains Malaysia (USM) were recruited for this cross-sectional survey study. The Mindfulness Attention Awareness Scale (MAAS), Gratitude Questionnaire-Six-Item (GQ-6) Form and Domain-Specific Risk-Taking (DOSPERT) Questionnaires were used. The data was analysed using Linear Regression and Multiple Linear Regression.

Results: Results showed no relationship between mindfulness and risk-based decision making and a significant relationship between gratitude and risk-based decision making among students. Overall, the findings suggest that students with a higher level of gratitude would make lesser risk-based decisions. Mindfulness showing no relationship

with risk-based decisions could be due to the field of studies of the students, related to the health. They may have been frequently exposed to risk-based decision during treatment planning of their patients, limiting mindfulness.

Conclusion: To conclude, the study offers a further understanding of the need to advocate the practicality of being grateful, such as implementing skills training or therapeutic programmes to reduce making risky decisions.

Supervisor:
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Co-supervisors:
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EFFECTS OF TAI CHI PRACTICE THROUGH VIRTUAL TRAINING ON ATTENTIONAL INHIBITION AND RESPONSE INHIBITION AMONG STUDENTS OF USM, KELANTAN, MALAYSIA

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Introduction: Tai Chi was shown to be effective in improving cognition as it is a mind-body exercise which incorporates the flow of the movements as well as breathing technique. In the current study, Tai Chi was used to act the intervention in order to study its effect on response inhibition and attentional inhibition among healthy young adults.

Methods: This is an interventional study with convenience sampling method. The target population was students from School of Dental and Health Sciences in Universiti Sains Malaysia, Kubang Kerian. All participants had fulfilled the subject criteria and passed both the screening tests. There were two screening tests which were the Ishihara Colour Blindness Test and Physical Activity Readiness Questionnaire (PAR-Q). The sample size of this study consisted of 31 (F = 21, M = 10) participants. The intervention was carried out using Yang-styled Tai Chi which is simplified version of Tai Chi. Pre and post assessments included Antisaccade task that measure response inhibition and Visual search task that measure attentional inhibition. Both Antisaccade task and Visual search task were done with the use of eye tracker. To analyse the collected data, both SMI BeGaze and Statistical Package for Social Sciences version 26.0 were utilised.

Results: The statistical test that was used to analyse the collected data was paired sample *t*-test. In both cognitive tasks, participants' response time and accuracy were included. For response inhibition, there were significant improvements in accuracy and response time between pre and post assessment. There was a significant difference in the accuracy for pre intervention (10.27 [SD = 8.72]) and post intervention (0.86 [SD = 1.66]); $t(30)$ = −6.17, P < 0.001. There was a significant difference in the reaction time for pre-

intervention (230.99 [SD = 265.10]) and post-intervention (157.78 [SD = 144.75]); $t(1633) = -10.04$, $P < 0.001$. For attentional inhibition, there was a significant improvement in response time between pre- and post-assessment of Visual search task but not n accuracy. There was no significant difference in the accuracy for pre-intervention (0.89 [SD = 1.46]) and post-intervention (0.32 [SD = 0.80]); $t(30) = -1.83$, $P = 0.07$. There was a significant difference in the reaction time for pre-intervention (634.84 [SD = 465.66]) and post intervention (462.92 [SD = 364.48]); $t(962) = -172.93$, $P < 0.01$.

Conclusion: Tai Chi training used in this study was able to significantly improve cognition, particularly response inhibition in terms of accuracy and reaction time while attentional inhibition in terms of reaction time among USM students.

Supervisor:
Dr Mohamed Faiz Mohamed Mustafar

Co-supervisors:
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INCORPORATING SELF-COMPASSION INTERVENTIONS IN ONLINE BEREAVEMENT SUPPORT GROUP FOR SUICIDE LOSS SURVIVORS IN MALAYSIA

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Introduction: Losing someone to suicide can be one of life's most devastating experiences. In view of the pervasive stigma of suicide in Malaysia, interventions to address suicide grief has been inadequate, if not scarce. In addition to the insurmountable grief and pain, individuals bereaved by suicide are also at risk of detrimental mental health outcomes.

Objectives: This study evaluated the effectiveness of an online bereavement support group with self-compassion interventions on the mindfulness qualities, self-compassion, and grief reactions of suicide loss survivors in Malaysia.

Materials and Methods: A total of four survivors participated in the eight-session online bereavement support group. Their levels of mindfulness qualities, self-compassion, and grief reactions were measured at pre- and post-intervention. Retrospective case analysis was also conducted to obtain anecdotal evidence of their subjective experience during the support group.

Results: A significant increase in overall mindfulness qualities and nonreactivity to inner experience and lower levels of isolation were observed after the intervention. Anecdotal evidence suggests an increased sense of belonging, increased knowledge on suicide bereavement, and increased intention and acceptance to practice self-compassion.

Conclusion: The study contributes to the growing body of research on postvention and self-compassion. Although further research is required, this study showcases the potential benefits of a self-compassion-based support group on the subjective well-being of suicide loss survivors.

Supervisor:
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THE LIVED EXPERIENCE OF CHILDLESS CHINESE ETHNIC COUPLES IN MALAYSIA

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Introduction: Childlessness be it voluntarily or involuntarily, is a social phenomenon that elicit strong interests among researchers as the number of married couples without children is increasing. Childless population is often associated with psychological impacts of depression, anxiety, stress, societal pressure and stigmatisation. Cultural context and expectations may play significant role in shaping the lived experience of childless couples.

Objectives: This study aims to explore the lived experiences of childless Chinese ethnic couples in Malaysia and the factors associate with their positive and negative experiences.

Methods: A qualitative phenomenological study was conducted on four pairs of Malaysian Chinese married couples who aged 18 years old and above, married for more than 5 years and above, did not have a biological child and have Internet access. They were selected based on purposive and snowball sampling methods. An in-depth interview was conducted individually among the couples to collect the research data via the online platform. Data collected were analysed using thematic analysis.

Results: Twelve themes emerged from the analysis, including i) family consists of a group of people, not a single person, ii) family is connected by emotional bond, iii) self-reliance, iv) did not give up in childbearing in early years of marriage, v) personal acceptance towards the state of childlessness, vi) well-maintained relationship with partner facilitated by communication and mutual understanding, vii) pressure and stress from the family, viii) well-maintained relationship with friends or social connections, ix) society did not view them differently, x) no major struggles and challenges in life, xi) positive coping with childlessness and xii) no regret and satisfied with life.

Conclusion: Findings of this study revealed a general positive experience reported among the childless couples, with presence of social support, resilience, and positive coping as protective factors that contributed to positive experience and familial pressure that contributed to negative

experience. The findings may be useful for mental health practitioners to develop interventions strategies to reduce the psychological impacts of childlessness among married couples.

Supervisor:
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BRAIN ACTIVATION CHANGES DURING POSITIVE AND NEUTRAL EMOTION REGULATION TASK FOLLOWING BRIEF MINDFULNESS EXERCISE: AN FMRI STUDY

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Introduction: Mindfulness is used to bring awareness and focus to a present state of mind. It also enhances positive emotion where people with a mindfulness state have control of their emotion and reduces the regulation of negative emotion.

Objective: This study focuses to identify the associated brain activation of positive and neutral emotion regulation task following brief mindfulness exercises.

Methods: This study focuses on the healthy and young adult population. A neurotechnology tool is used which is functional magnetic resonance imaging (fMRI) to identify the brain activation of positive and neutral emotions. The positive and neutral emotion regulation task which was measured during the pre and post task consisted of positive word and neutral word stimuli which are extracted from Affective Norms for English Words (ANEW). Mindfulness state is assessed using the Mindful Attention Awareness Scale (MAAS) and the affect of the positive emotion regulation task is assessed using the Positive Affect and Negative Affect Scale-Expanded (PANAS-X).

Results: Six participants were included in this study. The mindfulness group for positive emotion showed activation in the inferior frontal operculum, tri-inferior frontal, superior frontal and calcarine, while the neutral emotion showed activation in Rolandic operculum, postcentral gyri, calcarine and precentral gyri. The response time for both groups was insignificant ($P > 0.05$) but displayed a large size effect over the post-task. The positive effect for both groups was insignificant ($P > 0.05$) but the audiobook group, showed a medium size effect while the mindfulness group showed a large size effect in the positive affect of PANAS-X.

Conclusion: Visual, motor and language had higher activation which would be defined by the presence of the audiobook and mindfulness audio and word stimuli while the mindfulness audio group showed a slight regulation of positive emotion. The small sample size showed the reduced efficiency of the results, but the large effect size indicated that differences in response time and positive effects are worth to be conducted in future studies. The study is suggested to be expanded to all age groups. In this preliminary study, a brief mindfulness exercise with 15 minutes time frame was able to identify the emotional effect on an individual.

Supervisor:
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A QUALITATIVE STUDY OF OCCUPATIONAL STRESS AMONG ABA THERAPISTS WORKING WITH CHILDREN WITH AUTISM

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This is a qualitative study with a phenomenological design, which aims to explore occupational stress among ABA therapists working with children with autism. A total of seven Malaysian ABA therapists aging at least 22 years old were recruited using purposive and convenience samplings. All participants were virtually interviewed using Google Meet with a semi-structured format due to the COVID-19 pandemic's Restriction Movement Order (MCO). Each interview lasted around thirty minutes with 16 non-leading questions. The interviews were audio-recorded separately and privately in an individual session. The interviews were then transcribed. All participants have at least worked for six months as ABA therapists, having completed the probation period. A pilot test was conducted by peer and supervisor checking to confirm the interview questions were understandable. The resulting transcriptions were then analysed to thematic analysis, whereby main patterns and themes were produced using the semantic contents. The main themes obtained based on the transcriptions are in line with the three research objectives respectively. The themes covering the experiences of occupational stress among ABA therapists working with children with autism are high-stress work and poor support from the management in the workplace. For sources of stress, the themes are role overload working with children with autism, working from home during Movement Control Order (MCO) due to COVID-19 pandemic, powerlessness and challenging interactions with children with autism. As for coping strategies, the themes of self-care, grit towards working with children with autism and social support from colleagues.

Supervisor:
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Co-supervisor:
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STIGMA AND PSYCHOLOGICAL HELP SEEKING ATTITUDE AMONG NURSES: THE MODERATING ROLE OF SELF-COMPASSION

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Introduction: Stigma has been a major barrier for people with mental health issues or mental disorder to seek for psychological help as treatment. The reluctance to seek help may be quite prevalent among healthcare workers including nurses, such as the stigma that they may look weak if they seek help due to the nature of their work that provides care for others. There has been no study thus far that has investigated self-compassion in nurses in Malaysia in which self-compassion may play a role to improve help-seeking attitudes.

Objectives: This study aims to investigate the correlation i) between public stigma and self-stigma of seeking help, ii) between self-stigma and attitude towards seeking psychological help, and iii) between self-compassion and self-stigma, and iv) the role of self-compassion as a moderator between self-stigma and public stigma that is expected to improve psychological help-seeking attitude among a nursing sample in Kubang Kerian, Kelantan, Malaysia.

Methods: The study was conducted among 102 nurses in Hospital Universiti Sains Malaysia who completed self-reported questionnaire Stigma Scale for Receiving Psychological Help (SSRPH), Self-Stigma of Seeking Help (SSOSH), Mental Help Seeking Attitude (MHSAS) and Self-Compassion Scale (SCS).

Results: Results revealed statistically significant positive correlation between public stigma and self-stigma, negative correlation between self-stigma and attitude towards seeking psychological help, and negative correlation between self-compassion and self-stigma. Moderation analysis for the relationship between public stigma and self-stigma however was not significant. The findings supported the theory that explains the relationship between public stigma, self-stigma, and attitude towards seeking psychological help, although not for self-compassion as a moderator.

Conclusion: This study fills in the knowledge gap relating to help-seeking attitude of nurses in a local Malaysian context and may become a reference for future mental health campaigns relating to stigma among nurses to improve help-seeking attitude.

Supervisor:
Associate Professor Dr Azizah Othman

Co-supervisor:
Dr Sabarisah Hashim

BRAIN ACTIVATION CHANGES DURING NEGATIVE EMOTION REGULATION TASK FOLLOWING BRIEF MINDFULNESS EXERCISE: AN FMRI STUDY

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Introduction: Mindfulness enhances mental health by promoting adaptive emotional control responses. Mindfulness is linked to emotion control since it needs a nonreactive awareness and acceptance of current circumstances.

Objective: This study aims to measure the changes in negative emotion regulation task and the associated brain activation following a brief audio mindfulness exercise and a brief audiobook exercise.

Methods: Six participants (2 males and 4 females) between the ages of 19 years old and 34 years old (24 [SD = 2.19]) participated in this study. The neurotechnology used is functional magnetic resonance imaging (fMRI). Brief mindfulness intervention for 15 min was carried out after the pre-emotion regulation task where participants responded to emotionally valent negative and neutral words, A post emotion regulation task was carried out to evaluate the effectiveness of the brief mindfulness intervention. The negative and neutral word stimuli used in this study were extracted from Affective Norms for English Words (ANEW). We used self-reporting questionnaires such as PANAS-X and MAAS Malay version to measure emotion and mindfulness.

Results: Repeated measure ANOVA was carried out for between-group differences (treatment effect), between-group differences based on time (time-treatment interaction effect) and within-group changes (time effect) for PANAS-X scores and reaction time of the negative and neutral visual stimuli. Independent sample t-test was carried out to analyse the activated brain regions in the conjunction analysis. The P-value used in these statistical tests was uncorrected < 0.05 for all three objectives. The commonly activated regions between both the mindfulness and audiobook groups are the left precentral gyrus, left postcentral gyrus, left cuneus, and left middle occipital gyrus for negative stimuli. As revealed from the study's findings, mindfulness exercise enhances emotion regulation by showing less negative emotion trait as seen from PANAS-X score. Participants showed more positive emotion in the post-PANAS-X scoring. However, the results of the PANAS-X score and Reaction Time did not yield statistically significant results but a medium and large effect size prominently were identified for both the mindfulness and audiobook group.

Conclusion: As revealed from the study's findings, mindfulness exercise enhances emotion regulation by showing less negative emotion trait as seen from PANAS-X and Reaction Time results. Participants showed more positive emotion in the post PANAS-X scoring compared to the pretesting and participants also responded at a faster rate compared to the pretesting reaction time score. Audiobook and mindfulness groups showed common regions that are

responsible for voluntary motor movements, proprioception, generation and regulation of emotions, visual information, and mindfulness. Although the mindfulness intervention was given for only 15 minutes, brain activation were able to be identified.

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THE RELATIONSHIP BETWEEN OCCUPATIONAL STRESS, BURNOUT AND COPING AMONG POLICE OFFICERS IN KELANTAN DURING A PANDEMIC

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Introduction: Policing has been ranked as one of the top five jobs in Malaysia with the highest rate of prevalence for occupational stress. Work-related stress has been reported to bring detrimental effects to job performance, depression, burnout and health risk behaviours. The emergence of COVID-19, which is truly an unprecedented event that supplements the existential work-related stress that police officers experience. An individual's utilisation of coping mechanism plays a significant role in mediating the relationship between occupational stress and burnout thus giving us meaningful information in preventive interventions targeting stress-related psychopathology among police officers.

Objectives: This study aims to determine the relationship between occupational stress, burnout and coping among the Malaysian police officers specifically in the state of Kelantan during the pandemic COVID-19.

Methods: Police officers (N = 277) from different districts in Kelantan were recruited for this cross-sectional survey study. The instruments that were utilised for this study are Burnout Assessment Tool (BAT), Operational Police Stress Questionnaire (PSQ-Op), Organisational Police Stress Questionnaire (PSQ-Org) and Brief-COPE Questionnaire. The data was then analysed by utilising the independent-samples Kruskal-Wallis test and independent samples Mann-Whitney-U test as well as performing a series of regression equations in order to examine which coping method best predicts burnout.

Results: Results showed that there is a positive relationship between occupational stress, burnout and utilisation of coping styles among the police officers in Kelantan during the pandemic. 'Staff shortages' and 'inadequate equipment' were the highest source of stress reported by the police officers. Religion is the primary coping strategy employed by the respondents for both

male and female. There was a statistical significance for level of stress, burnout and coping between the level of education of the police officers. Police officers that are more educated experience more stress, burnout and utilise more coping strategies compared to the officers with lower levels of education. Utilisation of coping style with the theme 'avoidance' is the best predictor of burnout based on the regression analysis, β = 0.324; t (272) = 5.152; P = 0.000.

Conclusion: This study is considered unique as it was conducted during an unprecedented time, which is during the COVID-19 pandemic. It provides valuable insight on identifying the sources of occupational stress that the police officers are experiencing to which can be taken into consideration towards the improvement of the organisation. Psychoeducation and more programmes focusing on the utilisation of positive coping strategies or mindfulness strategies can help the individuals to better manage themselves when dealing with occupational stress.

Supervisor:
Associate Professor Dr Geshina Ayu Mat Saat

THE BIOMARKERS CHANGES AFTER CONVENTIONAL REHABILITATION THERAPY IN ISCHEMIC AND HAEMORRHAGIC STROKE PATIENTS IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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Introduction: Stroke is a heterogeneous disease with multiple causes and risk factors and a major cause of death globally. The pathophysiology of stroke is a complex process that leads to the release of different blood markers into blood circulation, such as creatine kinase (CK) enzyme, cardiac troponin T (cTnT) and pro-inflammatory interleukins-6 (IL-6). A conventional rehabilitation therapy aimed to balance the release of these biomarkers in patients with stroke by increasing the activity of the heart and muscles. Rehabilitation therapy also helps individuals to improve their quality of life, dependency and facilitate social reintegration.

Objectives: This study evaluated the changes in the serum concentration level of plasma CK, cTnT, IL-6 biomarkers and modified Barthel index (MBI) scores after 6 weeks of the conventional rehabilitation therapy in ischaemic and haemorrhagic stroke patients in Hospital Universiti Sains Malaysia (HUSM).

Method: This was a prospective study with 19 participants (males = 12, females = 7, age M = 52.79; Ischaemic = 9, Haemorrhagic = 10) who underwent conventional physiotherapy sessions over a period of 6 weeks. The sessions were based on conventional rehabilitation therapy conducted by similar sets of physiotherapists. A fully automated analyser was used to measure the concentration level of serum CK (The Architect c8000), serum cTnT

(Cobas e411) serum IL-6 (Cobas e601) and MBI was used to measure the biological and functional outcomes before the intervention and after the 6 weeks intervention.

Results: There were no statistically significant changes in CK, cTnT, IL-6 and MBI scores before and after 6 weeks of conventional rehabilitation in ischaemic and haemorrhagic stroke groups. Comparison between the ischaemic and haemorrhagic stroke groups showed no significant difference $P > 0.05$ ($\alpha = 0.05$ significant level) in all biomarkers' levels after six weeks of conventional rehabilitation therapy. However, there was a significant difference in MBI scores between ischemic and hemorrhagic stroke types after 6 weeks of therapy ($P = 0.006$).

Discussion: The findings suggest that the changes in CK and cTnT, IL-6 are likely to be regulated by different mechanisms and influenced by different factors related to the severity of the stroke. Better functional recovery in stroke patients is related to the initial nervous system severity and dysfunction. Functional recovery outcome has been more positive, which was measured and self-reported by the patients using MBI.

Conclusion: From our findings, this study suggested that conventional rehabilitation therapy positively affects functional outcomes in stroke patients. However, the changes in the concentration level of blood biomarkers (CK, cTnT, IL-6) and MBI in this study were limited due to the small sample size. Larger sample size is recommended for future studies to confirm the influence of conventional rehabilitation on physiological changes in ischaemic and hemorrhagic stroke patients.

Supervisor:
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Co-supervisors:
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THE RELATIONSHIP BETWEEN INTOLERANCE OF UNCERTAINTY, RESPONSE OF UNCERTAINTY AND ANXIETY AMONG HEALTH CAMPUS STUDENT OF USM KUBANG KERIAN DURING COVID-19 PANDEMIC

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Introduction: The emergence of COVID-19 pandemic has brought significant changes to human life especially among university students which has caused unprecedented degrees of uncertainty that result in anxiety. Intolerance of uncertainty characterised by prospective anxiety and inhibitory anxiety while response of uncertainty marked by emotional uncertainty, cognitive uncertainty and desire for change.

Objectives: The current study aims to investigate the relationship between intolerance of uncertainty, response of uncertainty and anxiety among health campus students of USM Kubang Kerian

Methods: A total of 104 health campus students from USM Kubang Kerian have successfully recruited in this quantitative-based cross-sectional design study using non-probability sampling method, purposive sampling. Participants had completed intolerance of uncertainty scale (IUS), uncertainty response scale (URS) and generalised anxiety disorder-7 item (GAD) overall between April 2022 till early May 2022.

Results: The prevalence of anxiety among USM Kubang Kerian Health Campus students was found to be at mild level during at the last stage of COVID-19 pandemic before it was announced as endemic while the finding also depicts that prospective anxiety, inhibitory anxiety and emotional uncertainty have significant relationship with the generalised anxiety disorder while cognitive uncertainty and desire for change do not have a significant relationship with generalised anxiety disorder. In relative to that, emotional uncertainty was found to be the best predictor of generalised anxiety disorder with (Beta = 0.648, $P < 0.01$).

Conclusion: The prevalence of anxiety among USM Kubang Kerian Health Campus students was found to be at mild level during at the last stage of COVID-19 pandemic. It can be concluded that emotional uncertainty is significantly influence the general anxiety disorder among health campus student of USM Kubang Kerian.

Supervisor:
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Co-supervisor:
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THE EFFECTS OF FIBOD SMART BALANCE WITH TABLE SOCCER GAME ON ATTENTION AND MEMORY USING EYE TRACKING

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The objective of this study is to identify the relationship between the use of Fibod Smart Balance and cognitive functions, mainly attention and memory while wearing eye tracking device. The variables studied were focused on the participants' reaction time and accuracy. Thirty participants from USM Kubang Kerian were chosen at random. To measure their memory and attention, they had to take Visual Search Task and Figure Memory Task before and after intervention while wearing the eye tracking device. During the intervention phase, 15 participants in the control group were requested to lead their normal life, whilst the other 15 participants in the intervention group had to undergo a series of practice for one month, which a total

of 12 sessions consisting of 15 min per session. They had to play exergames called Table Soccer game in which they needed to practice their balance using a balance device called Fibod Smart Balance while playing the casual video games. Findings showed that there is no significant differences between intervention group and control group in terms of attention and memory. However, there is a significant difference between participants' reaction time of the eye movement during the attention task ($P < 0.001$). Therefore, it can be concluded that there is no significant effect between 4 weeks of intervention of Fibod Smart Balance and Table Soccer game with attention and memory, but a significant improvement showed in the reaction time of participants' eye movement during attention task.

Supervisor:
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Co-supervisor:
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EXAMINING THE EFFECTIVENESS OF SELF-COMPASSION INTERVENTION TO REDUCE BODY DISSATISFACTION AMONG MALAYSIAN YOUNG ADULTS

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Introduction: With the rise of mental health issues among adults, the exploration of psychological interventions can be diversified to cater to this need as a public health measure of improving general well-being. One issue of concern is body dissatisfaction which influences individuals' perception of their own physical appearance negatively. Research shows high levels of self-compassion is positively linked to better aspects of mental health and has benefits for body dissatisfaction. Previous studies found benefits of self-compassion intervention in reducing psychopathology including symptoms of body dissatisfaction.

Objectives: The current study aimed to examine whether there is a benefit of self-compassion intervention techniques in reducing levels of body dissatisfaction among young adults. To examine this, pre-and post-experimental design was conducted to see whether online self-compassion intervention has benefits on two aspects which are self-compassion and body dissatisfaction.

Methods: Nine undergraduate students fully completed the brief online self-compassion group intervention. They participated in a bi-weekly 1-h online group intervention for four weeks, for eight sessions. Self-Compassion Scale (SCS) and Body Shape Questionnaire (BSQ) were used to measure their levels of self-compassion and body dissatisfaction respectively. The participant's pre-and post-intervention level of self-compassion and body dissatisfaction were compared to identify any significant differences.

Results: Paired *t*-test statistical analysis showed no difference in both self-compassion level and body dissatisfaction level before and after the intervention.

Conclusion: The current study lacks sample size to arrive at a conclusive result. However, the intervention did not negatively affect levels of self-compassion or body dissatisfaction and can be considered safe. Implications are discussed and recommendation for future research is included.

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BRAIN BEHAVIOURAL STATE FROM EEG MICROSTATES ANALYSIS: EXPLORING THE IMPACTS OF QURANIC AND NON-QURANIC RHYTHMIC RECITATIONS

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Discovery of atoms of thought has led the way into understanding of not just the spatio-temporal dynamics of electroencephalography (EEG) data but has also opened a vast avenue for future research into understanding health and disease better by analysing the four canonical classes of EEG microstates. The four classes A, B, C and D have been linked to increased or decreased magnitude of their parametric variables like time duration, frequency of occurrence and time coverage under different mental and physical health conditions. The changes in EEG features and alteration in topographical maps of microstate classes because of music, meditation, rhythmic quality of sound and breathing exercises present a gap in research where a study that combines rhythm, spirituality, religious beliefs and the properties of sound can bridge the gap if it involves data dealing with neural signals produced after rhythmic auditory stimulation which can be processed and analysed by latest neuroscience Graphic User Interfaces (GUIs). The present study deals with retrospective EEG datasets collected during passive auditory stimuli of rhythmic Quranic and rhythmic non-Quranic in nature to the participants who met the inclusion criteria for the study. 30 subjects were recruited for the study with alpha value set at 0.05% at the power of 90%. The EEG data were then pre-processed, processed and analysed for microstate analysis of the data in MATLAB and EEGLAB. There were statistically significant findings in all three parameters (time coverage, time duration and frequency of occurrence) of the microstate classes examined. A statistically significant decrease in time coverage of microstate class C and time duration of microstate classes A, C and D during rhythmic Quranic recitation was noted in comparison to rhythmic non-Quranic auditory stimuli.

A statistically significant increase in frequency of occurrence of microstate classes B and D during rhythmic Quranic recitation as compared to rhythmic non-Quranic auditory stimuli was also noted in the present study. This study is an extension of the work on the Neuroscience-Quran Project by the team, and is first of its kind to highlight the scientifically intangible domain of spirituality, faith, effect of rhythmic Quranic and rhythmic non-Quranic auditory stimuli on brain-behaviour states. It serves as a steppingstone for the microstate analysis of EEG as neural correlates for the auditory stimuli of rhythmic Quranic verses research.

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BRAIN ACTIVATION CHANGES DURING RSFMRI FOLLOWING BRIEF MINDFULNESS EXERCISE: AN FMRI STUDY

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Introduction: Mindfulness is a practice involved in the volitional shifting of attention from the present moment to sensations. In the current study, the researcher is interested in performing rsfMRI on healthy participants to explore brain activation changes.

Objectives: The study aims to measure the changes in brain activation during rsfMRI before and after the brief mindfulness exercise and brief audiobook listening. Besides, to also determine the relationship between participants' mindfulness traits with the changes in brain activation after the brief mindfulness exercise and brief audiobook listening.

Methods: Six healthy participants, age ranged from 20 years old to 32 years old (23.33 [SD = 4.309]) were recruited through advertisement at Universiti Sains Malaysia. The research design of this study is quasi-experimental design. Functional magnetic resonance imaging (fMRI) neurotechnology tool is used to identify brain activations. An equal number of subjects were divided into the brief audiobook group (control) and brief mindfulness group (experimental). Upon screening process, a set of questionnaires consisting of the demographics, Physical Activity Readiness Questionnaire (PAR-Q), Edinburgh Handedness Inventory-Short Version (EHI), Malay Mindfulness Awareness and Attention Scales (MMAAS) and Positive and Negative Affect Schedule - Expanded Form (PANAS-X) were used.

Results: For MMAAS, participants in the brief audiobook group showed higher mindfulness traits compared to the brief mindfulness group. In the control group, higher activated brain activations were observed in the right and left angular gyrus, right precuneus, left middle temporal gyrus and left middle frontal gyrus. In a brief mindfulness exercise, increased activations were found in the left precuneus, right and left superior frontal gyrus,

right middle temporal gyrus and left superior medial frontal gyrus. No significant correlation between MMAAS and blood oxygen level-dependent (BOLD) signals, which is the percent signal change is observed in the audiobook group, and, a significant correlation in the right angular gyrus and anticorrelation in the right middle temporal gyrus were seen in the mindfulness group.

Conclusion: These findings suggest that a larger sample size is needed to increase the margin of error. The brief mindfulness group showed significant activations in the right angular gyrus and right middle temporal gyrus focusing on the default mode network (DMN) based on group fixed-effect analysis (FFX). This paves the way to conjoint other resting state networks into DMN in future research to better explore the brain activations changes in DMN in mindfulness studies.

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THE EFFECTS OF CHRONIC ADMINISTRATION OF MITRAGYNINE ON CORTICAL OSCILLATIONS IN RATS

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Mitragynine is the significant alkaloid extracted from the leaves of M. speciosa (Kratom). The leaves have been extensively used to relieve pain as well as to aid in opioid withdrawal symptoms. Previous studies have recorded that drug do affect cognitive mechanisms in human yet the debate over the potential side effects of the drug which includes addiction risk and cognitive decline is still ongoing and also its underlying neural activity remains unclear. Thus, this study was designed to investigate the changes in brain spectral power and theta coherence after repeated exposure to mitragynine in freely moving rats. Male Sprague-Dawley rats was implanted with electrodes on right and left frontal cortex, hippocampal cornu ammonis (CA1), subiculum and sensory cortex for wireless EEG recording. Mitragynine (1 mg/kg, 5 mg/kg and 10 mg/kg) was administered for 28 days, and EEG activity was recorded on day 7, 14, 21 and 28. The readings was transmitted to receiver and analysed for different frequency range, delta (0.1 Hz–4 Hz), theta (4 Hz–7 Hz), alpha (7 Hz–13 Hz) and beta (13 Hz–30 Hz). The results have demonstrated frequency specific changes in spectral power occurring selectively in both cortical and hippocampal regions. In cortical regions, a general increase in beta power with collateral reduction in alpha power is seen as novel effects of mitragynine, while a reduction in delta power is appreciated in both cortical and

hippocampal regions. Mitragynine induced reduction in theta coherence (4 Hz–7 Hz) was seen as disruptions in functional connectivity between left frontal cortex and sensory cortex. It can be concluded that, these findings show mitragynine induced frequency specific changes in cortical neural oscillatory activity and suppressed theta coherence could potentially impact cognitive functioning.

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COGNITIVE CHANGES IN STROKE PATIENTS FOLLOWING ROBOTIC REHABILITATION

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Introduction: Stroke continues to be a serious healthcare issue that has significant impact on the cognition. Different interventions are available for post-stroke patients to bounce back healthy again after obtaining a number of difficulties due to the stroke.

Objectives: The objective of this study is to investigate the effect of robotic rehabilitation and conventional rehabilitation on the cognition; specifically, through the domains of general cognition, memory and attention.

Methods: A randomised trial design was used on a sample of post-stroke patients undergoing rehabilitation at Hospital Universiti Sains Malaysia and the participants were recruited through convenient sampling. The total number of participants that were obtained are 10; six from the robotic group and four from the conventional group. The participants were assessed twice using Wechsler Abbreviated Scale of Intelligence-Second Edition (WASI-II), Wechsler Memory Scale-Third Edition Abbreviated (WMS-III) and Comprehensive Trail Making Test (CTMT). The first assessment was done at the initial stage of the intervention and another assessment was done after a one-month duration.

Results: The outcome of this study found that robotic rehabilitation has a higher improvement in terms of the cognitive domains of memory and attention, as opposed to conventional rehabilitation.

Conclusion: The limitations of this study includes the sample size, accessibility of participants and time limitation. Despite the limitations found throughout the study, the findings have contributed to the understanding of the efficacy of robotic rehabilitation in the aspect of cognition because robotic rehabilitation is fairly new to Malaysia and the

contributions of this findings act as a literary contribution to the field of rehabilitation medicine.

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GRIT AND GROWTH MINDSET AMONG HEALTH SCIENCES UNIVERSITY STUDENTS; THE ROLE OF PSYCHOSOCIAL LEARNING ENVIRONMENT

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Introduction: The psychosocial learning environment (PSLE) plays a vital role in cultivating positive traits such as grit and growth mindset. However, due to limited studies, not much is known about the learning environment setting in Malaysia and its impact on the development of the two constructs.

Objectives: This research aims to study the level of grit and growth mindset, study the relationship between grit and growth mindset, and identify the main characteristics of PSLE that contribute to grit and growth mindset among the population.

Methods: This quantitative study included 288 undergraduate health sciences students from Universiti Sains Malaysia (USM). The short grit scale (Grit–S), Dweck mindset instrument (DMI) and the Dundee ready education environment measure (DREEM) were used to assess grit, growth mindset and PSLE, respectively. Statistical Package for the Social Sciences (SPSS) version 27.0 was used to analyse the data, including descriptive analysis, Pearson's correlation coefficient and multiple regression analysis.

Results: Health sciences university students have a poor level of grit and moderate level of mindset (undecided type). It was also discovered that grit and a growth mindset had a positive relationship. Lastly, the results indicated that students' academic self-perception (SASP) and students' perception of teachers (SPT) were the PSLE features that contribute to grit and growth mindset among the population.

Conclusion: This study showed that few PSLE factors influence the development of grit and a growth mindset among health sciences university students, as it has highlighted the importance of cultivating these two constructs and their impact on students' experience on PSLE.

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LOCALISATION OF THE PRIMARY GUSTATORY CORTEX WITHIN THE INSULAR LOBE USING STRUCTURAL WHITE MATTER CONNECTIVITY EVIDENCE AS DETERMINED BY DIFFUSION TENSOR IMAGING

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Introduction: The primary taste cortex localisation has been inconsistent in previous research. The current study aims to divide the insular lobe into subdivisions to determine investigate their individual structural connectivity to taste processing areas of the brain.

Methods: Diffusion-weighted imaging data from thirteen healthy female participants were obtained from a database built in 2013. All participants had normal taste perception as determined by the modified Monell-Jefferson Taste and Smell Questionnaire. Probabilistic tractography using FMRIB Software Library (FSL) was performed to determine the relative connection probability of eleven divisions of insula lobes to target brain areas shown to be associated with taste processing, namely amygdala, frontal operculum and ventral striatum.

Results: The inferior part of the middle lobe and the inferio-posterior part of the anterior lobe of the insula had the highest connection probability to the areas of taste processing targeted in this research. The posterior lobe of the insula had the least connection probability to all targets as shown in previous research, while the frontal operculum had widespread connection to all lobes of the insula. The results of this research are with the statistical value of $P < 0.05$.

Conclusion: The inferior aspect of the middle lobe and the inferio-posterior part of the anterior lobe of the insula had the highest probabilistic connection to the areas of taste processing making it highly probable to be the site for primary taste cortex.

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