

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

### COMPARISON OF EASE OF INTUBATION IN PATIENTS USING C-MAC D-BLADE BETWEEN SIMULATED CORMACK LEHANE 1 AND 2 VIDEOLARYNGOSCOPIC VIEW: A RANDOMISED CONTROLLED TRIAL

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**Background:** Difficult intubation could result in both morbidity and mortality. Current surging popularity with videolaryngoscope such as C-MAC D-Blade can reduce the risk of complications associated with difficult intubation. Despite showing good glottis view, the unique laryngoscope shape could pose a problem during tracheal intubation. Having a lesser appearance of the glottis may hypothetically ease the endotracheal tube delivery. This study compares the ease of intubation in patients using C-MAC D-Blade between simulated Cormack Lehane 1 and 2 videolaryngoscopic view among adult patient undergoing elective surgery.

**Methods:** Ninety-four adults with no features of difficult intubation undergoing elective surgical procedures in Hospital Universiti Sains Malaysia Kelantan were recruited and randomly assigned to two groups either A for Cormack Lehane 1 ( $n = 46$ ) or B for Cormack Lehane 2 ( $n = 48$ ) videolaryngoscopic view. The outcome measured include duration of intubations, number of intubation attempts, and easiness of intubations.

**Results:** Duration of intubation was less ( $7.7 \pm 1.93$  s) in Group B than in Group A ( $9.2 \pm 2.49$  s) with a mean difference of  $1.4$  s (95% CI = 0.53, 2.35;  $P = 0.002$ ). There is no significant difference between the two groups in terms of the number of intubation attempts ( $P = 0.322$ ) and easiness of intubation ( $P = 0.78$ ).

**Conclusion:** Cormack-Lehane 2 videolaryngoscopic view significantly reduce time to intubation compared to Cormack-Lehane 1 videolaryngoscopic view when using C-MAC D-Blade.

*Supervisor:*  
Associate Professor Dr Rhendra Hardy Mohamad Zaini

*Co-supervisor:*  
Dr Mohamad Hasyizan Hassan

### COMPARISON OF THE EFFICACY OF INTRAVENOUS OXYCODONE VERSUS MORPHINE ON POST-OPERATIVE PAIN FOLLOWING ORTHOPAEDICS SURGERY UNDER GENERAL ANAESTHESIA

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**Background:** The introduction of intravenous (IV) oxycodone has replaced morphine as the first choice of opioid used in post-operative pain management in some countries. The aim of this study is to assess the efficacy of IV oxycodone versus morphine on post-operative pain following orthopaedics surgery under general anaesthesia.

**Methods:** Fifty-eight American Society of Anesthesiologists (ASA) physical status I–II patients were randomly assigned to receive either 0.08 mg/kg IV oxycodone (Group O,  $n = 29$ ) or 0.08 mg/kg morphine (Group M,  $n = 29$ ) at the starting of skin closure. Post-operative pain was evaluated using a visual analogue scale (VAS) from at 0 min, hourly till 6th hour post-operatively. The time to first rescue analgesia, requirement of the first and second rescue analgesia and adverse effects were assessed.

**Results:** Post-operative pain score did not differ significantly in Group O and Group M from 0 min, hourly till 6th hour post-operatively ( $P > 0.950$ ). There were no significant differences in the time to first rescue analgesia ( $P = 0.721$ ), requirement of first ( $P = 0.594$ ) and second rescue analgesia ( $P = 0.517$ ) and adverse effects in both groups.

**Conclusion:** Intravenous oxycodone is equipotent to morphine in treating acute post-operative pain following orthopaedics surgery and no increased risk of opioid related adverse events reported.

*Supervisor:*  
Dr Mohamad Hasyizan bin Hassan

*Co-supervisor:*  
Dr Rhendra Hardy bin Mohamad Zaini

### GRANISETRON VERSUS GRANISETRON AND DEXAMETHASONE ON THE REDUCTION OF POST-OPERATIVE NAUSEA AND VOMITING AFTER CAESAREAN SECTION WITH INTRATHECAL MORPHINE: A RANDOMISED CONTROLLED TRIAL

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**Introduction:** Intrathecal morphine (ITM) has proven to be excellent in reducing post-operative pain. However, its use is associated with the occurrence of post-operative nausea and vomiting (PONV). In this study, we wish to compare the efficacy between the combination therapy of granisetron and dexamethasone versus granisetron alone on the occurrence of PONV in parturients undergoing elective Caesarean delivery.

**Objectives:** To compare the efficacy between the combination therapy of granisetron plus dexamethasone versus granisetron alone on the occurrence of post-operative nausea and vomiting (PONV) in patients undergoing elective Caesarean section with intrathecal morphine. Also, to compare the incidence of nausea, retching and vomiting as well as the requirement of rescue antiemetics at 1 h, 4 h, 8 h, 12 h and 24 h post-operatively between both group of patients.

**Methods:** This is a prospective double-blinded, randomised controlled trial (RCT) involving 126 parturients of American Society of Anesthesiologist (ASA) physical status I and II undergoing elective Caesarean deliveries. Subjects were randomly allocated into two groups ( $n = 63$ ), to either receive a combination of intravenous (IV) granisetron 1 mg plus IV dexamethasone 4 mg (Group A) or to receive IV granisetron 1mg (Group B). Patients were assessed at 1 h, 4 h, 8 h, 12 h and 24 h post-operatively. Episodes of nausea, retching, vomiting and the requirement of rescue antiemetics at these time intervals were recorded.

**Results:** There are no statistically significant differences in the occurrence of nausea, retching and vomiting between both groups at 1 h, 4 h, 8 h, 12 h and 24 h post-operatively,  $P = 0.999$ . It was observed that the occurrence of PONV at 1 h post-operatively was similar between both groups. At 4 h post-operatively the occurrence of nausea and retching in group A was slightly more than in group B (8.8% versus 7%) but the incidence of vomiting was similar between both groups ( $P = 0.999$ ). At 8 h post-operatively, group A recorded a slightly higher occurrence of retching than group B (3.5% versus 1.8%) but then again, this is also statistically insignificant ( $P = 0.999$ ). There was an incident of retching in group B, but there was no episode of PONV seen in patients in group A (1.8% versus 0,  $P = 0.999$ ) at 12 h post-surgery. No episode of PONV were recorded thereafter. It was also found that the usage of rescue antiemetics were similar in both groups of subjects,  $P = 0.999$ .

**Conclusion:** The use of granisetron is comparable with the use of granisetron and dexamethasone in the prevention of PONV in parturients receiving intrathecal morphine for elective Caesarean section.

Supervisor:  
Dr S Praveena Seevaunnamtum

Co-supervisor:  
Professor Dr Nik Abdullah Nik Mohamad

### COMPARING THE EFFECT OF ELECTROACUPUNCTURE STIMULATION AT PC-6 ON HEMODYNAMIC AND VASOPRESSOR REQUIREMENT IN ELECTIVE SPINAL ANAESTHESIA: A RANDOMISED CONTROLLED TRIAL

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**Introduction:** Spinal anaesthesia (SA) is one of the commonest anaesthetic techniques used for lower limb surgery in orthopaedic and surgical cases. Post SA, there will be sympathetic blockage leading to a decrease in systemic vascular resistance and vasodilatation. Electroacupuncture (EA) is a form of complementary therapy with stimulation of the Pericardium-6 (PC-6) point that will stimulate the sympathetic response and helps to attenuate the hypotensive response post SA.

**Objectives:** The aims of this study were to assess intra-operative EA efficacy on patients' hemodynamic and vasopressors requirement in patients undergoing elective lower limb surgery with PC-6 acupoint stimulation under SA.

**Methods:** A total of 58 patients with American Society of Anaesthesiologist (ASA) I or II electively underwent lower limb surgery were randomised into two groups. Group EA received EA ( $n = 29$ ) intra-operatively or Group B ( $n = 29$ ) as a control. All patients received 250 mL of Ringer's lactate and induced under SA. Haemodynamic monitoring (MAP, HR) was recorded within a 5-min interval before SA until 1-h post-SA. A requirement of vasopressor has also been recorded.

**Result:** Mean (SD) MAP was statistically significant lower in Group B compared to Group EA (92.79 [14.11] versus 94.10 [20.28];  $P = 0.010$ ) at 0 min and (76.97 [8.73] versus 81.03 [11.65];  $P = 0.010$ ) at 1 h. There was no significant different for HR variation. Group B showed higher requirement of vasopressor ( $P < 0.001$ ).

**Conclusion:** This study showed stimulation of EA at PC-6 successfully attenuates the severity of hypotension and the requirement of vasopressors post (SA).

Supervisor:  
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Professor Dr Nik Abdullah Nik Mohamad

## ULTRASOUND ASSESSMENT OF DIAPHRAGM AS A PREDICTOR TOOL OF SUCCESSFUL EXTUBATION IN MECHANICALLY VENTILATED PATIENTS

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**Introduction:** Weaning failure is defined as failure to pass a spontaneous breathing trial or the need for re-intubation within 48 hours following extubation. An estimated 20% of all mechanically ventilated patients will encounter a failed extubation scenario. The pathophysiology of weaning failure is multifactorial but a recent factor of interest described in current literature is that of diaphragm dysfunction.

**Objectives:** The purpose of this study is to determine the role of ultrasound assessment of diaphragm as a predictor tool of successful extubation in mechanically ventilated patients

**Patients and Methods:** This study was carried out in Hospital Queen Elizabeth, Sabah and Hospital Universiti Sains Malaysia, Kelantan. Seventy-five mechanically ventilated patients who were planned for extubation and met the inclusion criteria were enrolled into the study. Written consent was obtained from the next of kin. Bedside diaphragmatic ultrasound was carried out prior to extubation to assess diaphragm excursion and diaphragm thickness fraction. The diaphragm ultrasound was performed by the clinician who had no role in the management of the patients. Extubation was based on intensivist's or anaesthetist's decision who were blinded of the ultrasound results. The patients were followed up for 48 h post-extubation.

**Results:** There was a statistically significant difference in both the mean diaphragm excursion and the mean diaphragm thickness fraction between the successful extubation group and the failed extubation group. When the diaphragm thickness fraction increased by 1%, the chance of successful extubation increased by 1.29 times.

**Conclusion:** Ultrasound assessment of diaphragm thickening fraction can be used as a predictor tool of successful extubation in mechanically ventilated patients.

Supervisor:  
Professor Dr Nik Abdullah Nik Mohamad

Co-supervisor:  
Associate Professor Dr Saedah Ali

## COMPARISON OF THE EFFICACY OF INTRATHECAL FENTANYL 20MCG VERSUS INTRATHECAL MORPHINE 0.2 MG AS AN ADJUVANT THERAPY IN SPINAL ANESTHESIA IN LOWER LIMB SURGERY

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**Introduction:** Spinal anesthesia is the preferred method of anesthesia for majority of the lower limb surgery. Intrathecal Morphine is an adjuvant used to provide prolonged analgesia post-operatively. The objective of this study was to investigate the efficacy of adding intrathecal morphine 0.2 mg by assessing the analgesic effect 24 h post spinal anesthesia and to assess the proportion of complication that ensues.

**Objectives:** To compare the total Visual analogue scale (VAS) 24 h post-operatively between intrathecal fentanyl and intrathecal morphine spinal anaesthesia block in lower limb surgery. Secondly, to determine the proportion of complications of nausea, vomiting, pruritus and sedation between intrathecal morphine and intrathecal fentanyl spinal anaesthesia block in lower limb surgery

**Methods:** Forty-three patients scheduled for various lower limb orthopedic surgery were studied in a prospective, single blinded controlled clinical trial. They were divided into two groups: i) patient in ITF group receive 2.8 mL of 0.5% hyperbaric bupivacaine with 20 mcg of fentanyl added whilst ii) patient in ITM group received 2.8 mL of 0.5% hyperbaric bupivacaine with 0.2 mg of morphine added. The primary outcome was the pain score within 24 h post-operatively while the secondary endpoint was to determine the proportion of complications (nausea, vomiting, pruritus sedation and respiratory depression) between the two groups.

**Results:** Intrathecal morphine group revealed significantly lower median pain score at 6th, 12th, 18th and 24th h post-op. There was a significant difference in VAS score between the ITF and ITM group over 24 h post-operatively. There is no difference in terms of incidence of nausea between two groups ( $P = 0.098$ ), higher incidence of vomiting ( $n = 9$ , 39.1%;  $P = 0.002$ ) and pruritus ( $n = 10$ , 43.5%;  $P = 0.001$ ) in ITM group. No incidence of respiratory depression was recorded in both ITF and ITM group.

**Conclusion:** Intrathecal morphine 0.2 mg as an adjuvant to spinal anesthesia provided prolonged 24 h analgesia with no respiratory depression but at the expense of increased vomiting and pruritus which can be prophylactically treated with antiemetics.

Supervisor:  
Associate Professor Dr Rhendra Hardy Mohamad Zaini

Co-supervisor:  
Associate Professor Dr Wan Mohd Nazaruddin Wan Hassan

### A SILVER ALGINATE COATED DRESSING TO REDUCE CATHETER-RELATED BLOODSTREAM INFECTION (CRBSI) AMONG ADULT ICU PATIENT: A RANDOMISED CONTROLLED TRIAL

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**Introduction:** Catheter-related bloodstream infection (CRBSI) is a bloodstream infection related to the presence of a central venous catheter (CVC) in the patient's vein. Many types of dressing have been used on CVC to reduce the numbers of CRBSI. However, the most ideal dressing to reduce CRBSI is still under study.

**Objective:** The aim of this study is to evaluate the effectiveness of silver alginate dressing in reducing CRBSI in comparison to conventional dressing among adult intensive care unit (ICU).

**Methods:** A total of 98 ICU patient from Hospital Universiti Sains Malaysia, Kelantan that were indicated for CVC insertion were divided randomly into two groups; Group 1 for silver alginate dressing ( $n = 49$ ) and Group 2 for conventional dressing ( $n = 49$ ). The CVC was subsequently applied with either silver alginate dressing or conventional dressing. Blood culture was withdrawn from the CVC lumen on day 6 of catheter placement or earlier if infection was suspected or prior removal of the catheter in the patient whose catheter no longer needed before 6th day. CVC was removed as soon as possible if no longer required or suspicious of catheter-related infection or when the duration was more than 14 days. Demographic data, catheter colonisation, the occurrence of local infection and CRBSI will be recorded.

**Results:** No subject in silver alginate group developed CRBSI and one subject in the conventional dressing group developed CRBSI, respectively ( $n = 0$ , 0% versus  $n = 1$ , 2.1%;  $P = 0.99$ ). Total of four subjects developed catheter colonization: one subject in silver alginate group and three subjects in the conventional dressing group, respectively ( $n = 1$ , 2.1% versus  $n = 3$ , 6.1%;  $P = 0.617$ ). Total of four subjects developed local infection: one subject in silver alginate group and three subjects in the conventional dressing group, respectively ( $n = 1$ , 2.1% versus  $n = 3$ , 6.1%;  $P = 0.617$ ). Silver alginate dressing group showed less proportion of CRBSI, catheter colonisation and local infection compared to conventional dressing. However, these results were not statistically significant with  $P > 0.05$ .

**Conclusion:** Silver alginate dressing is not effective in reducing CRBSI, catheter colonisation and local infection compared to conventional dressing.

Supervisor:  
Dr Sanihah binti Che Omar

Co-supervisors:  
Professor Dr Shamsul Kamarujan Hassan  
Associate Professor Dr Siti Suraiya binti Md Noor

### THE EFFECTS OF PROPHYLACTIC GRANISETRON ON MATERNAL HAEMODYNAMICS DURING ELECTIVE CAESAREAN SECTION UNDER SPINAL ANAESTHESIA: A RANDOMISED CONTROL STUDY

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**Introduction:** Neuraxial anaesthesia for caesarean delivery is preferred to general anaesthesia because it minimises the risk of failed intubation, ventilation and aspiration. Maternal hypotension, a recognised complication of post-spinal anaesthesia due to sympathetic blockage may be detrimental to the outcome due to pressure dependant uteroplacental flow. Granisetron, a selective 5-HT<sub>3</sub> receptor antagonist potentially improves hypotension despite its usage as anti-emetic for post-operative nausea and vomiting. The study conducted to determine the effects of prophylactic intravenous Granisetron on haemodynamics of parturients undergoing lower segment caesarean section (LSCS) under spinal anaesthesia (SA) as well as the usage of vasopressors intra-operatively. The Apgar score and post-operative nausea and vomiting will be observed.

**Objectives:** The aims of the study to compare haemodynamics in parturients undergoing LSCS receiving intravenous Granisetron pre-spinal anaesthesia and post-SA. The mean arterial pressure, the heart rate and vasopressors requirement were monitored. Additional assessment of post-operative nausea and vomiting and the Apgar scores at 1 min and 5 min after delivery for each group of patients were also recorded.

**Methods:** This was a stratified balanced randomisation (1:1), single blinded, parallel group study conducted in Hospital Universiti Sains Malaysia. Eligible participants were screened pre-operatively to meet the inclusion and exclusion criteria. Consented parturient scheduled for elective caesarean section under spinal anaesthesia were randomised into two arms, the group that received intravenous Granisetron pre-spinal anaesthesia versus the group that received intravenous Granisetron 30 min post-spinal anaesthesia using computerised software randomisation. A slow bolus of intravenous Granisetron 1 mg was given. All patients were subjected to standard spinal anaesthesia using intrathecal heavy Marcaine 1.9 mL (9.5 mg) in combination with intrathecal morphine 0.1 mg and intrathecal fentanyl 25 mcg. Spinal anaesthesia is given at the level L3/L4 or L4/L5 using Pencan or Spinocan size 27 G or 25 G. All participants were placed on the operating table in the supine position, 15° of left lateral tilt with supplemental oxygen nasal prong 3 L/min and standard haemodynamic monitoring, non-invasive blood pressure, SPO<sub>2</sub>, ECG and end tidal CO<sub>2</sub>. Haemodynamics and vasopressors requirement were recorded every 3 min for 30 min from the start of spinal anaesthesia. We used an analysis of variance (ANOVA) for

the primary end point which studied mean arterial pressure and heart rate. The requirement of vasopressors was analysed using Chi-squared test. The Apgar score and post-operative vomiting were observed.

**Results:** The results show that the mean MAP of parturients given intravenous granisetron pre-spinal anaesthesia results was higher compare to the post-spinal anaesthesia results for each time of measurements ( $P < 0.05$ ). There was no significant different between the two groups as for heart rate variation. The comparison between the two groups vasopressors usage show significant difference ( $P < 0.05$ ), whereby the group that receives intravenous Granisetron prior of SA had stable haemodynamic and require less vasopressor compare to the other group. Both groups have no different in term of Apgar score and post-operative nausea and vomiting.

**Conclusion:** Intravenous Granisetron administration prior to spinal anaesthesia stabilise haemodynamic of parturients LSCS.

*Supervisor:*  
Dr S Praveena a/p Seevaunnamtum

*Co-supervisor:*  
Dr Mohd Zaini Abu Bakar

## COMPARISON OF THE PRE-EMPTIVE ANALGESIA OF LOW DOSE INTRAVENOUS KETAMINE IN COMBINATION WITH INTRAVENOUS PARECOXIB VERSUS INTRAVENOUS KETAMINE ALONE ON PATIENTS UNDERGOING LAPAROTOMY UNDER GENERAL ANAESTHESIA

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**Introduction:** Pre-emptive analgesia is important for post-operative analgesia and reducing opioids requirement and their side effects after major surgery.

**Objectives:** The aim of this study is to compare the efficacy of low dose IV ketamine in combination with IV parecoxib versus IV ketamine alone as pre-emptive analgesia in patients undergoing laparotomy under general anaesthesia.

**Methods:** A total of 48 patients scheduled for laparotomy under general anaesthesia were randomised into two different groups of pre-emptive analgesia: Group R: low dose IV ketamine 0.3 mg/kg in combination with IV parecoxib 40 mg ( $n = 24$ ) and Group C: IV ketamine 0.3 mg/kg alone in combination with placebo (normal saline) ( $n = 24$ ) and administered before induction of anaesthesia. Both groups received standardised technique of general anaesthesia and post-operative analgesia using patient-controlled analgesia of morphine (PCAM). Both groups were assessed for dosage of rescue analgesia requirement at the

recovery bay, pain intensity using visual analogue scale (VAS) over 24 h, time for the first PCAM demand and total dose requirement of intra-operative and post-operative opioids.

**Results:** Group R showed lower dose of rescue analgesia requirement at recovery bay (6.25 [16.9] versus 20.8 [28];  $P = 0.035$ ), longer time for the first PCAM demand (70.8 [40] versus 22.2 [15.7];  $P < 0.001$ ), less total requirement of PCAM within 24 h post-operatively (-8.04 [4.6] versus -16.8 [6.46];  $P < 0.001$ ) and less VAS at an hour and subsequently 4 hourly interval over 24 h than Group C.

**Conclusion:** Combination of low dose IV ketamine and IV parecoxib was more effective as pre-emptive analgesia compared to IV ketamine alone for post laparotomy patients who were on PCAM as post-operative analgesia.

*Supervisor:*  
Associate Professor Dr Wan Mohd Nazaruddin W Hassan

*Co-supervisors:*  
Associate Professor Dr Saedah Ali  
Dr Abdul Karim Othman

## COMPARISON OF STANDARD MONITORING AND PLETHYSMOGRAPHIC VARIABILITY INDEX-GUIDED FLUID THERAPY IN SEVERE TRAUMATIC BRAIN INJURY PATIENTS SCHEDULED FOR EMERGENCY CRANIOTOMIES: A RANDOMISED CONTROL TRIAL

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**Introduction:** Fluid management in traumatic brain injury (TBI) patients is crucial. Both excessive and inadequate fluid worsen secondary brain injury. Previous studies showed plethysmographic variability index (PVI) to be beneficial in guiding fluid therapy.

**Objectives:** We aim to investigate the merit of PVI-guided fluid therapy for severe TBI patients scheduled for emergency craniotomies.

**Methods:** Sixty-four patients were equally assigned to standard monitoring (SM), which includes MAP, HR, urine output and PVI group. In the SM group, patient were given fluids if MAP  $< 70$  mmHg or HR  $> 100$  bpm. In the PVI group, if PVI  $\geq 13\%$ , patients were given fluids. Blood products were given if haemoglobin  $< 10$  g/dL in both groups. Primary outcomes were total volume and types of fluid administered. Secondary outcome was laboratory parameters (serum lactate, sodium, chloride, pH, base excess, creatinine) at 0 h and 24 h post-operatively. Independent *t*-test was used to analyse the amount of fluids used and the difference in laboratory parameters at 0 and 24 h.

**Results:** There were no significant differences in term of the mean amount of fluid administered (6352.72 [2134.82] and 5917.50 [2171.42];  $P = 0.422$ ) and types of

fluid administered between the two groups within 24 h. The changes of lactate, sodium, chloride, pH, base excess and creatinine between 0 h and 24 h for both groups were comparable and within clinical range.

**Conclusion:** PVI guided fluid therapy showed no difference in amount and type of fluids given to patient with severe TBI when compared to standard monitoring.

*Supervisor:*  
Dr Laila Ab Mukmin

*Co-supervisor:*  
Professor Dr Shamsul Kamalrujan Hassan

### STUDY OF PREVALENCE AND RISK FACTORS FOR DEPRESSION AND ANXIETY AMONG CHRONIC PAIN PATIENTS IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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**Introduction:** Psychological disorder namely anxiety and depression often co-exist in chronic pain patient. Likewise affective disorder more likely to express pain differently. Concomitant anxiety and depression in chronic pain were difficult and challenging to manage. To date, the predisposing factors to these affective disorder were largely inconclusive.

**Objectives:** To determine prevalence of anxiety and depression among Chronic pain patient as well as to determine association between anxiety and depression among chronic pain patient. and to predict factor associated with anxiety and chronic pain.

**Patients and Methods:** One hundred and sixteen patients with chronic pain were given set of questions related to their general well-being and demographic details. Question contains HADS-A and HADS-D either in original English and validated Malay version. The severity of anxiety and depression were recorded and analysed.

**Results:** Prevalence of anxiety and depression were 28.4% and 26.7%, respectively. Anxiety had a positive association with depression among chronic pain patient. Factors such as age, gender, race, educational status, employment status, income, severity of pain, age of diagnosis, duration of pain and treatment of pain did not predict depression. However employment, income, duration of pain, diagnosis age and etiology of pain can predict anxiety.

**Conclusion:** The relationship between depression and anxiety with chronic pain were complex. Affective disorder can occurs as result of chronic pain and vice versa. Anxiety and depression has significant positive association. Addition of the screening of anxiety and depression in chronic pain

patient who come for treatment may help in timely manage their affective disorder as well as helping in their chronic pain.

*Supervisor:*  
Associate Professor Dr Saedah Ali

*Co-supervisor:*  
Dr Ariffin Marzuki Mokhtar

### THE PRACTICE, OUTCOME AND COMPLICATIONS OF TRACHEOSTOMY FOR TRAUMATIC BRAIN INJURY PATIENTS IN NEUROSURGICAL INTENSIVE CARE UNIT

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**Introduction:** The tracheostomy procedure is commonly required for weaning of severe traumatic brain injury (TBI) patients.

**Objectives:** The aim of this study was to determine the practice, techniques and outcomes for TBI patients in neurosurgical intensive care unit (neuro-ICU).

**Methods:** This was a retrospective, cross sectional study from 1 January 2013 until 31 December 2017, involving 268 severe TBI patients who required tracheostomy during neuro-ICU management. The data were obtained from their medical records.

**Results:** If based on techniques, percutaneous tracheostomy (PT) was significantly shorter day of tracheostomy plan (7.0 [2.5] versus 8.3 [2.6] days;  $P < 0.001$ ), day of execution (7.2 [2.6] versus 8.6 [2.9] days;  $P < 0.001$ ), duration of mechanical ventilation (9.8 [3.4] versus 11.3 [3.1] days;  $P < 0.001$ ) and duration of ICU stay (12.3 [3.7] versus 13.8 [3.5] days;  $P < 0.003$ ) than surgical tracheostomy (ST). If based on timing of tracheostomy, early tracheostomy (ET) showed significantly shorter day of decision (4.9 [1.0] versus 8.7 [2.4] days;  $P < 0.001$ ), day of referral to otorhinolaryngology team (5.0 [0.9] versus 8.8 [2.3] days;  $P < 0.001$ ), day of tracheostomy plan (5.9 [1.0] versus 9.9 [2.2] days;  $P < 0.001$ ), day of execution (6.0 [0.9] versus 10.3 [2.6] days;  $P < 0.001$ ), duration of mechanical ventilation (8.8 [2.1] versus 12.9 [2.9] days;  $P < 0.001$ ), duration of ICU stay (11.4 [2.4] versus 15.2 [3.5] days;  $P < 0.001$ ) and duration of hospital stay (17.1 [3.2] versus 20.0 [4.0] days;  $P < 0.001$ ) than late tracheostomy (LT). However, LT showed significantly better GCS at discharge (9.8 [2.6] versus 8.3 [2.7];  $P < 0.001$ ) and GOS at 6 months (3.7 [0.8] versus 3.3 [0.8];  $P < 0.001$ ).

**Conclusion:** PT showed shorter duration of mechanical ventilation and ICU stay than ST. Whereas, ET showed shorter duration of mechanical ventilation, ICU stay,

and hospital stay than LT. However, LT showed better GCS at discharge and GOS at 6 months.

*Supervisor:*

*Associate Professor Dr Wan Mohd Nazarudin Wan Hasan*

*Co-supervisor:*

*Dr Mohd Hasyizan Hassan*

## ASSOCIATION BETWEEN ROUTINE PRE-OPERATIVE ELECTROCARDIOGRAM FINDINGS WITH PERI-OPERATIVE ELECTROCARDIOGRAM CHANGES IN NON-CARDIAC SURGERIES AMONG LOW CARDIAC RISK PATIENTS: A CROSS-SECTIONAL STUDY

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**Introduction:** Pre-operative electrocardiogram (ECG) plays a big role in detecting any underlying myocardial pathology. Recent evidence also suggests for pre-operative ECG in patients with symptoms and at increased cardiac risk undergoing non-cardiac surgeries. However, to screen all patients especially those without symptoms with low cardiac risk might add burden to the burgeoning healthcare cost.

**Objective:** To determine the proportion of abnormal pre-operative ECG in low cardiac risk patients aged 40 years old and above and factors associated with it and its association with actual development of peri-operative ECG abnormalities in patient undergoing non-cardiac surgery under general or regional anaesthesia.

**Method:** A cross-sectional study design was adopted in this research. A total of 406 subjects were recruited in this study. They were aged 40 years old and above, ASA 2 and below, NYHA class 2 and below as well as patient who had low revised cardiac risk index (RCRI) that were admitted for non-cardiac surgeries in HUSM. Study sample were selected by convenient sampling. Pre-operative ECG was done during routine pre-operative anaesthetic assessment. Subsequent ECG assessments were done at: i) after induction of anaesthesia, ii) any changes in the cardiac monitoring and iii) one hour post-extubation period. ECG abnormalities include axis deviation, atrial fibrillation, bundle branch block, left ventricular hypertrophy, premature ventricular complexes more than six beats per minutes, Q wave, S-T segment changes, sinus tachycardia or bradycardia, supraventricular tachycardia, ventricular tachycardia and ventricular fibrillations. All ECG diagnoses were done by cardiologist following the recommendation by AHA/ACCF/HRS. Multiple logistic regression was used to determine the association between pre-operative ECG findings and new or worsening peri-operative ECG changes.

**Results:** A total of 132 patients (32.5%) had abnormal pre-operative ECG and of this abnormal pre-operative ECG, 53 patients (40.2%) experienced new or worsening ECG

peri-operatively. Factors associated with abnormal pre-operative ECG were: i) age ( $RR = 1.02$ , 95% CI: 1.01, 1.03;  $P < 0.001$ ); ii) male ( $RR = 1.41$ , 95% CI: 1.13, 1.77;  $P < 0.05$ ); iii) smoker ( $RR = 1.62$ , 95% CI: 1.04, 2.52;  $P < 0.05$ ) and iv) hypertension ( $RR = 1.28$ , 95% CI: 1.01, 1.62;  $P < 0.05$ ). Patients who had abnormal pre-operative ECG changes were associated with higher incidence of developing new or worsening ECG peri-operatively than patients with normal pre-operative ECG findings (40.2% versus 14.2 %,  $\chi^2(df) = 34.15$  (1);  $P = < 0.001$ ). The most common ECG findings were left axis deviation (pre-operative,  $n = 69$  [17%]; peri-operative,  $n = 71$  [17.5%]) and T wave inversion (pre-operative,  $n = 44$  [10.8%]; peri-operative,  $n = 53$  [13.1%]). After adjusting for covariates, the odds of developing new or worsening peri-operative ECG were found to be higher in patients who had abnormal pre-operative ECG findings (OR: 4.41, 95% CI: 2.62, 7.39;  $P < 0.001$ ) and lower intra-operative heart rate (OR: 2.71, 95% CI: 1.55, 2.74;  $P < 0.001$ ). Among patients with abnormal pre-operative ECG findings, the most common new ECG findings during intra-operative and post-operative was sinus bradycardia, 16 patients (13.5%) and 20 patients (16.8%), respectively.

**Conclusion:** Proportion of abnormal ECG in low cardiac risk patient age 50 years old and above is considerably significant. Those with abnormal pre-operative ECG were significantly associated with new or worsening peri-operative ECG abnormalities.

*Supervisor:*

*Dr Laila Ab Mukmin*

*Co-supervisors:*

*Associate Professor Dr Saedah Ali*

*Dr Wan Yus Haniff Bin Wan Isa*

## THE EVALUATION OF PROGRAM DEATH 1 AND PD-1 LIGAND EXPRESSIONS IN HISTOLOGICAL SUBTYPES OF PRIMARY EXTRANODAL NON HODGKIN LYMPHOMA

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**Introduction:** Emergence of programmed death 1 (PD-1) and its ligands, PD-L1 immunotherapy provide new insight in the treatment modality of malignancies. The responsiveness of the patients are associated with the expressions of the PD-L1 and PD-1 protein. We aimed to evaluate the expression of PD-1 in the tumour microenvironment and PD-L1 in the tumour cells with histological subtypes of primary extranodal non-Hodgkin lymphoma (peNHL).

**Methodology:** A retrospective cross-sectional study using 87 archived formalin fixed paraffin-embedded tissue blocks of patients diagnosed with peNHL. Samples were stained for PD-1 and PD-L1 by immunohistochemistry method and the proteins expressions were evaluated

microscopically. The association between expression of the PD-1 and PD-L1 with subtypes of peNHL were statistically analysed.

**Results:** Majority of the cases are negative expression of PD-L1 in the tumour cells ( $n = 46$ , 52.9%), however majority are positive for PD-1 expression in the tumour microenvironment ( $n = 57$ , 65.5%). Significant associations were found between PD-1 and PD-L1 expression with subtypes of peNHL ( $P < 0.05$ ) and higher expression was found in DLBCL.

**Conclusion:** Our study, the first in Malaysia to explore expression of PD-1 and PD-L1 in peNHL, demonstrates significant association of PD-1 and PD-L1 expressions with subtypes of peNHL which may impact treatment of these patients in the future.

*Supervisor:*

*Dr Faezahtul Arbaeyah Hussain*

*Co-supervisors:*

*Dr Pavitratha Puspanathan*

*Dr Asyilla Che Jalil*

### THE EXPRESSION OF EGFR AND PEGFR IN NASOPHARYNGEAL CARCINOMA PATIENTS IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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**Introduction:** Nasopharyngeal carcinomas (NPC) are squamous cell carcinomas arising from the mucosal epithelium of the nasopharynx that commonly observed at the fossa of Rosenmüller. Although the role and mechanism of EGFR in NPC are not fully understood however, activation of EGFR pathways promotes tumour cell growth and prevents apoptosis, tumour invasion and metastasis, induces chemoresistance and radio-resistance. Furthermore, overexpression of EGFR was associated with tumour recurrence and poor survival in NPC patients.

**Objectives:** The aim of this study was to investigate the expression of EGFR and pEGFR on NPC including the cellular localisation, extent, and intensity and the possibility of cellular translocation from the cell membrane into nucleus and to associate findings with clinicopathological parameters.

**Methods:** Thirty-four cases of NPC were diagnosed and treated in Hospital Universiti Sains Malaysia from year 2005 to 2018. The cases were examined for EGFR and pEGFR immunohistochemistry expression to study the cellular localisation and possible cellular translocation of EGFR and pEGFR. The extent and intensity of EGFR and pEGFR expression were calculated using descriptive analysis. The association between clinicopathological parameters with EGFR and pEGFR expression were then analysed using Fisher's exact test or Chi-square test.

**Results:** All NPC cases were positive that showed membranous expression of EGFR and pEGFR with no

significant association with clinicopathological parameters; 67.6% of NPC cases, showed membranous and nuclear localisation of pEGFR that indicated evidence of cellular translocation and 91.3% pEGFR cellular translocated cases were in advanced TNM staging (stage IV) ( $P = 0.217$ ).

**Conclusion:** All NPC cases were positive for EGFR and pEGFR membranous expression. Only pEGFR showed cellular translocation (shuttle) from cell membrane into nucleus. Most of pEGFR cellular translocated cases were at TNM stage IV, indicating that nuclear localisation of pEGFR in NPC cells carry poor prognosis.

*Supervisor:*

*Dr Aidy Irman Yajid*

*Co-supervisor:*

*Dr Norzalina Zawawi*

### A STUDY ON DENGUE FEVER PRESENTATION AND OUTCOME IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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**Introduction:** Dengue fever is one of the most endemic infectious disease in Malaysia and the number of cases increases each year. Patients may present in various phases and forms of dengue, which can progress to severe dengue. In clinical practice, identifications of severe dengue risk factors has its important implications. During an outbreak of dengue infection or dengue endemic, it will help the physicians to prioritise care and anticipate deterioration in managing the patients. It offer clues on which patient may progress to severe dengue and its complications.

**Objectives:** The aims of this study were to determine the sociodemographic, presentation and outcome of patients with dengue infection in our population. We also aimed to determine the prevalence of severe complication of dengue infection and the risk factors associated with severe complication in adult patients in order to help physicians prioritise their management of high-risk dengue patients.

**Methods:** This retrospective study involved patients aged 12 years old and above with positive dengue infection presented to emergency department in our tertiary, suburban hospital and admitted, from year 2016–2018. Factors associated with severe dengue infection, sociodemographic patterns, presentation and complications of dengue patients were identified.

**Results:** A total of 327 cases were included, with 66 patients (20.2%) contracted severe dengue. Most common symptoms was loss of appetite (75.2%), followed by fever (65.7%) and vomiting (55.7%). Most common complication was dengue shock syndrome (18.3%) followed by respiratory distress (1.2%). Factors predictive of severe dengue include shortness of breath (AOR: 5.82, 95% CI: 1.37, 24.69;  $P = 0.017$ ), diarrhoea (AOR: 0.49, 95% CI: 0.27, 0.91;  $P = 0.023$ ),



tachycardia (AOR: 2.85, 95% CI: 1.59, 5.10;  $P = 0.001$  and hepatomegaly (AOR: 2.76, 95% CI: 1.24, 6.18;  $P = 0.013$ ).

**Conclusion:** Identifying factors predictive of severe dengue may help physicians in prioritising the patients care and anticipate deterioration and complications. Factors associated with severe dengue in this study were shortness of breath, diarrhoea, tachycardia and hepatomegaly.

Supervisor:  
Dr Junainah Nor

## COMPARISON OF PREHOSPITAL INDEX WITH MGAP SCORE TO DETERMINE OUTCOME IN TRAUMA PATIENTS PRESENTED TO EMERGENCY DEPARTMENT HOSPITAL TENGKU AMPUAN RAHIMAH KLANG, SELANGOR

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**Background:** Trauma is one of the leading causes of death worldwide including Malaysia. Death due to trauma is best explained by the Trimodal Death Model, death occurring immediately after trauma, intermediate death several hours after trauma and delayed death. The importance and significance of pre-hospital score system is to reduce the death rate in the intermediate group which can be prevented if given treatment in a timely manner.

**Objectives:** The objective of this study is to determine the outcome (mortality, length of hospital stay, major surgery and morbidity) of patients in relation to the score calculated using pre-hospital index (PHI) score and mechanism, Glasgow Coma Scale (GCS), age and pressure (MGAP) score in trauma patients.

**Methods:** This was a cross sectional observational study, using retrospective data from May 2019 till April 2020. A total of 502 patients were recruited, PHI and MGAP scores were calculated based on pre-hospital clerking done by responder at the scene or en route to the hospital. Convenient sampling was used with the researcher recruiting upon patient arrival in ED and follow up patient until they are discharged or until maximum 30 days post-trauma for prolonged hospitalisation cases.

**Results:** All 502 patient's data were analysed. Pearson's Chi-squared test was used to measure the finding of both scores. Both PHI and MGAP score were significant with a  $P$ -value of  $< 0.01$  in determining patient's general outcome (mortality, morbidity, prolonged hospital stay and major surgery prediction). However, PHI has higher sensitivity and specificity 72.97% and 95.91%, whilst MGAP scores are 24.32% and 2.64%. Kappa was used to compare the association between the scores with the standard score to predict individual outcome of mortality, morbidity, prolonged hospital stay and prediction of major surgery. Both scores failed to predict prolonged hospitalisation. For major surgery

prediction also both scores failed to show significant result and Kappa score was less than 0, MGAP (-0.012) and PHI (0.060). In the prediction of morbidity and mortality PHI score showed slight agreement with ISS score, morbidity (0.299) and mortality (0.431), whilst MGAP showed no agreement for morbidity (-0.051) and mortality (-0.060).

**Conclusion:** We conclude that, between both scoring system, PHI has a better specificity and sensitivity in determining the outcome of trauma patients. However, both scores have low to no agreement with ISS score in predicting prolonged hospitalisation, major surgery prediction, morbidity and mortality. PHI can be used as screening tool to facilitate and tighten the management of trauma patients from the scene till arrival of patient to the hospital.

Supervisor:  
Dr Mimi Azliha binti Abu Bakar

Co-supervisor:  
Associate Professor Dr Tuan Hairulnizam bin Tuan Kamauzaman

## MANAGEMENT OF IN-FLIGHT MEDICAL EMERGENCIES: A STUDY ON KNOWLEDGE AND CONFIDENCE AMONG EMERGENCY DEPARTMENT DOCTORS IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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**Introduction:** In-flight medical emergencies are common and the numbers are expected to rise as the world population ageing. This research is to study on knowledge and confidence among emergency department doctors in the management of in-flight medical emergencies.

**Methods:** This cross-sectional study used a self-administered questionnaire conducted among doctors in the emergency department of a tertiary hospital in the east-coast of Malaysia from January 2019 to January 2020. The validated questionnaire which was adapted from a study done in the United States (Katzner et al.) consists of a total three sections on demographic data, confidence and knowledge on the management of in-flight medical emergencies.

**Results:** There were a total of 132 respondents. Majority of respondents were medical officers (53.8%) and most of them were divided in the age group 25 years old–30 years old (43.2%) and 31 years old–35 years old (46.2%). In addition, majority of respondents had working experience of 5 years and less in clinical field (47.7%). The mean knowledge score was 5.22/9. Only 38.6% of doctors felt confident in managing in-flight medical emergencies. There was a significant association between number of years working in clinical field with knowledge level ( $P = 0.032$ ) and confidence level ( $P = 0.006$ ). However, there was no significant association between knowledge and confidence level with previous healthcare training.

**Conclusion:** Our current local training should include management of in-flight medical emergencies to improve the knowledge and confidence level among doctors.

*Supervisor:*  
Dr Ariff Arithra

### KNOWLEDGE, ATTITUDE AND PRACTICE TOWARDS DISASTER PREPAREDNESS AMONG EMERGENCY DEPARTMENT MEDICAL PERSONNEL IN EMERGENCY DEPARTMENTS IN MALAYSIA

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**Introduction:** Disasters are phenomenon that causes damage in properties and lives. Disaster preparedness is an action to be taken in systematic planning with regards to disaster. Natural disasters happen almost every year throughout the world which includes landslides, tsunami, floods and typhoons and etc. It includes to foresee and if possible, to prevent disaster and attenuate the impact of the disaster on individuals and societies. Disaster preparedness also includes to respond to and effectively cope with their sequel. Mitigation, preparedness, response and recovery are the four phases of emergency management.

**Objectives:** The aim of this study are to determine the level of knowledge, attitude and practices (KAP) among ED medical personnel in Malaysia in disaster preparedness and to study the associated factors between the different level of knowledge, attitude and practices among ED medical personnel

**Methods:** This cross-sectional study was conducted in 12 hospitals in Peninsular Malaysia which were randomly selected. A self-administered questionnaire regarding the knowledge, attitude and practices towards disaster preparedness comprise of 37 questions were used. A total of 427 participants were recruited. This study was carried out for 1 year from March 2019–March 2020.

**Results:** This study showed that emergency medicine staff personnel in Malaysia had adequate knowledge, attitude and practice towards disaster preparedness which score 91.6%, 78.2% and 61.1%, respectively. Experience and training in disaster response were significant predictors associated with increased level of knowledge and practice. Duration of working experience was also associated with increased level of practice. However, there were no significant association found with level of attitude and disaster preparedness.

**Conclusion:** The level of knowledge, attitude and practice was satisfactory in ED medical personnel. Curriculum on theories and practices of disaster preparedness should be incorporated to mentally prepare emergency department staff in the event of disaster.

Continuous education and training of staff is important to improve the healthcare system.

*Supervisor:*  
Dr Abu Yazid Noh

*Co-supervisor:*  
Dr Afifah Sjamun

### DISCHARGE AGAINST MEDICAL ADVICE IN EMERGENCY DEPARTMENT HOSPITAL UNIVERSITI SAINS MALAYSIA; ASSOCIATED FACTORS, REASONS AND SHORT TERM FOLLOW UP RATE

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**Introduction:** Discharge against medical advice (DAMA) is studied worldwide in multiple setting alongside the quality improvement of health service delivery. There were currently limited studies on DAMA in the emergency department in Malaysia. This study aims to look at the prevalence of DAMA in the study setting, their associated factors, reasons, and short term follow up rate.

**Methods:** This was a prospective case-control study among 264 patients (88 cases and 176 control) over a three-month period of June 2019 until August 2019 in the Emergency Department (ED) of Hospital Universiti Sains Malaysia, Kelantan. Consented phone call interviews were conducted day 3–day 5 after the discharge of DAMA patients to find out on any 72-h follow-up to any health facility and their reason for DAMA.

**Results:** Prevalence of DAMA in ED was 6.36 in 1,000 patient population. When adjusted with other confounding factors, in every year increase of age, the odds of having DAMA was 8% higher (AOR: 1.08; 95% CI: 1.01, 1.17) and female was lower compared to male (AOR: 0.27; 95% CI: 0.12, 0.62). For the interaction effect between age and triage, the odds of having DAMA was 9% lower (AOR: 0.91; 95% CI: 0.83, 0.99) in green zone patients interacting with increasing age compared to the red zone. DAMA was 35% higher (AOR: 1.35; 95% CI: 1.00, 1.82) in green zone patients interacting with the increasing length of stay in ED compared to red zone patients. One-fifth of DAMA patient came for short term follow up and most others were well. DAMA were due to socioeconomic reasons mostly, but the highest percentage of reason subcategory expressed for DAMA was the 'relief of symptoms or feeling well'.

**Conclusion:** DAMA was associated with increasing age, male patient, and interaction of triage factor to the age and length of stay in the hospital. Although the prevalence of DAMA was low, tailored finding in the studied facility could prompt further improvisation in administrative and practice

setting by further understanding of DAMA associated factors and reasoning.

*Supervisor:*  
Professor Dato' Dr Nik Hisamuddin Nik Ab Rahman

## ERGONOMIC RISK ASSESSMENT AMONG DOCTORS PERFORMING FOCUSED ASSESSMENT WITH SONOGRAPHY FOR TRAUMA (FAST) IN THE EMERGENCY DEPARTMENT HOSPITAL UNIVERSITI SAINS MALAYSIA

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**Introduction:** This study aimed to explore workplace ergonomic risk assessment and its associated factors among emergency doctors who performs focused assessment with sonography for trauma (FAST).

**Methods:** This prospective cross-sectional pilot study involved 42 doctors. The participants were selected using convenient sampling method from the emergency department. They were requested to perform FAST on a simulated mannequin in three different positions namely standing, sitting on a chair and sitting on the bed. The whole process was recorded and timed in a video camera and subsequently assessed for ergonomic musculoskeletal risk (MSD) using rapid entire body assessment (REBA) scoresheet.

**Results:** The study showed that performing FAST while sitting on chair was relatively higher risk of developing MSD (mean 10.3, high risk category) followed by sitting on the bedside (mean 6.9, moderate risk category) and standing (mean 6.09, moderate risk category).

**There were no statistically significant sociodemographic factors that can be related to the risk of MSD ( $P > 0.05$ ). There were also no statistically significant association between time to achieve optimum FAST image and the REBA risk score ( $P > 0.05$ )**

**Conclusion:** Ergonomic modification should be considered for FAST examination in the emergency department in order to prevent further injury towards the health care practitioners. In centers with limited ergonomic facilities, FAST upon standing or sitting on the bed is recommended. More studies in the field of ergonomic is needed in the emergency department.

*Supervisor:*  
Associate Professor Dr Hashairi Fauzi

*Co-supervisor:*  
Associate Professor Dr Shaik Farid Abdul Wahab

## A RANDOMIZED CONTROLLED TRIAL ON OUTCOME OF REST ALONE VERSUS REST WITH MEDICATION FOR HYPERTENSIVE URGENCY MANAGEMENT IN EMERGENCY DEPARTMENT

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**Background:** Different approaches in the management of hypertensive urgency are currently practiced worldwide. All aim for lowering blood pressure to some degree with no concurrent precipitous reduction in light of the risk it may convene. Recent 2018 Malaysia Clinical Practice Guideline suggests a 2-h rest period before the administration of antihypertensive medication.

**Methods:** A prospective randomised, controlled study was conducted in the Emergency Department of Hospital Universiti Sains Malaysia from May 2019 to April 2020. Its aim was to compare the two novel approaches; rest alone versus rest with early antihypertensive medication to patients diagnosed with hypertensive urgency in the first 2 h of diagnosis. Serial blood pressure measurements were made and analysed for the efficacy of both treatment modalities.

**Results:** In total, 80 patients were enrolled in this study. There was no statistical difference in the systolic blood pressure and diastolic blood pressure reduction by percentage in the rest alone group versus the rest with medication group after 2 h of treatment where both groups showed a comparable reduction. The rest with medication group showed a faster pace of reduction after 30 min but the declining pattern in both groups showed no difference.

**Conclusion:** Resting period for the initial 2 h of diagnosis before any medication is shown to be safe and as effective as initiating early antihypertensive for management of hypertensive urgency.

*Supervisor:*  
Associate Professor Dr Shaik Farid Abdul Wahab

## USAGE OF FOCUSED ASSESSMENT WITH SONOGRAPHY IN TRAUMA (FAST) SCAN IN BLUNT INTRAABDOMINAL TRAUMA

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**Introduction:** Blunt intra-abdominal trauma (BAT) encompasses a major portion of trauma cases in the emergency department (ED). It poses a difficulty in diagnosis due to its low sensitivity and specificity of history and physical examination. Morison pouch is typically considered the most common area of free fluid (FF) in BAT visualised on

the focused assessment with sonography in trauma (FAST) scan. However, no studies to date have investigated the correlation of the abdominal quadrant for positive FF with the type of abdominal trauma.

**Objectives:** This study aims to determine the most common quadrant and subquadrants for detecting FF and their association with the type of injury in BAT patients.

**Methods:** This multicentre study evaluated 86 BAT patients who presented to the ED. The FAST scan was performed per trauma life support protocol and video clips were extracted for patients with positive FAST findings confirmed by abdominal computed tomography (CT) or exploratory laparotomy. The most common quadrant and subquadrant positive for FF were then determined. Positive quadrants and their association with type of injury were also analyzed. Areas studied were the right upper quadrant (RUQ), left upper quadrant (LUQ) and suprapubic area (SP). Subquadrant areas were RUQ 1: hepato-diaphragmatic; RUQ 2: Morison pouch; RUQ 3: caudal liver edge and superior para-colic gutter; LUQ 1: splenic-diaphragmatic; LUQ 2: spleno-renal; LUQ 3: around the inferior pole of kidney; SP 1: bilateral to bladder; SP 2: posterior to bladder and SP 3: posterior to uterus.

**Results:** The most frequent region with positive FF results was the RUQ, seen in 82 (95.3%) patients. In subquadrant analysis, RUQ 3 was the most common region (78 patients, 90.75%), followed by RUQ 2 (73 patients, 84.9%) and LUQ 2 (51 patients, 59.3%). A significant association was observed between the LUQ region positive for FF and the presence of splenic injury ( $P = 0.006$ ).

**Conclusion:** In patients with BAI, the RUQ is the most frequent quadrant and RUQ 3 is the most frequent subquadrant positive FF. A positive LUQ free fluid suggests the presence of splenic injury in BAT.

Supervisor:  
Dr Mohd Boniami Yazid

### KNOWLEDGE, ATTITUDE AND PRACTICE OF DOCTORS IN EMERGENCY DEPARTMENT TOWARDS ANTIMICROBIAL STEWARDSHIP AND THEIR PREDICTORS IN TERTIARY HOSPITAL IN KOTA BHARU, KELANTAN

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**Introduction:** Antimicrobial stewardship (AMS) is vital in the emergency department (ED) because the doctors encounter high frequency of infectious disease.

**Objectives:** The aims of this study were to measure the level of knowledge, attitude and practice (KAP) of doctors towards AMS and their predictors in tertiary hospitals in ED, Kota Bharu, Malaysia.

**Methods:** This cross-sectional study was conducted at the ED of Hospital Universiti Sains Malaysia and Hospital Raja Perempuan Zainab II in Kota Bharu, Malaysia, among

150 doctors from August 2019 to February 2020 using a previously validated self-administered questionnaire. Respondents were randomly selected. The questionnaire comprised of four sections, including sociodemographic, knowledge, attitude and practice on core elements of AMS. Descriptive statistics were used for data analysis. Multiple linear regression analysis was conducted to determine the best model of predictors of the KAP scores.

**Results:** The respondents' overall knowledge and practice were good but with an unfavourable attitude towards AMS with a mean percentage score of 85.3%, 70.4 % and 58.1%, respectively. Multiple linear regression analysis revealed that the mean score of attitudes was associated with the doctor's years of overall ED experience ( $b = 0.198$ ;  $P = 0.003$ ) and frequency of antibiotic prescription ( $b = 0.928$ ;  $P = 0.005$ ). Doctors' perceptions of AMS exhibited significant association with good knowledge ( $b = 0.373$ ;  $P = 0.044$ ) and good practice ( $b = 0.921$ ;  $P = 0.001$ ) on AMS.

**Conclusion:** The respondent's overall knowledge and practice level was good but had an unfavourable attitude toward AMS. Significant predictors of good knowledge and practice were doctor's perceptions of AMS. The predictors of favourable attitudes toward AMS were antibiotic prescription frequency and years of ED experience.

Supervisor:  
Dr Andey Rahman

### COMPARISON STUDY OF VIDEO ASSISTED TEACHING (VAT) VERSUS TRADITIONAL TEACHING-BASED FORMAT ON KNOWLEDGE AND CONFIDENCE LEVEL AMONG MEDICAL STUDENTS ON PERFORMING FOCAL ASSESSMENT WITH SONOGRAPHY FOR TRAUMA EXAMINATION IN EMERGENCY DEPARTMENT HOSPITAL UNIVERSITI SAINS MALAYSIA

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**Introduction:** In medical practice, ultrasound technology was used since the late 1940 and early 1950 and has progressed greatly over time. It is predicted that ultrasound equipment will become more compact and will be the new stethoscope of the future. It can therefore be argued that it is important to introduce ultrasound and its significance in undergraduate teaching in the early years of their education. Up to our knowledge, there is no standard ultrasound training in Malaysian undergraduate curricula. Thus, we decided to explore the feasibility of teaching basic ultrasound skills to the undergraduates using focal abdominal with sonography assessment of trauma (FAST) scanning as a model module. Traditional teaching (TT) in ultrasound is often expensive and time-consuming, requiring the use of live human models, instructors, and ultrasound

machines. Video assisted teaching (VAT) has several potential advantages over traditional teaching (TT), such as anytime–anywhere access, rich multimedia, and nonlinear navigation. While known to be an effective method for learning facts.

**Objectives:** This study aims to compare the level of knowledge and confidence level about FAST scan pre and post workshop among medical students who received VAT versus those who received TT. Hopefully, after this study, we can determine the gaps in ultrasound training and establish standard ultrasound training for undergraduate medical students' curriculum.

**Methods:** This prospective interventional study was conducted from September 2019 till August 2020 and it involved 100 final year medical students. Eligible study subjects were randomly assigned to the control group or intervention group. Informed consent was obtained from the subjects. Both groups received a pre-course assessment together, and each group received workshop, and on the same day both groups received a post-course assessment. The assessment tools included a written examination to evaluate baseline knowledge of the ultrasound physics and knobology, the anatomy of the abdomen, and image interpretation of few clips for FAST scan and to evaluate the confidence level about FAST scan as well.

**Result:** There was significant difference between pre- and post-workshop for knowledge and confidence level. Post-workshop results were higher compared to the pre-workshop results for all parameters compared. When the pre-result was controlled, there was no significant mean difference of all compared parameters between the two groups. In this study feedback from students' responses were 31% preferred the hand-on session and 28% preferred the bedside teaching. While few of them preferred the lectures and videos with 20% and 18%, respectively.

**Conclusion:** VAT is at least as effective as TT of teaching ultrasound to the medical students with the advantage of spending less time in the VAT comparing to TT. Based on that, we recommend using the VAL as standard method of teaching beside other methods. We also suggest incorporating ultrasound in the curriculum early years of undergraduate and usage for teaching of basic knowledge such as physiology and anatomy.

*Supervisor:*  
Associate Professor Dr Mohd Hashairi Fauzi

## KNOWLEDGE AND ATTITUDE TOWARDS CARDIOPULMONARY RESUSCITATION AND DEFIBRILLATION AMONG MEDICAL OFFICERS IN GOVERNMENT PRIMARY CARE CLINICS IN KELANTAN, MALAYSIA

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Marican**  
MMed Emergency Medicine

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**Introduction:** Sudden cardiac arrest has been one of the leading causes of out-of-hospital mortality worldwide, particularly in Malaysia.

**Objectives:** In this study, we want to assess the knowledge, attitude, determine the preferred method of resuscitation, and establish the associated factors between demographic and training exposure with knowledge and attitude towards CPR and defibrillation among government primary care clinic medical officers.

**Methods:** A cross-sectional study was conducted on 192 government primary care physicians based over 10 districts in Kelantan using a questionnaire. Stratified random sampling was applied in determining the sample size. This study was analysed using descriptive statistics and multivariate logistics regression.

**Results:** One hundred ninety-two respondents were analysed. We found out that 68.8% of government primary care clinic medical officers in Kelantan have good knowledge towards CPR and defibrillation, 90.6% of government primary care clinic medical officers in Kelantan have a good attitude towards CPR and defibrillation and 59.9% of medical officers would not perform mouth-to-mouth ventilation during CPR. Among 192 medical officers, the majority preferred both ventilation and compression (CPR), 77.6% of medical officers. There were no significant association between related variables towards knowledge of cardiopulmonary resuscitation and defibrillation. Clinics having defibrillator ( $P = 0.048$ ) was statistically significant with the attitude towards cardiopulmonary resuscitation and defibrillation with the odds ratio of 3.70 when adjusted for other variables.

**Conclusion:** Overall, government primary care clinic medical officers in Kelantan, Malaysia, possess good knowledge and positive attitude towards CPR and defibrillation but this cannot be used as a sole predictor because the practice was not studied in this research.

*Supervisor:*  
Dr Mimi Azliha Abu Bakar

*Co-supervisor:*  
Dr Andey Rahman

## A COMPARATIVE CROSS-SECTIONAL STUDY ON COMPARISON OF HYPERKALEMIA MEASUREMENT BETWEEN BLOOD GAS ANALYSER IN EMERGENCY DEPARTMENT AND MAIN LABORATORY BIOCHEMISTRY ANALYSER IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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**Background:** Potassium level is measured for the patient with a high risk of hyperkalemia in an emergency department (ED) using both blood gas analyser (BGA) and

biochemistry analyser (BCA). The purpose of the study to evaluate the correlation and agreement of hyperkalemia measurement between these two analysers.

**Methods:** This is a prospective cross-sectional study was conducted at Hospital Universiti Sains Malaysia (HUSM) from Jun 2018 until May 2019. The blood samples were taken by single pricked from venous blood and were sent separately using 1-mL heparinised syringe and analysed immediately in the ED using BGA (Radiometer, ABL800 FLEX, Denmark) and another sample was sent to the main laboratory of HUSM and analysed by BCA (Architect, C8000, USA). Only patients who had a potassium level  $\square$  5.0 mmol/L on blood gas results were included. The correlation and agreement were evaluated using Passing and Bablok regression, linear regression and Bland-Altman test.

**Result:** A total of 173 sample pairs were included. The mean of potassium level based on BGA and BCA were 5.77 mmol/L (SD = 0.74) and 6.05 mmol/L (SD = 0.91), respectively. There was moderate correlation between the two measurements ( $P < 0.001$ ,  $r = 0.36$ ). The agreement between two measurements showed within acceptable mean difference which was 0.27 mmol/L with 95% limit of agreement was -1.21 mmol/L to 1.73 mmol/L.

**Conclusion:** There are moderate correlation and acceptable agreement in hyperkalemia measurement between BGA to BCA. However, the BGA results tend to be lowered compared to BCA results. Therefore, the clinicians should use the BGA result with caution in a certain clinical situation where time-is-of-the-essence to initiate treatment for hyperkalemia.

*Supervisor:*  
Associate Professor Dr Kamarul Aryffin Baharuddin

### APPROPRIATENESS IN IMAGING STUDIES SELECTION AMONG EMERGENCY MEDICINE POST-GRADUATE STUDENT IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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**Introduction:** Radiological imaging has played a significant role in evaluating patients in the emergency department (ED). Thus, emergency department personnel needs to be competent in selecting appropriate radiological imaging for the patients.

**Objectives:** This study aims to determine competency in appropriate imaging studies selection among the postgraduate students and look for association of competency with academic year and clinical experiences.

**Methods:** Emergency medicine postgraduate students were recruited from Hospital Universiti Sains Malaysia and were given a set of questionnaires that consist of 10 common clinical scenarios. The questions were selected from American College of Radiology appropriateness criteria and cross-reference was made using the local guideline. The results were then graded in mean and further stratified

by academic year and clinical experiences using analysis of variance and independent *t*-test.

**Results:** A total of 92 respondents completed the survey. The mean of the overall correct answer was 7.61 (SD = 1.41). First to fourth year postgraduate students scored 6.88 (SD = 0.85), 7.29 (SD = 1.04), 7.23 (SD = 1.41) and 9.13 (SD = 1.13), respectively. The inferential analysis found a statistically significant association between competency and academic year and a statistically non-significant difference between competency and clinical experiences

**Conclusion:** Statistically significant improvement was noted in the competency throughout the programme. However, the average score that was not perfect concludes that a more structured curriculum and familiarisation towards appropriateness guidelines might help in producing a more proficient emergency physician.

*Supervisor:*  
Dr Normalinda Yaacob

*Co-supervisor:*  
Dr Boniami Yazid

### LUNG ULTRASOUND PATTERN IN PULMONARY TUBERCULOSIS

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**Background:** Pulmonary tuberculosis is a lethal transmissible airborne disease. There are various challenges in establishing diagnosis due to the low sensitivity of conventional bacteriological confirmation and limited accessibility to chest X-ray. These challenges result in a delay of diagnosis, risking more populations being infected, resulting in overall poor control of the disease. We aim to increase the diagnostic accuracy by introducing the usage of lung ultrasound in combination with current diagnostic modalities. We describe common lung ultrasound pattern seen in pulmonary tuberculosis and measure its agreement with the routine screening imaging, that is chest X-ray.

**Methods:** A multicentre prospective cross-sectional study was conducted among confirmed pulmonary tuberculosis patients aged above 18 years old. Lung ultrasound was performed using a convex probe covering 14 lung sectors that covered the anterior, lateral and posterior aspect of the lung. The pattern observed in pleura, subpleural and subcostal space were described. The findings were also being compared with chest X-ray to find the agreement between the two imaging modalities.

**Findings:** A total of 141 patients were recruited between January 2019 and February 2020. The most frequent sector with findings was R1a seen in 92 (65.4%) patients, followed by R1b seen in 88 (62.4%) patients. The most common zone with finding was right middle zone

observed in 112 (79.4%) patients. Pleural irregularity and subpleural consolidation were observed in 139 (98.6%) and 125 (88.7%), respectively. There was a moderate Kappa agreement between lung ultrasound and chest X-ray observed in all zones with a value ranging from 0.46 to 0.59, with higher sensitivity observed for lung ultrasound.

**Conclusion:** The lung ultrasound pattern observed is in line with pulmonary tuberculosis pathology, which involved the right upper and middle sector of the lung parenchyma. Lung ultrasound showed higher sensitivity compared to chest X-ray especially when involving right middle zone and right lower zone.

*Supervisor:*

Associate Professor Shaik Farid Abdull Wahab

## A STUDY ON PATIENTS REQUIRING EMERGENCY HEMODIALYSIS IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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**Introduction:** It is currently unknown whether there are differences in patients' characteristics and haemodialysis (HD) outcomes between patients who undergo emergent HD in the emergency department (ED) and non-ED setting (i.e. ward, intensive care unit (ICU) or HD unit).

**Objective:** This study aims to compare the clinical and non-clinical characteristics and HD outcomes between patients who underwent emergent HD at ED ('ED group') and non-ED ('non-ED group') settings.

**Methods:** This is a retrospective observational study among patients admitted through the ED of a tertiary teaching hospital in Malaysia and underwent acute HD within 24 h of admission between January 2016 till December 2017.

**Results:** A total of 177 patients were included in the study. The bivariable analysis found that the ED group had a significantly higher proportion of new cases (i.e. no known history of HD), fluid overload cases, and refractory fluid overload indication as compared to the non-ED group. It was also found that the ED group had a higher proportion of those requiring mechanical ventilation and 60-day mortality. Hierarchical regression found that HD locations play a significant role in determining HD outcomes in terms of 60-days mortality and ICU stays. Those who underwent HD at non-ED have 0.263 (95%CI=0.096, 0.723) times lower odds of 60-day mortality but 2.946 (95% CI: 1.051, 8.258) times higher odds of staying in ICU.

**Conclusion:** There were significant differences in patients' characteristics and HD outcomes between patients underwent HD in ED and non-ED settings. Emergent HD location may influence 60-day mortality and ICU stays. As the current study is insufficient to confidently justify the use

of HD in ED settings as compared to the non-ED setting, a randomized controlled trial is needed.

*Supervisor:*

Professor Dato' Dr Nik Hisamuddin Nik Abdul Rahman

## KNOWLEDGE, ATTITUDE AND PRACTICE AMONG HEALTHCARE PROVIDERS ABOUT INTENTION OF REPORTING CHILD ABUSE IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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**Introduction:** This was a cross-sectional study among staff nurses and assistant medical officers in Emergency and Paediatric department in Hospital Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia.

**Objectives:** This study aims to assess and determine knowledge, attitude and behavioural practice regarding intention to report child abuse cases of healthcare providers in Hospital Universiti Sains Malaysia.

**Methods:** Data were collected using Child Abuse Report Intention Scale (CARIS), self-administered questionnaire adopted from the previous studies. The questionnaire was given to 140 respondents. Descriptive analysis, Mann-Whitney, Kruskal-Wallis dan Spearman's correlation was used to analyse the statistical analysis of the responses. The total knowledge of healthcare providers was poor (42%). Their attitude toward child abuse and perceived behavioural control was acceptable with mean score of 40.1 (SD = 6.58) and 23.1 (SD = 3.38), respectively. There was slight correlation between attitude about child discipline and intention of reporting with  $r = -0.248$ ,  $P$ -value = 0.003.

**Conclusion:** Multiple regression test showed attitude toward child physical discipline and attitude toward punishment to perpetrators were the predictors of intention of reporting child abuse. In this study, the healthcare providers had low knowledge, acceptable attitude and perceived behavioural control on handling child abuse. This may be due to less exposure to child abuse cases.

*Supervisor:*

Associate Professor Dr Kamarul Aryffin Baharuddin

## A STUDY ON ACUTE CHEMICAL POISONING AMONG PATIENTS IN EMERGENCY DEPARTMENT HOSPITAL TENGKU AMPUAN RAHIMAH KLANG AND ITS COMPLICATIONS

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**Introduction:** Acute poisoning is one of the most common reasons of patient visits to the emergency department (ED). The sociodemographic and presentations vary from one region to another. This study purpose is to determine the sociodemographics, presentations and factors associated with complications in patients with acute chemical poisoning

**Objectives:** The aim of this study is to describe the sociodemographics, presentations, chemical agents involved, complications and factors associated with development of complications among patients presenting with acute chemical poisoning.

**Methods:** This retrospective study involved all patients presented with acute chemical poisoning to the emergency department of a government hospital in Malaysia from January 2016 until December 2018. A total of 260 patients were included and their sociodemographic, clinical presentation, complications and outcomes were recorded. Multiple logistic regression analysis was used to determine factors associated with complications.

**Results:** From 260 patients, 168 (64.6%) patients had intentional poisoning while 92 (35.4%) patients accidentally exposed to different chemical substances. Majority were single ( $n = 158$ , 60.8%), male ( $n = 152$ , 58.5%) and Indian ( $n = 149$ , 57.3%). The most common agent involved was pesticide. Complication rate was 14.2% with mortality rate of 4.6%. Common complications included respiratory insufficiency ( $n = 30$ , 11.5%), altered consciousness ( $n = 14$ , 5.4%) and renal failure ( $n = 17$ , 6.5%). Factors significantly associated with complications were age (AOR = 1.05, 95% CI: 1.02, 1.09;  $P = 0.005$ ), other race (AOR = 30.35, 95% CI: 2.77, 332.94;  $P = 0.005$ ), Chinese (AOR = 12.27, 95% CI: 1.03, 146.63;  $P = 0.048$ ), tachycardia (AOR = 39.7, 95% CI: 11.31, 139.27;  $P = 0.004$ ), time of exposure from 0800–1600 (AOR = 22.15, 95% CI: 1.95, 252.04;  $P = 0.013$ ) and latency time from presentation of 2 h–12 h (AOR = 3.43, 95% CI: 1.28, 9.21;  $P = 0.015$ ).

**Conclusion:** Acute chemical poisoning is common among single, male patients with intentional circumstance. Apart from and other factors associated with complications were age, tachycardia, Chinese ethnicity and other races, time of exposure and latency time from presentation to ED.

*Supervisor:*  
Dr Ariff Arithra Abdullah

### ERGONOMIC RISK ASSESSMENT OF MUSCULOSKELETAL DISORDERS DURING CHEST COMPRESSION AT KNEELING, STANDING AND STEP-ON-STOOL, POSITION IN RESCUER PERFORMING CARDIOPULMONARY RESUSCITATION

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**Introduction:** Countless research has been carried out to improve the quality of cardiopulmonary resuscitation (CPR) delivered to the patient but there is scarce data concerning health impact of CPR upon person performing it.

**Objectives:** The aim of this study was to determine the ergonomic risk of musculoskeletal disorders (MSD) in rescuer performing CPR at three different positions: kneeling, standing and standing on step-stool, quality of CPR performed at each position and their correlations.

**Methods:** A cross-sectional simulated-manikin study of in-hospital cardiac arrest was conducted among medical personnel of emergency department of university hospital located in Kelantan, Malaysia. Rapid entire body assessment (REBA) score as a universal tool for ergonomic assessment was used in this study.

**Results:** In total, 67 participants took part in this study. Kneeling showed the worst mean REBA score of 9.00 (1.00) with high risk of developing MSD, followed by step-on-stool 7.63 (1.54) and standing position 7.00 (1.00) which account for moderate risk. Significant difference were observed in compression depth between kneeling and standing position ( $P < 0.001$ , mean difference [95% CI] = 6.27 [3.26, 9.28]) and between kneeling and step-on-stool ( $P < 0.001$ , mean difference [95% CI] = 4.35 [2.21, 6.49]). There is no evidence of significant correlation between REBA risk group and CPR quality at standing position and kneeling position, although at step-on-stool position significant correlation noted between REBA risk group and complete recoil.

**Conclusion:** There is notable risk of developing MSD in person performing CPR at three different positions although no remarkable correlation between the risk and quality of CPR performed.

*Supervisor:*  
Associate Professor Dr Shaik Farid Abdull Wahab

*Co-supervisor:*  
Dr Rohayu Othman

### A STUDY INTO THE KNOWLEDGE OF CHILDHOOD ASTHMA AMONG PARENTS AND ITS RELATION TO EMERGENCY DEPARTMENT VISIT

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**Background:** Asthma continues to be a major cause of frequent pediatric visits at the emergency department (ED). Children with asthma rely on parents to control the pulmonary disease. The level of knowledge of these parents has been found to influence asthma control. This study aims to evaluate parental knowledge and its relation to emergency department visits and explore factors associated with knowledge level.



**Methods:** A cross-sectional study was conducted involving all patients visiting the emergency department of a tertiary center in Kelantan, Malaysia, for 6 months in 2020. There were 231 respondents involved. A 25-item Asthma Knowledge Questionnaire (AKQ) was used to evaluate the parental level of knowledge about childhood asthma, and knowledge levels were categorized into good and poor knowledge. To analyse the associations, a descriptive test and Fisher's exact test were used.

**Results:** In this study, 131 women (57.5%) and 97 men (42.5%) participated. Most of their children were over five years of age (70.2%). More than half of the respondents (51.5%) in the middle class or M40 household income group (51.8%) with higher education. Parents with good childhood asthma knowledge ( $n, \% = 224, 97.0\%$ ) were significantly higher compared to those with poor knowledge. Child age was the only sociodemographic factor with a significant p-value ( $P = 0.03$ ) among the seven factors tested (gender, child age, the time period after diagnosis, education level, household income group, family history of atopy disease and history of admission due to asthma). However, there is no significant association between the frequency of visits to the emergency department within 6 months and parental knowledge of children's asthma ( $P = 0.62$ ).

**Conclusion:** Parental knowledge of childhood asthma is an essential factor in the assessment and monitoring of childhood asthma. This research has a significant association of good knowledge with parents having younger children. Although the parent has relatively good knowledge of childhood asthma, the issues relating to diagnosis and pathogenesis of the condition and treatment are very worrying. To strengthen asthma education for parents and children, good coordination between healthcare professionals and a culturally adapted intervention is needed.

*Supervisor:*  
Professor Dato' Dr Nik Hisamuddin Nik AB. Rahman

## SONOGRAPHIC EVALUATION OF INTRAVASCULAR VOLUME IN SIMULATED CLASS 1 HAEMORRHAGIC SHOCK: A COMPARISON OF SUBCLAVIAN VEIN COLLAPSIBILITY INDEX AND INFERIOR VENA CAVA COLLAPSIBILITY INDEX

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**Introduction:** Early detection of haemorrhagic shock can be helpful in management of trauma cases. Subclavian vein collapsibility index (SCV-CI) has been reported to be helpful in determining intravascular volume status in intensive care units.

**Objectives:** The objective of this study is to determine if SCV-CI can be used as a possible adjunct to inferior vena cava collapsibility index (IVC-CI) in detecting early stages of haemorrhagic shock.

**Methods:** This is a prospective study which was carried out from March 2019 until March 2020. One hundred and seventeen blood donors were recruited and ultrasonography readings of the SCV and IVC diameter before and after blood donation were recorded, along with the clinical vital signs.

**Results:** A total of 116 patient's data were analysed. There was a significant mean difference between SCVi, SCV-CI, IVCi and IVC-CI when compared between pre and post blood donation results. There was no statistically significant difference for mean IVCe, SCVe, pulse rate, SBP, MAP and SI. There was significant positive correlation between SCV-CI and IVC-CI for the post test result, with weak strength ( $r < 0.29$ ). There was no significant correlation between SCV-CI and the clinical indices (i.e. PR, SBP, MAP and SI) pre and post blood donation.

**Conclusion:** Ultrasonographic measurement of SCV-CI may be a useful non-invasive tool in early detection of blood loss of at least 480cc in adult patients, however larger studies are required to validate the result.

*Supervisor:*  
Dr Mohammad Zikri Bin Ahmad

## ACUTE ABDOMINAL PAIN AND POTENTIAL LIFE-THREATENING OUTCOME IN ADULT PATIENTS PRESENTING IN EMERGENCY DEPARTMENT HOSPITAL UNIVERSITI SAINS MALAYSIA

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**Background:** Abdominal pain is one of the most common reasons for patient visits to the emergency department (ED). We aim to study the presentation of acute abdominal pain (AAP) in ED, the prevalence of potentially life-threatening AAP and its associated factors.

**Methods:** This was a retrospective medical record review of ED visits for AAP among patients aged  $\geq 12$  years old from January 2018 to May 2018 at our suburban, academic tertiary centre ED in the east coast of Malaysia. A total of 945 cases were identified and 390 cases were selected by simple randomization.

**Results:** A total of 335 patients were included in the analysis. The mean age was 39.23 (SD = 16.42) years old. The majority were female (52.8%), Malays (95.2%) and came within 24 h of the symptom (50.4%). The prevalence of potentially life-threatening AAP was 26% or 87 out of 335 patients. Its most frequent diagnosis was acute appendicitis (55.2%) followed by acute cholecystitis (11.5%) and ectopic pregnancy (6.9%). Factors predictive towards potentially life-threatening AAP were right iliac fossa pain (AOR = 11.8, 95% CI: 3.89, 36.34;  $P < 0.001$ ), right hypochondriac pain (AOR = 6.29, 95% CI: 1.61, 24.67;  $P = 0.008$ ), generalised abdominal pain (AOR = 6.28, 95% CI: 1.39, 28.43;  $P = 0.017$ ), loss of appetite (AOR = 7.64, 95% CI: 1.85, 31.55;  $P = 0.005$ ), tachycardia (AOR = 7.64, 95% CI: 1.4, 9.93;  $P =$

0.008), fever (AOR = 2.8, 95% CI: 1.05, 7.44;  $P = 0.039$ ), leucocytosis (AOR = 3.34, 95% CI: 1.44, 8.7;  $P = 0.006$ ) and low haemoglobin level (AOR = 18.26, 95% CI: 2.45, 136;  $P = 0.005$ ).

**Conclusion:** A comprehensive history and clinical examination such as location of pain, loss of appetite, fever and tachycardia combined with laboratory testing to look for leucocytosis and anaemia may facilitate effective assessment in detecting potentially life-threatening AAP in ED.

*Supervisor:*  
Dr Junainah Nor

### OPTIMISING MULTIPLEX PCR FOR A SET OF MALAY ANCESTRY INFORMATIVE SINGLE NUCLEOTIDE POLYMORPHISMS AND PRELIMINARY ANALYSIS OF GENOTYPES BETWEEN MALAY AND NON-MALAY POPULATION

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**Introduction:** Inference of ancestry is of great interest to many and various methods have been developed in selecting and validating panels of ancestry informative markers (AIMs). One of the ancestry informative marker that is commonly used is single nucleotide polymorphisms (SNPs). Yahya et al. had determined that a panel of approximately 200 SNPs can distinguish the Malay population with an accuracy of more than 80%. Five SNPs were chosen from the above panel of SNPs to be developed into a PCR-multiplex assay. This pilot study describes the PCR optimisation process and the genotyping results of the Malay and non-Malay subjects.

**Methods:** Ancestry informative SNP panels were selected from the genotyping databases of the Malaysian Node of the Human Variome Project and Singapore Genome Variation Project and referenced against the International HapMap Project Phase 3. Five SNPs were chosen for the pilot study (rs197824, rs752625, rs4599414, rs12550668 and rs4134376). The subjects were participants who identified themselves as Malay and non-Malay for at least three generations. Forward and reverse primers were designed for each SNP and the polymerase chain reaction (PCR) for each SNP were optimised in singleplex. The PCR products were then sequenced to determine the allele at the target SNP.

**Results and Discussion:** Four SNPs were successfully optimised and later genotyped for 10 subjects. The difference in the genotypes of the Malay and non-Malay populations were found to be statistically insignificant, however, there is a significant difference in the allele frequency for rs752625. One SNP rs4134376 was tri-allelic. The similarities may arise from several factors, including the history of admixture in these populations that have occurred, the close geographical distance and the absence of

an appropriate reference population. To validate the panel further, more SNP and more subjects should be involved, and genotyping could be done with single base extension reaction in multiplex to assay multiple SNPs simultaneously.

*Supervisor:*  
Professor Zilfalil Alwi

*Co-supervisors:*  
Associate Professor Dr Sarina Sulong  
Dr Nazihah Mohd Yunus

### GENETIC ASSOCIATION OF ABCG2 GENE POLYMORPHISMS WITH TAC CHEMOTHERAPY RESPONSE IN TRIPLE NEGATIVE BREAST CANCER (TNBC) PATIENTS

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**Introduction:** Triple negative breast cancer (TNBC) is one of the most aggressive subtypes of breast cancer. Due to the lack of hormone receptors, chemotherapy using taxane-adriamycin-cyclophosphamide (TAC) regimen remains the mainstay of TNBC treatment and is the only choice of treatment available for TNBC. However, TNBC is characterised by high risk of recurrence, metastasis and chemoresistance, and is associated with inter-individual variability in treatment response. Despite several mechanisms have been implicated in anticancer drug resistance, the exact mechanism of chemoresistance in TNBC remains unclear. A defective transport is a major mechanism of resistance. Transmembrane transport proteins such as breast cancer resistance protein (BCRP) encoded by *ABCG2* can cause chemoresistance by means of increased efflux transportation of the drug out of the cell, hindering its molecular action on cancer cells. It was hypothesised that, the genetic variations G34A and C421A of *ABCG2* gene, that impair substrate efflux could be associated with chemoresistance in TNBC patients undergoing chemotherapy and designed this study to test this hypothesis.

**Methods:** Blood samples from 76 Malaysian TNBC patients who had undergone TAC chemotherapy regimen were collected and stored in EDTA tube. DNA was extracted from these blood samples and genotyped using PCR-RFLP technique. The genotypes were categorized into homozygous wildtype, heterozygous and homozygous variant based on the band sizes on gel electrophoresis. The difference in genotype frequencies between chemoresistant and chemoresponsive groups was determined by using crosstabs analysis. The association between the genotypes and alleles with TAC chemotherapy response was determined by using binary logistic regression analysis deriving odds ratio (OR) with confidence interval (CI) of 95% on SPSS version 20.2. Haplotype frequencies between the chemoresistant

and chemoresponsive groups of TNBC patients and their association with treatment response was calculated using Haploview software v4.2.

**Result:** The heterozygous (GA) and homozygous variant (AA) genotypes of the *ABCG2* G34A polymorphism showed a significantly lower risk association with chemoresistance ([OR = 0.303,  $P = 0.029$ ] and [OR = 0.151,  $P = 0.011$ ], respectively). Whereas, the heterozygous (CA) and homozygous variant (AA) genotypes of C421A showed statistically insignificant low risk association with chemoresistance, (OR = 0.481,  $P = 0.251$ ; OR = 0.412,  $P = 0.113$ , respectively). The variant A allele of both SNPs (with OR = 0.320,  $P = 0.002$  and OR = 0.487,  $P = 0.039$ , respectively) and haplotypes GA, CA and AA (with ORs = 0.020, 0.002 and 0.00004, respectively) also showed significantly lower risk association with chemoresistance. It is reasonable to suggest that the variant genotype (AA) and variant allele (A) of G34A and C421A decrease the expression and transporter activity of *ABCG2*, lower the efflux activity of chemotherapeutic drugs, resulting in increased intracellular accumulation of the drug and thereby improve the efficacy of chemotherapy and lower the risk of chemoresistance.

**Conclusion:** These findings suggest that the *ABCG2* G34A polymorphism may be useful as a potential biomarker to predict chemotherapy response in TNBC patients.

*Supervisor:*

Professor Dr Ravindran Ankathil

*Co-supervisors:*

Dr Andee Dzulkarnaen

Dr Maya Mazuwin Yahya

Professor Dr Md Salzihan Md Salleh

## ASSOCIATION BETWEEN VITAMIN D RECEPTOR POLYMORPHISMS (BSMI AND FOKI) AND GLYCEMIC CONTROL FACTORS AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS

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**Introduction:** Several studies have suggested that the vitamin D receptor (VDR) gene plays a role in type 2 diabetes mellitus (T2DM) susceptibility. Nonetheless, the association between T2DM and VDR polymorphisms remains inconclusive. We determined the genotype of VDR rs1544410 (BsmI) and rs2228570 (FokI) polymorphisms among Malaysian patients with T2DM and their association with glycaemic control factors (vitamin D levels, calcium, magnesium and phosphate).

**Methods:** A total of 189 participants comprising 126 patients with T2DM (63 with good glycaemic control and 63 with poor glycaemic control) and 63 healthy controls were enrolled in this case-control study. All biochemical assays were measured using spectrophotometric analysis while

vitamin D and insulin levels were measured by immunoassay technique. VDR gene FokI and BsmI polymorphisms were analysed using polymerase chain reaction and endonuclease digestion.

**Results:** Our findings revealed no significant differences in VDR FokI and BsmI genotypes between participants with T2DM and healthy controls. Moreover, no significant association was observed between both single nucleotide polymorphisms and glycaemic control factors. Participants with poor glycaemic control had significantly lower serum magnesium levels and significantly higher homeostatic model assessment for insulin resistance (HOMA-IR) compared to the other groups.

**Conclusion:** The present study revealed that VDR gene BsmI and FokI polymorphisms were not significantly associated with T2DM and the glycaemic control factors.

*Supervisor:*

Dr Nazihah Mohd Yunus

*Co-supervisor:*

Dr Tuan Salwani Tuan Ismail

## THE CLINICAL AND LABORATORY SIGNIFICANCE OF ANTIPHOSPHOLIPID SYNDROME PATIENTS IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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**Introduction:** Antiphospholipid syndrome (APS) is diagnosed in patients with vascular thrombosis or pregnancy morbidity whose laboratory assays demonstrate persistent antiphospholipid antibodies (aPL). To confirm their existence, these antiphospholipid antibodies, which are lupus anticoagulant (LA), anticardiolipin antibodies (aCL) and anti- $\beta$ 2-glycoprotein I antibodies (anti- $\beta$ 2GPI), need to be repeated after 12 weeks.

**Objectives:** The objective of this study is to analyse the clinical and laboratory characteristics of patients with confirmed APS sent for LA and aCL tests in Hospital Universiti Sains Malaysia (USM).

**Methods:** A retrospective study on 391 samples sent for LA tests within 6 years in haematology laboratory of Hospital USM were analysed. Sixty-nine out of 391 samples showed positivity for LA in the first samples. However only 35 repeated sample were available. The results of their aCL tests were also analysed for each patient who were sent for LA testing. Therefore, proportion of confirmed APS patients according to Sydney criteria are 19.5% (17/81).

**Results:** Their result along with clinical and laboratory characteristics of each patient were analysed. Confirmed APS patients (LA or aCL positive) is more common in patients aged between 20 years old and 40 years old, female gender with female to male ratio 4.7:1, Malay race, vascular thrombosis, patients with autoimmune diseases such

as systemic lupus erythematosus (SLE), normal platelet count, normal prothrombin time (PT), prolonged activated partial thromboplastin time (APTT), normal international normalized ratio (INR), corrected mixing study, prolonged LA-sensitive activated partial thromboplastin time (APTT-LA), positive Rosner's index, positive DRVVT (LA ratio), positive LA and negative aCL. Multivariate analysis shows prolonged DRVVT ratio (LA ratio > 1.2) and positive Rosner's index were the only independent risk factors responsible for confirmed APS in this study.

**Conclusion:** In conclusion, the number of samples sent for second testing are lesser than the expected amount shows the lack of awareness among healthcare practitioners on the practice of attaining diagnosis of APS on second sample. Therefore, more efforts are needed to be strained to ensure proper investigation of APS.

*Supervisors:*

Associate Professor Dr Noor Haslina Mohd Noor  
Associate Professor Dr Rosnah Bahar

### EVALUATION OF IMMUNOPHENOTYPIC EXPRESSIONS OF PLASMA CELLS IN PLASMA CELL MYELOMA PATIENTS AND ITS ASSOCIATION WITH PROGNOSTIC FACTORS AND CLINICAL STAGES

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Kelantan, Malaysia

**Introduction:** Neoplastic plasma cell expresses aberrant markers which differ from normal plasma cell was postulated to carry prognostic significance. This study aimed to determine the proportion of immunophenotypic expression of plasma cells in plasma cell myeloma patients at diagnosis and to study the association between these markers with clinical and laboratory parameters.

**Methods:** A retrospective study was carried out from June 2016 till June 2019 by collecting the flow cytometry results (CD38/CD138/CD19/CD45/CD56/CD117 and cytoplasmic kappa and light chains expression) from newly diagnosed plasma cell myeloma, PCM cases in both Hospital Kuala Lumpur and Hospital USM. Clinical data and laboratory results retrieved from medical record were analysed statistically using SPSS26.0.

**Results:** All 78 cases of flow cytometry results in newly diagnosed PCM had more than one aberrant antigen expression with 100% expression rate for both CD38 and CD138 while CD19/CD45/CD56/CD117 in 28.2%, 23.1%, 83.3% and 25.6%, respectively. The majority were expressed kappa light chain restriction, 60.3%. A significant association was demonstrated between CD19 markers with serum creatinine ( $P = 0.036$ ). However, there was no significant association between expression of other immunophenotypic markers with its associated factors.

**Conclusion:** Immunophenotyping by multiparametric flow cytometry is a useful tool for distinguishing neoplastic plasma cells from normal plasma cell where aberrant antigens were present in most of the PCM with a heterogenous immunophenotypic profile of PCM were defined in our population as compared to others. Moreover, there was a significant association demonstrated between CD19 with serum creatinine. However, this result should be confirmed with a bigger sample size.

*Supervisor:*

Dr Shafini Mohamed Yusoff

*Co-supervisors:*

Professor Dr Rosline Hassan

Dr Nik Rus Mazeni

Dr Abu Dzarr Abdullah

### THE SIGNIFICANCE OF CAPILLARY ELECTROPHORESIS IN DETECTION OF HAEMOGLOBIN CONSTANT SPRING AND ITS RELATIONSHIP WITH HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY

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**Introduction:** Haemoglobin Constant Spring (Hb CS) is one of the most common non-deletional types of alpha ( $\alpha$ ) thalassaemia in Southeast Asia region. The nature of this abnormal globin gene is that it is unstable, labile and is present in minute amount in the peripheral blood. Thus, this may lead to underdiagnosis of the disease. This study was conducted to determine the proportion of Hb CS among the Kelantan population and to compare range of peak value in Zone 2 CE findings for 3 groups of Hb CS (heterozygous, homozygous and compound heterozygous) and their haematological parameters. The study aimed to look at the findings of HPLC in relation to CE results in detecting Hb CS.

**Methods:** This was a cross-sectional study involving secondary data collection from 378 samples which showed peak value on Zone 2 of CE. The samples were taken from the National Thalassaemia screening of Form 4 students from all districts in Kelantan. The haematological parameters of red cells were analysed using Sysmex XN 3000 automated blood cell analyser, Hb analysis was performed using automated CE system (CAPILLARYS2 Flex-Piercing System Sebia), HPLC Biorad variant II, DNA analysed using multiplex polymerase chain reaction (PCR) and multiplex Amplification refractory mutation system (ARMS) to detect both deletional and non-deletional  $\alpha$ -thalassaemia.

**Results:** Three hundred and seventy-six samples (99.5%) with presence of peak value on Zone 2 of CE were confirmed to have termination codon CS mutation. Heterozygous Hb CS is the most common type of Hb CS detected in 344 samples (91.5%), followed by compound

heterozygous Hb CS which was 31 samples (8.2%) and only one sample (0.3%) of homozygous Hb CS. The mean (SD) of peak value in Zone 2 of heterozygous Hb CS and compound heterozygous Hb CS were 0.61 (SD = 0.13) and 0.77 (SD = 0.34), respectively. The only sample of homozygous Hb CS showed the value of 4.9% of peak value in Zone 2 of CE. The significant differences of haematological parameters between heterozygous and compound heterozygous Hb CS were observed in haemoglobin level, MCV, MCH and MCHC. This study showed there was a good linear correlation between peak in C-window on HPLC and peak value in Zone 2 of CE in detecting Hb CS,  $r = 0.73$ .

**Conclusion:** Thus, by combining the haematological parameters and complementary tests of both CE and HPLC, the diagnosis of Hb CS can be detected prior to confirmation by DNA molecular study that is far more expensive.

*Supervisor:*

Associate Professor Rosnah Bahar

*Co-supervisors:*

Dr Shafini Mohamed Yusoff

Dr Suryati Hussin

## FACTORS INFLUENCING POST-CRYOPRESERVED CD34+ CELLS VIABILITY IN THE HARVESTED PRODUCTS OF AUTOLOGOUS HAEMATOPOIETIC STEM CELLS AT HOSPITAL UNIVERSITI SAINS MALAYSIA

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**Introduction:** The cryopreservation process of the stem cells potentially cause the loss of CD34+ cells. The aim of this study is to evaluate association of patient characteristics, graft characteristics and technical characteristics with post cryopreserved CD34+ cells viability among lymphoproliferative disease namely multiple myeloma and lymphoma patients at Hospital USM.

**Method:** This retrospective study was conducted in the Transplant Unit at the Transfusion Medicine Unit, Hospital USM. A search of the hospital data (2008–2018) to identify 132 patients for both MM and lymphoma treated in Hospital USM who underwent autologous peripheral blood haematopoietic stem cells (APBSC) mobilisation, and were successfully harvested and cryopreserved. Selected patients' profile as well as selected parameters of stem cell mobilisation and cryopreservation were obtained from LIS, record unit and the Transplant Unit. Multiple logistic regression (MLR) was used to find significant associated factors and  $P < 0.05$  was considered significant.

**Results:** The mean age of the patients was 39 years old with almost equal gender distribution and majority are lymphoma patients, 96 (72.7%) while 36 (27.3%) are

multiple myeloma (MM) patients. The significant influencing factors of post-cryopreserved CD34+ cells viability were pre-cryopreserved CD34+ cell viability, total nucleated cells (TNC), and anti-platelet and antibiotics usage. Patients who are not on anti-platelet (adjusted OR = 4.63,  $P = 0.008$ ) and have higher pre-cryopreserved CD34+ cells viability (adjusted OR = 9.12,  $P = 0.001$ ) have higher chance for good post-cryopreserved CD34+ cells viability. While, those patients with higher TNC (adjusted OR = 0.97,  $P = 0.001$ ) and on antibiotics (adjusted OR = 0.35,  $P = 0.031$ ) have lower chance for good post cryopreserved CD34+ cells viability.

**Conclusion:** This study showed patients who are not on anti-platelet and antibiotics will have higher probability of achieving good post cryopreserved CD34+ cells viability. Therefore, the practice of administering anti-platelet and antibiotics during the harvesting period of APBSC need to be considered accordingly without compromising patient's safety. The APBSC products with higher pre-cryopreserved CD34+ cells viability and lower TNC will achieve better post-cryopreserved CD34+ cells viability. The addition of extra plasma to the APBSC products is recommended to reduce the TNC in the future.

*Supervisor: NA*

## COMPARISON OF PLATELET FUNCTION AND PLATELET PARAMETERS OF APHERESIS PLATELETS USING PLATELET ADDITIVE SOLUTION AND WITHOUT PLATELET ADDITIVE SOLUTION

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**Introduction:** Platelet additive solution (PAS) is a crystalloid nutrient media practically used to replace and reduce approximately two-thirds of plasma in platelet product. It is an alternative medium intended to maintain good quality of platelets with longer shelf life.

**Objectives:** The aim of this study is to compare the platelet function and platelet parameters of apheresis platelets store in PAS as the treated group and without PAS (plasma) which is the standard practice as a control group.

**Methods:** An interventional study was conducted involving apheresis blood donors in Unit Perubatan Transfusi, Hospital USM from February 2019 until June 2019, and a total of 20 apheresis blood donors that fulfilled the inclusion and exclusion criteria were selected. Apheresis platelets were collected using Amicus cell separator and were stored in PAS and without PAS for 7 days. Platelet parameters including platelet count, mean platelet volume (MPV), platelet distribution width (PDW), platelet morphological assessment using light microscopy, platelet aggregation test and pH were measured on day 1 and day 7 of storage in PAS and without PAS. The statistical analysis used for these parameters was repeated measures ANOVA. Other parameters such as ABO antibody titer was measured only

on day 1 of storage and was analysed using Wilcoxon Signed Ranks test. The bacterial cultures were carried out on day 7 of storage and analysed using chi-square test. A  $P$ -value of  $< 0.05$  which was considered statistically significant.

**Results:** Majority of the apheresis donor was Malay male. The average platelet count of apheresis platelets was between  $3.0 \times 10^{11}/\text{unit}$  and  $4.0 \times 10^{11}/\text{unit}$ . There were significant differences in the MPV (day 7,  $P = 0.004$ ), platelet aggregation test with arachidonic acid (day 7,  $P = 0.001$ ), collagen (day 1,  $P = 0.011$ ) and epinephrine (day 1,  $P = 0.005$ ; day 7,  $P = 0.041$ ), platelet morphology (day 1 and day 7,  $P = 0.041$ ), pH (day 1,  $P = 0.014$ ; day 7,  $P = 0.002$ ) and ABO antibody titers (anti-A,  $P = 0.002$ ; anti-B,  $P = 0.004$ ) between apheresis platelet in PAS and without PAS. Other platelet parameters were statistically not significant.

**Conclusion:** The apheresis platelets stored in PAS demonstrated inferior findings in most study parameters compared to without PAS, while the study of antibody titer in PAS showed superior results compared to without PAS. The platelet morphology and function were better maintained in plasma (without PAS) compared to in PAS. However, this study needs to be confirmed with more samples and include in-vivo study in the future.

*Supervisor:*

*Professor Dr Wan Zaidah Abdullah  
Dr Mohd Nazri Hassan*

*Co-supervisor:*

*Dr Zefarina Zulkefli*

## THE STUDY OF THE EFFECT OF BOWEL PREPARATION AGENT ON THE QUALITY OF COLONOSCOPY IN HOSPITAL UNIVERSITI SAINS MALAYSIA, KUBANG KERIAN

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**Introduction:** Colorectal cancer (CRC) is one of the most common cancers worldwide and Malaysia. Screening colonoscopy reduces overall incidence and death due to CRC. Proper bowel cleanliness is one of the main factors that directly affect the quality of the colonoscopy. The objective of our studies is to compare the effect of PEG versus OSP on the quality of colonoscopy measured by Boston bowel preparation score, caecal intubation rate and total procedural time.

**Objectives:** The aim of this study is to compare the effect of PEG versus OSP on the quality of colonoscopy measured by Boston bowel preparation score in patients who underwent colonoscopy in Hospital Universiti Sains Malaysia. Our study aims to explore the effect of the bowel preparation agents on the quality of colonoscopy. Quality indicators we using in our study are the bowel cleanliness measured by the Boston bowel preparation score, the caecal intubation time and the total procedural time.

**Methods:** This comparative cross-sectional study was conducted in November 2020 till February 2021 Universiti Sains Malaysia. A total of 171 patients underwent colonoscopy in the hospital endoscopy unit. 80 patients received OSP, while 91 received PEG bowel preparation. All patients' information such as age, gender, comorbidities, creatinine level, and indication for colonoscopy were recorded and saved. The quality indicators of colonoscopy including the efficiency of bowel cleanliness, the caecal intubation rate, and the total procedural time were compared between these two groups. For statistical analysis, categorical data was presented as frequency and percentage while numerical data was presented as mean and standard deviation (SD). We applied the Independent  $t$ -test, Pearson's chi-squared test, Fisher's exact test and simple logistic regression (SLR) appropriately in the univariate analysis. Then, we used analysis of covariates (ANCOVA) for objectives 1 and 3, and multiple logistic regression (MLR) test to analyse our second objective. All assumptions for the tests were met.

**Results:** Among 171 patients that underwent colonoscopy, 90 (52.6%) of them received Fortrans bowel preparation and 81(47.4%) received fleet bowel preparation. One hundred and fifty patients (87.7%) had a successful caecal intubation while 21 patients (12.3%) failed caecal intubation due to poor bowel preparations. The BBPS mean score 5.69 (SD = 1.86). The mean colonoscopy time was 50.18 (SD = 23.24) min. The Boston Bowel Preparation Score (BBPS) was not significantly different (adjusted mean 5.68 versus 5.69,  $P = 0.987$ ) between PEG and OSP after controlling age and creatinine level. A logistic regression was performed to ascertain the effects of PEG and OSP with age and creatinine level as covariates on the likelihood of successful caecal intubation. The model was not statistically significant ( $P = 0.93$ ) but correctly classified 87.1% of cases and has 64.7% of area under receiver operating characteristic (ROC) curve. OSP was 4% more likely to achieve successful caecal intubation than PEG when age and creatinine level were controlled. The colonoscopy procedural time was not significantly different (adjusted mean = 50.12 versus 50.29,  $P = 0.963$ ) between PEG and OSP after controlling age and creatinine level.

**Conclusion:** We compared two bowel preparation agents, PEG and OSP, in terms of quality of colonoscopy. Our analysis showed no significant difference between these two agents in terms of bowel cleanliness efficiency and total procedural time. The overall caecal intubation rate was below standard, and the OSP group was 4% more likely to achieve successful caecal intubation than the PEG group when age and creatinine level were controlled as confounders.

*Supervisor:*

*Dr Amry Abdul Rahim*

## TRANSLATION AND VALIDATION OF MALAY LANGUAGE VERSION OF THE PATIENT-PHYSICIAN RELATIONSHIP SURVEY (PPRS) (PATIENT VERSION) AND DETERMINANTS OF AN EFFECTIVE PATIENT-PHYSICIAN RELATIONSHIP IN THE MANAGEMENT OF IRRITABLE BOWEL SYNDROME

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**Introduction:** Irritable bowel syndrome is prevalent and its therapy involves multi-pronged approaches. An effective patient-physician relationship (PPR) often affects the treatment outcome but its determinants are not fully known. PPR can be assessed using a newly developed PPR questionnaire, but this tool has not been translated and validated in Malay language.

**Objectives:** This study aimed to translate and validate the English version of patient-physician relationship survey (PPRS) into Malay version and to evaluate the determinants of effective relationship among irritable bowel syndrome patients

**Methods:** The original English PPR survey (PPRS) (patient version) was first translated into Malay language, using a standard forward and backward translation approach. Subsequently, to validate the translated PPRS questionnaire, it was administered to patients with IBS (based on the Rome IV criteria), recruited sequentially using a cross-sectional design. Exploratory factor analysis (EFA) and reliability analysis were performed to determine the psychometric properties of PPRS. A validated Malay-version of SKIP-11 questionnaire (a survey to assess patient satisfaction and probably the closest to PPRS) was administered concomitantly to determine the comparative validity of PPRS. Comparative mean and regression analyses were conducted to explore the determinants of effective PPRS in the management of IBS.

**Results:** The EFA yielded three factors. The Kaiser-Meyer-Olkin was 0.798. Bartlett's test of sphericity was significant ( $P < 0.001$ ). The final Malay-translated PPRS consisted of three domains with 28 items. The domains included interpersonal features, clinical care expectations and aspects of communication. The internal consistency was satisfactory (Cronbach's alpha = 0.932). For the determinants of effective PPR, a total of 80 patients with irritable bowel syndrome with the mean age 52 years old, 70% Malay and 52.5% female had responded. Factor analysis showed marital status (single) (median = 36, interquartile range = 14;  $P$ -value = 0.038) and household income (higher income) (mean score 37.67 [SD = 7.98];  $P$ -value = 0.02) were the significant determinants of effective PPR. There was a fair significant correlation between PPRS and SKIP-11 ( $r = 0.3$ ,  $P = 0.007$ ).

**Conclusion:** The study suggested that the Malay-translated PPRS (patient version) is a valid and reliable tool to be used to assess PPR. Marital status of single and high

household income are the determinants of effective PPR in IBS.

Supervisor:  
Professor Dr Lee Yeong Yeh

Co-supervisor:  
Dr Wong Mung Seong

## PROFILE OF ORTHOPAEDIC SURGICAL SITE INFECTIONS IN HOSPITAL UNIVERSITI SAINS MALAYSIA AND POTENTIAL USE OF STINGLESS BEE HONEY FOR THE TREATMENT

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**Introduction:** The devastating outcome of orthopaedic surgical site infections (SSI) are largely preventable if its risk factors, causative organisms and antimicrobial susceptibility patterns in the regional area are known.

**Objectives:** We conducted a retrospective study to address the lack of epidemiological and microbiological data on orthopaedic SSI in Malaysia.

**Methods:** All the 80 patients diagnosed and treated for microbiologically proven orthopaedic SSIs in a tertiary hospital in Malaysia from April 2015 to March 2019 were included in a 1:2 case control study.

**Results:** The prevalence of SSI in clean and clean-contaminated surgeries was 1.243%, which is consistent with most of the studies worldwide, but is low compared to other studies done in Malaysia. The most common type of orthopaedics SSI was internal fixation infections (46.25%). Obesity and tobacco use were found to be significant risk factors of orthopaedic SSI. The most common peri-operative prophylaxis used was IV cefuroxime. Majority of the cases (86.5%) received prolonged prophylactic antibiotics. The most common causative agent was *Staphylococcus aureus* (31.25%), followed by *Pseudomonas aeruginosa* (26.25%) and *Enterobacter spp* (7.5%). Methicillin-resistant *Staphylococcus aureus* (MRSA) accounted for 20% of the *S. aureus* infections. Up to 19.4% of the Gram negative organisms are multidrug resistant. The prevention of SSI in orthopaedic practice, its prevalence and trends in microbiological profile are related to the management of the risk factors, the appropriate use of prophylactic antibiotics and implementation of infection control measures.

**Conclusion:** A more definitive and larger study in the country is needed to address these issues. We also investigated the role of stingless bee honey as a potential topical agent for the treatment of orthopaedic SSI, to take advantage of its anti-bacterial and anti-biofilm properties. In-vitro synergistic testing was conducted to test honey-antibiotic combinations against MDR Gram-negative and

Gram-positive organisms. At 5% concentration, stingless bee honey can be safely used as an adjunctive topical agent, without any antagonistic effect with systemic antibiotics.

*Supervisors:*

*Professor Dr Zakuan Zainy Deris  
Dr Shaifuzain Ab Rahman*

### SEROTYPE AND VIRULENCE GENES OF GROUP B STREPTOCOCCUS (GBS) ISOLATED AMONG NON-PREGNANT ADULTS IN EAST COAST MALAYSIA AND ITS ASSOCIATION WITH PATIENT'S CLINICAL DIAGNOSIS

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**Background:** Group B *Streptococcus* (GBS) infection among non-pregnant adults is emerging nowadays. The severity of the disease caused by GBS depends on the serotype and presence of virulence genes in the particular strains. This study aimed to determine the distribution of GBS serotypes and virulence genes and to know the association of GBS serotype with the clinical disease.

**Methods:** A cross-sectional study involving retrospective record review was done involving a total of 75 GBS isolates collected from October 2018 till October 2019 in two major hospitals in Kelantan (East coast of Peninsula Malaysia). Those isolates were from various clinical samples of non-pregnant adults > 18 years old (excluding vaginal swab). Identification of all isolates serotype (serotype Ia, Ib, II until IX) and their virulence genes (*scpB*, *lmb*, *bca*, *bac*, *rib*, *cylE*, and *hylE*) were done using conventional PCR. The antibiotic susceptibility testing was traced from The BIOMIC V3, Microbiology System. Clinical information of patient was assessed from medical records and were analysed and presented as tables and figures.

**Results:** GBS was commonly isolated among adults aged between 41 years old and 60 years old (66.7%,  $n = 50$ ). Of all the isolates tested, serotype III (21.3%,  $n = 16$ ) was the most common followed by serotype Ia (18.7%,  $n = 14$ ), II (12%,  $n = 12$ ) and IV (13.3%,  $n = 10$ ). Virulence gene PCR showed *cylE*, *scpB*, *lmb*, *hylE* and *bca* were discovered in most isolates while *rib* and *bac* were detected in 10.7% ( $n = 8$ ) and 2.7% ( $n = 2$ ) of the isolates. The most common clinical diagnosis was skin and soft tissue infection (66.7%,  $n = 50$ ); it was mainly associated with serotype Ia (22%,  $n = 11$ ). Diabetes mellitus (DM) was the leading risk factor for GBS disease (76%,  $n = 57$ ). The majority of the isolates (98.7%,  $n = 74$ ) were penicillin-sensitive. One of the serotype IV isolates had reduced susceptibility to penicillin. The resistance rate to clindamycin and erythromycin were 9.3% ( $n = 7$ ) and 6.7% ( $n = 5$ ), respectively. The mortality rate was 2.7% ( $n = 2$ ). There was no association between the most common GBS serotypes, and clinical diagnosis.

**Conclusion:** Serotype III was the most common serotype detected among non-pregnant adults infected with GBS. GBS generally infected adults with underlying DM who had skin and soft tissue infections.

*Supervisor:*

*Associate Professor Dr. Siti Asma' Binti Hassan*

*Co-supervisors:*

*Associate Professor Dr. Kirnpal Kaur Banga Singh  
Dr. Azura Binti Hussin*

### A STUDY ON FUSARIUM ISOLATION, ITS MOLECULAR IDENTIFICATION, CLINICAL MANIFESTATIONS AND RISK FACTORS

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**Introduction:** *Fusarium* species are ubiquitous in soil and plant debris. *Fusarium* species are well recognised as plant pathogens and have emerged as human pathogens affecting both immunocompetent and immunocompromised hosts since recent years. Conventional methods of *Fusarium* identification are inadequate as it only identifies *Fusarium* to genus level. Molecular methods by nucleotide sequences are more accurate and consistent for species identification.

**Objectives:** The aims of this study were to determine molecular identification and proportion of *Fusarium* species isolated from the clinical samples, risk factors and to describe the clinical manifestations of *Fusarium* infection.

**Methods:** We reviewed 87 medical records of patients for whom fungal culture was performed on various clinical specimens in Hospital Sultanah Nur Zahirah, Terengganu and Hospital Universiti Sains Malaysia, Kelantan from 2017 until 2019.

**Results:** Out of 87 cases, 43 cases were positive for *Fusarium* and 44 cases were non-*Fusarium* cases. We identified the proportion of *Fusarium* based on species, clinical manifestation and risk factors from clinical isolates. Twenty four available clinical isolates were specifically identified by sequencing the translation elongation factor 1-alpha (*TEF-1 $\alpha$* ) gene. Our results showed that keratitis ( $n = 17$ , 39.5%) and onychomycosis ( $n = 16$ , 37.2%) were the most common type of fusariosis, followed by fungaemia ( $n = 7$ , 16.3%). Forearm skin infection, fungal pneumonia and fungal maxillary sinusitis were presented in one case each. Based on *TEF-1 $\alpha$*  sequencing, 22 of 24 isolates belong to *Fusarium solani* species complex (FSFC),  $n = 22$ ; which comprised *Fusarium solani* ( $n = 10$ ), *Fusarium proliferatum* ( $n = 7$ ), and *Fusarium keratoplasticum* ( $n = 5$ ). Another two were *Fusarium pseudocircinatum* ( $n = 1$ ) which belongs to *Fusarium fujikuroi* species complex (FFSC), and *Fusarium oxysporum* ( $n = 1$ ) which is a member in *Fusarium oxysporum* species complex (FOSC). *Fusarium* infection was more common in males ( $n = 29$ , 67.4%), and the mean



age was 53 years old. Risk factors for *Fusarium* infection has been studied including diabetes mellitus, malignancies, neutropenia, eyes trauma and embedded foreign body, were analysed but none were statistically significant.

**Conclusion:** *TEF-1 $\alpha$*  sequencing has resulted in satisfactory differentiation in *Fusarium* species identification in our study. Studies on risk factors need further improvement in future studies especially in population selection and sample size.

*Supervisor:*

Associate Professor Dr Azian Harun

*Co-supervisor:*

Dr Norlela Othman

## PREVALENCE OF CYTOMEGALOVIRUS INFECTION AMONG INFANTS AND CORRELATION BETWEEN CMV PCR WITH CLINICAL OUTCOMES IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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**Introduction:** Congenital cytomegalovirus (CMV) infection is the leading infectious cause of congenital hearing loss and neurodevelopmental disability.

**Objectives:** The aims of this study were to describe the prevalence and clinical manifestations of infants with CMV infection in Hospital Universiti Sains Malaysia (HUSM) and to determine its correlation between CMV PCR with clinical outcomes.

**Methods:** A total of 648 blood samples of infants requested for TORCHES screening from January 2018 to December 2018 were sent to microbiology laboratory in Hospital Universiti Sains Malaysia (HUSM). The samples were tested for anti-CMV IgM and IgG by electrochemiluminescence immunoassay (ECLIA) method. Infants with first serum sample of IgM and IgG antibody titre suggestive of cytomegalovirus infection were requested for second serum sample at 2 weeks to 4 weeks interval together with plasma samples for cytomegalovirus DNA viral load and maternal sample for serological analysis. The plasma CMV DNA quantification was performed using real-time PCR assays. Correlation of CMV viral load with clinical outcomes were analysed using the point- biserial correlation

**Results:** The prevalence of symptomatic cytomegalovirus infection among infant in HUSM was 6.48 % (42/648). Out of 648 cases, 196 cases had paired sera samples and 97 cases were tested for CMV PCR. Only 39 cases were positive for CMV PCR. Based on serological and PCR results, the cases were categorised into three groups: acute CMV infection ( $n = 42$ ), passive immunity ( $n = 113$ ) and inconclusive ( $n = 41$ ). Clinical presentations for acute cytomegalovirus infection were small for gestational age

(64%), jaundice (52.3%), presumed sepsis (21.4%), abnormal hearing assessment (9.5%), hepatitis (9.5%), ocular problem (4.7%), prematurity (4.7%), rash (2%), microcephaly (2.3%), cerebral calcification (2.3%) and thrombocytopenia (2.3%). There was positive moderate significant correlation between CMV viral load and abnormal hearing assessment and weak positive significant correlation between CMV viral load and abnormal ocular finding.

**Conclusion:** The prevalence of CMV infection among infants in our centre was comparable with previous studies. However, the prevalence of cCMV among infants was lower that might be due underdiagnosed. Abnormal hearing assessment, presumed sepsis, CMV hepatitis and rash were significantly associated with acute symptomatic CMV infection among infants. There were significant correlation between CMV viral load with abnormal hearing assessment and abnormal ocular findings.

*Supervisor:*

Dr Zeti Norfidiyati Salmuna

*Co-supervisor:*

Dr Nabilah Ismail

## COMPARISON BETWEEN REVERSE AND TRADITIONAL SCREENING ALGORITHMS FOR SYPHILIS DIAGNOSIS IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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**Introduction:** The global incidence of syphilis increased drastically throughout the world, including Malaysia. Screening algorithm with high sensitivity and specificity should be available to detect syphilis accurately. This study aimed to assess the performance of reverse screening algorithm for syphilis diagnosis in our population. We compare the diagnostic accuracy between two available screening methods: electrochemiluminescence immunoassay (ECLIA) and rapid plasma reagin (RPR), each represents reverse and traditional screening algorithms, respectively.

**Methods:** A total of 206 serum samples were included in this study. These samples were tested with ECLIA, RPR and *Treponema pallidum* particle agglutination (TPPA) assay. TPPA was considered as the gold standard test. Reverse and traditional screening algorithms were applied to all specimens. Sensitivity, specificity and predictive values of the screening tests were calculated. ROC curve analysis was used to determine optimal cut-off RPR titer related to TPPA reactivity.

**Results:** Out of 206 serum samples, 32 (15.53%) were diagnosed with syphilis using the reverse algorithm, but only 23 (11.17%) were diagnosed with syphilis using the traditional algorithm. Majority of syphilis cases were male and among  $\geq 50$  years old age group. Following the reverse algorithm, 27

(13.11%) cases showed discordant ECLIA and RPR results. Further testing with TPPA reveals that 5 (2.42%) cases are false-positive ECLIA. The sensitivity, specificity, PPV and NPV of ECLIA and RPR for syphilis detection were 100%, 97.13%, 86.49%, 100%, and 71.88%, 92.53%, 63.89%, 94.71% respectively.

**Conclusion:** The reverse algorithm showed better performance with higher syphilis detection. ECLIA revealed excellent diagnostic accuracy as a screening test for syphilis with a low false positivity supporting its use in our population. RPR reactivity (titer 1:1) should be able to predict the reactivity of confirmatory treponemal test. However, further evaluation with a larger sample size is required.

*Supervisor:*  
Dr Nabilah Ismail

### SEROPREVALENCE OF CYTOMEGALOVIRUS INFECTION IN PREGNANT WOMEN WITH ABNORMAL PREGNANCY IN HUSM

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**Introduction:** Cytomegalovirus (CMV) is the most common virus associated with congenital malformations in developed countries. Pregnant women who acquired primary infection during pregnancy carry a high risk of transmission to the foetus, and foetal CMV infection in the early trimester can lead to severe congenital malformation. This study aims to describe the seroprevalence of cytomegalovirus among pregnant women with abnormal pregnancy in Hospital Universiti Sains Malaysia (HUSM) and describe the pregnancy outcome.

**Methods:** In this study, a total of 153 serum samples of pregnant women with abnormal pregnancy outcomes were sent to the microbiology laboratory in a one-year duration from 1st June 2019 until 31 May 2020 either for TORCHES (toxoplasma, rubella, cytomegalovirus, herpes simplex, HIV, syphilis) screening or to rule out CMV infection. These samples were tested for CMV IgG and IgM antibodies' presence using electrochemiluminescence immunoassay (ECLIA). Out of 153, 112, which were positive with CMV IgG antibodies were then being tested with CMV IgG avidity using Elecsys CMV IgG avidity kit via ECLIA method for determination of the phase of infection. Medical records of these pregnant women were reviewed for the outcome of pregnancy.

**Results:** The seroprevalence of CMV among pregnant women with abnormal pregnancy in HUSM was 98.69% ( $n = 151/153$ ). Out of 153, 1 sample was positive for CMV IgM and IgG, while the rest positive for CMV IgG only. Only 112 that fulfilled the inclusion criteria and were tested for CMV IgG avidity. The CMV IgG avidity result was categorised into primary CMV infection ( $n = 4/112$ ) and non-primary CMV infection ( $n = 111/112$ ). The abnormal pregnancies were those with either abnormal ultrasound findings, namely IUGR,

SGA, ventriculomegaly, cerebral calcification, echogenic foetal bowel or pregnancy loss such as miscarriage or intrauterine death. Three out of four mothers with primary CMV infection gave birth to a healthy child, while one mother had intrauterine death of her foetus.

**Conclusion:** The seroprevalence of CMV in this study is comparable to other studies done in Asian regions with similar socioeconomic status. Most infections were non-primary as most likely, the people in this population have been infected during childhood or adolescence.

**Keywords:** Cytomegalovirus, pregnant women, CMV IgG avidity

*Supervisor:*  
Dr Zeti Norfidiyati Salmuna Ayub

*Co-supervisor:*  
Dr Azura Hussin

### A CLINICAL TEST FOR A NEWLY DEVELOPED DIRECT BRAIN COOLING SYSTEM FOR THE INJURED BRAIN AND PATTERN OF CORTICAL BRAINWAVES IN COOLING, NON COOLING AND DEAD BRAIN

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**Introduction:** Malaysia has high incidence of motor vehicle accident. Patient with severe traumatic brain injury requiring treatment is frequently referred to neurosurgeons.

**Objectives:** A direct brain cooling system was newly innovated purposely to ensure direct delivery of therapeutic hypothermia at a selected constant temperature to the injured brain. The main objectives is to determine the Glasgow Coma Outcome Scale (GOSE) on discharge and 6 months on follow up for patient receiving focal cooling therapy.

**Methods:** The patients were randomised into two groups—direct brain cooling at 32 °C and the control group. The patients underwent standard decompressive craniectomy. Post-operatively, all of them received intracranial pressure, focal brain oxygenation, brain temperature and direct cortical brainwave monitoring.

**Result:** The direct brain cooling group did better in the extended Glasgow Outcome Scale at the time of discharge and at six months after trauma. This could be due to a trend in the monitored parameters; reduction in intracranial pressure, increment in cerebral perfusion pressure, optimal brainredox regulation, near-normal brain temperature and lessening of epileptic-like brainwave activities are likely reasons for better outcomes in the cooling group. Finally, this manuscript depicts interesting cortical brainwaves during a transition time of being alive to dead. The demonstrated cortical brainwaves are thought as obeying the principles in quantum physics.

**Conclusion:** Direct brain cooling therapy shows improved outcome in treatment patient.

*Supervisor:*  
Professor Dr Zamzuri Idris

## NEURONAL ACTIVATION IN PATIENTS WITH MILD AND MODERATE TRAUMATIC BRAIN INJURY DURING WORKING MEMORY TASKS

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**Introduction:** Cognitive impairment in patients following traumatic brain injury (TBI) is a significant cause of morbidity both to patients and their families. Memory impairment is one of the most common complaint patients and their families have as it impairs patients' daily function. Current neuroimaging modalities allows us to study the neuronal activation relevant to working memory in patients.

**Objectives:** The aim of this study is to identify regions of brain activation during working memory (WM) tasks using functional magnetic resonance imaging (fMRI) in patients with mild and moderate TBI (mTBI/modTBI) as compared to controls during the recovery phase at 6 weeks–10 weeks and at 6 months after traumatic event. This study also aims to correlate the fMRI findings of neuronal activation involved in WM of patients with mTBI/mod TBI with neuropsychological assessments at the corresponding time periods.

**Methods:** Patients who sustained mTBI/modTBI, between the age of 18 years old and 65 years old and managed in Hospital Universiti Sains Malaysia were recruited into the study. These patients and a control group underwent fMRI scanning where they concurrently performed *n*-back tasks of four different memory loads. These fMRI scans were performed at 6 weeks–10 weeks post-injury and at 6 months post-injury. These cohort of subjects also had neuropsychology assessments performed at the same two time period as the fMRI.

**Results:** At 6 weeks–10 weeks post-injury, patients with mTBI/modTBI exhibited much lower brain activation in the dorsolateral prefrontal cortex, inferior parietal gyrus and anterior cingulate gyrus compared to control which was consistent with the impairment of visuospatial WM. Neuropsychological assessments showed corresponding results for these patients. At 6 months after injury, other areas of the brain appeared to be active which may be due to underlying neuroplasticity.

**Conclusion:** Patients with mTBI/modTBI are at risk of visuospatial WM dysfunction which may affect their quality

of life. Hence the role of early and targeted rehabilitation for these patients during the recovery phase is crucial.

*Supervisor:*  
Professor Dato' Dr Jafri Malin Abdullah

*Co-supervisor:*  
Dr Aini Ismafairus Abd Hamid

## DOOR TO SKIN TIME IN PATIENTS UNDERGOING EMERGENCY TRAUMA CRANIOTOMY

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**Background and Objective:** Traumatic brain injury (TBI) is predicted to be the third leading cause of death and disability worldwide in 2020. It places a significant burden on health care especially in developing countries like Malaysia. For a subset of patients' with TBI with significant intracranial bleed, urgent surgical intervention remains the mainstay of treatment. Although all efforts are taken to ensure that patients received surgical intervention in a timely manner, often we find that there are inadvertent delays in management of these patients. This study aims to evaluate the performance of neurosurgery referral centre in Malaysia, review the possible pitfalls and propose ways to improve performance.

**Methods:** This is a retrospective study conducted in HSAJB between 1 January 2019 and 31 December 2019. All patient with TBI admitted to HSAJB with abnormal CT brain findings requiring urgent craniotomy was enrolled in this study. A list of patients who underwent emergency craniotomy or craniectomy from our operating theatre registry. The demographic data and required clinical data were extracted from the clinical notes. The data obtained were entered into computer software Statistical Package for Social Science (SPSS) version 22. Data distributions were described with non-parametric statistics.

**Result:** A total of 154 patients who were subjected to emergency trauma craniotomy during the duration of study was included in this study. Overall, the median Door to Skin times were 605 min, Door to CT time was 131 min, CT to Review time was 274 min, Review to Booking time was 20 min, Booking to OT time was 90 min and OT to Skin time was 62 min. Patients who were directly admitted to HSAJB had an overall median Door to Skin time of 459 min. At discharge, there were a total of 102 patients (66.23%) with poor outcome. On performing simple logistic regression, we found that the polytrauma, hypotensive episode, ventilated patients, severe TBI and Door-Skin times were all significantly associated with poor outcomes. The adjusted OR for Door to Skin times was 1.005 with 95% CI (1.002, 1.008). Hence, for every minute delay in Door to Skin time, there was 1.005 time increase likelihood of having poor outcome during discharge. During the 6 months follow up, the number of patients with

poor outcome reduced to 58 patients (37.66%). We found that regardless of patients' clinical characteristic, every minute delay in Door to Skin led to 1.008 (95% CI: 1.005, 1.011) times increase in having poor outcome at 6 months.

**Conclusion:** Door to Skin time is directly proportional to poor outcomes in patients with TBI. Despite being the regional neurosurgical and trauma referral centre, there are still significant delays in patient management leading to delayed surgical intervention. Concerted efforts from all parties involved in trauma care with established neurotrauma protocol are essential in eliminating this delay.

*Supervisor:*  
Dr Azman Abd Rahman

### CHRONIC ANTERIOR PITUITARY DYSFUNCTION FOLLOWING TRAUMATIC HEAD INJURY: PROSPECTIVE STUDY IN HOSPITAL SULTANAH AMINAH JOHOR BAHRU

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**Introduction:** Traumatic brain injury (TBI) is associated with increase morbidity, mortality and long-term disability. Hypopituitarism following TBI is not rare and most patient had undiagnosed and untreated hypopituitarism. Association of post TBI hypopituitarism causing neurobehavioral and quality of life impairment. There are wide range of post-traumatic hypopituitarism (PTHP) has been reported ranging 10%–58%.

**Objectives:** The aim of the study is to determine the incidence of the chronic anterior pituitary deficiency in patients with traumatic brain injury. Subsequently determine the risk factor and the outcome of the patient with chronic anterior pituitary dysfunction.

**Methods:** This is the single centre prospective cross-sectional study where 105 traumatic head injury patients under Neurosurgical Department Hospital Sultanah Aminah, Johor Bahru follow up who fulfilled the inclusion criteria. The inclusion criteria were patient with traumatic head injury, age from 18 years old to 65 years old and had history of trauma 3 month prior to enrolment. The exclusion criteria were traumatic brain injury patient in chronic vegetative state with low life expectancy, patient who diagnosed or taking hormonal replacement therapy prior to the trauma, pregnant woman, and female patient with normal menses LH and FSH will not be taken. The primary investigator will do an interview with the patient and the patient will be asked question to complete questionnaire form (36 questions). Subsequently, consent for participation will be taken and blood sampling will be done. Other demographic data will be acquired from the admission documents.

**Results:** A total 33 (31%) were noted to have anterior pituitary dysfunction. The mean age was 36.97 (SD = 12.96) years old with a median of 35 years old. Out of 33 patients,

27 (32.5%) were male and 6 patients were female (27.3%). Chronic anterior pituitary dysfunction also was seen in more patients with a severe traumatic head injury around 47.1%, a total of 23 patients sustained a severe head injury as compared to a moderate head injury (eight patients, 38.1%) and two sustained mild head injuries (5.6%). The mean duration after the onset of trauma was 10.3 months (SD = 1.79) and the median was 11 months. Chronic anterior pituitary commonly found in the patient enrolled in the study at 11-months and 12-months post-trauma. All patient with pituitary dysfunction had positive CT brain findings. Out of 33 patients, 22 had SAH at the basal cistern and 27 patients had a base of skull fracture. 52.1% of the patient underwent surgical intervention and eight patients didn't undergo any surgical intervention. Out of all 33 patients with chronic anterior pituitary dysfunction, 84.8% involved one axis and another five patients had two axes involved. Binary logistic regression analysis studies the relationship between each of the variables and showed that severity of the head injury ( $P < 0.001$ ), prolonged duration of hospital stay ( $P = 0.014$ ), radiological findings of a base of skull fracture ( $P < 0.001$ ), and presence of SAH at basal cistern ( $P < 0.001$ ) was significantly associated with chronic anterior pituitary dysfunction. There was a significant difference seen in SF-36 marks, where the patient with anterior pituitary dysfunction has the lower SF-36 marks 56.3 (SD = 10.3).

**Conclusion:** The prevalence of hypopituitarism was estimated at 31%. Indicators of increased TBI severity, prolonged hospitalisation and positive finding of radiological assessment (presence of SAH and base of skull fracture). Post-traumatic chronic anterior pituitary dysfunction also related with poor quality of life as showed by low SF-36 marks.

*Supervisors:*  
Professor Dr Abdul Rahman Izani Ghani  
Dr Noor Azman A Rahman  
Dr Sharon Casilda Theophilus

*Co-supervisors:*  
Professor Dr Zamzuri Idris  
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### VACUUM DRAINS VERSUS PASSIVE DRAINS VERSUS NO DRAINS IN DECOMPRESSIVE CRANIECTOMIES—A RANDOMISED CONTROLLED TRIAL ON SUBGALEAL DRAIN COMPLICATION RATES

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**Introduction:** Subgaleal drains are generally deemed necessary for cranial surgeries including decompressive craniectomies (DC) to avoid excessive post-operative subgaleal haematoma (SGH) formation but these drains maybe associated with other complications. This study

aims to assess complication rates, functional outcome and mortality in patients utilising vacuum drains (VD), passive drains (PD) and no drains (ND).

**Methods:** This was a triple blinded randomised controlled trial involving 78 patients requiring DC which were equally randomised into the three different drain groups. The primary outcome was SGH thickness. Secondary outcomes of SGH volume, new remote hematomas, post-craniectomy hydrocephalus (PCH), modified Rankin Scale (mRS), mortality rates and their associated risk factors were studied as well.

**Results:** There was no difference in SGH thickness between the three drain types ( $P = 0.171$ ). The mean SGH volume and new remote hematoma rate was not significantly different ( $P = 0.320$  and  $P = 0.647$ , respectively). Only one patient in the VD group required re-surgery to evacuate SGH. Fifty-eight patients survived at least 60 days after DC, seven of them (12.1%) developed PCH with insignificant difference between groups ( $P = 0.083$ ). In the univariate and multivariate analysis, VD group had better mRS ( $P = 0.011$ ) and mortality rates ( $P = 0.032$ ). In the subgroup analysis of 49 TBI patients, mean SGH thickness of VD group was significantly less than PD and ND group but this did not improve outcomes ( $P = 0.022$ ).

**Conclusion:** There was no difference in SGH thickness, SGH volume, rates of PCH or new remote haematomas in all types of drain. However VD may have an advantage with regards to mRS, mortality rates and lower SGH amounts in TBI.

Supervisor:NA

## COMPARISON OF IMMEDIATE POST-OPERATIVE CT ANGIOGRAPHY WITH DELAYED ANGIOGRAPHY TO DETECT ANEURYSM REMNANT: A CROSS-SECTIONAL STUDY IN HSAJB

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**Background and Objective:** Ruptured intracranial aneurysm is a common cause of stroke leading to high morbidity and mortality. Despite there are advancements in the surgical management of ruptured aneurysms, post-operative follow-up imaging still varies, and no consensus. Currently, some centres are utilising an immediate post-operative CT scan to detect residual aneurysms. Hence, we aim to test the significance and reliability of immediate post-operative CT angiography (CTA).

**Methods:** This was a single centre cross-sectional study. A total of 54 patients aged between 18 years old and 80 years old were admitted to the Department of Neurosurgery, Hospital Sultanah Aminah Johor Bahru (HSAJB) from 1 January 2019 to 31 May 2020 for ruptured aneurysm who fulfilled the inclusion criteria were included in this study. Demographic data including age, gender, type of aneurysm,

WFNS score, type of diagnostic imaging and requirement of EVD were collected. The patients subsequently underwent surgical clipping and subjected to immediate CTA. Then the patients followed up and proceeded with delayed angiography from 3 months–6 months. Data were analysed and the finding of both imaging compared.

**Results:** A total of 54 patients with a mean age of 51.87 (SD = 12.34) years old were admitted and subjected to clipping surgery, 66.7% ( $n = 36$ ) admitted with good WFNS score. ACOM aneurysm was the commonest (31.5% [ $n = 17$ ]). Generally, it required a mean time of 4.85 days from the day of admission until clipping. Intra-operatively, 27.8% ( $n = 15$ ) had re-rupture of the aneurysm. Four cases were able to detect aneurysm remnants with immediate CTA while eight cases were detected via delayed angiography. Cohen's Kappa test showed a value of 0.63, which indicates substantial agreement between immediate and delayed angiography. There is a significant association between intra-operative Doppler signal and detection of vasospasm in CTA ( $P < 0.001$ ). Also found that there is a significant association between CTA vasospasm and intra-operative rupture ( $P = 0.006$ ). The general outcome of the patient measured with the mRS score during the first follow-up was a median of 2.

**Conclusion:** There is substantial agreement between immediate CTA and delayed angiography in detecting aneurysm remnants. Therefore using immediate CTA as an early imaging tool post-clipping enabled us to tabulate subsequent management strategy. At the same time, if combined with intra-operative Doppler, it can be useful in detecting vasospasm.

Supervisors:

Dr Noor Azman Abd Rahman  
Dr Sharon Casilda Theophilus  
Dr Regunath Kandasamy

## DISORDERS OF SODIUM BALANCE AFTER TRAUMATIC BRAIN INJURY IN ADULT PATIENTS: A PROSPECTIVE STUDY IN A SINGLE CENTRES

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**Background and Objective:** Traumatic brain injury (TBI) is the leading cause of death and disability in young adults remain a major public health concern. Post-traumatic endocrinopathy has been reported as one of the complications TBI which causes serious physical and mental deficit. While many studies focus on anterior pituitary insufficiency, the function of posterior pituitary in survivors of TBI remains poorly investigated. Hence, the aim of this study is to evaluate the sodium abnormality in patients in the acute and chronic phase of TBI and a proposed protocol that was developed for the early identification of sodium abnormality for prompt treatment.

**Methods:** This was a single centre longitudinal cohort study. A total of 270 patients aged between 18 years old and 65 years old with Glasgow Coma Scale (GCS) 3–13 who fulfilled the inclusion criteria admitted to the Department of Neurosurgery, Hospital Sultanah Aminah (HSAJB) from 1 January 2018 to 31 December 2018 were included. Patients were managed based on the proposed protocol. Demographic data: age of patients, gender, mechanism of injury, types of head injury and types of intervention were evaluated. Serum and urine osmolality were obtained if the patients developed hypernatremia with polyuria (serum Na > 145). If the patients developed hyponatremia (serum Na < 130), serum and urine osmolality, urine Na, serum cortisol and thyroid function test was obtained. All the patients who were diagnosed with acute diabetes insipidus (DI) and who developed symptoms of DI during clinic follow-up, were subjected for water deprivation test at 6 months post-TBI

**Results:** In all 36 patients (13.3%) developed DI in the acute phase of TBI, with a mean age 31.4 (SD = 12.6) years old with 35 patients suffering severe head injury. The median GCS was 6. The mean onset of DI in the acute phase of TBI was 2.0 (SD = 1.0) days, the range of serum sodium during onset of DI was 149 mmol/L–162 mmol/L with mean sodium 153.5 (SD = 3.3) mmol/L. For the day of normalisation of sodium level, the mean was 4.5 (SD = 1.7) days. From the multiple logistic regression (Table 6), base of skull fracture ( $P < 0.001$ ), cerebral oedema ( $P = 0.040$ ) and GCS score ( $P = 0.009$ ) were significant. This indicated that the base of skull fracture, cerebral oedema and GCS score are associated factor towards DI regardless of the existence of polytrauma and SAH at basal cistern. Two patients had abnormal WDT at 6 months post TBI. The overall mortality rate for acute DI is 13%. A total of 24 patients (8.9%) developed Syndrome of Inappropriate Antidiuretic Hormone (SIADH) secretion in the acute phase of TBI with all patients suffering severe head injury with adrenal and thyroid sufficiency being ruled out. The median GCS was 6. The mean onset of sodium abnormality was 7.7 (SD = 3.4) days, the range of serum sodium during onset of SIADH was 114 mmol/L–128 mmol/L with mean sodium 125.3 (SD = 2.9) mmol/L. Only one factor associated with SIADH, which is cerebral oedema ( $P = 0.018$ ) when adjusted OR for both factors using multivariate logistic regression test (Table 8). All SIADH resolved prior discharge and there was no new case of SIADH being diagnosed. Cerebral salt wasting (CSW) syndrome was seen in three patients with serum sodium 120 or less with natriuresis.

**Conclusion:** Study results showed significant frequency of sodium disorder in acute and chronic phase of TBI and it was possible to determine the significant factors that were associated with DI and SIADH at the acute phase of TBI. Hence, early recognition and prompt treatment with proper treatment protocol is extremely important in order to reduce the morbidity and mortality of sodium imbalance. Water deprivation test (WDT) is a gold standard for differentiation of cranial DI from nephrogenic and

identification of partial or severe cranial in chronic phase of TBI.

*Supervisors:*  
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*Co-supervisors:*  
Dr Regunath Kandasamy  
Professor Dr Zamzuri Idris  
Dr Norhaliza Mohd Ali  
Dr Rahidatul Fairuz Ibrahim

## ELUCIDATION OF SERUM INTERLEUKIN-35 LEVELS AND INTERLEUKIN-35 RECEPTORS IN SYSTEMIC LUPUS ERYTHEMATOSUS PATIENTS: ASSOCIATIONS WITH SEROLOGICAL PARAMETERS AND DISEASE ACTIVITY

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**Introduction:** Interleukin-35 (IL-35) and IL-35 receptors are associated with the development of systemic lupus erythematosus (SLE). Many studies have been done recently to look into its association with autoimmune diseases, particularly SLE.

**Objectives:** This study aims to determine the serum IL-35 levels and the surface levels of IL-35 receptors (IL-12R $\beta$ 2 and gp130) on T helper cells in SLE patients versus healthy controls and their associations with serological parameters and disease activity.

**Methods:** Fifty SLE patients were enrolled in the study and 50 volunteers were recruited as healthy controls. The percentage of CD3+CD4+ T helper cells and IL-35 receptors subunits IL-12R $\beta$ 2 and gp130 in peripheral blood mononuclear cells were analysed using flow cytometry. Serum IL-35 levels were measured by enzyme-linked immunosorbent assay (ELISA). SLE disease activity was evaluated using the Systemic Lupus Erythematosus Disease Activity Index-2K (SLEDAI-2K) score.

**Results:** The results showed that the mean serum IL-35 levels were significantly higher in SLE patients (31.53 [SD = 14.15] pg/mL) than those in the healthy controls (25.36 [SD = 7.073] pg/mL,  $P = 0.038$ ) whereas there was no significant difference among the mean IL-35 receptors (IL-12R $\beta$ 2 and gp130) levels in SLE patients compared to healthy control. In addition, IL-35 receptor subunit gp130 was positively correlated with the SLEDAI-2K scores ( $r = 0.425$ ,  $P = 0.002$ ). No significant association was observed between IL-35 and IL-35 receptor subunit IL-12R $\beta$ 2 and gp130 levels with the serological parameters in SLE patients.

**Conclusion:** Our findings demonstrated a significant increase in serum IL-35 levels in SLE patients and a positive correlation between IL-35 receptor subunit gp130 with SLEDAI-2K scores. Higher levels of gp130 on CD3+CD4+ T helper cells might play a role in the clinical manifestation

of SLE, leading to more severe disease activity. Hence, they might serve as an essential biomarker and estimation for SLE disease activity and severity as well as for monitoring disease progression.

*Supervisor:*  
Associate Professor Dr Che Maraina Che Hussin

*Co-supervisor:*  
Associate Professor Dr Wong Kah Keng  
Associate Professor Prof Dr Wan Syamimee Wan Ghazali

## OUTCOME OF LABOUR OF UNTESTED CAESAREAN SCAR AND FACTORS AFFECTING ITS OUTCOME IN SABAH WOMEN AND CHILD HEALTH HOSPITAL

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**Introduction:** Caesarean section rate is on a rising trend worldwide resulting in increased pregnancies with the previous caesarean scar. Proper patient selection for the trial of labour after caesarean section is important as this improves success rate as well as reduce morbidity associated with labour. It is known that the single important predictor value is the history of successful VBAC.

**Objective:** This study aims to evaluate the success rate of VBAC as well as to explore the factors affecting its success rate after excluding patient with a history of successful VBAC.

**Methods:** A retrospective cohort study was conducted at Hospital Wanita dan Kanak Kanak Sabah (HWKKS) involving reviews of patients' record with one previous lower segment caesarean section which is untested and going for the trial of labour in the hospital. The information obtained includes sociodemographic distribution, maternal non-modifiable and modifiable factors, antenatal and intrapartum factors and outcome of the delivery. The data were analysed using SPSS by multiple logistic regression.

**Results:** The success rate of untested VBAC was 66.8%. The significant factors affecting the success rate of VBAC include inter-delivery intervals more than 60 months (adjusted OR = 2.128, 95% CI: 1.343, 3.373), maternal obesity (adjusted OR = 1.457, 95% CI: 1.303, 1.629), absence of previous vaginal birth (adjusted OR = 3.436, 95% CI: 2.307, 5.118), increasing estimated foetal weight (adjusted OR = 2.723, 95% CI: 1.385, 5.354), induction of labour (adjusted OR = 3.645, 95% CI: 2.541, 5.227) and previous caesarean section for the indication of malpresentation, placenta previa, poor progress of labour, prolonged second stage of labour and cord prolapse. Following an unsuccessful VBAC, the risk of PPH is statistically insignificant. The OASIS risk increases with the need for instrumental delivery. The risk of uterine scar dehiscence increases with short inter-delivery interval. Their neonatal risk of neonatal asphyxia and meconium aspiration syndrome is considerably low.

**Conclusion:** Proper patient selection can reduce morbidity associated with the trial of labour after caesarean section as well as avoid unnecessary morbidity associated with repeated caesarean section. The obstetrician should assist the patient in making a sound decision on her delivery plan.

*Supervisor:*  
Associate Professor Dr Mohd Pazudin Ismail

*Co-supervisor:*  
Datuk Dr Soon Ruey

## A 11-YEAR REVIEW OF EMERGENCY OBSTETRIC HYSTERECTOMY IN HOSPITAL UNIVERSITI SAINS MALAYSIA, KUBANG KERIAN, KELANTAN (JANUARY 2007–DECEMBER 2017)

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**Introduction:** Emergency obstetric hysterectomy (EOH) is one of the life-saving procedure performed in cases of intractable haemorrhage due to uterine atony, rupture uterus and placental disorders and it is usually reserved for the situations where conservative measures fail to control the haemorrhage. It is sometimes associated with both maternal and perinatal morbidity and mortality.

**Objective:** To evaluate the prevalence, indications, maternal and perinatal outcome associated with emergency obstetric hysterectomy in a tertiary care hospital.

**Methods:** A retrospective study conducted in the Department of Obstetrics and Gynaecology in Hospital Universiti Sains Malaysia (HUSM) for 11 years from January 2007 until December 2017 involving a total of 43 women who underwent emergency obstetric hysterectomy. The records of all cases of emergency obstetric hysterectomy were analysed included patient profile, obstetric history, details of present labour, indications for obstetric hysterectomy and the fetomaternal morbidity and mortality associated with emergency obstetric hysterectomy.

**Results:** Among 79,777 deliveries, there were 43 cases of emergency obstetric hysterectomy, giving the prevalence of emergency obstetric hysterectomy was 0.29 per 1000 deliveries. Maternal demographic characteristics showed that mean age was 36 years old in caesarean hysterectomy group while mean age for postpartum hysterectomy group was 33 years old. The most common parity group encountered in emergency obstetric hysterectomy was para two to para five. Whether or not women underwent prior uterine surgery was investigated and 30 women (69.77%) had history of previous caesarean section. Of the 30 women with an obstetric history of caesarean delivery, 15 (50%) had more than two caesarean deliveries. Placenta accreta was the most common indication for emergency obstetric hysterectomy (30 women, 69.8%)

followed by uterine atony (10 women, 23.3%), uterine rupture (2 women, 4.7%) and extended tear (1 woman, 2.3%). Furthermore, about 93.33% (28 out of 30 patients) with adherent placenta had history of caesarean section prior. No maternal mortality reported in this study. The most significant maternal complications post-operatively include coagulopathy (12 out of 43 women), where 27.91% required massive transfusion protocol, followed with re-laparotomy (4 women, 9.3%), and febrile illness (3 women, 6.98%). Most of the babies were born with good Apgar score. The perinatal complication include perinatal death, 2 out of 43 babies, 4.65% were fresh stillbirth were both cases were referred to our centre for abruptio placenta.

**Conclusion:** Caesarean section, especially repeat caesarean sections in women with placenta previa and uterine atony, significantly increased the risks of emergency obstetric hysterectomy. Emergency obstetric hysterectomy is safe with reduce complications compared to before with advancement of obstetric care and good clinical practice. Early decision to perform emergency obstetric hysterectomy is essential before the patient's condition deteriorates.

*Supervisor:*

*Dr Wan Fadhlina Wan Adnan*

*Co-supervisor:*

*Dr Ahmad Amir Ismail*

#### A RETROSPECTIVE STUDY (2009–2018) ON THE OUTCOME OF UNCOMPLICATED TWIN PREGNANCIES IN HOSPITAL SULTAN ISMAIL JOHOR BAHRU: THE ASSOCIATION BETWEEN GESTATIONAL AGE AT DELIVERY AND THE NEONATAL OUTCOMES

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**Introduction:** The incidence of twin pregnancy is increasing worldwide and so does in Malaysia. It is associated with a higher risk of morbidity and mortality throughout pregnancy to both mother and fetus. This study aims to determine the maternal and foetal characteristic of twin pregnancies in Hospital Sultan Ismail Johor Bahru (HSIJB) and to observe the association between the gestational age at delivery and the delivery outcomes in uncomplicated twin pregnancies.

**Methods:** This is a retrospective observational study of women with uncomplicated monochorionic and dichorionic twin pregnancies delivered at 36 completed weeks or beyond from January 2009 until December 2018 in HSIJB. The data is divided into 36 weeks group, 37 weeks group and  $\geq 38$  weeks group. The maternal demographic and pregnancy characteristics were observed. The primary outcome was neonatal composite morbidity, which was defined as having one or more of the following: neonatal intensive care unit's

admission, low Apgar score, the requirement of mechanical ventilator support, respiratory distress syndrome and stillbirth or perinatal/neonatal mortality. The optimal gestational age for delivery according to chorionicity is determine based on the neonatal composite morbidity.

**Results:** A total of 949 sets of twins delivered at HSIJB over ten years, from which 360 women with uncomplicated twin pregnancies and 720 neonatal outcomes were eligible for the study (144 DCDA and 216 MCDA). In DCDA twins, the composite morbidity was least in the 37 weeks group, followed by the  $\geq 38$  weeks group and then 36 weeks group. On the contrary, more composite morbidity was seen in the MCDA twinning group at 36 weeks group, followed by the 37 weeks group and later in  $\geq 38$  weeks group. However, the association between the gestational age at delivery with composite morbidity in MCDA twin were insignificant.

**Conclusion:** Our data suggest that the optimal gestational age for delivery in uncomplicated DCDA twins was at 37 weeks and MCDA twins at  $\geq 38$  weeks.

*Supervisor:*

*Dr Ahmad Amir Ismail*

*Dato Dr Ghazali Ismail*

#### REVIEW OF THE PREGNANCY OUTCOME OF MOTHER WITH ADVANCED MATERNAL AGE IN HOSPITAL SULTANAH AMINAH, JOHOR BAHRU (2017–2018)

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**Introduction:** Advanced maternal age is generally held to signify maternal age after 35 years at the time of delivery. Advanced maternal age has been regarded as a risk factor for complications in pregnancy. Prior studies have reported that increasing maternal age is relevant to risks for various complications including pre-eclampsia, gestational diabetes mellitus, stillbirth, preterm birth and caesarean delivery. However, some studies have yielded inconsistent conclusions about the outcomes adversely affected by maternal age. Thus, the effect of maternal age on adverse outcomes be still controversial.

**Objective:** To investigate the association between advanced maternal age and adverse pregnancy outcomes.

**Methods:** A cross-sectional study comparing 239 advanced maternal age mother ( $\geq 35$  years old) and a control group of 239 pregnant mothers aged 20 years old–34 years old, delivering at Hospital Sultanah Aminah in Johor from 2017 through 2018. Each of these groups was further analysed depending on parity (nulliparity and multiparity). Demographic background and pregnancy outcomes were compared between the groups.

**Results:** The mean age of study group and Controls was 37.48 (SD = 2.226) years old and 28.21 (SD = 3.610) years old, respectively. Advanced maternal age was



associated with higher parity and pre-existing medical illness. Advanced maternal age was significantly associated with higher incidence of anaemia. Those nulliparity mother with advanced maternal age had increased risk of exposure to lower Apgar scores ( $\leq 4$  at 1 min) by 14.75 compared to Controls. There were no significant differences between the two age groups in the incidences of other adverse obstetric outcomes and perinatal outcomes.

**Conclusion:** We observed that maternal anaemia was associated with advanced maternal age and a low Apgar score at 1 min is an independent risk factor for advanced maternal age nulliparity. Otherwise, this study demonstrated that the reproduction beyond the age of 35 years old is not associated with any significant maternal, delivery and perinatal complications. Overall, the study showed that the outcome of pregnancy with advanced maternal age is comparable to the control group.

Supervisor:

Dr Wan Fadhlina Wan Adnan

## EVALUATION OF INTERLEUKIN-6 AND TUMOUR NECROSIS FACTOR-ALPHA IN TEARS AND SERUM AND ITS ASSOCIATED FACTORS IN AGE RELATED MACULAR DEGENERATION PATIENTS

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MMed Ophthalmology

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**Introduction:** Age-related macular degeneration (AMD) is a progressive neurodegenerative disease that affect the macula lutea. AMD is the leading cause of irreversible central vision loss in elderly population in developed countries. AMD is a multifactorial disease. The development of AMD involved continuous interaction between genetic factors, oxidative stress and environmental factors. Recent studies have been showing that inflammation plays a critical role in pathogenesis of AMD. Increased in interleukin-6 (IL-6) and tumour necrosis factor alpha (TNF- $\alpha$ ) in the serum and intraocular fluid has been associated with AMD and its progression. Measurement of IL-6 and TNF- $\alpha$  in tears will provide a potential non-invasive biomarker for the progression and monitoring of AMD.

**Objectives:** The objective of this study was to evaluate IL-6 and TNF- $\alpha$  in tears and serum between AMD patients and control group as well as between early AMD and late AMD. Our objective also was to determine the association between IL-6 and TNF- $\alpha$  in tears with duration of AMD, serum level of IL-6 and TNF- $\alpha$ , smoking status and AMD status.

**Methods:** A comparative cross-sectional study was conducted at a tertiary hospital in Malaysia, Hospital Universiti Sains Malaysia (USM) from June 2018 till May 2021. This study involved patients with early AMD, late AMD and control group who attended ophthalmology clinic.

Tears and serum samples were collected. The samples were analysed using commercial human IL-6 and TNF- $\alpha$  ELISA kit to measure IL-6 and TNF- $\alpha$  levels in tears and serum. Statistical analysis was done using SPSS Inc Version 24.

**Results:** A total of 142 patients (56 early AMD, 56 late AMD and 30 control group) were recruited and analysed in this study. In the late AMD group, there was no late dry AMD and only include late neovascular AMD (nAMD). The adjusted mean for IL-6 in tears was significantly higher in AMD compared to control group (21.91 [95% CI: 19.89, 23.93] versus 16.27 [95% CI: 12.32, 20.22], respectively,  $P = 0.014$ ) after adjusted with covariates. The adjusted mean for IL-6 in serum also was significantly higher in AMD compared to control group (12.01 [95% CI: 10.93, 13.08] versus 8.51 [95% CI: 6.41, 10.62], respectively,  $P = 0.004$ ) after adjusted with covariates. The adjusted mean IL-6 in serum was significantly higher in Late nAMD compared to early AMD (13.97 [95% CI: 12.43, 15.52] versus 10.03 [95% CI: 8.49, 11.58], respectively,  $P = 0.001$ ) after adjusted with covariates. The adjusted mean TNF- $\alpha$  in serum was significantly higher in AMD compared to control group (18.49 [95% CI: 17.11, 19.86] versus 13.96 [95% CI: 11.27, 16.65], respectively,  $P = 0.004$ ) after adjusted with covariates. There was no significant association found between IL-6 and TNF- $\alpha$  level in tears with duration of AMD, serum level of IL-6 and TNF- $\alpha$ , smoking status and AMD status.

**Conclusion:** Systemic IL-6 level was significantly higher in late nAMD. There was no different in the level of IL-6 and TNF- $\alpha$  in tears between early AMD and late nAMD. There was also no significant factors associated with IL-6 and TNF- $\alpha$  in tears among AMD patients. A large cohort study is needed for further evaluation of tears inflammatory biomarkers level in AMD patients.

Supervisor:

Professor Dr Zunaina Embong

Co-supervisor:

Associate Professor Dr Che Badariah Ab Aziz

## EVALUATION OF SEXUAL DYSFUNCTION AND ITS ASSOCIATED FACTORS IN PRIMARY OPEN ANGLE GLAUCOMA PATIENTS

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**Introduction:** Malaysia is expected to be an aging nation by 2030. Sexual dysfunction (SD) and primary open angle glaucoma (POAG) are diseases that generally affect older population. The prevalence of both diseases is increase with age. Moreover, human life expectancy increases over time. POAG is the most common form of glaucoma and is known as 'silent thief of sight'. SD affects quality of life on top with the treatment burden from POAG. Thus, consideration

to confront the older adults is important to warrant an individual's future well-being.

**Objectives:** The aim of this study is to evaluate sexual dysfunction (SD) and its associated factors in primary open angle glaucoma patients.

**Methods:** A cross sectional study was conducted from September 2019 to September 2020 involving three ophthalmology clinics in Malaysia: Hospital Raja Permaisuri Bainun (HRPB), Hospital Raja Perempuan Zainab II (HRPZ II) and Hospital Universiti Sains Malaysia. Only participants aged between 40 years old and 80 years old who attended clinic and able to provide two consecutive reliable and reproducible Humphrey visual fields (HVF) 24-2 were recruited. Participants were interviewed on demographic data and latest health status. Severity of glaucoma was based on modified Advanced Glaucoma Intervention Study (AGIS) scoring system on HVF and categorised into mild, moderate and severe glaucoma. SD assessment was done using validated Bahasa Malaysia version of 'International Index of Sexual Function' (IIEF-5) for male POAG participants and 'Female Sexual Function Index' (FSFI-6) for female POAG participants.

**Results:** A total of 432 participants with pre-existing POAG were recruited (222 men and 210 women). Men and women were assessed and analysed differently by using two different questionnaires. Prevalence for erectile dysfunction (ED) was 91% by using IIEF-5 questionnaire and prevalence rate of female sexual dysfunction (FSD) was 78.5% by using FSFI-6 questionnaire. Prevalence of ED and FSD increased with age. There was significant association between ED and severity of glaucoma ( $P < 0.001$ ) but not found in FSD. High educational level had 67% lower odds to experience FSD compared to lower educational level (OR = 0.33; 95% CI = 0.12, 0.88). For 1 year older in male POAG patients, there were 1.23 times odds to experience ED (OR = 1.23; 95% CI = 1.10, 1.38).

**Conclusion:** Prevalence of SD is high in patients with POAG in our study population. Malaysia is expected to be aging nation by 2030. Sexual health in older adults should not be overlooked as both diseases are affecting them. Sexual health is an integral part of overall health in older life and quality of life includes the pleasure of sexual activity.

*Supervisor:*

*Professor Dr Liza Sharmini Ahmad Tajudin*

*Co-supervisors:*

*Associate Professor Dr. Azhany Yaakub*

*Associate Professor Dr Nani Draman*

*Dr Norhalwani Hussain*

*Dr Chong Mei Fong*

## EVALUATION OF RETINAL NERVE FIBRE LAYER AND MACULAR THICKNESS PRE-AND POST-CHEMOTHERAPY WITH CARBOPLATIN AND PACLITAXEL IN PATIENTS WITH ENDOMETRIAL AND OVARIAN CANCER

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**Introduction:** Carboplatin and paclitaxel are two standard chemotherapeutic agents known to cause neurotoxicity. In this study we aim to evaluate the toxicity by measuring the peripapillary retinal nerve fibre layer (RNFL) and macular thickness in patients with endometrial and ovarian cancers receiving them.

**Objective:** The aim of this study is to evaluate the change in RNFL and macula thickness pre- and post-chemotherapy with carboplatin and paclitaxel in patients with endometrial and ovarian cancer.

**Methods:** A one-year prospective cohort study involving 28 patients who were treated intravenously with carboplatin (200 mg/m<sup>2</sup>-400 mg/m<sup>2</sup>) and paclitaxel (175mg/m<sup>2</sup>) three-weekly for six cycles was conducted. RNFL and macula thickness were measured using optical coherence tomography (OCT) before commencement of chemotherapy, after the third cycle and one month after the sixth cycle. The main outcome measurements were the average RNFL thickness and central subfield thickness of macula.

**Results:** The mean age of the 28 participants was 54.68 (SD = 9.03) years old. Eleven had endometrial cancer while 17 had ovarian cancer. The mean of the average RNFL thickness during baseline pre-chemotherapy was 96.43 (SD = 11.39)  $\mu$ m. One month after cessation of treatment the mean RNFL thickness increased to 101.57 (SD 13.54)  $\mu$ m. Statistical analysis showed a significant increment in the mean RNFL thickness ( $P < 0.001$ ), from baseline to after three cycles and baseline to 1-month post-six-cycles of chemotherapy, except nasal quadrant. The increment in all the macular quadrants was statistically significant ( $P < 0.05$ ) except central subfield thickness.

**Conclusion:** Systemic administration of carboplatin and paclitaxel affected both the peripapillary RNFL and macula thickness. This represents early evidence of subacute subclinical retinal toxicity. OCT can be used as a screening tool to assess peri-chemotherapeutic retinal alterations.

*Supervisor:*

*Professor Dr Wan Hazabbah Wan Hitam*

*Co-supervisors:*

*Dr Chong Mei Fong*

*Dr Lee Saw Joo*

## ASSOCIATION BETWEEN AQUEOUS HUMOUR LEVEL OF GLUTATHIONE PEROXIDASE AND REDUCTASE AMONG PRIMARY GLAUCOMA PATIENTS

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**Introduction:** Glaucoma is the leading cause of irreversible blindness worldwide. Oxidative stress is believed to have a significant role in pathogenesis of glaucoma by trabecular meshwork degeneration leading to aqueous outflow resistance. Subsequently, this condition might lead to IOP elevation, retinal ganglion cell loss and glaucomatous optic neuropathy. Detection of oxidative stress level in ocular tissues may show a role of oxidative stress in pathogenesis of glaucoma that would affect the disease prognosis.

**Objective:** To evaluate the oxidative stress level of glutathione peroxidase and reductase in aqueous humour between primary glaucoma and age-matched controls.

**Methods:** A cross sectional study was conducted between June 2018 and February 2021 involving patients with confirmed diagnosis of primary open angle glaucoma (POAG) and primary angle closure glaucoma (PACG) who attended eye clinic in two tertiary hospitals in Malaysia; Hospital Universiti Sains Malaysia and Hospital Raja Perempuan Zainab 11, Kota Bharu, Kelantan. Age-matched non-glaucoma patients were recruited as controls. Complete evaluations, detail medical, ocular and drug history such as antioxidant supplement were obtained. Ocular examinations were conducted including intraocular pressure and Humphrey visual field analysis. Aqueous samples collected during cataract surgery, trabeculectomy or triple procedure. Laboratory analysis was performed to test on glutathione peroxidase (GPX) and reductase (GR) levels in aqueous using commercially available immunological kits (ELISA). Statistical analysis was done using Statistical Package for the Social Science (SPSS Inc Version 26.0). Independent t-test was used to compare the level of GPX and GR in aqueous between glaucoma and controls.

**Results:** A total of 70 primary glaucoma patients and 70 controls were recruited. Control subjects were older than glaucoma patients. Predominantly, Malay samples were the highest in both groups. The mean values of GPX and GR in both groups were slightly higher in control group. There was no significant difference in GPX level ( $P = 0.154$ ) and GR level ( $P = 0.756$ ) between glaucoma and controls using multivariate analysis after adjusting confounding factors. There is significant association between the female patients in primary glaucoma and higher level of glutathione reductase.

**Conclusion:** Lower aqueous level of GPX and GR may play a role in pathogenesis of primary glaucoma. Improvement of the levels GPX and GR might help to reduce the risk of primary glaucoma. In the future, perhaps comparing with older adults without ocular disease

will provide a better understanding of the role of these antioxidant enzymes.

**Supervisor:**  
Professor Dr Liza Sharmini Ahmad Tajudin

**Co-supervisors:**  
Associate Professor Dr Azhany Yaakub  
Associate Professor Dr Asreene Ab Razak  
Associate Professor Dr Che Badariah Abd Aziz  
Dr Norhalwani Hussain

## ANXIETY AND DEPRESSION WITH ITS ASSOCIATED FACTORS IN PRIMARY OPEN ANGLE GLAUCOMA PATIENTS

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**Introduction:** Anxiety and depression are associated with chronic medical illness. Primary open angle glaucoma (POAG) is a chronic disease and requires lifelong treatment. Psychological aspect is often overlooked during the course of glaucoma management. The awareness and knowledge of anxiety and depression in glaucoma in our local setting is still inadequate. Screening of anxiety and depression at different severity stage of POAG is essential to detect the psychological disorder at its early stage and help to better manage glaucoma treatment.

**Objectives:** The aim of this study is to compare the anxiety and depression score between different types of glaucoma severity (mild, moderate and severe) and to identify the associated factors of the anxiety and depression using HADS in primary open angle glaucoma patients

**Methods:** A cross-sectional study was conducted involving 191 patients diagnosed with POAG with no chronic ocular disease except cataract. They were grouped into mild, moderate and severe group based on the better eye using modified AGIS scoring system with two reliable and reproducible SITA standard 24-2 Humphrey visual field results. Depression and anxiety scoring were evaluated using Hospital Anxiety Depression Scale (HADS) which consist of two subscales: anxiety (HADS-A) and depression (HADS-D) with scoring ranges from 0–21. The scoring for each subscale were compared among three POAG severity groups and its associated factors.

**Results:** HADS-A and HADS-D score was significantly lower in mild severity ( $3.48 \pm 2.77$ ;  $3.57 \pm 3.29$ ) group compare to moderate ( $5.21 \pm 2.51$ ,  $P < 0.001$ ;  $4.99 \pm 2.57$ ,  $P = 0.031$ ) and severe ( $6.54 \pm 0.85$ ,  $P = 0.009$ ;  $7.01 \pm 4.29$ ,  $P < 0.026$ ) groups, respectively. A younger age group ( $b = -0.14$ ,  $P < 0.001$ ), duration of glaucoma ( $b = 0.43$ ,  $P < 0.001$ ), number of antiglaucoma ( $b = 1.95$ ,  $P = 0.003$ ) and bilateral blindness ( $b = 1.53$ ,  $P = 0.005$ ) were associated with higher HADS-A score. Significant independent predictor of higher HADS-D score were seen younger subjects ( $b = -0.13$ ,  $P <$

0.001), duration of glaucoma ( $b = 0.44, P < 0.001$ ), financial responsibility ( $b = 1.07, P < 0.029$ ) and history of glaucoma surgery ( $b = 2.31, P < 0.05$ ).

**Conclusion:** Severity of POAG is an independent predictor of HADS score. Glaucoma severity associated with higher level of anxiety and depression. Younger age, longer duration of glaucoma, higher number of anti-glaucoma and bilateral blindness were associated factors for anxiety whereas younger age, longer duration of glaucoma and history of glaucoma surgery were associated factors for depression.

*Supervisor:*

*Associate Professor Dr Azhany Yaakub*

*Co-supervisors:*

*Professor Dr Liza Sharmini Ahmad Tajudin*

*Associate Professor Dr Asree Ab Razak*

### EVALUATION OF TUMOUR NECROSIS FACTOR-ALPHA AND INTERLEUKIN-6 IN TEARS AND SERUM AMONG DIABETIC RETINOPATHY PATIENTS

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**Introduction:** Diabetic retinopathy (DR) is a leading cause of blindness and visual disability. DR is a microangiopathy classified according to the presence or absence of abnormal new vessels as non-proliferative diabetic retinopathy (NPDR) and proliferative diabetic retinopathy (PDR). Blood-retinal barrier breakdown, characteristic of DR, is believed to depend on inflammation and apoptosis. Increased levels of tumour necrosis factor-alpha (TNF-alpha) and interleukin 6 (IL-6) have been found in the vitreous fluid of diabetic patients and a strong correlation between plasma levels of TNF-alpha and severity of DR has been reported. In ophthalmology, there is limited study done on TNF-alpha and IL-6 level in tears to assess the degree of eye involvement in type 2 diabetic patients with and without DR. Detection of TNF-alpha and IL-6 in tears is a less invasive and safe method for screening of DR and identify patients who are at increased risk of progression from NPDR to PDR. This will reduce the number of patient with DR related complications.

**Objective:** The objective of this study is to compare TNF-alpha and IL-6 level in tears and serum of type 2 diabetes mellitus patients with and without DR. Besides that, to correlate the mean TNF-alpha and IL-6 level between tears and serum among diabetic patients and to identify associated factors (age, gender, smoking, hypertension, duration of DM and severity of DR) affecting TNF-alpha and IL-6 level in tears among DR patients.

**Methods:** A comparative cross sectional study was conducted in Ophthalmology Clinic, Hospital Universiti Sains Malaysia (USM), Kelantan, Malaysia from June 2019

until November 2020. The study populations include all DR patients who attended Ophthalmology Clinic, Hospital USM within the allocated time frame and those who fulfill the criteria after fundus examination. Tears sample were collected using Schirmer paper and 3 mls of blood were collected. Laboratory analysis using commercial human TNF-alpha and IL-6 immunoassay ELISA kit with pre coated plates was performed to measure TNF-alpha and IL-6 levels in serum and tears. Statistical analysis was done using SPSS Version 26.

**Results:** A total of 99 patients were included in this study with 33 patients of No DR, 32 patients of NPDR and 34 patients of PDR. Tears TNF-alpha and IL-6 were significantly higher in PDR (5.20 [SD = 0.62] pg/mL and 41.37 [SD = 2.31] pg/mL, respectively) compared to NPDR (2.32 [SD = 1.20] pg/mL and 16.19 [SD = 3.20] pg/mL, respectively;  $P < 0.001$  for both) and No DR (0.30 [SD = 0.11] pg/mL and 4.81 [SD = 1.02] pg/mL;  $P < 0.001$ ). Serum TNF-alpha and IL-6 were significantly higher in PDR (21.09 [SD = 1.72] pg/mL and 16.23 [SD = 1.11] pg/mL, respectively) compared to NPDR (10.04 [SD = 2.90] pg/mL and 8.29 [SD = 1.59] pg/mL, respectively;  $P < 0.001$  for both) and No DR (4.24 [SD = 1.56] pg/mL and 4.78 [SD = 0.72] pg/mL;  $P < 0.001$  for both). There was significant strong correlation of TNF-alpha ( $r = 0.96, P < 0.001$ ) and IL-6 ( $r = 0.99, P < 0.001$ ) between serum and tears. Serum TNF-alpha was significantly affecting TNF-alpha tears level in DR patients. Severity of DR and serum IL-6 were significantly affecting IL-6 tears level in DR patients.

**Conclusion:** This study showed that there was significant associations of tear and serum TNF-alpha and IL-6 in type 2 diabetic patients based on its clinical disease severity after adjusting for potential confounders. Thereby, this non-invasive technique of evaluating TNF-alpha and IL-6 in tears can be used as a biomarker for screening the severity of DR in order to reduce the DR related complications.

*Supervisor:*

*Professor Dr Zunaina Embong*

*Co-supervisors:*

*Associate Professor Dr Mahaneem Mohamed*

*Dr Wan Mariny W Md Kasim*

### EVALUATION OF HEALTH-RELATED QUALITY OF LIFE IN CHILDREN WITH VERNAL KERATOCONJUNCTIVITIS USING QUALITY OF LIFE IN CHILDREN WITH VERNAL KERATOCONJUNCTIVITIS QUESTIONNAIRE

**Dr Khairil Ridzwan Kamalul Khusus**  
MMed Ophthalmology

*Department of Ophthalmology and Visual Sciences, School of Medical Sciences, Universiti Sains Malaysia, Kelantan, Malaysia*

**Introduction:** Vernal keratoconjunctivitis (VKC) is a recurrence and chronic bilateral ocular allergic conjunctivitis

mainly affected male prepuberty children. The signs and symptoms of VKC given a negative impact on well-being, lifestyle and limitation on psychosocial activities. There has been a lack of data on health-related quality of life (HRQoL) in children with VKC from Southeast Asia.

**Objective:** To evaluate the mean total and subscales score of the QUICK questionnaire between the severity of VKC and in children with VKC and healthy groups.

**Methods:** This study is a comparative cross-sectional study conducted in Hospital Selayang, Universiti Sains Malaysia between February 2019 and May 2020 involving children aged 8 years old–15 years old. The VKC participant's recruitment depends on the diagnosis of VKC, which was made based on the patient's clinical history, previous diagnosis and objective examination. While in the control group, the participants were recruited from children with no existing ocular problems.

**Results:** Two hundred and forty children were recruited, including 120 children with VKC and 120 normal healthy children as control. There were statistically significant differences in all aspects of clinical data in the comparison between children with VKC and normal children ( $P < 0.001$ ) and within the children with VKC group ( $P < 0.001$ ). There was a statistical difference in mean total scores and all of the subscales between children with VKC and the control group ( $P < 0.001$ ) and between the children with mild, moderate and severe VKC ( $P < 0.05$ ).

**Conclusion:** The QUICK questionnaire is a good tool to assess the HRQoL among children with VKC. VKC disease negatively impacts HRQoL in children with VKC compared to normal children and in comparison within the severity of the VKC group. Understanding the psychosocial limitation and sign and symptoms of VKC that affected most HRQoL leads the physician to a holistic approach to managing the VKC patient.

Supervisor:  
Professor Dr Shatriah Ismail

Co-supervisor:  
Dr Fiona Chew Lee Min

## EVALUATION OF TNF- $\alpha$ AND IL-6 IN SALIVA AMONG DIABETIC RETINOPATHY PATIENTS

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MMed Ophthalmology

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**Introduction:** Diabetes retinopathy (DR) is one of the major microvascular complication of diabetes mellitus (DM). It is known as the second most common cause of blindness in Malaysia and the 5th worldwide. The burden cause by DM and blindness due to DR is high. Multifactorial etiology involves in DR pathogenesis include genetic backgrounds and environmental risk factors. Recent evidence had showed that inflammatory process plays a crucial role in the development

of DR. Increase in tumor necrosis factor alpha (TNF- $\alpha$ ) and interleukin 6 (IL-6) were associated with DR. Saliva protein biomarkers are a novel technique for clinical diagnosis. Thus, identification of TNF- $\alpha$  and IL-6 in saliva perhaps provide insight in the role of saliva as a diagnostic alternative in future.

**Objectives:** The objective of this study was to compare TNF and IL-6 level in saliva between DM patients and no DM, and also in between the different DR groups. Besides that, it also to determine the relationship between TNF- $\alpha$  and IL-6 level in saliva with level of HbA1c and duration of DM.

**Methods:** A comparative cross-sectional study was conducted exclusively at a tertiary hospital in Malaysia, Hospital Universiti Sains Malaysia (USM) between January 2018 and November 2020. This study involved DM patients with DR, no DR and no DM. Unstimulated saliva samples were collected. Laboratory analysis using commercial human TNF- $\alpha$  and IL-6 ELISA kit (LEGEND MAX™, BioLegend, Inc.) was performed to measure TNF- $\alpha$  and IL-6 levels in saliva. Statistical analysis was done using SPSS Inc. version 26.

**Results:** A total of 120 patients were included into the study (DM no DR: 33 patients, DM with NPDR: 30 patients, DM with PDR: 32 patients, no DM: 25 patients). There was significantly higher mean saliva IL-6 in DM group (0.033 [SD = 0.005] pg/mL) compared to no DM group (0.027 [SD = 0.001] pg/mL) after adjusted with covariates ( $P < 0.001$ ). There was no significant difference of mean TNF- $\alpha$  in saliva between DM and no DM after adjusted with covariates. Mean IL-6 in saliva were significantly higher in NPDR (0.036 [SD = 0.003] pg/mL) and PDR (0.093 [SD = 0.023] pg/mL) compare to no DR (0.027 [SD = 0.001] pg/mL) ( $P < 0.001$  and  $P < 0.001$ , respectively). Mean TNF- $\alpha$  in saliva were significantly higher in NPDR (0.086 [SD = 0.022] pg/mL) and PDR (0.093 [SD = 0.023] pg/mL) compare to no DR (0.049 [SD = 0.011] pg/mL) ( $P = 0.015$  and  $P = 0.003$ ), respectively. However, there was no significant difference of mean IL-6 and TNF- $\alpha$  in saliva between NPDR and PDR. The HbA1c level and duration of DM were not associated with TNF- $\alpha$  and IL-6 in saliva. Comorbidities and DR stages were the factors associated with TNF- $\alpha$  in saliva. While only DR stages was the significant factor associated with IL-6 in saliva.

**Conclusion:** This study showed that there is significant association between TNF- $\alpha$  and IL-6 level in saliva among DM patients. DR pathogenesis involved multiple pathway which is mediated by inflammatory mediators. They are found to be in high concentration in the eye and systematically compare to non-DR patients. Further study with larger cohort and longer duration of follow-up needed to confirmed this finding.

Supervisor:  
Professor Dr Zunaina Embong

Co-supervisors:  
Dr. Wan Nazatul Shima Shahidan  
Dr Siti Lailatul Akmar Zainuddin

## THE VISION-RELATED QUALITY OF LIFE USING NEI-RQL-42 AND ITS ASSOCIATED FACTORS IN UNDERGRADUATE STUDENTS WITH MYOPIA

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MMed Ophthalmology

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**Introduction:** The prevalence of myopia is getting higher around the world especially in Asia. However, there is limited study regarding the vision-related quality of life (VRQOL) among the myopes.

**Objectives:** To evaluate the vision-related quality of life using (National Eye Institute-Refractive Error Quality of Life Instrument-42) NEI-RQL-42 and its associated factors among undergraduate students with myopia.

**Methods:** A cross-sectional study was conducted in selected universities in Kelantan from December 2018 till November 2020. The samples were selected with the convenience purposive sampling method. The participants were recruited after the relevant history taking, ocular screening, and refraction. The suitable subjects were asked to answer the NEI-RQL-42 questionnaire.

**Results:** A total of 458 participants aged 18 years old–29 years old were recruited (378 were myopic and 80 were emmetropic). Myopes had poorer VRQOL significantly ( $P < 0.001$ ) in mean global score (62.20 [SD = 9.53]) than emmetropes (81.12 [SD = 12.72]) and showed a lower score in all subscale scores significantly ( $P < 0.05$ ) except symptoms domain ( $P = 0.319$ ). Contact lenses wearers reported significantly poorer VRQOL with a lower mean global score (58.68 [SD = 8.16;  $P = 0.001$ ]) comparing to spectacles wearers. After adjustment for other confounding factors, health-related courses were significantly more likely to report poorer global scores of VRQOL than other courses.

**Conclusion:** There was a significant difference in the mean score of NEI-RQL-42 between myopes and emmetropes in which myopes had poorer VRQOL. Contact lenses wearers acquired a significantly poorer mean score statistically compared to spectacles wearers. Health-related courses can cause a poorer mean score of VRQOL significantly.

Supervisor:  
Professor Dr Mohtar Ibrahim

Co-supervisor:  
Dr Julieana Mohammed

## EVALUATION OF HAEMOGLOBIN LEVEL AND PLATELET COUNT IN NEONATES WITH AND WITHOUT RETINOPATHY OF PREMATURITY

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**Introduction:** Haemoglobin and platelet have been postulated to play a role in the development of retinopathy of prematurity (ROP).

**Objectives:** This study aimed to compare weekly mean haemoglobin level and platelet count between ROP and non-ROP infants in the first 6 weeks of life.

**Method:** Ninety-three premature infants with birth weight less than 1.5 kg and gestational age less than 32 weeks were recruited in Hospital Universiti Sains Malaysia from 2017 to 2019. Each ROP case was individually matched (1: 2) to two non-ROP cases. Weekly mean haemoglobin level, weekly mean platelet count, and other related risk factors were documented.

**Result:** Thirty-one infants with ROP and 62 infants with non-ROP were recruited. Of those with ROP, eight had stage 1 ROP, six had stage 2 ROP, 16 had stage 3 ROP. The mean birth weight and gestational age of the ROP group was 962.2 g and 27.6 weeks while the non-ROP group was 1056.9 g and 28.5 weeks, respectively. We found significant differences in the weekly mean platelet counts between ROP and non-ROP infants from week 2 to week 6 of life ( $P = 0.003$ ). A significant difference was also found when comparing weekly mean haemoglobin level at week one of life ( $P = 0.003$ ). However, no significant difference was found in the weekly mean platelet count ( $P = 0.489$ ) and weekly mean haemoglobin level ( $P = 0.292$ ) after adjusting to covariates.

**Conclusion:** There is no significant difference in mean haemoglobin level and platelet count in the first six weeks of life between ROP and non-ROP infants after adjusting to confounding factors like sepsis, bronchopulmonary dysplasia and blood transfusion.

Supervisor:  
Professor Dr Shatriah Ismail

Co-supervisor:  
Professor Dr Hans Van Rostenberghe

## EVALUATION OF RETINAL NERVE FIBRE LAYER AND MACULAR THICKNESS IN PATIENTS WITH HYPERTENSIVE DISORDER IN PREGNANCY

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**Introduction:** Hypertensive disorder in pregnancy (HDP) is a multisystemic disorder triggered by defective uteroplacental trophoblastic invasion of maternal uterine artery. Subsequent cascade of event leads to widespread endothelial cell dysfunction causing vasospasm, coagulopathy and multiorgan dysfunction. Visual system is commonly

affected in HDP. However, retinal nerve fibre layer and macular thickness changes in HDP are seldom examined unless patients are symptomatic or develop hypertensive retinopathy changes

**Objectives:** Evaluate retinal nerve fibre layer (RNFL) and macular thickness in patients with hypertensive disorder in pregnancy (HDP) compared to healthy pregnant control in third trimester.

**Methods:** Comparative cross-sectional study conducted in Hospital Universiti Sains Malaysia with 200 HDP participants and 50 controls recruited. Clinically stable participants who fulfilled criteria with normal ocular examinations were subjected to optical coherent tomography (OCT) of the right eye. RNFL and macular thickness were evaluated and analysed using SPSS 26.0.

**Results:** Thinner mean RNFL and macular quadrants in HDP groups compared to control were observed; after controlling potential cofounders. Pre-eclampsia showed significant thinning at average and superior RNFL quadrants while, gestational hypertension group showed thinning at average, superior and inferior RNFL regions. Chronic hypertension group showed thinner average RNFL, while chronic hypertension with superimposed pre-eclampsia showed significant thinning at average and superior RNFL quadrants. Thinner outer temporal macular region observed in both gestational and chronic hypertension with superimposed pre-eclampsia groups with mean of 251.00  $\mu\text{m}$  and 251.11  $\mu\text{m}$ , respectively. The latter group also showed thinner outer inferior macular of 259.53  $\mu\text{m}$ . Regression analysis between blood pressure (BP) and number of antihypertensive medications with average RNFL and macular thickness showed no significant associations.

**Conclusion:** Mean RNFL thickness was significantly lower in the all HDP groups while macular thickness was significantly lower in the gestational hypertension and chronic hypertension with superimposed pre-eclampsia group. Blood pressure and number of medications showed no significant associations with RNFL and macular thickness.

Supervisor:

Professor Dr Wan Hazabbah Wan Hitam

Co-supervisor:

Associate Professor Dr Adibah Ibrahim

## EVALUATION OF GENETIC MARKERS OF LOXL1 AND CACNA1A AND THEIR ASSOCIATION WITH CORNEAL THICKNESS, PSEUDOEXFOLIATION SYNDROME AND PSEUDOEXFOLIATION GLAUCOMA IN MALAYS

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**Introduction:** Pseudoexfoliation (PEX) syndrome is an age-related systemic disorder of the extracellular matrix characterised by deposition of fibrillary material in the eye. Deposition of this material may obstruct the trabecular meshwork which leads to pseudoexfoliation glaucoma (PEXG). There is possibility that central corneal thickness (CCT) plays a role in conversion of PEX to PEXG. Perhaps, the interplay of genetics affects the CCT and increases the susceptibility of PEX and PEXG.

**Purpose:** To evaluate single nucleotide polymorphisms (SNPs) of rs3825942 of LOXL1 and rs4926244 of CACNA1A and their association with pseudoexfoliation syndrome (PEX), pseudoexfoliation glaucoma (PEXG) and central corneal thickness (CCT) in Malays.

**Methods:** A case control study was conducted involving Malays with PEX (50), PEXG (52) and controls (50). CCT was measured using non-contact pachymetry. Venesection was conducted and genomic DNA was extracted using commercialize DNA extraction kit. Optimisation of primer was conducted for rs3825942 and rs4926244. Polymerase chain reaction was performed, and the products were purified. DNA sequencer was used to identify the polymorphisms. Pearson's chi-square, Mann-Whitney test and multiple logistic regression analysis were used to analyse the data.

**Results:** rs4926244G and rs3825942G were significantly associated with PEX, which increased the risk of 2.6 folds (95% CI: 1.25, 5.37;  $P = 0.015$ ) and 4.3 folds (95% CI: 1.33, 17.52;  $P = 0.017$ ), respectively. There was significant difference of rs3825942G between Malay patients with PEXG and controls ( $P < 0.001$ ) but there was no significant difference with rs4926244G ( $P = 0.243$ ). CCT was significantly thinner in patients with PEXG ( $P = 0.014$ ). PEX patients with rs4926244G ( $P = 0.038$ ) and rs3825942G ( $P = 0.029$ ) showed significant thicker CCT. However, there was no significant association of both SNPs with CCT in patients with PEXG ( $P = 0.089$ ).

**Conclusion:** In this replication study, rs3825942G of LOXL1 and rs4926244G of CACNA1A are potential genetic markers for susceptibility of PEX and PEXG in Malays. These SNPs also has potential role in CCT of PEX patients. Identification of these genetic markers may perhaps help in early detection of pseudoexfoliation disease in Malays, in the future.

Supervisor:

Professor Dr Liza Sharmini Ahmad Tajudin

Co-supervisors:

Associate Professor Dr Azhany Yaakub

Professor Dr Zilfalil Alwi

Dr Norhalwani Husain

## EVALUATION OF THE RETINAL VASCULAR CALIBRES AND ITS ASSOCIATED FACTORS IN CHILDREN WITH TYPE 1 DIABETES MELLITUS

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**Background:** Poor glycaemic control in patients with type 1 diabetes mellitus (Type 1 DM) is closely associated with an increased risk of microvascular complications. Our study aims to determine the mean retinal arteriolar and venular calibres at baseline visit, mid visit and final visit. We also look into the factors affecting the retinal vascular calibres in children with type 1 diabetes mellitus.

**Methods:** A cross-sectional prospective hospital-based study involving children with Type 1 DM. The participants were recruited from Ophthalmology and Paediatric Clinics of Universiti Sains Malaysia Hospital. Fundus photo of right eye were taken at baseline, mid and final visit and analyse by Singapore 1 Vessels Analysis (SIVA). HbA1c at each visit were documented.

**Objectives:** Mean central arteriolar equivalent (CRAE) and venular equivalent (CRVE) were determined at each visit and its associated factors were analysed.

**Results:** The mean presenting age were 12.5 (SD = 2.24) years old. Majority of the participant were Malay race and mostly had poor glycaemic control at each visit. The mean CRAE and CRVE were not significantly differ between good and poor glycaemic control group at each visit. However, the mean CRVE were significantly wider ( $P = 0.037$ ) in poor glycaemic control group along the duration of follow up. Age, duration of DM, blood pressure, BMI and HbA1c are not associated with vascular calibres.

**Conclusion:** A wider CRVE is associated with poorly glycaemic control DM. It can be one of earlier indicator in detecting the progression to diabetic retinopathy. In this closer and shorter duration of follow up study, no significant associated factors such as age, duration, blood pressure, BMI and glycaemic control with retinal vascular calibres.

*Supervisor:*  
*Professor Dr Hajjah Shatriah Ismail*

*Co-supervisors:*  
*Dr Evelyn Tai Li Min*  
*Dr Suhaimi bin Hussain*

## EVALUATION OF STEREOPSIS AND FUSION IN PATIENTS WITH VESTIBULAR VERTIGO

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**Introduction:** Fusion and stereopsis are components of binocular vision in which the stereopsis is the highest grade. Various studies showed that binocular vision dysfunction is one of the causes that contribute to refractory vestibular vertigo due to the presence of fixation disparity and reduced stereopsis. Binocular vision is an important

factor for postural stability. Normal binocular vision is required to retain stable visual image on retina during vestibulo-ocular reflex. Thus the presence of binocular vision dysfunction in vertigo warrants an evaluation.

**Objectives:** To compare the means of stereopsis and fusional vergence between the patients with vestibular vertigo and control subjects.

**Methods:** A comparative cross-sectional study was conducted in the Ophthalmology Clinic, Hospital Universiti Sains Malaysia, Kelantan from January 2019 till February 2021 among patients with vestibular vertigo patients and the control group. Fifty-seven patients included in this study with 57 controls who are in the same age range of 30 years old to 60 years old. Both groups were evaluated for stereopsis and fusion vergence amplitude once fulfilled the required criteria. The far and near stereopsis were tested using M&S smart system II PC-Plus and Titmus test, respectively. Fusional vergence was measured using a prism bar.

**Results:** Parametric analysis of stereopsis revealed a statistically significant difference of mean stereopsis at near ( $P < 0.05$ ) and an insignificant difference in mean stereopsis at far ( $P > 0.05$ ) between vestibular vertigo patients and the control group. Independent *t*-test showed statistically significant difference of mean fusional vergence measurement ( $P < 0.05$ ) between these two groups which consists of near and far of negative and positive fusional vergence for break and recovery point.

**Conclusion:** There was statistically significant difference in mean near stereopsis and fusional vergence between patients with vestibular vertigo and the control group. However, there was no significant difference in mean for far stereopsis.

*Supervisor:*  
*Professor Dr Mohtar Ibrahim*

*Co-supervisors:*  
*Professor Dr Hajjah Shatriah Ismail*  
*Associate Professor Dr Rosdan Salim*

## EVALUATION OF MACULA AND RETINAL NERVE FIBER LAYER THICKNESS IN POST-MENOPAUSAL WOMEN WITH HORMONE REPLACEMENT THERAPY

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**Introduction:** Menopause is a state of natural ovarian senescence with accompanying estrogen deficiency. It is associated with various systemic manifestations due to estrogen deficiency including vasomotor, genitourinary, sleep disturbance and others. Besides, menopause is also associated with ocular changes. Declination of estrogen causing impaired ocular blood flow as estrogen have the ability to influence the vascular tone and blood flow in organs and



tissues; the impaired ocular blood flow is contributing factor in aetiology and progression of glaucoma and age-related macular degeneration (ARMD). Hormone therapy is used as the most effective treatment for menopausal symptoms because it reduces the frequency and discomfort causing by decline of estrogen in the body. In the meantime, it also has the advantages towards eyes structures itself.

**Objective:** To evaluate macula and retinal nerve fiber layer thickness in post-menopausal women with and without oral hormone replacement therapy (HRT) and to correlate between duration of oral HRT treatment and macula and RNFL thickness.

**Methods:** This is a cross sectional study conducted at Hospital Universiti Sains Malaysia and Hospital Raja Perempuan Zainab II between July 2019 until November 2020. A total of 100 menopause women who fulfilled selection criteria were selected using non-probability sampling method. They were divided into two groups; Group 1: post-menopausal women with oral HRT treatment and Group 2: post-menopausal women without HRT treatment. The macula and retinal nerve fibre layer thickness were taken using Hiedelberg Spectralis OCT machine for both groups by blinded trained personnel. The participants came only once during the study period. Statistical analysis was performed using SPSS version 26.0.

**Results:** There were no significant mean differences of mean macula thickness between postmenopausal women with and without oral HRT except for superior outer macula ( $P = 0.042$ ) and temporal outer macula ( $P = 0.007$ ). Meanwhile, for RNFL thickness, there were no significant mean differences of mean RNFL thickness between post-menopausal women with and without oral HRT except for total temporal ( $P = 0.044$ ), temporal superior ( $P = 0.002$ ) and temporal inferior ( $P = 0.033$ ). There was no significant correlation between macular thickness and RNFL thickness with duration of oral HRT treatment (all  $P > 0.050$ ).

**Conclusion:** HRT usage demonstrated positive structural changes on the macula thickness (specifically on superior outer macula and temporal outer macula) and RNFL thickness (over the temporal, temporal superior and temporal inferior). Hence, the usage of HRT is benefited to the ocular structures of post-menopausal women.

Supervisor:  
Dr Khairy Shamel Sonny Teo

Co-supervisor:  
Professor Dr Wan Hazabbah Wan Hitam

## EVALUATION OF RETINAL NERVE FIBER LAYER AND MACULA THICKNESS, COLOUR VISION AND ELECTRORETINOGRAM IN PATIENTS WITH ACNE VULGARIS TREATED WITH SYSTEMIC ISOTRETINOIN

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**Introduction:** Isotretinoin (13-*cis*-retinoic acid) is a synthetic retinoid that is used specially for treating acne vulgaris that does not respond to other therapies. Isotretinoin is an extremely effective systemic medication for acne vulgaris which is widely used. However, isotretinoin is also known to have a broad side effect including ocular toxicity. Some studies have shown its effect on retinal nerve fiber layer (RNFL) and ganglion cell layer and visual functions.

**Objectives:** This study was performed to evaluate RNFL and macular thickness, colour vision and electroretinogram (ERG) on systemic isotretinoin treatment in acne vulgaris patients.

**Methods:** Prospective observational cohort study involving patients with moderate to severe acne vulgaris on systemic isotretinoin was conducted at Hospital Universiti Sains Malaysia and Hospital Raja Perempuan Zainab II from June 2018 till May 2021. All patients had to undergo a complete ophthalmologic examination. RNFL and macula thickness analysis using optical coherence topography (OCT), colour vision analysis using Farnsworth-Munsell 100 Hue test and ERG were performed before the start of treatment and at three months of treatment. Statistical analysis was done using SPSS Inc version 26.

**Results:** Forty patients who were treated with 20 mg daily oral isotretinoin were enrolled in this study. The mean age of the patients was 26.88 (SD = 7.16) years old (which is between 17 years old–43 years old). Measurements of mean RNFL and macula thickness before starting isotretinoin treatment was 93.88 (SD = 11.08)  $\mu\text{m}$  and 300.94 (SD = 14.66)  $\mu\text{m}$ , respectively, while the mean RNFL and macula thickness at 3 months of treatment was 94.35 (SD = 10.11)  $\mu\text{m}$  and 301.42 (SD = 15.65)  $\mu\text{m}$ , respectively. Measurements showed no statistically significant change between two measurements ( $P > 0.05$ ). The colour vision score was 76.30 (SD = 32.27) before starting treatment and 74.15 (SD = 24.17) at 3 months of treatment. The amplitude of *a* wave and *b* wave in ERG before starting treatment was measured as 269.45 (SD = 57.00)  $\mu\text{V}$  and 450.48 (SD = 70.07)  $\mu\text{V}$ , respectively. Whereas the amplitude of *a* wave and *b* wave at 3 months of treatment was measured as 268.68 (SD = 55.13)  $\mu\text{V}$  and 448.40 (SD = 69.91)  $\mu\text{V}$ , respectively. No statistically significant differences were observed in the colour vision score and ERG amplitude at three months of treatment ( $P > 0.05$ ).

**Conclusion:** There was no statistically significant difference in mean RNFL and macula thickness, colour vision and ERG of acne vulgaris patients before and at three months of systemic isotretinoin treatment.

Supervisor:  
Dr Khairy Shamel Sonny Teo

Co-supervisors:  
Associate Professor Dr Mokhtar Noor  
Dr Wan Noor Hasbee Wan Abdullah

## EVALUATION THE EFFECT OF ACITRETIN ON OCULAR SURFACE PARAMETERS IN PSORIATIC VULGARIS PATIENTS

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**Objective:** To evaluate the effect of oral acitretin on ocular surface parameters which are, time of tear film to loss its integrity by tear break-up time (TBUT), production of tears by lacrimal gland (by Schirmer test) and score for ocular surface disease index (OSDI) in psoriatic vulgaris patients.

**Design:** A prospective analysis of 29 patients with psoriasis vulgaris who need step up treatment to oral acitretin. Outcome measures included patients' demographic data, types and duration of previous treatment for psoriasis received before, TBUT, Schirmers' test and ocular surface disease index (OSDI) at baseline, 3 months and 6 months of treatment.

**Result:** No statistically significant changes were found in mean for TBUT, Schirmers test and OSDI in psoriasis vulgaris patient treated with oral acitretin for 6 months durations.

**Conclusion:** Ocular surface integrity and tear film are not affected by 6 months therapy with oral acitretin in psoriasis vulgaris patients.

Supervisor:  
Dr Khairy Shamel Sonny Teo

Co-supervisor:  
Dr Akmal Haliza Zamli

## EVALUATION OF ANXIETY, DEPRESSION AND QUALITY OF LIFE USING THE HOSPITAL ANXIETY AND DEPRESSION SCALE AND GLAUCOMA QUALITY OF LIFE-36 IN JUVENILE OPEN ANGLE GLAUCOMA PATIENTS.

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**Introduction:** Glaucoma is the leading cause of blindness worldwide with a large number from Asia and Africa continents. Juvenile Open-Angle glaucoma is a rare subset of Primary open-angle glaucoma. It is usually diagnosed between the age of 5 years old–35 years old and predominantly affecting men. The effect of glaucoma on quality of life, anxiety and depression have been shared by the previous studies. However, there are very few studies

published specifically on the juvenile open angle glaucoma group.

**Purpose:** This study aims to evaluate anxiety, depression and quality of life in among JOAG patients as compared to control. It also serves to identify factors affecting anxiety, depression and quality of life among JOAG patients in Malaysia.

**Methods:** The Hospital Anxiety and Depression Scale (HADS) questionnaire and Glaucoma-Quality of Life 36 (GlauQOL-36) questionnaire were administered to 68 Juvenile Open Angle Glaucoma (JOAG) patients and 202 controls to evaluate their anxiety, depression and quality of life. Sociodemographic of both groups were evaluated. The clinical features of JOAG patients were further evaluated. Univariate and multivariate analysis were done using simple linear and multiple linear regression respectively on the variables to look at factors affecting anxiety, depression and quality of life.

**Results:** The mean score for HADS-A and HADS-D and GlauQOL-36 among JOAG patients were, 6.31 (SD = 4.04), 5.53 (4.017) and 69.85 (SD = 10.43), respectively, while the mean among controls were 3.20 (SD = 3.71), 3.27 (SD = 3.64) and 83.29 (SD = 7.98), respectively. The scores among JOAG were significantly lower than control in all domains, namely daily life, driving, psychological wellbeing, self-image, anxiety, treatment burden and confidence in health care. The significant factor to account for the increase in HADS-D score were tertiary education ( $P = 0.009$ ), poorer MD worst eye ( $P = 0.013$ ) and shorter duration of diagnosis ( $P = 0.012$ ). The significant factor associated with better GlauQOL-36 were female ( $P = 0.052$ ), income more than USD500 ( $P = 0.036$ ) and the use of topical carbonic anhydrase inhibitor (CAI) ( $P = 0.005$ ).

**Conclusion:** The JOAG patients were significantly more affected in terms of anxiety, depression and quality of life as compared to the control group. The factors associated with depression were tertiary education, poorer MD worst eye ( $p = 0.013$ ) and shorter duration of diagnosis. The significant factor associated with better GlauQOL-36 were female, income more than USD500 and the use of topical carbonic anhydrase inhibitor (CAI). The use of questionnaire in clinical setting may help in having a holistic evaluation of glaucoma patients. Healthcare providers need to pay attention to the quality of life and the psychological aspect of this group of patients and formulate personalised care.

Supervisor:  
Associate Professor Dr Azhany Yaakub

Co-supervisors:  
Professor Dr Liza Sharmini Ahmad Tajudin  
Associate Professor Dr Asrene Ab Razak

## DISCOGENIC BACKPAIN; OUTCOME OF INTRADISCAL STEROID INJECTION

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**Introduction:** Discogenic lower backpain and lumbar radicular pain is a common presentation with great disability and a negative impact of quality of life of the patient and subsequently toward working limitation. This minimally invasive intradiscal steroid injection provide an alternative to patient who failed conservative treatment. We conducted a study to determine the outcome of intradiscal steroid injection in discogenic back pain patient based on the pain score (Visual Analog Score) and the disability score (Oswestry Disability Index). Finally we want to determine the correlation of discography grading (Adam grading with improvement/changes in pain and disability score

**Methods:** This was a retrospective cohort study involving 70 patients with chronic discogenic back pain evaluate from 1 December 2015 till 31 September 2018. The clinical data evaluate using Visual Analog Score and Oswestry Disability Index (ODI). Statistical analysis was performed using SPSS version 24 to run paired *t*-test to compare the VAS and ODI pre-injection and at 6 months post-injection. All *P*-value less than 0.05 were considered as statistically significant.

**Result:** Most patient (mean age of 56.4 [SD = 9.2] years old) significantly had reduction of pain score from pre-injection VAS score of 66.3 + 16.1 to 32.2 + 17.4 6 months post injection. ODI shows reduction of 67.9 + 14.5% (severe disability) to 33.1 + 13.6%, 6 months post-injection were categorised as moderate disability. Based on Spearman's correlation analysis change of pain score VAS and change of disability score ODI weak and not significantly correlated with Adam's classification.

**Conclusion:** The intradiscal steroid injection is a potential adjunct treatment in patient with chronic discogenic backpain who failed conservative management. Our study shows that result suggested that intradiscal steroid injection can improve the short-term clinical outcome in patient with discogenic backpain.

Supervisor:  
Professor Dr Mohd Imran Yusof

Co-supervisor:  
Dr Joehaimiey Johari

## STUDY OF ANTHROPOMETRIC MEASUREMENT OF DISTAL FEMUR AMONG MALAY, CHINESE AND INDIAN

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**Introduction:** Knee joint replacement surgery requires a good shape match between the implants and the resected knee surface to ensure good outcome. It is well known that Asian knees are smaller compared to their

Western counterparts. However, there is paucity of data regarding the anthropometric measurement of distal femur within the Asian population. Hence, our main objective is to study the difference between the anthropometric measurement of distal femur within the Asian population particularly the Malay, Chinese and Indian.

**Methods:** A total of 90 CT knee images of Malay, Chinese and Indian subjects performed were measured using axial slice perpendicular to the long axis of femur. Parameters measured are anteroposterior measurement of lateral (APL) and medial (APM) femoral condyle and mediolateral (ML) measurement of distal femur condyle. Aspect ratio were calculated using the formula (ML/AP). All parameters were measured up to 0.1 mm and statistical analysis was performed using IBM SPSS Statistics version 24.0. Two-way analysis of variance (ANOVA) was conducted to analyse the influence of two independent variables (gender and race) on anthropometric measurement of distal femur. Any differences in anthropometric measure of distal femur between races were ascertained using one-way analysis of covariance (ANCOVA) after controlling the age. Pearson's correlation test was used to measure correlation between distal femur morphology and age.

**Results:** There was a significant difference of AP medial measurement of distal femur between three races ( $F [2, 89]: 6.88; P = 0.002$ ). Difference in gender also showed a significant effect on the AP medial ( $F [1, 86]: 33.36; P < 0.001$ ) and AP lateral ( $F [1, 86]: 26.79; P < 0.001$ ) measurement of distal femur. Our study showed strong correlation between AP and ML measurement indicating that with increasing AP length, the ML width increases. Indian population noted to have the most pronounced knee-implant mismatch in our study.

**Conclusion:** We concluded that not all Asian knees are the same and thus similar implant designs cannot be universally applied throughout all Asian population.

Supervisor:  
Dr Mohammad bin Paiman

Co-supervisors:  
Dr SL Vijayakumar

## THE EFFECT OF SEVERITY OF CLUB FOOT BASED ON PIRANI SEVERITY SCORE ON THE CLINICAL OUTCOME AND THE FOOT BIMALLEOLAR ANGLE AT THE END OF TREATMENT

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**Introduction:** Persistent foot adduction is one of the residual deformity encountered after clubfoot treatment. Foot bimalleolar angle (FBA) has been recently described for initial clubfoot assessment as an objective, specific and numerical way of assessing foot adduction. There are several

clinical and functional outcome scoring system after clubfoot treatment, but clinical outcome assessment by Jain et al. is more practical and objective.

**Objectives:** The aim of this study is to evaluate the correlation of initial Pirani score with FBA and Jain clinical outcome in post treatment patients.

**Methods:** Foot tracings with the level of both the malleoli of children who completed Ponseti treatment for clubfoot from January 2009 to June 2019 were taken. The anteromedial angle between the long axis of foot and the bimalleolar plane was taken as the FBA angle. Initial Pirani severity score was collected from patients' medical records, and patients were graded post Ponseti treatment according to Jain clinical outcome.

**Results:** Comparisons of initial Pirani score, FBA and Jain clinical outcome was done in 26 feet (16 patients). There was a moderate, significantly negative correlation ( $r = -0.62$ ,  $P = 0.001$ ,  $n = 26$ ) between Pirani score and FBA. A child with a unit increase of Pirani score has 2.85 odd of a reduction in FBA. Kruskal-Wallis test revealed a statistically significant relationship between Pirani severity score and Jain clinical outcome ( $P = 0.01$ ) as well as a statistically significant relationship between FBA and Jain clinical outcome ( $P = 0.01$ ).

**Conclusion:** The initial Pirani score inversely correlates with post treatment FBA. Poorer FBA and higher initial Pirani score is associated with a tendency to have a poorer Jain clinical outcome.

Supervisor:  
Dr Ismail Munajat

### FOOT CARE KNOWLEDGE AND PRACTICE AMONG TYPE 2 DIABETES MELLITUS PATIENTS IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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**Introduction:** Diabetic foot ulcer (DFU) is a chronic disease which causes significant mortality and morbidity to diabetic patients worldwide, especially complication like lower limb amputation. This study aims to determine the level of foot care knowledge and practice among type 2 diabetes mellitus (T2DM) patients and to determine relationship of foot care knowledge or practice with DFU.

**Methods:** A cross sectional study was conducted in Hospital Universiti Sains Malaysia with subjects recruited from May 2019 to Jun 2020. They were recruited using convenient sampling method. Foot care knowledge and practice were obtained using a validated self-administered questionnaire. All patients were assessed for body mass index, monofilament testing for neuropathy and ankle brachial index for arterial insufficiency by single trained medical personnel.

**Results:** Among 134 T2DM patients, 56 (42.8%) patients had DFU. The mean (SD) age of the study participants was 58.3 (9.9) years old. A total of 113 (84.3%) T2DM patients had good foot care knowledge and 85 (63.4%) T2DM patients had good practice. Majority of the T2DM patients with DFU had good foot care knowledge (87.5%), but poor practice (62.5%); while T2DM patients without DFU had good knowledge (82.1%) and good practice (82.1%). The multiple logistic regression model showed that the foot care practice was an independent factor associated with DFU when age, peripheral diabetic neuropathy and BMI were adjusted, with estimated adjusted odds ratio 0.242 (95% CI: 0.077, 0.761). The foot care knowledge was not significantly associated with an increased risk of DFU when other confounders were adjusted (AOR: 1.347; 95% CI: 0.296, 6.741).

**Conclusion:** Poor foot care practice was significantly associated with DFU. Apart from having foot care knowledge, adherence to education regarding foot hygiene, nail care and proper footwear is strongly recommended preventing DFU and lower limb amputation. We suggest that the foot care practice adherence be evaluated and reinforced during every visit of T2DM patients to the health care facilities.

Supervisor:  
Dr Emil Fazliq Mohd

### QUALITY OF LIFE AFTER SCOLIOSIS SURGERY: THE HOSPITAL SULTANAH BAHYAH EXPERIENCE

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**Introduction:** Idiopathic scoliosis is a is a complex three-dimensional deformity of the spinal column. Adolescent idiopathic scoliosis (AIS) is the most common type affecting healthy young individuals. Psychological well-being of these young group of patients has been area of concern when managing these patients. Aim of this study is to assess quality of life in patient undergoing corrective surgery for AIS using the SRS-30 questionnaire.

**Objectives:** The purpose of this study is to assess the quality of life of patients that have undergone deformity corrective surgery for adolescent idiopathic scoliosis in Hospital Sultanah Bahiyah (HSB).

**Methods:** A cross sectional study of all patients that underwent deformity correction surgery for AIS from January 2016 till December 2019 in Hospital Sultanah Bahiyah was done. Patient had to be followed up for at least 6 months. Only patient with idiopathic adolescent scoliosis were included. Radiographic measurements of the Cobb angle pre-operative and post-operatively were obtained from medical records of the patient. Patients were then contacted and given the SRS-30 questionnaire to be filled up.

**Results:** 24 patients were recruited in this study based on the inclusion and exclusion criteria. The median pre-

operative Cobb angle was 63.0 (19.90), while post-operatively it was 18.0 (11.25) with a percentage of correction of 68.0 (17.5). The average total SRS score is 4.20(0.38). Using the Spearman's Rho correlation analysis there was a significance and moderately positive correlation between the satisfaction with management domain scores and the percentage of Cobb's Angle correction. However, the total scores despite having a positive correlation, were not statistically significant.

**Conclusion:** In this study, the average total SRS score was 4.2 (0.38) indicating a favourable outcome in terms of quality of life in patient undergoing scoliosis surgery in Hospital Sultanah Bahiyah.

*Supervisor:*

Associate Professor Dr Abdul Naufar bin Sadagatullah

### THE EFFECT OF LEG LENGTH DISCREPANCY ON VERTICAL GROUND REACTION FORCE IN ADULT WITH HEIGHT 150 CM TO 170 CM

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**Introduction:** Leg length discrepancy is defined as condition in which paired legs are noticeably unequal. It is relatively common problem found as many as 40% to 70% of the population. Leg length discrepancy up to 2 cm is considered normal by some studies. Therefore, we conducted this study to determine the effects of leg length discrepancy of 1 cm and 2 cm to vertical ground reaction force. This study also aims to find out whether long leg or short leg were more affected in the simulated leg length discrepancy.

**Objectives:** The aim of this study is to determine the effect of 1 cm and 2 cm simulated leg length discrepancy to vertical ground reaction force for long leg and short leg, and to determine whether long leg or short leg has significant changes in vertical ground reaction force with 1 cm and 2 cm simulated leg length discrepancy.

**Methods:** This was a cross sectional study involving 18 healthy male subjects with height of range from 150 cm to 170 cm. Vertical ground reaction force was measured using gait analysis study. Reflective markers were placed on bony landmark of bilateral lower limbs to be captured by 3D-motion cameras. Subjects walked on a straight walkway with a force plate to measure ground reaction force. First measurement was taken without discrepancy (0 cm) as control. Then leg length discrepancy simulated with shoe raise of 1 cm and 2 cm and vertical ground reaction force were measured repeatedly on the long and short legs. Measurement of first peak of vertical ground reaction force was taken for analysis. Vertical ground reaction force of 1 cm and 2 cm simulated leg length discrepancy was compared with control for both long and short legs and were analysed with repeated measure analysis of variance within factors.

**Results:** The first peak of vertical ground reaction force reduced gradually on long leg and increased gradually

on short leg when simulated leg length discrepancy of 1 cm and 2 cm. There was significant difference of vertical ground force reaction in both 1 cm and 2 cm leg length discrepancy compare to control (0 cm). There were significant differences between comparison of measurements in short leg with 1 cm and 2 cm leg length discrepancy.

**Conclusion:** Leg length discrepancy of 1 cm and 2 cm has shown significant effect to vertical ground reaction force. Short leg had increased vertical ground reaction force with increased leg length discrepancy. However, there was no significant changes in long leg with leg length discrepancy.

*Supervisor:*

Dr Emil Fazliq bin Mohd

### PREVALENCE AND RISK FACTORS OF PRE-OPERATIVE DEEP VEIN THROMBOSIS IN ELDERLY PATIENTS WITH HIP FRACTURES

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**Introduction:** Hip fractures are common in the elderly population after a fall. Consequently, they are at a high risk of developing complications such as venous thromboembolism, deep vein thrombosis (DVT) and pulmonary embolism (PE), which may cause significant morbidity and mortality. To date, there are no local data regarding the prevalence of DVT before surgery in elderly patients with hip fractures and risk factors associated with it. This study aimed to establish the prevalence of DVT in elderly patients following a hip fracture in the local population and evaluate the risk factors for the occurrence of pre-operative DVT in this population.

**Objective:** To determine the prevalence of deep vein thrombosis in elderly patients following a hip fracture. To identify and determine risk factors associated with the occurrence of deep vein thrombosis in elderly patients following a hip fracture in the local population.

**Methods:** This research is a retrospective cross-sectional study involving 91 patients with a history of hip fracture and received treatment in HUSM from January 2014 to November 2019. Patient screening was conducted via the PACS (Picture Archiving and Communication Systems) system and the patients' medical records. Patients with hip fractures and had ultrasound Doppler of lower limb one day before surgery were selected. All selected risk factors, including demographic data information was then recorded in a study proforma. Data were entered in Microsoft Excel and analysed using SPSS version 26.0.

**Results:** The overall prevalence of pre-operative deep vein thrombosis in elderly patients with hip fracture was 5.4 %. The mean duration of immobilisation in DVT patient is

18.4 days. None of them received Enoxaparin as prophylaxis. Two out of five DVT patients had underlying malignancy.

**Conclusion:** Pre-operative DVT prevalence is relatively low (5.4 %) in elderly patients with hip fracture in this study, which may be contributed by precautions taken to prevent DVT in this population. The critical risk factors for DVT development were the duration of immobilisation, types of DVT, prescribed prophylaxis and malignancy.

*Supervisor:*  
Dr Al Hafiz bin Ibrahim

*Co-supervisor:*  
Professor Dr Amran Ahmed Shokri

### MEASUREMENT OF MAXIMUM RADIAL BOWING IN MALAY ETHNICITY OF MALAYSIAN

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**Introduction:** Maximum radial bowing, and its locations were studied based on normal anteroposterior (AP) radiograph of radius/ulna within the Malay ethnicity of Malaysians. Knowledge of radial bowing and its variation is beneficial when reconstructing radius.

**Objectives:** The aims of this study were to evaluate the normal bowing of the radius in normal anterior-posterior (AP) radiograph of radius/ulna in skeletally mature bone of Malay ethnicity of Malaysian's population.

**Methods:** Radius AP bowing, and its locations were assessed on 219 normal AP radiograph of radius/ulna in Picture Archiving and Communications System (PACS) that meet inclusion and exclusion criteria using the method of Schemitsch and Richards.

**Results:** The mean maximum radial bowing was 13.9 (SD = 2.11) mm. The location of maximum bowing was 60.3% (SD = 3.38) of the total radius length. The bow location was situated more distal in female (61.7% [SD = 2.93]) than male (59.7% [SD = 3.88]). However, males had more magnitude of radial bowing (14.7 [SD = 1.84] versus 12.1 [SD = 1.55]) and longer length of total radius measurement (209.9 [SD = 12.3] versus 188.1 [SD = 12.2]). In general, the left radius bowing location was situated proximally as compared to the right radius by 1% (59.8 [SD = 3.4] versus 60.9 [SD = 3.3]). No significant differences were found for magnitude of maximum radial bow in between the left and right radius (14.0 [SD = 2.1] versus 13.8 [SD = 2.1]). The total length of left radius was found to be 1.1 mm longer than right radius (203.0 ± 15.3 versus 201.9 ± 15.9).

**Conclusion:** The mean maximal radial bowing and mean location of maximal radial bowing in the Malay ethnicity are 13.9 (SD = 2.1) mm and 60.3 (SD = 3.4), respectively. These values are significantly higher in male as compared to female.

*Supervisor:*  
Dr Nur Sabrina Abdul Ghani

### COMPARATIVE STUDY OF CLINICAL OUTCOMES OF VASCULARISED VERSUS NON-VASCULARISED FIBULAR GRAFT RECONSTRUCTION AFTER WIDE RESECTION OF GIANT CELL TUMOUR OF DISTAL RADIUS

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**Introduction:** Giant cell tumour (GCT) of distal radius is a benign tumour but can be locally aggressive. The tumour can be devastating to the bone which may result in severe deformity. For Campanacci grade III and some grade II usually treated by wide local excision followed by reconstruction using either autologous vascularised or non-vascularised fibular graft and both were reported with good results. We would like to compare the clinical outcomes of these two groups of treatment.

**Methods:** This is a multicentre cross sectional study involving Hospital Universiti Sains Malaysia (HUSM) and University Malaya Medical Centre (UMMC). Patients who diagnosed with distal radius GCT and underwent wide resection followed by reconstruction with either autologous vascularised fibular graft (VFG) or non-vascularised fibular graft (NVFG) between year 2000 and 2019 in respective centres with minimum 1 year of follow up were included. Indications for VFG are Campanacci grade III, extensive soft tissue involvement, large tumour and fracture deformity. A total of 21 patients (7 VFG and 14 NVFG) fulfilled the criteria with a median age of 27 years were called for assessment using musculoskeletal tumour society (MSTS) score. Among the 21 patients, 9 males (5 VFG, 4 NVFG) and 12 females (2 VFG, 10 NVFG). Bony union was determined by plain radiograph with bridging callus at least three cortices in two views. Non-parametric Mann-Whitney U test were used for statistical analysis using SPSS version 24.0.

**Results:** The Overall MSTS score of NVFG was 80%, better than VFG 73.3% but statistically was not significant with the *P*-value of 0.60. In comparison of each component in MSTS scoring found to be no significant difference in pain (*P* = 0.48), function (*P* = 0.94), emotional (*P* = 0.50), hand positioning (*P* = 0.61), manual dexterity (*P* = 0.93) and lifting ability (*P* = 0.89). Median difference of union rate for VFG was 30 weeks (IQR = 31) while NVFG was 22.8 weeks (IQR = 23). There was no significant difference in union rate (*P* = 0.52) between these two groups of patients. However, two patients from NVFG group were reported non-union whereas all patients in VFG group achieved union. No serious morbidity reported at donor site from both groups.

**Conclusion:** Generally, VFG patients have larger tumour, hence more complicated surgeries. However clinical outcomes are generally similar compared to NVFG. VFG has slightly higher complication rates but they are considered minor whereas NVFG has serious complications such as non-union and graft resorption which required revision surgery. This is a retrospective study with limited sample

size. Prospective study with larger sample size is justified to further prove these results.

*Supervisor:*  
Dr Sahran Yahaya

## INCIDENCE OF DEEP VEIN THROMBOSIS IN PATIENTS WITH PELVIC AND ACETABULUM FRACTURES REQUIRING OPERATIVE INTERVENTION IN HOSPITAL UNIVERSITI SAINS MALAYSIA: IS PRE-OPERATIVE SCREENING WITH DOPPLER ULTRASOUND NECESSARY?

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**Introduction:** Pelvic and acetabulum fractures commonly occur due to high impact injury putting patients at higher risk of developing thromboembolic diseases such as deep vein thrombosis and pulmonary embolism.

**Objectives:** This study was performed to determine the incidence of lower extremity deep vein thrombosis in patients with pelvic and acetabulum fractures to determine the importance of pre-operative screening with Doppler ultrasound prior to surgical intervention.

**Methods:** This was a retrospective study involving 78 patients admitted to Hospital Universiti Sains Malaysia with pelvic and acetabulum fractures requiring surgical intervention from January 2015 till December 2019. All patients planned for surgical intervention were screened pre-operatively with Doppler Ultrasound to detect for lower limb DVT. These were compared with incidence of lower limb DVT post-operatively. Descriptive statistical analysis was performed using IBM SPSS Statistics version 24.0.

**Results:** There were 78 patients included in this study consisting of 30.8% females and 69.2% male patients. Pre-operative screening with Doppler ultrasound showed three (3.8%) patients were diagnosed with lower limb DVT whereas one (1.3%) was symptomatic and diagnosed with PE. Post-operatively, one patient developed DVT and one patient developed PE. Both of these patients were negative for DVT pre-operatively.

**Conclusion:** The incidence of VTE in patients with pelvic and acetabulum fractures in our centre based on pre-operative screening is low but is significantly important to prevent further morbidity and mortality. However, negative pre-operative screening cannot safely rule out patients from developing VTE post-operatively. Despite initiation of thromboprophylaxis in trauma patients, we cannot prevent the incidence of venous thromboembolic diseases. We recommend pre-operative screening with Doppler ultrasound prior to operative intervention to detect DVT especially in asymptomatic patients with pelvic and acetabulum fractures

to be included in our Malaysian Clinical Practice Guidelines for management of DVT.

*Supervisor:*  
Dr Mohd Hadizie Din

## THE IMPORTANCE OF NASOENDOSCOPIC FINDINGS AND MULLER'S MANEUVER IN PREDICTING SEVERITY OF OBSTRUCTIVE SLEEP APNOEA

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**Introduction:** Obstructive sleep apnoea/hypnoea (OSA) is a respiratory sleep disorder characterised by recurrent episodes of partial or complete upper airway obstruction, resulting in intermittent cessation of breathing (apnoea) and reduction in airflow (hypopnoea). It is crucial to make a diagnosis of this under recognised disorder as its complications can be debilitating. We studied the importance of nasoendoscopic findings and Muller's Maneuver (MM) in predicting severity of OSA.

**Objectives:** To determine the association between deviated nasal septum (DNS), inferior turbinate hypertrophy (ITH) and upper airway obstruction during MM with severity of OSA.

**Methods:** A cross sectional study involving patients with OSA. All consented patients who fulfilled the criteria underwent upper airway examination using rigid 0-degree endoscope and flexible nasopharyngolaryngoscope (FNPLS) for MM, focusing on the anatomy of inferior turbinate and nasal septum as well as the airway obstruction at retropalatal and retroglossal levels. Mladina classification of DNS was used. Sociodemographic data and clinical characteristic for inferior turbinate, nasal septum and upper airway obstruction were recorded and analysed using Statistical Package for Social Sciences (SPSS).

**Results:** A total of 64 OSA patients aged between 23 years old and 60 years old (31 male and 33 female) involved. The average age was  $40.8 \pm 8.8$  years old and the mean BMI was  $29.7$  (SD = 2.9). The association between DNS and severity of OSA, also between MM findings with severity of OSA were highly significant with  $P < 0.001$ . However, ITH did not show a significant association with severity of OSA ( $P > 0.05$ ).

**Conclusion:** Overall, DNS based on Mladina classification and upper airway obstruction during MM are significant in predicting severity of OSA.

*Supervisor:*  
Dr Hazama Mohamad

*Co-supervisor:*  
Dr Nor Asnieda Md Shukri

## HAEMOSTATIC EFFECT OF NASAL SALINE IRRIGATION DURING ENDOSCOPIC SINUS SURGERY: A SYSTEMATIC REVIEW AND META-ANALYSIS

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**Introduction:** Intra-operative haemostasis is crucial for adequate anatomical visualisation during endoscopic sinus surgery (ESS) and has been identified as gold-standard treatment for medically refractory chronic rhinosinusitis (CRS). Effective surgery is termed upon adequate identification of anatomic structures, good surgical visualisation and controlled bleeding throughout the surgery. Nasal saline irrigation is a novel technique to reduced intra-operative bleeding during endoscopic sinus surgery.

**Objective:** The aim of this research is to assess the suitable and optimum temperature for nasal saline irrigation during endoscopic sinus surgery with regards to bleeding control and quality of surgery site during endoscopic sinus surgery(ESS).

**Methods:** Three authors independently conducted an electronic search via (PubMed, Scopus, Google Scholar) and (Cochrane) from their origination to September 2018. The included studies compared nasal saline irrigation (hot saline/warm saline irrigation [HSI/WSI]) versus room temperature/normal saline irrigation (RTSI/NSI) during ESS. The outcomes of interest were bleeding score (BS), mean arterial pressure (MAP), duration of the surgery (DS), blood loss (BL) and the surgeon satisfaction score (SS).

**Results:** Based on three studies with a total of 212 patients providing the data, we found that WSI/ HSI produced a better outcome compared to the RTSI/NSI group in the surgical field quality (mean difference [MD] = -0.51; 95% CI: -0.84, -0.18;  $P < 0.003$ ,  $I_2 = 72\%$ ), three studies consisting 237 patients; moderate certainty. There was no significant difference between the two comparison group in regard to mean arterial pressure (MD = -0.60; 95% CI: -2.17, 0.97;  $P = 0.45$ ;  $I_2 = 0\%$ , three studies with 237 patients; moderate certainty). The surgeons' satisfaction about the significant reduction in bleeding during the operation showed that there was significant decrease in bleeding in WSI/HSI compared to RTSI/NSI in two studies (risk ratio = 0.18; 95% CI: 0.09, 0.33;  $P < 0.001$ ;  $I_2 = 0\%$ , two studies with 175 patients; moderate certainty). The volume of blood loss was

also significantly higher in groups under RTSI/NSI than HSI/WSI in all the studies reviewed (MD = 56.4; 95% CI: -57.30, -55.51;  $P < 0.001$ ;  $I_2 = 0\%$ ; moderate certainty). The duration of surgery showed significant increase in RTSI/NSI group than HSI/WSI group in all the studies (MD = -9.02; 95% CI: -11.76, -6.28;  $P < 0.001$ ;  $I_2 = 0\%$ , three studies with 237 patients; moderate certainty).

**Conclusion:** The evidence from this review suggests that WSI/HSI group are statistically better compared to RTSI/NSI group. Also, no beneficial or detrimental effect of surgeons' satisfaction score could be determined based on existing evidence. However, since very small number of studies were recruited, further trials are needed to establish the results of this study.

*Supervisor:*  
Professor Dr Baharudin Abdullah

*Co-supervisors:*  
Associate Professor Dr Nor Hafiza Mat Lazim  
Dr Kueh Yee Cheng

## PREVALENCE OF NOISE INDUCED HEARING LOSS AMONG KITCHEN STAFF IN MALAYSIA EAST COAST HOSPITAL

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**Introduction:** Noise can be hazardous as it is known to cause hearing loss. Since the industrial revolution, various factories or large scale set up are known to produce excessive noise. Kitchen especially hospital kitchen is one of it that produce tremendous noise pollution. Long hours of working in hospital kitchen may potentially lead to hearing loss.

**Objectives:** To study on noise induced hearing loss (NIHL) among hospital kitchen staff compare to other staff in the east coast Malaysia hospitals.

**Methods:** This was a descriptive cross-sectional study. The source population was from kitchen staffs of five Malaysian east coast hospitals comparing to other hospital staffs (hospital clerk and clinical based medical attendant) of the same hospitals. The data were collected at these five hospitals, outpatient clinics to fill the pro forma, otoscopic examination and hearing test using pure tone audiometry in a soundproof room at least 48 h after the subjects were free from noise exposure.

**Results:** A total of 123 hospital kitchen staffs and 122 other hospital staffs participated in this study. There was a significant correlation of noise induced hearing among the hospital kitchen staffs (54.3%) compared to the other group (27%). The dip on pure tone audiometry was mostly at 6 kHz, followed by 4 kHz and 3 kHz. There was a significant mean difference of years of service between groups (mild, moderate and severe) of hearing impairment ( $P = 0.010$ ).

**Conclusion:** This study showed that hospital kitchen noise is hazardous to its working staffs that working. Kitchen staffs will have a worse hearing loss following longer term of



working years. We recommend all hospital kitchen staffs the use of hearing protection equipment while working in the kitchen.

*Supervisor:*  
Professor Dr Mohd Khairi Md Daud

*Co-supervisor:*  
Dr Nik Adilah Nik Othman

## MICRODEBRIDER ASSISTED TURBINOPLASTY FOR NASAL OBSTRUCTION IN INFERIOR TURBINATE HYPERTROPHY: A SYSTEMATIC REVIEW AND META ANALYSIS

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**Introduction:** Common cause of nasal obstruction is inferior turbinate hypertrophy and microdebrider is a new method for inferior turbinoplasty that preserves mucosa.

**Objectives:** The objective of this study is to examine the efficacy of microdebrider assisted inferior turbinoplasty compared to other standard techniques. Our primary outcome is to assess the relieve in nasal obstruction. Our secondary objective is to assess the relieve of other nasal symptoms and complications related to these techniques.

**Methods:** We retrieved trials from the Cochrane Register of Controlled Trials (CENTRAL) which includes MEDLINE. We used Review Manager 5.3.5 software to perform the meta-analysis.

**Results:** We retrieved 124 records from the search of the electronic database and other sources. Eleven trials were included systematic review and 10 studies in meta-analysis. There is a reduction in nasal obstruction in the microdebrider group when compared to radiofrequency (SMD = -0.58; 95% CI: -1.01, -0.15;  $P = 0.008$ ;  $I^2 = 76\%$ ; four studies, 400 patients). However, there is no difference when compared between the microdebrider and submucosal resection (MD = -0.10; 95% CI: -0.36, 0.15;  $P = 0.13$ ;  $I^2 = 57\%$ ; two studies, 280 patients). There is no difference between microdebrider and radiofrequency or submucosal resection in reduction of other nasal symptoms. Haemorrhage is increased in the microdebrider group when compared to radiofrequency but no difference when compared with submucosal resection. However, crusting was noted to be less in the microdebrider group when compared with submucosal resection group.

**Conclusion:** Microdebrider offers an alternative, safe method for inferior turbinoplasty. However, the efficacy of the microdebrider is unsure until new trials are available to make a further recommendation.

*Supervisors:*  
Professor Dr Baharudin Abdullah  
Professor Dr Suzina Sheikh Abdul Hamid

## COMPUTED TOMOGRAPHIC STUDY ON NEW CLASSIFICATION OF FRONTAL SINUS VARIANTS IN RELATION TO CHRONIC RHINOSINUSITIS PATIENTS

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**Background:** There are variations of frontal cells in different populations, and the usefulness and applicability of the new frontal sinus classification in our population need further study. Hence, we aimed to study the International Frontal Sinus Anatomy Classification (IFAC) in our patients with chronic rhinosinusitis (CRS) and determine the association of the frontal cells with the development of frontal sinusitis. In addition, the relations of frontal cells variants with severity of frontal sinusitis was studied.

**Methods:** This was a retrospective chart review on computed tomography paranasal sinus (CTPNS). A total of 200 patients who had clinical and endoscopic findings suggestive of CRS and undergone CT paranasal sinuses and plus 51 patients as control was reviewed and the prevalence on frontal cells variants were analyse based on IFAC.

**Results:** Five hundred two sides of CTPNS was reviewed and showed the agger nasi cells was mostly found (95.8%) followed by supra bulla cell (59.8%), supra bulla frontal cell (54.8%), supra agger cell (48.6%), supra agger frontal cell (33.1%), frontal septal cell (FSC) (8.6%) and supraorbital ethmoidal cell (SOEC) (4.6%).

**Conclusion:** Patients with the presence of SOEC and FSC are more significant in developing frontal sinusitis ( $P < 0.05$ ). Posterior and medial cells play more role in causing frontal sinusitis. IFAC is useful in identifying the cells responsible for causing frontal sinusitis. It may help in guiding the surgeon to remove the cells in preventing recurrent disease.

*Supervisor:*  
Professor Dr Baharudin Abdullah

*Co-supervisor:*  
Associate Professor Dr Norhafiza Mat Lazim

## SYSTEMATIC REVIEW AND META-ANALYSIS ON INTRALYMPHATIC IMMUNOTHERAPY IN ALLERGIC RHINITIS

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**Objective:** Intralymphatic immunotherapy (ILIT) is a potential treatment option for allergic rhinitis (AR). We aimed to determine the efficacy and safety of intralymphatic immunotherapy in the management of patients with AR.

**Methods:** An electronic literature search was performed using MEDLINE (1966–March 2019), EMBASE (1974–March 2019) and Cochrane Central Register of Controlled Trials (CENTRAL) (March 2019). A random-effects model was used to estimate the pooled prevalence with 95% confidence intervals. Quality assessment was done using the principles of the grades of recommendation, assessment, development and evaluation approach. Heterogeneity was assessed using the  $I^2$  statistic and at face value by comparing populations, settings, interventions and outcomes. This study is registered with PROSPERO (CRD42019126271).

**Result:** We retrieved a total of 51 publications between March 2008 and March 2019, of which seven satisfied our inclusion criteria. There were 298 participants with age ranged from 15 years old to 58 years old. The allergen was administered via superficial inguinal lymph nodes using ultrasound guidance. ILIT was given in three doses with intervals of 4 weeks between doses in six trials. One trial gave three and six doses with an interval of 2 weeks. There was no difference in the symptom scores (MD = -0.09; 95% CI: -2.69, 2.51;  $P = 0.950$ ;  $I^2$  statistic = 87%; two trials, 80 participants; very low certainty evidence) and rescue medication scores (RR = 3.02; 95% CI: 0.37, 24.49;  $P = 0.30$ ;  $I^2$  statistic = 52%; two trials, 86 participants; moderate certainty evidence) between intralymphatic immunotherapy and placebo groups.

**Conclusion:** The evidence does not support the use of ILIT in the treatment of AR. There is no difference in the efficacy of ILIT to placebo based on very low quality evidence. Better designed trials are recommended to define its role in the management of AR.

*Supervisor:*

*Professor Dr Baharudin Abdullah*

*Co-supervisors:*

*Associate Professor Dr Norhayati Mohd Noor*

*Professor Dr Khairi Md Daud*

## THE EFFECTIVENESS OF TACHOSIL PATCH AS A DRAINAGE AND HAEMOSTATIC AGENT IN THYROID AND SALIVARY GLANDS SURGERIES.

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**Introduction:** Intra-operative and post-operative bleeding is one of the most severe complications of head and neck surgeries. A surgical procedure with inadequate haemostasis may lead to blood transfusion or other bleeding related complications. TachoSil®, is

a haemostatic patch used intra-operatively to stop bleeding. This study focuses on the effectiveness of TachoSil® in establishing haemostasis and drainage for minor head and neck surgeries.

**Objectives:** The aim of this study is to evaluate the effectiveness of TachoSil® patch as a drainage and haemostatic agent in thyroid and salivary glands surgeries.

**Methods:** Twenty-seven patients who undergone thyroid and salivary glands surgeries between June 2018 and May 2020 for benign pathology were included in the study. They were classified into two groups; those who did not use TachoSil® patch intra-operatively (known as non-Tachosil group) and those who used TachoSil® patch intra-operatively (known as Tachosil group). Parameters such as duration of surgery, estimated blood loss, post-operative drain amount, duration of drain and duration of hospital stay were used to measure the outcomes in both groups.

**Result:** After 24 h of surgery, mean drainage volume was reduced in Tachosil group (20 mL versus 45 mL in non-Tachosil group,  $P = 0.049$ ). Drain removal occurred earlier in the Tachosil group (2 days, as opposed to 2.5 days in non-Tachosil group,  $P = 0.045$ ), which resulted in a shorter duration of hospital stay (2 days, as opposed to 2.5 days for non-Tachosil group).

**Conclusion:** This study demonstrated that TachoSil® is beneficial in reducing post-operative drainage volume, which lead to reduction of drain duration, and eventually a reduction in hospitalisation time. Considering that it was significant in providing haemostasis intra-operatively, a bigger sample size future study is needed to adequately assess its effectiveness.

*Supervisor:*

*Associate Professor Dr Norhafiza Mat Lazim*

*Co-supervisors:*

*Professor Dr Baharudin Abdullah*

*Dr Wan Zainira Wan Zain*

## DEVELOPMENT AND VALIDATION OF A QUESTIONNAIRE TO ASSESS PERCEPTION, ATTITUDE AND PRACTICE OF PRIMARY CARE PRACTITIONERS' TOWARDS ALLERGIC RHINITIS PRACTICE GUIDELINES

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**Introduction:** Allergic rhinitis (AR) poses a major global health concern as its prevalence is increasing and impacts the health care system in terms of costs. The primary care practitioners (PCPs) play an important role in treating AR patients as they are the frontliners and their knowledge of AR guidelines are essential. Currently, there is no proper

questionnaires to assess their perception, attitude and practice in utilising the AR guidelines.

**Objectives:** The aim of this study is to develop and validate questionnaire to assess the perception, attitude and practice of primary care practitioners towards allergic rhinitis practice guidelines.

**Methods:** The development phase consists of both literature and expert panel review. The newly developed questionnaire was tested on the PCPs, working at the out-patient clinic in all hospitals, health clinics and private clinics in three districts in Kelantan (Kota Bharu, Tumpat and Kuala Krai). The validation phase consists of content validity, face validity and construct validity. Cronbach's alpha was used to verify internal consistency. The perception domain of the validation phase utilised item response theory (IRT) analysis and the attitude and practice domain utilised exploratory factor analysis (EFA) to verify psychometric properties of the questionnaire.

**Results:** There were 302 participants enrolled consists of 118 male and 184 female doctors with a mean age of 36.42 years old. The mean years of practising were 10.07 years and mean estimate of total number of patients seen per week were 153.52, with mean 10 rhinitis, 10 asthmatic and 5 both rhinitis and asthmatic patient seen per week. The development phase produced questionnaires with three domains: perception, attitude and practice consisting of 59 items. IRT analysis demonstrated for perception, the difficulty and discrimination values of the items were acceptable except for three items. Based on EFA, the psychometric properties were good for attitude and practice domains, except for three items in practice domain. Experts opinion and judgement were obtained, and those items were included as they were deemed important.

**Conclusions:** The newly developed and validated questionnaires is promising instrument to assess the perception, attitude and practice of PCPs towards ARIA guidelines. This is an important step towards understanding the treatment gap in allergic rhinitis. Although further testing and refinement is needed, the questionnaires provide an initial means for evaluating the knowledge and understanding PCPs of ARIA guidelines.

*Supervisor:*

*Professor Dr Baharudin Abdullah*

*Co-supervisors:*

*Professor Dr Zahiruddin Wan Mohammad*

*Dr Nik Fariza Husna Nik Hassan*

*Dr Ahmad Filza Ismail*

## DETERMINING THE DIAGNOSTIC ACCURACY OF TUNING FORK WEBER TEST AND AUDIOMETRIC WEBER TEST IN CONDUCTIVE HEARING LOSS INDIVIDUALS

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**Introduction:** Weber test is typically conducted using a tuning fork (TF) but an audiometer can also be used for a similar purpose. Compared to the TF test, performing Audiometric Weber (AW) test offers several flexibilities as multiple frequencies can be tested and the sound presentation can be fixed at one intensity level without decay issue. Nevertheless, the performance of TF and AW tests in comparison to pure tone audiometry (PTA) has not been systematically studied.

**Objectives:** The objectives of this study were to determine the accuracy and agreement of TF test in comparison to PTA and to determine the accuracy and agreement of AW test in comparison to PTA.

**Methods:** TFW test was performed according to the established protocol at 256 Hz and 512 Hz. For AW test, a B-71 bone vibrator was placed in the midline of forehead, and 250 Hz and 500 Hz frequencies were tested. The results of TFW and AW tests were then compared with the expected lateralisation results.

**Results:** At 256 Hz (or 250 Hz), the overall accuracy values of TFW and AW tests were 81.1% and 86.5%, respectively. At 512 Hz (or 500 Hz), the overall accuracy results of TFW and AW tests were 85.1% and 82.4%, respectively. The kappa statistics revealed substantial agreements between the two tests and PTA ( $\kappa = 0.63-0.72$ ). Relatively, better accuracy results were noted when testing participants with larger air-bone gaps (81.5%–89.1%) compared to those with smaller air-bone gaps (77.7%–88.5%).

**Conclusion:** Both AW and TFW tests are reasonably accurate in assessing patients with CHL. It is recommended for audiologists to perform the simple AW test to verify incomplete or questionable audiograms that are commonly encountered in clinical practice.

*Supervisor:*

*Dr Nik Adilah Nik Othman*

*Co-supervisors:*

*Associate Professor Dr Normani Zakaria*

*Associate Professor Dr Rosdan Salim*

## THE EFFECTS OF RELAXATION THERAPY AMONG HEAD AND NECK CANCER PATIENTS ON QUALITY OF LIFE

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**Objective:** Head and neck cancer (HNC) is a debilitating condition due to the impact of the cancer and

its treatment consequences on the daily basic-life function namely breathing, speech and swallowing. Hence, HNC has been detrimental to the patients, leading to an adverse impact on their quality of life (QoL). The objective of our study was to study the effect of relaxation therapy among head and neck cancer patients on QoL. Specifically, the study aimed to determine changes in anxiety, depression and quality of life score within relaxation therapy and psychoeducation therapy group. It also compared differences in anxiety, depression and quality of life score between relaxation therapy and psychoeducation group at pre- and post-intervention.

**Methods:** A randomised clinical trial was conducted. HNC patients were recruited from otorhinolaryngology (ORL) clinic and oncology clinic. They were randomly grouped into study and control groups. The study group received periodically-time-specific relaxation therapy at week 1, 2, 4 and 6 at Psychiatric Rehabilitation Centre @ Mentari USM, whereas the control group were provided with psychoeducation at week 1 and 6. The evaluations were done at week 1 (before commencement of therapy) and week 6 (after completion of intervention) using Functional Assessment Cancer Therapy-Head & Neck (FACT-H&N version 4) questionnaires for assessment of QoL, and Hospital Anxiety and Depression Scale (HADS) for screening of anxiety and depression.

**Results:** A total of 26 participants were recruited for this study. There was statistically significant reduction ( $P = 0.041$ ) in the level of depression after relaxation therapy at 6-week period. The subscale of SWB and EWB showed improvement in scoring after the relaxation therapy, but not statistically significant ( $P > 0.050$ ). There was no statistically significant reduction in the level of anxiety and overall improvement of the QoL after relaxation therapy at 6-week period.

**Conclusion:** In conclusion, the study suggests that the relaxation therapy showed statistically significant reduction in depression level and have a beneficial outcome among HNC patients in managing the psychological distress that later potentially contribute to better QoL. Therefore, the relaxation therapy can be emphasised as an adjunct therapy as part of holistic approach among HNC patients' management.

*Supervisor:*  
Associate Professor Dr Norhafiza Mat Lazim

*Co-supervisors:*  
Professor Dr Irfan Mohamad  
Professor Dr Baharudin Abdullah  
Dr Nor Asikin Fadzil  
Dr Wan Mohd Nazri Wan Zainon

## ASSOCIATION OF LARYNGOPHARYNGEAL REFLUX AND CENTRAL OBESITY

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**Objective:** Laryngopharyngeal reflux (LPR) is a common disease encountered in otolaryngology. The presentation differs from gastroesophageal reflux disease (GERD) despite sharing similar pathophysiology. There are various postulated risk factors to LPR amongst which is central obesity. The aim of this study is to establish central obesity as a risk factor in developing LPR.

**Methods:** This is a comparative cross-sectional study in which 180 patients who were 18 years old and above regardless of obesity status without confounding factors in causing laryngeal mucosal change such as smoking, malignancy, post nasal drip, treatment with proton pump inhibitors and pregnancy were enrolled. These patients were not diagnosed with LPR prior. No pH studies or empirical treatment with proton pump inhibitors were given before. Reflux symptom index (RSI) and reflux finding score (RFS) were used to screen for LPR sign and symptoms.

**Results:** Eighty-seven central-obese patients based on waist-to-hip ratio ( $\geq 0.9$  and  $\geq 0.85$  for male and female, respectively) and 93 non central-obese patients were recruited in this study. There was a significant higher value of both RSI and RFS in central-obese patients with significant positive correlation between these variables. Patients with central obesity might have a 2.6-fold higher probability of being diagnosed with LPR.

**Conclusion:** This study derived a linear correlation between central obesity and LPR based on the relatively simple and non-invasive RSI and RFS tool.

*Supervisor:*  
Professor Dr Irfan Mohamad

*Co-supervisors:*  
Associate Professor Dr Hazama Mohamed  
Dr Nik Fariza Husna

## THE THREE-DIMENSIONAL MAPPING OF THE SURFACE ANALYSIS OF ELECTROMAGNETIC NAVIGATION SYSTEMS USING SURFACE REGISTRATION IN ETHNIC MALAYSIAN FEATURES

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**Introduction:** Since its introduction, surgical navigation systems have become integrated into surgical practices that include complex nasal endoscopic procedures to avoid serious complication such as injury to the optic nerve, the carotid artery, the dura mater and the brain parenchyma.

**Objectives:** We aimed to determine the accuracy of image guided system (IGS) by using different timing interval of computed tomography scan of paranasal sinus and our experience in performing the surface marking.

**Methods:** A cross sectional study was done. Subjects were recruited from patients planned for endoscopic sinus surgery with IGS, who met the inclusion and exclusion criteria. The image guided navigation measurements were compared to the actual anatomical measurements of intercanthal distance of both eyes and the tangential line of inverted triangle to the philtrum. The estimated time to register the IGS was recorded. All measurements were done at the same time as the calibration of the IGS.

**Results:** The mean intercanthal distance measured by IGS was 38.17 (SD = 3.34) mm whereas the actual intercanthal distance was 38.17 (SD = 3.37) mm. The tangential line measured by IGS was 46.62 (SD = 3.39) mm whereas the actual measurement of the tangential line was 46.47 (SD = 3.27) mm. There was no significant difference in both measurements between IGS and actual anatomical measurements ( $P = 0.804$  and  $0.496$ , respectively).

**Conclusion:** Even with the different intervals there was not much deviation from the actual anatomical distance. The IGS is accurate and is applicable for use in Asian patients.

*Supervisor:*

*Professor Dr Baharudin Abdullah*

*Co-supervisors:*

*Dr Harvinder Singh Sran*

*Dr Norasnieda Md Shukri*

## A MULTICENTRE STUDY OF CLINICOPATHOLOGICAL FEATURES AND PROGNOSTIC FACTORS OF CUTANEOUS MELANOMA IN MALAYSIA

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**Introduction:** Cutaneous melanoma is an aggressive skin cancer with high mortality rate. This study aimed to describe the clinicopathological characteristics and to identify the independent prognostic factors and median survival time of patients diagnosed with primary cutaneous melanoma in Malaysia.

**Methods:** This was a retrospective study conducted in Hospital Universiti Sains Malaysia, Hospital Kuala Lumpur, Hospital Sultanah Bahiyah and Hospital Queen Elizabeth I, Malaysia. All traceable medical records on patients with primary cutaneous melanoma between January 2012 and December 2018 were investigated based on the demographic data, histopathological and management. Median survival time was analysed using Kaplan-Meier method. Univariate and multivariate analysis of prognostic factors associated with survival were performed.

**Results:** Ninety-nine patients were included and analysed. The mean age during diagnosis was 60.4 years old, with female: male ratio of 1:1.1. Majority of the patients were Malays (52%) and 44.4% had clinical stage II on presentation. Nodular melanoma was the commonest subtype (50.5%) in Malaysia. Histologically, the mean Breslow thickness was 7.9 mm. The median survival time was 673 days. The 1-, 3-, 5- year survival rates were 47.5%, 11.1% and 15.2%. Mitotic rate and Breslow thickness were independent risk factors for poor prognosis ( $P < 0.05$ ).

**Conclusion:** Most patients with cutaneous melanoma in Malaysia diagnosed with locally advanced disease and had poorer prognosis as compared to other Asia countries. Much work is needed to create an awareness of cutaneous melanoma based on the local data for early detection and treatment.

*Supervisors:*

*Professor Dr Wan Azman Wan Sulaiman*

*Associate Professor Dr Sharifah Emilia Tuan Sharif*

## PATTERNS OF MAXILLOFACIAL FRACTURES IN RELATION TO HELMET USAGE AND VELOCITY AMONG MOTORCYCLISTS

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**Introduction:** Significant number in road traffic accidents in Malaysia involve motorcyclists, and facial injuries poses serious functional, physiological and aesthetical problems. One of the contributing factors in sustaining debilitating injuries are speeding and non-compliance to the usage of safety helmets. The aim of this study is to determine the patterns of maxillofacial injury among motorcyclists according to helmet usage, different types of helmets used and cruising velocity of the motorcycle.

**Methods:** This was a cross sectional study that evaluates the patterns of maxillofacial injuries sustained following road traffic accidents among motorcyclists. A total of 163 patients were recruited into this study which were then grouped into five categories (unhelmeted, full-faced, modular, open-faced and half-helmet). Convenience sampling was used in this study to recruit all the motorcyclists that presented to the emergency department, or those who was referred as an outpatient to the clinic. Maxillofacial injury was then determined based on clinical and radiological examination and then categorised into upper, midface and lower face fractures. Specific proforma was used for data collection.

**Result:** A total of 143 males and 20 females were involved in an accident in this study. Among all the races, Malay had the highest involvement (85.3%), followed by Indians (7.4%), Chinese (3.7%) and others (3.7%). The three most common mechanisms of injuries were motorcycle versus car, single-vehicle collision (skidded) and motorcycle versus motorcycle. In general, injuries were seen mainly on

midface (41.7%), followed by a combination of upper and mid face (20.2%), combination of midface and lower face (16%) and others (22.1%). There was no association between helmet usage and pattern of maxillofacial fracture ( $P > 0.05$ ). There was also no association between pattern of maxillofacial fractures and velocity ( $P > 0.05$ ).

**Conclusion:** Helmet usage, the types of helmet used and velocity do not influence the pattern of maxillofacial injuries among motorcyclists following road traffic accidents. However, a helmet of any type that is correctly worn and remains secured on the head throughout a crash will provide some form of protection against head and facial injury.

Supervisor:  
Professor Dr Wan Azman Wan Sulaiman

## BODY IMAGE PERCEPTION IN NON-SYNDROMIC CLEFT LIP AND PALATE

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**Introduction:** Cleft lip and palate (CL/P) poses a dynamic anatomical and functional challenges that spans across multiple medical disciplines. While best effort is put in restoring normal appearance and function, the psychosocial impact of CL/P, specifically towards body image and self-esteem is not routinely addressed in the typical multi-disciplinary team approach. This study aims to assess the body image perception and its correlation to self-esteem in patients with CLP who has completed treatment for their primary deformities.

**Methods:** Non-syndromic CL/P patients who have completed treatment for primary deformities fulfilling the study criteria were invited to participate in the study. Malay-language translated and validated version of the Body Image Disturbance Questionnaire (BIDQ) and the Rosenberg Self-Esteem Scale (RSES) were used for this study. Based on distribution pattern of data gathered, Pearson's correlation or Spearman's rank-order analysis were utilised to correlate between mean scores of the tools, meanwhile differences between subgroups were evaluated using the one-way analysis of variance or Kruskal-Wallis H test with post-hoc Dunn-Bonferroni test.

**Result:** There were 109 participants in this study comprising of 78% ( $n = 85$ ) Malays, 13.5% ( $n = 15$ ) Chinese, 7.3% ( $n = 8$ ) Indian and 0.9% ( $n = 1$ ) indigenous. Females made up 63.3% ( $n = 69$ ) of the participants while the remainder 36.5% ( $n = 40$ ) were males. The average age of participants were 22.8 (SD = 5.8) years old. The mean BIDQ score of the participants was 2.0 (SD = 0.79), while the mean RSES score of the participants was 16.8 (SD = 3.18). There was no statistically significant difference in the mean BIDQ scores between participants with different types of CL/P ( $P > 0.01$ ). There was a moderate, negative correlation between body image dissatisfaction and self-esteem ( $P < 0.01$ ). Participants who cited nose and lips deformities had

higher body image dissatisfaction scores ( $P < 0.1$ ) than other participants.

**Conclusion:** This study demonstrated the presence of body image dissatisfaction among patients with CL/P and the degree of dissatisfaction does not differ between types of CL/P. There is a moderate, negative correlation between body image dissatisfaction and self-esteem. Secondary nasal and lip deformity are the common cause of body image dissatisfaction in patients with CL/P. While the degree of dissatisfaction does not warrant a routine psychological assessment, patients with CL/P should be offered counselling or considered for psychological assessment while under treatment for CL/P. The psychosocial perspective of the impact of CL/P must be considered during decision making for further corrective surgery during advanced stage of treatment protocol.

Supervisor:  
Professor Dato' Dr Ahmad Sukari Halim

## AESTHETICALLY IDEAL BREAST PREFERENCE AMONG PLASTIC SURGEONS AND GENERAL POPULATION

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**Introduction:** Describing and accurately evaluating the ideal female breast is essential for surgical planning and to establish the goals of surgery as well as to assess surgical outcomes. There are, nevertheless, no measurable aesthetic standards for the female breast. Henceforth, setting objectively measurable ends is a critically vital element of breast surgical procedures in plastic surgery, moreover, that previous study showed that there were different opinions among plastic surgeons and their patients.

**Objectives:** The aims of this study were to determine the preference of an ideal breast by using four key parameters of which are areola size, upper pole contour, upper pole to lower pole ratio and breast size from plastic surgeons and general population in Malaysia.

**Methods:** A cross-sectional study using a web-based interactive questionnaire was conducted among plastic surgeons and the general population group. This questionnaire consists of created images of female breasts with four key parameters to assess subjects' preference towards the appearance of an aesthetically ideal female breast.

**Results:** There were 45 plastic surgeons and 135 men and women participated in the study. There is no significant difference in the preference when comparing both the plastic surgeons and the general population group. This study showed that generally, both plastic surgeon and general population group more prefer an aesthetically ideal breast that are; areola size of 3 cm (50.4%), slightly convex upper pole contour (40.7%), 45:55 ratio of the upper pole to lower pole (36.7%) and breast size of a D cup (49.25%).

**Conclusion:** The appearance of an aesthetically ideal female breast should have areola with 3 cm diameter, a slightly convex in upper pole contour, have a proportion of upper pole to lower pole of 45:55, and with a breast size of a D cup. Any deviation from these parameters is prone to an unattractive appearance.

*Supervisor:*  
Professor Dr Wan Azman Wan Sulaiman

## VALIDATION OF THE MALAY VERSION OF THE INVENTORY OF CALLOUS-UNEMOTIONAL TRAITS AMONG ADOLESCENTS IN PAHANG

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**Background:** One of the key components in the study of antisocial behaviour among adolescents is the presence of callous-unemotional (CU) traits. Among the most established tools available to measure CU traits is the Inventory of Callous-Unemotional (ICU) traits. To date, information regarding the psychometric properties of this scale when used in the local context is still lacking. Therefore, there is a need to validate the Malay version of the ICU so that research can be conducted to explore on CU traits among adolescents in Malaysia and their associated factors.

**Objectives:** The aim of the study is to validate the Malay version of the Inventory of Callous-Unemotional Traits (M-ICU).

**Methods:** A cross-sectional study involving 409 adolescents aged between 13 years old and 18 years old was conducted from August 2020 until October 2020 in six secondary schools in the district of Kuantan, selected via multistage random sampling method. M-ICU was initially translated into Malay using forward and backward translation procedure by a group of experts. The final version of the M-ICU was harmonised and pre-tested on 10 participants. Study participants who assented for the study and obtained parental consent then completed the final version of the M-ICU questionnaire and a socio-demographic questionnaire. Data was analysed using SPSS version 26 and MPlus software for construct validity by performing exploratory factor analysis, confirmatory factor analysis and construct reliability.

**Results:** In this study, initial EFA revealed three factors with two items deleted. EFA was then repeated with two factors resulting in the deletion of items from the Unemotional factor. Cronbach alpha for overall scale improved from 0.70 to 0.74 while alpha for Uncaring and Callousness factor was 0.790 and 0.674, respectively. After CFA, the final model of the M-ICU that provided best fit to the data comprised of two factors with 17 items, compared to the original English version that has three factors with 24 items. The findings revealed acceptable fit indices (RMSEA = 0.057, CFI = 0.941, TLI = 0.932, WRMR = 0.968).

**Conclusion:** The study revealed that a two-factor model with 17 items of the Malay Version of M-ICU has good psychometric properties. The scale is valid and reliable to

measure callous and unemotional traits among adolescents in Malaysia.

*Supervisors:*  
Dr Maruzairi Husain  
Dr Kuay Hue San

*Co-supervisor:*  
Dr Kueh Yee Cheng

## A QUALITATIVE STUDY ON THE EXPERIENCE OF A MINDFULNESS PROGRAMME FOR NURSES AT A HOSPITAL IN KELANTAN, MALAYSIA

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**Introduction:** Mindfulness programmes have been used among nurses as a stress reduction tool. Studies have reported that mindfulness programmes are effective in reducing stress and improving psychological well-being. Improvements in awareness of the present moment and self-compassion, which contribute to the positive outcome of mindfulness practice, have frequently been reported. However, our local intervention study on mindfulness programme for nurses revealed a significant reduction in stress perception score, but not in mindfulness score.

**Objectives:** To explore the experiences of practising mindfulness among our local nurses and to understand what shaped their experiences in practising mindfulness and how this affects their practice of mindfulness at workplace.

**Methods:** This was a basic interpretive qualitative study via focus group discussions for nurses at a teaching hospital in Kelantan, Malaysia. The nurses had completed a 3-month mindfulness programme. Three focus group discussions comprising five participants in each group were conducted at different times between August 2019 and January 2020. The data were analysed using thematic analysis.

**Results:** Three themes emerged from the data: 'activating change in perception, 'nurturing self-empowerment' and 'not a norm'. Through their experiences in practising mindfulness, the nurses experienced changes in their perceptions of stress and being self-empowered in emotion regulation. However, challenges in sustaining the mindfulness practice arose due to it being new to the local culture.

**Conclusion:** Mindfulness programmes are feasible to be practised among nurses. However, the effects depend largely on the ability of nurses to sustain the practice and to incorporate it into their busy working environment. Focus needs to be directed towards normalising mindfulness practice as the new culture in nurses' working environments and incorporating cultural values and spiritual needs based

on our local context for the mindfulness practice to be better accepted and practised.

*Supervisor:*  
Dr Nor Asyikin Fadzil

*Co-supervisor:*  
Associate Professor Dr Asrenee Ab Razak

### ASSOCIATION BETWEEN TREATMENT ADHERENCE AND PERSONALITY TRAITS, ANXIETY, AND DEPRESSION AMONG PATIENTS WITH HIV IN NORTHWEST PENINSULAR MALAYSIA

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**Background:** Antiretroviral therapy is a life-saving treatment for HIV-positive individuals. However, to achieve complete viral suppression, they must maintain adherence to treatment every day. Factors affecting adherence to antiretroviral therapy has been studied by many researchers in Western and Asian countries like Malaysia. However, up until now, there is still a lack of studies focusing on understanding the association between treatment adherence and anxiety, depression and personality traits among adult HIV patients receiving ART in Malaysia.

**Objectives:** To study treatment adherence in adult HIV patients receiving ART and its association with personality traits, anxiety, and depression at Hospital Perlis and Kedah.

**Methods:** A hospital-based cross-sectional study was conducted from 1 July 2018 to 31 April 2020 among 229 adult patients under outpatient department HIV clinic follow-up. Participants that fulfilled the criteria were selected via a purposive sampling method. Data were collected through an interviewer-guided questionnaire set. The anxiety and depression were evaluated through the hospital anxiety and depression scale (HADS), while the personality traits were examined through the Zuckerman-Kuhlman personality test (ZKPQ-M-40-CC). Adherence to ART was assessed through an interviewer-guided timeline follow-back (TLFB). Sociodemographic, clinical characteristics, mood symptoms, and personality variables were collected. A total of 229 respondents completed HADS, ZKPQ-M-40-CC, and TLFB.

**Result:** There were 220 (96.1%) out of 229 participants who adhered to therapy. Older individuals 167 (97.7%) more adhered to treatment as compared with younger individuals 53 (91.4%); ( $P = 0.033$ ). Those who were married 91 (98.9%) were more likely to adhere to treatment than those who were single 107 (95.5%) or divorced 25 (88.0%); ( $P = 0.044$ ). Only 2 (3.2 %) of the 62 participants who had an anxiety disorder did not adhere to therapy; ( $P = 0.542$ ). Only 5 (5.0%) of the 100 participants with a depressive disorder did not adhere to therapy; ( $P = 0.509$ ). An individual with an activity type of personality trait more adhered to treatment 30 (SD = 5.8); ( $P = 0.014$ ) as compared to an individual with sociability 24

(SD = 5.0); ( $P = 0.320$ ), aggression-hostile 18 (SD = 6.3); ( $P = 0.650$ ), impulsive-sense-seeking 18 (SD = 6.3); ( $P = 0.688$ ) and neurotic-anxious 18 (SD = 6.3); ( $P = 0.623$ ) type of personality traits. Multiple logistic regression found that the activity domain of the personality trait was the only factor significantly associated with ART treatment adherence after controlling for age, education level, and viral load. An increase in one score of the activity domain of the personality trait has a 1.14 (95% CI: 1.02, 1.28) higher odds of being adherent to therapy.

**Conclusion:** The results of this study revealed that there was a direct relationship between Activity personality trait with treatment adherence where higher scores in the Active personality domain predicted higher adherence to treatment. Conversely, anxiety and depression are not associated with adherence to treatment. Personality trait assessment can help in the identification of HIV patients who are at risk for poor adherence especially for those who score low in the activity domain of personality trait. As such by conducting behavioural modification therapy for the vulnerable individual can help to improve and increase their treatment adherence.

*Supervisor:*  
Associate Professor Dr Mohd Azhar Mohd Yasin

*Co-supervisor:*  
Dr Alwi Muhd Besari

### MASS HYSTERIA AMONG SECONDARY SCHOOL STUDENTS IN KELANTAN; A PHENOMENOLOGICAL APPROACH

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**Introduction:** Despite rising incidences of hysteria especially among school students in Malaysia this phenomenon still puzzled and bring challenges to many parties. The teaching and learning continuity as well as activities are often disrupted by this scenario, often forcing temporary school closure to deal with the occurrence of outbreak. Despite the rising incidences and cases of hysteria in Malaysia, the study in relation to it is still limited.

**Objectives:** The aims of this study were to explore and interpret this phenomenon and then to explore the cultural factors that conceptualises the hysteria expressions that are unique in our study setting.

**Methods:** Qualitative interpretative phenomenological approach with face to face interviews were conducted among 20 Malay adolescence using the semi-structured in-depth interview guide.

**Results:** The mean age of participants were 14.3 years and all of them are Malay Muslim. 50% of participants were either youngest or eldest siblings and majority of the participants came from low socioeconomic household. The experience and interpretation of hysteria emerged as 'culture



stereotyping', 'idiom of distress' and 'social reinforcement factors'.

**Conclusion:** As the hysteria phenomenon is the intermeshed of deep-rooted cultural influence with the mental health issues, the management would need cultural competency and sensitivity apart from further psychological and emotional evaluation by the health professional.

*Supervisor:*  
Associate Professor Dr Asrenee Ab Razak

*Co-supervisor:*  
Dr Suria Hussin

## PERCEIVED SOCIAL SUPPORT AMONG END-STAGE RENAL DISEASE PATIENTS IN KOTA BHARU

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**Introduction:** End-stage renal disease (ESRD) can affect patients' psychological well-being including depression and anxiety. Social support has been associated with positive outcomes in ESRD.

**Objectives:** The aims of this study were to identify the level of perceived social support, its association with anxiety and depression, as well as its predictive factors.

**Methods:** A cross-sectional study was conducted from August 2019 to September 2020 among 225 ESRD patients who underwent regular dialysis or had follow-up at haemodialysis unit in Hospital Universiti Sains Malaysia and Hospital Raja Perempuan Zainab II, by using a self-administered questionnaires which include sociodemographic profile, the Malay version of the Multidimensional Scale of Perceived Social Support (MSPSS-M) and the Malay version of Hospital Anxiety and Depression Scale (HADS). Data was analysed using measure of frequency for level of perceived social support. Correlation analysis was used to study the relationship between perceived social support and anxiety/depression, and linear regression analysis was conducted to examine independent factors predicting perceived social support.

**Results:** Participants felt highly supported by their family (mean = 5.99, SD = 0.82) and their significant others (mean = 5.51, SD = 1.52); but perceived lesser support from their friends (mean = 4.61, SD = 1.32). There were significant negative correlations between depression and all subscales of MSPSS. Depression, marital status, and employment status were the predictors of perceived social support.

**Conclusion:** ESRD patients perceived high levels of support from their family and significant others. Depression was negatively correlated with all dimensions of perceived social support. Depression, marital status and employment status were predictive factors of perceived social support in ESRD patients. Assessment of social support in daily clinical

practice is needed to ensure holistic individualised care to ESRD patients.

*Supervisor:*  
Dr Norzila Zakaria

*Co-supervisors:*  
Dr Raishan Shafini Bakar  
Dr Muhammad Imran Kamarudin

## SUICIDE LITERACY AMONG FIRST YEAR UNDERGRADUATE HEALTHCARE STUDENTS IN UNIVERSITI SAINS MALAYSIA

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**Introduction:** Suicide has become a formidable challenge to the mental health practice as the warning signs could manifest subtly or they could be instantaneous. Suicide literacy is a recognised approach to prevent suicide, which involves improving the identification and treatment of individuals at high risk.

**Objectives:** This study aims to examine the level of suicide literacy among first year healthcare student in Universiti Sains Malaysia (USM) and its predictors. It also intends to determine the correlation between suicide literacy and depression literacy.

**Methods:** A cross-sectional study was conducted among 246 first year undergraduate healthcare students in USM health campus, which is situated in West Malaysia. They were campus students in USM who were recruited via convenient sampling. They were required to complete a set of self-administered questionnaires which include sociodemographic profile, literacy of suicide scale (LOSS) and depression literacy (D-Lit). Data was analysed using IBM SPSS Statistical Software version 24.0.

**Results:** The study has found above-average score of suicide literacy 4.9(1.33). There is a positive linear correlation between total D-Lit and LOSS score ( $P = 0.002$ ,  $r = 0.197$ ). Multiple regression analysis showed a significant association between LOSS score and D-Lit score ( $P = 0.012$ ) and courses enrolled by the students ( $P = 0.046$ ), where medical students were found to have a higher level of suicide literacy compared to paramedical students.

**Conclusion:** There is above-average level of suicide literacy among first year undergraduate healthcare students. It was associated with the courses enrolled by the students and depression literacy. There is a need to enhance the knowledge about suicide and depression among the students, particularly among the paramedical students through

continuous psychoeducation and direct involvement in mental health service as part of the gatekeeper training.

*Supervisor:*  
Associate Professor Dr Asrenee Ab Razak

*Co-supervisor:*  
Dr Raishan Shafini Bakar

### POSTNATAL DEPRESSION: ASSOCIATED FACTORS AND ITS RELATIONSHIP WITH MATERNAL BONDING AMONG MALAY WOMEN IN KOTA BHARU

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**Introduction:** Postnatal depression is the commonest postpartum mood disorders, and is associated with significant morbidities and mortalities. The prevalence varies with geographical regions, but observed to be highest during the early weeks after childbirth. Studies have observed the negative effect of postnatal depression on postpartum bonding.

**Objective:** The aim of the study is to determine the prevalence of postnatal depression among Malay women in Kota Bharu and its associated factors as well as to investigate the relationship between postnatal depression and postpartum bonding.

**Methods:** A cross-sectional study was conducted among 276 mothers attending their first postnatal check-up at six health clinics in Kota Bharu. Participants were given questionnaires of sociodemographic profile, the Malay version Edinburgh Postnatal Depression Scale (EPDS) and the Malay version of Postpartum Bonding Questionnaire (PBQ). Data was analysed using correlation and multiple regression analysis.

**Result:** The prevalence of postnatal depression is 5.1%. The study also found positive correlation between postnatal depression and postpartum bonding ( $r = 0.364, P < 0.001$ ). Multiple regression analysis showed that mode of delivery (caesarean section) and perceived stress as predictors for postnatal depression.

**Conclusion:** This study confirmed the result of previous studies on the inverse relationship between postnatal depression and postpartum bonding. Realising how detrimental the effect of impaired bonding can be, mothers with the risks of developing postnatal depression should be screened and managed appropriately, at the earliest time possible.

*Supervisor:*  
Professor Dr Zahiruddin Othman

### PROTEIN INDUCED VITAMIN K ABSENCE RESPONSE IN ASSOCIATION TO TREATMENT MODALITIES AMONG HEPATOCELLULAR CARCINOMA PATIENTS AT HOSPITAL UNIVERSITI SAINS MALAYSIA

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**Introduction:** Hepatocellular carcinoma (HCC) is the commonest tumour of the liver with multiple aetiologies responsible for cirrhosis which evidently and eventually leads to hepatocellular carcinoma. With drastically increasing incidence since 1990 in Malaysia from 6.1% to 42.8% and with an annual mortality rate of 6.1%, the diagnosis of hepatocellular carcinoma is mainly dependent of imaging and biochemical markers. The commonest imaging modalities used to diagnose hepatocellular carcinoma are magnetic resonance imaging and computed tomography of the liver, while the commonest tumour marker used in conjunction with imaging is alpha-fetoprotein (AFP). In the setting of hepatocellular carcinoma, 30% of the time, the tumour marker alpha-fetoprotein is not elevated which leads to a conundrum during the time of diagnosis. A more robust tumour marker is required and protein induced vitamin K absence (PIVKA-II) has shown potential in this regards with a few studies showing that PIVKA-II was superior in both sensitivity and specificity in the initial diagnosis, during follow-up post-treatment via hepatic artery embolisation and hepatic artery infusion and it also shows a better correlation with overall survival in comparison to AFP.

**Objectives:** The purpose of this study is to evaluate the association between radiological response and PIVKA-II response in patients undergoing interventional radiological treatment, as radiological response is used as a benchmark to determine whether more interventions should be performed or that the patient should be observed.

**Methods:** A prospective study was conducted at Hospital Universiti Sains Malaysia (USM), Kota Bharu, Kelantan, Malaysia, where 66 patients who underwent interventional radiological treatment for hepatocellular carcinoma had blood investigation for PIVKA-II taken prior to the treatment, 6 weeks post-treatment and 3 months post-treatment with concurrent computed tomography or magnetic resonance imaging at baseline, 6 weeks post-treatment and 3 months post-treatment. Only 28 patients of the 66 patients, were available at the end of the 3<sup>rd</sup> month post intervention, owing part to the patients succumbing to their disease and part due to the pandemic. The radiological response was based on modified response evaluation criteria (mRECIST) into four criteria's of progressive disease, stable disease, partial response and complete response. PIVKA-II response was classified into either PIVKA-II responders or non-responders. The Fischer's exact test was used to determine the association between radiological response and PIVKA-II response. This study is to evaluate the association between radiological response and PIVKA-II response in

patients undergoing interventional radiological treatment, as radiological response is used as a benchmark to determine whether more interventions should be performed or that the patient should be observed.

**Results:** There was a significant association between radiological response and PIVKA-II response at 6 weeks post-interventional radiological treatment with  $P < 0.001$  and a Cramer's V value of 0.71. However, at 3 months post-treatment, there was no significant association between radiological response and PIVKA-II response with a  $P$ -value of 0.915 and Cramer's V value of 0.141.

**Conclusion:** This study shows that at 6 weeks post-interventional treatment there was a significant association between radiological response and PIVKA-II response, however, there was no significant association between post-interventional radiological response at 3 months. Thus PIVKA-II as tumour marker cannot be used in place of radiological imaging. However, it can be used in conjunction with imaging.

*Supervisor:*

*Associate Professor Dr Mohd Shafie Abdullah*

*Co-supervisors:*

*Professor Dr Lee Yeong Yeh*

*Dr Julia Binti Omar*

## ANALYSIS OF BRAIN ACTIVATION AND EFFECTIVE CONNECTIVITY DURING SELF-PACED UNILATERAL AND BILATERAL FINGER TAPPING USING FUNCTIONAL MAGNETIC RESONANCE IMAGING IN PATIENTS WITH TEMPORAL LOBE EPILEPSY

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**Background:** Temporal lobe is the most frequent site of origin of partial seizures. Patients with temporal lobe epilepsy (TLE) represent approximately two thirds of the intractable seizure population. This study aims to explore on motor networks in TLE patients.

**Methodology:** This study involves 12 healthy subjects and 12 TLE patients who have undergone functional magnetic resonance imaging (fMRI) performing self-paced unilateral and bilateral finger tapping. The images were then pre-processed and analysed using statistical parametric mapping (SPM). The activated areas were compared between healthy subjects and TLE patients. The effective connectivity for visual and motor node were performed using dynamic causal modelling (DCM).

**Results:** Comparing the two groups, using two samples  $t$ -test, familywise error rate (FWE)  $P < 0.05$ . Healthy subjects showed more areas of significant activation. For effective connectivity, in healthy subjects, visual to motor was the dominant model with average value of 0.03 Hz bilaterally. In TLE patients, on the right hemisphere, a contrary result

was observed whereby motor to visual area was the dominant model. On the left hemisphere, the same model as healthy subjects was the dominant model, visual to motor but with higher average value of 0.1 Hz.

**Conclusion:** This study found that there were less area of brain that has significant activation in TLE patients during motor activity. TLE brains also exhibit alteration in effective connectivity between visual and motor region.

*Supervisor:*

*Associate Professor Dr Mohd Ezane Aziz*

*Co-supervisors:*

*Dr Aini Ismafairus Abd Hamid*

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## COMPARISON OF CONTRAST ENHANCEMENT AND IMAGE QUALITY USING DIFFERENT CONTRAST ADMINISTRATION PROTOCOLS FOR ROUTINE ABDOMINAL COMPUTED TOMOGRAPHY IN TWO CENTRES

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**Introduction:** Computed tomography (CT) scanning is a diagnostic imaging procedure that uses X-rays to build images of the body. CT scanning is an extremely common imaging modality in modern medicine. Contrast enhancement is the key component in CT scanning which helps to distinguish abnormal from normal body structure. Numerous interacting factors can affect the quality of contrast-enhanced CT (CECT) images, which may be divided into three categories: patient, contrast medium and CT scanning. A lack of standardisation has resulted in heterogeneous dosing regimens across radiology practices. The purpose of this study is to compare the effect of the two different scanning protocols mentioned above on the contrast enhancement and image quality of CECT abdomen.

**Objectives:** To study the effect of two different scanning protocols (weight-based contrast volume with automatic bolus tracking technique and fixed contrast volume with fixed time-delay technique) on the contrast enhancement and image quality of CECT abdomen.

**Methods:** A cross-sectional study was conducted in Hospital Universiti Sains Malaysia (HUSM), Kota Bharu, Kelantan, Malaysia and Advanced Medical and Dental Institute (AMDI), Kepala Batas, Pulau Pinang, Malaysia on 336 patients aged 18 years old and above with CECT scan of abdomen between January 2017 and December 2019. Images of the CECT abdomen using different protocol were collected retrospectively from these two centres: 168 patients from HUSM, using fixed contrast volume with fixed time-delay technique and 168 patients from AMDI using weight-based contrast volume with automatic bolus tracking technique. Quantitative assessment was performed by measuring

the degree of enhancement in region of interest and were quantified in Hounsfield unit (HU). Mean enhancement values from each protocol was assessed and compared using independent *t*-test. Qualitative assessment was performed in which the images will be graded by radiologist using 4 points scale. Mean qualitative score from each protocol will be compared using independent *t*-test.

**Results:** A total of 336 participants were recruited for this study, which includes of 146 males and 190 females. The mean age of the participants is 41.51 years old from HUSM and 47.68 years old from AMDI. The result of the data showed that the mean weight of the participants is 54.55 kg from HUSM and 59.86 kg from AMDI. There was significant mean difference of enhancement value (HU) between weight-based contrast volume with automatic bolus tracking protocol and fixed contrast volume with fixed time-delay protocol ( $P < 0.001$ ). The mean enhancement values of aorta and portal vein was higher in weight-based contrast volume with automatic bolus tracking protocol. There was also significant mean difference of qualitative score between the two protocols ( $P = 0.004$ ). The score was higher in weight-based contrast volume with automatic bolus tracking protocol.

**Conclusion:** Weight-based contrast volume with automated bolus tracking protocol demonstrate higher degree of contrast enhancement and significant better CT quality with higher grading by assessor in routine CECT abdomen.

Supervisor:  
Dr Muhamad Zabidi Ahmad

### SONOGRAPHIC REVIEW OF THYROID LESION BASED ON ATA AND ACR-TIRADS CLASSIFICATION

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**Introduction:** Thyroid malignancy is one of the commonest cancers among adults with prevalence rate of 3%–7%. High frequency ultrasound has been gold standard in detecting thyroid nodules and able to stratify malignant lesions. Research has been undertaken on these nodules with qualitative and quantitative manners to stratify these lesions.

**Objectives:** The purpose of this study is to compare stratification of thyroid lesions based on ACR-TIRADS and ATA in detecting malignant thyroid nodules and analyse the sensitivity and specificity of each scoring system.

**Methods:** A retrospective case-control study using sonographic images done prior to the patient's thyroidectomy. Identified thyroid nodules were analysed using ATA and ACR-TIRADS classification system for stratification and scoring. Variables such as age, gender, family history, previous malignancy history and previous irradiation history were documented in data collection form. For the purpose of our study, ATA benign and very low suspicion nodule were categorised as benign and TR2 and

below category was taken as benign. On contrary to this, ATA low suspicion nodule with ACR-TIRADS TR3 category and above were taken as malignant.

**Results:** A total of 129 nodules from 53 participants were included in this study. The mean total identified benign thyroid nodule based on USG ATA classification showed 0% benign and 3% were malignant on HPE. Meanwhile, based on benign USG ACR-TIRADS features, 0.8% were benign and 3.9% were malignant. Malignant thyroid HPE based on ATA and ACR-TIRADS classification was 93.0% and 91.0% respectively. The specificity, negative predictive value (NPV) and accuracy of ACR-TIRADS classification were high (95.2%, 97.6% and 93.0%), respectively. There was no significant association of each sonographic characteristics ACR-TIRADS with HPE proven malignant thyroid nodules. A total of 28 nodules of category TIRADS 3 (TR3) was identified as histopathological examination (HPE) proven malignancy with malignancy rate of 21.71% in comparison to TR4 nodule and TR5 nodule of 10.08 % and 6.98% of detected malignancy rate.

**Conclusion:** Overall, this study showed that no single sonographic features of thyroid nodule have significant association with malignant histology outcome of thyroid nodule. However, combination of sonographic features improves predictability of malignancy. Concisely, ACR-TIRADS is simple and practical method for thyroid nodule stratification with high accuracy.

Supervisor:  
Associate Professor Dr Mohd Shafie Abdullah

Co-supervisor:  
Dr Maya Mazuwin Yahya

### PROGNOSTIC BIOMARKERS FOR CHEMOTHERAPY RESPONSE ON HPE IN OSTEOSARCOMA PATIENTS

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**Introduction:** Osteosarcoma is the most common primary malignant tumour derived from primitive bone-forming mesenchymal tissue. The study aims to find any association between clinical findings, tumour growth patterns, tumour volume, pulmonary metastasis, and tumour necrosis with chemotherapy response on HPE in osteosarcoma patients following neoadjuvant chemotherapy which in turn correlates with the patient survival. These prognostic factors may help in the application of risk adaptive management of osteosarcoma patients.

**Objectives:** Evaluation of clinical findings, tumour growth patterns, tumour volume, pulmonary metastasis and tumour necrosis with chemotherapy response on HPE in osteosarcoma patients following neoadjuvant chemotherapy.

**Methods:** This is a retrospective cohort study of all patients treated between January 2000 and December 2020.

MR images of patients with osteosarcoma were taken from PACS and data analysed for the study variables as described. Patients were divided into three groups based on the tumour growth pattern, namely concentric, eccentric and longitudinal groups. Tumour volume and tumour necrotic volumes were calculated using reliable semi-automated software. Correlations between tumour growth patterns, volumes and clinical features with histopathological variables were analysed.

**Results:** We included 18 patients with an age range of 6 years old–48 years old (median = 20). In total, five patients had a good chemotherapy response. Lung metastasis and pathological fractures were found in seven patients. In our study, a smaller necrotic volume calculated on pre-chemotherapy MRI showed a significant response to chemotherapy in terms of histological necrosis. There was a significant correlation found in the chemotherapy response for variables like pathological fractures and location of the tumour. However, there was no significant correlation found between chemotherapy response and the other variables like age, gender, subtype, presence of lung metastasis, growth pattern and tumour volume.

**Conclusion:** Overall, the study suggests that growth patterns, tumour volume and clinical features like the presence of pulmonary metastasis in imaging were not associated with the HPE necrosis outcome. However, there is evidence to suggest that patients with a comparatively smaller pre-chemotherapy tumour necrotic volume showed a good chemotherapy response. Also, the absence of pathological fracture showed a good chemotherapy response.

*Supervisor:*

*Associate Professor Dr Mohd Ezane Aziz*

## DETECTION OF KNEE CHONDRAL DEFECT BY 3-DIMENSIONAL WATER SELECTIVE FOR CARTILAGE SEQUENCE (3D WATSc) IN 3.0 T MAGNETIC RESONANCE IMAGING

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**Introduction:** Knee chondral defect is one of the important causes of pain and disability. Arthroscopy is the gold standard method in detecting knee chondral defects however it is invasive. Magnetic resonance imaging (MRI) had been used as a non-invasive method in detecting knee chondral defect. Many MRI sequences had been developed for assessing the cartilage however it still pose limitations and inconsistent results. To date there is no general consensus for the MRI sequence in cartilage assessment.

**Objectives:** This study aims to assess the detection and grading of knee chondral defect in 3.0 T MRI using 3-dimensional water selective for cartilage (3D WATSc) sequence, in comparison with proton density (PD) sequence and gold standard arthroscopy.

**Methods:** This retrospective study was conducted in Hospital Universiti Sains Malaysia (HUSM), Kelantan, from January 2017 until June 2020. MRI images of PD and 3D WATSc sequences of patients who fulfilled the inclusion criteria were independently reviewed by two independent raters. Presence of chondral defect and the grading in these two sequences were recorded and compared with arthroscopy findings. The interclass correlation coefficient (ICC) using absolute agreement under two-way mixed model for the grading between two raters was performed to determine the inter-observer reliability, which showed good inter-observer reliability for the grading of knee chondral defect in PD and 3D WATSc. Wilcoxon signed ranks test was used to test the differences in grade between PD and 3D WATSc. Sensitivity, specificity and accuracy were calculated for PD and 3D WATSc grades using the arthroscopy grades as standard reference.

**Results:** Total of seventy subjects ( $n = 70$ ), predominantly male (53 males; 17 females) with a mean age of 29.59 (15–44) years old were included in this cross-sectional study. The prevalence of knee chondral defect detected by PD, 3D WATSc and arthroscopy were 55.7%, 48.6% and 44.3%, respectively. Majority of subjects were rated as Grade 0 across all assessment modalities with significant portion of subjects were rated as Grade II, Grade III and Grade IV. No statistically significant in the difference of knee chondral defect gradings between PD and 3D WATSc ( $P > 0.05$ ). The sensitivity, specificity and accuracy of 3D WATSc were 77%, 74% and 76%, and PD were 64%, 81% and 71%, respectively.

**Conclusion:** The study showed that the diagnostic performance of 3D WATSc is not superior to PD in the detection of presence and grading of the knee chondral defect by 3.0 T MRI. The sequence also only had moderate sensitivity, specificity and accuracy as compared to gold standard arthroscopy. Therefore it cannot outperform PD sequence in assessing the knee chondral defect. Future prospective study is needed to further evaluate the diagnostic accuracy of 3D WATSc in 3.0 T MRI.

*Supervisor:*

*Dr Ahmad Hadif Zaidin Samsudin*

*Co-supervisor:*

*Dr Muhammad Rajaei Ahmad @ Mohd Zain*

## THE ASSOCIATION BETWEEN DEGENERATIVE SPINE DISEASE ON MRI OF THE LUMBAR SPINE AND FUNCTIONAL DISABILITY

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**Introduction:** Degenerative spinal disease is one of the spinal conditions that can cause a person to be unable to work. Various forms of questionnaires are available in

determining the lack of function. The purpose of this study was to investigate and determine the relationship between degenerative spinal diseases on MRI lumbar spine and work disability. Various causes of degenerative spine disease. In this study, we wanted to investigate the different such as facet joint arthropathy, degenerative disc disease and nerve root impingement.

**Objectives:** To determine the association between the degenerative spine disease on MRI of the lumbosacral and functional disability.

**Methods:** Patients with degenerative spine disease were undergone a magnetic resonance imaging (MRI) and images that have been taken were viewed on pictures archiving and communication system (PACS). The patient's MRI images showed facet joint with degenerative disc disease/nerve root compression at the level of L4/L5 or L5/S1 vertebra were required. This patient were given a copy of the questionnaire. This questionnaire were answered by the selected patients within one hour. Each copy of the questionnaire produced the degree (grade) of disability, i.e. minimum disability (0%–20%), moderate disability (21%–40%), severe disability (41%–60%), crippled (61%–80%) and the patient is bedbound (81%–100%). Using logistic regression analysis, the associations between the functional disability (PDI score) and the binary outcomes of the three study focuses were analysed.

**Results:** A total of 137 study subjects were recruited in this study. The participants over 40 years old constitute about 82% of the study subjects. The proportion of male to female was almost similar. At the same time, the majority of the study subject was Malays, followed by Chinese and Indians. The proportion of the patient with facet joint osteoarthritis patients on MRI at the level L4/L5 and L5/S1 were 51 (37%) and 86 (63%), respectively. From the logistic regression analysis, the degenerative disc disease on MRI at the level L4/L5 and L5/S1 showed no significant interaction with the functional disability using pain disability index (PDI) in a patient with facet joint osteoarthritis. On the other hand, the logistic regression analysis of PDI grades versus nerve root compression in patient with facet joint osteoarthritis also shows no significant interaction with each other. However, there is significant interaction between the PDI and level of vertebral involved.

**Conclusion:** Our study shows that facet joint with degenerative disc disease/nerve root compression has no significant association with functional disability. However, the different level of vertebral involved gives a significant level of PDI.

*Supervisor:*

*Dr Chandran a/l Nadarajan*

*Co-supervisor:*

*Associate Professor Dr Mohd Ezane Aziz*

## ASSOCIATION BETWEEN INCIDENCE OF WHITE MATTER HYPERINTENSITIES IN MAGNETIC RESONANCE IMAGING OF THE BRAIN AND SMOKING

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**Introduction:** White matter hyperintensity (WMH) is a common finding on T2 weighted MRI brain or CT brain among the older subjects. There has been a recognised linkage between the development of Dementia and Alzheimer's disease. Technological advancements in recent years have made the understanding of the pathogenesis of WMHs deeper, with several proposed mechanisms, focusing on anatomy, blood-brain barrier disruption, cerebral blood flow autoregulation, venous collagenases and genetic factors. Smoking has been postulated to have an influence on WMH in several reports. Most of previous studies have only included older age groups in their studies, with which comes other confounding factors such as age and co-morbidities.

**Objectives:** The aim of this study were to investigate the association between the incidence of WMHs in MRI brain and smoking in young adult population, as well as to compare the proportion of WMHs between smokers and non-smokers, and to determine the association between WMHs and pack years.

**Methods:** A retrospective study was conducted in Hospital USM, Kelantan, Malaysia with MRI brain of patients aged 18 years old and above were reviewed. The MRI must include both T2WI and FLAIR sequences. Patients with gross brain lesions, structural abnormalities, and history suggestive ongoing intracranial infection, inflammatory or demyelinating diseases were excluded. Demographic data regarding pack-years, age of initiation/cessation, duration of smoking, type of cigarettes (non-filtered, filtered or e-cigarette) was collected and analysed using Pearson's correlation method, Fisher's exact test, and independent *t*-test as necessary.

**Results:** No significant association was found between incidence of WMHs in MRI brain and smoking in the young population subset. There was a significant association between age ( $P < 0.001$ ), smoking status ( $P < 0.001$ ) especially in the ex-smoker and passive smoker group ( $P = 0.022$ ) and comorbidities ( $P < 0.001$ ) with WMH. The mean age of participants in the WMH group was higher than No WMH ( $P < 0.001$ ). For smoking status, a higher prevalence of non-smoker was found in the No WMH group. There was a high percentage of participants with no comorbidities reported to be in the No WMH group ( $n = 80, 77.7\%$ ).

**Conclusion:** No significant association was found in this preliminary study of the effects of smoking on the cerebrovascular disease in the young adult population. Significant association was found between age, smoking

status (ex-smoker and passive smoker) and comorbidities with WMHs, which enforces previous study findings.

Supervisor:

Dr Chandran Nadarajan

## LIPIODOL ACCUMULATION PATTERN AS IMAGING BIOMARKER OF TUMORAL RESPONSE AFTER CONVENTIONAL TRANSARTERIAL CHEMOEMBOLISATION AND SURVIVAL OUTCOME IN HEPATOCELLULAR CARCINOMA PATIENTS

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**Introduction:** TACE is the locoregional treatment of choice for unresectable hepatocellular carcinoma and a successful procedure would improve the survival rate of the patient. Good antitumoural coverage in the targeted liver tumour is necessary to produce good tumoural necrosis and results in a good therapeutic effect. TACE by using a mixture of anticancer and iodised oil (Lipiodol) may provide an overview of the degree of accumulation and retention within the targeted tumour on subsequent CT-scans follow up, thus predicting the outcome of the treatment. This study aimed to determine the correlation between the pattern of accumulation pattern of lipiodol and the targeted tumoural response toward the treatment given and the overall survival rate of HCC patients.

**Objectives:** This study will stress the importance of achieving good lipiodol retention as a bioimaging marker and its correlation with the tumour response and overall survival among early (BCLC stage B) and advanced (BCLC stage C) patients in HUSM. It will also highlight further significance in recognising good lipiodol accumulation as a therapeutic aim and imaging biomarker in the future.

**Methods:** This retrospective record review was done from 2013 until 2020 in patients who received TACE with anticancer and lipiodol in Hospital Universiti Sains Malaysia, who are fulfilling inclusion and exclusion criteria. Lipiodol accumulation pattern is observed approximately after 6 weeks post-TACE on the follow-up CT scans and later is classified into four accumulation patterns; pattern 4 - complete accumulation; pattern 3 - intense (> 75% of tumour volume); pattern 2 - moderate (< 75% of tumour volume) and pattern 1 - low accumulation. Evaluation of the tumoural response was done according to the mRECIST criteria. Pearson's Chi-squared or Fischer's exact test and multiple logistic regression test analysis was used to determine the association between the lipiodol accumulation pattern and the tumour response towards the treatment. A survival analysis test (Kaplan-Meier analysis) was used to determine the association between the accumulation pattern and the overall survivability of the patient who received TACE. Simple and multiple Cox proportional hazard regression tests

were used to study other associated factors affecting overall survivability.

**Results:** A total of data from 38 subjects were obtained in both BCLC stage B ( $n = 33$ ) and BCLC stage C ( $n = 10$ ) groups. In BCLC stage B, 18% ( $n = 7$ ) were in complete accumulation, 26% ( $n = 10$ ) in intense accumulation, 16% ( $n = 6$ ) in moderate accumulation and 13% ( $n = 5$ ) in low accumulation pattern. Fisher's exact test for BCLC stage B subjects showed significant association between lipiodol accumulation pattern and tumour response with Fisher's exact value of 27.025 ( $P < 0.001$ ). Spearman-rho test reports a significant association of lipiodol accumulation pattern and tumour response with a magnitude of 0.84 in this group. In BCLC stage C, no complete accumulation pattern was observed, 5% ( $n = 2$ ) were in intense accumulation, 11% ( $n = 4$ ) were in moderate accumulation and 11% ( $n = 4$ ) were in low accumulation pattern. The Fisher's exact test for subjects in BCLC stage C showed no significant association between lipiodol accumulation pattern and tumour response with Fisher's exact value 2.281 ( $P > 0.05$ ). Survival analysis shows higher proportion of cases survived at 1-year and 3-year in complete (85.7% at 1-year and 17.1% at 3-year) and intense (88.9% at 1-year and 38.1% at 3-year) lipiodol accumulation group in BCLC stage B group as compared to other accumulation patterns. The median survival time in BCLC stage B for each group were 26 months (complete), 30 months (intense), 9 months (moderate) and 16 months (low). In BCLC stage C group where only moderate and low accumulation pattern were observed above one year, with 1-year survival rate was 50% (moderate) and 25% (low) with none survive at 3 years and 5 years. The median survival time for BCLC stage C group were 6 months (intense), 4 months (moderate) and 8 months (low). Simple and multiple Cox regression analysis revealed that the number of liver nodules group and number of TACE procedures done were among significant prognostic factor of death in HCC. Patients that have 5–9 liver nodules had a 12.1 times higher risk of death as compared to the group of patients with 1–4 liver nodules (HR: 12.1; 95% CI: 1.17, 124.57). Patients that received one TACE procedure are expected to have a decrease in risk of death by 0.57 (HR: 0.565; 95% CI: 0.393, 0.812). Though additional regression analysis did not report a significant influence of lipiodol accumulation pattern on disease progression, correlation analysis reported a moderate positive correlation between lipiodol accumulation pattern and disease progression ( $r_s [36] = 0.796$ ;  $P < 0.001$ ).

**Conclusion:** Lipiodol deposition in liver tumours can be evaluated using quantitative baseline imaging characteristics and it shows significant correlation with tumour response toward the treatment and influence the survival outcome of the patients. Our study confirms the findings of previous studies and validates the unique properties and function of lipiodol as a tumour-specific, drug-carrying and imaging biomarker agent to treat HCC patients.

Supervisor:

Dr Chandran Nadarajan

## EVALUATION OF FATTY LIVER IN BREAST CANCER PATIENTS AND ITS METASTATIC POTENTIAL

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**Introduction:** Non-alcoholic fatty liver disease (NAFLD) has a higher prevalence among breast cancer patients compared to the normal population and is one of the risk factors for extrahepatic carcinogenesis. It has also increased the risk of primary tumour progression, risk of distant metastasis and tumour recurrent. However, to date, not many clinical studies were done to evaluate fatty liver and metastatic risk. Thus, further clinical study is needed. This study aims to evaluate the association of fatty liver with distant metastasis and metastatic site.

**Objectives:** This study aims to look at the association between fatty liver and distant metastasis among breast cancer patients.

**Methods:** A cross-sectional study was conducted in Hospital Universiti Sains Malaysia (HUSM), Kelantan, Malaysia on histopathological confirmed female breast carcinoma patients from January 2014 until December 2020. The evaluation of fatty liver done were made on plain CT abdomen images with reference of contrasted images. Three regions of interest (ROI) were drawn on the liver and spleen and the Hounsfield unit (HU) was documented. Liver to splenic ratio (L/S ratio) was calculated by dividing the average liver HU to splenic ratio. L/S ratio of less than 1.0 was taken as fatty liver. Evaluation of distant metastasis was also done. The association of fatty liver with distant metastasis and metastatic site were evaluated.

**Results:** Out of 624 screened subjects, a total of 332 subjects with histopathologically proven breast carcinoma patients that underwent CT scan stage including thorax, abdomen and pelvis scans were included as participants in this study. Mean age was 53 (SD = 10.93) years old ranging from 28 years old to 82 years old, 45.5% ( $n = 151$ ) had tumour size of  $> 5$  cm, 51.8% ( $n = 172$ ) had metastasis at diagnosis. The most common metastasis site was the lung, followed by bone and liver. The prevalence of fatty liver in the study population was 27.2% ( $n = 91$ ). This current study showed association of fatty liver with distant metastasis. Association of fatty liver with lung metastasis were also demonstrated. However, there was no association between fatty liver and distant metastasis or with the site of metastasis in tumour size of  $\leq 5$ cm.

**Conclusion:** Prevalence of fatty liver in breast carcinoma patients in our study was 27.2%, which corresponds to most of other studies. Considering the existing studies investigating the relationship between fatty liver and breast cancer, our study results showed a similar finding of an association of fatty liver with distant metastasis. Association of fatty liver with distant metastatic site to lung and pleura were also demonstrated. However, no association

between fatty liver and distant metastasis or metastatic sites in tumour size of  $\leq 5$  cm.

Supervisor:  
Associates Professor Dr Juhara Haron

## ASSOCIATION BETWEEN TYPES OF MAMMOGRAPHIC BREAST DENSITY AND HISTOLOGICAL SUBTYPES OF INVASIVE BREAST CARCINOMA

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**Introduction:** Mammographic density is an established risk factor for breast cancer. It reflects the relative component of fat, epithelial tissue and connective tissues that has a specific appearance due to different tissue attenuation on the mammogram. Women with dense breast have more epithelial and connective tissue and less fat tissue, and are at higher risk to get breast cancer. Histological subclassification of breast cancer can be divided into invasive carcinoma of no special type (NST) and special types (ST) which include lobular, tubular, cribriform, metaplastic, apocrine, mucinous, papillary and many others. From various works of literature, majority breast carcinoma of special types carries a better prognosis than NST. Thus, appropriate classification can allow accurate estimation of a patient's prognostication and facilitate the identification of optimal treatment strategies.

**Objectives:** The purpose of this study is to evaluate the association between mammographic breast density and histological subtypes of breast carcinoma, to determine the types of mammographic breast density using the Breast Imaging Reporting and Data System (BI-RADS) and Tabar classification in patients with invasive breast carcinoma and to determine the agreement between the two classifications of mammographic breast density (BI-RADS and Tabar classification).

**Methods:** A cross-sectional study was conducted in Hospital Universiti Sains Malaysia (USM), Kota Bharu, Kelantan, Malaysia on 125 patients who had been diagnosed with breast carcinoma and had undergone mammogram prior to surgery. Breast density was determined using BI-RADS and Tabar classification. It was divided into dense (BI-RADS C and D, Tabar types I, IV and V) and non-dense (BI-RADS A and B, Tabar types II and III) categories. Histological subtypes of breast carcinoma are categorised into invasive carcinoma of NST and ST breast carcinoma. The association between mammographic breast density and histological subtypes of breast carcinoma had been carried out using Pearson's Chi-squared test. Cohen's Kappa analysis was done to determine the agreement between BI-RADS and Tabar classification.

**Results:** There is no significant association between mammographic breast density using BI-RADS and Tabar classification with histological subtype ( $P = 0.833$  and  $P = 0.336$ , respectively). However, Cohen's Kappa analysis shows



good agreement between BI-RADS and Tabar classification, with a Cohen's Kappa coefficient of 0.8 ( $P < 0.001$ ).

**Conclusion:** Our study shows no significant association between mammographic breast density and histological subtypes of breast carcinoma. However, with limited literature, further research might be plausible to show the association between breast density and histopathological subtypes of breast carcinoma.

*Supervisor:*  
Associate Professor Dr Juhara Haron

*Co-supervisor:*  
Associate Professor Dr Wan Faiziah Wan Abdul Rahman

## DETECTION OF ORTHOPAEDIC IMPLANTS AND IN VITRO OBJECTS USING HAND HELD METAL DETECTOR

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**Introduction:** Due to superior soft tissue contrast functional applications, guiding interventional procedures and planning radiation therapy, there is tremendous growth in MRI imaging. With the increasing use of MRI, MRI incidents are also increasing. Hand held metal detector (HHMD) is used in the MRI environment of many hospitals, which is not appropriate to prevent MRI hazards. Although there have been several recent publications on HHMD, there is no previous documentation on sensitivity, specificity and accuracy of HHMD in the detection of a ferromagnetic object in patients going for MRI scanning.

**Objectives:** To determine the sensitivity, specificity and accuracy of the HHMD in the detection of ferromagnetic and non-ferromagnetic objects (in vitro) and to determine the factors (obesity status and site of orthopaedic implant) associated with detection of orthopaedic implants in patients using HHMD (in vivo).

**Methods:** This was a cross sectional study conducted in two phases. In both phases data collection was done in the Radiology Department of HUSM. In first phase of the study, source population was from orthopaedic patients who operated in HUSM and attended orthopaedic clinics in HUSM for follow up. Consent was taken from patients and patients were scanned using HHMD. Details of implants were obtained from operative notes and BMI of the patient calculated. In second phase of study commonly encountered objects in MRI environment were put at usual locations on healthy volunteer and scanning of volunteer was done using HHMD.

**Results:** One hundred and seventy-five (97.2%) of the 180 implants were detected by the HHMD. The overall rate of detection was 100% for arthroplasty implants, 100% for plates and 94.1% of screws were detected. Only 60% of K-wires were detected, 100% of titanium and 95.5% of stainless steel orthopaedic implants were detected. Two

implants in each range  $< 50$  mm and 51 mm–100 mm and one implant in the range 101 mm–150 mm were not detected. Other orthopaedic implants were detected regardless of size. Obesity and site of orthopaedic implants did not show association with detection of orthopaedic implants in patients using HHMD ( $P = 1.000$  and  $P = 0.158$ ). Overall sensitivity, specificity and accuracy of HHMD in detecting metallic objects were found to be 96.3%, 73.2% and 84.8%, respectively.

**Conclusion:** All joint prostheses, nails and plates were detected by the HHMD. Few screws and K-wires were not detected. All titanium implants were detected and a small number of stainless steel implants were not detected. Obesity and site of orthopaedic implants were not significant factors in HHMD detection. HHMD was not accurate in detecting ferromagnetic and non-ferromagnetic objects.

*Supervisor:*  
Dr Khairil Amir Sayuti

*Co-supervisor:*  
Dr Mohd Hadizie Din

## THE ASSOCIATION OF MAMMOGRAPHIC DENSITY, AGE AND POSITIVE FAMILY HISTORY WITH MOLECULAR SUBTYPES AMONG BREAST CANCER PATIENT IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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**Introduction:** Breast cancer is one of the commonest cancers among females. Multiple risk factors such as age, family history, mammogram density and molecular subtypes are associated with the formation of breast carcinoma. Each factor causes the carcinogenesis of breast cancer in different mechanisms. A mammogram is one of the gold imaging modalities to diagnose breast cancer. Based on the imaging, a woman's breasts can be categorised as non-dense and dense. There is a clinically proven association between mammogram density and breast cancer development. Also, the prognosis of breast cancer is linked to the molecular subtypes, namely the 'non-triple-negative' and 'triple-negative' subtypes depending on the type of hormonal receptor detected. To date, the association between molecular subtypes and the major risk factors of breast cancer is still poorly defined, especially among the Malaysian population.

**Objectives:** This study aimed to assess the association between molecular subtypes with mammogram density and other risk factors of breast cancer patients in Hospital Universiti Sains Malaysia (USM).

**Methods:** We conducted a cross-sectional study involving 280 patients with a diagnosis of breast cancer in Hospital USM. Their mammogram findings and histopathological results with molecular subtyping were obtained. The mammogram was categorised as non-dense

and dense while the molecular subtypes were divided into non-triple-negative and triple-negative. Other variables collected in this study were the patients' age and family history of breast cancer. The proportion of non-dense and dense breasts among the patients was presented as descriptive analysis. The association between mammographic density, age, family history of breast cancer and molecular subtype was tested using multiple logistic regression.

**Results:** Majority of patients were Malay ( $n = 248$ , 98.6%) with age 50 years old and above ( $n = 220$ , 78.6%). Slightly more than half of them ( $n = 159$ , 56.8%) had non-dense breasts. A high number of them reported no family history of breast cancer, ( $n = 246$ , 87.9%). Multiple logistic regression showed that the molecular subtypes of breast cancer were not significantly related to breast density, age and family history of breast cancer.

**Conclusion:** Based on the findings, breast density, age and family history were not directly related to the molecular subtypes of breast cancer. Nonetheless, a case-control study with larger sample size is recommended to obtain a more comprehensive of the relationship between breast density, age and family history with the molecular subtype of breast tissue.

*Supervisor:*

*Associate Professor Dr Juhara Haron*

*Co-supervisors:*

*Dr Chandran a/1Nadarajan*

*Dr Wan Faiziah Wan Abdul Rahman*

## RIGHT AND LEFT ATRIAL DIMENSIONS USING 3 TESLA CARDIAC MAGNETIC RESONANCE IN HEALTHY ADULT: HUSM EXPERIENCE

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**Introduction:** Cardiac magnetic resonance (CMR) has been widely used recently. The database on normal cardiac dimensions has long been established using 1.5 Tesla (1.5T) magnetic resonance scanner. Data on clinical and prognostic features of measurement and volume of atria are limited especially of the right atrium. Accurate normal atrial reference values are very important in clinical practice and research. The purpose of this study was to assess the dimensions of the atrium in healthy populations undergoing 3 Tesla (3T) CMR at HUSM.

**Objectives:** This study aimed to evaluate the right and left atrial dimensions in healthy adult and determine its correlation with the age in Hospital Universiti Sains Malaysia (HUSM).

**Methods:** A retrospective cohort study was conducted in Hospital Universiti Sains Malaysia (HUSM), Kota Bharu, Malaysia on 57 healthy patients aged 18 years old–60 years

old involving Malay, Chinese and Indian populations with 3T CMR between May 2020 and November 2020. Total of 29 males and 28 females were involved in this study. Two observers were responsible for the data analysis. Atrial dimensions were measured in different cardiac planes (2 chamber;2ch, 3 chamber;3ch and 4 chamber;4ch views) using a steady-state free precession sequence. Maximum area, transverse and longitudinal diameters, were evaluated. Correlation of atrial dimensions and age were analysed using Pearson's correlation method.

**Results:** For left atrial area, the upper limits were 24.3 cm<sup>2</sup> (17.3 cm<sup>2</sup>/m<sup>2</sup>) in the 4ch view and 24.7 cm<sup>2</sup> (15.4 cm<sup>2</sup>/m<sup>2</sup>) in the 2ch view and 21.8 cm<sup>2</sup> (11.5 cm<sup>2</sup>/m<sup>2</sup>) in the 3ch view. The upper limits for diameters in the 4ch and 2ch views were longitudinal 5.9 cm (4.0 cm/m<sup>2</sup>) and 5.5 cm (3.7 cm/m<sup>2</sup>), transverse 5.1 cm (3.2 cm/m<sup>2</sup>) and 5.5 cm (3.5 cm/m<sup>2</sup>), respectively, and an anteroposterior diameter of 4.0 cm (2.3 cm/m<sup>2</sup>) in the 3ch view. For right atrial area, the upper limits were 25.5 cm<sup>2</sup> (15.5 cm<sup>2</sup>/m<sup>2</sup>) in the 4ch view. The upper limits for diameters in 4ch was longitudinal 5.8 cm (3.5 cm/m<sup>2</sup>) and transverse 5.7 cm (4.4 cm/m<sup>2</sup>), respectively.

There was a significant linear correlation between LA longitudinal diameter for 4ch, maximum area and LA longitudinal diameter for 2ch and LA transverse diameter for 3ch with age.

**Conclusion:** We have helped to provide a local database for the right atrium and left atrium dimensions in accordance with age using 3T magnetic resonance imaging (MRI).

*Supervisor:*

*Dr Khairil Amir Sayuti*

## A RETROSPECTIVE STUDY ON SURVIVAL ANALYSIS AND ITS PROGNOSTIC FACTORS OF PROSTATE CANCER PATIENTS IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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**Introduction:** Prostate cancer is a leading cause of male morbidity and mortality globally and in Malaysia. This study assessed the five-year survival and prognostic factors among prostate cancer patients in Hospital USM, Kelantan.

**Methods:** We reviewed 150 medical records of patients diagnosed with prostate cancer, from 2009 to 2014. Survival time was analysed in relation of patient demographics, Gleason score, ASA classification, ECOG scores, PSA level, family history, cancer staging, cancer-related haematological parameters and treatment method. Kaplan-Meier survival curves and Cox proportional hazards models are used for the analysis.

**Results:** The prostate cancer 5-year survival rate was 84.5%. Overall the Kaplan-Meier survival curve showed good median survival times. Univariate regression analysis revealed significant prognostic factors including age (HR =

1.06, 95% CI:1.00, 1.11;  $P = 0.034$ ), ASA 3 classification (HR = 3.72, 95% CI: 1.38, 10.00;  $P = 0.009$ ), ECOG score 2 (HR = 17.98, 95% CI: 3.98, 81.1;  $P < 0.001$ ), ECOG score 3 (HR = 33.94, 95% CI: 7.41, 150.0;  $P < 0.001$ ), anaemia (HR = 9.07, 95% CI: 3.33, 24.6;  $P < 0.001$ ), high LDH (HR = 5.37, 95% CI: 1.80, 15.90;  $P = 0.003$ ), high ALP (HR = 8.94, 95% CI: 3.31, 24.1;  $P < 0.001$ ), nodular staging (HR = 5.87, 95% CI: 1.74, 19.85;  $P = 0.004$ ), metastasis (HR = 3.48, 95% CI: 1.28, 9.44;  $P = 0.014$ ), androgen deprivation therapy (HR = 0.29, 95% CI: 0.08, 0.99;  $P = 0.05$ ) and chemotherapy (HR = 4.57, 95% CI: 1.79, 11.6;  $P = 0.001$ ).

**Conclusion:** The 5-year survival rate of HUSM patients treated for prostate cancer was 84.5%. The survival rate reduces significantly due to prognostic factors like age, ASA classification, ECOG score, some haematological parameters, cancer staging and chemotherapy. However, patients received the ADT have a better survival rate, which suggests the main role of prompt initiation of the therapy in improving patient survival.

*Supervisor:*

Associate Professor Dr Andee Dzulkarnaen Zakaria

*Co-supervisors:*

Dr Mohamed Ashraf Mohamed Daud

Dr Nik Mohd Nurhafizi Nik Anuar

## HYPERAMYLASAEMIA AND 6 HOURS POST-ERCP PANCREATITIS AMONG PATIENTS ATTENDING HOSPITAL RAJA PEREMPUAN ZAINAB II (HRPZ II), KELANTAN

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**Background:** Pancreatitis remains a major complication of endoscopic retrograde cholangiopancreatography (ERCP) with a prevalence of 2%–9%. Young age, female gender, difficulty in bile duct cannulation, pancreatic sphincterotomy and sphincter of Oddi dysfunction have been found to be risk factors. Serum amylase and lipase levels are regarded as useful markers for early diagnosis of pancreatitis. However timing of amylase level taken after ERCP is not standardised among different centres. This study is to determine association of post-ERCP pancreatitis with 6-h amylase level after ERCP.

**Methods:** This is a retrospective review of patients undergoing ERCP in Hospital Raja Perempuan Zainab II from 1 January 2015 to 31 December 2018. Serum amylase level at 6-h after ERCP and complications after ERCP were reviewed. The association of amylase level 6-h after ERCP and pancreatitis was determined.

**Results:** A total of 308 patients were included in this study of which 41 (13.3%) had post ERCP pancreatitis. Amylase level of more than 300 IU at 6-h after ERCP ( $P < 0.001$ ) and sphincterotomy ( $P = 0.028$ ) associated with post ERCP pancreatitis.

**Conclusion:** Post-ERCP pancreatitis is associated with an increase in serum amylase level greater than 300IU at 6-h after ERCP.

*Supervisor:*

Dr Ikhwan Sani Mohamad

*Co-supervisors:*

Dr Leow Voon Meng

Dato' Dr Ahmad Shanwani Mohamed Sidek

Dr Ahmad Zuraimi Zulkifli

## RISK FACTORS ASSOCIATED WITH LOW ANTERIOR RESECTION SYNDROME: A CROSS-SECTIONAL STUDY

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**Introduction:** Oncological outcomes following rectal cancer surgery have improved significantly over recent decades with lower recurrences and longer overall survival. However, these survival advantages have greatly overshadowed functional outcomes of surgery, which are poor for many patients and consistently under-reported. Many of the patients experienced several bowel symptoms after surgery, which include flatus and faeces incontinence, frequent bowel opening, urgency or sense of incomplete defecation. This combination of such symptoms after sphincter preserving surgery is referred as Low Anterior Resection Syndrome (LARS).

**Objectives:** The aim of this study is to identify the prevalence and risk factors associated with development of LARS.

**Methods:** This is a cross-sectional study from two tertiary hospitals with colorectal unit in Kelantan. All patients who were diagnosed with rectal cancer and had undergone sphincter-preserving low anterior resection at the participating hospitals between January 2011 and December 2020 were eligible. Upon clinic follow-up, patients were asked to complete an interviewed based simple questionnaire (LARS score) designed to assess bowel dysfunction after rectal cancer surgery. Patients were grouped into two separate cohorts—those with major LARS scores and those with mild/no LARS symptoms. Categorical outcomes were compared for the major LARS group.

**Results:** A total of 76 patients who fulfilled subject criteria recruited from clinic from those who had sphincter preserving rectal surgery for rectal cancer in participating hospital. There were 25 (32.8%) patients with major LARS, 10 (13.1%) patients minor LARS and 41 (53.9%) patients with no LARS. Height of tumour from anal verge showed the association ( $P = 0.039$ ) with development of major LARS. Those patients with less than 8 cm tumour from anal verge increased risk of LARS by three times compared to those with 8 cm and above (adjusted OR [95% CI] = 3.11 [1.06, 9.13]).

**Conclusion:** We identified low tumour height as a significant risk factor which has negative impact on bowel function after surgery. The high prevalence of LARS emphasises the need of study regarding risk factor and importance of understanding pathophysiology of LARS, in order for us to improve patient bowel function and quality of life after rectal cancer surgery.

*Supervisor:*  
Dr Wan Zainira Wan Zain

*Co-supervisor:*  
Dato' Dr Ahmad Shanwani Mohamed Sidek

### THE EFFECT OF CARBOHYDRATE LOADING ON GASTRIC RESIDUAL VOLUME AND THE PATIENTS' WELL-BEING: A SINGLE-BLINDED, RANDOMISED CONTROLLED TRIAL

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**Background:** Carbohydrate loading is one of the key steps in enhanced recovery after surgery (ERAS) protocol which aims to expedite post-operative recovery. Body response to surgery and prolong fasting by releasing of stress hormone and inflammatory marker leads to insulin resistance and catabolic state.

**Objective:** Effectiveness of carbohydrate loading versus plain water on gastric residual volume and patient's well being.

**Methods:** This is a single centre, single-blinded, parallel, placebo-controlled, stratified randomised controlled trial at Endoscopy Unit, Hospital Universiti Sains Malaysia (HUSM) from May 2019 to March 2020. Patients older than 18 years old were randomly assigned to either carbohydrate loading (237 mL of resource) or control group (250 mL of plain water). Randomisation sequence was computer generated and allocation sequence was sealed in sequentially numbered and opaque envelopes. The drinks were served 2 h prior to OGDS procedure. During the OGDS, all the gastric contents were aspirated into a reservoir bottle and recorded as gastric residual volume for comparison later. The patients' well-being (hunger, thirst, anxiety, tiredness and weakness) were assessed using visual analogue scale (VAS) before (pre) and after (post) drink consumption.

**Results:** 78 patients were randomised and analysed with equal allocation between groups. Their mean age was 49 years old with standard deviation (SD) of 14.3 years old. The means (SD) gastric residual volume in carbohydrate loading group was 58.54 (52.98) mL, whereas 13.97 (14.93) mL in plain water group. There was significantly more gastric residual volume in carbohydrate group ( $P < 0.001$ ). Carbohydrate loading group significantly showed reduction in VAS score of hunger ( $P = 0.043$ ) and thirst ( $P = 0.021$ ). There was improvement of VAS score for anxiety, tiredness and

weakness over time in carbohydrate loading group compared with plain water group but not statistically significant.

**Conclusion:** Carbohydrate loading is associated with higher gastric residual volume compared to plain water. However, they were associated with significantly better well-being.

*Supervisor:*  
Dr Michael Pak-Kai Wong  
*Co-supervisor:*

Dr Mohd Nizam Md Hashim

### PREDICTIVE RISK FACTOR FOR DIFFICULT ELECTIVE LAPAROSCOPIC CHOLECYSTECTOMY IN HUSM

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**Introduction:** Laparoscopic cholecystectomy (LC) is a gold standard management for symptomatic cholelithiasis. However, LC might be difficult by the various risk factors. Pre-operative risk factors are very important for the surgeon and patient in anticipating of difficulty during surgery.

**Objective:** The aim of the study is to identify clinical, radiological, and peri-operative risk factor with difficult elective laparoscopic cholecystectomy in HUSM.

**Methods:** This is a retrospective record review of patients who underwent elective laparoscopic cholecystectomy from 2013–2018 in Hospital Universiti Sains Malaysia. The patient's characteristics, clinical history, laboratory data, ultrasonography results and intra-operative details were retrospectively analysed to evaluate predictors of difficult LC.

**Results:** A total of 154 patients who underwent elective laparoscopic cholecystectomy and fulfil the criteria were included in this study. The conversion to open surgery rate was 4.5%, the mean operative length was 91.71 min and the mean hospital stay post-operative was 1 day. The prevalence of difficult elective laparoscopic cholecystectomy in HUSM was 55.2% (95% CI = 47.3, 63.0). The multivariate analysis showed the patient history of cholangitis ( $P = 0.006$ ), history of ERCP ( $P = 0.028$ ), thick gallbladder wall on ultrasound ( $P = 0.011$ ), dense adhesion ( $P < 0.001$ ) and fibrosed Calot's triangle ( $P = 0.008$ ) intra-operatively had significant association with difficult laparoscopic cholecystectomy.

**Conclusion:** From this study, it is concluded that patient history of cholangitis, history of ERCP, thick gallbladder wall on ultrasound, dense adhesion and fibrosed

Calot's triangle intra-operatively were found to be the predictive factors of difficult LC.

*Supervisor:*

*Dr Wan Zainira Wan Zain*

*Co-supervisors:*

*Dr Ikhwani Sani Mohamed*

*Dr Leow Voon Meng*

## RETROSPECTIVE STUDY ON THE MANAGEMENT OF LIVER TRAUMA: A 7-YEAR EXPERIENCE IN A HEPATOBILIARY CENTRE

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**Introduction:** Liver trauma is one of the most common injury in abdominal trauma. For the last 3 decades, there was a paradigm shift from operative to non-operative management (NOM) in liver trauma, with stable haemodynamic, regardless to the grading of liver injury. There are factors that should be considered for anticipating failure of non-operative management. Therefore, this study is performed to identify these factors, to ensure that early intervention is done in order to achieve less morbidity and mortality in non-operative management of liver trauma.

**Objectives:** The aims of this study were to determine factors that contributes to failure of non-operative management in managing liver trauma, the proportion of non-operative management and the morbidity and mortality of operative management in liver trauma at Hospital Sultanah Bahiyah, Alor Setar in 7 years period.

**Methods:** This is a retrospective study of case record of patients diagnosed with liver injury in Hospital Sultanah Bahiyah, Alor Setar from 1 January 2012 to 31 December 2018. Subjects who met the inclusion criteria were recruited in this study. The outcome of non-operative management and factors leading to its failure were studied. The data were analysed using Statistical Package for the Social Sciences (SPSS) version 26.0.

**Results:** A total of 158 patients were included in this study. They were 12 years old–80 years old, with mean age of 25.6 years old. The subject pool comprised of 125 males and 33 females. Majority of the liver traumas were due to motor vehicle accidents, 141 (89.2%), followed by fall, 6 (3.8%) and industrial injury 3 (1.9%). Grade III and grade IV liver injuries were the two most common grading with a total of 43 (27.2%) and 42 (26.6%) cases encountered, respectively. Fifty-three patients underwent emergency laparotomy and 20 (37.2%) of them developed post-operative complications. Hundred and five patients were treated non-operatively. Majority of the patients in this group were young, mean age of 21.0 years old. Simple logistic regression revealed six predictive factors associated with failure of NOM, including haemoglobin at presentation ( $P = 0.015$ ), blood transfusion

status ( $P = 0.008$ ), unit of blood transfused ( $P = 0.014$ ), liver injury grade ( $P = 0.001$ ), length of stay ( $P = 0.028$ ) and intensive care unit admission ( $P = 0.041$ ). Multiple logistic regression shown that liver injury grade and length of stay had significant association with failure of NOM, with  $P$ -values of 0.003 and 0.040, respectively.

**Conclusion:** Non-operative management in liver trauma is a safe approach in haemodynamically stable patients. Factors related to its failure must be considered for better outcome in term of morbidity and mortality.

*Supervisor:*

*Dr Leow Voon Meng*

*Co-supervisor:*

*Dr Zuhdi Mamat*

## A RETROSPECTIVE STUDY ON PREDICTIVE RISK OF INFECTION COMPLICATION POST PERCUTANEOUS NEPHROLITHOTOMY IN HOSPITAL UNIVERSITI SAINS MALAYSIA FROM 2013 TO 2018

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**Introduction:** Percutaneous nephrolithotomy (PCNL) has become a standard procedure in a large, complex stone of the upper urinary tract since it was introduced into the endourologist's armamentarium 4 decades back. Though the procedure is safe, complications still occur and is well reported in literature.

**Objectives:** This study aims to investigate the pre- and intra-operative predictors on infection complication in patient underwent PCNL.

**Methods:** This is a retrospective cohort study in a single institution involving patients underwent PCNL since 2013 to 2018 in a teaching hospital at East Coast Malaysia. The variables were categorised into pre-operative risk factors and intra-operative risk factors and the outcome measured was infective complication including fever, systemic inflammatory response syndrome (SIRS) and sepsis.

**Results:** We identified 86 consecutive patients who underwent primary PCNL that fulfil the inclusion criteria. The prevalence of infective complication was 31.4% (95% CI = 21.8, 42.3), SIRS 17 patients ( $n = 19.8\%$ ) and sepsis 6 patients ( $n = 7\%$ ). In multivariable analysis, the choice of other antibiotic in comparison with cephalosporin group (adj. OR = 17.77, 95% CI: 2.38, 209.91;  $P = 0.009$ ), presence of nephrostomy tube or ureteric stent (adj. OR = 7.14, 95% CI: 2.39, 209.91;  $P = 0.021$ ) and longer duration of hospital stay (adj. OR = 1.85, 95% CI: 1.30, 2.95;  $P = 0.003$ ) remain independently associated with increased risk of infective complication post PCNL.

**Conclusion:** The risk of individuals undergoing PCNL to developed sepsis is low. The choice of prophylaxis antibiotics, presence of nephrostomy tube or ureteric stent

and length of stay were found as independent risk factors to develop infective complication. Therefore, the presence of these risk factors should alert the treating urologists and patients regarding its most detrimental complications especially sepsis.

*Supervisor:*  
Associate Professor Dr Andee Dzulkarnaen Zakaria

*Co-supervisor:*  
Dr Mohamed Ashraf Mohamed Daud

### RETROSPECTIVE EVALUATION OF PRE-OPERATIVE IMAGING AND FACTORS AFFECTING LOCALISATION AND SURGICAL OUTCOME IN PRIMARY HYPERPARATHYROIDISM

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**Introduction:** Primary hyperparathyroidism is an endocrine disease that is most commonly caused by parathyroid adenoma. Focused surgery with the aid of the advancement of pre-operative localisation together with intro-operative adjuncts allows shorter operative time and improve surgical outcome. This study aims to evaluate the sensitivity of ultrasonography and Sestamibi scan for correct localisation of parathyroid adenoma.

**Methods:** Data were retrospectively collected for patients that underwent parathyroidectomy for primary hyperparathyroidism between January 2014 and December 2018 in Hospital Putrajaya, a single high-volume endocrine centre. Patient included underwent both ultrasonography and Tc-Sestamibi scan. Demographics, pre-operative data, intra-operative gland location and surgical outcome were recorded. Data were analysed to assess the sensitivity and specificity of ultrasonography and Tc-Sestamibi scan for localising parathyroid adenoma as well as factors and that influences correct detection.

**Results:** Eighty-six patients fulfilled the inclusion and exclusion criteria. The sensitivity of ultrasound to detect adenoma was 65% with positive predictive value (PPV) and accuracy of 89.7% and 60.5% accuracy. Tc-Sestamibi scan had a sensitivity of 79.5% with PPV and accuracy of 88.6% and 72.1%, respectively. Combining scan showed a sensitivity and PPV of 90.5% and 97.4%, respectively with an accuracy of 88.4%. Adenoma weight and pre-operative PTH levels have no association of detectability by Tc-Sestamibi scan however on ultrasound, heavier adenomas and higher PTH levels influence detectability ( $P = 0.021$ )

**Conclusion:** Dual modality of pre-operative localisation increases the sensitivity of parathyroid adenoma detection. Heavier adenomas and higher pre-operative PTH

levels influence detection by ultrasound however has no influence on detectability by Tc-Sestamibi scan.

*Supervisor:*  
Dr Rosnelifaizur Rameily

*Co-supervisor:*  
Dr Sadhana Sadar Mahamad

### DELAY IN SEEKING CARE FOR BREAST SYMPTOMS AND ITS ASSOCIATED FACTORS

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MMed Surgery

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**Background:** Breast cancer is the most common cancer among Malaysian and in women worldwide. The incidence of breast cancer is increasing yearly. Early presentation and thus, early detection of breast cancer will lead to better prognosis and survival.

**Objective:** This study aimed to investigate the delay of presentation time in women with breast symptom and its associated factors.

**Methods:** The study was conducted between January 2020 and October 2020, recruiting women with new breast symptoms at their first visit to the clinic. Face-to-face interviews using the standardised Malay language questionnaires, and the date of symptom first develop and first visit the clinic was recorded. Presentation time was calculated based on the number of days between the two date. Those with presentation time more than 90 days was considered as a delayed group. Associated factors were recorded, cross-tabulation and multiple logistic regression with the delay presentation for were used for analysis.

**Result:** In total, 106 respondents were included. The mean age of the respondents was 33.99 (SD = 11.207) years old and most of them (73.6%) were age 39 years old and younger. The respondents mainly were Malay ethnicity (98.1%) and Chinese (1.9%). Most of the respondents first visited the local government health clinic (35.8%) for breast symptoms. They presented symptoms were breast lump (75.5%), followed by pain (15.1%), nipple discharge (5.7%), skin changes of breast (0.9%) and others (2.8%). Only 10.4% of the respondents went for alternative treatment before for the breast symptoms. The mean of presentation time was 98.91 (SD = 323.71) days with median of 14.5 days. Approximately, 61.3% of the respondents came within 1-month time. Only 19.8% of the respondents had delay presentation of more than 3 months. The factor that significantly associated with the delay in the presentation was the interpretation of the symptom as not dangerous with adjusted OR 3.05 (95% CI: 1.11, 8.38) with adjustment of the symptom of breast lump

**Conclusion:** The percentage of delay presentation was lower compared to the previous local study in Malaysia. The significant factor associated with the delay for breast care was

the interpretation of the symptom as harmless. The future education program must be targeted and tailored to the local community.

*Supervisor:*  
*Dr Maya Mazuwin Yahaya*

*Co-supervisor:*  
*Professor Dr Norsa'adah Bachok*

## FACTORS ASSOCIATED WITH CHRONIC WOUNDS AMONG SURGICAL WOUNDS IN WOUND CLINIC FROM 2016 TILL 2019 IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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**Background:** Wound management have been a cornerstone in medical field. Wound management have taken leaps and bounds over the years with the latest advancement and products to improvise the healing process. Patients with surgical wounds require wound dressing and long term follow up especially in cases of chronic wound. Patients with chronic wound will undergo wound dressing for long term. Wound care clinic HUSM was establish in 2016 and have actively providing wound care service for patients in HUSM as well as the surrounding neighbourhood. This study is to establish factors associated with chronic wounds among surgical wounds from 2016 till 2019 in HUSM. By identifying the associated risk factors, progression of surgical wound to the chronic wound could be reduced.

**Methods:** A retrospective secondary data of total 147 patients who underwent wound dressing for surgical wounds in wound clinic at HUSM between Jun 2016 and December 2019 was carried out. Initially the data of patients were gained from patient's wound clinic assessment records and entered in a data collection form. Simple random sampling using random number generator (using Microsoft Excel) of all surgical patients with acute surgical wound underwent dressing at wound clinic at HUSM from 2016 till 2019 was done to choose the patients. The demographic and medical history data was obtained from patients summary from the medical record. The primary outcome were to describe the prevalence of chronic surgical wound among acute surgical wound under wound clinic follow-up. Outcome parameters were: healed wound and chronic wound after duration of 3 months. Demographic and medical history of patients (diabetes mellitus, hypertension and coronary artery disease, smoking habits and type of wounds) were analysed as the factors influencing the wound healing of the patients.

**Results:** A total of 147 patients were included into the study and vast majority of them were Malay (96.6%). Eighty of them were less than 55 years old, and more than half were male (52.4%). Sixty patients out of hundred and forty-seven patients were active smoker. More than half of them had diabetes mellitus (72.8%) and hypertension (60.5%)

and only 23.1% had cardiovascular disease. There were 15 patients with clean and clean contaminated wound each. Five patient wound was found to be contaminated and 115 patients had dirty wound. The median initial wound size was 52 cm<sup>3</sup> (interquartile range: 18 cm<sup>3</sup>, 193.5 cm<sup>3</sup>). For patients with chronic wound, the median wound size after 3 months were 4.5 cm<sup>3</sup> (interquartile range: 2.3 cm<sup>3</sup>, 8.5 cm<sup>3</sup>). Significant associations were found in between wound healing time with smoking status ( $P = 0.018$ ), diabetes mellitus ( $P = 0.004$ ) and hypertension ( $P = 0.029$ ). There were more smokers found to have chronic wound (57.1%) compared to patients which wound healed in less than 3 months (35.7%). Besides, patients with diabetes were observed to contribute to higher proportion in chronic wounds (91.4%) compared to acute wound (67.0%). Significant association was found between hypertension and wound healing time where 77.1% of patients with hypertension were observed to have chronic wound compared to 55.4% in patients with normal blood pressure. Apart from that, significant difference was found in initial wound size between patients with wound healing time of less than 3 months vs more than 3 months ( $P < 0.001$ ). Patients with chronic wound were observed to have bigger initial wound compared to patients which wound healed in 3 months.

**Conclusion:** This study showed significant influence of smoking habit, comorbid like diabetes and hypertension as factor that influence the wound healing process and causing more chronic wounds among patients. Significant associations found in between wound healing time with smoking status ( $P = 0.018$ ), diabetes mellitus ( $P = 0.004$ ) and hypertension ( $P = 0.029$ ). Apart from that, significant difference was found in initial wound size between patients with wound healing time of less than 3 months versus more than 3 months ( $P < 0.001$ ). A unit increase in wound size (cm<sup>3</sup>) will increase the odds for chronic wound by 1%.

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