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In this issue:

- Cost Analysis on Ticagrelor Utilisation in the Treatment of Patients with Acute Coronary Syndrome: A Preliminary Study
- Stability of an Extemporaneously Prepared Alcohol-Free Phenobarbitone Oral Suspension

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Malaysian Pharmaceutical Society
16-2 Jalan OP 1/5, 1-Puchong Business Park
Off Jalan Puchong
47160 Puchong
Malaysia
Tel: 6-03-80791861
Fax: 6-03-80700388
Homepage: www.mps.org.my
Email: mps.online@gmail.com

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c/o School of Pharmaceutical Sciences
Universiti Sains Malaysia
11800 Penang
MALAYSIA.
Email: maljpharm@gmail.com

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Editorial

Pharmacists: Meeting the needs of the community

PT Thomas

School of Pharmacy, Taylor's University, 47500 Subang Jaya, Selangor, Malaysia

All statutory professions, by definition, are mandated and given the responsibility by society to take care of their needs. The needs of society will change due to industrialization, new technologies, climate change, prosperity or poverty, war or peace, environmental shifts and so on. It is therefore imperative that professions are aware of these changes and tuned to the needs of society probably even before the needs become apparent.

The pharmacy profession is responding to changes in different ways in various parts of the country. The profession is practiced differently in different countries because the needs of the society are different. In more advanced and developed countries, the pharmacists are being increasingly asked by society to provide primary care. Thus, in number of countries, pharmacists are being asked to play a limited prescribing role, and to provide immunisations and emergency treatment. In other countries pharmacists are being asked to play a greater role in quality use of medicines or comprehensive medication management and are thus involved increasingly in medication use reviews, especially in the elderly. In Malaysia, pharmacists and pharmaceutical services are improving access to medicines by services such as drive-thru pharmacies and sending medicines by post, and also attempting to improve adherence and quality use of medicines.

With great strides being made in the understanding the human genome and its role in health and disease, personalized medicine may not be that far away. Pharmacists will also need to find ways to meet the needs of societies that are struck by natural calamities such as earthquakes and floods and also those that are ravaged by war and strife.

As they have always done, and more so in an increasingly challenging global environment, pharmacists need to make use of their training and education, technology and new medicines and treatments and possibly even move from our “comfort zones” to respond to the needs of society in appropriate and innovative ways.

Cost Analysis on Ticagrelor Utilisation in the Treatment of Patients with Acute Coronary Syndrome: A Preliminary Study

L Anchah^{1*}, AYY Fong^{2,3}, TK Ong³

¹ Department of Pharmacy, Sarawak General Hospital Heart Centre, 94300 Kota Samarahan, Sarawak, Malaysia

² Clinical Research Centre, Sarawak General Hospital, 93586 Kuching, Sarawak, Malaysia

³ Department of Cardiology, Sarawak General Hospital Heart Centre, 94300 Kota Samarahan, Sarawak, Malaysia

* Contact for correspondence, please email: lawrenceanchah@gmail.com

ABSTRACT

Background: Dual therapy with aspirin and clopidogrel is the standard treatment for acute coronary syndrome (ACS). Dual antiplatelet therapy plays an important role in reducing major acute, short- and long-term adverse clinical outcomes. Currently, the economic evaluation of ticagrelor, a reversible and direct-acting oral antagonist of adenosine diphosphate receptor P2Y₁₂ remains unknown.

Objective: To compare the annual cost of ticagrelor versus branded clopidogrel in patients with ACS from a Malaysian health care perspective.

Methods: The data required for this analysis was obtained from a 2007 study carried out by Fong et al. in ACS patients (n=57). Assumptions used for the present analysis were based on data from the Cardiac Rehabilitation Program (CRP) study, the Study of Platelet Inhibition and Patient Outcomes (PLATO) and the National Cardiovascular Disease ACS (NCVD ACS) registry of Malaysia. For all calculations, the Ringgit Malaysia (RM) currency and prices as of 2007 were considered.

Results: The cost of clopidogrel treatment in post-ACS patients for 30 days was calculated to be RM1,381,340 (n=2072; daily cost=RM5.50) and assuming treatment with ticagrelor, the cost would be RM1,554,000 (daily cost=RM8.70). Based on PLATO and NCVD ACS 2007, it was estimated that major adverse coronary event (MACE) in the form of unstable angina (UA) would occur in an additional 21 patients on clopidogrel, which could have been avoided with ticagrelor. Extrapolating cost data from CRP study, it was estimated that the annual costs for 21 additional cases of UA in terms of annual treatment and readmission would be more than RM400,000. Treatment with ticagrelor would thereby be associated with lesser number of MACE that can be translated in avoiding annual costs of treatment of UA and result in annual cost savings of RM238,856.

Conclusion: Although direct comparisons were not made, this analysis suggests that ticagrelor therapy may be a more cost-saving alternative to clopidogrel in Malaysian patients with ACS.

Keywords: ticagrelor, clopidogrel, acute coronary syndrome, cost analysis, major adverse coronary event

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INTRODUCTION

Acute coronary syndrome (ACS) is an important cause of mortality and hospitalisation in Malaysia. It encompasses a range of ischaemic heart diseases, such as unstable angina (UA), non-ST-elevation myocardial infarction (NSTEMI) and ST-elevation myocardial infarction (STEMI). It most commonly occurs due to the rupture, fissuring or ulceration of an atherosclerotic plaque along with thrombosis and coronary vasospasm (1). According to the National Cardiovascular Disease ACS (NCVD ACS) report 2007 and 2008, there were 2851 ACS-related admissions in Malaysia in 2008, of which 54% patients were admitted with STEMI, 23% with NSTEMI and 23% with UA. ACS was more common in males than females, with the former constituting 75% of the ACS-related admissions in 2008. The in-hospital mortality rate associated with ACS during the period from 2006 through 2008 was between 7% and 8% (2). In GRACE study, the median age of ACS patients; with STEMI was 64 years, with NSTEMI was 68 years, and with UA was 66 years. However, in Malaysia according to NCVD ACS report for 2006, 2007, and 2008 the median age of ACS patients with STEMI, NSTEMI and with UA were same at 59 years suggesting that people are getting affected with ACS at a younger age when compared to developed countries. Hence, it is necessary to study different treatment patterns along with associated cost to develop cost analysis strategies for patients of different socioeconomic backgrounds in Malaysia (3).

Acute coronary syndrome is characterised by partial or complete blockage of epicardial coronary artery, which occurs due to a platelet-rich thrombus. Since the prognosis of the condition depends on the activity of platelets, dual antiplatelet therapy is considered necessary to avoid a repeat occlusion in the target vessel after a successful percutaneous coronary intervention (PCI). Until recently, aspirin and clopidogrel were the drugs forming the dual antiplatelet therapy. The antiplatelet activity of clopidogrel is dependent on the formation of the active metabolite from the prodrug. Various genetic or non-genetic factors influence this bioactivation, which takes place in two metabolic reactions in the liver. As a result, clopidogrel is associated with considerable interindividual variation in antiplatelet activity. Delayed and/or insufficient bioactivation causes low- or no-response, thereby leading to adverse cardiovascular outcomes, such as stent thrombosis, recurrent MI, or cardiovascular death (4). The limitations associated with clopidogrel therapy have opened avenues for new antiplatelet agents.

Ticagrelor, an oral and reversible inhibitor of the P2Y₁₂ receptor, belongs to a novel chemical class called cyclopentyl-triazolopyrimidine (5). It is a direct acting agent and has a quicker and more predictable onset of action compared with clopidogrel (4,5). Also, the more rapid neutralisation of ticagrelor's effect allows platelets to resume function more quickly (5).

The Study of Platelet Inhibition and Patient Outcomes (PLATO) was a multicentre, randomised, double-blind trial conducted in 18,624 patients to assess the superiority of ticagrelor over clopidogrel in the prevention of vascular events and death in patients who had ACS with or without ST elevation. This study demonstrated that treatment with ticagrelor was associated with a significant reduction in mortality from vascular causes, myocardial infarction, or stroke as compared with clopidogrel without an increase in the rate of overall major bleeding. However, an increase in the rate of non-procedure-related bleeding was noted with ticagrelor. Based on the PLATO trial, several subgroup analyses were conducted to evaluate the efficacy of ticagrelor in various patient populations. These analyses demonstrated beneficial effects of ticagrelor over clopidogrel in patients with STEMI referred for primary PCI, patients with diabetes, patients undergoing coronary artery bypass graft, and patients with chronic kidney disease. These results provided evidence for inclusion of ticagrelor in European Society of Cardiology guidelines for

ACS without ST elevation and myocardial revascularisation (6).

Economic analyses from the PLATO trial and other studies that compared ticagrelor with clopidogrel in patients with ACS, have suggested that ticagrelor therapy may be more cost-effective than clopidogrel (7-10).

The present study was conducted to assess the cost savings of treatment with ticagrelor for 30 days in Malaysian patients with ACS. This study seeks to supplement expert opinion with empirical data regarding the next potential alternative for antiplatelet therapy in ACS.

METHODS

The study had recruited consecutive patients admitted with ACS at Cardiac Tertiary Referral Centre (CTRC), Sarawak General Hospital, Malaysia (n=57), which is currently known as Sarawak General Hospital Heart Centre and at District General Hospital Sibu, Malaysia (n=32) from 1 October 2007 to 30 November 2007. All patients attended routine pre-scheduled outpatient follow-up 30-days after hospital discharge. For the purpose of this analysis, baseline characteristics and patient outcomes at 30 days were retrieved from this study.

ANALYSIS OF COST SAVING

The cost details captured for this analysis included costs of all medical and non-medical supplies and costs incurred from the perspective of the healthcare provider. For the purpose of this study, it was assumed that reducing the number of events (non-fatal myocardial infarction, non-fatal stroke, severe recurrent ischaemia, UA or other vascular causes) will ultimately reduce the overall cost of treatment.

The incurred cost in treatment of a disease possibly indicates the disease burden and can be measured descriptively through a cost of illness study, which translates the entire burden of resources used in the treatment into a monetary value. Measuring the direct costs during hospitalisation and discharge would be the most ideal approach to identify direct economic burden to health care providers over a period of time. Based on the data obtained from Cardiac Rehabilitation Program (CRP) study, the rate of hospitalisation resulting from ACS was estimated (11). The direct medical costs were calculated by multiplying the number of interventions (drug doses, laboratory tests, procedures, consumables, medical equipments, and other investigations) with the cost per intervention. This direct medical cost correlates with the number of interventions necessitating hospital stay, clinical examination and also on the length of stay with each event of hospitalisation.

Several simplifying assumptions are made to maintain transparency in the model structure. Post-ACS, a patient may be indicated for coronary artery bypass graft (CABG), elective surgery for PCI or medications. Prices as of 2007 are considered for calculations and the currency is Ringgit Malaysia (RM). The economic evaluations are done to compare the two-treatment strategies between those patients with clopidogrel and to those patients who could have been opted to ticagrelor as an alternative ADP inhibitor. The projected potential cost savings for treatments and expected health outcomes of MACE are obtained by comparing the two treatments option. All data used are based on a single clinical trial at Cardiac Tertiary Referral Centre and NCVD database, which are applied to compare the cost and consequences of treatments. Probability of switching to ticagrelor in cost evaluation strategies would help to estimate the exact cost saving in interventions and treatment options particularly in long-term disease management.

Because a range of cost of treatments for ACS was used, there is inevitably some uncertainty in estimated costs incurred for interventions. Sensitivity analysis was therefore conducted. The effect of treatment of MACE, cost of interventions, total cost treatment and other key data in costs of managing ACS were tested.

RESULTS

For this analysis, data related to patients recruited only at CTTC Sarawak was considered as cost details were available only for this hospital. The baseline characteristics of these patients as collected in the study by Fong et al. have been outlined in Table 1 (12).

Table 1: Baseline characteristics of patients with ACS admitted to CTTC Sarawak General Hospital, Malaysia

	n=57	Percentage
Male	41	71.9
Age (mean, years)	58 ± 13	
Ethnic Origin		
Malay	23	40.4
Non-Malay Bumi	12	21.1
Chinese	22	38.6
Diabetes	19	33.3
Hypertension	37	64.9
Smoking (30 days)	14	24.6
Dyslipidaemia	16	28.1
Family history of CAD	7	12.3

ACS, acute coronary syndrome; CAD, coronary artery disease; CTTC, Cardiac Tertiary Referral Centre.

This study provided information on the occurrence rate of major adverse coronary events (MACE) during the first 30 days post ACS. In this study that based on our local setting, we extracted and applied relevant information on cardiovascular death rate and UA incidences unto NCVD ACS database. Among the 57 patients recruited, 7 had a MACE; of which, 4 were cardiovascular deaths and 3 were UA (Table 2). This fraction 4 over 7 (4/7 MACE) can be related to a similar approach presented in NCVD ACS where cardiovascular death rate was 10%. Similarly, UA was seen in a fraction of 3 over 7 MACE or corresponding rate 7.5% MACE in ACS patients post admission in 30 days. Thus, the prevalence rate of total MACE as estimated from NCVD ACS 2007 was 17.5% (12).

Table 2: Patient outcome at 30 days

CTTC	n=57	Percentage
Inpatient mortality	4	7.0
30-day MACEs	3	5.7
Inpatient angiography	28	49.1
Outpatient, elective angiography	5	8.8

CTTC, Cardiac Tertiary Referral Centre; MACEs, major adverse cardiovascular events.

From the NCVD-ACS report 2007 and 2008, it was extrapolated that 65% of all patients with ACS who were admitted for treatment, received a daily maintenance dose of an adenosine diphosphate (ADP) antagonist with or without a loading dose (2). It was assumed that the ADP antagonist given to patients was clopidogrel as during that period the evidence recommended clopidogrel and it was also the only standard drug available (13, 14).

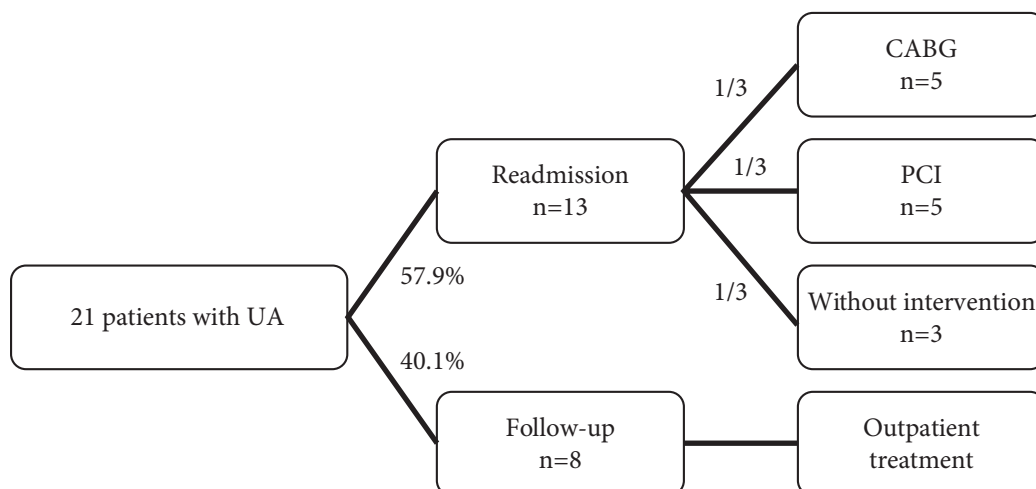
According to the NCVD ACS registry, there were 3,646 cases of ACS in 2007 (2). Of these patients, 2,072 fulfilled the inclusion criteria used in the PLATO study and were used for all cost calculations in this analysis. The daily cost of ticagrelor was higher compared with clopidogrel (RM8.70 vs. RM5.50, respectively). The 30-day drug cost of clopidogrel treatment in Malaysian patients with ACS was calculated to be RM1,381,340. Using the same pool of patients and assuming that ticagrelor was used instead of clopidogrel, the corresponding costs of treatment with ticagrelor would be RM1,554,000. The difference in the costs of the two treatments would be RM172,660 higher for ticagrelor.

The PLATO study demonstrated that there was a relative risk reduction (RRR) of 12.2% in the primary event, favouring the ticagrelor arm at 30 days. The estimated MACE from NCVD ACS 2007 was 17.5% and the rate of MACE could have been reduced to 15.4% if all the ACS population in 2007 were treated with ticagrelor. Based on this information, it is estimated that 158 patients were having MACE when using clopidogrel and only 137 MACE when using ticagrelor.

Thus, there were 21 additional cases of readmission due to UA with clopidogrel treatment (Figure 1).

To calculate the costs of readmission and management of 21 patients with UA, data from CRP study was used. According to CRP study (11), the total direct cost for patients undergoing CABG during the subsequent 12-month follow-up period was estimated to be a median value of RM53,562 and the cost for patients on inpatient coronary angiography during the subsequent 12-month follow-up period was a median value of RM16,620 which was three times less than patients who had undergone CABG (15). Activity based costing (ABC) method was used to determine the direct cost including consumables, medications and all other operational costs associated with treatment. However, indirect cost was not considered to determine the cost for treatment. (Table 3)

Figure 1: Schematic representation of treatment options for unstable angina and probabilities of clinical outcomes



CABG, coronary artery bypass graft; PCI, percutaneous coronary intervention; UA, unstable angina.

Table 3: Estimate direct cost of treatment for ACS patients in clopidogrel group

	Clopidogrel group (CRP study, n=104) ‡
Per patient cost of drugs during admission for ACS, median (range) ††	RM 1,078.45 (95.44–13,559.11)
Estimated per patient cost of optimised medical therapy in a year, median (range) ††	RM 2,731.91 (1,365.26–5,976.96)
From health care perspective the annual estimated direct costs per patient for those undergoing CABG, median (range)	RM 53,562.25 (46,538–61,542)
From health care perspective, the annual estimated direct costs per patient for those undergoing PCI, median (range)	RM 16,620 (4,565–9,182.68)

ACS, acute coronary syndrome; CABG, coronary artery bypass graft; PCI, percutaneous coronary intervention; RM, Ringgit Malaysia; UA, unstable angina

‡ Drug prices based on 2007 market pricing.

†† Cost of pharmaceutical expenditure during admission for quasi-experimental design in CRP study (n=104). Only clopidogrel (Plavix®) was available and indicated for this ACS group.

Translating the findings from the study by Fong et al., of the 21 patients readmitted with UA, as high as 57.9% (13 patients) would be planned for or underwent PCI or CABG within 30 days. It was assumed that an approximately equal number would undergo PCI with drug eluting stent ($1/3 \times 13 \approx 5$ PCI procedures), and CABG ($1/3 \times 13 \approx 5$ CABG) and the rest would be on optimal medical therapy alone. Therefore, the estimated annual costs for 21 cases of UA in terms of re-admissions and treatment would cost the health care provider more than RM400,000. Although the daily cost of ticagrelor treatment is higher, it is associated with lesser number of readmissions when compared with clopidogrel, thereby resulting in annual cost savings of RM238,856 (Table 4).

Table 4: Distribution of the number of long-term prescription medications. (A) Daily cost of ADP inhibitors doses per day; (B) estimated cost of medical therapy in 30 days with ADP inhibitors; (C) estimated cost of medical therapy for 2,072 patients from NCVD registry; (D) the differences in 30 days between the two groups; (E) projected clinical outcomes (MACE) and cost incurred annually after 30 days treatment

	Clopidogrel group††	Ticagrelor	Ticagrelor
(A) Daily cost of ADP inhibitors ‡	RM 5.50 per day	RM 8.70 per day	
(B) Estimated per patient cost of medical therapy for first 30 days after discharge†	RM 666.67	RM 750	
(C) Estimated cost of medical therapy for 2,072 patients from NCVD ACS database in first 30 days after discharge#	RM 1,381,340 (a)	RM 1,554,000 (b)	
(D) Difference in cost of ADP antagonist therapy for 30 days (b-a)			
(E) Estimated total costs incurred for treatments and interventions of 21 patients with UA	RM 411,516* (d)	-	RM 172,660 (c)

NCVD, National Cardiovascular Disease; UA, unstable angina; PCI, percutaneous coronary intervention; RM, Ringgit Malaysia; \$, United States dollar.

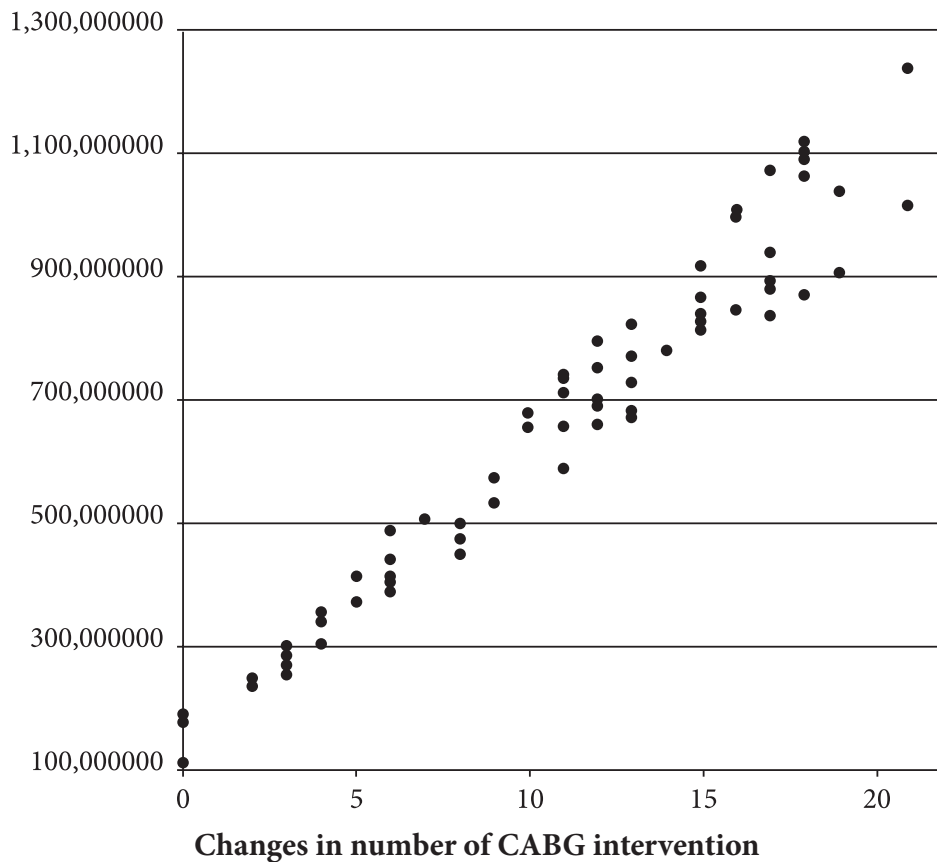
‡ Drug prices based on 2007 market pricing.

† The average medical cost per patient for ACS in first 30 days treatment with clopidogrel was \$194.36 (\$1= RM3.43).

* Approximately higher numbers of patients undergo medical therapy, but equal numbers undergo PCI and CABG.

One-way sensitivity analyses were performed by changing estimated costs within a range of potentially reasonable values all treatment options (CABG, PCI or medication alone) and evaluating whether changes in treatment options of 21 patients with UA modify incurred cost. If total CABG intervention at that year escalates, the total incurred cost of treatment will definitely increase. It can be clearly seen that the overwhelming majority of simulation results are located above of RM400,000. The maximum estimated total incurred cost of treatments could reach to RM1.2 million. The analysis showed that even if we decrease the number of major intervention like CABG, it would not extensively decrease the cost of treatments of MACE. This reflects the significance of using ticagrelor and suggests a high probability of cost avoidance in the treatment of MACE (Figure 2).

Figure 2: Sensitivity analysis: Influence of increase option of CABG in the total cost incurred in treatment of MACE.



DISCUSSION

Acute coronary syndrome, which was initially associated with developed countries, is on the rise in Asia-Pacific countries, including Malaysia (16, 17). In order to reduce the risk of developing ACS and control the associated burden, a comprehensive action plan is required. To this end, the NCVD ACS registry was established in 2006, to capture data of ACS patients in Malaysia (17). According to the NCVD ACS report 2007 and 2008, ACS is affecting the Malaysian population at a much younger age (<50 years) when compared with findings from GRACE. During the period from 2006 through 2008, ACS was associated with in-hospital mortality rates between 7% and 8% (2).

The availability of newer therapies has provided more alternatives to treating physicians. However, physicians must be armed with sufficient knowledge regarding new drugs in order to ensure their optimal usage. This includes not only clinical data regarding the efficacy and safety of the drug, but also data on its cost-effectiveness. This helps in efficient utilisation of the limited health care resources available (18).

Cost analyses based on the PLATO trial have been conducted to determine the cost-effectiveness of 12-month ticagrelor treatment in patients with ACS as compared with clopidogrel (7,8). In one such analysis conducted by Nikolic et al., ticagrelor treatment was associated with a quality-adjusted life years (QALYs) gain of 0.13 and increased costs of €362, yielding a cost per QALY gained of €2753 as compared to generic clopidogrel. The cost per life year gained was €2372. The price of generic clopidogrel considered was €0.06 per day (lowest available price as of July 2011) and that of ticagrelor was €2.21 per day (reimbursed price in Sweden). The cost analysis of ticagrelor was uniform across all subgroups of ACS patients—those with UA, STEMI, NSTEMI, and those planned for invasive management. The study concluded that the cost per QALY gained with ticagrelor treatment in patients with ACS for a 12-month period is within the usually accepted levels for cost-effectiveness (8). Another analysis based on the PLATO trial published previously had shown similar results. The price considered for clopidogrel and ticagrelor for this study was €0.17 per day and €2.25–3.50 per day, respectively (7).

The absence of similar data for countries in Asia, prompted Chin et al. performed a cost-effectiveness analysis of ticagrelor treatment in patients with ACS in Singapore. This study was based on data obtained from the PLATO trial. The daily cost of clopidogrel and ticagrelor considered was 1.05 and 6.00 Singapore Dollar (\$), respectively. The QALY gained with ticagrelor was 0.13 at a lifetime incremental cost of \$1328, yielding a cost per QALY of \$10,136. The study demonstrated that even after considering the low willingness-to-pay threshold in Singapore according to World Health Organisation standards, 12-month treatment with ticagrelor in patients with ACS is likely to be favorable. The lower hospitalisation-related costs with ticagrelor, mainly lower bed-days and lesser interventions, compensate partly for the higher drug cost of ticagrelor (18).

These results are similar to the results obtained in our study. Our study also demonstrates that in Malaysia, treatment with ticagrelor can result in annual cost savings of RM238,856 when compared with clopidogrel. Although there are short-term cost savings with clopidogrel, the trend clearly shows that readmission rates are higher, thereby increasing the overall cost of treatment and cost burden in managing patients in acute setting.

To our knowledge, this cost analysis is the first of its kind to evaluate the cost of ticagrelor compared with clopidogrel in Malaysian patients with ACS. It was carried out to supplement the clinical data on ticagrelor use in Malaysia. It was based on treatment outcomes of ticagrelor from the PLATO trial, prevalence of ACS in Malaysia from NCVD ACS registry and treatment outcomes of clopidogrel in Malaysian patients from a 2-month study in CTRC Sarawak. We

hope that this study will provide a basis for future studies that will estimate the cost saving of ticagrelor by its actual use in Malaysian patients with ACS. Such studies will help guide hospitals and physicians to make informed decisions regarding the usage of ticagrelor in patients with ACS.

LIMITATION

This study has certain limitations. It is limited to a single centre; however, the results are likely to be relevant to cardiac centres outside the state also in terms of intended management strategy (i.e., medical, interventional, or surgical) and clinical events (19, 20). Certain assumptions, which were made for this study, may affect the robustness of results. Also, clinical outcomes of ticagrelor treatment were adapted from the PLATO study and extrapolated to the Malaysian population. This may again affect the results of our analysis as treatment outcomes may vary in different populations.

It is also likely that the incurred costs for treatments and interventions for ACS were underestimated in this analysis as only the perspective of the healthcare providers' was considered. A complete overview of the cost of ticagrelor treatment in patients with ACS could have been obtained, only if we could measure the costs incurred from the societal perspective. In addition, data for this analysis was retrieved from two clinical studies conducted at our local setting and the costs per survivor for post-ACS participants were estimated manually from the anticipated records as the case note, prescription profile, laboratory investigation, and other relevant documents. The cost of branded clopidogrel was considered for this analysis because only the branded drug was available in Malaysia in the year 2007. This might have implications on the cost savings derived from ticagrelor treatment in this analysis.

CONCLUSION

In this analysis, a formal link was established between measures of costs and outcomes of ticagrelor therapy, although direct comparisons cannot be made. This economic analysis suggests that ticagrelor therapy may be a more cost-saving alternative to clopidogrel in Malaysian patients with ACS. However, a head-to-head comparison in larger population may be required to further validate the findings of this study.

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CONFLICT OF INTEREST

None declared.

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Stability of an Extemporaneously Prepared Alcohol-Free Phenobarbitone Oral Suspension

Lian T. Chan*, Lucy Yeoh

Winwa Medical Sdn Bhd, Bukit Mertajam, Pulau Pinang, Malaysia.

* Contact for correspondence, please email: ltchan@winwamedical.com

ABSTRACT

Many drugs used in paediatric are often not available in suitable dosage forms and have to be extemporaneously prepared by pharmacists to make them suitable for the body weight, body surface area, or age of the children. Phenobarbitone is the main anti-epileptic drug (AED) for the treatment of seizure in paediatric patients. The objective of this study is to evaluate the physicochemical and microbiological stability of an extemporaneously prepared Phenobarbitone Oral Suspension using commercially available tablets and X-temp Oral Suspension System. The Phenobarbitone Oral Suspension (10mg/ml) was stored at 4°C and 30°C / 75%RH protected from light and were examined at the interval of 0, 1, 2, 3 and 6 months. The content of Phenobarbitone was determined using a validated high-performance liquid chromatography (HPLC) method. The visual appearance, odour, pH and specific gravity remained fairly unchanged throughout the study period and the content of Phenobarbitone remained above 98% of the original concentration throughout the course of the study for both temperatures. The extemporaneous preparation was not susceptible to microbial contamination. The results from the stability studies confirmed that X-temp Oral Suspension is a suitable suspending vehicle for preparing extemporaneous liquid formulation of Phenobarbitone Oral Suspension with the added advantage of alcohol-free, colourant-free and sugar-free. Based on the data collected, the shelf-life of this liquid formulation is at least 6 months when stored at 4°C (refrigeration) and 30°C / 75%RH (room temperature).

INTRODUCTION

The pharmaceutical industry supplies oral solid dosage forms that are generally inadequate for paediatric needs. Most licensed oral medicines are intended for adults and are presented as tablet or capsule formulations, often in a unit intended as a single adult dose. Some are available as liquids, but have a concentration unsuitable for measuring the dose and administering to the infant or young children (1).

Many drugs used in paediatrics are often not available in suitable dosage forms and have to be extemporaneously prepared by pharmacists to make them suitable for the body weight, body surface area, or age of the children. Paediatric patients are also more vulnerable to the effects of a medication error and may experience a more serious adverse drug reaction than an adult, due to the differences in weight or body surface area and because of the varying ability to metabolize and excrete medications (2).

Pharmacists are often required to prepare the extemporaneous preparation and they also face the challenge to choose an appropriate formula. Ideally, the pharmacist should choose formulation used for extemporaneous preparation with validated stability and proven shelf-

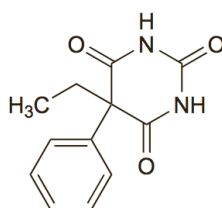
life. However, the information related to the extemporaneous formulations and the stability of the final products are lacking (3,4). When the stability data and validated formulations are not available, further research should be carried out to validate the formulations used in practice whenever possible and then the formulations should be standardized among all the hospitals (5).

Phenobarbitone is highly effective for all forms of epilepsy except typical absences in patients of all ages, including neonates. It is still a main anti-epileptic drug (AED) for neonatal and febrile seizures (if treatment is needed) and established convulsive status epilepticus. It is the main monotherapy AED in resource-poor countries (6).

Phenobarbitone exerts its anti-epileptic activity through multiple modes of action. Its primary effect is probably through its post-synaptic binding to GABA_A receptors. It also blocks voltage-sensitive sodium and potassium channels, reduces presynaptic calcium influx and possibly inhibits glutamate-mediated currents (6).

Phenobarbitone (**Figure 1**) is a white, odourless, glistening, small crystals or a white crystalline powder. It may exhibit polymorphism. Soluble 1 in 1000 of water and 1 in 10 of alcohol; sparingly soluble in chloroform; soluble in ether and in solutions of fixed alkali hydroxides and carbonates. A saturated solution in water has a pH of about 5 (7).

Figure 1: Phenobarbitone



Since licensed medicines represent the ‘gold standard’ for quality, safety and efficacy, the underlying general rule is that a licensed preparation is always preferable to a compounded one (8). However, the currently available commercial oral liquid formulation of Phenobarbitone contains 14% (v/v) alcohol. The American Academy of Pediatrics (AAP) has raised the concern with regard to the alcohol content of various medications. AAP recommended that nonprescription oral liquid preparations contain no more than 5% (v/v) alcohol because of the risk of harmful central nervous system adverse effects (9).

Phenobarbitone Oral Suspension was prepared in hospital practice for the treatment of seizure in paediatric patients. Phenobarbitone has poor solubility (1 mg/ml) but it is freely soluble in ethanol (100 mg/ml). Therefore, for this reason alcohol is often used in Phenobarbitone solutions. For neonates, as well as for children who use Phenobarbitone for the treatment and prevention of seizures, there is a need for an easy to administer liquid oral dosage form of Phenobarbitone without alcohol (10, 11). In order to increase the solubility of Phenobarbitone, a cosolvent system without alcohol should be created using mixtures of various oral cosolvents. Sorbitol, glycerin, propylene glycol, and several polyethylene glycol polymers are cosolvents that are both useful and acceptable in the formulation of oral liquids (10).

To address this problem, a liquid formulation has to be developed whose suitability and stability must be optimized and shelf-life determined. This present study intends to provide

the information and data to help the pharmacist to determine the shelf-life of the extemporaneous preparation of Phenobarbitone commonly prepared in the hospital.

The use of commercially and universally available suspending bases is encouraged, particularly where information on the stability of such bases is available in the literature (12). Commercial available oral liquid vehicles, such as X-temp Oral Suspension System are a convenient choice for pharmacists, since many practice settings may not stock a wide variety of excipients and many of the stability studies in the literature on oral liquids prepared extemporaneously utilize these commercial vehicles (13).

The objective of this study is to evaluate the physicochemical and microbiological stability of extemporaneously prepared Phenobarbitone Oral Suspension and to determine the shelf-life and storage condition of the extemporaneous preparation. This information is important to ensure that the extemporaneous preparation remains stable and efficacious during the course of their use.

MATERIALS AND METHODS

Commercial Drug and Vehicle

The commercially available tablet, Phenobarbitone 30mg Tablet (in blister pack) manufactured by Idaman Pharma Sdn Bhd was sourced for this study. X-temp Oral Suspension System marketed by Pharm-D Sdn Bhd was selected for this extemporaneous preparation. X-temp Oral Suspension System is an oral suspending system specially formulated to assist in extemporaneous preparation of oral liquid, non-soluble (suspended), aqueous dosage forms. It is an orange flavoured, sweetened, alcohol-free, colourant-free, sugar-free vehicle containing suitable preservatives. Furthermore, it also contains cosolvents (sorbitol and glycerin) which is useful for this liquid formulation to increase the solubility of poorly water-soluble substances (10).

Sample Preparation

Phenobarbitone Oral Suspension containing 10mg/ml was prepared using the commercial available tablets. The required numbers of tablet were grounded to a fine powder in a mortar with a pestle. A portion of the vehicle was used to levigate the fine powder to form a uniform paste. Additional vehicle was added to the mortar in small portions and then transferred to a graduated container and more vehicle was added to make the total volume required.

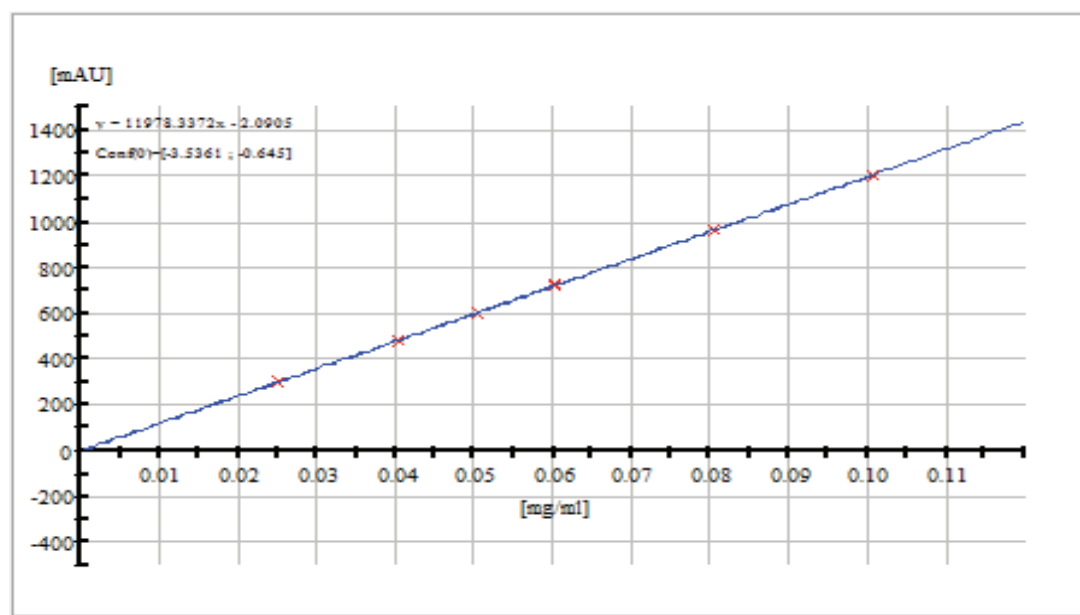
Thirty bottles of Phenobarbitone Oral Suspension (10mg/ml) were packed into 100ml amber high-density polyethylene (HDPE) plastic bottles and were fitted with white polypropylene (PP) screw caps. Twelve bottles were stored at $4 \pm 2^\circ\text{C}$ (refrigeration) and the other eighteen bottles at $30 \pm 2^\circ\text{C} / 75 \pm 5\%\text{RH}$ (room condition) in the absence of light.

Analytical Method and Equipment

The Phenobarbitone content in the oral suspension was assayed throughout the course of the study (0, 1, 2, 3 and 6 months) according to the in-house HPLC method with reference to the British Pharmacopoeia 2014. The analysis was performed using Agilent 1200 RRLC instrument with UV/VIS detector and the content of Phenobarbitone was set at 90 to 110% of the stated amount (14). The HPLC method for the analysis of Phenobarbitone in this study was validated in another study for its specificity, linearity, accuracy, precision and system suitability (**Table 1**). A range performed on the HPLC system has confirmed the linearity of the method ($R^2 = 0.99999$) (**Figure 2**).

Table 1: Results of analytical method validation

Test Parameter	Validation Results	Acceptance Limits
Specificity <u>Identification</u> Comparison with a known reference material <u>Assay</u> Placebo/Matrix analysis	<ul style="list-style-type: none"> ▪ Positive result ▪ No peaks at RT 4 min ▪ No interfering peaks from diluent and placebo were observed ▪ Placebo effect = 0.43% ▪ The placebo effects were found to be insignificant 	<ul style="list-style-type: none"> ▪ Positive control: Positive result ▪ Negative control: Absence of peak at RT 4 min ▪ No interference from excipients ▪ Placebo effect NMT 1.5%
Linearity & Range	<ul style="list-style-type: none"> ▪ $r^2 = 0.9999982$ ▪ Intercept = 0.35% of the response of 100% working concentration 	<ul style="list-style-type: none"> ▪ $r^2 \geq 0.995$ ▪ Y-Intercept at 100% working concentration $\leq 2\%$
Accuracy 9 determination (3 replicates/3 concentrations)	<ul style="list-style-type: none"> ▪ 98.1%, 98.2%, 98.7%, 98.5%, 99.0%, 98.5%, 98.9%, 100.5%, 99.1% 	<ul style="list-style-type: none"> ▪ % Recovery within 95% to 105%
Precision (Repeatability) 6 determinations at 100% working concentration	<ul style="list-style-type: none"> ▪ RSD = 0.66% ▪ CI = $\pm 0.70\%$ assayed 	<ul style="list-style-type: none"> ▪ RSD $\leq 2.0\%$ & CI
Precision (Reproducibility) 6 determinations at 100% working concentration	<ul style="list-style-type: none"> ▪ RSD = 0.50% ▪ CI = $\pm 0.52\%$ assayed 	<ul style="list-style-type: none"> ▪ RSD $\leq 2.0\%$ & CI
Precision (Intermediate Precision/Ruggedness)	<ul style="list-style-type: none"> ▪ RSD in case of comparison = 0.58% ▪ Mean difference = 0.34% 	<ul style="list-style-type: none"> ▪ RSD $\leq 2.0\%$ & CI ▪ Mean difference $\pm 2\%$ & CI
Detection Limit (LOD)	<ul style="list-style-type: none"> ▪ LOD = 0.000225 mg/ml 	-
Quantitation Limit (LOQ)	<ul style="list-style-type: none"> ▪ LOQ = 0.000824 mg/ml 	-
System Suitability a) System precision b) Peak performance	<ul style="list-style-type: none"> ▪ RSD for peak response = 0.07% ▪ RSD for peak retention time = 0.06% ▪ $k' = 1.712$ ▪ Resolution = 26.910 ▪ USP tailing factor = 1.017 ▪ Column efficiency, N = 13525 	<ul style="list-style-type: none"> ▪ RSD $\leq 2\%$ ▪ $k' \leq 1.5$ ▪ Resolution > 2 ▪ USP tailing factor < 2 ▪ Column efficiency, N ≥ 2000

Figure 2: Calibration Curve of the LC assay method

The content of Phenobarbitone was measured by HPLC-UV method after the sample of extemporaneous preparation was made throughout the stability study period. Samples were removed from each individual bottle on 0, 1, 2, 3 and 6 months. A working reference standard of Phenobarbitone was obtained from British Pharmacopoeia Commission, United Kingdom.

The HPLC system used for the analysis was an Agilent 1200 RRLC instrument with binary pump SL, autosampler SL, DAD SL detector, Thermostat Column Compartment SL and chemstation. The chromatographic separation used was Zorbax Eclipse XDB-C18 (4.6mm ID x 150mm, 5 μ m). The DAD detector operated at 230nm. The mobile phase consisted of a mixture of 72 volumes of a mixture of 0.1M disodium hydrogen phosphate (Na₂HPO₄) and 0.026M potassium dihydrogen phosphate (KH₂PO₄) phosphate buffer adjusted to pH 7 with 10% (v/v) orthophosphoric acid 85% and 28 volumes of acetonitrile. The mobile phase was delivered at a flow rate of 1ml/min. Samples were filtered before HPLC analysis and the injection volume as 5 μ L.

Physicochemical Stability

The analyses of physical and chemical testing (such as visual appearance, odour, pH, specific gravity and active content) which could possibly change during storage were assessed at 0, 1, 2, 3 and 6 months. Prior to sample removal, the bottles were agitated on a rotating mixer for 30 minutes. The oral suspension was examined at each sample time for any change in appearance (colour and clarity) or odour. The pH was determined using a pH meter at initial and 1, 2, 3 and 6 months during storage for both temperatures. The preparation is considered stable if physical characteristics have remained fairly unchanged and the assay of Phenobarbitone content has remained equal or above 90% of the original concentration during the study period.

Microbiological Stability

Microbiological stability of the Phenobarbitone Oral Suspension stored at the two different storage conditions (4°C and 30°C) was studied at the interval of 0, 1, 2, 3 and 6 months. The microbial limit test was designed according to the British Pharmacopoeia 2014 for non-sterile products to determine whether the total bacteria, total fungi and *Escherichia coli* (*E. coli*) in the extemporaneous preparation complies with the established specifications for microbiological quality of this type of product (15).

RESULTS AND DISCUSSION**Physicochemical Stability**

The visual appearance and odour of the Phenobarbitone Oral Suspension remained the same throughout the 6 months at 4°C and 30°C and no precipitation was observed in any of the samples (**Table 2**). The results from this study also confirmed that the pH values and the specific gravity of the extemporaneous preparations remained fairly constant at both temperatures (**Table 3**).

Table 2: Visual appearance and odour of Phenobarbitone Oral Suspension					
Visual Appearance (Colour and Clarity)					
Time (Month)	0	1	2	3	6
4°C	White to off-white & opaque	White to off-white & opaque	White to off-white & opaque	White to off-white & opaque	White to off-white & opaque
30°C	White to off-white & opaque	White to off-white & opaque	White to off-white & opaque	White to off-white & opaque	White to off-white & opaque
Odour					
Time (Month)	0	1	2	3	6
4°C	Orange	Orange	Orange	Orange	Orange
30°C	Orange	Orange	Orange	Orange	Orange

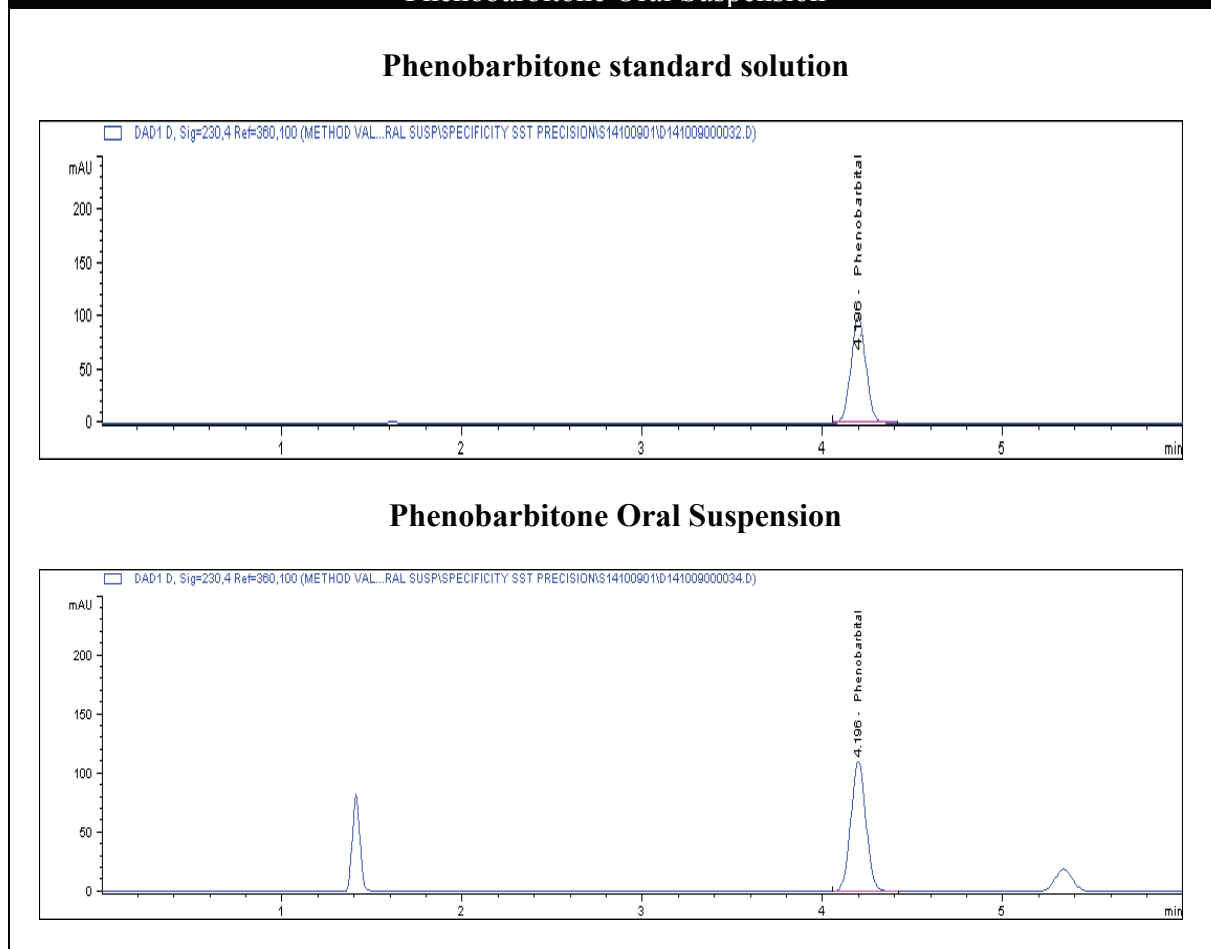
Table 3: pH and specific gravity of Phenobarbitone Oral Suspension					
pH					
Time (Month)	0	1	2	3	6
4°C	4.115	4.145	4.061	4.182	4.128
30°C	4.115	4.159	4.151	4.182	4.105
Specific Gravity					
Time (Month)	0	1	2	3	6
4°C	1.0322	1.0284	1.0393	1.0427	1.0426
30°C	1.0322	1.0323	1.0294	1.0423	1.0406

The Phenobarbitone content in all the samples were above 98% throughout the 6 months for both temperatures (**Table 4**) and were relatively stable in acidic pH. There were no significant differences in the assay results between the two storage conditions to establish any possibility of degradation during storage even though the rate of chemical degradation usually increases with temperatures (16). The chromatograms illustrated below showed that the HPLC method to be selective for the purpose of this study with minimal interference from the excipients in the formulation (**Figure 3**). The chromatograms of tested samples at the different intervals throughout the stability study period revealed no other peak that could be attributed to a possible degradation compound.

Table 4: Concentration of Phenobarbitone Oral Suspension

Assay					
Time (Month)	0	1	2	3	6
4°C	98.5%	98.2%	98.8%	101.5%	102.2%
30°C	98.5%	99.9%	100.0%	100.7%	101.3%

Figure 3: Chromatograms of Phenobarbitone standard solution and Phenobarbitone Oral Suspension



The above results confirmed that the temperature has little effect on the physical and chemical stabilities of the active content in the Phenobarbitone Oral Suspension. Storage in the refrigerator may not be considered necessary.

Microbiological Stability

No microbial contamination was observed in all samples of Phenobarbitone Oral Suspension during the 6 months study period for both temperatures (**Table 5**) and the results confirmed that the microbial quality was within the established test limits according to the British Pharmacopoeia. The total viable aerobic bacteria count was kept low and total yeast and mould count was also low. *E. coli* was absent throughout the study period. These results showed that the preservatives of the extemporaneous preparation were effective against bacteria and fungi and the Phenobarbitone Oral Suspension is microbiologically stable at both temperatures for up to 6 months.

Table 5: Microbial results of Phenobarbitone Oral Suspension

Microbial Limit (4°C)					
Time (Month)	0	1	2	3	6
Total aerobic microbial count	<10cfu/g	<10cfu/g	<10cfu/g	<10cfu/g	<10cfu/g
Total yeast & moulds count	<10cfu/g	<10cfu/g	<10cfu/g	<10cfu/g	<10cfu/g
<i>Escherichia coli</i>	Conforms	Conforms	Conforms	Conforms	Conforms
Microbial Limit (30°C)					
Time (Month)	0	1	2	3	6
Total aerobic microbial count	<10cfu/g	<10cfu/g	<10cfu/g	<10cfu/g	<10cfu/g
Total yeast & moulds count	<10cfu/g	<10cfu/g	<10cfu/g	<10cfu/g	<10cfu/g
<i>Escherichia coli</i>	Conforms	Conforms	Conforms	Conforms	Conforms

CONCLUSIONS

An extemporaneously prepared Phenobarbitone Oral Suspension using X-temp Oral Suspension System is stable for at least 6 months when packed in amber HDPE bottle with plastic screw cap at 4°C (refrigeration) and 30°C / 75%RH (room condition). This liquid formulation is also microbiologically stable throughout the course of the study which is critical for the safe use of extemporaneous preparations in paediatric patients. The results from the stability studies confirmed that X-temp Oral Suspension is a suitable suspending vehicle for preparing extemporaneous liquid formulation of Phenobarbitone Oral Suspension. This formulation is not only stable but has the added advantage of alcohol-free, colourant-free and sugar-free.

The extemporaneous preparation of Phenobarbitone Oral Suspension can now be prepared with ease by pharmacists in the hospital practice by using X-temp Oral Suspension System supported by stability data and proven shelf-life.

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**ABSTRACT OF THE 12th MALAYSIAN PHARMACEUTICAL SOCIETY -
PHARMACY SCIENTIFIC CONFERENCE 2015**

Pharmacists: Meetings the Needs of Community

Date: 13th-15th November 2015

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PLENARY 1

Individualized Therapy: How Far Away Are We?

Kenneth S. Ramos

Department of Medicine, University of Arizona Health Sciences, Arizona, United States

Precision medicine has emerged as a healthcare delivery platform that emphasizes the individualization of care through the integration of novel technologies and approaches into the diagnosis, treatment and clinical management of patients and populations. A major driver has been the sobering reality that healthcare, as we know it today, will not be sustainable in the long term without novel approaches that help to augment diagnostic precision and accuracy and that deliver targeted therapies that improve efficacy. Pharmacogenetic testing has been proposed as a means to individualize therapy and optimize therapy and this presentation will highlight the strengths of this approach and the challenges that remain to widespread adoption of individualized modalities in healthcare delivery.

PLENARY 2

Are Pharmacists' Ready for Disaster Relief?

A Halim Hj Basari

Health Services Division, Malaysian Armed Forces HQ, Ministry of Defence, Malaysia

It is inspiring to note that pharmacists in Malaysia had been involved in disaster relief work be it nationally and internationally. However much of the work by the military and emergency pharmacists in missions for Humanitarian and Disaster Relief (HADR) had gone pretty much unnoticed. This is because much of the work were done by individuals on a voluntary basis and by the Non-Governmental Organizations (NGO) in an isolated manner. Pharmacists from the military and public services sectors had contributed in HADR before but these actions only by the orders of the National Security Council. There is no reason to confine HADR initiatives only to certain pharmacy quarters by certain orders. There is a need of the community for the pharmacist at large to take stock of the importance and urgency of HADR initiatives, the pharmacy associations to adopt appropriate policies, the pharmacy academia or special interest group to develop theoretical framework and guidelines for such activities, the unsung pharmacy heroes to document the challenges of various HADR missions and for the pharmacy actors to share and present their lessons learnt for a better and holistic HADR approach. HADR missions are not truly the responsibility of just the military and emergency pharmacists. It is the responsibility of all healthcare professionals especially pharmacists because they are the custodian of a very unique discipline for the community's consumption. To be ready for such HADR activities requires the appropriate knowledge, skills and attitude (KSA). This KSA can be learnt and pharmacy associations can take the lead to create the appropriate strategy for pharmacists to get more involved in alleviating disaster victims' pharmaceutical care, healthcare and basic humanitarian needs.

PLENARY 3

Education of Pharmacists: Should we all be PharmDs?

Surakit Nathisuwan

Faculty of Pharmacy, Mahidol University, Thailand

Decades of debate have been ongoing about to what extent and scope of pharmacy education should be. Recent movement toward patient-oriented education for pharmacist leads to the expansion and integration of clinical pharmacy into core competency of pharmacy education. A division between those who have a vision of “pharmacy as a clinical profession” and those who see “clinical pharmacy as a specialty” still lingers and provoke intense debates in many corners of the world.

For Thailand, the Pharmacy Council issued a decree to end its approval for the 5-year Bachelor of Science curriculum and demanded a nationwide change toward the 6-year Doctor of Pharmacy (PharmD) curriculum. Key reasons for such changes were exponential growth in scientific content, demand for improvement in pharmacy graduate readiness to work and a desire to push for higher standard of pharmacy graduate.

Multiple intense debates and heated discussions during public hearings soon followed. Opponents of such movement also provided strong arguments. Example of those arguments were limited availability of qualified preceptors, imbalance of clinical faculty members versus those in basic sciences/product-oriented sciences, financial burden to parents for additional year of education, fear of indifference between 5-year versus 6-year graduates and differential competitiveness of former graduates and new graduates. It was clear that this was a controversial issue in Thailand’s pharmacy circle.

In April 2015, the first cohort of 6-year pharmacy graduates entered the job market nationwide. Feedback from employees started to flow in and will be systematically evaluated. Outputs from such evaluation along with findings from educational committees supervising national licensing examination and preceptors feedbacks will be instrumental in the critical evaluation of 6-year curriculum of Thailand.

For any nation, the decision to change its professional degree is complex in nature and requires thorough examination of key national context. In general, graduates must possess the basic knowledge, skills, attitudes, and values to practice pharmacy, independently, at the time of graduation. The key discussion therefore lies in the designation of scope of pharmacy practice of a pharmacy graduate entering into practice. Such scope will vary from one society to another. If any change is intended, preparation and readiness for such change must be done to ensure smooth transition and success to meet the changing demand of the society.

PLENARY 4

Role of Health Economics in Pharmacy Practice in Malaysia

Asrul A Shafie

School of Pharmaceutical Sciences, Universiti Sains Malaysia, Penang, Malaysia

In the age of increasing cost of healthcare, changing pharmacy practice, ageing population, and severe shortage of healthcare human resources, now more than ever is an urgent need to assess the scarce resources that we have in order to produce the maximum output of health. Pharmacy professionals, policymakers and administrators frequently found themselves in the cross road to determine the growth, efficient use, and allocation of resources. Economic discipline offered natural empirical solution to these three central problems – from understanding their existence to looking at optimizing its use. Pharmacy practice in Malaysia needs to embrace the discipline not only to be abreast with global trend in applying the tool, but also in solving the three perennial problems in the sector: How much resources are we using to produce health? How much health are we using? How to get the maximum health at the lowest cost?. Previous attempts to solve the three questions were unsuccessful because of the fundamental analytical weakness or inability to translate research findings into practice. Therefore, the objective for this address is threefold: first is to give an overview of health economic principles; second is to explore its potential in solving the problems, taking example of local and international evidences; and finally is to ponder ways to enhance its role in Malaysia pharmacy practice

SYMPOSIUM 1

Emerging Global Diseases: How Should Healthcare Professionals Prepare?

Irma N. Ramo

University of Arizona, Arizona, United States

Despite extraordinary advances in the development of new diagnostics, therapeutics, and vaccines, emerging and re-emerging diseases continue to be a challenge in the 21st century. The emergence of communicable and non-communicable diseases is multifactorial and highly complex, and driven by the human host, microorganisms, and the environment, to list a few. Among the modern demographic and ecologic conditions that favor the spread of disease are the rapid expansion of population growth; increasing poverty and urban migration; frequent movements across international boundaries by tourists, workers, immigrants, and refugees; alterations in the habitats of animals and arthropods that transmit disease; increasing numbers of persons with impaired host defenses; and changes in the way that food is processed and distributed.

Emerging and re-emerging diseases know no physical boundaries and represent a threat to all nations, communities, and individuals regardless of age, sex, lifestyle, ethnic background, and economic status. Of note in this regard is the importance of having a strong infrastructure that supports health departments, academic health centers, federal agencies, health care providers, public health systems and international organizations. A strong infrastructure should involve national and international collaborations to allow for development of better crafted plans to reduce the morbidity and mortality associated with disease.

As health care providers we need to be well prepared to recognized and address the negative health outcomes of emerging global diseases impacting the world. It is key to recognize the importance of communication, education, cultural awareness and information exchange with patients and their caregivers, prescribers, and other healthcare professionals. Worldwide, due partly to accessibility, affordability and trust, pharmacists are often the first point of contact with the healthcare system. As such, pharmacists play a central role in the provision of healthcare, the conduct of biomedical research, and the implementation of disease prevention and management strategies within the healthcare system and beyond.

SYMPOSIUM 2

Interprofessional Learning towards Collaborative Practice

Mohamad Haniki Nik Mohamed

Kulliyah of Pharmacy, International Islamic University Malaysia, Kuantan, Pahang, Malaysia

The World Health Organization (WHO) defines interprofessional education (IPE) as the occurrence of two or more health or social professions learning interactively about, from and with each other, all with the common goal of enabling effective collaboration and improving patient health outcomes. IPE prepares students towards collaborative practice in healthcare which occurs when professionals from different specialties provide comprehensive services by working with patients, their families, carers and communities to deliver the highest quality of care across all settings. IPE is applicable to healthcare professional students in the classroom as well as in clinical placements and these efforts should ideally involve both present and future healthcare workers. Interprofessional initiatives should begin before graduation or registration and should persist through the course of the career via continuing professional development (CPD). Progressive practices and development are currently seen in Australia, part of Europe and North America. However, in Malaysia, IPE is yet to be implemented at most of the teaching institutions. Challenges towards implementation of IPE need to be identified and addressed. Readiness towards IPE among students and lecturers of local universities offering health-related programmes must first be assessed as buy-in from relevant stakeholders is crucial to ensure sustainability. Last but not least, on-going research in IPE is needed to further strengthen correlation between IPE with positive patient outcomes.

SYMPOSIUM 3

Fusion of Knowledge Based and Natural Product Research to Meet the Needs of the Community

Habibah A Wahab

School of Pharmaceutical Sciences, Universiti Sains Malaysia, Penang, Malaysia

Natural products have been consistently successful sources of new drugs. As a country blessed with mega-biodiversity, the prospect for discovering new drugs from 15,500 flowering species grown in Malaysia, coupled with rich knowledge of traditional uses of herbal remedies cannot be understated. However, to leverage this biodiversity for discovering new active pharmaceutical ingredients is still a great challenge. In recent years, we see the tremendous increase in community interest in plant-centred healing. However, many of the herbal products available in the market still lack definite and complete information about the composition of extracts, especially on the safety and efficacy of the compositions.

In meeting the need of the community, our pharmaceutical research will highlight the development of MyNature50000 and CURINAP, a centralised natural product library developed in IPharm and USM, respectively. These libraries aim to facilitate the need to share our physical library of natural products, knowledge, expertise and experience to take natural product research to a new level. In addition, an integrated system, NADI which means “pulse of life” in Malay language is a Natural Based Discovery resource has been developed with intended aim as a one-stop center for in silico drug discovery from natural products. NADI also provides plethora on information of traditional knowledge in the use of medicinal herbs. The library and database’s application in natural product drug discovery will be demonstrated through its application in the discovery of new potential anti-infectives (e.g. in influenza and dengue infections).

SYMPOSIUM 4

A Closer Look at Biofilm-Targeted Wound Delivery Systems for the Treatment of Chronic Wound Infections

Shiow-Fern Ng

Centre for Drug Delivery Research, Faculty of Pharmacy, Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia

Chronic wounds are defined as a break in the skin of at least six weeks that fail to progress through a normal wound healing path. Bacteria are present on all open wounds, and the wounds become clinically infected when the host defenses are overwhelmed. If a wound infection is not managed properly, the bacteria may manifest into the systemic circulation and cause the patients to become septicaemic. Wound infections are generally considered treatable by the administration of antibiotics; however, this is not always effective due to the high-level antibiotic resistance found today. It is now established that microbial biofilms are largely responsible for the recalcitrance of many infections to conventional antimicrobial therapy. Biofilm is defined as a structured community of bacterial cells adhered to a surface. Once attached, the biofilm secretes an extracellular polymeric substance (EPS) that is nearly impervious to host defenses and resistance to antibiotic therapy. Bacterial biofilms are one of the reasons why chronic wound infections do not heal. Research shows that biofilms delay wound healing significantly and have been identified in association with a number of chronic wound, including diabetic wounds, venous stasis ulcers, and pressure sores. One of the strategies to overcome the biofilm barrier is the use antibiofilm agents. Antibiofilm agents are important in targeting the biofilm cells through interfering with the communication of cells, their metabolism as well as disrupt the protective matrix of biofilm. It was proposed that the efficacy of antibiotics for wound infections could be optimised via the inhibition of bacterial biofilm growth in wounds. The combination of antibiofilm agent and antibiotics in a wound drug delivery system may be a plausible strategy in wound infection management.

ORAL PRESENTATIONS**Clinical Pharmacy**

No	Presenting Author	Title
CPO 01	Abdul Nazer Ali, Assoc Prof	Knowledge Evaluation on Human Papilloma Virus (HPV) Infection and HPV Vaccination among Parents
CPO 02	Arwa Mohamed Amin Mostafa, Ms	The Frequency of Clopidogrel High on Treatment Platelets Reactivity (HTPR) among Coronary Artery Disease (CAD) Patients undergoing Interventional Angiographic Procedure
CPO 03	Hamza Mohamed Amin Mostafa, Mr	Identification of Alcohol-Dependence Biomarkers in Urine by using Metabolomics Analysis
CPO 04	Khoo Su Pei, Ms	Prevalence, Risk Factors and Management of Hyperlipidemia among HIV-Infected Individuals Receiving Treatment
CPO 05	Lau Yi Yeen, Ms	Polypharmacy and Risk Factors among Older HIV-Infected Individuals in University Malaya Medical Centre (UMMC)
CPO 06	Lo Yoke Lin, Dr	Application of Pharmacometrics in Hospitals
CPO 07	Law Bee Keng, Ms	Medication Discrepancies upon Discharge among Adult Patients in Queen Elizabeth Hospital: A Pilot Study
CPO 08	Lim Li Min, Ms	Polypharmacy and Risk Factors among Urban Community-Dwelling Elderly in Malaysia.
CPO 09	Mohd Farizh bin Che Pa, Mr	Prevalence of Infection after Disease Modifying Antirheumatic Drugs (DMARDs) Treatment in Rheumatoid Arthritis Patients in Negeri Sembilan
CPO 10	Nabila Perveen, Mdm	A Study on the Herbal Drugs Utilization in Pregnant Women in Two Hospitals of Sungai Petani, Kedah Darul Aman
CPO 11	Negin Naderifar, Ms	The Prevalence of Psychiatric Disorders among Patients Suffering from Nightmares
CPO 12	Tahir Mehmood Khan, Dr	The Use of Handheld Computers for Accessing Medical Mobile Applications and Investigative Tools (MAP-IT) Among Pharmacists in Malaysia
CPO 13	Sim Szyuin, Ms	Retrospective Analyses of Bleeding Associated with Novel Oral Anticoagulants (NOACs) in Patients in a University-Affiliated Tertiary Care Hospital
CPO 14	Nur Syafiqah Mohd Jeffri, Ms	Patient's Expectations of Methadone Maintenance Therapy (MMT) in an Urban Integrated Community-Based MMT Clinic
CPO 15	Tan Yean Hoon, Ms	The Impact of Fish Oil and Non-Fish Oil Based Lipid Emulsion on Liver Function among Surgical Patients Requiring Parenteral Nutrition (PN) in Hospital Selayang

Pharmacy Practice / Social Pharmacy

No	Presenting Author	Title
PPO 01	Siti Nadiah Abdul Rahim, Mdm	Skin Medications: The Impact of Specialized Counselling by Pharmacists in Psoriasis Management
PPO 02	Annushiah a/p Vasanthakumar, Ms	How Do Malaysians Define Health-Related Quality of Life (HRQoL)?
PPO 03	Che Suraya Zin, Dr	Patterns of Opioid Prescribing for Treating Pain in Patients with Different Age and Gender: A Retrospective Cross Sectional Study
PPO 04	Dayana Nicholas, Ms	Why Impaired Quality of Life in Epileptic Patients?: A Cross-Sectional Study
PPO 05	Ho Yiing Ee, Mdm	Influences of a Pilot Pictogram-Incorporated Label for Liquid Medications on Understanding, Dosing Accuracy and Preferences among Caregivers in Malaysia
PPO 06	Kang Pei Wen, Ms	Knowledge of Students from Non-Medical Faculties of a Public University on the Methods of Contraception
PPO 07	Lua Pei Lin, Prof	Feasibility and Acceptability of My Electronic Personal Health Record Monitor (MY-ePHRM)
PPO 08	Amrahi bin Buang, Mr	Guidelines for Use of Non-Halal Medicines for Muslim Patients
PPO 09	Ooi Guat See, Dr	Assessment of Malaysian Community Pharmacists Involvement in Extended Pharmacy Services
PPO 10	Mohd Ikhwan Bin Hashim, Mr	Setting Up a Hospital Based Nuclear Pharmacy Service- AMDI Experience
PPO 11	Yeo Keh Hau, Mr	Customers Satisfaction towards Community Pharmacists Professional Practice in Malaysia
PPO 12	Zaswiza Mohamad Noor, Dr	Optimising Community Pharmacy Intervention in Managing Sleep Disorders: Extended Roles of Community Pharmacists
PPO 13	Shalini Sivadasan, Ms	A Survey on Knowledge, Attitude and the Perception (KAP) of Pharmacovigilance and Adverse Drug Reactions (ADRs) Reporting among the Healthcare Students in a Private University

Pharmacy Education

No	Presenting Author	Title
PEO 01	Long Chiau Ming, Dr	Impact and Perception of E-learning: Pre-post Survey and Evaluations
PEO 02	Tahir Mehmood Khan, Dr	Pharmacy Students' Interprofessional Perceptions towards the Pharmacy Profession
PEO 03	Nor Ilyani Mohamed Nazar, Dr	Students' readiness for and Perception towards Inter-Professional Learning: A Cross Sectional Study

Pharmaceutical Chemistry

No	Presenting Author	Title
PCO 01	Ravichandran Veerasingam, Dr	Green Synthesis of <i>Parkia speciosa</i> Mediated Silver Nanoparticles - Characterization and Evaluation of Its Antibacterial and Antioxidant Potential
PCO 02	Ayesha Fatima, Ms	Combined Docking and Molecular Dynamics Provide Insights into the Trypanosoma Purine Salvaging Pathway Inhibitors
PCO 03	Neeraj Kumar Fuloria, Assoc Prof. Dr	Evidences of Antitubercular Potential of Novel Thiazolidinone Derivatives Bearing Chloroxylenol Moiety
PCO 04	Narendra Babu Shivanagere Nagojappa, Dr	Design and Synthesis of Acetylcholinesterase Inhibitors Targeting Alzheimer's Disease

Traditional and Complementary Medicine

No	Presenting Author	Title
TCMO 01	Gawry A/P Paramasivam, Ms	Complementary and Alternative Medicine (Cam) Use Among Liver Disorder Patients at an Outpatient Clinic in University Malaya Medical Centre
TCMO 02	Soh Yee Cheng, Ms	Perspective of Practitioners on Reflexology: A Qualitative Approach

Pharmaceutical Technology

No	Presenting Author	Title
PTO 01	Shalini Somasundaran Reveenderan, Ms	A Mechanistic Insight in Ketaconazole Soluplus Solid Dispersions

Military Pharmacy

No	Presenting Author	Title
MPO 01	Mohd Adlan Bin Adnan, Colonel	The Haiyan Super Typhoon in Philippines - Malaysian Military Pharmacist Experience
MPO 02	Mohammad Firdaus bin Yaacob, Major	Kelantan Flood: Role of Military Pharmacist in a Forward Hospital
MPO 03	Mohamad Halif bin Mohamad Yusof, Major	A Drug Utilization Review of Selected Antibiotics in the Medical Wards at Hospital Angkatan Tentera Tuanku Mizan

Pharmacology

No	Presenting Author	Title
PGO 01	Pitchai Balakumar, Assoc Prof. Dr	Differential Effects of Pre and Post Treatments with Low-Dose Dipyridamole in Aminoglycoside-Induced Nephrotoxicity in Rats
PGO 02	Praveen Thaggikuppe Krishnamurthy, Dr	A Glitazone with an Overall Glucose Control Potential: A Serendipitous Finding
PGO 03	Subramani Parasuraman, Dr	Effect of Ursolic Acid on Olanzapine Induced Obesity in Sprague Dawley Rats
PGO 04	Yew Chow Ping, Mr	<i>In vitro</i> Evaluation of the Anticancer Properties of the (1S, 2S)-1-Phenyl-2-(Phenylamino)Propane-1,3-Diol Derivative (RB4)
PGO 05	Md. Moklesur Rahman Sarker, Assoc Prof	Shiitake Mushroom: Potential Glycemic Control Activity on Alloxan- and Glucocorticoid-Induced Diabetic Long-Evans Rats

CLINICAL PHARMACY

CPO 01

MPSPSC2015000117 (Oral)

Knowledge Evaluation on Human Papilloma Virus (HPV) Infection and HPV Vaccination among Parents

NA Ali¹, S Sivadasan¹, XR Ng¹, MB Bahari¹, A Sarriff²

¹*Faculty of Pharmacy, AIMST University, Semeling, Kedah, Malaysia*

²*School of Pharmaceutical Sciences, Universiti Sains Malaysia, Penang, Malaysia*

The objective of this study was to assess the knowledge, attitude and practice regarding HPV infection and vaccination among the parent population with children aged >9 and <26 years in Kedah state, Malaysia. The study was conducted using pre-validated questionnaire in two phases, first at baseline and second post intervention using educational pamphlets. The completed questionnaires from both phases were analysed using SPSS version 20. A total of 1000 survey forms were distributed in phase 1 and 871 were retrieved back giving a response rate of 87.10%. In Phase 2, the questionnaire was distributed to the phase I respondents among which 619 responded giving a response rate of 71.06%. Thus, a total of 619 participants were included in Phase I and II of the study. It was found that 266 (43%) participants were male and 353 (57%) were female. Out of the 619 respondents, 55.57% were from urban area and 44.43% were from rural area. The results also showed that 39 (6.3%) were Malay, 502 (81.1%) were Chinese, 72 (11.6%) Indians and 6 (1%) were from other race. The overall score was tabulated for the 10 knowledge based questions and it was found that only 28.11% had excellent knowledge in phase I whereas, 72.4% had excellent knowledge in phase II. The study concludes that a short and focused education intervention can help literate, affluent parent to make a decision regarding HPV vaccination for their children.

CLINICAL PHARMACY

CPO 02

MPSPSC2015000025 (Oral)

The Frequency of Clopidogrel High on Treatment Platelets Reactivity (HTPR) among Coronary Artery Disease (CAD) Patients undergoing Interventional Angiographic Procedure

AMA Mostafa¹, SC Lim¹, MA SK Abdul Kader², O Ismail², DA Mohamed Noor¹, KH Yuen¹, B Ibrahim¹

¹*School of Pharmaceutical Sciences, Universiti Sains Malaysia, Penang, Malaysia*

²*Cardiology Department, Hospital Pulau Pinang, Penang, Malaysia*

Clopidogrel is an antiplatelet drug which is crucial for coronary artery disease (CAD) patients undergoing interventional angiographic procedure, particularly those with stent placement. However, clopidogrel use is hindered by patients' variable response. Patients with clopidogrel high on treatment platelets reactivity (HTPR) might have recurrence of cardiac events and death. This study aimed to evaluate the frequency of clopidogrel HTPR among CAD patients undergoing interventional angiographic procedure with or without stent placement. A total of 71 CAD patients planned for interventional angiographic procedure were recruited. Patients were loaded with clopidogrel 600mg and their platelet function testing (PFT) was done after 6 hours of loading. The PFT was assessed using the VerifyNow system P2Y12 testing kit. The cutoff point of HTPR was a PRU value more than 208. Out of the 71 patients, 30 (42.3%) were Malays, 22 (31.0%) were Chinese and 18 (25.4%) were Indians. In terms of gender, 59 (83.1%) were men. Of the study sample, 27 (38%) patients were suffering from clopidogrel HTPR and these were 10/30 (33.3%) of the Malay, 9/22 (40.9%) of the Chinese and 8/18 (44.4%) of the Indian. As HTPR might lead to the recurrence of cardiac events, the frequency indicated in this study could be considerably high. The ongoing identification of genetics and non-genetics factors associated with the HTPR and the pharmacometabonomics analysis of plasma and urine for identifying novel biomarkers of clopidogrel response may help in finding the optimum personalized antiplatelet therapy.

CLINICAL PHARMACY

CPO 03

MPSPSC2015000002 (Oral)

Identification of Alcohol-Dependence Biomarkers in Urine by using Metabolomics Analysis

HMA Mostafa¹, AMA Mostafa¹, NH Arif², CH Teh³, V Murugaiyah¹, B Ibrahim¹

¹*School of Pharmaceutical Sciences, Universiti Sains Malaysia, Malaysia*

²*Psychiatry Department, Hospital Pulau Pinang, Malaysia*

³*Bruker (Malaysia) Sdn Bhd*

The main clinical methods to diagnose Alcohol-dependence (AD) in clinical practice currently depend on AD assessment questionnaires and some biomarkers such as Carbohydrate-Deficient Transferrin (CDT) and Gamma Glutamyl Transferase (GGT). These two methods have been shown to lack specificity and sensitivity. Metabolomics technique using nuclear magnetic resonance spectroscopy (NMR) of urine can help us identify novel biomarkers which could provide a more accurate diagnosis of AD. Therefore, the aim of this study was to identify biomarkers in urine which can discriminate between alcohol-dependent, social drinkers and controls using metabolomics approach. Urine samples were collected from 30 alcohol-dependent (mean age: 45.7), 54 social drinkers (mean age: 39.5) and 60 controls (mean age: 37.1). Urine was mixed with phosphate buffer and then analyzed using NMR spectroscopy. Data analysis was done using multivariate analysis including principal component analysis (PCA) and orthogonal partial least square discriminate analysis (OPLS-DA) to develop a model to identify AD biomarkers. PCA-X plot showed a similarity between social drinkers and control groups, however, alcohol-dependent group was clearly distinct from them. After the combination of social drinkers and controls groups in one group, the OPLS-DA was done by comparing the combined group to the alcohol-dependent group. The OPLS-DA model showed a clear separation between the two groups with 97.25% specificity, 86.21% sensitivity, and 94.93% accuracy. In conclusion, the applied urine metabolomics technique was able to differentiate with good accuracy between alcohol-dependent and social drinkers and controls. The identification of the discriminating metabolites is ongoing.

CLINICAL PHARMACY

CPO 04

MPSPSC2015000052 (Oral)

Prevalence, Risk Factors and Management of Hyperlipidemia among HIV-Infected Individuals Receiving Treatment

SP Khoo¹, SF Omar², RI Azwa², A Kamarulzaman², R Rajasuriar^{1,2}

¹Department of Pharmacy, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia

²Centre of Excellence for Research in AIDS (CERiA), Kuala Lumpur, Malaysia

Hyperlipidemia among HIV-infected individuals is a significant problem as it is associated with an increased risk of metabolic syndrome and cardiovascular disease in this population. Management of hyperlipidemia in HIV-infected individuals is further complexed by the significant drug interactions between standard antiretrovirals (ART) and statins which are commonly used to treat hyperlipidemia. This study aimed to determine the prevalence of hyperlipidemia in HIV-infected individuals, associated risk factors and treatment outcomes. This retrospective study was conducted in University of Malaya Medical Centre and included 256 patients receiving ART and had at least one lipid profile done throughout their follow-up. The prevalence for hyperlipidemia was assessed and risk factors were analysed using multivariate logistic regression. Treatment outcomes were assessed by calculating the percentage of reduction/increment for each lipid parameter and achievement of target goals. The majority of patients were male (86.7%) and virologically suppressed (80.9%). The prevalence of hyperlipidemia was high in our cohort, 74.6% and body mass index ($p=0.006$) was the only risk factor associated with hyperlipidemia. Unlike other studies, we did not find increased age, current smoking, Type 2 Diabetes Mellitus, and the use of protease inhibitors and efavirenz to be associated with hyperlipidemia in our cohort. Most of the patients (81.1%) achieved their target goals within 12 months of initiating drug or dietary interventions. Hyperlipidemia was highly prevalent in treated HIV-infected patients. Although most patients achieved their target treatment goals, greater efforts to prevent the development of this disease through life-style change is warranted.

CLINICAL PHARMACY

CPO 05

MPSPSC2015000051 (Oral)

Polypharmacy and Risk Factors Among Older HIV-Infected Individuals in University Malaya Medical Centre (UMMC)

YY Lau¹, S Ponampalavanar^{2,3}, H Sulaiman^{2,3}, A Kamarulzaman^{2,3}, R Rajasuriar^{1,3}

¹*Department of Pharmacy, University of Malaya, Kuala Lumpur, Malaysia*

²*Infectious Diseases Unit, University Malaya Medical Centre, Kuala Lumpur, Malaysia*

³*Centre of Excellence for Research in AIDS (CERiA), University of Malaya, Kuala Lumpur, Malaysia*

Polypharmacy among older individuals is a serious issue as it is associated with adverse drug events, non-adherence and drug-drug interactions. Polypharmacy is of greater concern in those with HIV-infection due to their burden of antiretroviral medication and their increased risk of multiple age-related comorbidities. The aim of this study was to identify the prevalence and risk factors of polypharmacy, and prevalence of potentially inappropriate medications (PIMs) use and drug-drug interactions (DDIs) among older HIV-infected patients in UMMC. We retrospectively reviewed the medical records of all patients who were ≥ 50 years and who were on active follow up at the Infectious Diseases Clinic in University Malaya Medical Centre (UMMC). Polypharmacy was defined as being on ≥ 5 medications, PIM use was assessed according to the BEERS criteria and DDIs by the Lexicomp drug interaction software. Logistic regression was used to assess risk factors associated with polypharmacy. A total of 224 patients were included with a median (interquartile range) age of 55 (52-59) years. We found 58.5% of patients experienced polypharmacy, 14% with Category D or Category X DDIs and 5% with PIMs. The most common medication classes associated with PIMs were anticholinergics (28%), benzodiazepines (16%) and alpha blockers (16%). In multivariate analysis, the risk factors associated with polypharmacy were smoking, current AIDS, hepatitis B co-infection and increasing number of comorbidities ($p < 0.05$ for all co-variables). A high prevalence of polypharmacy was found in older HIV-positive adults and these patients would benefit from interventions including formal medication review services to improve medication utilisation.

CLINICAL PHARMACY

CPO 06

MPSPSC2015000028 (Oral)

Application of Pharmacometrics in Hospitals

YL Lo¹, LL Yeap¹, YC Sow^{1,2}

¹*Department of Pharmacy, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia*

²*Faculty of Pharmacy, Universiti Teknologi MARA, Selangor, Malaysia*

Pharmacometrics is the science which deals with quantitative description of disease, drug effects and variability by integrating and applying mathematical and statistical models jointly to facilitate decision making in drug development. The role of pharmacometrics in clinical trials during drug development is well recognized globally by pharmaceutical manufacturers and pharmaceutical control and licensing authorities such as the US Food and Drug Administration and the European Medicines Agency. Special populations such as children especially premature neonates, older adults and pregnant women, however, are often excluded in the Phase II or Phase III clinical trials during the process of bringing new drugs to patients. The application of pharmacometrics has therefore gained popularity in healthcare facilities in recent years. Pharmacokinetic-pharmacodynamic (PKPD) and disease progression modeling allows clinicians to understand better the pharmacology of a drug in altered physiologic or pathologic state and the biology of the disease of interested. This understanding will lead to a more efficient use of drug therapy. Since pharmacometrics is still a relative new field in this region including Malaysia, the aim of this presentation is to give an introduction to pharmacometrics, to describe different components of pharmacometrics and to discuss some examples of applications of pharmacometrics in assessing altered pharmacokinetic parameters in special populations, or in patients receiving treatments that may alter the PKPD of a drug; and formulating dosing recommendations, as well as linking biomarkers to outcome events using a modeling and simulation approach.

CLINICAL PHARMACY

CPO 07

MPSPSC2015000012 (Oral)

Medication Discrepancies Upon Discharge Among Adult Patients in Queen Elizabeth Hospital: A Pilot Study

BK Law¹, CP Chong²

¹Dept of Pharmacy, Queen Elizabeth Hospital, Sabah, Malaysia

²School of Pharmaceutical Sciences, Universiti Sains Malaysia, Penang, Malaysia

This prospective observational pilot study was conducted over a 4-week duration in a tertiary referral hospital in Kota Kinabalu, Sabah. The aim was to determine the percentage of medication discrepancy upon discharge (MDUD) in internal medicine wards and to identify the predictors for MDUD. Almost half of the study population (49%) was found to have MDUD and 40% were discharged with at least one unintentional medication discrepancy. The most common type of unintentional MDUD was omission (42.5%), followed by incomplete prescription (20%) and inappropriate/incorrect dose (12.5%). Nutrition and blood was the therapeutic class that most involved in MDUD (37%), but 60.9% of it were intentionally made by the prescriber, followed by cardiovascular and gastrointestinal drug (19% and 16%, respectively) regardless of the intention. The only predictor for MDUD and medication error was the number of discharge medications (adjusted OR: 1.277, 95% CI: 1.083 to 1.507, $p = 0.004$ and adjusted OR: 1.344, 95% CI: 1.0903 to 1.658, $p = 0.006$, respectively). Difference in the definition used for the percentage and types of MDUD made comparison among studies difficult. Multi-factorial causation for MDUD needs to be investigated in order to determine the importance of clinical pharmacist in discharge process especially in a hospital setting. The problem of unintentional MDUD is not uncommon and may lead to the negative clinical impact of patient's outcome if it is not addressed. Almost half of the patients were discharged with at least one medication discrepancy. Longer discharge medication list results in a higher chance of MDUD and medication error.

CLINICAL PHARMACY

CPO 08

MPSPSC2015000095 (Oral)

Polypharmacy and Risk factors Among Urban Community-Dwelling Elderly in Malaysia.

LM Lim¹, SB Kamaruzzaman², SS Chua¹, R Rajasuriar^{1,3}

¹*Department of Pharmacy, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia*

²*Department of Medicine, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia*

³*Centre of Excellence for Research in AIDS (CERiA), University of Malaya, Kuala Lumpur, Malaysia*

Polypharmacy has been associated with increased morbidity and mortality in elderly. The aim of this study was to determine the prevalence and risk factors associated with polypharmacy, potentially inappropriate drug (PID) use and potential drug-drug interactions (PDDI) in a cohort of urban community-dwelling elderly in Malaysia. This study involved the participants recruited in the Malaysian Elders Longitudinal Research (MELoR) from November 2013 to June 2014. Included were individuals aged 55 years and above, residing in Klang Valley and were on at least one medication. Participants were interviewed using a structured questionnaire. Polypharmacy was defined as concurrent use of five or more medications. PID use was analysed based on BEERS criteria. PDDI included Class D or Class X interactions assessed using Lexi-Interact drug interaction software. Risk factors associated with polypharmacy, PID use and PDDI were determined using multivariate logistic regression. A total of 505 participants were included in this study. The majority were Indians (39.8%) and females (56.2%). The prevalence of polypharmacy was 49.9%. The risk factors associated with it were older age, Indian ethnicity, more than one comorbidities, poorer self-rated health state and higher number of supplements. The prevalence of PID use was 16.6% and PDDI was 24.8%, with increasing number of drugs being the only significant risk factor for both outcomes. In conclusion, a significant proportion of these elderly were exposed to polypharmacy, PID use and PDDI. The use of supplements contributed significantly to polypharmacy. Medication reviews are warranted in the elderly to reduce polypharmacy, PID use and PDDI.

CLINICAL PHARMACY

CPO 09

MPSPSC2015000064 (Oral)

Prevalence of Infection after Disease Modifying Antirheumatic Drugs (DMARDs) Treatment in Rheumatoid Arthritis Patients in Negeri Sembilan

MF Che Pa¹, H Mat Zaid¹, NL Mohd Danil¹, S Aziz Bahaman¹, N Mohd Noor²

¹*Department of Pharmacy, Hospital Tuanku Ja'afar, Seremban, Negeri Sembilan, Malaysia*

²*Department of Medical, Hospital Tuanku Ja'afar, Seremban, Negeri Sembilan, Malaysia*

Rheumatoid arthritis (RA) is a chronic inflammatory disease associated with high morbidity and at least a twofold increase in mortality. There were reports of increased infection in RA patients on Disease Modifying Antirheumatic Drugs (DMARDs), but limited studies were found on its prevalence in Malaysia. The aim of the study was to determine the prevalence of infection after DMARDs treatment. The objectives of the study was to determine type of infections and hospital admission of RA patients treated with DMARDs. An observational retrospective study was done on all current RA patients on DMARDs attending Rheumatology Clinic in Hospital Tuanku Ja'afar, Seremban (HTJS) from January 1994 to September 2014. The data were analyzed using SPSS version 22.0 for descriptive statistics and statistical significance was tested using Chi square test ($p < 0.05$). Prevalence of infections was 86.6% among 180 RA patients on DMARDs, and there were 6.5% of hospital admissions due to infections. The most common type of infections was upper respiratory tract infection (URTI) with 262 events (67.7%). Prevalence of infection with use of different DMARDs was compared and was found to be statistically significant. As a conclusion, the prevalence of infection in RA patients on DMARDs is high. RA patients on DMARDs should be counseled on precautionary measures to reduce risk of infection.

CLINICAL PHARMACY

CPO 10

MPSPSC2015000105 (Oral)

A Study on the Herbal Drugs Utilization in Pregnant Women in Two Hospitals of Sungai Petani, Kedah Darul Aman

N Perveen¹, NH Khan², G June³, A Sharriff¹

¹*School of Pharmaceutical Sciences, Universiti Sains Malaysia, Penang, Malaysia*

²*Faculty of Pharmacy, Quest International University Perak, Ipoh, Perak, Malaysia*

³*Consultant Obstetrics and Gynaecology, Pantai Hospital, Sungai Petani, Kedah, Malaysia*

Malaysia is a multiracial nation consisting of three main races along with other minority racial groups. The predominant race being Malays (50.2%), followed by Chinese (24%) and then Indians (7.0%). Malaysians consume approximately RM1.2 billion worth of imported herbal products annually. Herbal drugs are part of the culture and belief for cure and maintenance of health in Malaysia. A total of 450 pregnant women from Sultan Abdul Halim Hospital and Pantai Hospital, Sungai Petani, Kedah, Malaysia were interviewed. The results showed that 85.8% of the respondents used herbal drugs. The highest utilization of herbal drugs was within age group of 31-35 years (38.5%). Less qualified respondents utilized more herbal drugs (49.9%) compared to the rest. Working respondents (56.1%) also utilized herbal drugs more than non-working respondents. Outpatient respondents (n=242, 53.8%) utilized more herbal drugs compared to the rest. Respondents utilized herbal drugs for vomiting and to ease labour: 33 (6.1%) and 21 (3.9%), respectively. The cost effectiveness and time saving factors were strongly agreed by 223 (49.6%) and 209 (46.4%) respondents, respectively. The respondents from Sultan Abdul Halim Hospital, 73.2% utilized herbal drugs compared to 26.8% from Pantai Hospital. Most of the respondents (50.4%) used external preparations. More than one type of herbal drugs was utilized by 66 respondents (14.7%). Nutritional supplements were also used with herbal drugs by 219 (48.7%) respondents.

CLINICAL PHARMACY

CPO 11

MPSPSC2015000102 (Oral)

The Prevalence of Psychiatric Disorders among Patients Suffering from Nightmares

N Naderifar¹, F Hashemian², A Sharifi³, S Pashang⁴

¹*School of Pharmacy, Islamic Azad University, Pharmaceutical Sciences Branch, Tehran, Iran*

²*School of Pharmacy, Clinical Pharmacy Department, Islamic Azad University, Pharmaceutical Sciences Branch, Tehran, Iran*

³*Iranian Scientific Society of Clinical Hypnosis, Tehran, Iran*

⁴*Psychology Department, Islamic Azad University, Pharmaceutical Sciences Branch, Tehran, Iran*

Nightmares are extremely frightening dreams by which the person wakes up with a detailed memory (usually involving threats to survival or security) followed by a quick orientation afterward. With a view to etiology, nightmares might be idiopathic or associated with disorders such as Post Traumatic Stress Disorder (PTSD), Nightmare disorder, drug induced and some psychiatric illnesses. Genetics and gender play an important role in the prevalence of nightmare. This study was conducted to assess the prevalence of psychiatric disorders among patients complaining of nightmares in a counseling institute. During the 9 months of investigation, a total of 26 patients complained of nightmares, including 4 males and 22 females aged 17 to 53 years. Four patients were on propranolol, a nonselective beta blocker that may induce nightmares. All patients were diagnosed by a psychiatrist as followed: 7 patients diagnosed with depressive disorder, 5 with mixed anxiety and depressive disorder, 4 with bipolar mood disorder, 3 with nightmare disorder, 2 with generalized anxiety disorder, 2 with migraine headaches, 1 with Obsessive Compulsive Disorder, 1 with Claustrophobia and 1 with Conversion Disorder. It was previously shown that females experienced more nightmares compared to males, maybe due to normal differences in physiological characteristics. In this study, most of the psychiatric patients who complained of nightmares were those diagnosed with Depressive Disorder. These results may suggest further studies to determine appropriate pharmacological and/or non-pharmacological interventions for the treatment of nightmares among this group of patients.

CLINICAL PHARMACY

CPO 12

MPSPSC2015000065 (Oral)

The Use of Handheld Computers for Accessing Medical Mobile Applications and Investigative Tools (MAP-IT) among Pharmacists in Malaysia

NA Apidi¹, DD Lee¹, PSM Lai², TM Khan³, LC Ming^{1,4}

¹*Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Puncak Alam, Selangor, Malaysia*

²*Department of Primary Care Medicine, University Malaya Primary Care Research Group (UMPCR), Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia*

³*School of Pharmacy, Monash University Malaysia, Bandar Sunway, Selangor, Malaysia*

⁴*Brain Degeneration and Therapeutics Research Group, Pharmaceutical and Life Sciences CoRE, UiTM, Shah Alam, Selangor, Malaysia*

Handheld computers (HHCs) such as smartphones and tablets are providing a variety of drug information (DI) applications to assist pharmacist's decision making in the clinical and hospital setting. Thus, the current study aimed to assess the use of electronic DI resources via HHCs by pharmacists in Malaysia using the newly developed Medical Mobile Applications and Investigative Tools (MAP-IT). This study also aimed to investigate the pharmacists' perception towards the DI content and functions of mobile medical applications. A convenience sampling method was adopted to invite pharmacists (n=450) working in various sectors such as hospitals, drug approval authority, and academia to participate in this online survey. A 36-item questionnaire was administered and data were summarized and presented using descriptive statistics. Overall, 213 respondents (95.1%) were active HHCs users in their daily clinical practice. About 194 respondents (86.6%) disclosed that they often use HHCs for searching DI. Dosage recommendations (n=198; 88.4%), adverse drug reactions (n=153; 68.3%), and drug interactions (n=146; 65.2%) were the most common DI retrieved. General dosage recommendation, pediatric dosage recommendation and dosage recommendation for renal failure were ranked as the most important DI in mobile medical application and the most popular applications used for drug related medical information was Micromedex[®], followed by Lexicomp[®] and Medscape[®]. In conclusion, the use of HHCs of DI among pharmacists in Malaysia was high. Gaining access to the latest information on drugs and clinical practice were regarded as the most important functions of the mobile medical app.

CLINICAL PHARMACY

CPO 13

MPSPSC2015000027 (Oral)

Retrospective Analyses of Bleeding Associated with Novel Oral Anticoagulants (NOACs) in Patients in a University-Affiliated Tertiary Care Hospital

S Sim¹, SA Beshir¹, KH Chee², YL Lo¹

¹*Department of Pharmacy, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia*

²*Department of Medicine, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia*

Novel oral anticoagulants (NOACs) are commonly used for the prevention or treatment of thromboembolic events. Despite their proven efficacy, significant bleeding risk remains a concern. The objectives of this study were to determine the frequency, characteristics and predictors of bleeding events in patients receiving NOACs in a university-affiliated tertiary care hospital. The demographic, clinical data, including bleeding episodes, and laboratory test results of patients who received NOAC therapy at the University of Malaya Medical Centre were reviewed. Data were collected until the date of death or April 2015. The primary outcome measure was the presence or absence of a bleeding event after initiation of NOAC therapy. Bleeding events were categorized as major bleeding, clinically relevant minor bleeding and minor bleeding, depending on the bleeding sites and the severity. A total of 192 patients with atrial fibrillation or venous thromboembolism receiving NOAC therapy were recruited. Twenty four patients (12.5%) and 33 bleeding events including two fatal cases were observed. Nine patients had recurrent bleeding episodes, but none of them bled more than two times. Bleeding sites mainly involved the gastrointestinal tract. The median times to the first bleeding event of dabigatran and rivaroxaban were 6 and 4 months, respectively. Liver disease (OR 3.381; 95% CI:1.298-8.273, p=0.012) and renal impairment (OR 2.791; 95%CI:1.149-6.780, p=0.023) were significant bleeding risk predictors. NOAC-associated bleeding events may not be frequent, but they could be fatal. Therefore, identifying and close monitoring of high risk patients with liver or renal impairment are of vital importance.

CLINICAL PHARMACY

CPO 14

MPSPSC2015000162 (Oral)

Patient's Expectations of Methadone Maintenance Therapy (MMT) in an Urban Integrated Community-Based MMT Clinic

NS Mohd Jeffri¹, AS Mohd Anuar¹, S Alwi¹, NA Mohd Salleh², V Pillai²

¹*Department of Pharmacy, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia*

²*Centre of Excellence Research in AIDs (CERiA), University of Malaya, Kuala Lumpur, Malaysia*

This cross sectional survey aimed to explore patients' expectations of methadone maintenance therapy (MMT) and to investigate the impact of MMT on risk behaviors, housing and employment status. A total of 189 patients from an urban integrated community-based MMT clinic were recruited to answer a validated questionnaire. This study showed that patients were hoping that MMT would help them to completely stop using illicit drugs (98.4%), to get them a job (83.1%) and a better housing (72%), to provide them a better quality of life for themselves and their families (98.4%), to prevent them from getting involved in crime (95.8%) and to reduce high risk activities such as needle sharing (93.1%). These expectations were not correlated with the duration of MMT and the patients' MMT dose. None of these patients claimed to revert back to needle sharing activities for the past one month, although 27 (14.3%) patients still use illicit drugs occasionally. The number of homeless patients has reduced significantly from 10.6% to 0.6% since started on MMT and these patients have either moved back in with family (10 patients) or being accepted to stay in a controlled environment such as Cure and Care Service Centre (CCSC) hostels (6 patients). The number of unemployment also reduced significantly by 17.5% from 35% and most of these patients (24 patients) have been accepted for full-time employment with one patient continuing back his tertiary education. As a conclusion, this study showed that MMT patients have high expectations and MMT has improved their social functions and quality of life.

CLINICAL PHARMACY

CPO 15

MPSPSC2015000077 (Oral)

The Impact of Fish Oil and Non-Fish Oil Based Lipid Emulsion on Liver Function among Surgical Patients Requiring Parenteral Nutrition (PN) in Hospital Selayang

YH Tan, NA Kamaruzaman, BL Toh, ZL Zaki, YY Loh, N Abdul Wahab, Z Zakaria, Z Zahid
Hospital Selayang, Selangor, Malaysia

This retrospective study aimed to investigate the impact of fish oil and non-fish oil based lipid emulsion on liver function among surgical patients requiring parenteral nutrition (PN) in Hospital Selayang. A total of 205 patients who were on the PN bag throughout year 2013 were included. Electronic medical records were reviewed to obtain the following parameters: weight, height, BMI, length of hospital stays (days), duration on PN bag (days), type of PN bag (with or without fish oil) and liver profile including bilirubin, ALP and ALT. Our study showed that there were significant differences of the type of PN bag on bilirubin and ALP but not ALT levels. About 89.24% of the surgical patients who were on PN bags without fish oil ($p < 0.05$) experienced increment in bilirubin, ALP and ALT levels when compared to the baseline levels. About 90.04% of the surgical patients who were on PN bags with fish oil ($p < 0.05$) showed a reduction in the bilirubin, ALP and ALT levels when compared to the baseline levels. Also, significant difference was observed ($p < 0.05$) in the duration of parenteral nutrition on bilirubin, ALP and ALT levels in surgical patients receiving both PN bags with and without fish oil. As a conclusion, PN bags with fish oil seem to show a more favorable effect on the liver profiles.

PHARMACY PRACTICE / SOCIAL PHARMACY

PPO 01

MPSPSC2015000112 (Oral)

Skin Medications: The Impact of Specialized Counselling By Pharmacists in Psoriasis Management

MSA Kassim, SN Abdul Rahim, DT Yaziz, AE Esahak Ayub, SA Idrus

Pharmacy Department, Hospital Sultanah Bahiyah, Alor Setar, Kedah, Malaysia

Treatment for psoriasis disease is complex. Successful treatment depends largely on patient's capacity to manage his/her disease and adherence to the prescribed drug regimen. Literatures show that pharmacists' involvement is minimal in this area, largely due to a lack of knowledge. This study aimed to investigate the impact of psoriasis education on pharmacists and the outcome of specialized pharmacist counselling on psoriasis patients. The current study was a quasi-experimental study which involved psoriasis patients on topical treatment, who had their follow-up at the skin clinic and pharmacists, who worked at the Pharmacy Department of Hospital Sultanah Bahiyah. Knowledge of pharmacists before and one month after they have attended a seminar on psoriasis therapy was assessed (n=50). Meanwhile, selected psoriasis patients were assessed for knowledge, medication compliance, and health-related quality of life (HQL) before and one month after specialized counselling by trained pharmacists. Knowledge of pharmacists improved significantly after the seminar ($p < 0.0001$). Patients' knowledge, medication compliance and HQL also improved significantly post specialized counselling ($p < 0.0001$). The findings of this study showed that psoriasis education significantly improved pharmacist' knowledge in this area, and there was a significant impact of pharmacists' involvement in the management of psoriasis disease. Pharmacists can be trained further, and should be actively involved in educating psoriasis patients alongside other healthcare providers.

PHARMACY PRACTICE / SOCIAL PHARMACY

PPO 02

MPSPSC2015000104 (Oral)

How Do Malaysians Define Health-Related Quality of Life (HRQoL)?

A Vasan Thakumar, AA Shafie, CJ Lim

School of Pharmaceutical Sciences, Universiti Sains Malaysia, Penang, Malaysia

The usage of EuroQol's EQ-5D instrument has been rising in Malaysia. However, cultural differences between Malaysia and the countries involved in the development of the EQ-5D instrument may render a slightly varied concept in the definition of health-related quality of life (HRQoL). Identifying these differences and subsequently adding to the EQ-5D instrument as additional dimensions, or bolt-ons will aid in capturing the HRQoL needs of Malaysians. This study aimed to study the adequacy of EQ-5D-5L in describing the HRQoL of Malaysians and to explore possible bolt-ons to supplement the current instrument. This study was carried out in two phases. In phase one, two focus group discussions were employed to gauge the perception of Malaysians on the dimensions deemed suitable additions to the EQ-5D-5L instrument. These were then structured to the current EQ-5D-5L format. Phase two involved testing the appropriateness of bolt-ons to the EQ-5D descriptive instrument using a cross-sectional survey of 100 general public. A total of 11 bolt-ons were identified including sleep, vitality, happiness, close relationships, stress, mental abilities, social support, religion, vision, hearing, and speaking. Results from the survey showed bolt-ons 'vitality' and 'stress' stood out from the other dimensions with 70% (70) and 64% (64) participants reported facing problems respectively, demonstrating potential HRQoL needs that the EQ-5D-5L instrument might be lacking to capture in Malaysians. The HRQoL concept of Malaysians might be seen to encompass a wider scope than covered by the EQ-5D instrument with vitality and stress having most potential for bolt-ons in future studies.

PHARMACY PRACTICE / SOCIAL PHARMACY

PPO 03

MPSPSC2015000100 (Oral)

Patterns of Opioid Prescribing for Treating Pain in Patients with Different Age and Gender: A Retrospective Cross-sectional Study

CS Zin¹, NS Ab. Rahman¹, CR Ismail¹, LW Choy²

¹*Kulliyah of Pharmacy, International Islamic University Malaysia, Kuantan Campus, Jalan Sultan Ahmad Shah, Bandar Indera Mahkota, 25200 Kuantan, Pahang*

²*Jabatan Farmasi, Hospital Tengku Ampuan Afzan (HTAA), Jalan Tanah Putih, 25100 Kuantan, Pahang*

Opioid utilization has been increasing over the last few decades and little is known about the patterns of opioid prescribing in different gender and age. This study aimed to investigate patterns of opioid prescribing for pain treatment in patients with different age and gender. A cross-sectional study was conducted at the Outpatient Pharmacy of Hospital Tengku Ampuan Afzan Kuantan (HTAA). Prescription records for four opioids (dihydrocodeine, fentanyl, morphine and oxycodone) issued between January 2013 and December 2014 were examined. Outcome measures included number of patients and prescriptions, age, gender and types of opioid. All analyses were performed using Stata 13 (Stata Corp LP, Texas, USA). Overall, 270 patients were prescribed with opioid analgesics from 2013 to 2014. Of these, 121 (44.8%) were women and 149 (55.2%) were men. The predominant age groups for women and men were 51-65 and 66-80 years old, respectively. During the same period, 481(44%) prescription for opioid analgesics were for women and 612(56%) for men. Oxycodone was the most frequently prescribed opioid in both women and men (39.5% vs 38.6%), especially for younger patients (<40 years old), followed morphine (38% vs. 28.1%), dihydrocodeine (15% vs. 20.2%) and fentanyl (7.48% vs.13.1%). Prescriptions for opioid analgesics were predominant in men compared to women primarily for age group 66-80 years old. Oxycodone was the most frequently prescribed opioid in both genders and mostly in the younger patients. Further research is required to explore the indication of opioid analgesics and its related clinical outcomes.

PHARMACY PRACTICE / SOCIAL PHARMACY

PPO 04

MPSPSC2015000141 (Oral)

Why Impaired Quality of Life in Epileptic Patients: A Cross-sectional Study

D Nicholas^{1,2}, A Sarriff², T Palanivelu³, MB Bahari¹, K Nelson⁴

¹*Department of Clinical Pharmacy & Pharmacy Practice, Faculty of Pharmacy, AIMST University, Semeling, Kedah, Malaysia*

²*Department of Clinical Pharmacy, School of Pharmaceutical Sciences, University Sains Malaysia, Penang, Malaysia.*

³*Department of Medicine, Hospital Sultan Abdul Halim, Sungai Petani, Kedah, Malaysia.*

⁴*AIMST Staff Apartment, AIMST University, Semeling, Kedah, Malaysia.*

Quality of life (QoL) in patients with epilepsy is affected by various health related factors. The current cross-sectional study was carried out to evaluate the factors affecting QoL and strategies to improve QoL in epileptic patients at various locations in Sungai Petani, Kedah. Participants were recruited and interviewed at secondary health care centres. A total of 212 epileptic patients were enrolled into the study with age range between 19 to 80 years. Each epileptic patient completed a standard questionnaire (QOLIE-31) in English or Malay. Pre-test was carried out with 20 participants; results obtained from the questionnaire showed an internal consistency reliability coefficient of 0.783 for each scale of the questions. The study concluded that the effects of medications were the most affected domains in epileptic patients. The lack of knowledge among epileptic patients had indirectly inflicted worries among the patients, where patients worried and doubted on things that they did not understand. Patient education was carried out with the enrolled patients on the improvement of quality of life. Healthcare professionals should provide further education to patients with epilepsy, who are under treatment and follow-up.

PHARMACY PRACTICE / SOCIAL PHARMACY

PPO 05

MPSPSC2015000111 (Oral)

Influences of a Pilot Pictogram-Incorporated Label for Liquid Medications on Understanding, Dosing Accuracy and Preferences among Caregivers in Malaysia

HK Chan, EA Mohd Nain, YE Ho, ZW Ng, LL Cheah

Pharmacy Department, Hospital Sultanah Bahiyah, ALor Setar, Kedah, Malaysia

In Malaysia, patients always rely on medication labels as the only source of written medication information. This pilot project aimed to assess the possible influences of a newly designed, pictogram-incorporated label on caregivers for young children. This was a two-arm experimental study undertaken in a state general hospital, which primarily serves the local rural population. The study included caregivers (N=63) with children aged 1 month to 8 years, who received a liquid antibiotic. They were randomized to receive a pictogram-incorporated label (intervention, n=32) or an original text-only label (control, n=31) along with the pharmacist verbal education. Face-to-face interviews were conducted to assess their understanding about medication instructions, dosing accuracy and preferences for the new label. The overall error rates for both understanding and dosing accuracy assessment ranged from 6.3 to 36.5%. Intervention group showed fewer errors in knowledge assessment on dose (6.2% versus 29%; p=0.017), duration of treatment (6.2% versus 35.5%; p=0.004) and storage conditions (9.4% versus 35.5%; p=0.013). Pictogram-incorporated label significantly reduced measurement errors using oral syringes (odds ratio: 0.192 [95% confidence interval: 0.037, 0.990]). A majority of the caregivers (58.7%), particularly those with only secondary education levels or below, expressed their preferences for the pictogram-incorporated label over text-only label. Used with oral syringes and pharmacist verbal education, pictogram-incorporated label resulted in improved medication knowledge and decreased dosing errors. High preferences among caregivers supported its utility in the hospital pharmacy.

PHARMACY PRACTICE / SOCIAL PHARMACY

PPO 06

MPSPSC2015000088 (Oral)

Knowledge of Students from Non-Medical Faculties of a Public University on the Methods of Contraception

PW Kang, SS Chua

Department of Pharmacy, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia

The World Health Organization estimated that 210 million pregnancies occurred every year of which 38% were unwanted pregnancy and 22% resulted in abortion. Many contraceptive methods and devices are available and a better knowledge of these birth control methods may reduce unwanted pregnancies, especially among adolescents. A cross-sectional study was carried out among undergraduate students from non-medical faculties in the University of Malaya. A validated self-administered knowledge instrument was used to collect the data. Of the 402 respondents, only 8.4% were considered to have adequate knowledge on the methods of contraception. The mean knowledge score (standard deviation) of the respondents was 25.0 (16.8) out of a maximum of 100. The respondents scored highest in Barrier Methods, followed by Natural Methods, Hormonal Methods and Intrauterine Devices. The main sources of information on contraception were internet (87.3%), teachers (70.9%) and friends (67.4%). The most common methods of contraception which were known to the respondents were condoms (91.5%), abstinence method (72.4%) and injections (63.2%). Talks by healthcare professionals were considered as the most effective means of providing information on contraception. Insufficient knowledge on the methods of contraception among young adults such as university students warranted the needs to strengthen reproductive health education programmes in Malaysia.

PHARMACY PRACTICE / SOCIAL PHARMACY

PPO 07

MPSPSC2015000153 (Oral)

Feasibility and Acceptability of My Electronic Personal Health Record Monitor (MY-ePHRM)

PL Lua & II Umar

Faculty of Health Sciences, Universiti Sultan Zainal Abidin (UniSZA), Kuala Nerus, Terengganu, Malaysia.

Smartphones could be used as a novel approach to improve medication adherence and patients' behaviour due to their wide communication accessibility and the possible provision of a repository for health and medication information. This study aimed to assess the feasibility and acceptability of the use of a newly-developed phone application, My Electronic Personal Health Record Monitor (My-ePHRM), for personal health record monitoring, as well as the factors that predict its acceptability. A cross-sectional study using structured questionnaire was conducted on 363 potential users (undergraduates of a public university). Statistical analyses were performed using SPSS 20.0. Descriptive statistics and multiple logistic regression analysis were employed. Majority were females (69.7%) with a mean age of 22 ± 1.7 years. More than half of the respondents (63.9%) agreed that My-ePHRM was easy to operate and 50.7% thought that the language used was simple and easy to understand. Most respondents (61.7%) found that the features of My-ePHRM were attractive and 52.1% would like to own it. Majority agreed that My-ePHRM could increase health knowledge (57.0%) and drug knowledge (54.0%) as well as improve drug adherence (56.5%). Overall, students believed that it was a good programme and would recommend it to others. Ethnicity, gender and current study programme of the respondents did not predict acceptance towards My-ePHRM. In conclusion, My-ePHRM has been shown to be acceptable, simple and practical by its target users - offering a huge potential for customers of community pharmacies to document and monitor their personal health related activities.

PHARMACY PRACTICE / SOCIAL PHARMACY

PPO 08

MPSPSC2015000075 (Oral)

Guidelines for Use of Non-halal Medicines for Muslim Patients

A Buang

Malaysian Pharmaceutical Society, Wisma MPS, Puchong, Selangor, Malaysia

Fulfilling the needs of a Muslim patient is a very fundamental aspect in pharmacotherapy. In line with the principles of Shariah, Muslims are not allowed to use medicines that contain any parts or products of animals (e.g. porcine and bovine source) that are non-halal or not slaughtered according to Shariah law. At the moment, there is no guiding principle for any healthcare professional to follow. As such, the following guidelines are recommended. Absolutely no other compounds from halal sources are available for use and this medicine must be clinically proven choice in treating the patient's condition. Class 1 recommendation with level A evidence is warranted. Treatment with this medicine is critical to the welfare of the patient. Prescribing of this medicine is restricted to Muslim physicians well versed in Islamic laws. A non-Muslim physician needs to refer to the above-mentioned physicians regarding the use of this medicine; or the attending physician may refer to previous cases regarding the use of this medicine on Muslim patients. The patient or relative must be well informed by the attending physician regarding the use of this medicine. The patient or relative's consent is absolutely essential. If necessary, a consent form must be completed in the patient's notes. This medicine may only be used for a specific period of time as per attending physician's recommendations. During life-threatening medical emergencies, the attending physician may use this medicine without first obtaining the patient's consent.

PHARMACY PRACTICE / SOCIAL PHARMACY

PPO 09

MPSPSC2015000074 (Oral)

Assessment of Malaysian Community Pharmacists Involvement in Extended Pharmacy Services

GS Ooi¹, MAA Hassali¹, AA Shafie¹, DCM Kong², VSL Mak³

¹*School of Pharmaceutical Sciences, Universiti Sains Malaysia, Penang, Malaysia.*

²*Faculty of Pharmacy and Pharmaceutical Sciences, Victoria College of Pharmacy, Monash University, Victoria, Australia.*

³*School of Pharmacy, Monash University Malaysia, Selangor, Malaysia.*

Roles of community pharmacists (CPs) have evolved in many parts of the world. In Malaysia, research on extended pharmacy services provided by CPs in Malaysia remains scarce. To effectively enhance the role of CPs in Malaysia, it is important to explore the views of all the key stakeholders. This study explored the views of the CPs, general practitioners (GPs), policy makers and consumers towards CPs' roles in the Malaysian healthcare system. A triangulation of qualitative and quantitative methods was used. The major themes identified included: barriers to enhancing professional roles, trends of community pharmacy practice in Malaysia, implementation of dispensing separation, consumers' acceptance towards the roles of CPs, perspectives of GPs on the current practice, knowledge and ability of CPs towards the provision of extended pharmacy services, strategies to overcome barriers, and future direction of community pharmacy practice. Two postal surveys were then conducted to explore the knowledge and preparedness of CPs (n=395) and the perception of GPs (n=205) towards community pharmacy practice change in Malaysia. Analysis of the responses received generated valuable data about the current provision of extended pharmacy services by the Malaysian CPs and managed to identify barriers faced by CPs. In general, GPs were supportive towards the involvement of CPs in extended pharmacy services but they were uncertain about their knowledge and skills. In conclusion, this study has identified the current barriers towards the transformation of community pharmacy practice in Malaysia. Future actions including planning, developing and implementing new policies are much needed.

PHARMACY PRACTICE / SOCIAL PHARMACY

PPO 10

MPSPSC2015000060 (Oral)

Setting up A Hospital Based Nuclear Pharmacy Service - AMDI Experience

H Mohd Ikhwan¹, AM Mahayuddin², AH Khadijah³, J Farakhdina³

¹Nuclear Pharmacy Unit, Pharmacy Section, Advanced Medical & Dental Institute, Universiti Sains Malaysia

²Oncological & Radiological Sciences Cluster, Advanced Medical & Dental Institute, Universiti Sains Malaysia

³Nuclear Medicine Unit, Radiology, Oncology and Nuclear Medicine Section, Advanced Medical & Dental Institute, Universiti Sains Malaysia

Nuclear Medicine Unit (NMU) of Advanced Medical & Dental Institute (AMDI) started its clinical services in August 2014. The primary services focused on clinical diagnostic tests, using kit-based radiopharmaceuticals supported by AMDI Nuclear Pharmacy Unit (NPU). Within the unit, a pharmacist was identified as the personnel for planning and setting up the NPU in collaboration with the clinical specialists and physicist. A pharmacist was involved in the planning process until the full completion of the NMU. These included budgeting, planning and identifying the essential equipment required to start the clinical services. A total of 24 equipment listed as the basic requirements for the services to start. The main challenge at this level was to work and adhere to the outline given by the guidelines, certification requirements and rules of the regulatory bodies with the amount of budget that had been determined earlier. The contribution of the pharmacist continued in the planning and setting up of the HotLab. The workflow and Standard Operating Procedure (SOP) had to be prepared before the services could commenced. The arrangement of the HotLab had to be clearly laid out as the rooms were identified based on their functions. Furthermore, it is also a sterile and clean complex; hence, the knowledge of pharmacist in aseptic technique is essential. In conclusion, in setting up a NMU, the pharmacist can contribute actively in planning the budget, deciding the necessary equipment, training of personnel as well as establishing the workflow and SOP of the NPU.

PHARMACY PRACTICE / SOCIAL PHARMACY

PPO 11

MPSPSC2015000005 (Oral)

Customers Satisfaction towards Community Pharmacists Professional Practice in Malaysia

KH Yeo, WS Wan Zaid, A Jamil

Faculty of Pharmacy, Cyberjaya University College of Medical Sciences, Selangor, Malaysia

Community pharmacists are pharmacists who practice in the community setting. Customer satisfaction was defined as the frequency of satisfactory customers towards the services provided by community pharmacists through past experience. The objectives of this study were to measure customer's level of satisfaction towards community pharmacists in Malaysia, to measure community pharmacists' professional practice level, to compare between community pharmacists' professional practice and customers' satisfaction level and to investigate whether the type of pharmacy visited by the customers affected their satisfaction levels towards the community pharmacists' professional practice. This survey was carried out through two ways; direct distribution of questionnaires and online distribution of questionnaires. A total of 271 respondents were involved in this study. The mean level of Professional Practice measured was 3.62 ± 0.68 (n=271). This indicated that the level of Professional Practice was moderately professional. The mean level of Customers' Satisfaction measured was 3.69 ± 0.68 (n=271). The studies revealed that most of the customers were moderately satisfied with the community pharmacists. There was a positive relationship between professional practice and customers' satisfaction. There was no difference in professional practice levels and customers' satisfaction level in different types of pharmacy. Overall, the satisfaction level and practice level were moderate. Many improvements can be made in the current community pharmacists' practice. More study with larger scale is recommended to establish an index that reflects the quality of practice among community pharmacists. It can also be referred to by policymakers in establishing good practice guidelines for community pharmacists.

PHARMACY PRACTICE / SOCIAL PHARMACY

PPO 12

MPSPSC2015000023 (Oral)

Optimising Community Pharmacy Intervention in Managing Sleep Disorders: Extended Roles of Community Pharmacists

Z Mohamad Noor^{1,2}, AJ Smith^{2,3}, SS Smith⁴, LM Nissen⁵

¹*Kulliyah of Pharmacy, International Islamic University Malaysia, Pahang, Malaysia*

²*School of Pharmacy, University of Queensland, Queensland, Australia*

³*School of Pharmacy, University of Otago, Dunedin, New Zealand*

⁴*Institute for Health and Biomedical Innovation and Centre of Accident Research and Road Safety, Queensland University of Technology, Queensland, Australia.*

⁵*School of Clinical Sciences, Queensland University of Technology, Queensland, Australia.*

Community Pharmacists are in a position to provide advice and services of sleep-related disorders to the community. Interventions that measure sleep/wake objectively can assist pharmacists in consultation. This feasibility study was conducted to evaluate: (1) the effectiveness of a community-pharmacy-based intervention, (2) the role of actigraphs and (3) the extended role of community pharmacists, in managing sleep disorders. Customers with sleeping disorders were recruited based on convenience sampling. The intervention-care-group (ICG) (n=20) received an 'intervention-package' including: a wrist-worn actigraph (to measure sleep/wake patterns for 2-weeks), a sleep-diary, and two consultations. Actigraphy sleep-parameters (sleep efficiency%, SE%; total-sleep-time, TST; sleep-onset-latency, SOL) were downloaded at week-1 (pre) and week-2 (post) for consultation use. The usual-care-group (UCG) (n=21) received 'standard-care' for sleeping disorders. Both groups completed sleep-scale scores (Epworth Sleepiness Scale, ESS; Insomnia Severity Index, ISI) at baseline (pre) and the end-of-study (post). All subjects answered Likert-type-scale questionnaires to determine their understanding of sleep disorders after week-2. Findings showed significant differences ($p < 0.05$) when comparing pre- and post-ISI mean scores in ICG and post-ISI mean scores between ICG and UCG. For SE%, an increase of subjects rated 'good sleepers' at post-assessment in ICG. Actigraphy sleep-parameters mean scores showed agreement with sleep-diaries. ICG showed 35% of subjects had improved understanding of sleep disorders after consulting the pharmacist, compared to UCG (4.8%). ISI scores offer insights into the development of community-pharmacy-based interventions, particularly in individuals with insomnia. It also demonstrated that actigraphs could provide objective sleep/wake data to assist community pharmacists during consultations on sleep health.

PHARMACY PRACTICE / SOCIAL PHARMACY

PPO 13

MPSPSC2015000086 (Oral)

A Survey on Knowledge, Attitude and the Perception (KAP) of Pharmacovigilance and Adverse Drug Reactions (ADRs) Reporting among the Healthcare Students in a Private University

S Sivadasan¹, NA Abdul¹, R Veerasamy¹, M Kasi², M Sellapan³

¹*Faculty of Pharmacy, AIMST University, Kedah, Malaysia*

²*Faculty of Applied Sciences, AIMST University, Kedah, Malaysia*

³*Karpagam College of Pharmacy, Tamilnadu, India*

This study was conducted to assess the knowledge and awareness of Pharmacovigilance and ADRs reporting among healthcare students from medicine, dentistry, pharmacy and nursing courses in a Malaysia private university. The study is necessary to assess the KAP among healthcare students, who are responsible and should have the willingness to be involved in ADRs reporting and monitoring in their future practice. A survey using a pre-validated questionnaire was carried out among pre-final and final year students of medicine, dental, pharmacy and nursing courses. The KAP questionnaire was designed and pre-validated by experts in the field. The KAP questionnaire consists of a total of 29 survey items organised into 2 sections; 15 items related to knowledge and 14 items related to attitude and perception aspects. The completed KAP questionnaires were analysed using SPSS software version 14. The questionnaire was administered to 629 students, of whom 331 were medical students, 148 pharmacy students, 117 dental students and 33 nursing students. A total of 396 students completed the questionnaire, giving a response rate of 63%. Our study shows that pharmacy students have better knowledge and understanding towards pharmacovigilance and ADRs reporting compared to medical, dental and nursing students. The study suggests that the medical, dentistry and nursing students have a positive attitude and should gain knowledge on ADRs reporting as they are the future important healthcare professionals who will be responsible for pharmacovigilance activities and ADRs reporting.

PHARMACY EDUCATION

PEO 01

MPSPSC2015000062 (Oral)

Impact and Perception of E-learning: Pre-post Survey and Evaluations

F Adib Azhari¹, LC Ming^{1,2}, TM Khan³

¹Faculty of Pharmacy, Universiti Teknologi MARA, Puncak Alam, Selangor, Malaysia

²Brain Degeneration and Therapeutics Group, Pharmaceutical and Life Sciences CoRe, Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia

³School of Pharmacy, Monash University Malaysia, Bandar Sunway, Selangor, Malaysia

Incorporation of e-learning was one of the initiatives taken for the Principles of Pathology, a core subject for second year Bachelor of Pharmacy programme. This teaching innovation used various online learning activities following the social constructivist learning environment (SCLE). Therefore, this study was to explore pharmacy students' perception on e-learning intervention in pathology subject and its effect on students' academic achievement. The Constructivist Online Learning Environment Survey (COLLES) was used to assess students' perception on e-learning application, while pre- and post-test assessment was used to estimate the impact on students' academic achievement following the e-learning intervention. All data were analysed using SPSS v. 20. Correlation analysis was conducted to determine the relationship between perception on e-learning and increase in knowledge. A total of 196 second year pharmacy students showed positive attitude towards the use of e-learning application. The results showed that "Reflection" (3.98 ± 0.47) and "Tutor Support" (4.30 ± 0.34) were significantly increased in actual COLLES score. Students' perception on e-learning was not correlated with knowledge gained post e-learning intervention. The students felt that e-learning can be beneficial for them in terms of an increase in their knowledge, teamwork and flexibility in time of study. The increase in "Reflection and Tutor Support" score indicates that the activities provided had developed the students' critical thinking and there was immense lecturers' involvement throughout the e-learning session. The results from COLLES illustrated the development of SCLE in the course. The use of e-learning in pathology subject could enhance student learning experience.

PHARMACY EDUCATION

PEO 02

MPSPSC2015000063 (Oral)

Pharmacy Students' Interprofessional Perceptions towards the Pharmacy Profession

FA Nor Azizi¹, M Abdul Hameed¹, CF Neoh¹, LC Ming^{1,2}, TM Khan³

¹*Faculty of Pharmacy, Universiti Teknologi MARA, Puncak Alam, Selangor, Malaysia*

²*Brain Degeneration and Therapeutics Group, Pharmaceutical and Life Sciences CoRe, Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia*

³*School of Pharmacy, Monash University Malaysia, Bandar Sunway, Selangor, Malaysia*

Interprofessional skill revolves with interconnected professional skills of healthcare professions. This skill is essential to deliver more effective, organized healthcare and welfare services. This study could help to improve the interprofessional training among pharmacy students. This study was conducted to investigate the perceptions of pharmacy students in Universiti Teknologi MARA (UiTM) towards interprofessional in the pharmacy profession in Malaysia. A validated questionnaire with 27 items was used. A universal sampling method was adopted and all the pharmacy students were invited for their participation in this study. A total of 275 students participated in this study. There was no significant difference in the interprofessional perception between the variable groups except for the academic year ($p < 0.01$), hospital or community pharmacy training ($p = 0.003$) and attendance to a seminar or conference ($p = 0.045$) within the last six months. Under the guidance of the pharmacist preceptor, students learnt how to engage in interprofessional relationship and interaction. Hospital, community training and exposure to pharmacy scientific gathering enhance the attitude of students towards interprofessional collaboration. The findings of this study call for a curriculum that also focuses on behavioral and administrative aspects of the pharmacy profession.

PHARMACY EDUCATION

PEO 03

MPSPSC2015000132 (Oral)

Students' Readiness for and Perception towards Inter-Professional Learning: A Cross Sectional Study

NI Mohamed Nazar, MG Ab Salam², MA Abibullah, MF Md Taib, SNF Alauddin @ Muhd Zahir, SS Syed Omar, NF Abdul Rashid, NNE Ramli, AN Abdul Hamid, NT Mustapa, MM Elkami

Pharmacy Practice Department, Kulliyah of Pharmacy, International Islamic University Malaysia, Kuantan, Malaysia

Current healthcare related issues and problems are becoming more complex. Comprehensive patient care is impossible to be achieved by clinicians alone as this requires inter-professional approach in the management. Therefore, it has been suggested that students in healthcare profession should be exposed to inter-professional learning (IPL) during their undergraduate years. The objectives of this study were to investigate the readiness for and the perception of IPL among healthcare professional students of International Islamic University Malaysia (IIUM). Data was collected using an established questionnaire namely, Readiness for Inter-professional Learning Scale (RIPLS) which was distributed to final year students of 3 main programmes; Medicine, Pharmacy and Nursing. Out of the 122 students, a majority denied being exposed to IPL. Teamwork and collaboration showed the highest mean (40.2 + 4.18) that the students highly agreed on. Female students have significantly lower negative professional ID compared to the male students ($p = 0.011$). This subdomain also exhibited significant difference in scores between cGPA results of the students. Students with high cGPA (3.50-4.00) tended to have lower negative attitude towards IPL crossing programmes ($p = 0.009$). Those who have exposure to IPL show significant positive attitudes towards IPL regardless of the programme ($p = 0.032$). The study shows that students from the medical programme have the least exposure to IPL. Gender and cGPA status of students may also play an important role in determining their attitude towards IPL. There are still rooms for improvement to nurture readiness among the students.

PHARMACEUTICAL CHEMISTRY

PCO 01

MPSPSC2015000072 (Oral)

Green Synthesis of *Parkia speciosa* Mediated Silver Nanoparticles - Characterization and Evaluation of its Antibacterial and Antioxidant Potential

R Veerasamy¹, S Sivadasan¹, V Sethu², H Rajak³

¹*Faculty of Pharmacy, AIMST University, Semeling, Kedah, Malaysia*

²*Faculty of Engineering, University of Nottingham, Semenyih, Selangor, Malaysia*

³*SLT Institute of Pharmaceutical Sciences, Guru Ghasidas Vishwavidyalaya, Bilaspur, India*

Green synthesis of silver nanoparticles using biological entities is gaining interest because of their potential applications in nanomedicine and material engineering. Herein, we report the green synthesis and characterization of silver nanoparticles (PAgNPs) using *Parkia speciosa* leaf aqueous extract. Synthesized PAgNPs were confirmed by using UV-visible spectrophotometer and the various reaction parameters were optimized. The antibacterial activity of PAgNPs was evaluated against *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Escherichia coli* and *Bacillus subtilis*. The antioxidant activity of the silver nanoparticles was evaluated by 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging method. The PAgNPs in solution has shown maximum absorption at 410.5 nm, spectrophotometrically. The optimized parameters for this synthesis were: temperature $60 \pm 2^\circ\text{C}$, pH 11, concentration of silver nitrate 6 mM aqueous solution, volume of leaf extract 1 mL and time 2 min. The scanning electron microscope and dynamic light scattering analysis confirmed the average particle size of 31 nm and 155.3 d.nm (polydispersity index of 0.381), respectively. X-ray diffraction confirmed the crystalline nature of the PAgNPs, and energy dispersive spectrometer authorized the presence of silver. Further FTIR spectrum of PAgNPs authorized the presence of phenolic compounds, proteins and flavonoids which may have possibly influenced the reduction process and stabilization of nanoparticles. The antibacterial study results indicated that the PAgNPs showed moderate inhibitory actions than the crude plant extract, demonstrating its antibacterial value against bacterial diseases. Synthesized silver nanoparticles showed significant antioxidant activity. Thus, the significant outcome of this study would help to formulate value added herbal based nanomaterials in biomedical and nanotechnology industries.

PHARMACEUTICAL CHEMISTRY

PCO 02

MPSPSC2015000087 (Oral)

Combined Docking and Molecular Dynamics Provide Insights into the Trypanosoma Purine Salvaging Pathway Inhibitors

A Fatima¹, CHH Hung²

¹*Faculty of Medicine, Quest International University Perak, Ipoh, Perak, Malaysia*

²*Faculty of Pharmaceutical Sciences, UCSI University, Cheras, Kuala Lumpur, Malaysia*

Human African Trypanosomiasis is endemic to 37 countries of the sub-Saharan Africa. Caused by two related species of *Trypanosoma brucei*, it is classified as a neglected disease. Pentamidine is the only available therapy for inhibiting the P2 adenosine transporter involved in the purine salvage pathway of the trypanosomatids, which however, suffers from resistance, toxicity, and public inaccessibility. Malaysia is blessed with a great biodiversity that can be explored for effective, safer and cheaper alternatives. Several researchers have pointed out the usefulness of flavonoids as trypanocidal drugs but its mechanism is unclear. The objective of the present study was to combine computational techniques of docking and molecular dynamics simulations for the investigation of the probable trypanocidal mechanism of flavonoids in the purine salvage pathway. Docking experiments were carried out on three flavonoids, namely kaempferol, quercetin and chrysin which could be found in several Malaysian plants. Using the Autodock 4.2 software, these three compounds were docked to inosine-adenosine-guanosine nucleoside hydrolase and the inosine-guanosine nucleoside hydrolase, the major enzymes of the purine salvage pathway. Our results showed that all the three flavonoids have high affinities for both hydrolases with binding energy ranging from -9.71 to -8.41 kcal/mol. Molecular dynamics studies using AMBER12 program were further used to elucidate the most suitable lead of the three compounds.

PHARMACEUTICAL CHEMISTRY

PCO 03

MPSPSC2015000071 (Oral)

Evidences of Antitubercular Potential of Novel Thiazolidinone Derivatives Bearing Chloroxylenol Moiety

NK Fuloria, S Fuloria, K Balaji, KM Sundram

Pharmaceutical Chemistry Unit, Faculty of Pharmacy, AIMST University, Semeling, Kedah, Malaysia.

Current limitations with tuberculosis (TB) treatment in drugs, like drug-drug interactions, toxicity, intolerance and poor patient compliance, as well as high antitubercular potential of thiazolidinones and alkylated phenolic derivatives challenged investigators to develop more efficient anti-TB drugs. Scientific reports over anti-TB potential of alkylated phenols, and thiazolidinones inspired investigators to carry out synthesis and explore antitubercular profile of some novel thiazolidinones. Therefore, this study was aimed to synthesize and determine anti-TB potential of novel thiazolidinone derivatives of chloroxylenol. 4-thiazolidinone derivatives bearing chloroxylenol moiety were synthesized and evaluated for in-vitro anti-tubercular activity. 2-(4-chloro-3,5-dimethylphenoxy)acetohydrazide, derived from ethyl 2-(4-chloro-3,5-dimethylphenoxy)acetate, was made to react with different aromatic aldehydes to offer N-substituted benzylidene-2-(4-chloro-3,5-dimethylphenoxy)acetohydrazide (3a-e). Further cyclization of compound (3a-e) with thioglycolic acid offered 3-((4-chloro-3,5-dimethylphenoxy)methylamino)-2-aryl-thiazolidin-4-one (4a-e). Synthesized compounds structures were confirmed by IR, NMR and mass spectra and novel compounds were further evaluated for antitubercular potential against human virulent H37RV strain of *M. tuberculosis*. All compounds 3a-e and 4a-e structures were in full agreement with mass, ¹H-NMR and IR spectral data. Among synthesized derivatives, compounds 3b, 3d, 4b and 4d showed promising antitubercular activities. In conclusion, designed synthetic route was proven as efficient and productive method for thiazolidinone derivatives. SAR pattern of results show importance of substitution of electronegative group at para position of benzene ring to enhance antitubercular activity of newer compounds. High antitubercular potential of compounds 3b, 3d, 4b, and 4d, claim them suitable for further in-vitro and in-vivo evaluations, for development of new antimycobacterial for tuberculosis treatment.

PHARMACEUTICAL CHEMISTRY

PCO 04

MPSPSC2015000115 (Oral)

Design and Synthesis of Acetylcholinesterase Inhibitors Targeting Alzheimer's Disease

NBS Nagojappa¹, SL Ting¹, JNNS Chandra², V Bantal³

¹School of Pharmacy, Taylor's University Lakeside Campus, Subang Jaya, Malaysia

²School of Pharmacy, Guru Nanak Institutions Technical Campus, Hyderabad, India

³G. Pulla Reddy College of Pharmacy, Hyderabad, India

Alzheimer's disease is an irreversible and progressive brain disorder that slowly destroys memory, thinking skills and, eventually, the ability to carry out the simplest tasks. At present, 18 million people worldwide are suffering from the disease. In Malaysia, it is estimated that there are currently about 50,000 people with the disease. The prominent strategy in the treatment of patients with Alzheimer's disease aims at the potentiation of acetylcholine in the brain by lowering its degradation rate. This is achieved by administering potent acetylcholinesterase (AChE) inhibitors. Since the use of AChE inhibitors is the most effective therapeutic approach in Alzheimer's disease treatment, the demand for new AChE inhibitors is high. Some literatures reported that pyridine/ piperidine analogues could become effective AChE inhibitors. In this context, we designed some new amide molecules containing pyridine/ piperidine nucleus. The designed molecules were docked into the human AChE enzyme computationally to check their enzyme inhibitory activity using computer aided drug design techniques. The molecules with very good binding/ molecular interactions with the enzyme were chosen for synthesis. The synthesis of the chosen molecules was performed by standard amide synthesis method using EDCI, HOBt/ HATU as coupling reagents. The compounds were characterized, tested for their in-vitro AChE inhibitory activity at 100 micro molar concentrations to yield two moderately active molecules. The active molecules could become lead molecules for the further development of AChE inhibitors.

TRADITIONAL AND COMPLEMENTARY MEDICINE

TCMO 01

MPSPSC2015000020 (Oral)

Complementary and Alternative Medicine (CAM) Use among Liver Disorder Patients at an Outpatient Clinic in University Malaya Medical Centre

G Paramasivam¹, N Shamsuddin¹, WK Chan²

¹Department of Pharmacy, Faculty of Medicine, University of Malaya

²Department of Medicine, Faculty of Medicine, University of Malaya

There were concerns over the use of Complementary and Alternative Medicine (CAM) by patients with liver diseases. Very few studies described the prevalence of CAM use in this specific population of patients. Thus, the present study seeks to evaluate the pattern of CAM use and to determine the association between socio-demographic factors and CAM use among liver disorder patients. A face to face interview with patients with liver disorders was conducted in a gastroenterology clinic at University Malaya Medical Centre. Out of 200 patients interviewed in the study, only 56 (28%) reported using CAM. The most common form of CAM used was dietary supplement (69.6%), herbal medicine (37.5%), spiritual healing (9.0%) and acupuncture (5.4%). Only 19.6% (n = 11) of the patients were taking CAM to treat their liver conditions. No significant relationships were found between socio-demographic factors and CAM use, except for education level ($\chi^2 = 15.93$, $p < 0.001$), where patients with higher education level used CAM more than patients with low education level. Family and friends are the main source of information about CAM use in these patients (46.4%). Sixty one percent of respondents did not disclose their CAM use to their doctors. The present study revealed the prevalence of CAM use among liver disorder patients is lower than the prevalence reported in the general population. This may represent high awareness of patients regarding CAM use in view of their liver conditions.

TRADITIONAL AND COMPLEMENTARY MEDICINE

TCMO 02

MPSPSC2015000067 (Oral)

Perspective of Practitioners on Reflexology: A Qualitative Approach

NH Embong¹, YC Soh¹, LC Ming^{1,2}

¹Faculty of Pharmacy, Universiti Teknologi MARA, Puncak Alam, Selangor, Malaysia

²Brain Degeneration and Therapeutics Group, Pharmaceutical and Life Sciences CoRe, Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia

Reflexology is the systematic practice of applying some pressure to particular points on the feet and hands to give impacts on health of the related parts of the body. The objective of the study was to explore the practitioners' perspectives of reflexology in Malaysia. Data were collected using face-to-face semi-structured interviews with practitioners in Malaysia. The interviews were conducted in Malay language and recorded. Interview conversations were translated, transcribed verbatim. Responses relating to different themes were identified in each of the interviews and a coding frame was developed. For each theme, the relevant data enabled a description of the range of views and experiences. Data collection and analysis were conducted concurrently and recruitment was stopped when saturation had been reached. All respondents had given written consent for their participation. The findings showed that reflexology treatment nowadays has been accepted as one of the ways to maintain general health. Practitioners believe that reflexology is able to detect some problems regarding to our body which can help customer to be aware of his/her body health condition and can seek further treatment. If not performed correctly, then it may cause negative effects and induce certain adverse effects. Some practitioners voiced concern on the abuse of certain reflexology centers for other illegal conducts. As conclusion, empowering the practitioner as professional would help gaining public's trust and confidence on their treatment. Strict enforcement of regulation related to illegal conducts in reflexology centers will improve people's perception toward its practice.

PTO 01

MPSPSC2015000082 (Oral)

A Mechanistic Insight in Ketoconazole Soluplus Solid Dispersions

V Krishnamoorthy¹, G Raju², P Subramani¹, S Krishnan³, MN Muralidhar⁴, S Adnan Ali Shah⁵, S Somsundaran Revendran¹, L Gunasegaran¹, LL Chia¹ and SH Ong¹

¹*Faculty of Pharmacy, AIMST University, Semeling, Malaysia*

²*Colloid Interface Science Centre, Centre of Excellence, Malaysian Rubber Board, Experiment Station, Sungai Buloh, Selangor, Malaysia*

³*KMCH College of Pharmacy, Coimbatore, India*

⁴*Spectroscopy Analytical Test Facility, Indian Institute of Science, Bengaluru, India*

⁵*Faculty of Pharmacy, Universiti Teknologi Mara (UiTM), Puncak Alam, Selangor, Malaysia*

Drug's poor aqueous solubility limits its bioavailability to a greater extent and its therapeutic efficiency. Solid dispersion is one of the common approaches to improve aqueous solubility but its instability is a major concern in its commercialization. An insight has been provided on issues related to the enhancement of solubility and instability of such dispersions by advanced characterization techniques. The aim was to provide the mechanical insight into solubility enhancement and instability aspects of Ketoconazole-Soluplus solid dispersions. Solid dispersions prepared by solvent evaporation method at varying drug: carrier ratios were evaluated by phase solubility studies, in vitro dissolution studies, kinetic analysis, solid state characterization studies and in situ perfusion studies. Phase solubility results indicated the solubilizing efficiency of carrier. A marked increase in solubility and dissolution rate was observed in dispersions compared to pure drug. The drug release was found to follow Korsmeyer-Peppas model. Crystallinity reduction in dispersions was confirmed by XRD and DSC results. Particle size analysis and SEM results proved the particle size reduction in samples. The drug-polymer interaction studies revealed a weak interaction between drug and carrier. The wettability data of samples suggested an improved wettability. The in-situ perfusion and permeation study results confirmed the absorption potential of the dispersions. The results show that the solubility of Ketoconazole could be markedly improved by using Soluplus (SP) as a carrier. It also provided mechanical insights to understand the issues related to solubility enhancement and its instability.

MILITARY PHARMACY

MPO 01

MPSPSC2015000145 (Oral)

The Haiyan Super Typhoon in Philippines - Malaysian Military Pharmacist Experience

MA Adnan¹, AH Basari²

¹*Dept of Pharmacy, Tuanku Mizan Armed Forces Hospital, Ministry of Defence, Malaysia.*

²*Health Services Division, Malaysian Armed Forces HQ, Ministry of Defence, Malaysia.*

On 8th November 2013, the strongest typhoon hit the Philippines and claimed more than 6,300 lives. Malaysian National Security Council established and deployed a disaster relief team with military pharmacist to provide HADR to the survivors in Tacloban district. The objectives are to document common diseases after typhoon, to list essential medications and to share experience during the mission. Top 2 clinical diseases were upper and lower respiratory infections (55%) and infected wounds and lacerations (14%). Top 2 age groups treated were 18-65 year old (55%) and 1-12 year old (33%). The 3 fast moving medicines were diphenhydramine expectorant, oral rehydration salt and cloxacillin capsule. Typhoon took away all medicines from survivors with chronic diseases and majority couldn't remember their medicines. Therefore, learning common local words made dispensing and counselling easier especially to elderly survivors. Extreme tropical weather contributed to not only high respiratory illnesses but created pharmamedlogistics issues especially during outreach programs. Communicable diseases such as leptospirosis and dengue amplified 2 weeks after the disaster. Survivors had to live in an area without clean water supply and poor sanitation. Pharmacist was involved in supplying clean and safe drinking water using Malaysian invention of Field Water Purification System known as JERNIH. In conclusion, an increase in patients with infected wounds and lacerations should be expected in water-based disaster such as this. Data collected can be used to improve disaster response procedures in the future. Networking with other pharmacists, local health authorities and other volunteers helped in coordinating and sustaining pharmamedlogistics.

MILITARY PHARMACY

MPO 02

MPSPSC2015000150 (Oral)

Kelantan Flood: Role of Military Pharmacist in a Forward Hospital

MF Yaacob¹, AH Basari²

¹*Armed Forces Health Training Institute, Terendak Camp, Malacca, Malaysia.*

²*Health Services Division, Malaysian Armed Forces HQ, Ministry of Defence, Malaysia.*

A big flood hit Manek Urai last year causing the residents the biggest disaster in terms of loss of homes, clean water supply, electricity and damage to the land transportation network, government, public and private facilities/equipment. Kuala Krai Hospital (KKH) had to close their operation temporarily. The Malaysian Armed Forces Health Services was given orders to set up a Level II Forward Hospital to provide healthcare services to the flood victims and support to the KKH. The Level II Forward Hospital offered outpatient/inpatient services, forward mobile medical services, operation theatre, and specialist services such as anaesthetic, surgery, orthopaedic, obstetric gynaecology, and paediatric. These medical services required its support and ancillary services such as pharmacy to manage dispensing, counselling, supply chain and logistics of the medicines/consumables which were prescribed/used by the medical specialists and officers/staff. In addition, laboratory and radiological services were also needed for diagnostic purposes. Rescue workers faced grave challenges during the post-flood period due to limited land mobility either to rescue the victims or deliver the medical services and supplies forward. Without clean water, electricity and proper shelter, the flood victims were exposed to many health-related risks especially to the elderly, chronic patients, pregnant women and children. They needed immediate and sustainable medical attention/services on site. Electrical power blackout had shut down the communication towers resulting in both mobile and landline communication failure. Meanwhile, flood victims and rescue workers were exposed to the various infections/diseases such as skin and wound infections, respiratory infections, and diarrhoea.

MILITARY PHARMACY

MPO 03

MPSPSC2015000034 (Oral)

A Drug Utilization Review of Selected Antibiotics in the Medical Wards at Hospital Angkatan Tentera Tuanku Mizan

MH Mohamad Yusof^{1,2}, MM Manan², AH Basari¹, MA Adnan³, N Moktar³

¹Pharmaceutical Services Division, Malaysian Armed Forces Health Services Headquarters, Kuala Lumpur, Malaysia

²Faculty of Pharmacy, Universiti Teknologi MARA, Puncak Alam, Malaysia

³Tuanku Mizan Armed Forces Hospital, Wangsa Maju, Selangor, Malaysia

The Malaysian Armed Forces Health Services conducted a retrospective study on antibiotic usage and pattern in the medical wards of Tuanku Mizan Armed Forces Hospital (TMAFH). The objective of the study was to review prescribed antibiotic utilization at the medical wards of TMAFH. Data was collected from prescriptions and bed medication charts. Thirteen indicators created by Strengthening Pharmaceutical Systems Program, ABC and VEN analysis were used in the analysis and comparison of data. The top 5 antibiotics that were commonly used in 2014, based on the Defined Daily Dose (DDD) were Ceftriaxone Inj (87.6), Augmentin Inj (52.4), Augmentin Tab (42.1), Azithromycin Inj (8.7) and Azithromycin Tab (46.8). Only 31% of the antibiotics were prescribed using their international nonproprietary names. Average costs of antibiotics incurred, according to 3 different age groups were RM213.55 (young adults), RM223.17 (middle aged adults) and RM201.95 (older adults), respectively. ABC analysis; Class A (5; 19.2%), Class B (3; 11.6%) and Class C (18; 69.2%). VEN analysis, Vital (7; 26.9%), Essential (6; 23.1%) and Non-essential (13; 50%). ABC-VEN matrix; Category I medicines (11; 42.3%), Category II (6; 23.1%) and Category III (9; 34.6%). In conclusion, drug utilization review is considered an important element to ensure the safe and appropriate use of antibiotics, what more in military medicine where combat environment requirement dictates the military pharmaceutical care to be different from that of civilian practice. The ABC and VEN analyses are good tools to manage antibiotics that require higher inventory control monitoring.

PHARMACOLOGY

PGO 01

MPSPSC2015000048 (Oral)

Differential Effects of Pre and Post Treatments with Low-Dose Dipyridamole in Aminoglycoside-Induced Nephrotoxicity in Rats

P Balakumar¹, S Prajapati¹, R Varatharajan¹, SA Jayachristy², K Sundram¹, MB Bahari¹

¹*Faculty of Pharmacy, AIMST University, Semeling, Malaysia*

²*Faculty of Medicine, AIMST University, Semeling, Malaysia*

The current study was aimed to investigate the pretreatment and post-treatment effects of low-dose dipyridamole in gentamicin-induced nephrotoxicity in rats. Rats were administered gentamicin (100 mg/kg/day, ip) for 8 days. In the pretreatment protocol, low-dose dipyridamole (20 mg/kg/day, po) treatment was started a day before the gentamicin administration and continued for 8 days. In the post-treatment protocol, gentamicin-administered rats were treated with low-dose dipyridamole (20 mg/kg/day, po) for 6 days after the completion of 8th day gentamicin administration protocol. Gentamicin-administered rats exhibited renal structural and functional changes as assessed in terms of a significant increase in serum creatinine and urea and kidney weight to body weight ratio as compared to normal rats. Hematoxylin-eosin, periodic acid Schiff, and Masson trichrome staining revealed degenerative changes in glomeruli and tubules in gentamicin-administered rats. These renal structural and functional abnormalities were accompanied with elevated serum uric acid level, and renal inflammation as assessed in terms of a decrease in interleukin-10 level. Low-dose dipyridamole pretreatment in gentamicin-administered rats afforded a noticeable renoprotection by markedly preventing renal structural and functional abnormalities, renal inflammation and serum uric acid elevation. On the other hand, low-dose dipyridamole post-treatment resulted in comparatively less renoprotection. In addition, low-dose dipyridamole post-treatment did not significantly prevent uric acid elevation and renal inflammation. In conclusion, uric acid elevation and renal inflammation could play a key role in gentamicin-induced nephrotoxicity. Low-dose dipyridamole pretreatment markedly prevented gentamicin-nephrotoxicity while its post-treatment resulted in comparatively less renoprotection.

PHARMACOLOGY

PGO 02

MPSPSC2015000010 (Oral)

A Glitazone with an Overall Glucose Control Potential: A Serendipitous Finding

TK Praveen

JSS College of Pharmacy, JSS University, Ootacamund, India

In our quest to discover and develop some novel glitazones with dual PPAR-alpha and gamma agonistic activities for the management of Fasting Blood Glucose (FBG, Pre-prandial) in type 2 diabetes mellitus, we discovered a molecule, 10b, with unusual overall glucose control potentials attributed to its fasting and postprandial glucose lowering activity. The FBG lowering effects are evident from its in vitro PPAR- alpha and gamma binding ability and its positive effects on the 3T3-L1 pre-adipocyte differentiation. In addition, it showed a significant antidiabetic effect against STZ and high fat diet induced elevation in body weight, serum glucose, triglyceride, total cholesterol levels and retroperitoneal fat mass in mice. The postprandial glucose lowering effects are evident from its significant in vitro and in vivo (starch tolerance test) alpha glucosidase inhibition. A good overall glucose control, including both FBG and postprandial hyperglycemia is important to prevent the complications of type 2 diabetes mellitus. The molecule, 10b, shows such potentials and therefore may show better glycemic control when compared to the existing drugs for the treatment of type 2 diabetes mellitus.

PHARMACOLOGY

PGO 03

MPSPSC2015000042 (Oral)

Effect of Ursolic Acid on Olanzapine Induced Obesity in Sprague Dawley Rats

P Subramani¹, MZ Khor¹, EW Lim¹, KH Chin¹, B Subramani², VC Parayil¹, B Urmila³

¹*Faculty of Pharmacy, AIMST University, Semeling, Malaysia*

²*College of Pharmacy, Madras Medical College, Chennai, India*

³*Faculty of Medicine, AIMST University, Semeling, Malaysia*

This study was conducted to evaluate the effect of ursolic acid, a pentacyclic triterpenoid on olanzapine induced obesity in rats. Sprague-Dawley (SD) rats were used for this experiment. The animals were divided into six different groups: normal control, olanzapine control, betahistine (10 mg/kg), ursolic acid 10, 20 and 40 mg/kg treated groups. All the drugs were administered once daily for 28 days orally. Except the normal control group, all other animals were treated with olanzapine 4 mg/kg intraperitoneally to induce obesity. During the experiment, animal's habit and behaviour variations were monitored at regular intervals. At the end of the experiment, blood sample were collected from all the experimental animals for biochemical analysis. Part of the brain, liver, heart, lung and kidney tissues were excised from the sacrificed animals and preserved in neutral formalin for histopathological studies. Ursolic acid showed a significant reduction in olanzapine induced body weight gain on the rats. Increase in grip strength, water navigation, motor coordination and locomotor activity were also observed with treatment of ursolic acid. Compare to ursolic acid, betahistine showed better tolerance against olanzapine induced body weight gain. This study has shown the metabolic alteration effect of ursolic acid on olanzapine, an antipsychotic drug treated SD rats.

PHARMACOLOGY

PGO 04

MPSPSC2015000148 (Oral)

***In-Vitro* Evaluation of the Anticancer Properties of the (1S, 2S)-1-Phenyl-2(Phenylamino) Propane-1, 3-Diol Derivative (RB4)**

CP Yew, CW Mai, CO Leong, LC Wong

School of Pharmacy, International Medical University, Kuala Lumpur, Malaysia

The anticancer properties of a novel nitrogen mustard derivative, (1S,2S)-1-phenyl-2-(phenylamino)propane-1,3-diol (RB4) synthesized in collaboration with School of Applied Sciences, Northumbria University were evaluated in vitro. The anti-proliferative effects of RB4 were studied on fifteen cancer cell lines namely breast (MCF-7, MDA-MB-231, MDA-MB-468, HCC38), colorectal (HT29, HCC2998, SW48, HCT116), lung (A549, NCI-H23, H1299) and nasopharyngeal (HK-1, SUNE-1, CNE-1, TWO-1) using CellTiter-Glo® Luminescent Cell Viability Assay. The morphological changes in cells treated with RB4 were observed by microscopic studies. Cell Death Detection ELISAPLUS kit was used to quantify the degree of necrosis and apoptosis in cells treated with RB4 at IC50 value. Initial screening with fifteen cancer cell lines indicated that cell viability of nasopharyngeal cancer cells were most affected by RB4, particularly SUNE-1 cells. The IC50 value of RB4 against SUNE-1 cells obtained from dose response curve was $10.449 \pm 0.56 \mu\text{M}$ with a selectivity ratio of 4.004. Under microscopic observation, a reduction in cell number was observed in SUNE-1 cells treated with $10 \mu\text{M}$ RB4 compared to control cells (1% DMSO). Cell death induced by RB4 was through apoptosis as a 4.5 fold increment in enrichment factor of apoptosis was quantified after 72 hours of RB4 treatment. In summary, RB4 was found to exhibit the highest anticancer activity against cancerous SUNE-1 cells, as well as selectivity for that particular nasopharyngeal cancer cell line. Further structural modification of RB4 can be carried out in future studies to enhance its anticancer property and improve its selectivity towards cancer cells.

PHARMACOLOGY

PGO 05

MPSPSC2015000037 (Oral)

Shiitake Mushroom: Potential Glycemic Control Activity on Alloxan- and Glucocorticoid-Induced Diabetic Long-Evans Rats

MM Rahman Sarker^{1,2}, MATR Zihad¹, M Islam¹, M Ahmad Shah³, M Kifayatullah², SK Das², M Nahar¹, A Ghosh¹, NE Ismail²

¹*Department of Pharmacy, School of Science, Primeasia University, Dhaka, Bangladesh*

²*Faculty of Pharmacy, Lincoln University College, Petaling Jaya, Selangor, Malaysia*

³*Department of Biomedical Sciences, Faculty of Medicine and Health Sciences, Lincoln University College, Petaling Jaya, Selangor, Malaysia*

Shiitake (*Lentinula edodes*), an edible mushroom, is used as an alternative medicine for centuries. It was reported to possess antitumour, immunomodulating, anti-inflammatory, hepatoprotective, and hypoglycaemic activities. Glucocorticoids indicated for arthritis treatment induce hyperglycaemia in diabetic patients. However, no report has been published on its activity in glucocorticoid-induced diabetes. Therefore, this study was to investigate its antihyperglycaemic effect on alloxan- and glucocorticoid-induced diabetic rats. Diabetes was induced by Alloxan (150 mg/kg, I.P.) to Long-Evans rats. Following three days, rats with plasma glucose >12 mmol/L were included in the study. Methanol extract (ME) of Shiitake was prepared by maceration and distillation techniques and administered at 200, 400, 600 and 800 mg/kg/day/P.O. along with metformin (150 mg/kg) for 7 days. After 1-week interval, the rats were administered with dexamethasone (2 mg/kg, I.M.) for 3 days and further treated for 7 days. ME of Shiitake mushroom dose-dependently reduced fasting blood glucose levels; extract doses 400 and 800 mg/kg significantly reduced fasting glucose on day 7 by 2.08 & 3.01 times in alloxane-induced, and 1.75 and 1.98 times in steroid-induced diabetic rats, respectively. The glucose lowering activity of the extract was comparable to that of metformin. ME (800 mg/kg) significantly increased plasma insulin level in alloxan- ($p < 0.001$) and steroid-induced ($p < 0.01$) diabetic rats. The study demonstrated that Shiitake mushroom is effective to reduce hyperglycaemia and induce insulin secretion in both alloxan- and corticosteroid-induced diabetic rats. Intake of Shiitake as vegetable or as an extract will be beneficial for the management of diabetes.

POSTER PRESENTATIONS

Clinical Pharmacy

No	Presenting Author	Title
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CPP 02	Nahlah Elkudssiah Ismail, Assoc Prof. Dr	Self-Esteem and its Correlation with Asthma Control in Adult Asthma Patients
CPP 03	Nahlah Elkudssiah Ismail, Assoc Prof. Dr	Impact of Comorbidities on Asthma Severity and Asthma Control in Adult Asthma Patients
CPP 04	Fann Zi Yin, Ms	Clinical Management of Breast Cancer Patients who Received Chemotherapy at the University of Malaya Medical Centre
CPP 05	Ganesh Sritheran A/L Paneerselvam, Mr	Evaluation of Pharmacist Interventions and Physicians Acceptance in Renal Transplant Patients in Medication Therapy Adherence Clinic (MTAC)
CPP 06	Hoo Yee Yin, Ms	A Retrospective Observational Study on Warfarin Use and Adverse Outcomes in Patients with Heart Valve Replacement
CPP 07	Law Kian Boon, Mr	Fludarabine, Cytarabine plus Granulocyte Colony Stimulating Factor (FLAG) Might Improve Survival Outcomes Of Elderly Patients With Acute Myeloid Leukemia
CPP 08	Eng Ker Loon, Mr	Do We Need Rationalisation of Elderly Pharmacotherapy?
CPP 09	Masrahayu Binti Moydin, Mdm	Pharmacist's Interventions On Medication Use In Hospitalised Patient
CPP 10	Negin Naderifar, Ms	A Review on Pharmacological Interventions for Treatment of Nightmare Disorder
CPP 11	Nur Farah Mohd Yazid, Ms	Physicians' Perception, Expectations and Experience Working With Ward Pharmacists in Public Hospitals in Selangor: An Online Survey
CPP 12	Siow Fui Shing, Ms	Treatment Pathways of Breast Cancer Patients Treated at the University of Malaya Medical Centre
CPP 13	Teng Jie Ying, Ms	The Prevalence of Adverse Events due to Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) in Rheumatology Patients treated at the University of Malaya Medical Centre
CPP 14	Vijaya A/P Ponnusamy, Ms	Prevalence and Risk Assessment of Cardiovascular Disease, Chronic Kidney Disease, Osteoarthritis, Retinopathy, Impotency and Cancer among Type 2 Diabetic Outpatients in Bangladesh
CPP 15	Wan Azuati Binti Wan Omar, Ms	A Prospective Evaluation of Venous Thromboembolism Prophylaxis among Surgical Patients at a Non-Academic Specialist Hospital

Pharmacy Practice / Social Pharmacy

No	Presenting Author	Title
PPP 01	Zaswiza Mohamad Noor, Dr	Community Pharmacy Intervention in Managing Sleep Disorders: Customer's Beliefs and Opinions
PPP 02	Angela Lim Wen Huey, Ms	Knowledge, Attitude and Practice towards Leptospirosis Among Malaysian Wet Market Sellers
PPP 03	Yeoh Ching Ching, Ms	Evaluation of Knowledge, Attitude and Perception of Medical, Dental and Pharmacy Students in AIMST University on the Progress of Amyotrophic Lateral Sclerosis (ALS)
PPP 04	Chu Heng Lit, Mr	Knowledge, Attitude and Perception of Japanese Encephalitis Among Healthcare Students of Medicine, Pharmacy and Dentistry of AIMST University
PPP 05	Chua Siew Siang, Assoc Prof. Dr	Perception of Female Staff from Non-Medical Faculties of a Public University towards Menopause and its Management
PPP 06	Mariani Ahmad Nizaruddin, Datin	A Retrospective Study: Medication Enquiries by the Public at National Pharmacy Call Centre (NPCC), Hospital Kuala Lumpur
PPP 07	Deneshwary A/P Balu, Ms	Knowledge and Perception of Medicine, Dentistry and Pharmacy Students of AIMST University regarding Ebola Virus Disease (EVD)
PPP 08	Dinesh Kumar A/L Subramaniam, Mr	Quality of Life and Usage of Pain Killers among Chronic Pain Patients in Hospital Tuanku Ampuan Najihah (HTAN)
PPP 09	Nahlah Elkudssiah Ismail, Assoc Prof. Dr	Measurement of Stigmatisation Level towards Mental Illness Patients among Urban And Rural Communities
PPP 10	Elaine Liew Li Fong, Ms	Patient or Care-Giver Knowledge Assessment for Home Administration of Subcutaneous Methotrexate
PPP 11	Fadhilah Ismail, Ms	Factors Associated with Prescription Opioid Overdose Deaths in Patients with Non-Cancer Pain: A Literature Review
PPP 12	Kee Soo Nin, Ms	Knowledge, Attitudes, and Practices of Undergraduate Female Students in a Private Tertiary Institution towards the Use of ECP
PPP 13	Khairiah Hashim, Mdm	Quality of Life (QOL) and HAART Adherence among People Living with HIV (PLHIV): Is it Correlated?
PPP 14	Khor Seau Ting, Mdm	The Use of Medications in Pre-packed Sizes for Prescriptions from the Emergency Department of Hospital Sultanah Bahiyah
PPP 15	Lua Pei Lin, Prof	Health-Related Quality of Life Benefits for Epilepsy Patients and Family Caregivers via the Animated Epilepsy Educational Video (AnEEV)
PPP 16	Lydia Lim Sung Min, Mdm	Quality of Care in Patients Discharged from Warfarin Clinic to Primary Care Upon Stabilization of Warfarin Therapy
PPP 17	Masfiza Abdul Hamid, Mdm	A Study Assessing Knowledge on Insulin Injection Technique using Pen by Patients Attending Kota Setar District Health Clinic in Kedah
PPP 18	May Khin Soe, Dr	Basic Primary Care Approach: Providing Community with Education and Hands on Training Regarding Diabetes Care
PPP 19	Mazlina Amira Binti Zamli, Ms	A Cosmetovigilance Survey in Malaysia
PPP 20	Muhamad Syaifullah Bin Ismail, Mr	Pharmacy Students Perception and Preparedness towards the Provision of Pharmaceutical Care: Findings from a Malaysian Public University

No	Presenting Author	Title
PPP 21	Ng Yen Ping, Mr	A Cross-Sectional Study on the Prevalence of Type 2 Diabetes, Hypertension, Hypercholesterolemia and Obesity Among Population at Sungai Petani, State of Kedah, Malaysia
PPP 22	Norazila Abdul Ghani, Mdm	Cost-Effectiveness Analysis of Antibiotics Treatment in Melioidosis in Hospital Sultanah Bahiyah
PPP 23	Norny Syafinaz Binti Ab Rahman, Dr	Knowledge, Attitude and Perceptions of Over-the-Counter (OTC) Medications Among non-Pharmacy Students: A Pilot Study
PPP 24	Nur'Ain Balqis Binti Ai, Ms	Adverse Cosmetic Reactions among Malaysian
PPP 25	Nurdiana Jamil, Mdm	Knowledge and Practice of Community Pharmacists in Selangor and Wilayah Persekutuan Kuala Lumpur on the Management of Childhood Common Cough and Cold
PPP 26	Pang Siow Fen, Ms	Relationship between the Movement Disorder Society-Unified Parkinson Disease Rating Scale (MDS-UPDRS) Domains and the Health-Related Quality of Life (HRQoL) among Parkinson Patients in Hospital Tuanku Ampuan Najihah (HTAN), Kuala Pilah
PPP 27	Perasma Mahendra Varma, Ms	Exploring the Halal Status of Antineoplastic and Immunomodulating Agents, and Nutritional and Dietary Supplements in Pusat Perubatan Universiti Malaya (PPUM) and Hospital Angkatan Tentera Tuanku Mizan (HATTM)
PPP 28	Samuel Ting Chuo Yew, Mr	The Awareness of Royal Malaysian Custom Officers towards Counterfeit Pharmaceutical Products and Roles of Pharmacy Enforcement Division Officers in Sarawak
PPP 29	Shairyah Ahmad Hisham, Mdm	Perceptions on Barriers in Conducting Smoking Cessation Counselling among Practising Pharmacists in Klang Valley
PPP 30	Sivakami Janahiraman, Mdm	Prescribing Error in Hospital Discharge Prescriptions: A Preliminary Study
PPP 31	Syaziayah Ahmad, Mdm	Prescribing Pattern of Human Albumin in Surgical Wards of Hospital Sultanah Bahiyah
PPP 32	Tan Boon Seng, Mr	A Study on the Use of Non-Prescription Medicines in the Management of Minor Ailment among the Community Pharmacists in Penang
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PPP 34	Wong Pui Mun, Ms	Prescribing Pattern of Polymyxin B & E in Hospital Serdang
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PPP 36	Yeo Hui Yee, Mdm	Health, Economic Impact and Cost-Effectiveness of Future Dengue Vaccination Program in Malaysia
PPP 37	Teong Win Wei, Ms	Job Satisfaction and Stress Levels among Community Pharmacists in Klang Valley

Pharmacy Education

No	Presenting Author	Title
PEP 01	Abdulkareem Mohammed Al-Shami, Mr	Induction of a Pharmacoeconomics Course in Pharmacy Curriculum: Preliminary Findings from the Final Year Cohort
PEP 02	Helena Sentiagoa, Ms	Assessment of Inhalation Technique Using Dry Powder Inhaler Among Third and Fourth Year Pharmacy Students in a Malaysian University : Pre And Post Education
PEP 03	Norny Syafinaz Binti Ab Rahman, Dr	How Community Pharmacists Responded towards the Community Pharmacy Attachment among Third Year Undergraduate Pharmacy Students? A 3-Years Experience.

Pharmaceutical Chemistry

No	Presenting Author	Title
PCP 01	Jong Yi Wen, Ms	In Silico Pharmacophore Elucidation for Bicyclic Antagonists Of Human A2A Adenosine Receptors and its Comparison with A3 Adenosine Receptor Bicyclic Antagonists
PCP 02	Joyce Wong Xin Yi, Ms	In Silico Pharmacophore Elucidation for Bicyclic Antagonists Of Human A3 Adenosine Receptors and its Comparison with A2A Adenosine Receptor Bicyclic Antagonists
PCP 03	Mohammad Gousuddin, Mr	Stability Indicating RP-HPLC Method for Simultaneous Determination of Tramadol Hydrochloride and Aceclofenac in Dosage Form
PCP 04	Muhamad Faris bin Osman, Mr	Phenolic Content Screening and <i>In-vitro</i> Antioxidant Evaluation for Radical Scavenging Activity of Methanolic Cladodes Extract of <i>Opuntia Cochenillifera</i> (L.) Mill
PCP 05	Rabiatul Adawiyah Dalim, Ms	Effects of Methyl Jasmonate Elicitation on the Growth and Alkaloids Content of In vitro Cultures of <i>Ruta Angustifolia</i> (L.) Pers
PCP 06	Thenmozhi Shanmugam, Assoc Prof	HPTLC Fingerprint Analysis of <i>Vitex Pinnata</i> Linn. Leaves
PCP 07	Gayathri Rajamanickam, Mdm	Synthesis and Cardioprotective Effects of Novel Series of Combination of Quinazoline-Thiadiazole against Isoproterenol-Induced Hypertrophy
PCP 08	Natrah Binti Abd Rahman, Ms	Molecular Dynamics Behaviour of One Third of the Site Reactivity of Microsomal Prostaglandin E Synthase Type 1 Complexes with an Oxicam Analog
PCP 09	Ko Wei Cheng, Ms	Phytochemical Study on the Methanol Fraction Of <i>Zingiber Officinale</i>

Traditional and Complementary Medicine

No	Presenting Author	Title
TCMP 01	Norazalina Mohd Zah, Dr	Antibacterial Activity of Extracts of Marine Brown Algae <i>Padina gymnospora</i>
TCMP 02	Chan Si Yan, Ms	New Herbal Dispensing System: Herbal Preparation Process, Patients' and Prescribers' Acceptance

Pharmaceutical Technology

No	Presenting Author	Title
PTP 01	Abdullah Khan, Dr	Development of Sustained Release Ophthalmic Delivery of Prulifloxacin Using in situ Gelling System
PTP 02	Bibhu Prasad Panda, Dr	Response Surface Methodology to Optimize Ppyrilamine Maleate Fast Dissolving Tablets Using Synergetic Disintegrants Approach
PTP 03	Chua Hui Jen, Ms	Development of Self-Emulsifying Drug Delivery System (S-SEDDS) for Glibenclamide
PTP 04	Hazrina Hadi, Dr	Nanosuspension Technology in Salicylic Acid and its Particle Size Characterization
PTP 05	Hazrina Hadi, Dr	Development and Characterization of Topical Caffeine Sunscreen Formulation
PTP 06	Hazrina Hadi, Dr	Formulation and Characterization of Resiquimod Microsponges Loaded Gel
PTP 07	Qusro Bin Hassan, Mr	<i>In vitro</i> and <i>in vivo</i> Evaluation of Formulated Piroxicam Subdermal Implants
PTP 08	Satheesh Babu Natarajan, Dr	Formulation of Stable Solid Dispersion Containing Artemether into Fast Disintegrating Tablets
PTP 09	Thong Li Ming, Ms	The Influence of Drug Localisation within Solid Lipid Nanoparticles (SLNS) on the Cellular Uptake of Insulin-Containing SLNS
PTP 10	Manimaran Sellappan, Dr	Development and Screening of Certain Essential Oil Based Topical Formulations for their Antimicrobial Activity
PTP 11	May Florence Dela Cruz-Bacayo, Mdm	Isolation and Ointment Formulation of a Semi-Purified Beta Carotene from <i>Daucus carota</i> L. and its Antimicrobial effect against <i>Staphylococcus aureus</i>

Military Pharmacy

No	Presenting Author	Title
MPP 01	Amirah Binti Rahmatullah Khan, Ms	Value-Added Services: Increasing Patient Utilization of Pharmaself Automated Dispensing Unit 24 Hour (PADU24) in Tuanku Mizan Armed Force Hospital (TMAFH)
MPP 02	Ahmad Muzakhir bin Sulong, Second Lieutenant	IV Ceftriaxone Use in Tuanku Mizan Armed Forces Hospital

Pharmacology

No	Presenting Author	Title
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PGP 02	Chellappan Dinesh Kumar, Dr	The Protective Effect of the Aqueous Extract of Auricularia Polytricha on Paracetamol Induced Hepatotoxicity in Sprague-Dawley Rats
PGP 03	E.Thilagam, Prof	Antioxidant Effect of Senna Surattensis Leaves Extract on Streptozotocin Induced Diabetic Rats
PGP 04	J Anbu Jeba Sunilson, Dr	Anti-Inflammatory Activity of Sansevieria Trifasciata Leaves
PGP 05	Kumarappan Chidambaram, Dr	Polyphenolic Extract of Ichnocarpus Frutescenes Leaves Modulates Peripheral Glucose Uptake Through GLUT Gene Transporters in Experimental Type 2 Diabetic Rats
PGP 06	Md. Moklesur Rahman Sarker, Assoc Prof	Augmentation of Humoral Immunity by an Ayurvedic Herbal Preparation, Anantamul Salsa <i>in vitro</i>
PGP 07	Naveen Kumar H.S, Dr	A Pharmacokinetic Study of Antimycobacterial N'-hexadecanoylisonicotinohydrazide
PGP 08	Rajavel Varatharajan, Assoc Prof	Edaravone Attenuates Gentamicin-Induced Nephrotoxicity in Rats
PGP 09	Sreemoy Kanti Das, Mr	Phytochemical and Toxicity Study of Standardised Extract of Epipremnum aureum in Rodents
PGP 10	Yeoh Peng Nam, Prof	Do Opioid Receptors have a Role in the Anti-Motility Effect of Pandanus Amaryllifolius in the Guinea Pig Ileum?
PGP 11	Lim Xiang Yin, Ms	In vitro Evaluation of Anticancer Properties of the (1R, 2R)-1-phenyl-2-(phenylamino)propane-1,3-diol Derivative (RB5)
PGP 12	Nicole Lim Xiu Fern, Ms	In vitro Evaluation of Anticancer Properties of N-((1S,2S)-1,3-dichloro-1-phenylpropan-2-yl)aniline Derivative (RB8)
PGP 13	S Aravinth Vijay Jesuraj, Mr	Antiproliferative Activity of L-Glutaminase from Aeromonas Veronii on A549 and HT29 Cell Lines
PGP 14	Tay Shun Ern, Mr	In Vitro Evaluation of the Anticancer Properties of the N-((1R,2R)-1,3-dichloro-1-phenylpropan-2-yl)aniline Derivative (RB9)
PGP 15	Venkateskumar Krishnamoorthy, Assoc Prof	Biological Screening of Malaysian Green Mussels (Perna Viridis)
PGP 16	Maryam Abbaspour Babaei, Ms	Natural Compound 2,2'-Oxybis (4-allyl-1-methoxybenzene), Biseugenol B, from Litsea costalis Induces Apoptosis through Activation of Intrinsic, Extrinsic and NF-kB Signaling Pathways on Human Prostate Cancer PC3 Cells <i>in vitro</i>
PGP 17	Mashood Ahmad Shah, Mr	Antidiabetic and Lipid Lowering Potential of Brassica Oleracea Var. Italica in Type 2 Diabetic Sprague-Dawley (SD) Rats

CLINICAL PHARMACY

CPP 01

MPSPSC2015000053 (Poster)

Guideline Adherence and Prescribing Pattern for Diabetes Mellitus Management with and without Co-Morbidities: a Malaysian Hospital Perspective

MZ Iqbal^{1,3}, MS Iqbal², S Prajapathi¹, AH Khan³

¹*Faculty of Pharmacy, AIMST University, Kedah, Malaysia*

²*Faculty of Pharmacy, MAHSA University, Selangor, Malaysia*

³*School of Pharmaceutical Sciences, Universiti Sains Malaysia, Penang, Malaysia*

This study aimed to evaluate the physician's adherence to the Malaysia Ministry of Health Clinical Practice Guideline (CPG) 2009 for the treatment of diabetes mellitus with or without co-morbidities. This cross-sectional study was carried out at a tertiary care hospital, Hospital Pulau Pinang (HPP) Penang, Malaysia. A total of 51 physicians and 1020 patients' prescriptions written by these physicians were taken from the prescription record (20 prescriptions for each enrolled physician). All 1020 patients were suffering from diabetes mellitus with or without co-morbidities. These patients were recruited from different wards of the hospital. Depending on the recommendations of the CPG 2009, the prescriptions were divided into adherent and non-adherent prescriptions. The overall good level of physician adherence was seen with respect to the recommendations of CPG 2009 in all prescriptions. A statistically significant negative association (Effect size = 0.094, p-value = 0.003) was observed between diabetes mellitus control and co-morbidities. CPG adherent had statistically weak negative association (Effect size = - 0.081, p-value = 0.010) with patients having co-morbidities. No statistically significant association was observed between CPG adherence and any other co-morbidity. The study explored the several features of prescription pattern of physicians involved in the management of diabetes mellitus with or without co-morbidities and recognised the need for improvement in their prescription pattern for treating diabetes mellitus.

CPP 02

MPSPSC2015000134 (Poster)

Self-Esteem and Its Correlation with Asthma Control in Adult Asthma Patients

NE Ismail^{1,2}, S Ahmad², A I Ismail³, M A Mohd Zim³, W Akram²

¹*Faculty of Pharmacy, Lincoln University College, Petaling Jaya, Selangor, Malaysia*

²*Clinical BioPharmaceutics Research Group (CBRG), Pharmaceutical and Life Sciences CoRe, Universiti Teknologi MARA, Puncak Alam, Selangor, Malaysia*

³*Respiratory Unit, Faculty of Medicine, Universiti Teknologi MARA, Selangor, Malaysia*

Psychological and psychosocial factors influence asthma control and self-management of asthma. Self-esteem of adult asthma patients may contribute to achieve and maintain asthma control. The objective of this study was to assess the self-esteem of the enrolled asthma patients and to determine its correlation with asthma control. This cross-sectional study enrolled 152 adult asthma patients from four respiratory specialist clinics in Selangor, Malaysia. The self-esteem was determined by using the translated Malay version of the 10-item Rosenberg self-esteem scale. The patients' responses were recorded on a 4-Likert like scale. Higher score reflected higher self-esteem. For asthma control, the Malay version of asthma control test (ACT) that consisted of five items was used. Once the questionnaires were completed by the asthma patients, data were entered and analysed using SPSS® version 21. The mean age of the asthma patients was 52.03 (15.11) years and the majority were Malays [81 (53.3 %)]. The enrolled asthma patients showed moderate level of self-esteem [29.31 (3.29)] whereas, the mean ACT score ACT [17.58 (3.99)] showed that asthma was not well controlled. Furthermore, self-esteem showed a low significant positive correlation with asthma control ($r = 0.206$, $p = 0.008$) using Pearson correlation analysis. The enrolled asthma patients showed moderate self-esteem and their asthma was not well controlled. The significant positive correlation of self-esteem with asthma control suggested that psychosocial issues such as self-esteem should be considered when providing patient education as this may help to achieve and maintain asthma control.

CPP 03

MPSPSC2015000135 (Poster)

Impact of Comorbidities on Asthma Severity and Asthma Control in Adult Asthma Patients

NE Ismail^{1,2}, S Ahmad², AI Ismail³, MA Mohd Zim³, W Akram², N Sajid Ali Bangash², S Ahmad Al. Abboud²

¹*Faculty of Pharmacy, Lincoln University College, Petaling Jaya, Selangor, Malaysia*

²*Clinical BioPharmaceutics Research Group (CBRG), Pharmaceutical and Life Sciences CoRe, Universiti Teknologi MARA, Puncak Alam, Selangor, Malaysia*

³*Respiratory Unit, Faculty of Medicine, Universiti Teknologi MARA, Selangor, Malaysia*

The management of asthma becomes more difficult in the presence of comorbidities in asthma patients. The aim of this study was to determine the impact of comorbidities on asthma severity and asthma control in asthma patients. In present study, 55 adult asthmatics were enrolled from the respiratory clinics at Hospital Selayang and Hospital Sungai Buloh, both located in Selangor, Malaysia. Malaysian version of asthma control test (ACT) was administered to the asthma patients. The severity of asthma was assessed by using the lung function test by spirometry. The socio-demographic data and comorbidities were recorded from patients' medical records. Patients were grouped into two categories; asthma patients without comorbidities and asthma patients with comorbidities. The data were extracted and entered in SPSS® version 21 for analysis. The results of independent t-test showed that the mean score of asthma control was significantly higher in the group of asthma patients without comorbidities (20.17 ± 3.70) than asthma patients with comorbidities (17.15 ± 3.17 ; $t = 2.959$ (53), $p = 0.005$). Whereas, the mean FEV1 % values were not significantly different in the groups of asthma patients without comorbidities (68.96 ± 17.16) and patients with comorbidities (60.98 ± 17.19 ; $t = 1.698$ (53), $p = 0.095$). The findings of the study suggested that asthma patients with comorbidities need special considerations from the healthcare professionals for effective control of asthma. Furthermore, multiple centre studies with greater sample size are recommended to ensure generalizability of present study.

CPP 04

MPSPSC2015000094 (Poster)

Clinical Management of Breast Cancer Patients who Received Chemotherapy at the University of Malaya Medical Centre

ZY Fann¹, M Dahlui², NAM Taib³, FH Shabaruddin¹

¹*Department of Pharmacy, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia*

²*Department of Social and Preventive Medicine, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia*

³*Department of Surgery, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia*

Breast cancer is a common cancer, causing disease and treatment-related morbidity and mortality. This study aimed to describe the characteristics and clinical management of a cohort of breast cancer patients who received chemotherapy from 2012 to 2014 at the University Malaya Medical Centre (UMMC). This retrospective study was based on patients' medical records. A total of 97 patients who met the inclusion criteria (mean age 53 years) were included. Chemotherapy was given as adjuvant (93%, n=90) or neo-adjuvant (7%, n=7) treatment. Among 91 patients who completed chemotherapy, 86 patients (95%) received only one regimen while five (5%) were switched to another regimen mid-treatment. The most common chemotherapy regimens were FEC regimen (44%, n=43) and FEC+D regimen (40%, n=39) with 86% and 95% of patients receiving all six cycles of chemotherapy, respectively. Chemotherapy dose delay and dose reduction occurred in 21% and 9% of patients. Most patients (76%, n=74) received radiotherapy after chemotherapy treatment. Two of nine HER-2 receptor positive patients received trastuzumab after chemotherapy. The most frequent chemotherapy adverse events were haematological particularly anaemia (53%, n=51) and neutropenia (44%, n=43), followed by gastrointestinal adverse events particularly nausea (45%, n=44), vomiting (39%, n=38) and mucositis (35%, n=34). Significant association was found between severe neutropenia and longer duration of chemotherapy treatment. The main radiotherapy-related adverse events were acute (55%, n=41) and delayed (8%, n=6) skin reactions. This study found that the delivery of chemotherapy and management of adverse events of breast cancer patients at UMMC were in line with published guidelines.

CPP 05

MPSPSC2015000099 (Poster)

Evaluation of Pharmacist Interventions and Physicians Acceptance in Renal Transplant Patients in Medication Therapy Adherence Clinic (MTAC)

GS Paneerselvam

Faculty of Pharmacy, Cyberjaya University College of Medical Sciences, Malaysia

Renal transplantation is an established treatment for end-stage renal disease. Poor adherence to renal transplant medications due to side effects leads to allograft failure. Therefore, the objectives of this study were to evaluate the pharmacist interventions, physician acceptance rates of the pharmacist recommendations and the patient's knowledge on their medications. This study was done retrospectively in University-affiliated, inner-city, kidney transplant-medication therapy adherence clinic (MTAC) in Selayang Hospital. Thirty two kidney transplant patients were enrolled as subjects for this study. A pharmacotherapy evaluation-recommendation form was used to collect the number of pharmacist interventions and physicians acceptance. The results showed that physician's acceptance rate was 91.5% of pharmacist recommendations. There was a strong linear correlation between the physicians acceptance of pharmacist intervention with the number of side effects after interventions ($r=0.8$; $p<0.01$). Additionally, there was a significant improvement in patient's knowledge towards medications after the pharmacist counselling session ($p<0.01$). As a conclusion, this study showed that clinical pharmacists directly contribute to kidney transplant patient care besides showing positive influence on physician prescriptions and patient treatment outcomes as well as improved patient knowledge and adherence towards their medications to ensure allograft long-term survival.

CPP 06

MPSPSC2015000033 (Poster)

A Retrospective Observational Study on Warfarin Use and Adverse Outcomes in Patients with Heart Valve Replacement

YY Hoo¹, SM Chuah¹, SF Syed Fadzli¹, H Ishak¹, SL Law¹, NA Mohd Yunos¹, KW Ng¹, MA Muhammad Nor²

¹*Department of Pharmacy, Hospital Serdang, Selangor, Malaysia*

²*Department of Cardiothoracic, Hospital Serdang, Selangor, Malaysia*

The selection of the right warfarin dose during warfarin initiation in heart valve replacement patients is not a straightforward task and is commonly decided by the operating surgeon based on the complexity of the surgery and the presence of arrhythmia during the recovery period. The presence of arrhythmias will delay removal of the pacing wire. Pacing wire removal can only be performed when the INR is < 2.0 to avoid excessive bleeding at the pericardium. Additionally, there is no data on the outcomes of patients initiated with warfarin both during hospitalisation and upon discharge. Therefore, the objectives of this study were to describe the warfarin initiation practice and duration to reach target INR, and to assess the bleeding, thromboembolic and readmission rates in patients with valve replacement in a tertiary hospital. A retrospective universal sampling study was conducted on all heart valve replacement patients (n=58) of Hospital Serdang in the year 2013, who met the study inclusion criteria with data retrieved from Patients' Medical Records. A majority of the patients were initiated on low dose warfarin. The average duration to reach therapeutic INR is 6.11 days. The current practice demonstrated low bleeding (3.4%) and thromboembolic events (1.7%) with 4 out of 58 patients (6.9%) being readmitted due to overwarfarinisation one year post discharge. The findings suggest that low warfarin initiation dose (< 5 mg) reduces the rate of excessive anticoagulation and offer a stable achievement towards targeted therapeutic INR, in addition to low adverse outcomes.

CPP 07

MPSPSC2015000054 (Poster)

Fludarabine, Cytarabine plus Granulocyte Colony Stimulating Factor (FLAG) Might Improve Survival Outcomes of Elderly Patients with Acute Myeloid Leukaemia

KB Law¹, KM Chang², NA Hamzah³, KH Ng³

¹*Clinical Research Centre, Ministry of Health, Malaysia*

²*Department of Haematology, Hospital Ampang, Ministry of Health, Malaysia*

³*Institute of Mathematical Sciences, University of Malaya, Malaysia*

Acute Myeloid Leukaemia (AML) is highly heterogeneous, causing variable treatment responses especially in elderly. The use of fludarabine, cytarabine plus granulocyte colony stimulating factor (G-CSF), namely FLAG, presents a potential synergistic effect with acceptable toxicity profile and could be used in elderly to improve survival outcome. Thus, this study aimed to investigate the role of FLAG as consolidating regimen in elderly patients diagnosed with AML. Retrospective cohort analysis of treatment data from 2008 to 2013 at Hospital Ampang was carried out. Analysis included only patients more than 54 years old who received consolidating chemotherapy with FLAG, non-FLAG and mixed regimens. Of 183 patients who were diagnosed with AML, only 48 patients entered remission after completion of induction therapy. Among them, 18 patients (37.5%) were consolidated with only FLAG, 10 patients (20.8%) received non-FLAG, and 20 patients (41.7%) received mixed regimens. The median survival time improved markedly from non-FLAG (9.74 months) to FLAG (18.2 months), and then to mixed regimens (27.50 months). However, a test of equality on the survival distributions by log-rank test was not significant ($\chi^2 = 2.0383$, df. = 2, $p = 0.3609$). Our data revealed an incremental trend in median survival time following the use of FLAG regimen, probably due to potential synergistic effect between fludarabine, cytarabine and G-CSF. In conclusion, the use of FLAG regimen might prolong survival of elderly AML patients when used in conjunction with other regimens and should continue to be studied.

CPP 08

MPSPSC2015000004 (Poster)

Do We Need Rationalisation of Elderly Pharmacotherapy?

M Kashyap¹, SR Rajagopal², KL Eng¹, FM Goh¹, D Sunderajan¹

¹*Faculty of Pharmacy, AIMST University, Semeling, Malaysia*

²*Faculty of Medicine, AIMST University, Semeling, Malaysia*

Studies on the rational use of drugs among Malaysian elderly are limited in the literature. Therefore, this study aimed to evaluate the prescription pattern specifically among elderly outpatients using the World Health Organisation (WHO) core prescribing indicators. Prescriptions of 142 outpatients, aged 60 years or above were evaluated prospectively using WHO core prescribing indicators. The average age \pm SD of patients was 69.8 ± 7.4 years. On an average, each patient had 1.6 ± 0.72 diagnoses. The most common disorder was 'Diseases of circulatory system' (97%). The patients were prescribed an average of 4.7 ± 1.6 medications. Over half of the patients (79.5%) received more than five medications concurrently. The percentage of drugs prescribed by generic name was only 22.12%. Antibiotic usage was 2.81% while 9.2% of patients were prescribed injections. The percentage of drugs prescribed from the National Essential Medicines List (4th edition) was 53.75%. In conclusion, the minimal prescription of antimicrobials and injections is a very positive reflection of good prescribing among elderly outpatients. However, a high prevalence of polypharmacy, low prescription by generic name and low prescriptions from the essential drug list require rationalisation. This study is, to the best of our knowledge, the first set of results based on WHO prescribing indicators on Malaysian elderly outpatients.

CPP 09

MPSPSC2015000131 (Poster)

Pharmacist's Interventions on Medication Use in Hospitalised Patient

M Moydin, K Mohamad, MH Mohamad Jinal, MA Abdullah, NS Adnan, SA Awang Ladin, WNF Wan Sharifuddin

Pharmacy Department, Hospital Kemaman, Terengganu, Malaysia

Medication errors can be reduced or prevented by pharmacists' intervention while reviewing patients in the wards. This study aimed to determine the types of pharmacists' intervention in hospitalised patients in Hospital Kemaman and to estimate the cost avoidance. This retrospective study examined all pharmacists' interventions recorded by ward pharmacists in Medical Male (MM), Medical Female (MF) and High-Dependency-Ward (HDW) over a one-year period. Data were categorised as incomplete prescription, inappropriate regimen and miscellaneous. Interventions were rated based on the probability of adverse drug event (ADE) which would have occurred in the absence of an intervention (0=low, 0.4=medium, 0.6=high). These scores were then used to calculate cost avoidance. Data were analysed using descriptive analysis and chi-square test. A total of 1,481 prescribing errors were detected by the ward pharmacists. Ninety-five percent (1,410) of interventions were accepted by the prescribers ($p < 0.05$). Inappropriate regimen, 71% (1,052) was the highest number of interventions made, where omission of medication was the common error for all the wards ($p < 0.05$). Cardiovascular medications were the type of medications with the highest intervention in both the medical wards (MM, 26.1%; FM, 26.3%) while for the HDW was electrolyte, 19.6% ($p < 0.05$). Most of the interventions were categorised under low [50.4% (747)] or medium probability [48.2% (714)] of ADE. Estimation of ADE cost avoidance in this was RM50,419.39. Therefore, pharmacists involved in patient care in the wards can help to optimise drug therapy especially in omission errors and thus save the cost of patient treatment.

CPP 10

MPSPSC2015000101 (Poster)

A Review on Pharmacological Interventions for Treatment of Nightmare Disorder

N Naderifar¹, F Hashemian²

¹*Pharmacy student, School of Pharmacy, Islamic Azad University, Pharmaceutical Sciences branch, Tehran, Iran*

²*School of Pharmacy, Clinical Pharmacy Department, Islamic Azad University, Pharmaceutical Sciences branch, Tehran, Iran*

Nightmares are extremely frightening dreams whereby the person wakes up with a detailed memory followed by a quick orientation afterward. With a view to aetiology, nightmares might be associated with disorders such as Posttraumatic Stress Disorder (PTSD), Nightmare Disorder, and some psychiatric illnesses. Nightmare Disorder is categorized as Parasomnic Disorders, which is usually associated with REM sleep and directly affects quality of sleep. Nocturnal awakenings with recall of intensive disturbing dreams lead to fear, anxiety and sadness of sleeper, resulting in insomnia, daytime sleepiness and fatigue. This paper presents the results of evaluations performed on articles related to medical treatment for nightmares. Nightmares are a core feature of PTSD. Thus, most of the studies assessing efficacy of different medications are limited to PTSD-associated nightmares. Clinical studies suggest that increased adrenergic activity in the central nervous system contribute to PTSD-associated nightmares pathophysiology. Therefore, prazosin recommended for treatment of nightmares in PTSD patients can significantly reduce nightmare frequency and severity. Numerous studies showed that Prazosin is generally well tolerated although patient should monitor for orthostatic hypotension. Prazosin notably reduces trauma nightmares and improves sleep quality. Other medications that have been studied for possible benefit to treat nightmares but with less documentation include: clonidine, trazodone, atypical antipsychotic, topiramate, low-dose cortisol, fluvoxamine, triazolam and nitrazepam, phenelzine, gabapentin, cyproheptadine and TCAs. In conclusion, prazosin is recommended as an effective medication to treat PTSD-associated nightmares. However, further studies are required to demonstrate efficacy of prazosin to treat nightmare disorder, or any other type of nightmares.

CPP 11

MPSPSC2015000016 (Poster)

Physicians' Perception, Expectations and Experience Working with Ward Pharmacists in Public Hospitals in Selangor: An Online Survey

NF Mohd Yazid¹, ZA Zainal¹, NAH Jamaluddin¹, MN Mohamad Alwi², YS Lim³, SH Mohd Jalil⁴, NA Abdullah⁵

¹*Department of Clinical Pharmacy, Faculty of Pharmacy, Cyberjaya University College of Medical Sciences, Selangor, Malaysia*

²*Faculty of Medicine, Cyberjaya University College of Medical Sciences, Selangor, Malaysia*

³*Department of Pharmacy, Hospital Ampang, Selangor, Malaysia*

⁴*Department of Pharmacy, Hospital Selayang, Selangor, Malaysia*

⁵*Department of Pharmacy, Hospital Tengku Ampuan Rahimah, Selangor, Malaysia.*

Physicians and ward pharmacists are important in a healthcare team. This study aimed to identify physicians' perception, expectations and experience working with ward pharmacists in four public hospitals in Selangor. Only 51 out of 248 physicians (20.6%) responded to the online survey. Physicians were mostly medical officers (63.0%), those between 20-39 years old (40.0%) and with 1-5 years of working experience (53.0%). Physicians have positive perception towards ward pharmacist in minimizing medication errors (86.3%), in improving patient techniques on medication devices (96.1%) and the ability of ward pharmacists to improve quality of medical care (74.5%). This study also found that majority of the physicians expected ward pharmacists to assist them in designing patients' drug regimen (94.1%), identify any drug-related problems (98.1%), know the specific indications of the drugs (96.1%), advise on cost-effective drug alternatives (88.3%), and maintain a complete medication profile on patients (98.1%). All physicians also agreed that ward pharmacists were reliable source of clinical drug information and 60.8% of them strongly agreed that they were regularly informed if there are any problems with the prescriptions. A majority of the physicians (54.9%) interact with fully-registered pharmacists more than 5 times per week to inquire about drug dosage (27.8%), drug availability (26.5%), side effects of drugs (22.2%) and drug alternatives (21.6%). There were no statistically significant ($p > 0.05$) associations between physicians' gender, age, position and length of practice to their expectations of ward pharmacists. Overall, physicians have positive perception, expectations and experience working with ward pharmacists.

CPP 12

MPSPSC2015000092 (Poster)

Treatment Pathways of Breast Cancer Patients Treated at the University of Malaya Medical Centre

FS Siow¹, M Dahlui², NAM Taib³, FH Shabaruddin¹

¹*Department of Pharmacy, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia*

²*Department of Social and Preventive Medicine, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia*

³*Department of Surgery, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia*

Breast cancer is the most common cancer among women worldwide. Clinical management of breast cancer requires a multidisciplinary approach with various treatment modalities. This study aimed to describe patient characteristics and treatment pathways of a cohort of breast cancer patients who received treatment in 2012 to 2014 at the University of Malaya Medical Centre. This retrospective study was based on patients' medical records. There were 178 patients who met the inclusion criteria (mean age 56). Most patients had early stage breast cancer at diagnosis (71%, n=127). Nearly all had surgery (99%, n=176), followed by radiotherapy (60%, n=106) and/or chemotherapy (55%, n=97) as well as subsequent hormonal therapy (67%, n=119) and/or trastuzumab monoclonal antibody (2%, n=4). The most common treatment pathway consists of surgery, followed by chemotherapy, radiotherapy and finally hormone therapy. The incidence of adverse events caused by each treatment modality was generally consistent with published literature. Most patients who had undergone surgery complained of post-operative pain at wound site (77%, n=135). Anaemia (78% n=76) and skin hyperpigmentation (74%, n=78) were the most frequent adverse events for chemotherapy and radiotherapy respectively. The incidence of hot flushes related to tamoxifen (7.0%, n=7) was lower than reported by other studies. This study found that the management of breast cancer at the University of Malaya Medical Centre is in line with recommendations by national and international guidelines.

CPP 13

MPSPSC2015000093 (Poster)

The Prevalence of Adverse Events due to Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) in Rheumatology Patients Treated at the University of Malaya Medical Centre

JY Teng¹, LSL Pok², S Mahadeva², FH Shabaruddin¹

¹*Department of Pharmacy, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia*

²*Department of Medicine, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia*

Non-steroidal anti-inflammatory drugs (NSAIDs) are frequently used for rheumatology conditions. This study aimed to describe the prevalence of NSAIDs-related adverse events in rheumatology patients treated with at least one month of NSAIDs in 2010 to 2011. This retrospective study was based on patients' medical records at the University of Malaya Medical Centre (UMMC). There were 202 patients who met the inclusion criteria (mean age 57). A total of 4848 months of patient data were collected. Most patients were prescribed nonselective NSAIDs (58%, n=118), followed by 22% (n=44) prescribed COX-2 selective NSAIDs and 20% (n=40) switching between both classes of NSAIDs. Diclofenac sodium (75mg) was the most commonly prescribed (58%, n=118), followed by celecoxib (200mg) (42%, n=84). The prevalence of NSAIDs-related adverse events was 15% (n=31 patients), with 16 patients (52%) on nonselective NSAIDs, 9 (29%) on COX-2 selective NSAIDs and 6 (19%) switching between classes. Of these, 30 patients had gastrointestinal adverse events; 26 had GI disturbances and GERD, 3 gastric ulcers and 1 upper gastrointestinal bleed. Clinical management of gastrointestinal events included endoscopy, outpatient clinic visits, pharmacotherapy with proton pump inhibitors, hospitalisation and blood transfusion. Of the 171 patients who did not have gastrointestinal adverse events, 68 (40%) were on primary prophylaxis with gastroprotective pharmacotherapy. There were no significant association between patient characteristics or the use of different classes of NSAIDs and the prevalence of NSAIDs-related adverse events. In conclusion, the prevalence of NSAIDs-related adverse events in rheumatology patients treated at UMMC were comparable to published literature.

CPP 14

MPSPSC2015000144 (Poster)

Prevalence and Risk Assessment of Cardiovascular Disease, Chronic Kidney Disease, Osteoarthritis, Retinopathy, Impotency and Cancer among Type 2 Diabetic Outpatients in Bangladesh

MMR Sarker^{1,2}, H Imam¹, Md. J Rana¹, K Tarek¹, V Ponnusamy², NE Ismail²

¹*Department of Pharmacy, School of Science, Primeasia University, Dhaka, Bangladesh*

²*Faculty of Pharmacy, Lincoln University College, Petaling Jaya, Selangor, Malaysia*

The prevalence of diabetes is increasing rapidly. Diabetes is burdened by the coexistence of several other chronic complications which shorten the life-span and quality of life of diabetic patients. The present study aimed to assess the prevalence and risks of diabetes related major complications, such as cardiovascular diseases (CVD), chronic kidney disease (CKD), liver disease, osteoarthritis, retinopathy, impotency and cancer among type 2 diabetic outpatients in Bangladesh. The study protocol was approved by the Ethical Committee for Human Studies of Primeasia University, Dhaka, Bangladesh. Patients of any age with type 2 diabetes mellitus from either sex who were willingly to participate were included in the study. A total of 796 patients were interviewed and their medical records screened. These patients were from the major hospitals and centres which provide dedicated treatment and services for diabetic patients in Dhaka, Bangladesh. The prevalence of CVD, CKD, osteoarthritis, retinopathy, liver disease, hyperlipidaemia, obesity, impotency, and cancer were found to be 48.49, 11.81, 26.88, 14.07, 2.76, 3.01, 1.76, 1.25, and 0.251%, respectively. The study showed that patients with diabetes for 10 - 20 years had greater prevalence of CVD (30.15%), arthritis (21.36%) and retinopathy (8.04%) than those who had diabetes for 1 - 10 years (18.34, 5.52, and 6.06%, respectively). The rate of hyperlipidaemia (3.01%) and obesity (1.76%) were lower than that in other countries. The study concluded that hyperlipidaemia and obesity were not the major risk factors. Nevertheless, CVD, CKD, arthritis, and retinopathy were the major diseases associated with diabetes in Bangladesh.

CPP 15

MPSPSC2015000068 (Poster)

A Prospective Evaluation of Venous Thromboembolism Prophylaxis among Surgical Patients at a Non-Academic Specialist Hospital

WA Wan Omar, NAH Mohd Radzi, NH Hashim

Pharmacy Department, Taiping Hospital, Perak, Malaysia

Hospitalised surgical patients are at an increased risk for venous thromboembolism but previous studies showed that thromboprophylaxis among surgical patients was suboptimal. The aim of this study was to evaluate the use of venous thromboembolism prophylaxis in a general surgical ward. This was a prospective observational study which involved patients aged >18 years admitted to a general surgical ward in Hospital Taiping during December 2014. A data collection form which consisted of a set of criteria based on existing clinical practice guidelines was used to collect data on demographic, patients at increased risk of developing venous thromboembolism, risk of bleeding and prophylactic agent used. A total of 173 patients met the inclusion criteria and were reviewed, of which, 82% (142/173) of the patients were identified as at increased risk of developing venous thromboembolism. Mean age was 50.6 (SD 19.94) years and all were males. Prophylaxis against venous thromboembolism was documented in 12.1 % (21/173) of the patients, or only 14.8% (21/142) of the total patients at increased risk. Fourteen patients received pharmacological prophylaxis alone, four received mechanical prophylaxis alone and three received both type. Unfractionated heparin was the only pharmacological prophylaxis prescribed. Among patients at increased risk of bleeding and having no contraindication to mechanical prophylaxis, only 10.1% (7/69) were prescribed with anti-embolism stockings. To conclude, this study showed a high proportion of patients at increased risk of developing venous thromboembolism did not received thromboprophylaxis during hospitalisation and unfractionated heparin remains the preferred pharmacological thromboprophylaxis in this institution.

PHARMACY PRACTICE / SOCIAL PHARMACY

PPP 01

MPSPSC2015000024 (Poster)

Community Pharmacy Intervention in Managing Sleep Disorders: Customers' Beliefs and Opinions

Z Mohamad Noor^{1,2}, AJ Smith^{2,3}

¹*Kulliyyah of Pharmacy, International Islamic University Malaysia, Pahang, Malaysia*

²*School of Pharmacy, University of Queensland, Woolloongabba, Queensland, Australia*

³*School of Pharmacy, University of Otago, Dunedin, New Zealand*

Pharmacists are in a suitable position to give advice and provide services related to sleep disorders to individuals who are unable to access sleep health centres easily. To improve the service, it is important to identify the customers' point of views regarding the service and intervention. The study objectives were to: (1) identify opinions and beliefs of community pharmacy general services and sleep health interventions, and (2) investigate the possible reasons for attending a community pharmacy to seek help, amongst customers with sleep-related disorders. A set of self-administered questionnaires was completed by a convenience sample of customers who visited community pharmacies for sleep-related disorders. The results showed that four most influential reasons affecting customers' decisions to attend a community pharmacy to seek help for sleep-related disorders were satisfaction with the previous services received from the pharmacy (95.1%), easily accessible premise (95.1%), belief that pharmacists always treat them with courtesy and respect (93.6%), and belief that pharmacists often show concern for customers (90.3%). Gender (female) and a higher education level were two main characteristics that influence decisions. Opinion of community pharmacists did not differ between those with more or less severe sleep disorders. Therefore, it was concluded that a variety of reasons affected customers' decisions to attend a community pharmacy. However, these were not related to the level of risks of sleep disorders. Those who seek help to improve sleep-related disorders from a community pharmacy had a high opinion of the pharmacist's attitudes toward customers.

PPP 02

MPSPSC2015000138 (Poster)

Knowledge, Attitude and Practice towards Leptospirosis among Malaysian Wet Market Sellers

NE Ismail^{1,2}, S Ahmad², MMR Sarker¹, AWH Lim¹, NA Ishak², N Husin², AN Johari²

¹*Faculty of Pharmacy, Lincoln University College, Petaling Jaya, Selangor, Malaysia.*

²*Clinical BioPharmaceutics Research Group (CBRG), Pharmaceutical and Life Sciences CoRe, Universiti Teknologi MARA, Puncak Alam, Selangor, Malaysia*

The study assessed the level of knowledge, attitude and practice (KAP) towards leptospirosis among Malaysian wet market sellers, determined the correlation between measured KAP of leptospirosis as well as investigated the differences, association, correlation and predictors of selected study variables with KAP of leptospirosis. Respondents were given reliable and validated self-administered questionnaires, which consisted of socio-demographic, medical and source of knowledge (11 items), knowledge (26 items), attitude (12 items) and practice (17 items) toward leptospirosis. A majority of the respondents had moderate knowledge (51.4 %), unsatisfactory attitude score (90.0 %) but satisfactory practice score (64.3 %). There were significant associations between knowledge and highest completed level of education, occupation, and ever heard of leptospirosis. There were statistically significant differences in the mean scores of the knowledge of leptospirosis with gender, marital status, ethnicity, highest completed level of education, type of occupation, and whether they had ever heard of leptospirosis. For attitude mean scores, there was a significant difference found between attitude and number of year(s) working at wet market. Significant positive low correlation was observed between the attitude and practice of leptospirosis among wet market sellers. Two predictors that made statistically significant contribution to knowledge score were the highest completed level of education, and ever heard of leptospirosis that had a negative relationship with the knowledge score while the other had positive relationship. As an infectious disease, information on leptospirosis must be made available to the residents via various communication media.

PPP 03

MPSPSC2015000080 (Poster)

Evaluation of Knowledge, Attitude and Perception of Medical, Dental and Pharmacy Students in AIMST University on the Progress of Amyotrophic Lateral Sclerosis (ALS)

CC Yeoh¹, MZ Iqbal¹, MS Iqbal², R Rathi³, S Prajapathi¹

¹*Faculty of Pharmacy, AIMST University, Kedah, Malaysia*

²*Faculty of Pharmacy, MAHSA University, Selangor, Malaysia*

³*Faculty of Dentistry, AIMST University, Kedah, Malaysia*

The objective of the study was to evaluate the knowledge, attitude and perception of medical, dental and pharmacy students in AIMST University on the progress of Amyotrophic Lateral Sclerosis (ALS). A cross-sectional observational study on a convenient random sample of 268 students from AIMST University was conducted by using pretested and validated questionnaires to gather information on the attitude, knowledge and perception of medical, pharmacy and dental students. Of the 268 respondents, 85 were male (31.7%). For the evaluation of attitude, a majority of the respondents from all the three faculties had positive attitude. The results showed that more female students (171, 93.4%) had positive attitude than the male students. For the evaluation of knowledge and perception, more male students (38.8%) had adequate knowledge than female students (30.6%). Indian students (36.0%) had the most adequate knowledge on ALS disease compared to other races. Among the Faculty of Medicine, Pharmacy and Dentistry, Faculty of Medicine (37.3%) had the most adequate knowledge compared to the other faculties. Year 3 and Year 4 respondents had almost the same percentage with adequate knowledge (33.7% and 33.8%, respectively). In addition, non-hostellers (48.2%) had more adequate knowledge than hostellers (26.5%). In the aspect of educational background, respondents from A-Level (57.1%) had the most adequate knowledge compared to other educational backgrounds.

PPP 04

MPSPSC2015000079 (Poster)

Knowledge, Attitude and Perception of Japanese Encephalitis among Healthcare Students of Medicine, Pharmacy and Dentistry of AIMST University

HL Chu¹, MZ Iqbal¹, MS Iqbal², R Rathi³

¹*Faculty of Pharmacy, AIMST University, Kedah, Malaysia*

²*Faculty of Pharmacy, MAHSA University, Selangor, Malaysia*

³*Faculty of Dentistry, AIMST University, Kedah, Malaysia*

The objective of the study was to evaluate the knowledge, attitude and perception of medical, dental and pharmacy students in AIMST University on the progress of Japanese Encephalitis. A cross-sectional observational study was conducted on a convenient random sample of 252 students from AIMST University, using pretested and validated questionnaires to gather information. Out of the 252 respondents: 70 (27.8%) were from the Faculty of Medicine, 100 (39.7%) from Pharmacy and 82 (32.5%) from Dentistry. There were 75 (29.8%) male students. Male students (mean rank = 10.53±2.91) were found to have less adequate knowledge than female students (mean rank = 11.02±2.88). Indian students had the most adequate knowledge on Japanese encephalitis compared to the other races (mean rank = 33.25±5.29). Students from the Faculty of Pharmacy had the most adequate knowledge compared to the other faculties (mean rank = 10.97±2.81). Year 4 and Year 5 respondents had an almost same levels of knowledge (mean rank = 32.69±4.84 and 32.99±5.02, respectively). Non-hostellers (mean rank = 31.93±4.12) had less adequate knowledge than hostellers (mean rank = 32.70±5.12). Respondents from A-Level (mean rank = 35.90±5.56) had the most adequate knowledge. Overall, the students of AIMST University had good knowledge about Japanese encephalitis. The pharmacy students had better knowledge compared to the other health-related faculties in the university.

PPP 05

MPSPSC2015000158 (Poster)

Perception of Female Staff from Non-Medical Faculties of a Public University towards Menopause and its Management

AN Aizuddin, SS Chua

Department of Pharmacy, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia

Studies on the perception of women towards menopause and its management, especially with hormone replacement therapy (HRT) are still scarce in Malaysia. This study aimed to investigate the perception and attitude of female staff in a public university towards menopause and its management. A Perception Instrument on Menopause and Its Management (PIM) was developed and validated via a pilot study. The original PIM with 20 items was modified to 12 items (PIM-12) based on results of the pilot study. The Cronbach's alpha coefficient of this PIM-12 was 0.834. A cross-sectional survey was conducted in 10 non-medical faculties using the PIM-12. A total of 300 questionnaires were returned. Generally, most of the respondents have positive perception on menopause and its management. A majority of the respondents (97%) disagreed that a woman who has reached menopause means that she is dying and agreed that these women can still have a normal life. However, 35.2% of the respondents agreed that women should not take HRT because it has many side effects. The most common sources of information on menopause and its management were the Internet, friends and family. Respondents with higher level of education have better perception regarding menopause and its management compared to those with a lower level of education. The findings of this study provide an insight into the perception of women on menopause and its management. These can help healthcare providers to plan on strategies to educate the general public, especially adult women on menopause and the use of HRT.

PPP 06

MPSPSC2015000009 (Poster)

A Retrospective Study: Medication Enquiries by the Public at National Pharmacy Call Centre (NPCC), Hospital Kuala Lumpur

MA Nizaruddin¹ NS Mohd Salleh¹, IA Jamaluddin²

¹*Faculty of Pharmacy, Cyberjaya University College of Medical Sciences, Cyberjaya, Malaysia*

²*Department of Pharmacy, Hospital Kuala Lumpur, Kuala Lumpur, Malaysia*

Malaysians spend a significant amount of money on health, but their understanding on the proper use of medicines is still lacking. Previous studies done on medication enquiries at drug information centres manned by pharmacists mostly focused on healthcare providers' medication enquiries. There is insufficient analysed data on the public's medication enquiries, hence this study looked at the pattern of medication enquiries made by the public. The study was conducted in June 2014 and analysed retrospectively the National Pharmacy Call Centre (NPCC) medication enquiry recording forms from January 2011 until June 2013. A total of 801 records met the study criteria. Data was analysed descriptively. In 2011, the public comprised 22% of the enquirers, and this doubled in 2012. The highest enquiries were for traditional medicines (35.5%), medicine dose and administration (15.2%) and therapeutic use (14.9%). The main types of references used were personal knowledge (26.3%), the Internet (22.7%) and Micromedex (10.2%). A majority of the replies (87%) were answered using a single reference. Most replies (46%) were made within 1-2 hours. A majority of the enquiries involved the status of registered and unregistered medicines and their safety levels, especially the traditional medicines. Pharmacists are at the forefront of providing satisfactory information on medicines to the public. It is envisioned that pharmacists in other sectors such as community and industry advocate awareness of the NPCC.

PPP 07

MPSPSC2015000078 (Poster)

Knowledge and Perception of Medicine, Dentistry and Pharmacy Students of AIMST University regarding Ebola Virus Disease (EVD)

D Balu¹, MZ Iqbal¹, MS Iqbal², R Rathi³

¹*Faculty of Pharmacy, AIMST University, Kedah, Malaysia*

²*Faculty of Pharmacy, MAHSA University, Selangor, Malaysia*

³*Faculty of Dentistry, AIMST University, Kedah, Malaysia*

Ebola Virus Disease (EVD) Outbreak is notified as Public Health Emergency of International Importance on 8th August, 2014 by the World Health Organisation (WHO). The objective of the study was to evaluate the knowledge, attitude and perception of medical, dental and pharmacy students in AIMST University on the progress of EVD. A cross-sectional observational study on a convenient random sample of 273 students from AIMST University was conducted using pretested and validated questionnaires. Non-parametric statistical analyses were performed; particularly Kruskal Wallis and Mann-Whitney U tests to find any statistically significant difference between variables. P-value <0.05 was considered as statistically significant. Out of 273 respondents, 103(37.7) were males. For evaluation of knowledge and perception, female students (mean rank = 10.14±3.06) have less adequate knowledge than male students (mean rank = 9.97±2.96). Among the different races, Chinese students have the most adequate knowledge on EVD (mean rank = 10.08±3.18). Faculty of Pharmacy has the most adequate knowledge compared to the other faculties (mean rank = 10.45±2.65). Hostellers (mean rank = 9.89±3.02) have less adequate knowledge than non-hostellers (mean rank = 10.42±2.90). Overall, the students of AIMST University have good knowledge about EVD. The pharmacy students have good knowledge about EVD compared to other faculties in the university. Poor knowledge in this study was due to poor motivation, education system and students' psychology.

PPP 08

MPSPSC2015000124 (Poster)

Quality of Life and Usage of Pain Killers among Chronic Pain Patients in Hospital Tuanku Ampuan Najihah (HTAN)

EL Lim, CH Long, WH Lee, S Dinesh Kumar, N Basariah

Pharmacy Department, Hospital Tuanku Ampuan Najihah, Negeri Sembilan, Malaysia

Chronic pain is a major healthcare problem worldwide due to lack of understanding and awareness. The experience of pain has a deleterious impact on the quality of life (QoL) of individuals. This study aimed to evaluate the QoL and usage of painkillers among chronic pain patients in Hospital Tuanku Ampuan Najihah (HTAN). A cross-sectional study was conducted in HTAN orthopedic clinic. A questionnaire consisted of five parts: personal details, medical history, pain score, QoL and usage of painkillers was used. A total of 48 subjects who presented with chronic pain of more than one month were randomly chosen to answer the questionnaire during their appointment visit. The correlations between pain score and each domain of QoL and statistical differences between each domain of QoL versus different pain locations were tested. The most commonly reported pain locations in this study were multiple pain locations (29.17%; n=14), low back pain (29.17%; n=14) and arthritis or joint disease (27.08%; n=13). Pain score is negatively-correlated with all the domain of QoL. There was no significant difference between QoL of each domain and pain locations ($p>0.05$). Of the study subjects, 68.6% (n=35) were using NSAIDs to control their pain. Adverse drug reactions were the most common drug-related problem (63.6%; n=14). QoL of patients with chronic pain was negatively-correlated with the pain score; the higher the pain score, the lower the QoL. There was no significant difference between QoL and pain locations.

PPP 09

MPSPSC2015000136 (Poster)

Measurement of Stigmatisation Level towards Mental Illness Patients among Urban and Rural Communities

NE Ismail^{1,2}, S Ahmad², MMR Sarker¹, NA Ishak², NS Husin², AN Johari²

¹*Faculty of Pharmacy, Lincoln University College, Selangor, Malaysia.*

²*Clinical BioPharmaceutics Research Group (CBRG), Pharmaceutical and Life Sciences CoRe, Universiti Teknologi MARA, Puncak Alam, Selangor, Malaysia.*

The present study determined the level of stigmatisation among urban and rural communities towards mental illness patients, and investigated study variables that differentiate, associate, correlate and predict the level of stigmatisation and determined the validity and reliability of the study instruments. A 20-item self-administered bilingual questionnaire, which consisted of socio-demographic and other questions (11 items) and an attribution questionnaire (AQ-9) (9 items; 9 stereotypes) were disseminated to urban (Shah Alam) and rural (Rembau) adults (≥ 18 years old), who were able to speak and write Malay or English. Using Rasch analysis, the AQ-9 instrument was found to be reliable and valid. Urban respondents had a significant higher pity level, and significant lower dangerousness stereotype, lower blame, lower anger, and lower coercion compared to rural respondents. The mean scores obtained by women respondents were significantly higher than men in referring to dangerousness, fear, segregation and coercion stereotypes. The level of stigmatisation among urban and rural communities on mental illness patients was significantly associated to living area and gender of the respondents. The age of the respondents showed a low negative correlation with the fear towards mental illness patients among urban and rural communities. Some predictors were found to be significant in a few stereotypes, including familiarity with mental illness (pity), gender and highest level of education (dangerousness), gender (fear), familiarity with schizophrenia (blame) and gender and living area (coercion).

PPP 10

MPSPSC2015000047 (Poster)

Patient or Care-Giver Knowledge Assessment for Home Administration of Subcutaneous Methotrexate

ELF Liew, JS Tong, SY Sin¹, CU Nabilah

Pharmacy Department, Selayang Hospital, Malaysia

Methotrexate is increasingly used as a second-line agent for JIA. Methotrexate injection is traditionally administered in the hospital setting instead of home-administration. This one-year study was aimed to determine the competency level of the patients or care givers in the home-administration of subcutaneous methotrexate. This is a one-year study carried out in Selayang Hospital. All subjects were on subcutaneous methotrexate weekly dosing. Subjects' socio-demographic data were collected. A competency based teaching package was implemented by M.T.A.C. Paediatric Rheumatology Pharmacists during visit 1. Reassessment of the competency was done based on the 13-step Patient Assessment Checklist. Distances and travelling costs were also calculated. A total of 13 subjects (4 males; 9 females) with a mean age of 14 ± 4.42 years were studied. Five out of 13 subjects (mean age 17.60 ± 4.34) were self-injecting while the other 8 (mean age 11.75 ± 2.77) were injected by care givers. Three (23%) out of 13 subjects made a mistake during the competency reassessment. None of the socio-demographics significantly influenced the competency of the subjects with $p > 0.05$ for each factor. The total travel savings per year were RM 16,663.7 (average RM1,281.82 per subject). The results of the study conclude that 76.9% of subjects achieved a 100% score when reassessed on their methotrexate home injections. Each subject was estimated to save RM1,281.82 per year by doing home-administrations.

PPP 11

MPSPSC2015000057 (Poster)

Factors Associated with Prescription Opioid Overdose Deaths in Patients with Non-cancer Pain: A literature Review

F Ismail, CS Zin

Kulliyah of Pharmacy, International Islamic University Malaysia, Pahang, Malaysia

Opioid analgesics have increasingly been prescribed in the treatment of non-cancer pain, and this trend has accompanied increasing rates of opioid overdose deaths (ODs). Little is known about the factors that may predispose an individual to being at risk for fatal overdose from prescription opioids. This review examined factors associated with prescription opioid overdose deaths in patients with non-cancer pain. A comprehensive literature search was conducted for studies published from 2004 to 2014 using databases such as Science Direct, PubMed, Web of Science, Cochrane's review and Scopus. Articles were included if they were original research studies written in English that reported deaths of prescription with an opioid overdose in patients with non-cancer pain. A total of 18 studies met the inclusion criteria and were included. Findings from the review demonstrated that concomitant use of opioids with benzodiazepines (polysubstance use) was the main factor associated with opioid ODs. Codeine and oxycodone were more commonly reported to cause opioid ODs and opioid doses of more than 100 mg per day in morphine equivalents have higher risk to cause ODs. Other factors included male patients, middle-aged and having mental illness. Prescription opioid overdose deaths were primarily caused by concomitant use of opioid with benzodiazepines. Further research is required to examine the trend and patterns of this co-prescribing. The guidelines on opioid prescribing and education on opioids for both patients and physicians should be emphasized to reduce fatalities from an overdose while enhancing the safe prescribing of opioids.

PPP 12

MPSPSC2015000019 (Poster)

Knowledge, Attitudes, and Practices of Undergraduate Female Students in a Private Tertiary Institution towards the Use of ECP

SN Kee, SL Tan

School of Pharmacy, Taylor's University, Selangor, Malaysia

Emergency Contraceptive Pill (ECP) offers an alternative method of contraception when there has been unprotected sexual intercourse or when there is a risk of contraceptive failure. University students are at a stage of their lives where they are exposed to considerable pressures from their peers and may feel the need to set free from parental guidance. Youths are filled with curiosity and may begin to explore their sexuality. ECP may have a role in reducing the incidence of unintended pregnancies among this high-risk group. This study aimed to assess the knowledge, attitudes and practices of undergraduate female students in a private tertiary institution for the use of ECP. In this descriptive cross-sectional study, subjects were recruited by stratified random sampling and divided into group A (health science students) and group B (non-health science students). Data about socio-demographics, knowledge, attitudes, and practices of ECP were gathered using a pre-validated self-administered questionnaire. The response rate for this study was 97.4%. It was found that knowledge of ECP among the students was generally low. Group A and group B subjects who have good knowledge were reported to be 28.0% and 12.7% respectively. Positive attitudes towards ECP were found in 65.3% of group A and 33.3% of group B students. Among the subjects surveyed, only 4.7% of them have used ECP previously. Strategies are recommended to increase awareness of the practice of safe sex, with the aim of widening the knowledge of students on contraception, including ECP, and reducing the number of unwanted pregnancies.

PPP 13

MPSPSC2015000108 (Poster)

Quality of life (QOL) and HAART adherence among people living with HIV (PLHIV): Is it Correlated?

K Hashim, BH Chew, NN Mohd Basyir, N Abdul Syukur, QH Ngoo, WC Ang, A Khairuddin

Pharmacy Department, Hospital Sultanah Bahiyah, Alor Setar, Kedah, Malaysia

Adherence to antiretrovirals is the second strongest predictor of disease progression to AIDS and death rate after CD4 count. In outpatient clinics' settings, there is a negative correlation between viral load and QOL of PLHIV. This study aimed to assess the correlation between QOL among PLHIV and their adherence to HAART. This was a cross-sectional observational study. Patients were recruited in the RV clinics using systematic random sampling technique. Recruited patients were given a validated 31-item WHOQOL-BREF HIV questionnaire to assess their QOL. Their adherence was then assessed with 8-items MMAS. Among 72 studied patients, the mean age was 42±9.4 years and 62.5% were male. Based on the 8-items MMAS, 90.3% of the participants had medium to high adherence and 9.7% had low adherence towards HAART, with a mean score (SD) of 7.3(0.89). The mean total scores (SD) for the 31-item WHOQOL-BREF HIV was 86.1(11.88), the physical needs domain was 15.4(2.42), the psychological domain was 14.4(2.26), the level of independence domain was 14.6(2.31), the relationships domain was 14.1(2.81), the environment domain was 14.7(2.25) and the spirituality domain was 12.9(4.01). A negative and weak correlation between WHOQOL-BREF HIV and HAART adherence (-0.026) was detected. There was also no difference observed between socio-demographic characteristics among the studied population and their adherence towards HAART. Correlation between QOL and HAART adherence among PLHIV in this study was negligible. Therefore, there is no significant relationship between these variables.

PPP 14

MPSPSC2015000118 (Poster)

The Use of Medications in Pre-packed Sizes for Prescriptions from the Emergency Department of Hospital Sultanah Bahiyah

G Phua, ST Khor, SN Md Yusof, SF Che Harun

Pharmacy Department, Sultanah Bahiyah Hospital, Alor Setar, Kedah, Malaysia

Medication stockpiling can lead to adverse reactions, medication sharing and wastage. In our institution, medication is prescribed electronically and the duration is electronically set as one week by default, which is amendable by the prescriber. The current practice in the pharmacy department is supplying pre-packed medicines for OTC prescriptions from the Emergency Department (ED); whereby the quantity supplied is less than that prescribed. The objective of this study was to assess the feasibility of dispensing OTC medications packed in pre-set quantities by looking at the rate of revisits due to unresolved symptoms. This was a retrospective study where all electronic prescriptions from the ED containing OTC medications received during the pharmacy's night shift over a span of 30 days were analysed. Prescriptions containing antibiotics and with no diagnoses stated were excluded. The prescriptions were followed up for two weeks to determine if there was a revisit in this period for the same ailment. The total number of prescriptions analysed were 304, with an average of 2.5 items per prescription. The common ailments requiring OTC medications were gastritis and upper respiratory tract infection. Of the 304 prescriptions analysed; only 24 patients (8%) revisited the ED for the same ailment. The mean medication cost per prescription (RM6.80) and per dispensing in pre-packed size (RM3.90) translated to a saving of RM2.90 per prescription. This study revealed a low revisited rate to the ED due to unresolved symptoms, which may justify the dispensing of the pre-packed OTC medications in minor ailments.

PPP 15

MPSPSC2015000160 (Poster)

Health-related Quality of Life Benefits for Epilepsy Patients and Family Caregivers via the Animated Epilepsy Educational Video (AnEEV)

PL Lua¹, NKW Khairuzzaman¹, MN Abdul Rahman², Z Abdul Aziz³, KF Lee⁴

¹*Faculty of Health Sciences, Universiti Sultan Zainal Abidin (UniSZA), Terengganu, Malaysia*

²*Information Technology Centre, Universiti Sultan Zainal Abidin (UniSZA), Terengganu, Malaysia*

³*Medicine & Neurology Department, Hospital Sultanah Nur Zahirah (HSNZ), Terengganu, Malaysia*

⁴*Paediatrics Department, Hospital Sultanah Nur Zahirah (HSNZ), Terengganu, Malaysia*

Receiving an epilepsy diagnosis is often upsetting thus, healthcare providers should constantly ensure that appropriate health education is imparted to both patients and their family caregivers (FCGs). This study intended to evaluate the impact of a new *Animated Epilepsy Educational Video (AnEEV)* on the health-related quality of life (HRQoL) profiles of FCGs and their patients. This randomized, controlled community trial included a sample of 131 epilepsy FCGs and 126 patients who were recruited from the Neurology and Paediatric Clinics of Hospital Sultanah Nur Zahirah (HSNZ), Kuala Terengganu. Descriptive statistics and ANCOVA were employed for data analyses (SPSS 17.0). HRQoL score between control group (CG) and intervention group (IG) were compared at pre-intervention and post-intervention. Majority of both FCGs and patients were female (53.4% and 53.2% respectively), educated at secondary school level and most FCGs were parents (64.1%). At post-intervention, HRQoL profiles have improved significantly FCGs in IG particularly for *Positive Adaptation, Mental Strain, Disease Information, Patient Protection* and *Family's Interest* ($p < 0.05$) after controlling for potential confounders. *Patient Protection* demonstrated the largest effect size ($d = 0.64$). Accordingly, significant increments were also reported for IG patients in *Seizure Worry, Overall Quality of Life, Emotional Well-Being* and *Overall Score* ($p < 0.05$). The biggest effect size was recorded for *Emotional Well-Being* ($d = 0.66$). Encouragingly, this newly-developed educational video seemed to offer an effective approach to empower knowledge for the improvement of HRQoL among patients and their FCGs.

PPP 16

MPSPSC2015000029 (Poster)

Quality of Care in Patients Discharged from Warfarin Clinic to Primary Care upon Stabilisation of Warfarin Therapy

LSM Lim¹, CSB Choo¹, K Kanthasamy¹, SY Tan¹, A Abraham¹, RL Then¹, YJ Puah¹, MS Mohamad Adzib¹, S Radhakrishnan¹, AR Ahmad Nizam¹, NS Baharin²

¹*Department of Pharmacy, Hospital Tuanku Ja'afar Seremban, Negeri Sembilan, Malaysia*

²*Department of Pharmacy, Klinik Kesihatan Seremban, Negeri Sembilan, Malaysia*

High patient volume has led to many patients being discharged from hospital-based warfarin clinics to primary care. This study was conducted both prospectively and retrospectively to compare the quality of anticoagulation care when patients were transitioned from an integrated pharmacist-physician care to primary care upon stabilization of warfarin therapy. The primary outcome of the study was to monitor the differences in time in therapeutic range (TTR) of international normalized ratios (INRs) over a 3-month period upon transitioning from warfarin clinic to primary care. The secondary outcome was to assess incidences of major bleeding, major thromboembolism occurrences and hospitalization rates. Of the 33 patients recruited, only 16 completed the study. Significant reduction in anticoagulant control was observed upon transitioning from warfarin clinic (Median TTR=100%) to primary care (Median TTR=68%) ($p<0.05$, Wilcoxon Signed-Rank Test). Using cross tabulation analysis, 94% of the patients had TTR values more than 75% (extremely good control of INR) and 6% had TTR values between 60-75% before transitioning from warfarin clinic to primary care. After transition, 44% of the patients had TTR values more than 75%, with 19% having values between 60-75% and 38% having values less than 60%, indicating a drop in quality of care. There were no reported major bleeding, major thromboembolism occurrences and incidences of hospitalization in both groups within the 3 months. In conclusion, transition of patients from warfarin clinic to primary care was associated with a significant reduction in INR control with no reported major bleeding, major thromboembolism occurrence and hospitalization.

PPP 17

MPSPSC2015000119 (Poster)

A study Assessing Knowledge on Insulin Injection Technique using Pen by Patients attending Kota Setar District Health Clinic in Kedah

M Abdul Hamid, LS Ng, NI Abd Halim, HS Chong, H Tahir

Pharmacy Department, Kota Setar District Health Clinic, Alor Setar, Kedah, Malaysia

Type 2 Diabetes Mellitus patients prescribed with insulin required the right technique of injecting insulin. Insulin will be effective when injected into the fat layer that is beneath the skin. Insulin should not be injected too close to the outer layer (may cause lump, pain or redness) or too deep into the muscle (may lead to pain, and insulin will be absorbed too quickly). Timing of insulin injection must be correct for the insulin to work efficiently. Therefore, the objective of this study was to assess knowledge of patients on insulin injection technique. The study was carried out from March until September 2014 at Simpang Kuala Health Clinic in Kedah. Eligible and consenting patients who attended the pharmacy counter were assessed on their insulin injection technique. The guideline on insulin technique produced by the Pharmaceutical Services Division was used to assess patients' knowledge. **Of** the 420 patients assessed, 37.8% rotated the injection sites each time they injected their insulin. However, 41% of the patients reported having bruises at the site of injection. In addition, 10% of the patients claimed to pinch the skin when injecting the insulin. Single needle reused was 3.3% while 35% of the patients injected insulin at the wrong time, 47% missed one of the three doses of rapid insulin, and 87% stored insulin in the refrigerator. This study revealed patients' knowledge on insulin technique. Reassessment of the insulin technique is one of the parameters, which should be done by the diabetes patients.

PPP 18

MPSPSC2015000133 (Poster)

Basic Primary Care Approach: Providing Community with Education and Hands on Training Regarding Diabetes Care

MK Soe¹, NI Mohamed Nazar²

¹*Basic Medical Sciences Department, Kulliyah of Pharmacy, International Islamic University Malaysia*

²*Pharmacy Practice Department, Kulliyah of Pharmacy, International Islamic University Malaysia*

The alarmingly increase in rate of diabetes prevalence and unsatisfactory quality of care among diabetes patients are major public health issues. In view of this, Kulliyah of Pharmacy, IIUM had conducted a "Diabetes Education Workshop" with hands-on training on handling diabetes-related devices. The aim of the workshop was mainly to educate the diabetes patients and caregivers on primary patients' care for diabetes mellitus. The activities of the workshop included lecture by experienced healthcare providers and demonstration of devices and hands-on training by experienced lecturers and laboratory personals. Questionnaires were distributed to all participants to evaluate their background knowledge related to diabetes prior to the lectures and training. Moreover, the participants' RBS, FBS and other physiological parameters were also checked and recorded. A total of 66 participants: 24 administrative staffs, 9 laboratory staffs from various faculties, 18 nurses, 14 caregivers and a pharmacist attended the workshop. They were male 14 (21.2%) and female 52 (78.8%) and 61 (92.44%) Malay, 4 (6.1%) Chinese and only one (1.5%) Indian. The mean BMI value was 24.92 ± 4.66 , mean RBS 6.63 ± 1.32 mmol/L, mean FBS 5.13 ± 0.52 mmol/L, mean SBP 113.94 ± 13.35 mmHg and mean DBP 74.13 ± 10.86 mmHg. Two male (3.3%) and 14 female (23.7%) were found to have abdominal obesity. Forty nine (74.2%) responded that they were satisfied with the knowledge and skills they gained from the programme and requested to continue it in subsequent years. It was suggested that such useful programme should be conducted in collaboration with other universities in the future.

PPP 19

MPSPSC2015000070 (Poster)

A Cosmetovigilance Survey in Malaysia

MA Zamli, N Ai, AI Awadh, H Hadi

Kulliyah of Pharmacy, International Islamic University Malaysia, Kuantan, Pahang, Malaysia

Despite the high popularity of cosmetics use among consumers, there is still a lack of studies on cosmetovigilance in Malaysia. The cosmetic safety issues may be associated with the consumers' level of knowledge, practice, attitude, and perception. The aim of this study was to assess cosmetovigilance-related knowledge, practices, attitudes, and perceptions of consumers in Malaysia. A SurveyMonkey questionnaire which comprised of five sections: demographic profile, knowledge on cosmetic safety, practice towards cosmetics, attitude towards cosmetic safety, and perception towards cosmetics, was distributed to 552 consumers in Malaysia by snowball sampling method from April to June 2015. The data was analyzed using Statistical Package for Social Sciences (SPSS) version 20. The reliability coefficient for knowledge, attitude, and perception parts were 0.75, 0.71 and 0.66, respectively. The results of this study revealed more than half of the respondents had poor knowledge (57.2%), attitudes (60.3%), and perceptions (59.2%) on cosmetics and its safety. Regardless, their practice towards cosmetics was acceptable. Total knowledge score showed significant difference between gender ($P < 0.001$) and monthly expenditure ($P = 0.001$), while total attitude scores showed a statistical significance differences with respect to gender ($P = 0.008$), age ($P < 0.001$), marital status ($P < 0.001$), education ($P = 0.014$), occupation ($P < 0.001$), income range ($P = 0.009$) and monthly expenditure ($P = 0.013$). In conclusions, the levels of cosmetovigilance-related knowledge, practices, attitudes, and perceptions of consumers in Malaysia are still insufficient. The findings provided information to the authorities to elevate the knowledge and attitude of consumers on cosmetovigilance issues and improve their practice and perception toward cosmetics.

PPP 20

MPSPSC2015000022 (Poster)

Pharmacy Students Perception and Preparedness towards the Provision of Pharmaceutical Care: Findings from a Malaysian Public University

MS Ismail, AN Mat Azmi, AM Sabar, NR Mohd Said, NE Juhari, FNN Kamaruzzam, A Aminuddin, S Jamshed

Kulliyah of Pharmacy, International Islamic University Malaysia, Kuantan, Pahang, Malaysia

Pharmaceutical care is a core element of any healthcare system. In the International Islamic University Malaysia (Kuantan campus), the pharmacy students were exposed to the concept of pharmaceutical care (PC) since their first academic year. Therefore, it is imperative to explore their perception towards the provision of PC and the barriers, as well as their preparedness and opinion towards various PC activities. A cross-sectional study was conducted among third and fourth year pharmacy students. Standard Pharmaceutical Care Attitudes Survey (PCAS) was adopted from a pre-validated and pre-piloted questionnaire and modified according to the local setting. Reliability of the modified instrument was found to be 0.897. In a classroom survey out of a total of 227 students, 211 responded (95%). Results depicted that the students have positive perception towards the provision of PC as well as its various activities (n=211; 100%). In their opinion, they were least prepared in managing pharmacy inventory (mean = 2.76). In addition, they felt that one of the barriers that they might be facing in the implementation of PC is the lack of physicians' trust (mean = 4.14). This might presumably be related to their observation during hospital attachments (clinical clerkships), as well as their formal discussions with the senior pharmacists during clinical clerkships. Therefore, it is recommended that the university should relook into the curriculum and promote inter-professional collaboration among students throughout the learning process.

PPP 21

MPSPSC2015000006 (Poster)

A Cross-Sectional Study on the Prevalence of Type 2 Diabetes, Hypertension, Hypercholesterolemia and Obesity among Population at Sungai Petani, state of Kedah, Malaysia

YP Ng, K. Mandavi, BY Chai, HC Chew, FH Koh, KL Eng, R. Sunder, FM Goh

Faculty of Pharmacy, AIMST University, Bedong, Kedah, Malaysia

This was a questionnaire based cross-sectional study to explore the prevalence of non-communicable diseases namely type 2 diabetes, hypertension, hypercholesterolemia and obesity among population of Sungai Petani (SP), Malaysia. General public from SP was conveniently approached from 12 to 28 February 2015 at three selected shopping malls. Descriptive statistics were used for demographic characteristics while inferential statistics were used to measure the extent of association among the study variables. A total of 462 respondents age ≥ 18 years participated in this study, and it was dominated by Chinese (50.4%) at the age group of 18 to 29 years old (43.9%). 42 out of 462 respondents (9.09%) reported to have type 2 diabetes; 75 (16.23%) having hypertension; 54 (11.69%) having hypercholesterolemia and 204 (44.16%) fell under the categories of pre-obese and obese. Indian (45.24%) was the major race found to have type 2 diabetes compared to the two other races (Malay and Chinese). However, Chinese were the most reported to have hypertension (49.33%) and hypercholesterolemia (46.30%). Malay race had the highest prevalence of pre-obese to obese (41.89%). A sharp increase in the prevalence of type 2 diabetes was observed in male of age group 30-39 years and female of 50-59 years. Hypertension and dyslipidaemia were dominated by both male and female of age ≥ 50 years. In conclusion, approximately 1 in 11 adults had type 2 diabetes, 1 in 6 with hypertension and 1 in 9 with dyslipidaemia and almost 2 in 5 is pre-obese or obese among the population of SP.

PPP 22

MPSPSC2015000107 (Poster)

Cost-Effectiveness Analysis of Antibiotics Treatment in Melioidosis in Hospital Sultanah Bahiyah

N Abdul Ghani¹, MR Abu Hassan², XR Teh¹, R Muhamad Fuzi¹, KK Lim¹, WL Tan³

¹*Pharmacy Department, Hospital Sultanah Bahiyah, Kedah, Malaysia*

²*Medical Department, Hospital Sultanah Bahiyah, Kedah, Malaysia*

³*Kedah Clinical Research Centre, Kedah, Malaysia*

Melioidosis is a community-acquired sepsis, classically presented with pneumonia and multiple abscesses. The mortality rate of melioidosis is high. In treating melioidosis effectively, it requires an intensive phase of intravenous antibiotics treatment, mainly ceftazidime or meropenem, followed by oral eradication therapy. This study aimed to assess the most cost-effective treatment of melioidosis in Hospital Sultanah Bahiyah. A retrospective cohort study was conducted on patients who had completed their melioidosis treatment from 2005-2012. Patients were divided into two groups, receiving ceftazidime and meropenem, respectively. Cost data was collected using activity-based-costing including the cost of medications, personnel, diagnostic laboratory tests, diagnostic imaging, blood transfusion and hospitalization. Of the 540 patients screened, only 58 (10.7%) met the inclusion criteria and were recruited. Of these patients, 65.5% had received a regimen containing the combination of IV ceftazidime and oral therapy for a variety of treatment durations, while 34.5% were receiving Injection meropenem and oral therapy. Average cost/patient treated with ceftazidime and meropenem was RM6,727 and RM4,505, respectively. Cost-effectiveness ratio (CER) for ceftazidime group was RM8,520/survival rate while the CER for meropenem group was RM11,259/survival rate. Incremental Cost-Effectiveness Analysis (ICER) calculated is RM5,706 per survival rate. In the treatment of melioidosis, ceftazidime was found to be superior compared to meropenem, being more effective and less costly.

PPP 23

MPSPSC2015000056 (Poster)

Knowledge, Attitude and Perceptions of Over-the-Counter (OTC) Medications among Non-Pharmacy Students: A Pilot Study

NS Ab Rahman, NH Marzuki, NN Azillah, MM Muhammad Muslih, AR Adenan, SS Mohamad Hisham, SN Syed Roslie, N Md Jusoh, MF Ahmad Fakri, AI Abdul Ghani, R Mohamad Elkalmi.

International Islamic University Malaysia, Kuantan, Pahang, Malaysia

Self-medication using over-the-counter (OTC) products is very common worldwide. Although it is safe and effective to be used by the public, it still requires advice and assistance from healthcare professionals such as the community pharmacists. The aim of this study was to assess non-pharmacy students' knowledge, attitude and perceptions regarding over-the-counter (OTC) products at a public university in Malaysia. A cross-sectional study was conducted in November 2014 among students in medical courses and science courses. A validated self-administered questionnaire was distributed using convenience sampling to 200 students, with 190 questionnaires successfully attempted (95%). Data was statistically analyzed using SPSS version 20. There was a significant difference in the mean score for knowledge of OTC products between medical and science course students ($p=0.001$). More than half (51.6%) of the respondents had good knowledge on how to use their OTC products in a safe way and 63.7% ($n=121$) of the respondents bought OTC medications from convenience stores. A majority (63.2%) of the respondents agreed that OTC medications are preferred because it is cheap and easily accessible. About 75.7% ($n=144$) of the respondents agreed that time constraint was the reason for them to use OTC products rather than seeking advice from doctors. The results of this study demonstrate that a majority of the non-pharmacy undergraduate students have basic knowledge of OTC medications. However, a larger scale, similar study is required to cover different courses, colleges, universities as well as level of education to further establish the results.

PPP 24

MPSPSC2015000069 (Poster)

Adverse Cosmetic Reactions among Malaysian

NB Ai , MA Zamli , AI Awadh , H Hadi

Kulliyah of Pharmacy, International Islamic University Malaysia, Kuantan, Pahang, Malaysia

Consumers often underestimate the occurrence of adverse cosmetic reactions; the incidence of more severe reactions has been identified recently. The incidence of adverse cosmetic reactions cannot be minimized or prevented by regulations. However, its documentation might be helpful for the authority in regulating the cosmetic products. The study aimed to assess the prevalence, type of adverse cosmetic events and the measures adopted by those experiencing the adverse cosmetic events. A SurveyMonkey questionnaire comprised of two sections: (a) demographic profile, (b) adverse cosmetic reaction was distributed to 552 consumers in Malaysia by snowball sampling method from April to June 2015. Statistical Package for Social Sciences (SPSS) version 20 was used to analyze the data. The results of this study revealed that 29% (n= 160) of the total respondents experienced adverse cosmetic events with eczema as the most frequent type of adverse cosmetic event. Facial area (n=178) was mostly affected as a consequence of products used on the face. After the incidents, 67 (41.1%) of the respondents chose to seek professional consultation, and a majority of them preferred to just changed to other products. In conclusion, the prevalence, types of adverse cosmetic events and the measures adopted were documented, and consumers were found to underestimate the incidence of adverse cosmetic reactions. More reliable cosmetovigilance system may be implemented to increase awareness on this matter.

PPP 25

MPSPSC2015000120 (Poster)

Knowledge and Practice of Community Pharmacists in Selangor and Wilayah Persekutuan Kuala Lumpur on the Management of Childhood Common Cough and Cold

N Jamil, SW Ding, ZA Zainal

Cyberjaya University College of Medical Sciences, Cyberjaya, Selangor, Malaysia

Children are inherently prone to cough and cold, usually of viral aetiology. They are commonly managed with different cough and cold medications such as decongestants, expectorants, mucolytics, antihistamines and antitussives. However, various regulatory bodies had recommended that cough, and cold products should not be used to treat children less than two years of age due to potential life-threatening side effects that outweigh the benefit of giving these medications. The objective of this study was to determine the knowledge and practice of community pharmacists on the management of childhood cough and cold in the state of Selangor and Wilayah Persekutuan Kuala Lumpur, Malaysia. The study was conducted using a questionnaire which assessed demographic data, knowledge and practice of community pharmacists on the management of cough and cold. The community pharmacists had good knowledge levels (mean knowledge score of 73.5%) and professional counselling practice (mean practice score of 4.61). A majority of the community pharmacists do not dispense antibiotics (80%), frequently dispense antitussives (36%), antihistamines (44%) and antipyretics (38%), and very frequently dispense mucolytics (39%) to children below 2 years old with cough and cold. Both knowledge ($p = 0.018$) and practice level ($p = 0.015$) showed positive linear correlation with the years of working experience. Community pharmacists in Selangor and Kuala Lumpur had good knowledge and practice in the management of childhood common cough and cold, but knowledge on the use of cough and cold medicines in children below 2 years old could be improved; especially in those with limited working experience.

PPP 26

MPSPSC2015000123 (Poster)

Relationship Between the Movement Disorder Society-unified Parkinson's Disease Rating Scale (MDS-UPDRS) Domains and the Health-related Quality of Life (HRQoL) among Parkinson's Patients in Hospital Tuanku Ampuan Najihah (HTAN), Kuala Pilah

TS Loh, SF Pang, HH Koay, N Basariah

Pharmacy Department, Hospital Tuanku Ampuan Najihah, Negeri Sembilan, Malaysia

Studies showed that Parkinson's disease (PD) has a significant negative impact on quality of life (QoL) in individuals with PD. This study aimed to assess the relationship between Movement Disorder Society-Unified Parkinson's disease rating scale (MDS-UPDRS) components and health-related quality of life (HRQoL) in PD patients in HTAN. A cross-sectional study was conducted from February to June 2014. Eligible subjects were selected from patients of HTAN Medical Out-patient Department (MOPD) clinic. PD questionnaire – 39 (PDQ-39) was used to assess the patient's QoL while MDS-UPDRS was used to assess the motor symptoms, non-motor symptoms and motor complications experienced by patients. A data collection form was used to collect patient's medical history and medications. Thirty-six subjects with mean age of 65.58 ± 7.11 years and mean duration of disease of 6.75 ± 6.37 years participated in this study. The mean total score of PDQ-39 (PDQ-39SI) was $25.45 \pm 17.87\%$, with the worst perception of QoL in the dimensions of "Mobility" (42.50%) and "Activities of Daily Living (ADL)" (34.14%). A strong positive correlation was found between PDQ-39SI and MDS-UPDRS motor and also non-motor symptoms, with a correlation coefficients of 0.793 and 0.792, respectively. Only 30.6% of the subjects experienced motor complications. PD patients in HTAN have good perception of HRQoL. The motor limitations related to mobility, and ADL present a significant association with the perception of QoL by the subjects. The MDS-UPDRS motor and non-motor symptoms were strongly correlated with the PDQ-39SI.

PPP 27

MPSPSC2015000017 (Poster)

Exploring the Halal Status of Antineoplastic and Immunomodulating Agents, and Nutritional and Dietary Supplements in Pusat Perubatan Universiti Malaya (PPUM) and Hospital Angkatan Tentera Tuanku Mizan (HATTM)

P Mahendra Varma¹, S Abdul Rahman¹, A Buang², AH Basari³, MA Adnan³, S Samsudin³, Z Ismail⁴

¹*Department of Pharmacy Practice, Faculty of Pharmacy, Cyberjaya University College of Medical Sciences, Selangor, Malaysia*

²*Department of Pharmacy, University Malaya Medical Centre, Kuala Lumpur, Malaysia*

³*Pharmacy Branch, Health Services Division, Malaysian Armed Forces HQ, Ministry of Defence, Kuala Lumpur, Malaysia*

⁴*School of Pharmaceutical Science, Universiti Sains Malaysia, Penang, Malaysia*

Halal has become a global issue among the Muslim communities worldwide. Muslims have specific requirements in the consumption of food and pharmaceuticals. With the rise of Muslim populations, there is an increase in concern and demand for halal pharmaceuticals. However, there is limited data on the halal status of available pharmaceutical products. This descriptive and exploratory study was aimed at determining the halal status of antineoplastic and immunomodulating agents, and nutritional and dietary supplements in Pusat Perubatan Universiti Malaya (PPUM) and Hospital Angkatan Tentera Tuanku Mizan (HATTM). Data collection was done by obtaining the medication leaflets and approaching the manufacturers. A data collection form was used to record the required particulars. Three statuses were used for categorisation; halal, mushbooh and haram. Assessment was done by referring to standard pharmaceutical references and feedback from manufacturers. A total of 212 medications were assessed where 136 were antineoplastic and immunomodulating agents, while 76 were nutritional and dietary supplements. For antineoplastic and immunomodulating agents, majority were classified as mushbooh with 61.8%, followed by halal at 36.7% and haram with 1.5%. Nutritional and dietary supplements had slightly more halal medications with a proportion of 51.3% compared to mushbooh of 48.7%. There were no haram medications found in this therapeutic class. Ethanol, gelatine and magnesium stearate were the commonest mushbooh ingredients. This study also showed that manufacturers have the capability of producing halal pharmaceuticals as only few ingredients are mushbooh. Cooperation from all parties is vital in using halal pharmaceuticals for the benefit of mankind.

PPP 28

MPSPSC2015000058 (Poster)

The Awareness of Royal Malaysian Custom Officers towards Counterfeit Pharmaceutical Products and Roles of Pharmacy Enforcement Division Officers in Sarawak

STC Yew

Sarawak Pharmacy Enforcement Branch, Sarawak State Health Department, Ministry of Health, Malaysia

Counterfeit pharmaceutical products (CPP) are described as a silent epidemic, which can cause drug resistance and death. In Malaysia, the knowledge and awareness level of the Royal Malaysian Customs (RMC) towards the CPP and roles of the Pharmacy Enforcement Division (PED) officers at custom ports are crucial in combating the entering of CPP. A questionnaire with 30 items using 5-point Likert scale was developed based on Poisons Act 1952, Sale of Drugs Act 1952 and Guideline of Importation Screening. Face validity and construct validity were examined with pre-test and exploratory factor analysis. A total of 110 RMC respondents (48.9% response rate) were included for data analysis. The mean scores (standard deviation) of knowledge of PED officers towards CPP were 4.06 (0.808) and 4.16 (0.777), respectively. On the other hand, the mean scores (standard deviation) of awareness level towards CPP and roles of PED officers were 4.12 (0.967) and 4.21 (0.785), respectively. These findings implied that the knowledge and awareness of RMC officers towards CPP and roles of PED officers were sufficient (mean value range from 4.06 to 4.21) to curb the entering of CPP with the collaboration of PED officers and yet still having room for improvement. Future researches are suggested to include the practice as a dependent variable to examine whether the increment in the knowledge and awareness level would have a positive impact on the actual practice in combating the importation of counterfeit pharmaceutical products.

PPP 29

MPSPSC2015000097 (Poster)

Perceptions on Barriers in Conducting Smoking Cessation Counselling among Practicing Pharmacists in Klang Valley

SC Huong, S Ahmad Hisham, M Mohamad

Faculty of Pharmacy, Cyberjaya University College of Medical Sciences (CUCMS), Cyberjaya, Malaysia

Prior studies have reported low pharmacists' participation in smoking cessation services. This suggests the existence of potential barriers, which prevent pharmacists from providing smoking cessation counselling to customers/patients. The study was conducted to identify the perceived barriers encountered by pharmacists in providing smoking cessation counselling and strategies to overcome the barriers. A quantitative survey was conducted where 125 hospital, primary care and community pharmacists were recruited using convenience sampling. A self-administered questionnaire was distributed through MPS bulletin and emails. Of the respondents, 59.2% had received smoking cessation training, and 23.2% were certified smoking cessation service providers (CSCSP). However, 18.4% had never provided smoking cessation counselling and only 16.8% had performed smoking cessation counselling once a week or more. Unreadiness of smokers to quit smoking was perceived as a central barrier, followed by unavailability of NRT products and time constraint. Community pharmacists were concerned about jeopardising their relationships with customers ($p=0.006$), while hospital and primary care pharmacists perceived inadequate staff ($p=0.035$), lack of knowledge and training ($p=0.014$), and lack of confidence ($p=0.017$) as significantly more important barriers. They also perceived improved knowledge ($p=0.002$), implementing smoking cessation as part of pharmacists' standard services ($p=0.004$) and providing private counselling areas ($p=0.004$) as better approaches to overcome the barriers. Although a majority were trained and possessed positive attitude towards smoking cessation, many do not actively provide the service. Steps to address perceived barriers must be taken to increase pharmacists' involvement in smoking cessation services.

PPP 30

MPSPSC2015000106 (Poster)

Prescribing Error in Hospital Discharge Prescriptions: A Preliminary Study

S Janahiraman, CY Tay, NM Jaafar, AF Abdul Latif, N Nagesvararao, SF Ahmadi, G Silvarajah, S Ahmad

Pharmacy Department, Hospital Kuala Lumpur, Malaysia

Hospital discharge is a transitional period of care from hospital to home where patients are at high risk of medication discrepancies owing to the errors in discharge prescriptions. The main aim of this study was to assess the prevalence and most common types of prescribing error during hospital discharge as well as to determine the classification of medicines with prescribing errors. Medical patients discharged from 5 active wards for a period of 2 weeks were identified. Medication discrepancies were evaluated in terms of prescribing errors through comparison of patient's medication charts and medication drug history with the actual discharge prescriptions. Out of 107 patients discharged, 96 were included in the study. The study revealed that 1 in 3 prescriptions had at least one prescribing error with a total number of 45 errors detected. Drug omission, duration and dosage regime accounted for more than 80% of prescribing errors. The top 3 classes of drugs associated with errors were cardiovascular, nutrition and blood disorder, and anti-infectives. An understanding on the types and frequencies of error can help prescribers to be more vigilant and take the necessary measures to prevent it. Continuous professional education and structured medication training are suggested strategies to reduce prescribing errors.

PPP 31

MPSPSC2015000110 (Poster)

Prescribing Pattern of Human Albumin in Surgical Wards of Hospital Sultanah Bahiyah

N Abdul Ghani, S Ahmad, IS Romli, AB Ismail, B Ismail

Pharmacy Department, Hospital Sultanah Bahiyah, Kedah, Malaysia

Human albumin is a very expensive colloid solution. It is indicated mainly as plasma expander for volume replacement therapy. However, human albumin has been widely prescribed when it is not indicated, especially for correcting hypoalbuminemia. This study consisted of two parts; 1) Evaluation of the prescribing pattern, and (2) Assessment of prescribers' knowledge on the use of human albumin. An observational study was conducted on all medical officers and specialists in surgical wards. A validated questionnaire was designed in order to assess the knowledge and perceptions of the healthcare professionals towards the usage of human albumin. The usage data of human albumin between November 2013 and January 2014 were retrieved and compared with the usage between August 2014 and October 2014. Seventeen doctors participated in this study. Most of the respondents had good knowledge of human albumin with an average score of 70%. However, 76.5% of the respondents thought that hypoalbuminemia was an appropriate indication to use human albumin, which contradicted the Ministry of Health Drug Formulary. There was a decrease in the trend of human albumin usage after the knowledge assessment and also after a continuing medical education (CME) session given to the prescribers. The percentage of human albumin used by surgical wards before and after the intervention was 44.76% and 29.27%, respectively. Most of the participants have good knowledge about the usage of human albumin. The data showed that human albumin usage reduced significantly after the knowledge assessment and CME session.

PPP 32

MPSPSC2015000114 (Poster)

A Study on the Use of Non-Prescription Medicines in the Management of Minor Ailment among the Community Pharmacists in Penang

BS Tan, CP Chong, A Sarriff

School of Pharmaceutical Sciences, Universiti Sains Malaysia, Penang, Malaysia

Non-prescription medicines use is becoming more prevalent in community setting and are used to treat many minor ailments either as a primary or adjunctive therapy. The objective of this study was to evaluate the common type of minor ailments managed by the community pharmacists and the total charges imposed on the consumers, such as medication prices, consultation fees or any additional service charges. This was a cross-sectional survey using a self-completed anonymous data collection form. Data was collected across the first ten requests for minor ailment management for adult consumers encountered by the pharmacist. Responses were received from 38 pharmacies (response rate 14.9%). Majority of the pharmacists were female (76%). Approximately half (51%) of the respondents were practicing in single-outlet independent pharmacies while another 30% and 19% were from multi-outlet independent pharmacies and chain pharmacies, respectively. Most of the pharmacists were part owner and manager (38%) or employee (38%). Majority of the pharmacies were located in urban area (76%) while 24% were in rural area. The mean (SD) working experiences of the pharmacists were 11.60 (7.50) years. The most common minor ailments handled by the pharmacists was respiratory related (26.7%; 104 cases), skin diseases 18.5% (72 cases), and gastro-intestinal diseases 17.2% (67 cases). The mean (SD) cost of medicines to the consumers was RM 19.49 (RM24.97) and ranged from RM 2.00 to RM 370.00, according to type of disease. All the pharmacists did not charge consultation fee or additional fee on the consumers.

PPP 33

MPSPSC2015000085 (Poster)

Awareness towards Risk of Smoking and Attitude towards Cessation Measures and Smoke-free Campus among Students: A Prospective Study

YM Tay¹, WZ Low¹, SX Leow¹, NA Abdul¹, R Veerasamy¹, M Doraisingam², S Sivadasan¹

¹*Faculty of Pharmacy, AIMST University, Semeling, Kedah, Malaysia*

²*School of General and Foundation Studies, AIMST University, Semeling, Kedah, Malaysia*

A survey was carried out to investigate the prevalence, awareness of smoking risk factors among private university students and their approach towards contributing to a smoke free campus. A pre-validated questionnaire which consisted of 41 questions, organised into seven sections was used. The survey data were analysed using SPSS statistical software package version 20. About 70.2% of the participants were in the age range of 19-21 years. Only about 8.6% of the participants responded that they have smoked even just a few puffs of which male participants (61.9%) were more than female participants (38.1%). Peer influence, stress relieves, and boredom relief were rated as important smoking motives. There was a high percentage of participants among smokers who looked for information through various sources. Students between the age group 25-27 years had excellent awareness about the risks of smoking. In the present study, the average age during initiation of smoking was between 19-21 years, and a minority persist to be a smoker. The most common reasons or motives for smoking were peer influence followed by stress relief and to improve concentration. Students between 25-27 years have excellent awareness, and most students had positive attitude towards a smoke-free campus. Although their awareness and attitudes towards smoking were remarkable, a smoke-free campus has yet to be achieved. Students suggested installing smoke detectors, imposing fines, conduct an anti-smoking campaign, etc. We conclude that a smoking cessation program, educational intervention or counseling sessions would help the smokers to be concerned about their health.

PPP 34

MPSPSC2015000050 (Poster)

Prescribing Pattern of Polymyxin B & E in Hospital Serdang

PM Wong, YS Foo, CY Leong, NH Munawar, NF Zolkifli, RN Zainal Abidin

Department of Pharmacy, Hospital Serdang, Malaysia

Polymyxin B and Polymyxin E are important treatments for multi drug resistant (MDR) infection in hospitals. Hospital Serdang is one of the highest users of Polymyxin in Malaysia. In view of the lack of newer antibiotics for the treatment of MDRs, it is important to use Polymyxin judiciously to avoid Polymyxin resistance. The objective of this study was to determine the prescribing pattern of Polymyxin B & E in Hospital Serdang as well as the incidence of nephrotoxicity. This is a cross-sectional retrospective study conducted between January 2012 and April 2014. All prescriptions and inpatient's record with Polymyxin B & E were reviewed. A total of 207 patients were prescribed with Polymyxin, in which 115 patients on Polymyxin B and 92 patients on Polymyxin E. Polymyxin was mainly used for ventilator-associated pneumonia, and most specimens were from the tracheal aspirate (57%) with MRO Acinetobacter (97.6%) being the most common organism isolated. The median duration of treatment for Polymyxin B was three days, and Polymyxin E was four days. Overall percentage of nephrotoxicity was higher in Polymyxin E (35%) compared to Polymyxin B (25%). The results were not statistically significant ($p=0.107$). The high usage of Polymyxin is thus justified due to the high incidence of MRO Acinetobacter, which are only sensitive to Polymyxin. However, nephrotoxicity occurs commonly and warrants frequent monitoring of the renal function.

PPP 35

MPSPSC2015000098 (Poster)

Response of Community Pharmacists to Complaints of Allergic Contact Dermatitis

YZ Seah, PT Thomas, PN Wong

School of Pharmacy, Taylor's University, Selangor, Malaysia

Allergic contact dermatitis (ACD) is a relatively common skin complaint seen in the community pharmacy setting, and its key treatment lies in the avoidance of allergens and treatment with topical corticosteroids. Treatment usually starts with a low potency topical corticosteroid (TC). The current study aimed to investigate consultation provided by community pharmacists to complaints of ACD and types of treatment that were recommended. A standardized scenario of symptoms and duration of ACD was designed and performed using a simulated patient method. The researcher used the standard scenario during the visit to 117 randomly selected community pharmacies located in Kuala Lumpur. The study has a response rate of 83.6%. It was found that almost all (>97%) of the pharmacists asked at least one question before recommending treatment. Only 30% of the community pharmacists recommended TC as the only treatment. On an average, community pharmacists asked two questions before recommending any treatment and provided two counselling points. It was also observed that younger pharmacists tended to provide more counselling as compared to older pharmacists ($P < 0.05$). As the response of community pharmacists to ACD displayed rooms for improvement, intervention such as training programmes should be developed to create awareness among pharmacists in playing a more active role in patient counseling, especially on the management of dermatitis.

PPP 36

MPSPSC2015000035 (Poster)

Health, Economic Impact and Cost -effectiveness of Future Dengue Vaccination Program in Malaysia

HY Yeo¹, AA Shafie¹, L Coudeville², LD Steinberg², BS Gill³, R Jahis³, HSS Amar-Singh⁴

¹*School of Pharmaceutical Sciences, Universiti Sains Malaysia, Penang, Malaysia*

²*Sanofi Pasteur, Lyon, France*

³*Disease Control Division, Ministry of Health, Putrajaya, Malaysia*

⁴*Paediatrics Department, Hospital Raja Permaisuri Bainun Ipoh, Perak, Malaysia*

Malaysia is currently experiencing dengue epidemic activity. We employed a dynamic transmission model to evaluate the potential cost-effectiveness, health and economic impact of the vaccine in Malaysia. The model was calibrated with Malaysia specific epidemiological data and vaccine efficacy data from phase-III clinical studies. The outcomes were evaluated over a 10-year period from healthcare provider perspective. Two vaccination strategies were simulated: targeted-hotspots (THS, covered population in 6 districts) and nationwide (NW, covered all populations). Both strategies comprised of routinely vaccinated children (13 years old) and a catch-up cohort age 14-30 over 1-year. Probabilistic and univariate sensitivity analyses on key-parameters were conducted to examine uncertainty in the model and assumptions. All costs were expressed in 2013 USD. The model predicted that dengue vaccination under the THS would prevent 448,124 [95%CI: 292, 875-632, 375]] dengue cases, 509 [95%CI: 335-707] dengue-related deaths, 11,785 [95%CI: 7, 888-16, 329]] life years lost and 16,751 [95%CI: 11, 128-23, 281]] DALYs. Nationwide vaccination would prevent 1,060,222 [95%CI: 694, 181-1, 490, 929]] dengue cases, 1,202 [95%CI: 797-1, 672]] dengue-related deaths, 27,834 [95%CI: 18, 756-38, 501]] life years lost and 39,584 [95%CI: 26, 464-54, 968]] DALYs. Total treatment costs saved for THS and NW strategies were USD163, 859,846 [95%CI: 109,093,124-235,805,776] and USD386, 962,641 [95%CI: 257, 410, 189-557, 347, 377], respectively. The cost-effective threshold values for THS and NW strategies were USD87.49 [95%CI: 59.52-116.33] and USD35.22 [95%CI: 23.67-47.54], respectively. In conclusion, vaccination would significantly reduce dengue disease and economic burden in Malaysia, especially if it is introduced during the current epidemic. It is cost-effective if it is priced at or below its cost-effective threshold value.

PPP 37

MPSPSC2015000162 (Poster)

Job Satisfaction and Stress Levels among Community Pharmacists in Klang Valley

WW Teong, WW Chong

Faculty of Pharmacy, Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia.

Community pharmacists are one of the most accessible health professionals whose aims are to ensure safe and effective use of medicines. However, poor job satisfaction and high stress levels may negatively impact pharmacists' job performance and increase medication errors. This study was conducted to evaluate job satisfaction and stress levels among community pharmacists in the Klang Valley, Malaysia. A cross-sectional survey was conducted using validated questionnaires to assess the demographic data of pharmacist respondents, pharmacists' work activities and indices of job satisfaction and stress level. A sample of 282 community pharmacists was selected from 9 districts of Klang Valley using stratified-random clustered sampling. Descriptive and inferential statistics were used to analyse data. In addition, written responses to an open-ended question about challenges to the pharmacy profession in Malaysia were analysed thematically. The results indicated that the level of job satisfaction among pharmacists was moderate, with a mean score of 3.33 ± 0.44 (range: 1-5 points). Stress levels among pharmacists also appeared to be at moderate level, with a mean score of 1.84 ± 0.44 (range: 0-4 points). Factors that contributed to the highest level of stress among community pharmacists were patient care responsibility and job conflict. Lack of dispensing separation, price war and under-recognition on professional roles by the general public were the main challenges identified to the pharmacy profession. In conclusion, the job satisfaction and stress level of community pharmacists in Malaysia appeared to be moderate. However, action needs to be taken to address the challenges identified to the pharmacy profession in Malaysia.

PHARMACY EDUCATION

PEP 01

MPSPSC2015000015 (Poster)

Induction of a Pharmacoeconomics Course in Pharmacy Curriculum: Preliminary Findings from the Final Year Cohort

A Mohammed Al-Shami¹, S Jamshed¹, AA Shafie²

¹*Kulliyyah of Pharmacy, International Islamic University Malaysia, Pahang, Malaysia*

²*Discipline of Social and Administrative Pharmacy, School of Pharmaceutical Sciences, Universiti Sains Malaysia, Penang, Malaysia*

Escalating healthcare costs and pharmaceutical spending continue to evolve rapidly. With the aim of curtailing the cost of treatment, there is an increased demand of understanding and applying the pharmacoeconomics principles. In view of this, we developed and implemented a 2-credit hour pharmacoeconomics module which constitutes didactic lectures, literature review workshops, and assignments in our final year cohort of pharmacy students. This study aimed to assess the views and attitudes of final year pharmacy students about the concepts and application of Pharmacoeconomics. A cross-sectional survey was performed among a final year cohort of 99 students in October 2013. A pre-validated, 15-item, questionnaire was used to assess the students views and attitudes towards this course. All the final year cohort of students (28 males and 71 females) responded to the survey. Three-fourth of the students (n= 76; 76.6 %) strongly agreed to have little knowledge of pharmacoeconomics before this course. Majority of the students (n=65; 65.5%) strongly agreed that the class exercises helped them to understand the course material. A large majority (n=61; 61.61%) strongly disagreed to evaluate the pharmacoeconomics literature confidently. Majority (n=62; 62.62%) expressed their intention to apply pharmacoeconomics principles in their professional practice. Majority (n=75; 75.75 %) expressed their desire work as a hospital pharmacist. In conclusion, the students expressed that they learnt about the basic concepts of pharmacoeconomics principles and expressed positive attitude towards the learning of application of pharmacoeconomics principles. It is recommended that the pharmacoeconomics principles to be introduced early into the pharmacy curriculum.

PEP 02

MPSPSC2015000143 (Poster)

Assessment of Inhalation Technique Using Dry Powder Inhaler among Third and Fourth Year Pharmacy Students in a Malaysian University: Pre and Post Education

NE Ismail^{1,2}, S Ahmad², H Sentiagoa¹, NA Ishak², NS Husin², AN Johari²

¹*Faculty of Pharmacy, Lincoln University College, Petaling Jaya, Selangor, Malaysia.*

²*Clinical BioPharmaceutics Research Group (CBRG), Pharmaceutical and Life Sciences CoRe, Universiti Teknologi MARA, Puncak Alam, Selangor, Malaysia.*

This study determined the dry powder inhaler (DPI) mainly turbuhaler (T) and accuhaler (A) techniques among third and fourth year pharmacy students pre- and post- education. The selected study variables that differentiate, associate, correlate, and predict the scoring of inhaler techniques when using DPI were also investigated. The study recruited 233 pharmacy students (n = 114 Year 3 students) from the Faculty of Pharmacy, UiTM Puncak Alam. Part one self-administered questionnaire consisted of basic socio-demographic items. The pharmacy students were asked to demonstrate the inhalation techniques for two devices verbally (pre-education). If there was any mistake, short education was given by the researcher and after that they were asked to demonstrate the inhalation techniques again (post-education). These sessions were audio recorded by the researcher and transferred to the checklist of A-T techniques for scoring. There were significant differences of A and T scores between pre- and post-education among Year 3, Year 4 and all the students. There were significant differences in the marks of T and A between males and females in both pre- and post- education. For Year 4 pharmacy students, there were significant association between different level of cGPA and T score pre-education, gender and T score post-education, gender and A score pre-education. The students' cGPA and confidence in using T was a predictor for T score pre-education. There was only a significant low positive correlation between age of the respondent and T score in pre-education.

PEP 03

MPSPSC2015000103 (Poster)

How Community Pharmacists Responded Towards the Community Pharmacy Attachment among Third Year Undergraduate Pharmacy Students? A 3-Year Experience

NS Ab Rahman, SHB ShaikhRahmanBux, CR Ismail

Kulliyah of Pharmacy, International Islamic University Malaysia, Kuantan, Pahang, Malaysia

Experiential learning has become one of the learning methods in higher education institution. A 6-week community pharmacy attachment has been implemented for year 3 undergraduate students of Faculty of Pharmacy at the IIUM since 2013. However, it is unclear how community pharmacist responded to the programme. This study aimed to explore the community pharmacists' perceptions and views towards the community pharmacy attachment among third year undergraduate students. This cross sectional study was conducted among community pharmacists whom were involved in the community pharmacy attachment programme. A post-placement evaluation form containing items on administration and support, student's supervision and pharmacist's practicing skill was administered. The data were analyzed descriptively using SPSS version 20. A total of 157 community pharmacists completed the evaluation form, which consisted of 47(29.9%) in year 2013 and 55(35%) for each year 2014 and 2015. A majority (87.9%) of the community pharmacists said that they were able to supervise students without compromising their service commitments. More than 90% reported that supervising students was stimulating and the majority said it has helped to develop their pharmacy practice skills. Although a few suggested the attachment period to be shortened, most of the community pharmacists supported the 6-week period as well as visit by the university preceptor. Overall, the results of this study demonstrate that community pharmacy attachment help to develop pharmacy practice skill among both community pharmacists and students.

PHARMACEUTICAL CHEMISTRY

PCP 01

MPSPSC2015000152 (Poster)

***In Silico* Pharmacophore Elucidation for Bicyclic Antagonists of Human A_{2A} Adenosine Receptors and Its Comparison with A₃ Adenosine Receptor Bicyclic Antagonists**

YW Jong¹, PK Deb², G Pastorin³, SL Cheong²

¹*Department of Pharmacy Practice, School of Pharmacy, International Medical University, Malaysia*

²*Department of Pharmaceutical Chemistry, School of Pharmacy, International Medical University, Malaysia*

³*Department of Pharmacy, National University of Singapore, Singapore*

In the past decades, many studies have reported the potential therapeutic role of human A_{2A} adenosine receptor (hA_{2A}AR) antagonists as anti-parkinsonism agent. In the present study, a 3D-QSAR pharmacophore model has been developed to determine the important structural requirements of bicyclic hA_{2A}AR antagonists for effective binding with the hA_{2A}AR. A dataset consisting of 157 pyrimidine derivatives were selected in this QSAR study. Hypothesis AAADR.104 is chosen as the best pharmacophore hypothesis with good alignment and statistically significant QSAR results ($R^2 = 0.8364$, $SD = 0.3719$, $F = 153.4$, $RMSE = 0.377$, $Q^2 = 0.8218$, $Pearson-R = 0.9191$). Furthermore, a newly synthesized hA_{2A}AR antagonist has been included in the test set to further validate the predictive ability of the QSAR model; the results showed good correlation between the experimental and predicted hA_{2A}AR binding affinity. Additionally, the so-obtained pharmacophore features of hA_{2A}AR bicyclic antagonists were also compared with that of the hA₃AR bicyclic antagonists. One of the hydrogen bond acceptors and the aromatic ring are located on the bicyclic scaffolds of hA_{2A}AR antagonists, whereas for hA₃AR antagonists, these features are located on the side chain. Additionally, hydrogen bond donor features for both hA_{2A} and hA₃AR antagonists are found located on the side chain. In conclusion, this QSAR pharmacophore model can be prospectively used to facilitate structural optimization of the newly synthesized lead compounds and rational design of new A_{2A} adenosine receptor bicyclic antagonists as anti-parkinsonism agents.

PCP 02

MPSPSC2015000151 (Poster)

***In Silico* Pharmacophore Elucidation for Bicyclic Antagonists of Human A3 Adenosine Receptors and Its Comparison with A2A Adenosine Receptor Bicyclic Antagonists**

XY Wong¹, PK Deb², G Pastorin³, SL Cheong²

¹*Department of Pharmacy Practice, School of Pharmacy, International Medical University, Malaysia*

²*Department of Pharmaceutical Chemistry, School of Pharmacy, International Medical University, Malaysia*

³*Department of Pharmacy, National University of Singapore, Singapore*

Four subtypes of human adenosine receptors are known, classified as A1, A2A, A2B and A3. They regulate a wide range of physiological functions in our body. The human A3 adenosine receptor (hA3AR) antagonists were recently discovered as potential therapeutic agents in many diseases, particularly in glaucoma, inflammatory diseases and cancer. To date, most of the QSAR analyses on hA3AR antagonists were focused mainly on tricyclic scaffold of hA3 antagonists but not much on the bicyclic derivatives. Therefore, ligand-based 3D-QSAR pharmacophore model was generated to understand the important structural features for ligand binding of bicyclic hA3AR antagonists. Fifty-one hA3AR bicyclic antagonists, including 9-alkylpurines, 7-oxo-thiazolopyrimidine-7-one, triazolotriazines, 2-phenylpyrazolopyrimidin-7-one, and 2-arylpyrazolopyrimidin-7-amino derivatives, with binding affinity (K_i) ranging from 3.2 to 3200 nM were employed in this study. The best hypothesis AADR.32 based on three PLS factors has demonstrated statistically significant parameters, exhibiting good predictive ability ($R^2=0.8360$, $SD=0.2886$, $F=62.9$, $RMSE=0.3009$, $Q^2=0.8298$, $Pearson-R=0.9117$). A four-site pharmacophore model with two acceptors (A), one donor (D) and one aromatic ring (R) was developed. The predictive power of the model was further confirmed with an external test compound involving a newly synthesized hA3AR antagonist. Furthermore, the so-obtained pharmacophore features of hA3AR bicyclic antagonists were also compared with that of the hA2AAR bicyclic antagonists. Results have revealed the importance of side chain substituents and bicyclic scaffold towards binding affinity at the respective receptors. In conclusion, the 3D-QSAR model constructed provides useful structural information for future design and development of new compounds as potent and selective hA3AR bicyclic antagonists.

PCP 03

MPSPSC2015000036 (Poster)

Stability Indicating RP-HPLC Method for Simultaneous Determination of Tramadol Hydrochloride and Aceclofenac in Dosage Form

M Gousuddin, P Sengupta, M Ahamad Shah, NE Ismail

Faculty of Pharmacy, Lincoln University College, Selangor, Malaysia

Assessment of stability of pharmaceutical product is very important to ensure the therapeutic efficacy of drugs. The high performance liquid chromatography assay method was used for the determination of tramadol hydrochloride (TMH) and aceclofenac (ACF) in a commercial tablet formulation. The separation was performed by chromatography analysis on a Phenomenex Gemini C18 (250 mm X 4.6 mm i.d., 5 μ m particle size) column. The mobile phase consisted of 0.01 M-ammonium acetate buffer pH 6.5-acetonitrile (65:35, v/v). The flow rate monitored at 1.0 ml/min and the injection volume was 20 μ l. UV detection was performed at 270 nm. TMH, ACF, and their combination drug product were analyzed under hydrolytic, thermal, and oxidative stress conditions, and the stressed samples were also analyzed by the proposed method. The described method was linear over the range of 0.015-0.060 mg/ml and 0.040-0.160 mg/ml for TMH and ACF, respectively. The mean recoveries were 99.76 and 98.12% for TMH and ACF, respectively. The intermediate precision data obtained according to ICH guidelines. The calculated value of correlation coefficient was found 0.999. The method was statistically validated for its linearity, precision and accuracy for routine analysis.

PCP 04

MPSPSC2015000055 (Poster)

Phenolic Content Screening and *In-Vitro* Antioxidant Evaluation for Radical Scavenging Activity of Methanolic Cladodes Extract of *Opuntia Cochenillifera* (L.) Mill

MF Osman¹, SZ Mat So'ad²

¹*Kulliyyah of Pharmacy, International Islamic University Malaysia Kuantan, Pahang, Malaysia*

²*Department of Pharmaceutical Chemistry, Kulliyyah of Pharmacy, International Islamic University Malaysia Kuantan, Pahang, Malaysia*

Opuntia cochenillifera is a tropical cactus from the family Cactaceae. It is commonly planted as an ornamental plant in Malaysia. The objectives of this study were to screen for phenolic content, optimize chromatographic system for thin layer chromatography (TLC) analysis and evaluate the antioxidant activity of methanolic cladodes extract of *Opuntia cochenillifera* (L.) Mill. by using DPPH radical scavenging method. Observation of the chromatograms under visible light showed that the best compounds separation was achieved with the chromatographic system of chloroform-methanol with ratio 90:10. The presence of phenolic compounds were detected by staining the chromatogram with 10% methanolic ferric chloride reagent. At the highest concentration tested (1 mg/mL), methanolic cladodes extract of *Opuntia cochenillifera* showed 41.5% DPPH radical inhibition in comparison with gallic acid, which showed 95.2% DPPH radical inhibition. The results clearly indicated that the free radical scavenging activity of methanolic cladodes extract of *Opuntia cochenillifera* was lower than the standard gallic acid. The current study provides important baseline information to explore the potential use of *Opuntia cochenillifera* as an ingredient in local nutraceutical and cosmeceutical products.

PCP 05

MPSPSC2015000073 (Poster)

Effects of Methyl Jasmonate Elicitation on the Growth and Alkaloids Content of *In Vitro* Cultures of *Ruta Angustifolia* (L) Pers

R Adawiyah Dalim

Department of Pharmaceutical Chemistry, Kulliyah of Pharmacy, International Islamic University Malaysia, Kuantan, Pahang, Malaysia

An *in vitro* plant culture is an alternative method for plant to grow in a sterile condition and under controlled nutritional and environmental conditions. This method has become a potential method in the area of plant propagation, plant improvement, production of secondary metabolites and others. This method is a useful method for natural product research and pharmaceutical industries to overcome the scarcity of natural resources in particular aiming for bioactive compound of interest. Therefore, this research study was carried out to investigate the influence of MeJa elicitation towards the growth of callus as well as production of alkaloids by *in vitro* microshoot culture of *Ruta angustifolia* specifically arborinine and skimmianine. Results show that MeJa strongly cause the change of the growth of the callus and physiologically increase the production of alkaloids by the microshoot. As a conclusion, MeJa elicitation of *R. angustifolia* is a potential method that can affect the growth of the plant and alkaloids production.

PCP 06

MPSPSC2015000084 (Poster)

HPTLC Fingerprint Analysis of *Vitex Pinnata* Linn Leaves

U Subasini¹, S Thenmozhi²

¹*Department of Pharmacology, International Medical School, Management and Science University,, Selangor, Malaysia;*

²*Department of Pharmacognosy, Swamy Vivekanandha College of Pharmacy, Tamil Nadu, India.*

This study aimed to determine the flavonoids, saponins, steroids and phenolic compounds of hydroalcoholic extract of *Vitex pinnata* Linn. (Synonym: Malayan Teak) leaves using HPTLC technique. The extract was tested to determine the presence of various phytoconstituents like carbohydrates, glycosides, alkaloids, flavonoids, saponins, terpenoids, steroids, tannins, protein and amino acids. A CAMAG HPTLC system equipped with LINOMAT 5 applicator, TLC scanner 3, REPROSTAR 3 and WIN CATS-1.3.4 software were used. Mobile phases in the different compositions were used for high resolution. The reports of qualitative phytochemical screening confirmed the presence of carbohydrates, phenols, saponins, flavanoids, terpenoids, steroids and tannins. The extract showed the presence of 13 different types of flavonoids with 13 different R_f values in the range of 0.01 to 0.97. The reports of saponin illustrated the presence of 12 types of saponins with 12 types of R_f value ranging from 0.01 to 0.92. The reports of phenolic profile showed the presence of 15 types of phenolic compounds with 15 different R_f values in the range of 0.02 to 0.94, and the reports of steroid profile demonstrated the presence of 7 types of steroids with 7 types of R_f value ranging from 0.02 to 0.53. It can be concluded that the present study can be used to evaluate the medicinal plant *Vitex pinnata* from the adulterant. HPTLC fingerprint analysis was developed to help in proper identification and quantification of marker compounds. By isolating and identifying the marker compounds, new drugs can be formulated to treat various diseases.

PCP 07

MPSPSC2015000040 (Poster)

Synthesis and Cardioprotective Effects of Novel Series of Combination of Quinazoline - Thiadiazole Against Isoproterenol-Induced Hypertrophy

G Rajamanickam¹, S Selvaraj², T Rajendran³, MMR Sarker¹, NE Ismail¹

¹*Faculty of Pharmacy, Lincoln University College, Selangor, Malaysia.*

²*Faculty of Medicine, Lincoln University College, Selangor, Malaysia.*

³*Department of Pharmaceutical Chemistry, S.S.M.college of Pharmacy, Tamilnadu, India.*

Cardiac hypertrophy is very common and can affect people of any age. It leads to ischemic heart disease, heart failure and it is one of the foremost causes of cardiac morbidity and mortality. Quinazoline and thiadiazole derivatives have caused universal concerns due to their widely and distinct biopharmaceutical activities. This study was designed to synthesize combinations of quinazoline-thiadiazole series of compounds and to evaluate their preventive role in isoproterenol-induced cardiac hypertrophy in male Wistar rats. The equimolar amount of 2-substituted quinazolin-4(3H)-one and 5-substituted-1,3,4-thiadiazol-2-amine in methanolic solution with formaldehyde reacted through Mannich reaction to produce the novel series of 3-[(5-Substituted-1,3,4-thiadiazole-2-yl amino) methyl]-2-substituted-quinazolin-4(3H)-one by microwave and conventional methods. The structure and purity of compounds were confirmed by TLC, IR, MS, and NMR studies. Isoproterenol (5 mg/kg body weight) was injected subcutaneously once daily for 14 days to induce cardiac hypertrophy, which increased heart weight to body weight ratio, cardiac wall thickness and myocytes diameter. The intraperitoneal administration of synthesized compounds (20 mg/kg body weight/once a day for 14 days) along with isoproterenol showed significant reversal of cardiac hypertrophy. Histological studies and Image analysis software were used to confirm the findings. Regarding the mechanisms underlying the cardioprotective effect of the compounds, they might function as antagonists of adrenergic stimulation caused by isoproterenol. The present study showed that the synthesised compounds were able to prevent cardiac hypertrophy caused by continuous exposure to isoproterenol in rats.

PCP 08

MPSpsc2015000163 (Poster)

Molecular Dynamics Behaviour of One Third of the Site Reactivity of Microsomal Prostaglandin E Synthase Type 1 Complexes with an Oxicam Analog

N Abd Rahman, KW Lam

Faculty of Pharmacy, Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia

Microsomal prostaglandin E synthase type 1 (mPGES-1) is a terminal transmembrane enzyme involved in the synthesis of prostaglandin E₂ (PGE₂), a powerful biological mediator of inflammation. The objective of the study was to analyze the conformation changes of mPGES-1 structure when it complexes with an oxicam analog, 13j, a selective mPGES-1 inhibitor. The stability and binding affinity of the inhibitor in the active site of mPGES-1 was also determined. In this study, a series of 20 ns molecular dynamics simulation (MD) was performed by using GROMACS 5.0 package with the GROMOS96 54a7 force field. An open conformation of mPGES-1 was embedded into 1-palmitoyl,2-oleoyl-sn-glycero-3-phosphocholine (POPC) phospholipid bilayer. All simulations were run under constant pressure (1 bar), temperature (300 K) and with periodic boundary conditions. Based on our observation, pocket monomer 1 was occupied by inhibitor causing it inaccessible to the substrate. Root Mean Square Deviation (RMSD) of the mPGES-1 backbone revealed that the protein-inhibitor complex was stable as the system converged to equilibrium state at 3 Å. Besides, hydrogen bonds (H-bonds) analysis revealed that five amino acid residues formed attractive electrostatic interaction with the inhibitor. Amino acid residues are Tyr117, His113, Arg126, Arg70 and Asn74. This shows that the protein-inhibitor complex is stable and has strong binding affinity throughout simulations.

PCP 09

MPSPSC2015000164 (Poster)

Phytochemical Study on the Methanol Fraction of *Zingiber Officinale*

WC Ko, J Jalil

Faculty of Pharmacy, Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia

Zingiber officinale belongs to family Zingiberaceae and is locally known as *zanjabil* (Arabic), *aadu* (gujarati), *shunti* (Kannada), *allam* (Telugu), *inji* (Tamil and Malayalam), *alay* (Marathi), *aduwa* (Nepali), and *adrak* (Hindi and Urdu). This species is widely distributed in India, China, Malaysia and Thailand. The rhizome of ginger has long been used in Ayurvedic and traditional Chinese medicine to treat a wide range of ailments including gastrointestinal disorders, mainly nausea and vomiting associated with motion sickness and pregnancy, abdominal spasm, as well as respiratory and rheumatic disorders. This research study was conducted with the objective to extract, isolate and purify chemical constituents from methanol fraction of rhizomes of *Z. officinale* then determine the chemical structures of compounds identified. The rhizome part of *Z. officinale* was collected then the rhizomes of *Z. officinale* in powder forms were extracted with methanol by cold maceration. This was followed by removal of tannin from crude extract which was carried out using diethyl ether. Methanol fraction was separated and isolated using thin layer chromatography and column chromatography to yield pure compound. Structure elucidation was carried out using ultraviolet (UV) spectroscopy, infrared (IR) spectroscopy, mass spectroscopy (MS) and one-dimensional proton nuclear magnetic resonance spectroscopy (¹H-NMR), carbon-13 nuclear magnetic resonance spectroscopy (¹³C-NMR) as well as comparison with literature. Saponins had been isolated from methanol fraction of rhizomes of *Z. officinale* and characterized.

TRADITIONAL AND COMPLEMENTARY MEDICINE

TCMP 01

MPSPSC2015000126 (Poster)

Antibacterial Activity of Extracts of Marine Brown Algae *Padina Gymnospora*

N Mohd Zah, AV Anita Gnana Kumari, J Anbu Jeba Sunilson

School of Pharmacy, KPJ Healthcare University College, Negeri Sembilan, Malaysia

Marine organisms are potentially prolific sources of highly bioactive secondary metabolites that might represent useful leads in the development of new active antimicrobial agents. No reports have been published to explore the possible antimicrobial activity of marine algae from the Port Dickson Sea. The present study aimed to scientifically evaluate the antibacterial activity of the brown marine algae, *Padina gymnospora* (Dictyoceae family) collected from coastal region of Port Dickson against the selected microorganisms. The powdered green algae were extracted successively with acetone, chloroform, ethanol and distilled water for 48 h using the Soxhlet apparatus. The extracts were concentrated using rotary vacuum evaporator. All the extracts were evaluated for their antimicrobial activity by cup-plate method against Gram positive bacteria such as *Streptococcus pneumoniae*, *Staphylococcus aureus* and Gram negative bacteria such as *Escherichia coli*, *Pseudomonas aeruginosa*. The antibacterial activity was assessed by measuring the diameter of inhibition zone. All the experiments were carried out in triplicate. The ethanol extract of *P. gymnospora* was found to possess the maximum antibacterial activity against the pathogens at the concentration of 10mg/mL which was comparable with standard drug streptomycin (50mcg/mL). The findings suggest that the ethanol extract of *P. gymnospora* contain active phytoconstituents responsible for potent antibacterial activity. The present study proposes the importance of isolation of these phytoconstituents and investigation of possible mechanism of action to develop novel antibacterial agent from *P. gymnospora*.

TCMP 02

MPSPSC2015000008 (Poster)

New Herbal Dispensing System: Herbal Preparation Process, Patients' and Prescribers' Acceptance

SY Chan^{1,2}, **WN Nik Nabil**^{1,2}, **RJ Lim**¹

¹*Traditional & Complementary Medicine Unit, National Cancer Institute, Malaysia.*

²*Pharmacy Department, National Cancer Institute, Malaysia.*

The Traditional and Complementary Medicine (T&CM) Unit, National Cancer Institute (NCI) provides herbal treatment to cancer patients. Previously, patients who received herbal treatment would mix the dispensed herbs at home, creating compliance issue and risk of administration errors. A new herbal dispensing system was introduced: pharmacists prepared the combination of prescribed herbs and supply the pre-mixed herbs sachets to the patients. The objectives of this study were to assess the new herbal preparation process on the preparation time and cost; and also the acceptance of the new system among patients and prescribers. Preparation time and cost of the prescribed herbs was collected from 1st March to 30th April 2015 from patients' electronic medical records in the T&CM Unit, NCI. Feedback forms were used to assess patients' and prescriber's acceptance of the new herbal system. Data were entered into and analysed using Microsoft Excel. A total of 228 herbal patients received 2,236 herbs during the study period. The new herbal dispensing system had longer mean preparation time (14±8 minutes) but lower mean cost per prescription (RM118.76±80.35) than the old system. Of the 50 patients who provided feedback, 72% preferred the new system, 96% considered the waiting time as acceptable and 78% agreed that their compliance had been enhanced. Both herbal prescribers regarded the new system had improved the patient's compliance and the expected herbal effects. In conclusion, although the new herbal dispensing system increases the patients' waiting time, it reduces the herb cost per patient and improves patient's compliance.

PHARMACEUTICAL TECHNOLOGY

PTP 01

MPSPSC2015000129 (Poster)

Development of Sustained Release Ophthalmic Delivery of Prulifloxacin Using *in situ* Gelling System

A Khan, Q Hassan, J Anbu Jeba Sunilson

School of Pharmacy, KPJ Healthcare University College, Negeri Sembilan, Malaysia

Delivery of drugs to the eye to achieve and maintain therapeutic concentrations remains a challenge due to the dilution and drainage of most commonly used conventional dosage forms such as solutions from the eye. This limitation of conventional dosage forms can be overcome by using *in situ gel* forming ophthalmic drug delivery systems prepared from polymers that exhibit reversible liquid – gel phase transitions. This may result in better ocular availability of the drug. The purpose of this work was to develop an ophthalmic drug delivery system based on the concept of ion activated *in situ* gelation for prulifloxacin, an antibacterial agent. Sodium alginate was used as a gelling agent. It formed a gel in the presence of divalent cation in the lacrimal fluid. HPMC E50, LV was incorporated as the viscosity enhancing agent. Formulation F4 containing sodium alginate (0.8%w/v), HPMC (0.02%w/v) with drug (0.3%w/v) and other formulation ingredients was found to be promising as it showed viscosity of 45 cps at 20 rpm and 74.63% drug release at the end of 8 hours. The developed formulations were therapeutically efficacious, stable, non-irritant and provided sustained release of the drug over an 8 hour period. Thus it may be concluded that the developed *in situ* gelling system may be a suitable alternative for the ophthalmic delivery of prulifloxacin.

PTP 02

MPSPSC2015000140 (Poster)

Response Surface Methodology to Optimize Pylamine Maleate Fast Dissolving Tablets Using Synergetic Disintegrants Approach

BP Panda, CJ Yew

Department of Pharmaceutical Technology, School of Pharmacy, Taylors University, Selangor, Malaysia

Pharmaceutical formulation development of fast dissolving tablets (FDTs) involves significant amount of time and efforts to get an optimized dosage form. It is scientifically essential to explore the design of experiments and response surface methodology concept to optimize FDT formulation with minimum amount of time and effort. The present research encompassed the formulation and optimization of pylamine maleate FDTs by employing synergic effects of a super disintegrant and a subliming agent. In optimization of pylamine maleate FDT, central composite design was applied to study the effect of disintegrant as independent variables that is, croscarmellose as a super disintegrant, and menthol as a subliming agent. Pylamine maleate FDT were prepared by direct compression method on Rimek Mini Press-I using flat 8-mm punches and characterized for the dependent variables like disintegration time and cumulative percent drug released after 30 minutes. Optimization study by response surface analysis revealed that 5% of croscarmellose and 20% menthol was found to be optimum which disintegrated in 28 secs and cumulative percent drug released was 98.9% at 30 minutes. A checkpoint formulation was prepared to prove the validity of the evolved mathematical model. The results of study suggest that synergic effect of croscarmellose as a super disintegrant and menthol as a subliming agent employed with systematic experimental design approach has greater impetus in optimization of pylamine maleate FDT.

PTP 03

MPSPSC2015000090 (Poster)

Development of Self-Emulsifying Drug Delivery System (S-SEDDS) for Glibenclamide

HJ Chua¹, SS Patro²

¹*Taylor's University, Selangor, Malaysia*

²*School of Pharmacy, Taylor's University, Selangor, Malaysia*

Glibenclamide (GBD) is one of the most prescribed long-acting antihyperglycaemic agent used in the treatment of Type 2 diabetes mellitus. GBD is a poorly soluble drug which results in low bioavailability. Therefore, the objective of the study was to develop a solid self-nano emulsifying drug delivery system (S-SNEDDS) to improve the solubility and dissolution rate of GBD. Liquid SNEDDS was prepared using Maisine-35-1 as oil, Cremophor RH40 as surfactant, and PEG 400 as cosurfactant. Ternary phase diagrams were constructed to identify the self-nano emulsification region. Based on the phase diagrams, few formulations containing 10-25% of oil were prepared by simple mixing and vortexing. These formulations were adsorbed onto Neusilin US2 to produce solid SNEDDS and were evaluated for drug content, globule size, zeta potential and *in vitro* drug release. The viscosity of liquid SNEDDS was low and inferred to be suitable for fast absorption of drug. DSC and FTIR studies were also performed and the results indicated that there were no incompatibilities between GBD and the components in the SNEDDS. The prepared formulations exhibited a globule size ranging from 14.14 to 45.36 nm. *In vitro* dissolution profiles showed that dissolution rate of GBD from liquid and solid SNEDDS was much greater when compared to the pure drug and the marketed tablet. Thus, this study indicated that the solid SNEDDS could be used as a potential drug carrier for GBD with improved solubility and dissolution rate.

PTP 04

MPSPSC2015000030 (Poster)

Nanosuspension Technology in Salicylic Acid and Its Particle Size Characterization

H Hadi, H N Khalid, A I Awadh

Faculty of Pharmacy, International Islamic University Malaysia, Kuantan, Pahang, Malaysia

Salicylic acid (SA) is known to have keratolytic activity for the treatment of skin related disease such as acne and psoriasis. However, it usually causes side effects such as skin irritation. Also, SA is poorly soluble in water making it difficult to formulate. This study aimed to explore the use of nanosuspension technology in enhancing the solubility of SA in aqueous solutions and to provide a control release to decrease the side effects of salicylic acid by reducing its particle size into nanometer scale. This research project focused on the use of oil-in-water emulsification followed by solvent evaporation technique. The use of different amounts of ethyl acetate was evaluated. This technique was chosen as it has high drug solubilization and capable of producing large scale because of simple manufacturing method and using low-cost materials. The manipulation of different amount of organic solvent, ethyl acetate has an impact on the particle size. Results showed that an increase in the amount of ethyl acetate produced smaller average particle size. However, the particle size increased after the process of centrifugation and freeze-drying. The percentage yield of the final products was low (below 25%). The study has shown that it is possible to reduce the particle size of SA to a nano-sized diameter. Thus the solubility of salicylic acid can be enhanced. However, more extensive research should be done to provide a more concrete conclusion. An improved understanding of the formulation factors will further advance the value of nanosuspension in topical drug delivery.

PTP 05

MPSPSC2015000031 (Poster)

Development and Characterization of Topical Caffeine Sunscreen Formulation

H Hadi, N A Rosli, Z A Hamid, A I Awadh

Faculty of Pharmacy, International Islamic University Malaysia, Kuantan, Pahang, Malaysia

The prominent property of caffeine as a natural sunscreen has received recent interests in research on topical formulations incorporating this organic compound. The main objective of this paper was to evaluate the behaviour of caffeine in a broad-spectrum sprayable sunscreen preparation. Two types of sunscreen formulations were developed with and without the presence of 2% caffeine. Parameters that may influence the formulation stability were assessed. This included organoleptic tests (appearance, colour, thickness, feel), physical tests (rheology and centrifugal phase separation) and chemical test (pH measure). Findings in both formulations were similar for organoleptic test parameters. Immediately after preparation, both formulations appeared as whitish fluid with low viscosity of almost watery-like. Upon spraying a small amount on the hand, the texture was smooth and easily spreadable on the skin. The conditions remained stable with similar findings even after 7 days of storage at room temperature. The pH values were all alkaline approximately at room temperature. The addition of 10% sodium hydroxide into the formulation contributed mainly to the measured alkalinity. Thus, caffeine did not significantly change the pH of the formulation. Both formulations produced almost the same results whereby they behaved like non-viscous Newtonian fluids. The findings also indicate that no phase separation of all triplicate samples with and without 2% caffeine. It can be concluded that caffeine has the potential to be used in topical sunscreen formulations as caffeine helps in enhancing activities of UV filters without affecting formulation stability.

PTP 06

MPSPSC2015000032 (Poster)

Formulation and Characterization of Resiquimod Microsponges Loaded Gel

H Hadi, A Zaiter, A I Awadh

Faculty of Pharmacy, International Islamic University Malaysia, Kuantan, Pahang, Malaysia

The aim of this study was to incorporate microsponges loaded with resiquimod in gel dosage form. Microsponges were prepared by emulsion solvent evaporation method using dichloromethane (DCM), ethylacetate (EA), and chloroform in dispersed phase which were incorporated into different gels. 0.5% w/w Carbopol® 934 (polyacrylic acid) powder was dispersed into deionized water under constant stirring with a glass rod. 0.2% and 0.02% w/w of methylparaben and propylparaben were used as preservative in the gel. The dispersion was neutralized using 10% sodium hydroxide (2% w/w). Topical microsponges gel formulations were prepared by incorporation of microsponges into the gel. A 0.03% w/w of resiquimod loaded microsponges was incorporated into the gel. Control gels which contained resiquimod only were prepared under the same conditions. Microsponges prepared by 2.5 mL of DCM, 1 mL of chloroform or 5 mL of EA in the dispersion phase were selected and coded as F1, F2 and F3. To study the compatibility of gel excipients along with microsponges, Attenuated Total Reflectance – Fourier Transform Infrared (ATR-FTIR) spectroscopy and FESEM microscopy were used. The ATR-FTIR spectrums of different formulations (F1, F2, and F3) are identical. F4 spectrum which contained empty microsponges loaded gel had no additional or missed peaks when compared against spectrums of other formulations. The integrity and surface morphology remained similar when compared to original microsponges observed under FESEM microscopy. Therefore, it can be concluded that there was no chemical interaction between resiquimod-loaded microsponges and gel excipients as shown in ATR-FTIR spectrum and FESEM microscope.

PTP 07

MPSPSC2015000130 (Poster)

In Vitro and In Vivo Evaluation of Formulated Piroxicam Subdermal Implants

Q Hassan, A Khan, J Anbu Jeba Sunilson

School of Pharmacy, KPJ Healthcare University College, Negeri Sembilan, Malaysia

Piroxicam is a non-steroidal anti-inflammatory drug (NSAID) used to relieve pain and inflammation. It is also used in long-term conditions like rheumatoid arthritis and ankylosing spondylitis. The drug has also been investigated for its efficacy in post-operative pain management and was found to be significantly effective. Therefore, the present study aimed to develop Piroxicam subdermal implants for post-operative pain management using biodegradable polymers viz., gelatin and sodium alginate and glycerine as plasticizers. The prepared implants were evaluated for various formulation parameters such as thickness, weight variation, content uniformity, sterility testing, in-vitro release, and drug excipient interaction studies using IR spectroscopy. In-vitro release of implants was carried out in phosphate buffer pH 7.4. In-vivo studies in animals were carried out for polymer-tissue compatibility at subdermal region. Formulation F3 and F4 contained a gelatin: sodium alginate ratio of 40:60 and 50:50 respectively were found to sustain the drug release for up to 5 days (89%) and 6 days (91%) respectively when treated with formaldehyde for 12 hours. In-vivo studies in rabbits for polymer tissue compatibility depicted no changes in tissue configuration histo-pathologically, suggesting compatibility with the surrounding tissues of subdermal region. IR spectrum of the formulation suggested no chemical interaction between the polymers and drug. The study concludes that piroxicam implants is a viable option for sustained drug release in post-operative pain management and this may improve patient compliance.

PTP 08

MPSPSC2015000046 (Poster)

Formulation of Stable Solid Dispersion Containing Artemether into Fast Disintegrating Tablets

SB Natarajan¹, NE Ismail¹, MM Rahman¹, VSN Moorhty²

¹*Faculty of Pharmacy, Lincoln University College, Malaysia*

²*Department of Pharmaceutics, Karpagam College of Pharmacy, Coimbatore, India.*

Malaria is the most prevalent infectious disease in the world which affects around 600 million peoples every year. Artemether (ARM) belongs to artemisinin family and is the active component of the qinghao Chinese herbs, known as *Artemisia annua* used for the treatment of malarial infection. The aim of this study was to design stable artemether by solid dispersion (ARM-SD) technique using various polymeric carriers including povidone, copovidone and soluplus. The physical stability of ARM-SD was investigated by using Powder-XRD technique and related substance was evaluated by HPLC method. Secondly the optimized stable ARM-SD were fabricated into fast-disintegrating tablet (FDT) by direct compression method and evaluated for weight variation, wetting time, disintegration time, hardness and friability. *In vitro* drug release studies were performed for RDTs at phosphate buffer (pH 1.2 and 6.8) as dissolution medium. The Related Substance (RS)/impurities was absent in ARM/Povidone which was confirmed by HPLC and X-RD studies. It was concluded that ARM/Povidone (1:8) was the most stable solid dispersion under elevated temperature and/or humidity. FDTs of ARM/Povidone (1:8) solid dispersion exhibited fast disintegration times (45 ± 3 sec), sufficient hardness (1.5 ± 0.08 MPa), and onset of drug dissolution ($42\pm 1.5\%$ of ARM dissolved in 10 min), and these properties were found to be retained with different storage condition. We have successfully optimized the drug/excipient ratio of the stable solid dispersion and FDT composition that possessed rapid disintegration and satisfactory drug dissolution in order to achieve enhanced therapeutic effectiveness.

PTP 09

MPSPSC2015000076 (Poster)

The Influence of Drug Localisation Within Solid Lipid Nanoparticles (SLNs) on the Cellular Uptake of Insulin-Containing SLNs

LM Thong¹, CJ Roberts², N Billa¹

¹School of Pharmacy, Faculty of Science, University of Nottingham Malaysia Campus, Malaysia

²School of Pharmacy, University of Nottingham, Nottingham, United Kingdom

Improved bioavailability is key to a successful nanoparticulate oral delivery system. It is strongly influenced by the drug uptake process across the gastrointestinal epithelium. Previously, we have successfully fabricated insulin-containing SLNs which conformed to two different insulin localisation models, namely the solid solution model (Model A) and the core-shell model with a drug-enriched shell (Model B). The purpose of this study was to investigate the propensity of these insulin-containing SLNs, being differentiated by the location of the drug payload, to be taken up by the human intestinal Caco-2 cell line. The cellular uptake of both these formulations were evaluated over a treatment duration of 90 minutes. The cells were examined under an inverted microscope at half hourly intervals. The cells exposed to insulin-free SLNs appeared to be confluent and morphologically similar to those untreated cells, indicating that the lipid nanoparticulate carrier itself was non-toxic. Free insulin solution at high concentration (100 µg/ml) caused instant cell death as early as 30 minutes of treatment. Interestingly, cells treated with Model A showed cell shrinkage and detachment within 30 minutes. In contrary, cells treated with Model B remained confluent throughout. These distinctive differences were noted with respect to the extent of cell death due to the exposure of the cells to a high concentration of insulin following the uptake of these insulin-containing SLNs into the cells, indicating that Model A showed a better propensity for cellular uptake. Therefore, cellular uptake can be influenced by drug localisation within SLNs, which eventually affects drug bioavailability.

PTP 10

MPSPSC2015000121 (Poster)

Development and Screening of Certain Essential Oil Based Topical Formulations for their Antimicrobial Activity

M Sellappan, KZ Hong

School of Pharmacy, Taylor's University, Selangor, Malaysia

Essential oils have been traditionally used for various purposes for many years. The most notable use is their antimicrobial activity. Oregano and geranium oil have shown good antimicrobial activity compared to other essential oils and thus have been chosen as candidates for this research. There is currently no cream formulation in the market consisting of these two oils. This study aimed to develop an antibacterial or antifungal cream formulation containing oregano oil, geranium oil and a mixture of both. Different concentrations of the oil in the cream formulation were made to ascertain the effectiveness of their antimicrobial activity. A zone of inhibition testing was conducted using prepared cream formulations against *Staphylococcus aureus*, *Bacillus subtilis*, *Pseudomonas aeruginosa*, *Escherichia coli*, *Candida albicans* and *Cryptococcus neoformans*. The prepared formulations were subjected to physical evaluations like glittiness, extrudability and pH. The results of all physical evaluations are found to be within the limit and complies the pharmacopoeia standards. Cream formulation containing 10% oregano oil has shown superior antimicrobial activity against *Candida albicans* and *Cryptococcus neoformans* as compared to the standard cream, miconazole. Oregano oil has promising antifungal properties; however further testing are required before it can establish itself as an antifungal cream in the market.

PTP 11

MPSPSC2015000137 (Poster)

Isolation and Ointment Formulation of a Semi-Purified Beta Carotene from *Daucus carota* L. and its Antimicrobial effect against *Staphylococcus aureus*

MFD Cruz-Bacayo, EM Faller

School of Pharmacy, Management & Science University, Shah Alam, Malaysia

Carrot (*Daucus carota* L) is one of the richest source of beta-carotene that enhances the immune system. Carrot contains a variety of phytochemicals such as retinol, carotenoids, provitamin A (a, β and cryptoxanthin) and a good health protective effects. The study would like to determine the antimicrobial activity of semi-purified beta-carotene extract formulated as ointment. The semi-purified beta-carotene was isolated from plant source (carrot) using column chromatography. The physicochemical properties were identified. The antimicrobial property of the extract and the formulated ointment was evaluated using agar diffusion method against *Staphylococcus aureus* (ATCC 9144). It was observed that the semi-purified extract exhibited a concentration value of 5.776 ± 0.221 ppm (absorbance at 436 nm) and soluble in organic solvents (ether, chloroform and acetone). Moreover, the semi-purified beta-carotene extract showed positive results in Bate-Smith-Metcalf test and Wilstatter-cyanidin test, indicating the presence of colouring pigments. Evaluation of antimicrobial activity of the extract revealed moderate to good zone of inhibition against *S. aureas* (10mm). Formulated ointment has significant inhibitory effects (12mm) compared with standard beta-carotene crème (7mm) and erythromycin ointment (25mm).

MILITARY PHARMACY

MPP 01

MPSPSC2015000159 (Poster)

Value-Added Services: Increasing Patient Utilization of Pharmaself Automated Dispensing Unit 24 Hour (PADU24) in Tuanku Mizan Armed Force Hospital (TMAFH)

A Rahmatullah Khan¹, MA Adnan¹, AH Basari², MA Mat Rahim³, MH Muhammad Yusof³

¹*Department of Pharmacy, Tuanku Mizan AFH, Kuala Lumpur, Malaysia*

²*Division of Health Services, MAF HQ, Kuala Lumpur, Malaysia*

³*Medical and Dental AFD, Kuala Lumpur, Malaysia*

PADU24 is a new, first in Malaysia, free of charge service offered in the Outpatient Department (OPD) of TMAFH, which was installed in March 2015. It serves patients with partial medication supplies to get their subsequent supplies through the machine at any time without the need to queue at the counter. This project aimed to increase the utilization of PADU24 service, to improve patient satisfaction with OPD services by reducing the waiting time, and to improve the Quality Use of Medicines (QUM). A retrospective cohort study of services utilized between April and August 2015 was conducted. In addition, patient self-administered questionnaires were employed to identify awareness and barriers to use the service; staff questionnaires were used to evaluate staff' comprehension of the standard operating procedure (SOP) and readiness to provide the service. Intervention was then conducted after the factors of under-utilization of the service were determined, including service promotion through banners and pamphlets. For pharmacy staff, continuous medication education (CME) was conducted to increase their understanding of the SOP and to improve motivation in providing the service. Also, post-interventional telephone interview was conducted with a random sample of patients, using a 10-statement questionnaire. Patients' waiting time was then analysed, before and after the service, to examine the effect of PADU24, which indirectly affects patients' satisfaction towards OPD service. The results of increasing patient utilization of PADU24 and increase patient satisfaction with OPD service were expected with a reduction in patient waiting time.

MPP 02

MPSPSC2015000154 (Poster)

IV Ceftriaxone Use in Tuanku Mizan Armed Forces Hospital

AM Sulong¹, MA Adnan¹, MA Mat Rahim², MH Mohamad Yusof², AH Basari³

¹*Department of Pharmacy, Tuanku Mizan AFH, Ministry of Defence, Malaysia*

²*Armed Forces Medical & Dental Depot, MAF HQ, Ministry of Defence, Malaysia*

³*Health Services Division, MAF HQ, Ministry of Defence, Malaysia*

IV Ceftriaxone is widely prescribed by the physicians in Tuanku Mizan Armed Forces Hospital (TM AFH). It has become the most frequently prescribed IV antibiotic in the hospital, recording a distinctive high number of prescription orders. Almost 400 patients were prescribed with IV Ceftriaxone from the first half of 2015, two-times higher than the second most prescribed IV antibiotic, ampicillin/sulbactam. The wide use of third-generation cephalosporin, including ceftriaxone, has been associated with the emergence of extended-spectrum beta-lactamases (ESBLs), presenting concerns for bacterial resistance in therapeutics. Therefore, the high number of recorded prescriptions raise an issue whether those prescribed IV Ceftriaxone are appropriately utilized. This retrospective study reviewed the IV ceftriaxone use in TM AFH, comparing it with the guidelines proposed by the National Antibiotic Guideline (NAG). Data were collected from the bed head ticket archive of all the patients who were prescribed with IV ceftriaxone from March to June 2015, and the appropriateness of the use were determined according to the guideline. Treatment of respiratory tract infection accounted for 47% of the use while surgical prophylaxis recorded 18%. The overall rate of concordance with indications recommended in guideline was 48% which is considered as low. Potential areas for intervention include empirical treatment of respiratory tract infection and use in surgical prophylaxis.

PHARMACOLOGY

PGP 01

MPSPSC2015000125 (Poster)

Antiulcer Activity of Extracts of *Hibiscus Vitifolius* Root Extracts

AVA Gnana Kumari, JJS Anbu, K Anandarajagopal

School of Pharmacy, KPJ Healthcare University College, Nilai, Malaysia

Hibiscus vitifolius (Malvaceae) is traditionally used by the people of Kerala, India for the treatment of gastric ulcers. The root paste is given orally for the treatment of stomach infections. The present study was aimed to scientifically evaluate the folklore claim of *H. vitifolius* root against *Helicobacter pylori* induced ulcers in experimental animals. Petroleum ether, chloroform, methanol and aqueous extracts of *H. vitifolius* roots were obtained successively by cold maceration technique. Twelve groups of Wistar rats were used to evaluate the antiulcer activity. Group I served as control whereas, gastric ulcers were induced in group II – XII using acetic acid. After 24 hours of ulcer induction, the animals in group III – XII were inoculated intragastrically with 1mL of *H. pylori* twice a day for 7 days. The extracts (200 and 400 mg/kg b.wt) and the standard drug, were administered to the respective groups twice a day from 3rd day of ulcer induction, for 14 consecutive days. After the treatment, the animals were sacrificed and the stomachs were removed for evaluation of gastric lesions. The ulcerated area and the healing rate were measured. Treatment with methanol extract (200 and 400 mg/kg) significantly reduced the ulcerated area compared to the other extracts. Histopathological studies supported the protective effect of the extract. The findings suggest that the methanol extract of *H. vitifolius* possesses antiulcer effects which may be due to the presence of various active phytochemicals in the plant and this justifies the folklore claim.

PGP 02

MPSPSC2015000011 (Poster)

The Protective Effect of the Aqueous Extract of *Auricularia Polytricha* on Paracetamol Induced Hepatotoxicity in Sprague-Dawley Rats

C Dinesh Kumar¹, G Sivamalar¹, B Shaminiswary¹, C Mayuren¹, K Purushotham², G Gaurav^{1,4}, D Kamal^{1,3}, C Jestin¹

¹*School of Pharmacy, International Medical University, Kuala Lumpur, Malaysia*

²*School of Medicine, International Medical University, Kuala Lumpur, Malaysia*

³*School of Biomedical Sciences & Pharmacy, University of Newcastle, Newcastle, Australia*

⁴*School of Medicine & Public Health, University of Newcastle, Newcastle, Australia*

The aqueous extract of *Auricularia polytricha* (Auriculariaceae) was investigated for its protective action against paracetamol induced hepatotoxicity in Sprague Dawley male rats. The extract in doses of 250 mg/kg and 500 mg/kg p.o. was administered for a period of 14 days. Hepatotoxicity was induced in rats using paracetamol with a dose of 2 g/kg p.o. on the 14th day of the study. Immediately after 48 hours of paracetamol administration, blood was withdrawn from the retro orbital sinuses of the experimental rats and the serum was separated for further analysis. The liver biomarkers namely aspartate transaminase (AST), alanine transaminase (ALT), alkaline phosphatase (ALP), lactate dehydrogenase (LDH), total bilirubin (TB), total protein (TP), triglycerides (TG) and cholesterol were determined in the serum samples. All estimations were performed as per existing standard procedures. Key findings showed that paracetamol significantly ($P < 0.001$) increased the serum AST, ALT, ALP, LDH, TB, TG and cholesterol levels whereas decreased the TP levels. However, extract treatment significantly ($P < 0.001$ to $P < 0.05$) reversed the effects of paracetamol by showing a significant decrease in AST, ALT, ALP, LDH, TB, TG and cholesterol levels and increased the levels of TP in a dose dependent manner. The standard drug, silymarin produced a significant ($P < 0.001$) decrease in the levels of AST, ALT, ALP, LDH, TB, TG and cholesterol while increasing the levels of TP. The results indicate that the aqueous extract of *A. polytricha* have protective action against paracetamol induced hepatotoxicity in animal model.

PGP 03

MPSPSC2015000091 (Poster)

Antioxidant Effect of *Senna Surattensis* Leaves Extract on Streptozotocin Induced Diabetic Rats

E Thilagam¹, CT Kumarappan², SC Mandal¹

¹*Department of Pharmaceutical Technology, Jadavpur University, Kolkata, India*

²*School of Pharmacy, Taylor's University, Subang Jaya, Malaysia*

Senna surattensis (Burm.f.) of family Caesalpiniaceae is a common medicinal herb native to tropical Asia which is frequently used in folk medicine to treat various chronic diseases particularly for diabetes mellitus. In the present study, the leaves of *S. surattensis* was used to evaluate its antioxidant and glucose lowering effect in Streptozotocin-nicotinamide induced diabetic rats. Leaves of *S. surattensis* were extracted with ethanol and the crude extract (EESS) was used for the treatment of diabetic rats. After 21 days of drug treatment, all the animals were sacrificed and antioxidant parameters were estimated in the liver and kidney tissues. All of the antioxidant parameters and blood glucose were compared with the diabetic control group. The progression of diabetes was significantly reduced with EESS treatment. In treated rats, both doses of EESS induced a significant reduction in serum glucose. Furthermore, EESS treatment increased antioxidant levels in liver and kidney tissues, with concomitant decreases in levels of thiobarbituric acid-reactive (Lipid peroxidation) substances. The results of the present study indicate that ethanol extract of *S. surattensis* leaves possesses anti-hyperglycemic and antioxidant effect and may be employed in protecting tissues against the oxidative damage induced by diabetes mellitus.

PGP 04

MPSPSC2015000127 (Poster)

Anti-inflammatory Activity of *Sansevieria Trifasciata* Leaves

JJS Anbu, K Abdullah, K Anandarajagopal, A Fazalda

School of Pharmacy, KPJ Healthcare University College, Nilai, Malaysia

Traditional medicines play an important role to combat serious ailments. Decoction of *Sansevieria trifasciata* leaves (Ruscaceae) is used for inflammatory conditions in traditional Chinese medicine. The present study aimed to evaluate the traditional claim of anti-inflammatory effect of *S. trifasciata* leaves. The dried powdered of *S. trifasciata* leaves were extracted separately with petroleum ether, methanol and distilled water for 6 days by cold maceration technique. The anti-inflammatory activity of the extracts was evaluated by carrageenan induced paw edema method using plethysmometer. Thirty minutes after the administration of extract and standard drug diclofenac sodium, 0.1 mL of carrageenan suspension (1 %, V/V in normal saline) was injected into the left hind paw sub-plantar region of control and test animals to induce the paw edema. The paw volume was measured immediately using plethysmometer (initial paw volume), and thereafter the paw volume was measured every one hour for three hours. The anti-inflammatory activity was measured in terms of percentage inhibition of edema. All the extracts of *S. trifasciata* leaves (200 mg/kg, p.o) exhibited anti-inflammatory activity (52.4-84.6% protection) against carrageenan induced paw edema when compared with the standard drug diclofenac sodium. The methanol extract showed highly significant ($p < 0.001$) anti-inflammatory activity followed by aqueous extract ($p < 0.01$) and petroleum ether extract ($p < 0.05$). The present study scientifically supports the traditional use of *S. trifasciata* leaves for the treatment of inflammation. These findings suggest the necessity of isolation of active chemical constituents and to find out the possible mechanism of action.

PGP 05

MPSPSC2015000142 (Poster)

Polyphenolic Extract of *Ichnocarpus Frutescenes* Leaves Modulates Peripheral Glucose Uptake through GLUT Gene Transporters in Experimental Type 2 Diabetic Rats

CT Kumarappan¹, MJ Cini², MF Fazlin², SC Mandal³

¹*School of Pharmacy, Taylor's University, Subang Jaya, Malaysia*

²*School of Pharmacy, Universiti Teknologi Mara (UiTM), Puncak Alam, Malaysia*

³*Department of Pharmaceutical Technology, Jadavpur University, Kolkata, India*

The overall objective of this investigation was to characterize the antidiabetic effects of polyphenol extract (PPE) of *Ichnocarpus frutescens* in Streptozotocin (STZ)-Nicotinamide treated rats at cellular and molecular levels. The positive findings corroborate its use for the prevention and treatment of diabetes mellitus in Ayurveda medicines. The total polyphenol extract of the plant leaf was tested for its antidiabetic activity for 30 days on the cellular and molecular expression of glucose transporters in STZ (STZ; 45 mg/kg in 0.1 M citrate buffer, pH 4.5, ip)-Nicotinamide (120 mg/kg, ip) induced diabetic rats. Glucose metabolism by the hepatocytes and adipocytes were analyzed by quantitative RT-PCR to gauge the levels of PCK1 and GLUT2 in the hepatocytes, and GLUT4 in the adipocytes. Daily oral administration of PPE significantly modified the fasting blood glucose (FBG) and gluconeogenesis process through GLUT2 and GLUT4 transporters. The *ex vivo* study on glucose uptake by isolated hemidiaphragm revealed that glucose uptake mediated by PPE was significantly higher (43.65 ± 3.60 mg/g tissue weight/30 min, $p < 0.05$) than that of insulin (17.25 ± 2.25). The upregulation of GLUT2 revealed that increased glucose transport and the down regulation of PCK1 showed involvement of PPE in regulating gluconeogenesis in diabetic rats. The present investigation suggests that the antidiabetic effect of PPE of *I. frutescens* is mediated through modulation of hepatic and adipocyte GLUT transporters in STZ-Nicotinamide induced Type II diabetic rats. It also explains and confirms the basis for its traditional use by tribal community of southern India.

PGP 06

MPSPSC2015000038 (Poster)

Augmentation of Humoral Immunity by an Ayurvedic Herbal Preparation, Anantamul Salsa *In vitro*

MM Rahman Sarker^{1,2}, MS Kabir Choudhuri³, SA Vijay Jesuraj², R Gayathri², MM Shahimi², N Satheesh Babu², NE Ismail²

¹*Division of Pharmaceutical Sciences, Okayama University, Okayama, Japan*

²*Faculty of Pharmacy, Lincoln University College, Petaling Jaya, Malaysia*

³*Department of Pharmacy, Jahangirnagar University, Dhaka, Bangladesh*

Anantamul Salsa (ANS), a polyherbal Ayurvedic preparation, is traditionally used for the treatment of gonorrhea, syphilis, leprosy, skin diseases, blood poisoning and gout. Scientific reports on its therapeutic value specially, immunomodulating effect, has not been found. Therefore, the study evaluated the immunostimulating potential of ANS *in vitro* by measuring IgM production and splenocytes proliferation. Freshly prepared BALB/c mice splenocytes were treated with 0.25, 0.5, 0.75, 1, 1.5, 2, 3, and 4% (v/v) of ANS in culture at 37 °C and 5% CO₂ for 5 days. IgM production and cells proliferations were determined by ELISA and MTT methods, respectively. The possibility of bacterial endotoxin (LPS) contamination in ANS was assessed by adding polymyxin B (PMB) during culture. ANS at 0.50-1.5% significantly augmented IgM productions; the highest IgM enhancement was two-times higher at a dose of 0.50% compared to control. ANS at 0.50, 0.75, 1.0, 1.5, 2.0 and 3.0% stimulated splenocytes proliferations by 1.98, 1.64, 2.21, 2.0, 2.27 and 1.78 times, respectively. The IgM production ability of ANS was not retarded by PMB treatment. The study demonstrated that IgM production ability of ANS was not due to the presence of bacterial endotoxin, rather owing to bioactive chemical(s) in ANS. However, higher doses of ANS (4%) showed cytotoxicity which resulted in a drastic decline of viable cells and consequently decreased IgM production. This is the preliminary and first report on the immunostimulating potential of ANS. Anantamul Salsa may be useful in strengthening immune responses in conditions of insufficient or impaired immunity.

PGP 07

MPSPSC2015000116 (Poster)

A Pharmacokinetic Study of Antimycobacterial *N'*-hexadecanoylisonicotinohydrazide**HS Naveen Kumar¹, AS Mohammed Ali², V Gantala³, M Zaini Asmawi², I Pazilah², S Amirin²**¹*School of Pharmacy, Taylor's University, Subang Jaya, Malaysia*²*School of Pharmaceutical Sciences, Universiti Sains Malaysia, Penang, Malaysia*³*InvaGen Pharmaceuticals, New York, United States of America*

Tuberculosis (TB) remains one of the major global health problems and causes serious illness among millions of people in each year. The emergence of multi-drug resistant and extensive drug-resistant strains of *M. tuberculosis*, where TB patients are co-infected with human immunodeficiency virus (HIV), poses a serious threat. In spite of the increasing worldwide incidence of TB, no new drugs have been brought to the market over the past four decades. Therefore, an attempt was made to synthesize new and effective isoniazid (INH) derivatives. In our previous studies, we identified *N'*-hexadecanoylisonicotinohydrazide (compound **2k**) as potential antimycobacterial compound with minimum inhibitory concentration (MIC) of 0.1 μ M and lethal dose (LD₅₀) >5000 mg/kg. The pharmacokinetic study (PK) of compound **2k** was conducted using *N'*-octadecanoylisonicotinohydrazide (compound **2m**) as an internal standard. An analytical method using HPLC and UV detection was developed for the estimation of the compound **2k** in plasma using solid phase extraction technique. The method was successfully validated and applied to evaluate the PK of compound **2k** after oral and intravenous (I.V) administration. Following I.V administration to the rats, the compound **2k** was eliminated gradually from the body and mean half-life was 18.62 hours with larger volume of distribution (Vd), 274.32 \pm 25.86 mL/kg compared to INH. After oral administration, compound **2k** was absorbed rapidly with the t_{max} of 1.92 hour and the absorption was incomplete with the calculated absolute oral availability of 0.112%. This study will be helpful in understanding the PK of potential lipophilic drug candidates.

PGP 08

MPSPSC2015000096 (Poster)

Edaravone Attenuates Gentamicin-Induced Nephrotoxicity in Rats

V Rajavel, HJ Lee, ZK Tan, WJ Lim

Faculty of Pharmacy, AIMST University, Semeling, Malaysia.

Gentamicin is an antibiotic that exhibits a broad spectrum of activity. Use of gentamicin is now limited due to its potential to induce nephrotoxicity by selective accumulation in the kidney. Edaravone is a potent anti-oxidant. It scavenges free radicals strongly, protecting the cells against oxidative stress. Therefore, this study was conducted to test the mentioned hypothesis of edaravone in gentamicin-induced nephrotoxicity in rats. Various parameters including animal body weight, kidney weight, body weight to kidney ratio, serum creatinine, serum urea and histopathology were analysed in nephrotoxic animals (induced with gentamicin 100 mg/kg/body weight, *ip*) with and without edaravone (10 mg/kg/body weight *ip*). Gentamicin control rats showed that body weight and kidney weight decreased, while kidney weight to body weight ratio, serum creatinine and serum urea increased significantly compared with the normal control rats. Moreover, marked renal histopathological abnormalities such as glomerulosclerosis, glomerular hypertrophy, tubular cell degeneration and renal arteriolar hyalinization were seen in the gentamicin control rats. Edaravone attenuated the biochemical analyses such as, serum creatinine and serum urea in treated rats. It also significantly reduced the kidney weight to body weight ratio. Renal histopathological abnormalities in the edaravone treated rats were reduced compared with gentamicin control rats. Edaravone *per se* group did not show any toxicity to the rats. This study suggests that edaravone ameliorated renal structural and functional abnormalities associated with gentamicin induced experimental nephrotoxicity. It was concluded that edaravone reduces nephrotoxicity caused by gentamicin.

PGP 09

MPSPSC2015000044 (Poster)

Phytochemical and Toxicity Study of Standardized Extract of *Epipremnum Aureum* in Rodents

KD Sreemoy, S Pinaki, RSM Moklesur, NE Ismail

Faculty of Pharmacy, Lincoln University College, Petaling Jaya, Malaysia

Epipremnum aureum (Araceae) is commonly known as money plant, having indoor air pollution removing capacity. The present study aimed to explore the acute and sub-chronic toxicity of orally administered standardised ethanolic extract of *E. aureum* using Sprague Dawley rats. The phytochemical analysis of plant extract was performed using thin layer chromatography and standard phytochemical screening techniques. In the 14-day acute toxicity study, the animals were divided into four groups and each group received a dose of (50, 500, 2000) mg/kg except control group which receives only 1% carboxymethyl cellulose. In case of sub chronic toxicity, the animals were fed with extract (100, 600, and 1000 mg/kg per day for 28 days. The parameters measured included organ weight, biochemical test, haematological test and histopathological observations. The qualitative TLC analysis and phytochemical screening revealed the presence of tannins, saponins, terpenoids, flavonoids, phytosterols, glycosides and alkaloids along with few phenolic acids. Acute oral administration of *E. aureum* did not show any mortality, CNS and ANS toxicities. Similarly, in subchronic toxicity studies, *E. aureum* did not showed any significant differences between the control and extract treated groups in terms of their organ weight, haematological and biochemical parameters. Histopathological examination did not reveal any remarkable and treatment related changes. A no-observed adverse-effect level for extract is 2000 mg/kg under the conditions of this study. Therefore, the extract could be considered as safe at the doses administered since they did not provoke toxic effects.

PGP 10

MPSPSC2015000157 (Poster)

Do Opioid Receptors Have a Role in the Anti-motility Effect of *Pandanus Amaryllifolius* in the Guinea Pig Ileum?

PN Yeoh, KY Koh, YS Chen

School of Pharmacy & School of Basic Medical Sciences, International Medical University, Kuala Lumpur, Malaysia.

Pandanus amaryllifolius (PA), from *Pandanaceae* family, widely distributed in south-east Asia, is commonly used as a flavouring agent in cooking. An earlier study showed that the ethanolic extract of PA has anti-histaminergic and anticholinergic activity on the guinea pig ileum. This study investigated the effects of PA on opioid receptors in the guinea pig ileum. The isolated guinea pig ileum, suspended in organ baths containing aerated Krebs solution at 36.9°C was stimulated electrically. Different doses of morphine were injected into the organ baths in the presence of different doses of PA or selected antagonists, atropine, mepyramine or naloxone. The contractions of the tissues were recorded using Powerlab. PA (1.0mg/mL, 2.5 mg/mL, 5.0 mg/mL and 10.0mg/mL) reduced the amplitude of contractions following repeated supra-maximum stimulation, in the absence and presence of 10^{-7} M mepyramine, 10^{-8} M atropine and 2.0µg/mL naloxone. Administration of naloxone (1.0 µg/mL and 2.0 µg/mL) which reversed the reduction of the amplitude of contractions due to 10 µg/mL of morphine, did not reverse the effect of PA, indicating no involvement of opioid receptors. The ethanolic extract of PA did not interact with opioid receptors. Further studies should be conducted to determine the role of other types of receptors that could be involved in the action of PA on ileum.

PGP 11

MPSPSC2015000146 (Poster)

***In Vitro* Evaluation of Anticancer Properties of the (1R, 2R)-1-phenyl-2-(phenylamino)propane-1,3-diol Derivative (RB5)**

XY Lim, CW Mai, CO Leong, LC Wong

School of Pharmacy, International Medical University, Kuala Lumpur, Malaysia

A series of novel nitrogen mustard derivatives was previously synthesised in collaboration with the School of Applied Sciences, Northumbria University. One of the compounds, RB5, was evaluated for its anti-cancer activities *in vitro*. Cell proliferation assay was carried out against fifteen cancer cell lines; breast (MCF-7, MDA-MB-231, MDA-MB-468, HCC38), colon (HT-29, HT116, SW48, HCC2998), lung (A549, NCI-H23, NCI-H1299) and nasopharyngeal (HK1, SUNE1, CNE1, TWO1) using luciferase assay. Dose response curves for RB5 against nasopharyngeal cancer cells were constructed. Morphological changes in SUNE1 and NP460 (normal nasopharyngeal) cells treated with RB5 were observed by microscopic studies. Lastly, Cell Death Detection ELISA^{PLUS} kit was used to quantify the degree of necrosis and apoptosis in treated SUNE1 cells. Cell proliferation assay showed that RB5 displayed more potent cytotoxicity than 5-fluorouracil on several cancer cell lines, particularly nasopharyngeal. Among nasopharyngeal cancer cells, RB5 displayed the highest potency towards SUNE1 with IC₅₀ value of 12.35 ± 3.55 µM. The selectivity of RB5 was assessed against SUNE1 and NP460 cells and was found to induce selective cancer cell death as indicated by selectivity index of 1.70 and by comparison of both dose response curves. Microscopic studies showed a decline in the number of viable treated SUNE1 cells but not in NP460 cells which further supported the notion that RB5 was selective for SUNE1 cells. RB5 was established to induce apoptosis in cancer cells via immunoassay. The promising cytotoxicity and selectivity of RB5 makes it a potential lead compound for anti-cancer drug design.

PGP 12

MPSPSC2015000147 (Poster)

***In Vitro* Evaluation of Anticancer Properties of N-((1S,2S)-1,3-dichloro-1-phenylpropan-2-yl)aniline Derivative (RB8)**

NXF Lim, LC Wong, CW Mai, CO Leong

School of Pharmacy, International Medical University, Kuala Lumpur, Malaysia

A series of nitrogen mustard derivatives was synthesized in collaboration with School of Applied Sciences, Northumbria University. Among the derivatives, RB8 was selected for anticancer evaluation in this study. RB8 was screened for anticancer activity against 15 human cancer cell lines; breast (MCF-7, MDA-MB-231, MDA-MB-468, HCC38), colorectal (HT29, HCT116, SW48, HCC2998), lung (A549, H23, H1299) and nasopharyngeal (HK-1, SUNE-1, CNE-1, TWO-1) using cell viability assay. Dose response curves for percentage of cell viability of nasopharyngeal cancer (NPC) cells against RB8 were constructed. Morphological changes to SUNE-1 and its isogenic normal cell (NP460) upon treatment with negative control (1% DMSO) and 10 μ M RB8 were evaluated by microscopic studies. The mode of cancer cell death induced by RB8 was elucidated using Cell Death Detection ELISA^{PLUS} kit. Results were analysed by ANOVA followed by a *post-hoc* (Dunnett's) test with $p < 0.05$ level of significance. RB8 demonstrated more potent anticancer activity than 5-fluorouracil particularly on NPC cells. SUNE-1 cells had the lowest IC₅₀ value (9.71 μ M \pm 0.47) and highest selectivity ratio (2.14) upon RB8 treatment. Microscopic studies demonstrated reduction in cell number and cell shrinkage with SUNE-1 after 48 hours of RB8 treatment compared to 1% DMSO. No significant morphological changes in NP460 cells for both groups were observed after 72 hours. RB8 induces apoptotic cell death based on higher enrichment factor in apoptosis of up to 10.47 folds compared to 1% DMSO while no changes were observed in necrosis. The promising cytotoxicity and selectivity of RB8 warrants further study on this compound.

PGP 13

MPSPSC2015000045 (Poster)

Antiproliferative Activity of L-Glutaminase from *Aeromonas Veronii* on A549 and HT29 Cell Lines

SAV Jesuraj^{1,2}, NE Ismail¹, MMR Sarker¹, MJ Praya¹, M Ravikumar³

¹Faculty of Pharmacy, Lincoln University College, Petaling Jaya, Malaysia

²Centre for Pharmaceutical Sciences, JNT University, Hyderabad, Telengana, India

³Faculty of Pharmacy, Geethanjali College of Pharmacy, Keesara, Telengana, India

Recently, L-glutaminase has attracted much attention because of its therapeutic and industrial application. This enzyme catalyzes the deamination of L-glutamine to L-glutamic acid and ammonium ions. It is found to be a potent drug for lymphocytic leukemia. We produced L-glutaminase from *Aeromonas veronii* by optimizing the physical and nutrient factors by submerged fermentation. The enzyme was purified and isolated from the medium by ammonium precipitation followed by dialysis. Antiproliferative activity of L-glutaminase was assessed on A549 (human alveolar adenocarcinoma) and HT 29 (human colon) cancer cell lines. The cancer cell lines were treated with different concentrations of the enzyme (ranging from 5 to 80µg/mL) and cultured for 24 hours and cell viability was determined by MTT assay. DNA fragmentation analysis was carried out to analyze the impact of the enzyme over the cell lines. The DNA of the overnight treated cell lines was isolated using Purelink Genomic DNA isolation kit and subjected to gel electrophoresis in ethidium bromide prestained 1.5% agarose gel. It was viewed and photographed by Gel imager. The antiproliferative activity of the enzyme on A549 was significantly higher than HT 29 cell lines ($p < 0.001$). The IC_{50} of the enzyme was found to be 35.9 ± 0.4 and 52.36 ± 0.39 µg/mL for A549 and HT29 cell lines, respectively. The DNA fragmentation patterns characterize the damage caused by the enzyme. The significant DNA cleavage implied apoptosis which was higher with A549 than HT 29 cells.

PGP 14

MPSPSC2015000149 (Poster)

***In Vitro* Evaluation of the Anticancer Properties of the N-((1R,2R)-1,3-dichloro-1-phenylpropan-2-yl)aniline Derivative (RB9)**

SE Tay, LC Wong, CW Mai, CO Leong

School of Pharmacy, International Medical University, Kuala Lumpur, Malaysia.

A novel nitrogen mustard derivative, RB9, was synthesised in collaboration with the School of Applied Sciences, Northumbria University and was evaluated for anticancer activity. Fifteen cancer cell lines (MCF7, MDA-MB-231, MDA-MB-4678, HCC38, HT29, HCT116, SW48, HCC2998, A549, H23, H1299, HK1, SUNE-1, CNE-1, TWO1) were treated with RB9, 5-fluorouracil (positive control) and 1% DMSO (negative control). The anticancer activity of RB9 was evaluated using luminescent cell viability assay. The morphological changes in cells treated with RB9 were observed by microscopic studies. Cell Death Detection ELISA^{PLUS} kit was used to determine the mode of cell death induced by RB9. Data obtained were analysed using one-way ANOVA, *post-hoc* Dunnett's test and independent sample t-test. RB9 was most potent towards nasopharyngeal cancer cell lines. The lowest IC₅₀ value ($10.16 \pm 0.51 \mu\text{M}$) and highest selectivity ratio (1.96) was observed in SUNE-1 cells. RB9 halted growth of SUNE-1 cells at the 24th hour and the number of cells was observed to decrease compared to negative control group as indicated by microscopic studies. However, RB9 did not cause significant changes on the growth and number of normal nasopharyngeal NP460 cells in both groups. RB9 induced apoptotic cell death rather than necrosis on SUNE-1 cells as it induced apoptotic markers of up to 2.97 folds compared to negative control group while there was no significant changes in necrotic markers. In conclusion, RB9 exhibits promising anticancer properties. However, further structural modification is required to improve its cytotoxicity towards cancer cells.

PGP 15

MPSPSC2015000109 (Poster)

Biological Screening of Malaysian Green Mussels (*Perna Viridis*)

**V Krishnamoorthy¹, P Subramani¹, V Palanimuthu¹, R Veersamy¹, A Tan², S Revendran¹,
L Gunasegaran¹, LC Ling¹ and HO Suat¹**

¹*Faculty of Pharmacy, AIMST University, Kedah, Malaysia*

²*School of Biological Sciences, Universiti Sains Malaysia, Penang, Malaysia*

Ocean is an exceptional reservoir and richest source of unique novel biomolecules with diversified applications. Green mussels (*Perna Viridis*) have been widely reported as a biomarker in assessing marine pollution and investigated for its bioadhesive mechanisms with few works reporting on its therapeutic activity. An attempt has been made in this work to explore the biological potential of Malaysian green mussel and its commercial utilization. Mussel samples were collected from floating structures and shore defense walls in and around Penang, authenticated and maintained under aerated conditions in simulated sea water. The shells were cracked open and whole body of the animals were removed and washed with autoclaved distilled water. The whole body with soft tissues were excised and homogenized in a homogenizer. The homogenate was macerated with methanol for period of 48 hours and precipitated by using ice cold acetone. The precipitate was washed repeatedly with organic solvent and dried to give a residue. The residue was screened for antibacterial activity against six bacterial strains viz. *Escherichia coli*, *Pseudomonas aeruginosa*, *Streptococcus pyogenes*, *Klebsiella pneumoniae*, *Bacillus subtilis* and *Vibrio cholera* using standard agar disc diffusion method. The results proved that the extracts exhibited a significant activity against Gram negative bacteria rather than the Gram positive ones. Physicochemical characterization of the extract was carried out by solubility studies, X-ray Diffraction (XRD), Differential Scanning Calorimetry (DSC) and FT-IR analysis. The results proved that more studies are imminent to unlock the biopotential of Malaysian green mussels.

PGP 16

MPSPSC2015000161 (Poster)

Natural Compound 2,2'-Oxybis (4-allyl-1-methoxybenzene), Biseugenol B, from *Litsea costalis* Induces Apoptosis through Activation of Intrinsic, Extrinsic and NF-kB Signaling Pathways on Human Prostate Cancer PC3 Cells *In Vitro*

M Abbaspour Babaei , H Zaman Huri

Department of Pharmacy. University of Malaya, Kuala Lumpur, Malaysia

Apoptosis is the central cellular process in the pathogenesis of cancer. The main cause of cancer originates through uncontrolled cell proliferation and inhibition of cell apoptosis pathways. Prostate cancer is the second most common type of cancer and fifth leading cause of cancer-related death in men globally. This study evaluated the efficacy of biseugenol B, isolated from *Litsea costalis* bark, to inhibit PC3 human prostate cancer cell and identify the apoptosis signaling pathways responsible for its toxicity *in vitro*. Biseugenol B-induced cell viability was evaluated using MTT assay. The apoptosis-induction effect of biseugenol b detected using Annexin V and cell cycle arrest analysis using flow cytometry. The protein expression levels of Bax, Bcl2 and Hsp70 were detected by western blotting. The mechanisms of apoptosis are investigated by measuring the levels of caspase-7, -8 and -9 and NF-kB. The results showed that biseugenol B-induced apoptosis in PC3 cells was mediated by apoptosis signals that regulate MMP through the release of cytochrome c from mitochondria to cytosol, resulted in down-regulation of Bcl2 and up-regulating of bax. The release of cytochrome c also resulted in caspase-9 activating which consequently activated caspase-7, leading to apoptosis. This form of apoptosis is associated with the intrinsic pathway and inhibition of NF-kB translocation from the cytoplasm to the nucleus whereas, activating of caspase-8 via death-cell receptor is closely related to extrinsic apoptosis signaling pathway. In conclusion, biseugenol B has potential for future chemoprevention studies, which may lead to the discovery of more cancer management strategies.

PGP 17

MPSPSC2015000041 (Poster)

Antidiabetic and Lipid Lowering Potential of *Brassica Oleracea* var. *Italica* in Type 2 Diabetic Sprague-Dawley (SD) Rats

M Ahmad Shah¹, MM Rahman Sarker², M Gousuddin²

¹*Department of Biomedical Sciences, Faculty of Medicine & Health Sciences, Lincoln University College, Petaling Jaya, Selangor, Malaysia*

²*Faculty of Pharmacy, Lincoln University College, Petaling Jaya, Selangor, Malaysia*

It has been reported that *Brassica oleracea* var. *Italica* (family Brassicaceae) exhibited antimicrobial and anticancer properties but antidiabetic activities have not yet been extensively explored. The present study was designed to investigate the antidiabetic and lipid lowering potential of *Brassica oleracea* var. *Italica* in type 2 diabetic Sprague-Dawley (SD) rats. Type 2 diabetes mellitus was induced in SD rats with high fat diet and injecting a low dose of streptozocin. Diabetic rats were treated with *Brassica oleracea* var. *Italica* ethanol extracts at the doses of 200, 400, 600, and 800 mg/kg of body weight for 28 days. Metformin was used as a standard antidiabetic drug. Fasting blood glucose, oral glucose tolerance, glycated haemoglobin, serum insulin, triglycerides, total cholesterol, high density lipoprotein cholesterol and low density lipoprotein cholesterol were determined from the serum by using standard kits. After 28th day, daily administration of *Brassica oleracea* var. *Italica* in diabetic treated SD rats showed improvement in body weight and water intakes compared to diabetic control rats. Moreover, *Brassica oleracea* var. *Italica* extract showed potent lipid lowering activities in this study. The extract significantly reduced the serum triglyceride ($P < 0.01$), total cholesterol ($P < 0.001$) and low density lipoprotein cholesterol ($P < 0.001$) and increases high density lipoprotein cholesterol ($P < 0.01$) and serum insulin ($P < 0.001$). The study demonstrated that ethanol extract of *Brassica oleracea* possessed potential antidiabetic and lipid lowering activities. Therefore, the administration of *Brassica oleracea* as vegetable or its extract would be beneficial for the management of hyperglycaemia and hyperlipidaemia.