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Editorial

ENHANCING ACCESS TO MEDICINES THROUGH VALUE-BASED APPROACHES

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In the last decade, value has played a key role in healthcare system. The value-based approach refers to a personalized care, where patient' expectations and needs are included in a holistic approach of medicine that considers physical, mental, and spiritual well-being[1]. Nowadays, the paradigm has shifted from evidence-based medicine (EBM) to value-based medicines (VBM). The term "value-based" was first introduced by Brown et al as "the practice of medicines incorporating the highest level of evidence-based data with patient perceived value conferred by healthcare interventions for the resource expended"[2]. The aim of introduction of VBM is to improve the quality of healthcare by efficient utilization of resources.

The key principle in VBM is the integration between best clinical evidence and patient preferences in the decision making process. Therefore, there are needs for changes in point of views between healthcare providers and patients. As healthcare management is clearly moving towards patient-centered system, we should emphasize on the patients' empowerment. This enables the patients to be an active and effective participant in their own process of care and to be part of the decision. Thus, the utilization of healthcare especially the access to medicines could be enhanced.

Our National Medicines Policy (2012) emphasizes on the improvement of access to medicines for the patients. The equitable access and rational use of safe, effective and affordable good quality essential medicines to improve health outcomes of the population are the main objective of the policy. In addition, it emphasizes the quality use of medicines by patients' empowerment on the information. This indirectly sets up a platform to initiate the implementation of VBM.

However, the resources are still lacking in terms of research especially this country, to enable the success of the implementation of VBM. Research in patients' preferences coupled with clinical expertise is fundamental towards a value-based system. The current emerging trend in research has captivated pharmacy profession to shift their focus to "Enhancing Access to Medicines through Value-based Approaches".

This issue of Malaysian Journal of Pharmacy encompasses the collection of abstract proceedings that is presented either as oral or poster presentation at the 10th National Pharmacy R&D Conference on 9 – 11 July 2018. On behalf of the scientific committee, I would like to express my sincerest gratitude to all pharmacist researchers who have shown immense passion by submitting their interesting research findings for us.

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SERIAL DRAMA: SEVEN STEPS TO AVOID FALLING FOUL OF FALSIFIED MEDICINES DIRECTIVE (FMD)

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INTRODUCTION

The Falsified Medicines Directive (FMD) imposes strict serialisation requirements on pharmaceutical manufacturers, distributors and dispensers. This article outlines everything you need to know and what you need to do for a seamless serialisation process – before regulators remove your right to trade.

Pharmaceutical manufacturers are currently the main actors in a serial drama where getting their lines right is paramount. Well, four lines of data, to be precise; in (and next to) DataMatrix barcodes applied to every pack of prescription medicines. The introduction of serialisation, designed to ensure the authenticity and traceability of individual medicines, promises to improve patient safety and create exciting opportunities for digital health. But there is a twist in the plot. Failure to comply with the EU regulation that mandates it means you cannot legally ship your product. No barcode, no trade. That is when a serial drama turns into a tragedy. And time is running out to be ready.

The unfolding story of the Falsified Medicines Directive (FMD), which was first introduced in 2011, is into its final episodes. The denouement arrives on February 9, 2019, when the Directive is fully enforced and the penalties for non-compliance officially come into play. FMD is an attempt to prevent inauthentic, substandard or harmful medicines entering the supply chain. It imposes strict serialisation, traceability and verification requirements on pharmaceutical manufacturers and their associated wholesalers, distributors and contract manufacturers. In particular, it mandates companies to print a unique identifier on the packaging of prescription medicines. Furthermore, companies are not just responsible for the data that goes on the packaging, they are responsible for submitting it to the central data hub that will enable pharmacists to authenticate products before they dispense them. It is a complex undertaking that could be easily underestimated - but not if you understand some key steps.

The implementation of serialisation is not an overnight task – it encompasses processes that have multiple touch-points across global organisations, partner networks and the wider supply chain. Yet despite this – and despite the enormous implications of getting it wrong – many companies are still some distance from being fit for purpose. Indeed, in some organisations, the Directive has not yet hit their radar. It needs to – because the clock is ticking. But all is not lost. Here are seven steps to successful serialisation.

1: GET EXECUTIVE BUY-IN

The significance of serialisation is often underestimated. It is typically considered a production issue and punted to manufacturing as an operational challenge. Yet serialisation is a board level issue, with ramifications that could directly affect business performance. Indeed, it is not a manufacturing cost – it is a business continuity risk that touches every aspect of an organisation. So the first step towards serialisation – one that is often overlooked – is to appoint an executive sponsor, ideally with board level oversight, to lead a holistic strategy. Implementation will naturally be delegated to project teams, but executive leadership will be crucial to making things happen quickly.

2: ASSEMBLE A MULTI-DISCIPLINARY TEAM

Multi-disciplinary engagement is essential. Many organisations do not understand all their business processes in sufficient detail to overlay serialisation. It is therefore vital that a multi-disciplinary team (MDT) is convened at the earliest opportunity to map the process flow of the business and establish a roadmap of how serialisation can be applied across multiple organisational boundaries. An MDT should actively engage representatives from manufacturing, supply chain, information technology, legal/regulatory and partner/contract management.

3: ESTABLISH LONG-TERM USER REQUIREMENTS TO ENSURE YOU RE 'FUTURE READY'

The next step is to define your user requirements and establish a template for the solution that will help ensure you are compliant. You must consider immediate and long-term factors. For example, which markets do you currently ship product to and which do you plan to target in the future? Which products in both your portfolio and your pipeline will need to be coded? Is there a potential future requirement to be able to track and trace products as they journey through the supply chain? Regulations, from FMD to the US Drug Supply Chain Security Act (DSCSA), differ from country to country and are constantly evolving. Take the opportunity to become 'future ready' by creating a design template that does not just focus on FMD but is flexible enough to be interoperable and implementable between national systems and provides the flexibility to adapt to change as it happens.

4: UNDERSTAND THE DATA IMPLICATIONS OF FMD

The barcodes required for FMD must include 4 lines of data; Global Trade Item Number (GTIN), serial number, batch number and expiry date. Some countries require a fifth element, usually for national reimbursement purposes. These datasets often live in disparate systems within organisations. The master data – including GTINs – is fixed information that is commonly stored in an enterprise resource planning (ERP) system. Although that data does not change, it still requires attention to ensure it is clean and accurate when uploaded to the repositories. In terms of variable data, the processes required to generate serial numbers, transfer them to production and ensure they are used appropriately are complex. Managing that immensity of numbers throughout the supply chain lifecycle is hugely important; mistakes can lead to expensive delays, medicines shortages and loss of revenue. Serialisation software is therefore an essential requirement to help you maintain control of all aspects of fixed and variable data.

5: CHOOSE THE RIGHT SOFTWARE

There are numerous factors to consider when selecting software:

Quality

Serialisation should not be divorced from the founding principle of Good Manufacturing Practice (GMP) – quality. GMP guidelines, as well as data integrity advice from regulators such as the UK MHRA, state that users of computer systems must always be in control. However, multi-tenant serialisation solutions (where multiple independent entities share the same instance of a software solution) can sometimes impose software updates without prior dialogue, leaving users out of control. The potential impact on quality is significant. Passive acceptance of change is not an option. Multi-tenant solutions require license-holding companies to ensure that risk assessment processes are in place to monitor and adapt to change. By contrast, the most effective solutions allow users to maintain control of their specific software instance and to dictate the timing, relevance and nature of upgrades.

Data Validation

An effective solution will focus on both connectivity and data integrity. Some systems concentrate on enabling a connection and flow of data across and between organisations but are blind to data quality. Companies should never assume that the data entering, or generated within, their systems is clean, tidy and accurate. Internal data checks are essential. The best solutions routinely monitor data to detect human error, inaccuracy and duplication. Smart solution providers validate data flowing through a system – in some cases up to 70 data validation checks on incoming records to ensure its integrity - essentially preventing bad data entering the EU hub.

Network connectivity

It is not enough to ensure your own business is ready: your partners must be ready too. With outsourcing now common across the industry, it is important that the software you use connects all parties to a single version of the truth. The most effective solution providers connect your entire partner network as standard. This means more than just having a potential connection – it means working with you and your partners to make sure that data really flows.

6: CHOOSE THE RIGHT PARTNER

It is important to find a vendor that can partner with you to design responsive solutions that go beyond technology. Certification of your vendor by the European Medicines Verification Organisation (EMVO) is a pre-requisite if you want to be compliant. In addition, a partner should be a recognised provider with experience, credibility and evidence that shows it can implement effectively within tight timeframes. A good partner will be committed to your success, keeping you abreast of fluctuating global regulations, and collaborating with you to customise solutions that adapt to changes in your business and the wider marketplace.

7: ACT NOW

The complexities of serialisation mean that a failure to act now could make it extremely difficult to complete implementation in time for the FMD deadline. Moreover, with the fees for registering with EMVO and other affiliate repositories set to increase in June, the internal costs of your project will inevitably rise if you wait. However, the biggest price of non-compliance will be your inability to ship product. So why risk it?

Act now and you can prevent your serial drama becoming a tragedy.

CONFLICT OF INTEREST

The author is the Head of Operations in the European Union (EU) for rfxel Corporation.

MANAGEMENT OF MILD VALPROIC ACID TOXICITY WITH HEMODIALYSIS – A CASE REPORT

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ABSTRACT

The management of Valproic Acid (VPA) toxicity is mainly supportive treatment. Invasive management such as hemodialysis (HD) and hemoperfusion were only used in isolated cases where patient is highly VPA toxic, which results in coma. We described a case of mild VPA toxicity (VPA serum concentration 326.42mcg/mL), where the patient was successfully treated with two hours of low-flux HD with no complication. While the guideline of indication of HD in VPA toxicity has yet to be published, low-flux HD can be an effective treatment in cases of mild VPA toxicity, if other supportive measures failed or not available.

KEYWORDS: Valproic acid toxicity; hemodialysis; therapeutic drug monitoring; pharmacokinetic

INTRODUCTION

Valproic acid (2-propylpentanoic acid; VPA) is widely prescribed for the treatment of epilepsy, bipolar mood disorder (BMD), and for migraine prophylaxis. VPA toxicity is an uncommon problem seen in clinical practice. However, due to its increased usage, accidental and intentional overdose can occur. Serious VPA toxicity may lead to coma, confusion, somnolence, hallucinations, cerebral edema and even death. Currently, the VPA toxicity management recommended include initial stabilization and resuscitation, decontamination, pharmacologic therapy, hemodialysis (HD) or hemoperfusion. There are isolated case reports and systematic review regarding management of VPA toxicity, yet, a consensus guideline or protocol is still not available. Hereby, we report a case of VPA toxicity successfully treated with two hours of low-flux HD, resulting in a marked reduction of VPA serum concentration and toxicity symptoms subsided.

CASE PRESENTATION

A 30-year-old woman presented to the Emergency Department at 4.30am due to vomiting and excessive drowsiness after multiple medications ingestion at around 2.30am. The empty medications strips include missing of eight tablets paracetamol, ten tablets chlorpheniramine maleate, ten tablets sodium valproate (Epilim®), and twenty tablets gabapentin. Patient has no underlying epilepsy or psychiatric related illness, and denied high risk behaviour or history of substance abuse. The medications ingested were taken from her uncle who has BMD. Upon admission, patient was not responding to call and pupils sluggish bilaterally (2mm/2mm). Vital signs were normal with oxygen saturation 100% and blood glucose 5.7mmol/L.

MANAGEMENT AND OUTCOME

Patient was given 50g oral activated charcoal (AC) at 6.45am but could only tolerate 25g. She was then sent for brain computed tomography (CT) scan. The serum VPA concentration taken at 5 hours post ingestion for Therapeutic Drug Monitoring (TDM) measured by fluorescent polarization (Cobas Integra 400 plus analyzer, Roche Diagnostics (M) Sdn. Bhd.) was 326.42mcg/mL (therapeutic range 50-100mcg/mL). Paracetamol, salicylic acid, phenytoin and

carbamazepine toxicity had also been ruled out. After CT scan, patient was noted to be drowsier with Glasgow Coma Score (GCS) of 12/15, laboured breathing and was not respond to pain stimuli. The patient was then intubated, ventilated and sedated and was admitted to the intensive care unit. All the blood investigations were normal. Low-flux HD (via a right femoral venous catheter) was performed for two hours with blood flow rate 150 mL/min and was uneventful. On the next day, the second TDM result (12 hours post HD) showed a marked decrease in VPA level to 37.14mcg/mL (non-toxic). Patient had regained full GCS with normal arterial blood gas (ABG) result. She was then extubated and referred to psychiatrist and allowed to discharge two days later with no complication.

DISCUSSION

The classification of VPA toxicity is dose dependent. Mild: Dose >200mg/kg and having risk of CNS depression; moderate: >400mg/kg and having risk of multi-organ system toxicities; severe: >750mg/kg and is potentially lethal. Maximum therapeutic dose is 60mg/kg/day.[1] Since the exact quantity of VPA ingested by the patient might not be accurate, we can only categorize patient based on the symptoms of CNS depression, which is mild toxicity.

Overdose of gabapentin and chlorpheniramine maleate can cause subtle mental status changes and drowsiness too. However, only mild clinical effects have been documented following significant overdose of gabapentin and chlorpheniramine due to their benign side-effect profile. VPA has neither significant interaction nor synergism effect with both gabapentin and chlorpheniramine.

The time for the enteric-coated sodium valproate tablet to reach maximum concentration (T_{max}) normally occurs within 3-7 hours. In this case, deterioration of patient condition happened at around 5 hours post ingestion might be due to the high serum VPA concentration at T_{max}. Decontamination with activated charcoal is best to be administered within 0.5-1 hour of VPA ingestion for maximum effect. AC may still be indicated after one hour post ingestion for enteric coated preparation due to the potentially delayed absorption. As this patient was admitted two hours post ingestion and could not tolerate AC, other modes of treatment are required.

Some literatures had documented naloxone for the reversal of sedation and coma at VPA level of 487.8mcg/mL and in cases of opioid co-ingestion.[2] Since this patient's condition was manageable after intubation, naloxone was not given. On the other hand, L-carnitine is also suggested for hyperammonemia associated with carnitine deficiency caused by long-term or high-dose VPA use. L-carnitine is not available in our setting and this patient had normal liver function tests with no hyperammonemia.

Therefore, the modes of treatment left to enhance elimination of VPA from the body available in our setting were HD and hemoperfusion. Despite the benefit of extracorporeal elimination techniques is undeniable, the clear indication and method of the techniques in VPA toxicity is still undefined. Charcoal hemoperfusion is proved to be more superior in clearing protein-bound and lipid soluble drugs, with equal effectiveness in clearing water soluble and small molecule drugs if compared to HD.[3] Since VPA is poorly water soluble (solubility in water 1.3mg/mL at room temperature), charcoal hemoperfusion seems to be more eligible treatment option. However, it has limitation in terms of complications, such as thrombocytopenia, electrolyte imbalance, disturbances in coagulation and technically and logistically more complicated. [3, 4]

On the other hand, VPA is a small molecule (MW 144.2) with about 90% plasma protein binding. At supratherapeutic level, the binding sites may become saturated, causing the amount of free drug to increase rapidly.[4] Low molecular weight and decreased protein binding during toxicity make it ideal for removal through HD. With 2 hours of low-flux HD conducted, the VPA serum concentration was able to reduce by 88.6%.

Rebound phenomenon was reported by a few studies, where a slight increase in VPA levels noted after termination of HD.[4, 5] This suggests that VPA may not follow single compartment kinetics at toxic concentration and redistribution from other body compartments may occur. In order to avoid rebound concentration of VPA after HD, repeated TDM level of VPA was scheduled at 12 hours post HD.

CONCLUSION

We have shown in our patient that HD is effective to eliminate excess VPA concentration in acute poisoning case when supportive measures failed or not available. More studies are required to identify the recommended indication for HD based on VPA serum concentration and also weighing the risk and benefit of HD or hemoperfusion in different clinical situation. More evidences are also needed regarding the TDM sampling time of VPA serum concentration in acute toxicity cases, including the initial post ingestion sampling time and also post dialysis sampling time, by taking the rebound phenomenon into consideration.

ACKNOWLEDGEMENT

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CONFLICT OF INTEREST

The authors affirm that this case report is original and have no conflict of interest to disclose.

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STABILITY OF EXTEMPORANEOUSLY COMPOUNDED CHLORAL HYDRATE ORAL SOLUTION

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ABSTRACT

The objective of this study is to look into the stability of Chloral Hydrate 40 mg per ml formulated as oral solution in X-temp Oral Suspension System in order to select proper storage conditions and establish beyond-use date. X-temp is a novel oral, flavoured sugar-free extemporaneous compounding vehicle to assist in the preparation of extemporaneous dosage forms.

The compounded solution of 40 mg/ml was prepared by dissolving chloral hydrate powder in X-temp vehicle. The solution was then packed in amber HDPE containers, and were stored at refrigeration 5 ± 3°C and room temperature 30°C. Physical, chemical and microbiological parameters were evaluated at predetermined time-points up to 180 days. Samples were tested using a validated stability–indicating assay. Chloral hydrate concentration was assayed by high-performance liquid chromatography (HPLC).

The stability results indicated that the solution remained unchanged in visual appearance or pH at both refrigeration and room temperature for up to 180 days. The HPLC results showed that all the stability studies maintained 90 – 100% of initial drug concentration. There was no substantial changes in the microbiological stability.

Chloral hydrate solution prepared in X-temp Oral Suspension System was stable for up to 180 days when stored at room temperature and refrigeration conditions. These results demonstrated that X-temp is a suitable vehicle for extemporaneous compounding for chloral hydrate.

INTRODUCTION

Extemporaneous preparation refers to a limited amount of a custom-made product prepared for an individual when medications and formulations are not commercially available in a suitable dosage that meet fully the clinical needs of a particular patient[1]. Extemporaneously prepared drug formulation is essential to provide optimal pharmaceutical care to special patient populations.

These include paediatric patients, patients who are unable to swallow solid dosage forms, patients who must receive medications via nasogastric or gastrostomy tubes and patients who require non-standard doses that are more easily and accurately measured by using a liquid formulation that allows for the dose to be reliable and reproducibly measured[2].

Children, especially the younger age groups, may require age-appropriate formulations allowing for both safe and accurate dose administration. The most acceptable drug forms in paediatric population are oral liquids. Often, liquid formulation forms are not commercially available due to many factors including small market size and physicochemical factors[2].

Due to convenience and availability of ingredients, commercially available tablets or capsules for adults are often used to prepare extemporaneously oral liquids for children. Hence there

may be potential interactions between the drug and the excipients of the solid dosage in the prepared oral liquid[3].

In many practice setting, there is a lack of choice or availability of excipients such as suspending agents, sweeteners, flavours and preservatives necessary for compounding extemporaneous solutions. Hence, pharmacists use commercial dispersing media to compound syrups from an active substance or from tablets available on the market. Commercial vehicles are considered an excellent and convenient choice for compounding extemporaneous solutions as they contain a combination of suspending agents, sweeteners and flavours, stabilised with preservatives.

CHLORAL HYDRATE

Uses and Administration

Chloral hydrate is a hypnotic and sedative. The active metabolite of chloral hydrate, trichloroethanol enhances the GABA (gamma-amino-butyric acid) receptor complex to produce its pharmacological effect[4] and therefore has properties similar to those of the benzodiazepines, non-benzodiazepines and barbiturates.

Chloral hydrate is a widely used oral sedative hypnotic drug in paediatrics for the short term management of insomnia. It has been used for sedation and as a sedative for premedication. Despite the availability of other sedatives such as midazolam and pentobarbital, it is one of the most commonly used sedatives in the clinical setting[5]. It is easily administered with high success rate and low prevalence of adverse reactions[5]. It is used especially to administer to children before diagnostic procedures such as computerised axial tomography scan and magnetic resonance imaging that require patient immobility. It is also used in intensive care units, paediatric emergency departments and dental surgery to reduce anxiety and stress provoked by technological procedures, light and sound levels and the presence of strangers. It is a cheap, effective and safe drug that can be easily handled and administered when performing nasofibroscopy[6].

Chloral hydrate is more effective than midazolam when it is used as a sleep inductor for electroencephalogram recordings in children age one to five years old. A deeper level of sedation can be achieved compared with other sedative agents and children remain calmer when undergoing echocardiography[6]. Other traditional sedative agents (such as midazolam, propofol and ketamine) can produce untoward effects on the respiratory drive or can have cardiovascular side effects. These characteristics of chloral hydrate make it potentially useful in the treatment of infants who require sedation in a Paediatric Cardiac Intensive Care Unit (PCICU)[5].

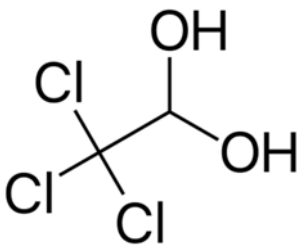
Formulation

At present, there is no commercially available liquid formulation of chloral hydrate. Because of this shortage, it is prepared as an extemporaneous formulation in hospital pharmacies. The 10% oral solution of chloral hydrate is found in the United States Pharmacopeia 30th edition (USP) while the Argentine Pharmacopeia (6th edition) has documented the 7% chloral hydrate syrup. Flavoured syrups are widely preferred by paediatric patients because it can effectively masks unpleasant taste and has good texture and palatability[6].

Chloral hydrate (Figure 1) is a colorless, transparent or white crystals with an aromatic, penetrating and slightly acrid odour. It is very soluble in water and in olive oil. It is freely soluble in alcohol, chloroform and ether.

It volatilises slowly on exposure to air and melts at about 55°C. It is light sensitive, decomposing upon exposure and has to be stored in air tight containers. A 10% solution in water has a pH of 3.5 to 5.5.

Figure 1: Molecular Formula of Chloral Hydrate



Chloral hydrate has an unpleasant, caustic bitter taste and is corrosive to skin and mucous membrane. The most frequent adverse effect is gastric irritation, abdominal distension and flatulence. Chloral hydrate is given by mouth as an oral liquid or as a gelatine capsule with chloral hydrate dissolved in a suitable vehicle. It should not be given as tablets because of the risk of damage to the mucus membrane of the alimentary tract. Oral dosage forms should be taken well diluted or with plenty of water or milk. Because of its unpleasant taste and its irritant action on the gastric mucosa, oral dosage is best avoided in gastritis[7].

Few stability studies of chloral hydrate liquid preparation have been conducted. Based on the pH evaluation and decomposition products by capillary electrophoresis, Kakehi et. al.[8] reported that the content of chloral hydrate in syrup at room temperature of 30°C and 60°C, did not show any substantial change over 3 months at both storage conditions. Stability study of chloral hydrate 40 mg/ml formulated in 50% simple syrup with pineapple flavour was reported by Taguchi et. al.[9] The chloral hydrate concentration was found to be stable for at least 14 days when stored at cold and dark conditions but there was a loss of colour during the storage duration[10].

Hence there is a need to develop a convenient liquid formulation in order to supply safe and reliable dosage for paediatrics. In this context, the objective of this work is to evaluate the physical, chemical and microbiological stability of chloral hydrate compounded in a suitable liquid vehicle both under room and refrigeration conditions in plastic bottles to provide the information and data to assist the pharmacist to determine the shelf life of the chloral hydrate extemporaneously prepared in the hospital.

MATERIALS AND METHODS

Formulation and Study Design

Currently there is no commercially available liquid formulation of chloral hydrate. The preparation was prepared from the active pharmaceutical ingredient in powder sourced from Fischer Scientific, Malaysia. The commercial vehicle X-temp Oral Suspension system marketed by Pharm-D Sdn. Bhd. Malaysia was selected to compound this preparation. The commercial vehicle is formulated specifically to assist in extemporaneous preparation of oral liquid; syrup or non-soluble (suspended) aqueous dosage form. It is sweetened, orange flavour, sugar-free vehicle with suitable preservatives.

Preparation of Chloral Hydrate Oral Solution

The following procedure was performed for the preparation of chloral hydrate oral solution 40 mg per ml compounded from pure drug powder. A mortar and pestle was used for compounding. First, the quantity of vehicle required was measured. The amount of chloral hydrate required is measured and placed into a mortar. A small amount of X-temp was used to levigate the powder to form a smooth and uniform paste. Under constant mixing, small amount of vehicle was gradually added to the paste to form a liquid. The blend was transferred to a graduated container. Some vehicle was added to rinse the remaining drug from the mortar and

transferred to the graduated container. The remaining X-temp vehicle was incorporated to the graduated container to achieve the final volume.

The chloral hydrate oral solution was bottled into 100 ml semi-transparent high-density polyethylene (HDPE) containers and was fitted with white polypropylene (PP) screw caps.

Thirty two bottles of the oral solution were prepared. These are kept under two- predetermined conditions to simulate the dispensing conditions: one group was stored at 5 ± 3°C (refrigeration) and the rest of the samples was stored at 30 ± 2°C / 75% RH ± 5% RH (room temperature) in the absence of light. All samples were labeled and kept for 180 days.

STABILITY EVALUATION

Stability evaluation of a formulation should take into account its physical, chemical and microbiological stability.

Samples of each storage condition were collected at intervals of 1, 14, 28, 60, 90, 120, 150 and 180 days. Before taking the samples for analysis, the bottles were manually shaken for a few seconds.

Physical Stability

At each time point, all samples were examined for obvious changes in colour, odour and clarity. Physical stability was assessed by visual examination and defined as the absence of any change in appearance, colour, odour and visible particulate matters.

Physical stability also includes compliance of the specific gravity according to in-house specification of 1.02 – 1.08 g/ml.

The extemporaneous preparation is considered stable if physical characteristics have remained fairly unchanged.

Chemical Stability

Chemical stability was evaluated by high-performance liquid chromatography (HPLC) quantification and pH measurement. Chemical stability was determined following the concentration of chloral hydrate in the samples. To be considered stable, the preparation had to retain a minimum of 90% of its initial drug dose and a pH value between 3.8 and 4.8.

Analytical Method and Equipment

Chloral hydrate concentration was assayed using HPLC. The assay method was developed according to the in-house HPLC method with reference to the British Pharmacopoeia (BP) 2014[11]. 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 (4.6 mm ID x 150 mm, 5 µm). The DAD detector operated at 220 nm. The mobile phase consisted of a mixture of 80 volumes of 0.02M potassium dihydrogen phosphate (KH_2PO_4) phosphate buffer adjusted to pH 8.00 with orthophosphoric acid 85% or 10M potassium hydroxide (KOH) and 20 volumes of acetonitrile. The mobile phase was delivered at a flow rate of 1ml/min.

About 2.5 ml of sample were prepared in duplicate and dissolved in 100 ml of mobile phase and further diluted to obtain final concentration of chloral hydrate 0.1 mg per ml. Equivalent standard concentration of 0.1 mg per ml was prepared using same mobile phase. Both solutions were filtered through 0.45 µm syringe filter before HPLC analysis and the injection volume as 100 µL.

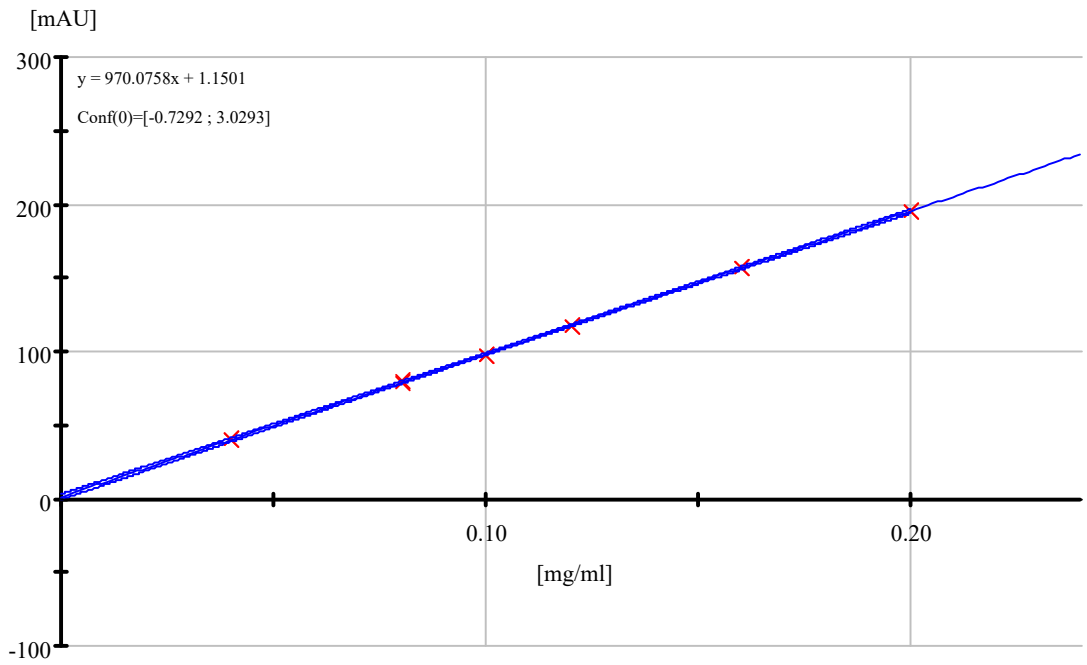
The HPLC method for the analysis of chloral hydrate in this study was validated in a former short-term stability study of extemporaneously prepared chloral hydrate oral solution using the above formulation. The validation of the analytical methods includes linearity, accuracy, specificity, precision and system suitability (Table 1).

A range performed on the HPLC system has confirmed the linearity of the method (R^2=0.99988) (Figure 2).

Table 1: Results of Analytical Method Validation

Test Parameter	Validation Results	Acceptance Limits
Specificity Identification Comparison with a known reference material	▪ Positive result ▪ No peaks at RT 3.7 min	▪ Positive control: Positive result. ▪ Negative control: Absence of peak at RT 3.7 min
Assay Placebo/Matrix analysis	▪ No interfering peaks from excipients were observed ▪ Placebo effect = - 0.50% The placebo effects were found to be insignificant	▪ No interference from excipients ▪ Placebo Effect NMT 1.5%
Linearity & Range	▪ r^2 = 0.9998810 ▪ Y-Intercept at 100% working concentration = 1.18%	▪ $r^2 \geq 0.995$ ▪ Y-Intercept at 100% working concentration ≤ 2%
Accuracy 9 determinations (3 replicates/3 concentrations)	▪ 97.0%, 100.3%, 99.3%, 98.3%, 97.6%, 97.0%, 98.3%, 97.8%, 97.5%	▪ % recovery within 95% to 105%
Precision (Repeatability) 6 determinations at 100% working concentration	▪ RSD = 0.68%	▪ RSD ≤ 2.0%
Precision (Reproducibility) 6 determinations at 100% working concentration	▪ RSD = 0.82%	▪ RSD ≤ 2.0%
Precision (Intermediate Precision/ Ruggedness)	▪ RSD = 0.86%	▪ RSD ≤ 2.0%
System Suitability a. System Precision	▪ RSD = 0.90%	▪ RSD ≤ 2%
b. Peak Performance	▪ k' = 2.689 ▪ Resolution > 2 ▪ USP tailing factor = 1.414 ▪ Column efficiency = 5205	▪ k' ≥ 1.5 ▪ Resolution >2 ▪ USP tailing factor < 2 ▪ Column efficiency ≥ 2000

Figure 2 : Calibration Curve of the LC Assay Method



Microbiological Stability

Microbiological stability of the chloral hydrate oral solution stored at 5°C and 30°C was carried out on day 1, 14, 28, 60, 90, 120, 150 and 180 to determine if they comply with the microbial attributes of non-sterile pharmaceutical products according to the BP 2014. The microbiological evaluation was determined based on total aerobic microbial count below 2 X 10^2 cfu/g, total combined yeasts & moulds count below 2 X 10 cfu/g and absence of *Escherichia coli* (*E. coli*).

RESULTS AND DISCUSSION

Physicochemical Stability

Throughout the study period, the results of the visual appearance and odour of the chloral hydrate oral solution remained unchanged at both temperatures (Table 2). Also, there were no notable changes in pH and the specific gravity of the extemporaneous preparations at both temperatures (Table 3). In fact, visual appearance, smell, taste and mouth feel are factors that can influence patient acceptance and compliance, specifically in the paediatric patients and are important factors to consider in the development of a suitable extemporaneous preparation.

Table 2: Visual Appearance and Odour of Chloral Hydrate Oral Solution								
Visual Appearance (Colour and Clarity)								
Time (Days)	1	14	28	60	90	120	150	180
5ºC	White to off-white & opaque	√	√	√	√	√	√	√
30ºC	White to off-white & opaque	√	√	√	√	√	√	√
Odour								
Time (Days)	1	14	28	60	90	120	150	180
5ºC	Orange	√	√	√	√	√	√	√
30ºC	Orange	√	√	√	√	√	√	√

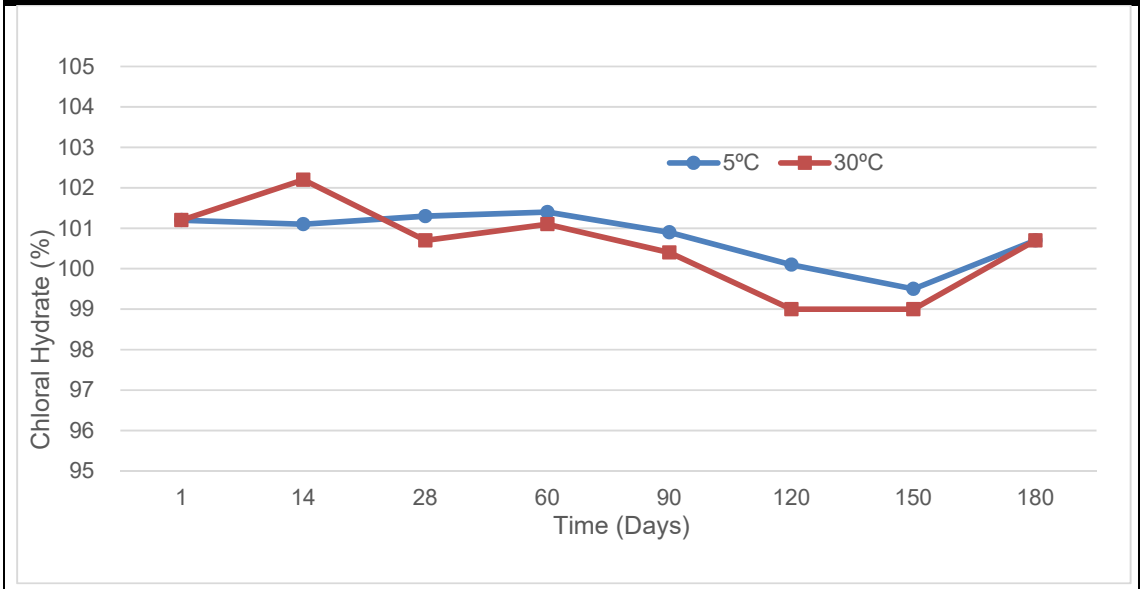
√ = Conforms to Specification

Table 3: pH and Specific Gravity of Chloral Hydrate Oral Solution								
pH								
Time (Days)	1	14	28	60	90	120	150	180
5ºC	4.086	4.100	4.092	3.960	4.137	4.118	4.142	4.093
30ºC	4.086	4.064	4.051	3.850	3.999	3.994	4.053	3.905
Specific Gravity								
Time (Days)	1	14	28	60	90	120	150	180
5ºC	1.0534	1.0540	1.0532	1.0531	1.0506	1.0531	1.0534	1.0611
30ºC	1.0534	1.0559	1.0522	1.0511	1.0506	1.0535	1.0516	1.0522

The analytic results indicated that the chloral hydrate content in all samples assayed was above 99% throughout the 180 days period for both temperatures (Table 4). During the study, little or no chloral hydrate loss occurred in the samples for both storage conditions (Figure 3).

Table 4: Percentage of Original Concentration of Chloral Hydrate Oral Solution								
Assay								
Time (Days)	1	14	28	60	90	120	150	180
5ºC	101.2%	101.1%	101.3%	101.4%	100.9%	100.1%	99.5%	100.7%
30ºC	101.2%	102.2%	100.7%	101.1%	100.4%	99.0%	99.0%	100.7%

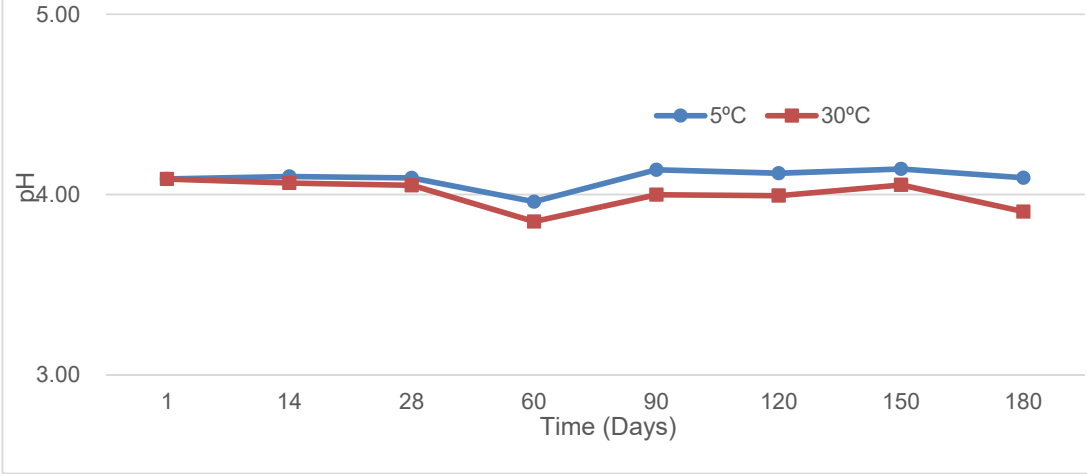
Figure 3: Percentage of Original Concentration of Chloral Hydrate Oral Solution



Chloral hydrate is easily decomposed in alkaline solution yielding mostly chloroform and formic acid. Chloral hydrate is also known to be a light sensitive material. The stability of the preparation is due to the compatibility of chloral hydrate with the X-Temp vehicle and also the protective nature of the amber plastic container which prevents light degradation. The X-temp vehicle has an average pH of 4.1 (slightly acidic) and is buffered with the Citric Acid – Monosodium Phosphate buffering system. The nature of the X-temp vehicle ensures that the pH of the chloral hydrate solution remains slightly acidic and constant which is favourable towards the stability of chloral hydrate.

The pH remained within the range of 3.8 to 4.1, which suggests minimal or no chemical degradation (Figure 4). This claim is further cemented by the relatively stable assay results throughout the study period of 180 days.

Figure 4: pH of Chloral Hydrate Oral Solution



Microbiological Stability

Microbiological tests were negative in all samples throughout the study period. The microbial examination test denoted the absence of microbial growth for the total viable aerobic count, total yeasts & moulds and the specific *E. coli* complying with official quality requirements. The microbiological stability study showed that the microbial quality of the chloral hydrate solution was within the established specifications during the 6 months study period for both temperatures (Table 5 and 6).

No microbial contamination was observed in all samples. The total viable aerobic count was kept low and total yeasts & moulds count was minimal. *E. coli* was absent throughout the 180 days period.

These results revealed that the preservatives of the extemporaneous preparation were effective against microbes and the chloral hydrate oral solution remained microbiologically stable at both temperatures.

Table 5: Microbial Results of Chloral Hydrate Oral Solution (5ºC)

Time (Days)	Total aerobic bacteria (NMT 200 cfu/g)	Total yeasts & moulds (NMT 20 cfu/g)	*E. coli* (Absence in 1 g)
1	< 10 cfu/g	< 10 cfu/g	Conforms
14	< 10 cfu/g	< 10 cfu/g	Conforms
28	< 10 cfu/g	< 10 cfu/g	Conforms
60	< 10 cfu/g	< 10 cfu/g	Conforms
90	< 10 cfu/g	< 10 cfu/g	Conforms
120	< 10 cfu/g	< 10 cfu/g	Conforms
150	< 10 cfu/g	< 10 cfu/g	Conforms
180	< 10 cfu/g	< 10 cfu/g	Conforms

Table 6: Microbial Results of Chloral Hydrate Oral Solution (30ºC)

Time (Days)	Total aerobic bacteria (Not more than 200 cfu/g)	Total yeasts & moulds (NMT 20 cfu/g)	*E. coli* (Absence in 1 g)
1	< 10 cfu/g	< 10 cfu/g	Conforms
14	< 10 cfu/g	< 10 cfu/g	Conforms
28	< 10 cfu/g	< 10 cfu/g	Conforms
60	< 10 cfu/g	< 10 cfu/g	Conforms
90	< 10 cfu/g	< 10 cfu/g	Conforms
120	< 10 cfu/g	< 10 cfu/g	Conforms
150	< 10 cfu/g	< 10 cfu/g	Conforms
180	< 10 cfu/g	< 10 cfu/g	Conforms

CONCLUSION

Chloral hydrate oral solution 40 mg per ml was easily prepared from the active ingredient and commercial compounding vehicle. According to serial qualitative assessment, the compounding support the stability for at least 180 days, maintaining all quality attributes required. Chloral hydrate oral solution is physically, chemically and microbiologically stable under refrigeration and room temperature for up to 180 days when packed in amber HDPE bottles with plastic screw cap.

The results from the stability studies showed that X-temp is a suitable compounding vehicle for preparing extemporaneous liquid formulation of chloral hydrate. Besides offering a stable formulation, it has added advantage of alcohol-free, colorant-free and sugar-free.

The extemporaneous preparation of chloral hydrate can now be conveniently prepared by pharmacists in the hospital setting by using X-temp Oral Suspension System. It is supported by stability data and proven shelf life.

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ABSTRACT OF THE 10th NATIONAL PHARMACY RESEARCH & DEVELOPMENT CONFERENCE 2018

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OP-01 (Oral)

A CROSS SECTIONAL STUDY ON PUBLIC BELIEFS, KNOWLEDGE AND PRACTICES TOWARDS ANTIBIOTIC USE IN THE STATE OF PERAK, MALAYSIA

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INTRODUCTION: Inappropriate use of antibiotics has led to antimicrobial resistance, a major public health challenge worldwide.
OBJECTIVES: This study aimed to explore beliefs, knowledge, and practice on antibiotic use among the general public in Perak.
METHOD: A cross-sectional study was conducted at 13 hospitals and 44 primary health clinics in Perak from May to July 2017. Adults above 18 years of age, literate and have experience in usingantibiotics were selected. Data was collected using a self-administered questionnaire with 3 domains i.e. belief: 6 item Likert-scale; knowledge: 12 item Likert-scale; practice: 12 item yes/no question. The subjects were selected via systematic random sampling. The questionnaire was pilot tested on 30 subjects.
RESULTS: Out of 2773 distributed questionnaires distributed, 2632 were included for analysis. The mean age of the respondents was 39.7±14.5 years old. Most participants were female (58.6%), Malay (74.7%) and underwent upper secondary school (45.6%). Mean score were generated for each domain with belief: 5.87±3.00 (total score: 12), knowledge: 15.82±3.85 (total score: 24), practice: 6.91±2.07 (total score: 12). In the belief domain, 63.2% of respondents believed that antibiotics help them to recover faster. In the knowledge domain, 52.7% of respondents inappropriately thought that antibiotics could work on viral infections. In the practice domain, 70% of respondents expected doctors to prescribe antibiotics if suffered from symptoms.
CONCLUSION: This study acknowledged the inappropriate knowledge, belief and practice among public. The areas of lacking knowledge have been identified and may aid in providing information for public health education in the future.

KEYWORDS: impact of pharmacy services, Perak, antibiotics, beliefs, knowledge, practices
NMRR ID: NMRR-14-1940-23309

OP-02 (Oral)

AN EVALUATION OF PHARMACEUTICAL CALCULATION SKILLS AMONG HOSPITAL PHARMACISTS AT QUEEN ELIZABETH HOSPITAL IN MALAYSIA: A CROSS SECTIONAL STUDY (PCAP-QEH)

Tok YC[1], Loh BCC[1], Tea YY[1], Tong SN[1], Lim CH[1], Ling CR[1], Jerry ES Liew[1]

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INTRODUCTION: Questions that require pharmaceutical calculation is commonly encountered by pharmacist. Any calculation performed especially during counter-checking process needs to be accurate to ensure correct dose and method of administration delivered to patient. Inaccurate pharmaceutical calculation leads to life-threatening errors and jeopardises patient's safety.
OBJECTIVES: To evaluate the capability of Hospital Queen Elizabeth (HQE) pharmacist in performing pharmaceutical calculation.
METHOD: A cross sectional study was conducted on pharmacist at HQE from March to July 2017. All pharmacists underwent a 1 hour-theory lecture and 1.5 hour-hands-on training in pharmaceutical calculations. This was followed by a 20 minute-short answer question assessment. The accuracy of the answers was evaluated by the researchers. The primary outcome was expressed as percentage of pharmacists who passed (>70%) the assessment.
RESULTS: A total of 82 pharmacists were recruited with mean aged of 28.65±3.97 years, 70% were female, 58 of them were Fully Registered Pharmacists (FRP) with average working experience of 50.91±41.22 months. From the assessment, 65% of the pharmacists passed the assessment. The percentage of pharmacists who passed was found to be higher among those with longer working experience [24 (45.2%), >60 months, 21 (39.6%), 13-60 months vs 8 (15.1%), <13 months, p=<0.001, respectively]. Sixteen pharmacists with clinical experience (94%) passed the assessment ($\chi^2(1)=8.15$, p=0.004). The areas of weakness observed (performance expressed in median and interquartile range) were questions related to supply (58.3% [0,100]), preparation (75% [60, 87.5]), administration (79.2%, [62.5,100]) and compatibility (83.3%, [0,100]).
CONCLUSION: Almost 65% of pharmacists passed the assessment for pharmaceutical calculation. The capability of pharmaceutical calculation thrived with working experience. Pharmacist with clinical experience will have a better performance. More emphasis should be put into calculations related to supply, preparation, administration and compatibility in order to address the weaknesses.

KEYWORDS: impact of pharmacy services, Sarawak, pharmacist, calculation skills
NMRR ID: NMRR-17-1495-36701

OP-03 (Oral)

STUDY ON THE IMPACT OF PHARMACIST COUNSELING ON PROPER EYE DROP INSTILLATION TECHNIQUE AMONG PATIENTS ON TOPICAL INTRAOCULAR PRESSURE LOWERING AGENTS (IPLA)

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INTRODUCTION: Proper eye drop instillation technique is crucial in the management of glaucoma. The role of pharmacist in maximizing treatment care for glaucoma patients has yet to be fully illustrated.
OBJECTIVES: This study aims to investigate the impact of pharmacist counselling on eye drop instillation technique which may be directly translated to the rate of intraocular pressure (IOP) lowering among patients on topical IPLA and to identify the most common error with eye drop instillation technique.
METHOD: This research was conducted from August 2015 until December 2016. Proper eye drop administration technique was based on the steps outlined by The Glaucoma Research Foundation. The score for administration technique, together with difference in intraocular pressure (IOP) was compared before and after pharmacist counseling, during next clinic follow up. Common errors with eye drop instillation technique were also described. Student's t-test or Mann-Whitney test and Wilcoxon signed rank test was used to analyze the parametric and nonparametric data, respectively.
RESULTS: Median IQR for the score of eye drop instillation technique improves significantly from 2 to 3 ($p<0.001$). However, our results did not show any significant difference in IOP and IOP reduction before and after counselling. The most common error identified with eye drop instillation technique was drops falling on the cheek (n=18, 56.3%) followed by too many eye drops coming out (n=9, 28.1%).
CONCLUSION: Our data showed significant improvements in patients' eye drop administration technique after counselling by pharmacist. The most common error identified with eye drop instillation technique is drops falling on the cheek. Future study is needed in order to illustrate on how to best integrate pharmacist in the management of glaucoma patients.

KEYWORDS: impact of pharmacy services, Malacca, counselling, glaucoma, eye drops
NMRR ID: NMRR-15-745-25722

OP-04 (Oral)

IMPACT OF PHARMACISTS' RE-EDUCATION ON INSULIN INJECTION SITE LIPOHYPERTROPHY AMONG TYPE 2 DIABETICS IN PRIMARY HEALTHCARE

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INTRODUCTION: Lipohypertrophy (LH) is an abnormal accumulation of fat scar tissue in the subcutaneous layer, caused by repeated insulin injections in the same location. Injection into this site leads to variability of insulin absorption and thus erratic glycemic control.
OBJECTIVES: The study aimed to determine the prevalence of LH and insulin injection practices among insulin users and the impact of pharmacist's monthly re-education on injection site rotation in preventing LH.
METHOD: A total of 160 type 2 diabetics who self-injected insulin for at least one year with $HbA1_c$ above 8% were recruited from 15 health clinics. The patients were randomly assigned to control and intervention groups. Intervention group received monthly re-education on LH and injection technique assessment for 4 visits. Control group received standard pharmacist counseling only on the first visit. Assessment on injection site rotation practices and presence of LH was performed on first and fourth visit.
RESULTS: Approximately 25.6% (n=41) patients had LH in the injection site. 10% admitted having injected into the lump. 1.9% did not rotate their injection site. 35.7% reused their needles more than 3 times. Only 5.7% had their injection site checked by healthcare professional at least once a year. There was significant difference on presence of LH pre and post re-education in the intervention group (30.0% vs 18.9%; p=0.002) compared to control (21.3% vs 13.9%; p=0.07). Gender (p=0.035), method of rotation (p=0.013) and size of injection site (p=0.049) were found to be associated with development of LH. The patients with improvement in LH had HbA1c reduction of 0.95% compared to 0.51% in non-improvement patients. Thus, reduction of HbA1c was significantly associated with improvement in LH (p=0.042).
CONCLUSION: Pharmacist assessment and re-education on insulin injection site rotation played a role in preventing lipohypertrophy. Monthly re-education is more effective in preventing LH compared to standard counseling.

KEYWORDS: impact of pharmacy services, Kuala Lumpur, insulin, lipodystrophy, pharmacists' re-education
NMRR ID: NMRR-16-1591-28767

OP-05 (Oral)
DRUG-RELATED PROBLEMS AMONG HOME MEDICATION REVIEW PATIENTS IN HOSPITAL SULTANAH NORA ISMAIL

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INTRODUCTION: Home Medications Review (HMR) is relatively new service provided by the Ministry of Health Malaysia. This services aims to identify, resolve and prevent drug-related problems (DRPs) among patients. DRPs lead to substantial morbidity and mortality and are significantly related to the clinical outcomes, healthcare costs, and quality of life.
OBJECTIVES: The aim of this study was to identify DRPs among HMR patients in Hospital Sultanah Nora Ismail (HSNI).
METHOD: A prospective cross-sectional study involving 80 patients participated in HMR was conducted from March 2016 until August 2016. The pharmacists interviewed the patients and reviewed all medications during HMR visit. Potential DRPs were identified based on patient's medications and personal records. The identified potential DRPs were classified using Pharmaceutical Care Network Europe (PCNE) Version 6.2 classifications.
RESULTS: A total of 114 potential DRPs were identified in 69 patients. The overall incidence of DRPs was 86% of which the mean + standard deviation of DRPs was 1.43 + 0.9 per patient. Treatment effectiveness (70.1%) was the most frequently reported problems among HMR patients followed by treatment costs(17.5%) and adverse drug reactions (12.4%). The common causes of DRPs were patient's own problem (38.5%), followed by drug use process (29.6%), inappropriate drug selection (16.3%), logistic issues (5.9%), others (4.4%), dose selection (3.7%) and drug form (0.7%). Most of the identified DRPs were intervened at patient/carer level (89.2%) followed by at drug level (1.6%) and at prescriber level (0.8%). None of the independent factor was associated with incidence of DRPs.
CONCLUSION: The findings reveal the existence of DRPs among HMR patients. HMR can be used as a method to identify DRPs among patients; hence it helps to expand pharmacy service to provide better pharmaceutical care to the community.

KEYWORDS: impact of pharmacy services, Johor, home medication review, drug-related problem
NMRR ID: NMRR-16-2506-32088

OP-06 (Oral)
THE USE OF COMPLEMENTARY AND ALTERNATIVE MEDICINE (CAM) AMONG BREAST CANCER PATIENTS IN HOSPITAL PULAU PINANG

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INTRODUCTION: Breast cancer is the most common cancer among females in Malaysia. Conventional cancer therapies have many adverse effects which cause many patients to avoid treatment and opt for complementary and alternative medicine (CAM) use.
OBJECTIVES: The objective of this study was to determine the prevalence of CAM use among breast cancer patients in Hospital Pulau Pinang (HPP).
METHOD: A cross sectional survey was performed and data was collected over 3 months among female breast cancer patients who followed up at HPP oncology daycare, clinic, surgical ward and oncology ward. Participants were required to fill up questionnaires about demographic, disease, treatment characteristics, CAM use, as well as reasons and perceived helpfulness of CAM use. Prayer-for-health was excluded from CAM modality in the data analysis to prevent inflating the statistics of CAM use.
RESULTS: A total of 206 participants were recruited. The use of CAM was prevalent among breast cancer patients in HPP, with 127 (61.7%) patients were identified as CAM users, and 79 (38.3%) patients were non-CAM users. Advanced disease staging was the strongest predictor of CAM use (OR 10.458, $n = 206$, $p < 0.05$, 95% CI 4.022 to 27.190). Age, especially younger patients (OR 0.964, $n = 206$, $p < 0.05$, 95% CI 0.932 to 0.997) and Malay ethnicity (OR 2.605, $n = 206$, $p < 0.05$, 95% CI 1.224 to 5.548) were also found to be significantly associated with CAM use. Majority of CAM users had taken vitamin and mineral supplements and they perceived that CAM might help to improve their physical well-being.
CONCLUSION: Patient education regarding CAM therapies is important in view of high prevalence of CAM use. CAM, with unproven efficacy, may pose harm to patients' health and future studies focusing on safety issues of CAM use is essential.

KEYWORDS: quality use of medicines, Penang, complementary and alternative medicine, breast cancer
NMRR ID: NMRR-15-2279-27245

OP-08 (Oral)

PHYSICIANS' KNOWLEDGE, ATTITUDE AND PRACTICES REGARDING MANAGEMENT OF MEDICATIONS DURING FASTING IN RAMADAN AT HOSPITAL TUANKU AMPUAN NAJIHAH (HTAN), KUALA PILAH

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INTRODUCTION: Healthy Muslims are required to fast from sunrise to sunset in Ramadan month. Although patients with serious illnesses are exempted from fasting during Ramadan, most Muslims prefer to fast. There are guidelines that can help physicians to address the concerns of patients fasting during Ramadan. However, there is limited data regarding knowledge, attitudes and practices (KAP) of physicians about management of medications during Ramadan in Malaysia.
OBJECTIVES: This study aimed toassess physicians' KAP regarding management of medications during Ramadan in HTAN.
METHOD: A cross-sectional survey, involving 111 respondents who worked in Hospital Tuanku Ampuan Najihah, was conducted using a validated questionnaire. The survey was distributed during Ramadan and Syawal month, 25 May 2017 to 31 July 2017.
RESULTS: The response rate of this study is 85.4%. Majority (n=86, 77.5%) of the respondents had a low level of knowledge, (n=22, 19.8%) had a moderate level of knowledge, and (n=3, 2.7%) had a high level of knowledge.Physicians' knowledge about the management of medications in Ramadan was generally poor with overall score of 9.51 (SD±2.91) out of a total of 21. The physician's attitude in concordance with the Islamic principles had overall score of 7.33 (SD±2.03) out of a total of 10. For physicians' practice, the overall score was 16.32 (SD±2.7) out of a total of 22. There were no significant differences in physician's religion, current position and department associated with physicians' KAP regarding management of medications during Ramadan.
CONCLUSION: The study revealed that there was lack of knowledge among physicians towards the proper management of medications during Ramadan. Continuous medical education is suggested to be held before the fasting month to improve physician's knowledge and practice regarding management of medications, as well as collaboration of physicians-pharmacist in pharmaceutical care issues, in an attempt to improve the quality of life of patients.

KEYWORDS: quality use of medicines, Negeri Sembilan,knowledge, attitude, practice, fasting, medications
NMRR ID: NMRR-17-2190-36162

OP-09 (Oral)

THE CAUSES OF PRESCRIBING ERRORS IN MEDICAL OUTPATIENT DEPARTMENT (MOPD), HOSPITAL TUANKU AMPUAN NAJIHAH: A QUALITATIVE STUDY

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INTRODUCTION: Prescribing errors are the most common type of error in the medication use process. However, there is a paucity of literature regarding the causes of prescribing errors in Malaysia.
OBJECTIVES: To explore and understand the causes of prescribing errors at Medical Outpatient department.
METHOD: A qualitative study using in-depth interviews of 23 prescribers in Medical Outpatient Department (MOPD), from May 2017 to June 2017 was conducted for this study. Prescriptions with errors from MOPD were collected and prescribers involved in the errors were interviewed within 12 hours after prescribing errors had occurred. The interviews were audiotaped and transcribed verbatim. The responses were analysed by using framework approach of Reason's Model of Error Causation.
RESULTS: Responses from the doctors suggested that knowledge-based mistakes are more commonly occurred. Prescribers mentioned various errors producing conditions of prescribing errors including work environment, communication issue, physical and mental well-being, and lack of knowledge contributed to the mistakes. Latent factors comprising of inadequate training, inappropriate prescribing practice, informal hierarchy culture, and an absence of self-awareness of errors were also identified. Defences against error such as other prescribers and guidelines were absent or deficient, and supervision was inadequate. Pharmacists were identified as the main defence before errors reached patient.
CONCLUSION: Prescribing errors could be minimized by training, improved communication skills, adherence to existing systems of work, and through the introduction of new working practices. Prescribers should aware of error producing conditions and formally review interventions made by pharmacists despite practice proper documentation when prescribing.

KEYWORDS: quality use of medicines, Negeri Sembilan,prescribing errors, causes, qualitative, human error theory
NMRR ID: NMRR-17-2825-36264

OP-10 (Oral)

A RANDOMIZED, OPEN-LABEL STUDY TO EVALUATE MEDICATION COMPREHENSION OF ELDERLY PATIENTS WITH ILLUSTRATED MEDICATION LABELS AT A PUBLIC HOSPITAL, PENANG

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INTRODUCTION: The difficulty in reading and understanding medication labels is highly prevalent among elderly patients, and likely to cause medication error and less effective treatment. Evidence suggests that specific content and format of medication labels may facilitate the acquisition and comprehension among the elderly population.
OBJECTIVES: To investigate the impact of newly designed illustrated medication label (IML) in elderly patients' medication comprehension at a tertiary public hospital of Penang, Malaysia.
METHOD: Elderly patient diagnosed with cardiovascular-related diseases visiting outpatient pharmacy of Hospital Seberang Jaya to refill prescription were randomized to either standard medication labels (SML) group (control) or IML group (intervention) after screening. Patients' comprehension of the prescribed medication was assessed at four weeks of interval in both groups. Patient characteristics include age, gender, duration of education years, disease length and pill burden was obtained. Descriptive and inferential statistics used to analyze data with statistical significant determine at $p<0.05$.
RESULTS: Of 172 patient, 110 underwent follow-up (IML group: 56 patients; SML group: 54 patients). The mean(SD) medication comprehension scores for IML was 3.89 (0.24), with minimum and maximum score was (2.89,4.00), for SML was 3.82(0.37) with (1.78,4.00). Medication comprehension on dosage, frequency, and administration based on food intake showed higher mean score in the IML group than SML group. Only patients' pill burden was found to significantly influence their medication comprehension in the IML group ($p=0.02$), while none of the patient factors affect medication comprehension in SML group
CONCLUSION: Introduction of IML has influence elderly patients' medication comprehension particularly with significant differences with their pill burden. Thus, IML can be used in specific subgroups of elderly patients to assist their medication comprehension.

KEYWORDS: quality use of medicines, Penang, illustrated medication label; elderly; comprehension
NMRR ID: NMRR-15-1059-25463

OP-11(Oral)

DOSE CONVERSION FROM PROGRAF® TO ADVAGRAF® FOR KIDNEY TRANSPLANT RECIPIENTS AND ITS ASSOCIATED COSTS: DO MALAYSIANS DIFFER?

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INTRODUCTION: Miligram-to-miligram dose conversion from standard-release tacrolimus (Prograf®) to prolonged-release tacrolimus (Advagraf®) among kidney transplant recipients (KTRs) is currently recommended and translated to lower drug costs and better compliance. However, there are suggestions that Asians require higher dose post-conversion, as our initial experience suggested that higher Advagraf® dose might be required to achieve similar target blood tacrolimus trough concentration ($TacC_0$).
OBJECTIVES: To determine dose-conversion ratio from Prograf® to Advagraf® among Malaysian KTRs and its impact on drug costs.
METHOD: This retrospective cohort study screened all stable KTR transplanted at our centre between 1st January 2000 to 31st December 2017 and converted from Prograf® to Advagraf®. KTR with completed database were recruited. Relevant clinical data, tacrolimus dosage and $TacC_0$ were collected from hospital electronic medical records. Average $TacC_0$ at steady state adjusted for tacrolimus dose were compared pre and post-conversion via SPSS Version 23.0.
RESULTS: Of 23 KTRs who converted from Prograf® to Advagraf®, mean $TacC_0$ was reduced from 4.19±3.07ng/mL/mg tacrolimus to 3.62±3.31ng/mL/mg tacrolimus after conversion with 1:1.13 dose-conversion ratio($p=0.062$). This implied additional cost of RM1539.57 per year incurred among these KTRs to achieve equivalent $TacC_0$. KTRs with concomitant diltiazem use as tacrolimus-sparing agent (n=12) demonstrated significant reduction of mean $TacC_0$ post-conversion from 3.32±1.74ng/mL/mg tacrolimus to 2.49±1.77ng/mL/mg tacrolimus($p=0.037$). Mean $TacC_0$ among KTRs without diltiazem co-administration (n=11) declined insignificantly from 5.13±3.94ng/mL/mg tacrolimus to 4.86±4.18ng/mL/mg tacrolimus($p=0.572$). Greater Advagraf® dose requirement is more pronounced among patients with diltiazem co-administration, who are possibly rapid tacrolimus metabolisers with CYP3A5 polymorphism, which is associated with diltiazem's tacrolimus-sparing mechanism.
CONCLUSION: There is a projected 13% increase of tacrolimus dose among Malaysian KTRs to maintain equivalent $TacC_0$ after conversion from Prograf® to Advagraf®, which translated to additional drug cost incurred, instead of cost-saving as suggested by previous studies. Further studies are required to verify the impact of pharmacogenomic variability on Prograf®:Advagraf® dose-conversion ratio.

KEYWORDS: clinical research, Selangor,tacrolimus, conversion, cost-saving
NMRR ID: NMRR-17-820-35750

OP-12 (Oral)

SINGLE-DOSE, OPEN-LABEL, RANDOMIZED, 2-TREATMENT, 2-SEQUENCE, 2-PERIOD CROSSOVER BIOEQUIVALANCE STUDY OF TWO OMEPRAZOLE CAPSULE PREPARATIONS IN HEALTHY MALE VOLUNTEERS UNDER FASTED CONDITION

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INTRODUCTION: Omeprazole is a substituted benzimidazole derivative and the first of the group of drugs, proton pump inhibitors (PPI) that suppress gastric acid secretion. It is acid labile and is administered orally as enteric-coated pellets or granules in capsules or tablets.
OBJECTIVES: To investigate the relative bioavailability and bioequivalence between two omeprazole capsule preparations under fasted condition for marketing authorization.
METHOD: The study was conducted in a single-center, single-dose, open-label, randomized, 2-treatment, 2-sequence, 2-period crossover study in healthy, adult male subjects with a washout period of 7 days. Omeprazole drug products were administered after a 10-hour fast. Standardized meals were served during both study periods. Blood samples for pharmacokinetic analysis were collected at 0 (predose), 20 minutes, 40 minutes, 1, 1.5, 2, 2.5, 3, 3.5, 4, 5, 6, 7, 8, 9, 10 and 12 hours. Blood samples were centrifuged, and plasma separated to cyrovials containing sodium carbonate and kept frozen (-15°C to -25°C) until analysis. Plasma concentrations of omeprazole were quantified using high performance liquid chromatography with UV detector. Bioequivalence was assessed according to the ASEAN guideline acceptance criteria for bioequivalence which is the 90% confidence intervals of $AUC_{0-\infty}$, AUC_{0-t} and C_{max} must be within the range of 80.00 – 125.00%.
RESULTS: 28 healthy subjects were enrolled in this study and only 26 subjects completed the trial. There were no significant differences observed between the $AUC_{0-\infty}$, AUC_{0-t} and C_{max} of the two omeprazole preparations in fasted condition. The 90% confidence intervals for the ratio of AUC_{0-t} (0.9107-1.0775), $AUC_{0-\infty}$ (0.9237-1.0814) and C_{max} (0.8420-1.0498) for the test preparation over reference preparation were all within acceptable range of 0.8000-1.2500.
CONCLUSION: The test preparation is bioequivalent to the reference preparation under fasted condition in healthy adult males.

KEYWORDS: clinical research, Selangor, omeprazole, bioequivalence, fasting
NMRR ID: NMRR-15-433-25317

OP-13 (Oral)

EFFECT OF DUAL ANTIPLATELET THERAPY (DAPT) ON PLATELET REACTIVITY IN CORONARY ARTERY BYPASS GRAFTING (CABG) PATIENTS

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INTRODUCTION: Addition of clopidogrel to aspirin in post-CABG antiplatelet treatment is thought to induce more potent platelet inhibition thus to prevent early graft failure and improve graft patency.
OBJECTIVES: This study aimed to investigate the effect of post-operative DAPT with aspirin and clopidogrel in CABG patients as compared to their aspirin monotherapy on platelet reactivity using whole blood platelet aggregometry.
METHOD: Patients who were scheduled for CABG and taking aspirin monotherapy were recruited from Sarawak Heart Centre. Clopidogrel was added to aspirin monotherapy after CABG for 6 weeks as the standard practice. ASPItest (arachidonic acid, AA) for aspirin was done before operation while taking aspirin only and six weeks after postoperative DAPT. ADPtest (adenosine diphosphate, ADP) for clopidogrel was only done at six-week of DAPT. High on-treatment platelet reactivity (HOTPR) were defined as platelet reactivity more than 300 and 468 AU*min for aspirin and clopidogrel respectively
RESULTS: Thirty-three patients were included. Mean ASPItest level during aspirin monotherapy before CABG was 276.6±91.5 AU*min and it was reduced significantly to 222.0±72.5 AU*min (p=0.002) after six weeks of postoperative DAPT. 27.3% of the patients (n=9) were found to have HOTPR with aspirin before CABG and more than half (n=5) were successfully converted to low on-aspirin platelet reactivity after 6 weeks of DAPT. Mean ADPtest level was 371.1±200.3 AU*min and 21.2% (n=7) of the patients were found to have HOTPR with clopidogrel after 6 weeks of DAPT. No factors were found to be associated with the effect of DAPT on platelet reactivity.
CONCLUSION: Inhibition on platelet reactivity was improved after CABG with DAPT than aspirin monotherapy. Addition of clopidogrel to aspirin was shown to have additive effect on AA-mediated platelet function inhibition besides inhibiting ADP pathway. A larger, randomised, and controlled study is however warranted.

KEYWORDS: clinical research, Sarawak,coronary artery bypass grafting, dual antiplatelet therapy, platelet function test
NMRR ID: NMRR-15-304-25000

OP-14 (Oral)

CORRELATION OF ANTIBIOTIC CONSUMPTION AND MULTIDRUG-RESISTANT INFECTIONS IN HOSPITAL TUANKU AMPUAN NAJIHAH (HTAN)

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INTRODUCTION: The increasing trend of multidrug-resistant (MDR) infection has become main concern because it will lead to increasing healthcare cost, failure of antibiotic treatment and increasing mortality rate.
OBJECTIVES: To assess the trend and correlation of antibiotic consumption and multidrug-resistant infection in HTAN from 2014 to 2016.
METHOD: A retrospective study was conducted. Antibiotic consumption data was expressed as defined daily dose (DDD)/1000 inpatients-day every 6 months while multidrug-resistant infection was expressed as number of ESBL and MDR *Acinetobacter* cases every 6 months. Individual trends were determined by linear regression while correlation of antibiotic consumption and multidrug-resistant infection was evaluated via Pearson's correlation coefficient or Spearman rank-order correlation.
RESULTS: All the antibiotic consumption reduced from 2014 to 2016 and were significant for ciprofloxacin (p=0.028), moxifloxacin (p=0.026), ceftriaxone (p=0.015), imipenem (p=0.004) and meropenem (p=0.031). Total ESBL infections increased significantly from 2014 to 2016 (p=0.001) and sub-analysis showed that significant increment was only seen in surgical discipline (p=0.024). Overall, all the antibiotic consumption was negatively correlated with ESBL infections. However, positive moderately strong correlations were found between ESBL infections and consumption of ceftazidime (r=0.656, p=0.157), cefepime (r=0.654, p=0.159) and cefoperazone/sulbactam (r=0.556, p=0.525) in surgical discipline. While for MDR *Acinetobacter* infections, there was no significant increment in total and in individual disciplines. Most of the MDR *Acinetobacter* infections were from ICU/CCU discipline (76%). There were positive strong correlation for the consumption of piperacllin/tazobactam (r=0.839, p=0.037) and positive moderately strong correlation for the consumption of ampicillin/sulbactam (r=0.560, p=0.248) with MDR *Acinetobacter* infections in ICU/CCU.
CONCLUSION: Our study revealed that only consumption of certain antibiotics in certain disciplines was positively correlated with MDR infections in HTAN. Further study is necessary to identify other possible factors contributing to the emergence of MDR infections.

KEYWORDS: clinical research, Negeri Sembilan,antibiotics, multiple drug resistance, defined-daily-dose
NMRR ID: NMRR-17-2843-36243

OP-15 (Oral)

A RETROSPECTIVE STUDY: COMPARISON OF TWO EXTENDED-INTERVAL GENTAMICIN DOSING GUIDELINES IN ACHIEVING THERAPEUTIC CONCENTRATION IN NEONATES

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INTRODUCTION: Extended-interval gentamicin dosing by Drug Doses (DD) and Neofax (NF) are two established mainstream guidelines in neonates. At current, there is no head to head comparison of safety and efficacy that suits Malaysia local population. In 2015, 10.38% (127 out of 1223) of gentamicin in HSNZ neonatal cases required dosage adjustment with high trough level (>1 μg/mL) which at risk of nephrotoxicity.
OBJECTIVES: To evaluate the level and safety of gentamicin dosing in neonatal population based on Drug Doses by Frank Shann and Neofax in a Malaysian hospital.
METHOD: This study was designed as retrospective, and sample was selected based on inclusion and exclusion criteria via data retrieval from Hospital Information System (HIS). All neonates ≤30 days of life received intravenous gentamicin treatment [according to Drug Doses (DD) or Neofax (NF) guidelines] in NICU/SCN/MAC were included in the study. Gestational age, body weight, serum creatinine concentration, gentamicin dose/interval, serum peak and trough concentrations were evaluated. Data was analysed using descriptive and non-parametric tests (SPSS v22) with p-value <0.05 was considered as statistical significant.
RESULTS: Of total 407 subjects included, 83.5% (n=340) achieved therapeutic concentration. These subjects achieved therapeutic trough concentration of <1 μgmL^{-1} and therapeutic peak concentration of 4-10 μgmL^{-1}. There was a significant finding of overall toxicity cases between Drug Doses group and Neofax group [95% CI, DD 21.8% (n=44); NF 11.2% (n=23); p-value 0.008]. There was no significant difference were found between the percentages of toxicity cases based on gestational age (GA) or body weight (BW).
CONCLUSION: The large percentage of toxicity cases in overall Drug Doses group revealed that Neofax regime appears to be a promising safer option regime with less incidence of toxicity.

KEYWORDS: clinical research, Terengganu,gentamicin, neonates, safety
NMRR ID: NMRR-16-1185-29757

OP-16 (Oral)

COMPARATIVE EVALUATION OF INTERNATIONAL NORMALIZED RATIO (INR) MONITORING BETWEEN POINT-OF-CARE AND LABORATORY-BASED TESTING METHOD IN PATIENTS RECEIVING WARFARIN THERAPY IN HOSPITAL SULTANAH NUR ZAHIRAH

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INTRODUCTION: Monitoring of patients receiving warfarin therapy is either by using POC-T or laboratory method. However, there was a greater variation at the higher INR value claimed by POC-T device provider. Data retrieved from September to December 2016, 31.5% of patients with POC-T INR ≥4 showed INR within therapeutic range after confirmatory result with laboratory method.
OBJECTIVES: The study aimed 1) To compare the INR results obtained between POC-T and laboratory based method, and 2) To determine the cut-off point for high INR values generated by POC-T device should mandate confirmatory testing with laboratory method.
METHOD: A retrospective cross-sectional study involved patients attending INR clinic was conducted from 1st June 2016 until 30th May 2017. The two (2) INR values were analysed using POC-T method and laboratory method on the same day. The INR results were compared using Bland-Altman plot. Data was analyzed using SPSS v.20 with $p<0.05$ was considered statistically significant.
RESULTS: A total of 118 patients with INR readings were included in this study. There was a significant difference between mean INR (mean±standard deviation) obtained by the POCT (3.87±1.71) and laboratory testing method (2.89±1.11). The INR of POC-T method were significantly correlated to the laboratory method ($r = 0.875$, $p<0.01$). INR measured by POC-T exhibit positive bias as INR increase, particularly when INR >4.0.
CONCLUSION: A significant correlation between two METHOD suggested that POC device is a reliable tool for INR <4.0. INR values generated by POC-T device exhibit bias at the high INR range thus a repeat test using laboratory method must be considered when INR ≥4.0.

KEYWORDS: clinical research, Terengganu, warfarin, international normalized ratio, point-of-care
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OP-17 (Oral)

GEFITINIB VERSUS ERLOTINIB FOR NON-SMALL-CELL LUNG CANCER WITH MUTATED EGFR

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INTRODUCTION: Non-small-cell lung cancer (NSCLC) with sensitive epidermal growth factor receptor (EGFR) mutations is highly responsive to EGFR tyrosine kinase inhibitors such as gefitinib and erlotinib, but little is known on its efficacy and safety profile in our population.
OBJECTIVES: This prospective study was designed to evaluate the treatment outcomes and safety profile of gefitinib and erlotinib in EGFR mutated advanced NSCLC for Malaysian population.
METHOD: Patients in Institut Kanser Negara prescribed with gefitinib and erlotinib between June 2015 and June 2017 were recruited and followed up for 2-years or till death. Progression-free survival and overall survival were evaluated using Kaplan-Meier survival analysis and log rank test was performed.
RESULTS: Fifty-four patients were treated with gefitinib (n=36) and erlotinib (n=18). The median PFS for gefitinib and erlotinib were 11.7 months for both drugs (p=0.322). The median OS was 16.8 months for gefitinib and 22.2 months for erlotinib (p=0.309). In multivariate analysis, no significant difference for median PFS and OS whether patients receiving EGFR-TKI in first or second line setting. In terms of safety, all patients experienced at least one adverse event. Three patients experienced grade 4 toxicities in gefitinib arm while none in erlotinib arm. Grade 3 toxicities occurs more common in erlotinib arm (94.4% vs 44.4%). The most common toxicities (all grade) for erlotinib and gefitinib arm respectively were aneroxia (66.7% vs. 36%), increased blood bilirubin (61% vs. 30.6%), hand-foot syndrome (94.4% vs. 75%), and rash acnieform (72.2% vs. 41.7%). In this study, pneumonitis was only observed in gefitinib arm (11.1%).
CONCLUSION: In NSCLC with mutated EGFR, treatment as first or second-line setting with either gefitinib or erlotinib will give similar PFS and OS. In terms of safety, gefitinib are more tolerable than erlotinib.

KEYWORDS: clinical research, Putrajaya, non-small-cell lung carcinoma, gefitinib, erlotinib
NMRR ID: NMRR-15-831-25773

OP-18 (Oral)
EFFECTIVENESS OF SMOKING CESSATION INTERVENTIONS IN PRIMARY HEALTH CARE

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INTRODUCTION: Whilst overall effectiveness of a smoking cessation service in Malaysian primary care setting has been previously reported, however, none of these studies assessed the effectiveness of each smoking cessation intervention.
OBJECTIVES: This study aimed to evaluate the effectiveness of each smoking cessation intervention that was available in the primary care setting in Malaysia, measured as 6-month abstinence rate and also to determine the predictors of smoking cessation.
METHOD: A multi-centre, retrospective cohort study was conducted. Medical records of participants who attended quit smoking clinics in Kuala Lumpur and Putrajaya from August 2015 to November 2016 were retrieved. Information on social demographics, smoking history, quit attempts and intervention types were collected, using a standardised data collection form. The primary outcome was abstinence at 6-month follow-up, confirmed by expired air carbon monoxide. Data were then analysed using SPSS version 24.0.
RESULTS: Three hundred and thirty four participants who fulfilled the inclusion criteria were included in this study. Overall 6-month abstinence rate was reported at 23.1%. Participants treated with counselling and varenicline achieved 32.1% of 6-month abstinence rate, followed by the group of counselling and nicotine replacement therapy (NRT) (20.8%), counselling only (15.0%) and the group of counselling, varenicline and NRT (13.0%). The predictors for smoking cessation were number of visit and intervention types.
CONCLUSION: In the Malaysian setting, counselling with varenicline appeared to be the most effective option in smoking cessation.

KEYWORDS: clinical research, Kuala Lumpur, smoking cessation, , varenicline, nicotine replacement therapy
NMRR ID: NMRR-17-2086-37463

OP-19 (Oral)
KNOWLEDGE, PERCEPTION AND ATTITUDE OF HEALTHCARE PROFESSIONALS TOWARDS THE USE OF GENERIC MEDICINES IN HOSPITAL TENGKU AMPUAN AFZAN (HTAA)

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INTRODUCTION: The rising of healthcare expenditure has led to introduction of Generic Drug Policy in government hospitals to ensure quality healthcare affordable. Therefore, knowledge, perception and attitude of healthcare professionals will influence the use of generic medicines in government hospital.
OBJECTIVES: This study aimed to explore the knowledge, perception and attitude of healthcare professionals towards the use of generic medicines in Hospital Tengku Ampuan Afzan (HTAA).
METHOD: An observational, cross-sectional study was conducted in HTAA among pharmacists and doctors using validated questionnaires, which consist of 4 domains (demographic data, 10 knowledge related questions, 12 perceptions and 5 attitude related statements).
RESULTS: A total of 269 healthcare professionals consist of 208 doctors and 61 pharmacists participated in the study. The overall knowledge score was 60.30 ± 19.39. Pharmacists achieved higher mean score (73.77) than doctors (56.35) (mean difference 17.42; 95% CI 12.79 to 22.05; p=0.022). More doctors believed that they need a standard guideline on brand substitution (p=0.003) and more information about the safety and efficacy of generic medicines (p=0.029) compared with pharmacists. In contrary to pharmacists' perception, more doctors believed that generic medicines are made in substandard facilities (p<0.001) and multinational products are of good quality than local products (p=0.037). In terms of attitude, most doctors are not comfortable if pharmacists performing any generic substitution without their permission (p<0.001).
CONCLUSION: Our findings suggested that there is a need to improve healthcare professionals' knowledge on safety, efficacy and quality of generic medicines. Besides, a standard guideline on brand substitution process is needed to improve the use of generic medicines.

KEYWORDS: quality use of medicines, Pahang, generic medicines, knowledge, attitude, perception
NMRR ID: NMRR-17-1365-35679

OP-20 (Oral)

PERCEPTIONS AND KNOWLEDGE ON ANTIBIOTIC USE AND RESISTANCE: A CROSS SECTIONAL MULTICENTER SURVEY AMONG PHARMACISTS IN MALAYSIAN PUBLIC HOSPITALS

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INTRODUCTION: Antibiotic Stewardship Programme (ASP) is an important measure to contain the spread of antibiotic resistance. ASP has been implemented in several major government hospitals in Malaysia with pharmacists working collaboratively with other healthcare professionals in ensuring appropriate use of antibiotics.
OBJECTIVES: This survey aimed to assess the practices, perceptions and knowledge of government hospital pharmacists on antibiotic use and resistance.
METHOD: A cross-sectional survey involving pharmacists from 6 public hospitals in Penang was conducted using self-administered validated questionnaire in January 2017. The survey was distributed by Research & Development coordinator of the selected hospitals. The main outcomes were pharmacists' antibiotic utilization knowledge, perceptions, and practices.
RESULTS: The overall response rate was 88% (n=295). A total of 65% (n=192) respondents demonstrated good level of knowledge on antibiotic use and resistance (Mean knowledge score: 10.1 out of maximum score of 13.0 [95% confidence interval 9.95-10.31]). Pharmacists from in-patient and ward pharmacy units have significant better antibiotic knowledge compared the others ($p<0.001$). Years of practice in hospital was not significantly associated with antibiotic knowledge. A majority of the pharmacists perceived that polypharmacy (85%, n=252) and overuse of broad-spectrum antibiotics (92%, n=270) can lead to antibiotic resistance, and that ensuring rational use of antibiotics is a shared responsibility between clinicians and pharmacists (94%, n=278). The respondents (90%, n=266) were positive that ASP helps promote rational use of antibiotics and they (93%, n=273) perceived that a formal training in infectious diseases should be given before their involvement in ASP. Majority (81%, n=234) of the pharmacists were concerned about variability in types and availability of antibiotics in hospital as compared to only 15.1% of them who felt that the use of generic/innovator brand influenced their recommendations.
CONCLUSION: This study has identified the antibiotic knowledge gap among hospital pharmacists in the state of Penang. Hospital pharmacists are generally supportive of ASP.

KEYWORDS: quality use of medicines, Penang, antibiotics, perceptions, knowledge, hospital pharmacists
NMRR ID: NMRR-16-2299-2875

OP-21 (Oral)

THE LEVEL OF UNDERSTANDING AMONG VARIOUS GROUPS OF GOVERNMENT HEALTHCARE PERSONNEL IN F.T. LABUAN TOWARDS REGISTERED PRODUCTS AND NOTIFIED COSMETICS

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INTRODUCTION: All medicinal and pharmaceutical products in Malaysia must be registered with the Drug Control Authority (DCA) whereas cosmetics must be notified with the National Pharmaceutical Regulatory Agency (NPRA). Availability of unregistered products and unnotified cosmetics in the market are longstanding issues affecting public safety and health. It is vital that all government healthcare personnel (GHP) as the front liners are equipped with the knowledge to properly advise the public on this issue.
OBJECTIVES: This study aims to determine the level of understanding towards registered products and notified cosmetics among various groups of government healthcare personnel under the Ministry of Health facilities in Labuan.
METHOD: This was a cross-sectional study performed from August to November 2017 using a validated 12 question questionnaire originally designed by Sabah State Pharmacy Enforcement Branch. Respondents were divided into 4 groups and results between different groups were analysed using SPSS Ver. 18. Respondent's knowledge was given score and those who scored 9 marks and above were considered to have good understanding. Those who scored 8 marks and below were considered to have poor understanding.
RESULTS: 219 out of 250 questionnaires were filled and returned with response rate of 87.6%. Pharmacists have the highest score of good understanding on registered products and notified cosmetics at 81.8% (n=18). The level of good understanding among allied health professionals (AHP) stood at 42.9% (n=21), 36.4% of nurses (n=43) and 20% of doctors (n=6). The level of understanding among GHP are significantly different ($p<0.001$). Main factor that affect the level of understanding is the inability of the respondent to correctly answer a question on cosmetics.
CONCLUSION: This study shows that the level of understanding among government healthcare personnel varies between groups of profession. More strenuous efforts and continuous education should be undertaken to properly address this situation.

KEYWORDS: quality use of medicines, Labuan, registered products, notified cosmetics, government healthcare personnel,
NMRR ID: NMRR-17-541-34803

OP-22 (Oral)

A REVIEW ON THE USE OF ORAL N-ACETYLCYSTEINE (NAC) IN PREVENTING CONTRAST INDUCED NEPHROPATHY (CIN)

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INTRODUCTION: Contrast-induced nephropathy (CIN) has become the third most common cause of hospital-acquired acute kidney injury after hypotension and surgery. CIN is reported to increase from 20% to 40% in high-risk patients following the administration of a contrast agent.
OBJECTIVES: This study was aimed to identify characteristics of patients who received oral NAC for CIN prevention and to determine the outcome of oral NAC in preventing CIN besides identifying the risk factor(s) associated with CIN.
METHOD: This was a retrospective, observational study conducted in HPJ. A total of 389 patients who received oral NAC during 2015 and 2016 were included according to inclusion and exclusion criteria. A paired-t test was conducted to evaluate the impact of the NAC on preventing CIN. Data was analyzed using SPSS Version 21.
RESULTS: A total of 336 patients were included. Only 96 of the patients fulfilled the criteria while the rest were excluded due to no pre or post procedure renal profile (60.4%), ESRF (5.7%) and cancellation of procedure (5.4%). The results showing no significant decrease in eGFR post procedure(mean eGFR 46.7± 25.0 ml/min) to eGFR pre procedure (mean eGFR 43.2 ± 25.0 ml/min) at $p > 0.05$. Study showed both Diabetes Mellitus and hydration were significant variables associated with incidence of CIN using Simple Linear Regression (SLR) at $p < 0.25$. Hydration was identified as significant risk factor associated with the incidence of CIN via Multiple Linear Regression at $p < 0.05$.
CONCLUSION: About 28.5% of the patients who received oral NAC were monitored for pre & post contrast procedure for CIN. Most patients (85.5%) who received oral NAC did not show any significant decrease in eGFR post contrast procedure. Hydration status was identified as a significant risk factor associated with CIN.

KEYWORDS: quality use of medicines, Putrajaya, contrast induced nephropathy, oral N-acetylcystiene,
NMRR ID: NMRR-17-2651-36798

OP-23 (Oral)

RETURN MEDICATION PROGRAMME AMONG PATIENTS AT OUTPATIENT SETTING IN HOSPITAL TUANKU AMPUAN NAJIHAH: A CROSS-SECTIONAL STUDY

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INTRODUCTION: Previous study showed that 89.1% patients have unused medications at home. Patients may not use all the medications given to them due to numerous reasons. The unused medication can lead to problems such as ineffective treatment, health risks, medicine resistance, excessive spending on pharmaceuticals and wastage of financial resources.
OBJECTIVES: To identify the awareness of Return Medication Programme, reasons of patient returning medication among patients and to assess patient medication disposal method.
METHOD: A cross-sectional study was carried out once a week within September 2017, using self-administered validated questionnaire. Patients included were patients from the medical outpatient clinic, surgical outpatient clinic, obstetrics and gynaecology clinic, dental clinic, psychiatric clinic, ear, nose & throat clinic. Patients from eye clinic and skin clinic were excluded.
RESULTS: A total of 171 questionnaires were distributed respectively and from which 148 responses were obtained (86.5%). 64.3%(n=95) respondents were aware of the medication return programme. Majority of the respondents returned medication due to having extra medications (n=37, 25%), discontinued due to self-taking supplements (n=24, 16.2%) and medications were expired (n=20, 13.5%). A total of 62.8% (n=93) respondents knew that improper disposal of medication can harm the environment. Percentage of respondents who had return medications in Hospital Tuanku Ampuan Najihah was 72.3% (n=107).
CONCLUSION: Patients can be educated with the proper method to handle extra medications and disposal method. Awareness programme to educate patient on medication return programme can be organized to increase awareness and understanding of patient towards the programme.

KEYWORDS: quality use of medicines, Negeri Sembilan, return medication, awareness, reason, disposal
NMRR ID: NMRR-17-1379-36239

OP-24 (Oral)

A PROSPECTIVE STUDY TO EVALUATE THE FREQUENCY OF ANTIBIOTIC DE-ESCALATION PRACTICE IN CULTURE POSITIVE RESULT AMONG PHYSICIANS AND THE IMPACT OF THIS STRATEGY IN MEDICAL WARD OF PENANG GENERAL HOSPITAL

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INTRODUCTION: The increasing of antimicrobial resistance (AMR) rate is a burden to the country due to the high treatment cost and increased mortality rate. One of the strategies to reduce AMR developed by Antimicrobial Stewardship (ASP) to reduce AMR was Antibiotic de-escalation (ADE).
OBJECTIVES: The aim of the study is to assess the frequency of antibiotic de-escalation and factors associated with antibiotic non-de-escalation among physicians in the medical ward of Penang General Hospital.
METHOD: This prospective study was carried out in Medical ward (C5, C6 and C7) of Penang General Hospital for three months. The frequency of de-escalation and the factors associated with non-de-escalation were determined.
RESULTS: Among 99 patients included in this study, antibiotics were de-escalated in 86(86.9%) patients. Reasons for non de-escalation included clinical deterioration(28%), fear of de-escalation in complicated patients (20%), and immunocompromised patients (12%). There were no significant differences in length of hospitalization between the antibiotic de-escalation and non de-escalation group.
CONCLUSION: The percentage of antibiotic de-escalation in medical wards of Penang General Hospital is high. Thus, this study serves as a precedent to introduce ASP with antibiotic de-escalation to other disciplines (i.e. surgical, O&G, and etc) to help tackle the increasing AMR rate.

KEYWORDS: quality use of medicines, Penang, antibiotic, de-escalation, antimicrobial stewardship
NMRR ID: NMRR-17-857-35440

OP-25 (Oral)

A QUALITATIVE RESEARCH ON FACTORS AFFECTING COMPLIANCE TOWARDS DEFEROXAMINE AMONG ADULT TRANSFUSION-DEPENDENT THALASSEMIA PATIENTS IN HOSPITAL PULAU PINANG

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INTRODUCTION: Deferoxamine is a well-established iron chelating agent used in managing iron overload in thalassemia patients. However, its treatment efficacy and success rates are highly dependent on patients' compliance.
OBJECTIVES: This study aims to explore patients' opinions on factors affecting their compliance towards Deferoxamine.
METHOD: A qualitative study was carried out from Mei to December 2015 in Hematology Clinic, Hospital Pulau Pinang. 10 adult patients who were undergoing or had undergone Deferoxamine therapy were interviewed with guided questions. The interviews were audio-taped, transcribed and interpreted.
RESULTS: Patients reported that their compliance was affected by personal factors, the treatment factors, environmental factors, and healthcare policies. Personal factors including the desire to get better or fear of worsening of condition affected patients' attitude toward the treatment for most patients in the study group. A positive attitude encouraged them to gain more knowledge about their condition and relevant treatments. 60% of patients reported reduced compliance when they were distracted with personal matters, family problems, and work-related issues. Some patients felt that females were more compliant to their treatment. The route of administration of deferoxamine was an important factor as well. This included the inconvenience prior to injecting, the duration of infusion, pain and swelling at injection site, and preference of patients for oral tablets over the subcutaneous route of treatment. A supportive environment was also important to improving patient compliance. This includes motivation from their family, friends and other support groups. Higher levels of acceptance and knowledge of their caregivers were conducive to improving their compliance. Healthcare policies in terms of subsidies and enforcement of patient education affected their compliance to a smaller degree.
CONCLUSION: In conclusion, compliance is not solely dependent on personal factors. Treatment choice and the support efforts from all stakeholders will also affect the patients' compliance towards the treatment.

KEYWORDS: quality use of medicines, Penang, deferoxamine, compliance, thalassemia
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OP-26 (Oral)
KNOWLEDGE AND PERCEPTION OF MEDICAL STAFF ON THE USE OF HIGH ALERT MEDICATIONS IN HOSPITAL PERMAI JOHOR BAHRU

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INTRODUCTION: High-alert medications (HAMs) are drugs that bear a heightened risk of causing significant patient harm when they are used in error, and hence it is vital to have adequate knowledge, education and training when handling with these medications. Previous studies have shown that errors involving high alert medications can be detrimental or even fatal to patients.
OBJECTIVES: To assess and compare knowledge of doctors, pharmacists, registered nurses, pharmacist assistants, and medical assistants in HPJB and their perceptions regarding high alert medications in HPJB.
METHOD: A 35-item questionnaire-based cross-sectional study carried out in HPJB. Assessment of knowledge between professions are compared using the ANOVA test with a significant p-value of ≤0.05
RESULTS: In the 109 respondents, 37% were nurses, 25% medical assistants, 15% pharmacists, 13% pharmacist assistants and, 10% doctors. Overall, the mean score of knowledge of medical staff is 6.42 which is considered as good knowledge. Pharmacists scored the highest with 7.44 point and medical assistants scored the lowest with 5.33 points. There is a statistical difference with p = 0.000 between medical professions and their knowledge scores regarding HAMs. Awareness on the practice of 5 Right of medication showed that interruption is the leading cause of 5 Rights being inconsistently done.
CONCLUSION: This study proves that there is a significant association between the knowledge on the use of high-alert medications among medical staffs in HPJB especially when comparing the knowledge scores of medical staffs with other professions. Each different profession also has a different perception regarding high alert medications and errors involved when handling high-alert medications. A total of 64% of respondents choose to be educated on HAMs through Continuing Medical Education (CME). This provides a valuable input when considering METHOD to educate medical staffs regarding high-alert medications in HPJB.

KEYWORDS: quality use of medicines, Johor, high alert medications, knowledge, perception
NMRR ID: NMRR-17-1620-34658

OP-27 (Oral)
PAIN BELIEF AND ADHERENCE TO PAIN MEDICATIONS IN PATIENTS WITH NEUROPATHIC PAIN IN HOSPITAL REHABILITASI CHERAS

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INTRODUCTION: Patients' beliefs about their pain are thought to play a prominent role in pain perception, function and response to treatment.
OBJECTIVES: This study was aimed to determine pain belief and medication belief in patients with neuropathic pain, to compare the belief between different neuropathic pain medications prescribed and to determine the correlation between beliefs and medication adherence in patient with neuropathic pain.
METHOD: A cross-sectional survey using researcher assisted questionnaire was conducted in Outpatient Pharmacy involving all patients prescribed with neuropathic pain medications (Pregabalin, Gabapentin and Amitryptyline) from August 2015 – May 2016. Data was analysed using SPSS Version 21.
RESULTS: This study included 30 patients with a mean age of 51 ± 15 years. Most of them were Malay (66.7%) and not working (56.7%). Pain duration was 28.0 ± 35.8 months. A total of 63.3% of patients received Gabapentin as monotherapy. 83.3% of them experienced constants pain with a pain score of 4.9 ± 2. Finding showed no statistical difference when compare pain belief and medication belief between medications (p=0.970 and p=0.288). This study also found that medication adherence has significant correlation with pain belief(r=0.446, p=0.014) but not with medication belief(r=0.150, p=0.429).
CONCLUSION: This study showed that pain belief and medication belief does not specific to any drug and medication adherence has significant correlation with pain belief but not with medication belief. Further research is needed to elucidate the relationship between pain belief and patient medication adherence, which can help to optimize the treatment and the adherence towards the medication.

KEYWORDS: quality use of medicines, Kuala Lumpur, pain, belief, adherence, neuropathic pain
NMRR ID: NMRR-15-858-25185

OP-28 (Oral)

EFFECTIVENESS OF "KNOW YOUR MEDICINE - TAKE IT FOR HEALTH" (MEDIHEALTH) PROGRAM IN IMPROVING MEDICATION ADHERENCE AMONG TYPE 2 DIABETES MELLITUS PATIENTS IN SARAWAK: A RANDOMIZED CONTROLLED TRIAL

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INTRODUCTION: Sarawak Pharmaceutical Services Division had developed a pharmacist-led, theoretical grounded, culturally sensitive and structured group-based program "Know Your Medicine – Take it for Health" (MEDIHEALTH), to improve medication adherence (MA) among T2DM patients.
OBJECTIVES: This study aimed to evaluate the effectiveness of the MEDIHEALTH in improving MA among Malay patients and to identify the factors associated with its effectiveness.
METHOD: The randomized controlled trial was conducted at Health Clinic Petra Jaya and Samarahan. Malay T2DM patients who had poor MA (8 items Morisky Medication Adherence Scale Malaysian specific score < 6) were randomly assigned to intervention group (IG) and control group (CG). The outcomes are the MA level (primary) and the attitude, subjective norms (SN), perceived behavioural control (PBC), intention and knowledge that are related to MA (secondary), at the baseline, 1 and 6 months of post-intervention. Quantitative results were triangulated by the findings from semi-structured interviews (SSI) conducted upon 1 month after the intervention.
RESULTS: A total of 131 participants completed follow-up measures with 68 and 63 for IG and CG, respectively. Participants in IG had significantly greater MA level at post 1 (p<0.01, 95% CI: 0.115, 0.543) and 6 months as compared to those in CG (p<0.01, 95% CI:0.105, 0.523). Path analysis found that the effectiveness of the Program was significantly associated with PBC (p<0.05, 95% CI:0.019, 0.213) and knowledge (p<0.01, 95% CI:0.123, 0.325), not attitude, SN or intention related to MA. Such associations were further supported by the qualitative results.
CONCLUSION: MEDIHEALTH was found to be effective in improving MA among Malay T2DM patients, through mediating effects of PBC and knowledge related to MA.
KEYWORDS: quality use of medicines, Sarawak, type 2 diabetes mellitus, medication adherence, structured group-based educational program, randomized controlled trial
NMRR ID: NMRR-17-925-35875

OP-29 (Oral)

PERCEPTION OF THE QUALITY, SAFETY AND EFFICACY OF TRADITIONAL AND COMPLEMENTARY MEDICINE (TCM) AMONG YOUNG ADUTS IN MALAYSIA

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INTRODUCTION: Traditional and Complementary Medicine (TCM) is an important and often underestimated part of healthcare. Understanding the perception of young adults in Malaysia regarding the quality, safety and efficacy of TCM is crucial as the demand for T&CM therapy is increasing and incorrect use of this therapy can have fatal outcomes.
OBJECTIVES: To study the use of Traditional and Complementary Medicine (TCM) among young adults as well as their perceptions towards its quality, safety and efficacy.
METHOD: A cross-sectional study was conducted through social media Facebook and Twitter accounts for 30 days; targeting respondents aged 15-40. A validated, self-administered questionnaire comprised of four sections was used. Analysis was done using descriptive statistics and chi square tests.
RESULTS: 350 respondents were recruited in this study. Overall, 64.3% of the respondents have used TCM at least once in the past. 31.7% of the respondents believed in the quality of TCM while 36.9% of them perceived TCM safe to use. 22.9% of the respondents believed that TCM does not have side effects while more than a quarter (27.1%) perceived it to have less side effects as compared to conventional treatments. Less than half of the respondents (40.9%) believed that TCM is effective while only 8.3% perceived it to be more effective than conventional treatments. The respondents' perception towards the quality, safety and efficacy of TCM was significantly associated with their experience of using TCM
CONCLUSION: The study revealed the current scenario on the use of TCM among young adults and their perceptions towards its quality, safety and efficacy. This serves as a yardstick for the development of new strategies and action plans in educating young adults in Malaysia regarding the quality use of TCM.
KEYWORDS: quality use of medicines, Malacca, traditional and complementary medicine, perception, young adults
NMRR ID: NMRR-17-2926-38994

OP-30 (Oral)

A CROSS SECTIONAL STUDY ON THE AWARENESS TOWARDS PHARMACEUTICAL PRODUCTS REGISTRATION AMONG MEDICAL PRACTITIONERS AND PHARMACISTS IN A TERTIARY HOSPITAL OF MALAYSIA

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INTRODUCTION: Unregistered pharmaceutical products are becoming rampant and easily accessed by public despite stringent surveillance and enforcement efforts. Public generally do not have comprehensive understanding about pharmaceutical products and tend to consult medical practitioners or pharmacists in government settings for such issues. Good understandings on the pharmaceutical products registration among these professionals are essential to deliver accurate information to the public.
OBJECTIVES: To study the awareness of medical practitioners and pharmacists working in Miri General Hospital (a tertiary government hospital) towards pharmaceutical products registration.
METHOD: A self-administered questionnaire was developed based on previous study and review on relevant Acts. The questionnaire was pre-tested and reviewed by 3 senior enforcement officers. Pilot study was adopted to determine the reliability and validity of the developed questionnaire. Universal sampling was employed to recruit medical practitioners and pharmacists working in Miri General Hospital. Permission to collect data and ethics approval were obtained prior to data collection. Descriptive analysis, independent T test and Pearson correlation were used to analyse the results obtained.
RESULTS: A total of 50 pharmacists and 70 medical practitioners were sampled (75% response rate). The overall mean score for pharmacists and medical practitioners is 7.66 (±SD 2.61) and the individual mean scores are 9.40(±SD 1.95) and 6.41 (±SD 2.3) respectively. The awareness of the pharmacists towards pharmaceutical products registration are significantly higher than the medical practitioners ($p<0.05$). There is a weak correlation between level of awareness and years of servicing ($r= 0.273$, $p<0.05$).
CONCLUSION: This study reveals that there is difference in level of awareness towards pharmaceutical products registration between pharmacists and medical practitioners, in which the mean scores denote 'good' and 'moderate' awareness respectively. Continuous professional development (CPD) courses for both professions are imperative to reinforce their understanding and subsequently delivering updated information to the public.

KEYWORDS: quality use of medicines, Sarawak, awareness, pharmaceutical products, registration**NMRR ID:** NMRR-17-1390-35163

OP-31 (Oral)

A RETROSPECTIVE CROSS-SECTIONAL STUDY ON DRUG UTILIZATION PATTERNS IN EMERGENCY AND TRAUMA DEPARTMENT (ETD) AT SIBU HOSPITAL

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INTRODUCTION: The drugs usage of ETD has increased over years which may lead to irrational drug utilization.
OBJECTIVES: This study aimed to identify the medication prescribing patterns and cost of drugs in patients discharged from ETD, Sibu Hospital according to WHO prescribing indicators.
METHOD: This was a cross-sectional study in which ETD prescriptions received by pharmacy, Sibu Hospital between January and February 2017 were screened for inclusion criteria. All information from the prescriptions was entered into data collection forms and analyzed using SPSS.
RESULTS: The study findings showed that ETD prescribing deviated from the WHO prescribing indicators. The average number of drugs per prescription was 2.88± 1.256 (WHO standard 1.6-1.8), 90.53% were prescribed in generic names (WHO standard: 100%), 28.5% of the prescriptions contained antibiotics (WHO standard 20.0-26.8%) and 80.34% were prescribed from NEML list (WHO standard 100%). Top 5 prescribed List A drugs were oral Tramadol (12.9%), Amoxycillin-Clavulanate (8.1%), Cefuroxime (2.7%), Omeprazole (1.6%), and Pantoprazole (1.5%). List B analgesics (RM0.23±0.15) has significantly lower cost ($p=0.0001$) compared to List A (RM1.57± 4.22) or co-prescribing of List A&B analgesics (RM1.81±4.25). List A gastroprotective drugs (RM1.81±0.77) has significantly lower cost ($p=0.0001$) than List B (RM4.08±1.89) or co-prescribing of List A& B gastroprotective drugs (RM6.38±0.89). Co-prescribing of List A&B antibiotics (RM48.36±17.28) was significantly more costly ($p=0.003$) than either List A (RM42.31±12.54) or List B antibiotics alone (RM14.03±17.28). Thirty-eight drugs were prescribed outside of the ETD pharmacy list and 3.9% of the antibiotics prescribed were not in accordance to national antibiotic guideline 2014.
CONCLUSION: Our study found prescribing deviation in ETD, Sibu Hospital according to WHO prescribing indicators. A revision on the prescribing policy in ETD is recommended to ensure that our practice is cost-effective and in accordance with WHO standard.

KEYWORDS: quality use of medicine, Sarawak, prescribing pattern, emergency and trauma department
NMRR ID: NMRR-16-2184-33152

OP-32 (Oral)

KNOWLEDGE, ATTITUDE, AND PRACTICES (KAP) CONCERNING PRESCRIPTION DRUG ABUSE AMONG PATIENTS IN HOSPITAL PULAU PINANG

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INTRODUCTION: Prescription Drug Abuse refers to use of medication without a prescription in a way other than prescribed or for the experience or feelings elicited. Prescription drug abuse has profound health, economic, and social consequences.
OBJECTIVES: The objective of this study is to assess the knowledge, attitude and practice (KAP) concerning prescription drug abuse among patients in Hospital Pulau Pinang.
METHOD: This is a cross-sectional survey carried out in Ambulatory Care Centre (ACC) Pharmacy of Hospital Pulau Pinang in March 2015. Patients aged more than 18 years old, able to read Bahasa Malaysia or English, who received more than one month supply of medications and were willing to give consent were interviewed using a face-validated questionnaire. Knowledge, attitude and practice were assessed using a scoring system. Positive attitude was defined as acceptance of prescription drug abuse while negative attitude was defined as non-acceptance. Patients who achieved 100 % score for the practice were considered "safe" while others were categorized as "risky".
RESULTS: A total of 137 patients completed the interview. The percentage of respondents with good level of knowledge about prescription drugs was 47%, the percentage of respondents with positive attitude regarding prescription drug abuse was 28%, and the percentage of respondents with a safe practice of using prescription drugs was 47%. The most commonly abused class of prescription drugs were painkillers (40%), followed by tranquillizers (14%), and then lastly, stimulants (7%). Analysis on marital status ($p<0.001$) and education ($p=0.019$) showed significantly better knowledge of prescription drug abuse. Education level ($p<0.001$) was significantly associated with negative attitudes towards prescription drug abuse.
CONCLUSION: Level of education plays a vital role to enhance knowledge and negative attitudes towards prescription drug abuse. Therefore, in the effort to reduce prescription drug abuse, strategies involving the young should be implemented.

KEYWORDS: quality use of medicine, Penang**,** prescription drug abuse, knowledge, attitude and practice
NMRR ID: NMRR-15-2500-28388

OP-33 (Oral)

IMPACT OF INSULIN INJECTION TECHNIQUE RE-EDUCATION ON PERCEPTION OF INSULIN THERAPY AMONG URBAN-DWELLING TYPE 2 DIABETES MELLITUS PATIENTS IN HEALTH CLINICS IN KUALA LUMPUR

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INTRODUCTION: Glycaemic control of diabetic patients can be influenced by many factors such as insulin technique, compliance, patient perception, diet and lifestyle factors. Patient perception towards insulin therapy may affect their compliance and subsequently glycaemic control.
OBJECTIVES: To investigate the impact of insulin injection technique re-education on the perception of insulin therapy of patients with T2DM.
METHOD: This was an unblinded randomized control trial, that recruited patients up to 4 months follow-up. From 160 patients recruited, 80 patients were randomized to the control group and received standard care comprising of insulin injection technique counselling upon the first visit. 80 patients in the intervention arm received monthly insulin injection technique counselling for 4 visits. Patient's insulin perception was measured uring the validated Insulin Treatment Appraisal Scale (ITAS) on first and 4th visit. Higher ITAS scores indicate a higher negative perception on insulin.
RESULTS: There were no significant differences between the ITAS score of the control group pre and post intervention (50.88 [10.75] vs 51.29 [10.54]; $p = 0.409$). However, the ITAS score of the intervention group post intervention were significantly lower than pre intervention, (51.98 [8.21] vs 49.84 [8.28]; $P = 0.007$), suggesting a more positive perception towards insulin therapy. The mean ITAS score difference in the intervention group (-2.10 [6.50]) showed a reduction , compared to the mean ITAS score difference in the control group (0.42 [4.26]), suggesting patients who received monthly insulin injection technique counselling had a more positive perception towards insulin therapy after 4 visits. Significant correlation between the changes in ITAS scores and HbA1c values pre and post-intervention in the intervention group was also observed (Spearman's rho = 0.242; $p = 0.049$).
CONCLUSION: Insulin injection technique re-education can modify patients' existing insulin perception to be more positive.

KEYWORDS: impact of pharmacy services, Kuala Lumpur**,**insulin injection technique, Insulin Treatment Appraisal Scale (ITAS), perception
NMRR ID: NMRR-16-1591-28767

OP-34 (Oral)
NSAIDS AVOIDANCE EDUCATION FOR HEART FAILURE PATIENTS IN REGIONAL REFERRAL HOSPITAL

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INTRODUCTION: Non-steroidal anti-inflammatory drugs (NSAIDs) uses in heart failure patients are associated with a range of potential adverse effects, including an increased risk of cardiovascular effects.
OBJECTIVES: To evaluate effectiveness of an in-patient education program in increasing the awareness of safety issues associated with the use of NSAIDs among hospitalized heart failure patients.
METHOD: The quasi experimental study was carried out using self-developed and self- administered questionnaires to evaluate patient knowledge on NSAIDs before and after counselling by pharmacist. Patient knowledge questionnaire (PKQ) contain 5 questions were completed by patients before intervention. Each correct answers will be given 1 marks. The interventions consist of self-developed educational leaflets together with 10 minutes standard verbal counselling by pharmacist. Then, post-counselling PKQ was completed by patients. Having 3 marks and above was equated with adequate knowledge on safety uses of NSAIDs. Data was analyzed using Wilcoxon signed ranked test.
RESULTS: A total of 31 participants (61% female) completed both pre-and post-intervention questionnaires; median age was 68 (IQR=22). 13% reported long term uses of NSAIDs and only 1% reported use of NSAIDs a week before admission. Median post-test scores 3 (IQR=2) was statistically significantly higher than median pre-test scores 1 (IQR=2). 87% found the education program were useful to avoid future NSAIDs uses.
CONCLUSION: Our findings suggest patients with underlying heart failure had inadequate knowledge on safety issues with NSAIDs uses. Pharmacist's counselling together with educational leaflet improved patients awareness on NSAIDs uses.

KEYWORDS: impact of pharmacy services, Perak, NSAIDs, education, heart failures
NMRR ID: NMRR-14-1895-21338

OP-35 (Oral)
SCHEDULED SUBSTANCES AS A CAUSE LEADING TO DANGEROUS DRUG ABUSE

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INTRODUCTION: Products containing scheduled substances such as psychotropic pills, cough medicines and Mitragyna Speciosa (ketum) had been frequently abused, mainly due to their addictive potential. The widespread abuse of products containing scheduled substances often perceived as less threatening compared to the pandemic issue of illicit dangerous drugs use.
OBJECTIVES: This study aims to qualitatively investigate the issues surrounding the abuse of products containing scheduled substances and the relationship between the abuse of these products and the illicit use of dangerous drugs among the clients in Cure & Care Clinic Karangan, Kedah.
METHOD: Direct interview sessions were simultaneously held by four interviewers, involving a total of thirty clients at the Cure & Care Clinic Karangan, Kedah. Convenience sampling method was used. Interviewers were given a set of questions as reference points. Interviews were done until the data saturation point was achieved. Interviews were audio-recorded, transcribed verbatim, and the data was analysed into themes.
RESULTS: The thematic analysis grouped the data into five themes, namely the factors triggering scheduled substance abuse, accessibility and affordability of the abuse scheduled substances, the types of scheduled substances abused and illicit use of dangerous drugs, dependence or habit-forming effects, and the ramification of substance addiction. Two main products containing scheduled substances; cough preparations and ketum had been identified as the popular choice for abuse among the clients. The thematic analysis of the data showed that the abuse of these products were driven by several socioeconomic factors and catalysed by the ubiquity of these products.
CONCLUSION: The abuse of scheduled substances plays a role in prompting the subsequent illicit use of dangerous drugs among the clients in Cure & Care Clinic in Karangan, Kedah, mainly due to the ease of access to the scheduled substances such as ketum and cough preparations in the market.

KEYWORDS: impact of pharmacy services, Penang, schedules substances abuse, ketum (Mitragyna Speciosa), cough medicine, illicit use of dangerous drugs
NMRR ID: NMRR-16-1088-31354

OP-36 (Oral)

EFFECTIVENESS OF PHARMACIST-LED EDUCATIONAL INTERVENTIONS ON SELF-CARE ACTIVITIES AND GLYCEMIC CONTROL OF TYPE 2 DIABETES PATIENTS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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INTRODUCTION: Effectiveness of pharmacist-led educational interventions on self-care activities and glycaemic control of type 2 diabetes patients is vague.
OBJECTIVES: The purpose of this review is to appraise the effect of pharmacist-led diabetes educational interventions in type 2 diabetes patients.
METHOD: According to PRISMA guidelines five electronic databases were searched from date of database inception to September 2017. Randomized clinical trials examining the effectiveness of pharmacist led-interventions, directed at type 2 diabetes patients only, were included for in this study. The study protocol is available with PROSPERO (CRD42017078854).
RESULTS: Eleven studies, involving 1544 type 2 diabetes patients, were included in this systematic review. Meat-analysis demonstrated that pharmacist-led interventions had a significant effect on lowering of glycosylated hemoglobin (-0.66; 95%CI [-0.83, -0.50]; I^2=58.3%), in comparison to usual care. Self-care activities were assessed by using Summary of Diabetes Self-care Activities (SDSCA) tool in eight studies. Overall meta-analysis of self-care activities of these studies (n=8) demonstrated a significant effect of pharmacist-led interventions on self-monitoring of blood glucose (1.62; 95% CI [0.92-2.32]; I^2=70.5%), foot care (1.20; 95% CI [0.49, 1.90]; I^2=95.0%) and overall diet (1.16; 95% CI, [0.38-1.93]; I^2=64.2%), except for specific diet (0.05; 95%CI [-0.58,0.69]; I^2 = 79.2%).
CONCLUSION: The findings of this review demonstrate that the involvement of pharmacist in diabetes educational programs, results in significant improvements in self-care practices and glycaemic control of type 2 diabetes patients.

KEYWORDS: impact of pharmacy services, Selangor**,** self-care, HbA1c, pharmaceutical care, glycaemic control
Research ID: 12794

OP-37 (Oral)

T2DM PATIENTS' ADHERENCE TO REFILLS AND MEDICATION: A COMPARISON BETWEEN TELEPHONE AND COLLECT SERVICE AND CONVENTIONAL COUNTER SERVICE IN A HEALTH CLINIC

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INTRODUCTION: Pharmacy Value Added Services (PVAS) has been implemented in Malaysian public healthcare to improve patients' accessibility to follow-up medication supplies, hence improve adherence. Studies have shown that PVAS increase patient satisfaction and reduce waiting time in pharmacy outpatient but no study investigated the adherence status of patients using PVAS, which is an important indicator to measure the effectiveness of this service in terms of patient outcome.
OBJECTIVES: To compare refill and medication adherence score and HbA_{1c} level in type-2 diabetes mellitus (T2DM) patients collecting refill medication through conventional counter service (CCS) and Telephone and Collect (T&C) Service using Adherence to Refills and Medication Scale (ARMS).
METHOD: A comparative cross-sectional, single centered, self-administered based survey was conducted at of one clinic under Klang District. Patients attending the outpatient pharmacy, dispensed with at least one type of T2DM medication for at least 6 months were conveniently selected. The instrument, adopted from a previous study, contained 28 items to assess demographic characteristics, medication refill supply and collection and ARMS. Lower ARMS score indicates better adherence. Data was also collected through patients record for HbA_{1c} and was analyzed using SPSS software version 24.
RESULTS: T&C group shown better ARMS score mean (14.47±2.37) compared to CCS group (16.67±4.44) (p<0.001). Patients in T&C group had significantly lower HbA_{1c} readings with a mean of 7.52±1.47 compared to patients in CCS group (8.73±2.09) (p<0.001).
CONCLUSION: Patients from T&C group demonstrated significantly better adherence to medication and refills score and better glycaemic control showing that PVAS could be an effective option. Further work is needed to assess other chronic diseases and various types of healthcare settings in Malaysia.

KEYWORDS: impact of pharmacy services, Selangor, adherence, refill prescription, Pharmacy Value Added Services (PVAS)
NMRR ID: NMRR-17-2113-37731

OP-38 (Oral)

THE MOST EFFECTIVE REMINDER METHOD TO REDUCE DEFAULTER RATE IN DRIVE-THROUGH PHARMACY SERVICE IN HOSPITAL MELAKA

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INTRODUCTION: Drive-Through Pharmacy (DTP) Service provides a convenient way of collecting medicine at the pharmacy as this service solves common problems encountered by patients at Hospital Melaka.
OBJECTIVES: The objectives are to determine the most effective reminder method to reduce the defaulter rate; to compare the number of defaulters and to evaluate the cost between the three methods of reminder in DTP service.
METHOD: The study was a one month randomized controlled study starting from early of August 2017 until early of September 2017. Late comers were randomly assigned into three groups; pre SMS reminder (group A), pre and post SMS reminder (group B) and pre SMS plus telephone reminder (group C). Defaulter rate in each group was calculated. Chi square test was used to compare the difference in the number of defaulters among three groups. SPSS version 20 was used for data analysis. The costs of reminders were calculated based on researcher salary and telecommunication (SMS and telephone). A simple linear regression test was run to compare correlation between the ratio of total cost per attendance and the success rate among the three groups.
RESULTS: Group C has the least defaulter numbers (n=3; 2.9%) as compared to that of in group A (n= 18; 17.8%) and group B (n=12; 11.7%) where P value < 0.005. A simple linear regression test found that the ratio of total cost per attendance was strongly correlated (r=0.857) with the rate of latecomers collecting medicines via DTP service among the three groups, but the result is insignificant (p-value = 0.345).
CONCLUSION: SMS plus telephone reminders appear to be the most effective reminder tools to keep patients adhere to DTP service . However, cost per attendance does not reduce the defaulter rate.

KEYWORDS: impact of pharmacy services**,** Malacca, drive-through, defaulter, late comer, reminder
NMRR ID: NMRR-17-1366-35782

OP-39 (Oral)

A SURVEY ON TYPE 2 DIABETES PATIENTS KNOWLEDGE AND PRACTICES ON INSULIN INJECTION TECHNIQUES IN PRIMARY HEALTH CARE

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INTRODUCTION: Patient's knowledge and practices on insulin injection technique (IT) played important role in the diabetes management and thus affecting their glycaemic control.
OBJECTIVES: Our study aimed to survey the knowledge and practices on insulin IT among self-injecting type 2 diabetics in the primary health care.
METHOD: This is a cross sectional study where 160 type 2 diabetics who self-injected insulin for at least one year and had poor IT with $HbA1_c$ above 8% were recruited from 15 health clinics. Consented patients were required to answer a pharmacist-assisted validated questionnaire, adapted from Insulin Technique Questionnaire (ITQ) by Anders, et al. to determine their knowledge and practices on insulin injection.
RESULTS: 27.5% of the patients reported that there is bleeding or bruising on the site of injection while 21.3% reported fluid leakages from the injection sites. 42.5% of the patients incorrectly tipped or mixed the insulin (<10 times) and another 8% has never tipped or mixed the insulin before injection. 54% of the patients were not compliant to insulin injection regime and the main reasons were forgotten to inject (57.5%), did not bring insulin along when they were travelling (19%) and skipping meals (8%). 38% of the patients did not keep track of the expiry dates of the insulin and 4% claimed to have used expired insulin. Majority of the patients (62.5%) disposed used needles into the garbage bin with the caps on, whereas 6.3% of the patients disposed the needles without recapping. 21% of the patients admitted that they needed some assistance due to episodes of hypoglycemia and 15% had previous hospital visits due to hypoglycemia.
CONCLUSION: Majority of the patients were found to have poor IT. There is a need for re-education sessions on IT to achieve good practices and a good glycaemic control.

KEYWORDS: impact of pharmacy services**,** Kuala Lumpur, knowledge and practices on insulin injection technique, Insulin Technique Questionnaire (ITQ)
NMRR ID: NMRR-16-1591-28767

OP-40 (Oral)
PERCEPTION OF HEALTHCARE PROFESSIONAL ON DRUG SHORTAGE IMPACT IN A MALAYSIAN DISTRICT HOSPITAL

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INTRODUCTION: Drug shortage is a problem that entangles health system. Not only is the patient care compromised, but healthcare team is also perplexed under the stress of insufficient supplies.
OBJECTIVES: This study aimed to understand the healthcare professionals' perspectives towards the drug shortages problem and its impact to the healthcare system.
METHOD: A validated questionnaire was distributed to 150 prescribers and pharmacists in Hospital Enche' Besar Hajjah Khalsom, Kluang from September to October 2017.
RESULTS: 130 respondents were stratified sampled forming a response rate 86.67%. Majority of the respondents (64.6%) were female with mean age of 29.64 years (SD+3.932). More than half of them perceived to encounter less than 10 prescriptions with drug shortage issues and spent less than 15 minutes to deal with it. From this survey, 41.5% perceived that they rarely received an advance notice of drug shortage and 51.5% of them perceived that they rarely received an advance notification of shortage duration. About half of the respondents (45.4%) reported that more waiting time and hospital visits required by patients. Majority of the respondents indicated an increase in their work load (n= 62, 47.7%) because of the shortages. Providing in service education for medical staffs on alternatives to counteract short supply was the most favorable strategy among respondents. In contrary, allocating budgets to encounter drug shortages was the less favorable strategy.
CONCLUSION: Drug shortages in Hospital Enche' Besar Hajjah Khalsom cause heavy workloads and it is time consuming. The healthcare professionals need to work together to formulate strategies to ensure the availability and continuity of drug supplies.

KEYWORDS: impact of pharmacy services, Johor, impact of drug shortage, survey
NMRR ID: NMRR-17-1208-35533

OP-41 (Oral)
A QUALITATIVE STUDY ON HEALTHCARE PROFESSIONALS PERSPECTIVES ON PHARMACISTS' ROLE IN MANAGING ANTIPSYCHOTIC MEDICATIONS IN HOSPITAL KAJANG

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INTRODUCTION: Mental illness requires acute and long term treatment management, thus adherence to medication is an important aspect.
OBJECTIVES: This qualitative study explored the perspective of the healthcare professionals towards pharmacist's role in improving patient's adherence in Hospital Kajang
METHOD: Thirteen one to one, semi structured interview sessions were conducted with doctors and nurses to explore their experience working with pharmacists and suggestions to improvise pharmacists' role to enhance medication adherence. Interviews were audio recorded, transcribed verbatim and thematically analysed using constant comparison approach.
RESULTS: The findings showed that healthcare professionals recognized pharmacists' role in managing antipsychotic medications. The services that were highlighted include Therapeutic Drug Monitoring (TDM), controlling the quota for list A medications, answering their enquiries such as drug-drug interactions and so on. Nevertheless, pharmacists' involvement in clozapine clinic, Community Psychiatric Unit (CPU) and Home Medication Review (HMR) may help patients in managing their antipsychotic medicines. Pharmacists may help to clarify patients' and caregivers' doubts and concerns by giving appropriate education. Collaboration of pharmacist with other healthcare professionals is an essential component to maximize adherence by developing care plans and follow up, reduce inappropriate use of psychotropic medicines, polypharmacy and involvement in patient centered care.
CONCLUSION: The lack of collaboration and shared understanding between healthcare professionals will be an important factor that could impact the continuity of care. All respondents agreed that mutual collaboration may foster greater patient satisfaction, reduce risks of non adherence and improve patient's health outcomes. In conclusion, pharmacists should be integrated within the healthcare team and need to be well trained to improve antipsychotic medication adherence in Hospital Kajang

KEYWORDS: impact of pharmacy services, Selangor, antipsychotic medications, pharmacist's role, healthcare professionals' perspectives
NMRR ID: NMRR-16-1776-32364

OP-42 (Oral)
ASSESSMENT OF COST AND ADHERENCE OF INSULIN PENFILL EXCHANGE PROGRAM: A PILOT STUDY

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INTRODUCTION: The expansion of public health services in recent years and the rising number of patients visiting government health facilities has caused an increase in health expenditure for the government. With the increase in economic burden, unused medicines are regarded as a problem and strategies should be devised to minimize drug wastage. In Hospital Shah Alam, 68.7% of the endocrine drugs returned to the pharmacy were insulin penfills. To curb this issue, he Insulin Penfill Exchange Program was initiated.
OBJECTIVES: To compare the cost of insulin pen fills supplied to patients who are randomized to the Insulin Penfill Exchange Group (IP) group or the usual dispensing group (UD). Additionally, patient adherence to insulin was also measured.
METHOD: 24 patients were randomly selected and divided equally into 2 arms, IP and UD. Patients, in the IP arm, were required to return the empty insulin penfills for further supply. They were otherwise supplied only one penfill during each visit. Patients in the UD arm were supplied with insulin penfills according to the standard dispensing policy. Cost analysis, where cost for individual subjects was based upon average daily drug administered during study period, was calculated. Medication adherence of patients was measured using the Proportion of Days Covered (PDC) formulae.
RESULTS: The average daily cost of treatment was RM 0.89 (0.35) for the IP arm and UD RM 1.59(1.07) for the UD arm. Cost analysis demonstrated significant cost savings (p=0.05) in the IP arm. Mean PDC value for the IP arm was at 0.33(0.49) while the UD arm had a value of 0.58(0.52). There was no significant difference in adherence between patients in both arms (p= 0.24)
CONCLUSION: This program is cost-saving and patient adherence in the intervention group was not affected by this programme.

KEYWORDS: impact of pharmacy services, Selangor, cost**,** adherence, insulin, minimize wastage
NMRR ID: NMRR-17-2758-37232 S3R1

OP-43 (Oral)
EXPLORING THE HEALTHCARE PROFESSIONALS' EXPERIENCE OF INTERDISCIPLINARY COLLABORATION IN MEDICAL DEPARTMENT, HOSPITAL TUANKU FAUZIAH (HTF): A QUALITATIVE STUDY

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INTRODUCTION: To cater for the complex healthcare demands in Malaysian public hospitals, different healthcare professionals (HCPs) especially doctors, nurses and pharmacists need to have good interdisciplinary collaboration. To date, there is a lack of studies regarding this collaboration in Malaysia.
OBJECTIVES: This study aimed to explore the experience of interprofessional collaboration among doctors, nurses and pharmacists at Medical Department, HTF, specifically on role clarity, adequacy, barriers and factors to facilitate effective collaboration and awareness of pharmacist-led medication therapy adherence clinic (MTAC) services.
METHOD: Four focus group discussions (FGDs) were conducted in May 2017 to explore participants' knowledge and experiences. Each FGDs is consisting of a medical specialist, a medical officer, a senior clinical pharmacist, a junior clinical pharmacist, a matron/sister and a staff nurse. Participants were recruited using purposive sampling (nomination by heads of department). FGDs were carried out in English but responses in Malay language were accepted and then translated into English. All FGDs were audio-recorded, transcribed and subjected to inductive thematic analysis.
RESULTS: In the theme of role clarity, most participants agreed that the doctors are the team leader in patient management, while the nurses are responsible to monitor, ambulate, and educate patients and drug administration. However, some participants did not know the roles of pharmacists in details. Most participants claimed effective collaboration did exist but was inadequate. Barriers to effective collaboration were lack of time, staff, communication and communication skills. Interprofessional collaboration might be facilitated with regular discussions between different departments. All participants were aware of the MTAC provided by the pharmacists but did not know much about it.
CONCLUSION: The roles and services provided by pharmacists should be actively promoted among other HCPs to prevent overlapping of tasks and human resource wastage.

KEYWORDS: impact of pharmacy services, Perlis, qualitative research; focus groups; intersectoral collaboration
NMRR ID: NMRR-17-628-34168

OP-44 (Oral)
THE EFFECT OF EDUCATION COUNSELING ON KNOWLEDGE OF HORMONAL THERAPY (HT)

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INTRODUCTION: Hormonal pills usually taken by women to relieve menopausal symptoms, contraception plan or treatment of gynaecological condition. However, non-compliance and self discontinuation of hormonal pills can result minimal effect of the drugs or unwanted pregnancy if hormonal pills are used as contraception. The reasons of poor compliance are because patients suffered from side effects and fear of side effects.
OBJECTIVES: The objective of this study was to assess the effect of education counselling on knowledge of hormonal therapy among patients in Hospital Melaka
METHOD: A cross-sectional study was conducted during 6 months period among patients who seek for their treatment at Medical Specialist Clinic, Hospital Melaka. The study involved 42 participants where 36 of them completed pre and post questionnaire. The data was collected using questionnaire and were analyzed using Wilcoxon Signed Ranked Test through IBM SPSS statistic software. P value < 0.05 considered statistically significance. Ethical approval of the study was sought from CRC and the informed consent was ensured prior participation to the study
RESULTS: There is a significant different between the knowledge score pre and post counselling session (p=0.00). Participants who experienced side effects (n=13) (7.00, IqR 1.00) have significantly higher knowledge score pre counselling session than those who did not experience side effects (6.00, IqR 2.00) after taking hormone pills
CONCLUSION: Overall, the patients' knowledge were improved after the counselling session. The results obtained will be beneficial in formulating an appropriate HT counselling.

KEYWORDS: impact of pharmacy services, Melaka**,** knowledge, compliance, counselling, Hormonal Therapy (HT)
NMRR ID: NMRR-16-1918-32025

OP-45 (Oral)
PERCEPTION AND EXPERIENCE OF EARLY-STAGE BREAST CANCER PATIENTS REGARDING CHEMOTHERAPY: A QUALITATIVE STUDY

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INTRODUCTION: Breast cancer is the most common form of cancer affecting women in Malaysia and chemotherapy is one of the treatment options. Side effects of chemotherapy have been well-characterized. Therefore, effective management of chemotherapy-induced adverse effects is essential to improve quality of life of patients. This may have an impact in their willingness to complete the treatment in the long run.
OBJECTIVES: To explore the perception and experience of early-stage breast cancer patients regarding chemotherapy
METHOD: Individual in-depth interviews were conducted in an isolated room through purposive sampling method. The study was conducted from October 2015 to January 2016. Participants were interviewed before and after the first cycle of chemotherapy. Semi-structured interviews were audio recorded with consent from the participants. Each interviews was transcribed verbatim independently by 2 different authors. Transcripts were compared repeatedly to identify and list out important and recurrent themes. Interviewing stopped when data saturation occurred.
RESULTS: Seven Malay women and one Indian woman aged between 41 to 68 years were interviewed. Two themes emerged from pre-chemotherapy interviews that describe the women's perception: Factors affecting decision making and acceptance of chemotherapy. Another two themes emerged after their first cycle of chemotherapy: Changes they experienced and continuation of treatment. Their friend's experiences played the biggest role in influencing patients' decision making. Majority of the women were anxious and worried about the chemotherapy-related side effects. However, their decision to continue the treatment were not affected by the side effects.
CONCLUSION: This study provides some important information on chemotherapy counselling to assist patient's decision making on the choice of treatment. Cancer survivor's experiences should be highlighted. To ensure all patients receive consistent and continuous chemotherapy information, each healthcare facility is recommended to develop a chemotherapy counselling checklist.

KEYWORDS: clinical research, Perlis, Perak and Penang, perception, experience, breast cancer, qualitative
NMRR ID: NMRR-15-2130-27222

OP-46 (Oral)

EFFICACY, ACCEPTANCE AND TOLERABILITY OF SPLIT-DOSE VERSUS SAME-DAY AQUEOUS SODIUM PHOSPHATE REGIMES FOR COLONOSCOPY BOWEL CLEANSING IN PORT DICKSON HOSPITAL

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INTRODUCTION: An ideal bowel preparation regime should be effective, tolerable, convenient, and safe.
OBJECTIVES: This study aimed to compare the efficacy, acceptance and tolerability of split-dose versus same-day aqueous sodium phosphate (NaP) regimes for outpatients scheduled for colonoscopy.
METHOD: This was a prospective cohort study conducted in the Surgical Outpatient Department of Port Dickson Hospital, Negeri Sembilan, Malaysia, from April 2017 to January 2018. Patients aged between 18 to 65 years old prescribed with one of the NaP regimes were recruited as study subjects and counselled by pharmacists according to the pre-specified counselling checklists. Validated questionnaires were used to assess the efficacy, acceptance and tolerability of the aforementioned colonoscopy bowel cleansing regimes on the day of colonoscopy.
RESULTS: There were 31 (54.4%) and 26 (45.6%) study subjects in the split-dose and same-day NaP groups, respectively. The consumption rates were not significantly different between these two groups (P=1.000). Split-dose NaP was significantly more efficacious than same-day NaP, with a rate of "good" or "excellent" on Boston Bowel Preparation Scale in 100% of study subjects in the split-dose NaP group versus 74.2% in the same-day NaP group (P=0.006). However, there were no significant difference in the acceptance and tolerability aspects between these two groups (P=1.000 and P=0.582, respectively). Patients' willingness to take the same preparation in the future was 80.8% in the split-dose NaP group compared to 83.9% in the same-day NaP group (P=1.000). The incidence of adverse events was comparable between these two groups. Notably, 53.8% of the study subjects in the split-dose NaP group reported presence of incontinence prior to colonoscopy procedure compared to 16.1% in the same-day NaP group (P=0.004).
CONCLUSION: Split-dose NaP was more efficacious compared to same-day NaP, even though acceptance, tolerability and other aspects between two groups were comparable.

KEYWORDS: clinical research, bowel cleansing, Negeri Sembilan, Aqueous Sodium Phosphate, efficacy, acceptance, tolerability
NMRR ID: NMRR-17- 490-34840

OP-47 (Oral)

THERAPEUTIC DRUG MONITORING OF INTRAPERITONEAL GENTAMICIN IN PERITONEAL DIALYSIS PATIENTS WITH PERITONITIS: A SINGLE CENTER STUDY IN MALAYSIA

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INTRODUCTION: There is limited evidence regarding the role of monitoring serum gentamicin concentrations to mitigate toxicity risk among Malaysian peritoneal dialysis (PD) patients receiving this antibiotic via intraperitoneal (IP) route for PD-related peritonitis.
OBJECTIVES: To investigate the role of Therapeutic Drug Monitoring (TDM) for IP gentamicin with dosage as per International Society of Peritoneal Dialysis (ISPD) guideline, and to determine the predictors of toxic serum gentamicin levels.
METHOD: This prospective cohort study recruited 128 patients diagnosed with PD-related peritonitis at Selayang Hospital between 1st February 2016 and 30th June 2017, who received ISPD-recommended dosage of IP gentamicin. TDM was performed every other day throughout the duration of gentamicin therapy (two weeks). Demographic data and TDM levels were retrieved from Hospital Laboratory Management System. The predictors for toxic gentamicin levels were examined using univariate and multivariate logistic regression via R version 3.3.2.
RESULTS: TDM of IP gentamicin reflected an upward trend of toxic serum gentamicin levels of >2mg/L throughout the treatment regime, from 16 out of 103 samples (15.5%) at Day 4 to 26 subjects out of 78 samples (33.3%) at final day of gentamicin therapy (p=0.052). The significant predictors of toxic serum gentamicin levels were body weight of 65kg and below (OR:3.02, 95% CI:1.13, 8.07), and absence of residual renal function (OR:4.78, 95% CI:1.66, 13.68). However, absence of residual renal function was the only predictor of toxic serum gentamicin levels after adjustment for other factors through multivariate logistic regression (adjusted OR:3.70, 95% CI:1.21, 11.32).
CONCLUSION: ISPD-recommended dosage of IP gentamicin resulted in systemic accumulation of this antibiotic among Malaysian PD patients. Serum gentamicin TDM is essential to mitigate risk of toxicity, especially among PD-related peritonitis patients without residual renal function. Further studies are needed to ascertain the impact of toxic serum gentamicin levels on residual renal function among patients with PD-related peritonitis.

KEYWORDS: clinical research, Selangor,therapeutic drug monitoring, gentamicin, peritonitis, peritoneal dialysis
NMRR ID: NMRR-15-2189-28501

OP-48 (Oral)

ANTIBIOTIC DE-ESCALATION: THE PREVALENCE, CLINICAL IMPACT AND FACTORS ASSOCIATED WITH THE PRACTICE IN GENERAL CRITICAL WARD HOSPITAL SULTANAH BAHIYAH, KEDAH

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INTRODUCTION: Uncontrolled used of broad spectrum antibiotic will result in resistant organism. One of the control measures is by practising antibiotic de-escalation.
OBJECTIVES: This observational study was aimed to assess the prevalence of de-escalation, to compare the clinical success rate within de-escalation and no de-escalation and to identify factors associated with de-escalation.
METHOD: All adult patient started with empiric antibiotic therapy in ICU/HDW within January to June 2015 were included. Antibiotic was counted as de-escalated if it had been streamlined or switched to a narrower spectrum that is driven by microbiological result, discontinued empiric therapy if testing unable to demonstrate evidence of infection or discontinued dual antimicrobial therapy if there is overlapping in the spectrum activity. Independent variables associated with de-escalation and the clinical success rate were assessed by using Chi-squared Test or Fisher's Exact Test for categorical data, and Mann Whitney Test for continuous data, where appropriate.
RESULTS: A total of 195 patients were studied. Antibiotic de-escalation was performed in 114 patients (58.5%). Most of the de-escalation case was carried out by streamlining antibiotics based on the culture and sensitivity (n=61, 53.5%). De-escalation was observed to lower all-cause mortality (34.2% versus 55.6%, p=0.003) without affecting ICU and hospital stay. Underlying CVD (p=0.017) and the use of meropenem (p=0.019) were the only independent variables linked with de-escalation. There were no association in term of severity of illness, reason for ICU/HDW admission, history of hospitalization, antibiotic stewardship program, appropriate empiric therapy, culture and sensitivity result and site of infection.
CONCLUSION: This study suggest de-escalation strategy is safe as part of managing empiric antibiotic and practicable in most cases without compromising clinical outcome even in critically ill patient.

KEYWORDS: clinical research, Kedah, antibiotic, de-escalation, , critically ill
NMRR ID: NMRR-15-1960-27714 (IIR)

OP-49 (Oral)

PATIENTS' PERCEPTIONS ON NECESSITY AND CONCERN OF ANTIDIABETIC MEDICATIONS IN AMPANGAN HEALTH CLINIC

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INTRODUCTION: According to NHMS 2015 the prevalence of diabetes mellitus in Malaysia was 17.5%. Studies showed that 53% of diabetics in Malaysia were not compliant to their medications and 73% of the diabetic-related healthcare costs were due to poor glucose control. Therefore, immediate actions should be taken to improve patients' adherence towards medication and patients' belief about medicines were shown to influence their adherence.
OBJECTIVES: This study was conducted to determine patients' belief about diabetic medications and to relate patients' belief with the control of the disease.
METHOD: This cross-sectional study was conducted in Ampangan Health Clinic from January till May 2017. Convenient sampling was conducted whereby validated, self-administered questionnaires were distributed to eligible patients.
RESULTS: A total of 84 subjects (response rate 76.3%) participated in this study. Majority of the respondents were Malay (97.6%), female (63.1%) and married (88.1%). The mean age and mean HbA1C of subjects were 52.3 ± 5.4 years and 9.0 ± 2.51 mmol/L respectively. Mean specific-necessity score and mean specific-concern score were 2.82 ± 0.64 and 2.71± 0.54 respectively. There was fair negative correlation between subjects' specific-necessity score and number of medications (r=-0.356, p= 0.001) as well as their HbA1c (r=-0.278, p=0.01). Subjects' specific-concern of medications was shown to correlate with the duration of the disease (r=0.262, p=0.016). In multivariable analysis, subjects' specific-necessity score were found to be associated with HbA1C (adjusted OR -0.278, 95% CI: -0.33 - -0.04).
CONCLUSION: Patients with higher specific-necessity score showed better diabetes control while patients with longer duration of DM were more concern of diabetes medication adverse effects.

KEYWORDS: clinical research, Negeri Sembilan, anti-diabetic medications, perceptions, belief
NMRR ID: NMRR-16-2627-32366

OP-50 (Oral)
FIRST-LINE PAZOPANIB IN METASTATIC RENAL CELL CARCINOMA: A "REAL-WORLD" EXPERIENCE AT NATIONAL CANCER INSTITUTE

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INTRODUCTION: In recent years, inexorable march towards the widespread use of targeted treatments especially of the subclass of tyrosine kinase inhibitors (TKI) in the treatment of metastatic RCC was observed. However, strict eligibility criteria of previous studies provide limited data on performance status, organ function and Asian counterparts. Decision on the use of TKI in daily practice becomes a clinical challenge when patients' outcomes are poorly characterized notably in terms of safety and efficacy
OBJECTIVES: To evaluate treatment and safety outcomes of pazopanib in unselected mRCC populationsin Malaysia.
METHOD: This is a mono-institutional, observational, prospective study, which was carried out in a cancer hospital. Patients with mRCC, treated with pazopanib, in first-line, from June 2015 to June 2017 were recruited and followed up for 2-years or till death. Progression-free survival (PFS) and overall survival (OS) were evaluated using Kaplan-Meier survival analysis.
RESULTS: 27 patients were treated with pazopanib including those with nonclear cell histology (11%). Based on Memorial Sloan Kettering Cancer Center (MSKCC) criteria, 11 patients (41%) were categorized as poor risk group and the rest were intermediate risk. All patients experienced at least one adverse event. The most common were cutaneous toxicity (92%) followed by proteinuria (48%), hypertension (41%), diarrhoea (37%) and mucositis (33%). The median PFS and OS were 9.57 months and 15.5 months, respectively. In multivariate analysis, MSKCC risk score demonstrated strong predictive treatment outcome. The median PFS was 14.5 months in intermediate risk and 3.96 months in poor risk (HR: 0.2, $p<0.001$). However, the median *OS* data are *not* yet *mature* where 63% of intermediate risk group is still alive at 2-years follow-up.
CONCLUSION: Pazopanib appears to be effective in intermediate risk group mRCC patients. Consistent with other naturalistic observational studies, the treatment-associated adverse events were manageable and mild to moderate in severity.

KEYWORDS: clinical research, Putrajaya, pazopanib, metastatic renal cell carcinoma
NMRR ID: NMRR-15-831-25773

OP-51 (Oral)
DYSLIPIDEMIA AMONG HIV ADULT PATIENTS ON ANTIRETROVIRAL TREATMENT (ART) IN HOSPITAL TUANKU AMPUAN NAJIHAH (HTAN), KUALA PILAH

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INTRODUCTION: The occurrence of one or more lipid abnormalities is known as dyslipidaemia and it is one of the metabolic disorders known to be related to Human Immunodeficiency Virus (HIV) and subsequent usage of antiretroviral treatment (ART). Previous study has shown that dyslipidaemia is common among HIV patients on ART in Malaysia.
OBJECTIVES: To determine the prevalence of dyslipidemia and potential factors that can be associated with lipid levels among HIV adult patients on ART in HTAN.
METHOD: This retrospective study was conducted in Infection Disease (ID) Clinic of HTAN from May 2012 until December 2017. Convenience sampling was applied and 72 subjects were included. Data of demography and factors that can affect lipid profile were collected from medical records using a data collection form. Data were analyzed via SPSS with application of Chi-Square and Fisher's Exact tests to identify the potential associated factors.
RESULTS: 58.3% of the subjects had dyslipidemia. The percentage of subjects with abnormal high density lipoprotein (HDL), abnormal low density lipoprotein (LDL), abnormal total cholesterol (TC) and abnormal triglyceride (TG) were 38.9%, 23.6%, 22.2% and 33.3% respectively. HDL, LDL levels and diabetes mellitus status were significantly associated with TG level ($p<0.05$). Hypertension status and TG level had association with LDL level ($p<0.05$) while there were associations of TG levels and gender with HDL outcome ($p <0.05$). However, unlike most other studies, protease inhibitors (PI) exposure, viral load, and CD4 count were not significantly associated with all lipid levels in this population.
CONCLUSION: More than half of HIV patients on ART in HTAN had dyslipidemia. Identified associated factors included lipid levels, diabetes mellitus status, gender, and hypertension status. Identifying contributing risk factor of dyslipidemia would help in preventing cardiovascular disease development in HIV population.

KEYWORDS: clinical research, Negeri Sembilan, dyslipidemia, , HIV, antiretroviral**NMRR ID:** NMRR-17-2900-36289

OP-52 (Oral)
STUDY ON THE MEDICATION KNOWLEGDE OF PATIENTS FROM MTAC GERIATRICS

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INTRODUCTION: Good medication knowledge is important to ensure maximum benefits of medication are obtained.
OBJECTIVES: This study aim to assess the medication knowledge among geriatric MTAC patients.
METHOD: A prospective, cross sectional study was carried out among patients from Geriatric Medication Adherence Clinic (MTAC), Hospital Banting. The study was carried out for 2 months from April to May 2016. A total of 100 patients were enrolled in this study for interview by questionaire and consent was taken. The questionnaire consists of three sections: patients' demographic data, medication factors, and medication knowledge. All data was analyzed by using Statistical Package for Social Science (SPSS) version 22.0.
RESULTS: A total of 100 patients were included (male 51%, median age 67 years). The average medication knowledge score (mean ± SD) was 8.04 ± 3.24 out of 12 as a total score. Most of the patients had highest knowledge on dose of medication (2.79 ± 0.61) and lowest medication knowledge on the method of administration (1.11 ± 1.46) ($p<0.05$). Patients with university education level were reported to have the highest medication knowledge compared to other group of patients ($p<0.05$). Patients were more able to demonstrate their medication knowledge by showing the physical product of medication with the mean score of 91.15%.
CONCLUSION: The medication knowledge score among Geriatric MTAC is 8.04. They showed low knowledge on the method of administration of medication. An assessment on medication adherance among Geriatric MTAC was suggested for further study.

KEYWORDS: clinical research, Selangor, geriatrics, , medication therapy adherence clinic, medication
NMRR ID: NMRR-17-665-34552

OP-53 (Oral)
HEMODIALYSIS CATHETER-RELATED BLOOD STREAM INFECTION (CRBSI) IN HOSPITAL TUANKU AMPUAN NAJIHAH (HTAN): A RETROSPECTIVE STUDY

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INTRODUCTION: Hemodialysis catheter-related blood stream infection (CRBSI) is a major complication of catheter use in hemodialysis patients, which ultimately lead to morbidity and mortality. The cause is multifactorial ranging from patient's factors to catheter's factors in different hemodialysis centers.
OBJECTIVES: This study aimed to determine the incidence of CRBSI cases among hemodialysis patients in HTAN, as well as association between CRBSI cases with hemodialysis centers.
METHOD: A retrospective study was conducted. Hemodialysis CRBSI cases were identified from 982 hospitalized hemodialysis cases in HTAN between January to December 2017. Case information was obtained from hemodialysis unit registry and hospital online record system (*Casemix*); while blood culture and sensitivity data were traced from the microbiology lab.
RESULTS: 157 CRBSI cases were detected with an incidence rate of 0.75 per 1000 patient-days. 84.7% (n=133) of cases were from private hemodialysis centers while another 15.3% (n=24) were from government hemodialysis center. There was a significant association between haemodialysis centres and CRBSI cases (p=0.002). Among 11 private haemodialysis centres involved, Center 1 showed the highest CRBSI cases (n=78, 58.6%), followed by Center 2 (n=33, 24.8%) and Center 3 (n=13, 9.77%). The most common pathogens causing CRBSI were *Staphylococcus aureus* (n=40, 25.3%) and followed by (n=21, 13.3%) methicillin-resistant *Staphylococcus aureus* infection.
CONCLUSION: Incidence of hemodialysis CRBSI in HTAN was lower, compared to other studies. Most hemodialysis CRBSI cases were from private hemodialysis centers, which warranted further investigation on the contributing factors involved. This finding would aid in formulating remedial actions to reduce and prevent hemodialysis CRBSI.

KEYWORDS: clinical research, Negeri Sembilan, catheter-related infection, , hemodialysis
NMRR ID: NMRR-18-101-39879

OP-54 (Oral)

AN OBSERVATIONAL STUDY ON ABVD AND ESCALATED BEACOPP REGIMENS AMONG PATIENTS WITH HODGKIN'S LYMPHOMA

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INTRODUCTION: ABVD regimen is a standard regimen for Hodgkin's Lymphoma, proven to be superior and less toxic compared to alternative regimens. BEACOPP is one of the treatment options in advanced Hodgkin's Lymphoma with escalated BEACOPP reported to be significantly better than baseline BEACOPP.
OBJECTIVES: Primary outcome measured was complete response (CR) rate, and secondary outcomes were disease-free survival (DFS), progression-free survival (PFS) and overall survival (OS) in patients who received either ABVD or escalated BEACOPP.
METHOD: An observational, retrospective cohort study was done in Hospital Tengku Ampuan Afzan (HTAA), involving patients who diagnosed with early unfavourable and advanced Hodgkin's Lymphoma from 2013 until January 2018.
RESULTS: A total of 28 patients were enrolled, ABVD (n =22) and escalated BEACOPP (n=6). The median age was 28 years old, with majority were Malay (89.3%). Based on the International Prognostic Score (IPS), 25% of them scored IPS ≥4 with 39.3% were on stage IV and 17.9% presented with "B" symptoms. The median follow-up was 34 months and complete remission (CR) rate was similar in both arms, 54.5% versus 83.3% respectively (p=0.36). At 63 months the DFS and PFS between ABVD and escalated BEACOPP were 54.5% versus 83.3% (p=0.26) and 54.5% versus 83.3% (p=0.36) respectively. The OS rate was 81.8% versus 100% (p=0.33) respectively.
CONCLUSION: ABVD and escalated BEACOPP showed similar outcomes in CR, DFS, PFS and OS in early unfavourable and advanced Hodgkin's Lymphoma. Median follow-up was short particularly in patients who received escalated BEACOPP. Further follow up is required to identify the median of DFS, PFS and OS. These results act as a preliminary data for further investigations.

KEYWORDS: clinical research, Pahang, Hodgkin Lymphoma, ABVD, BEACOPP**NMRR ID:** NMRR-17-2477-34798 (IIR)

OP-55 (Oral)

EFFECTIVENESS AND ECONOMIC EVALUATION OF NAUSEA AND VOMITING MANAGEMENT FOR MODERATELY AND HIGHLY EMETOGENIC CHEMOTHERAPY IN MALAYSIA: A MULTICENTER COHORT STUDY

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INTRODUCTION: While chemotherapy-induced nausea and vomiting (CINV) have been shown to be prevalent, their management is still noticeably conservative in Malaysia.
OBJECTIVES: To evaluate the effectiveness of the CINV management in Malaysia, and to determine the cost-effectiveness of all the commonly used antiemetic regimens.
METHOD: This prospective cohort study was undertaken in five public hospitals. Cancer patients who received 1-day moderately and highly emetogenic chemotherapy (MEC and HEC) were randomly sampled and required to record their 5-day CINV experience in a diary. The rate of overall uncontrolled CINV (nausea score ≥5 and emesis ≥1 episode), was used as the efficacy endpoint. The total cost incurred by the drug and medical resource utilization and the incremental cost-effectiveness ratio (ICER) of each antiemetic regimen were computed. One-way sensitivity analysis was also performed to assess the robustness of the results.
RESULTS: Of the 211 patients recruited, the majority had breast cancer (70.1%), were in the late stages (III/ IV) of the disease (54.1%), and received HEC (73.9%). The rates of the post-chemotherapy nausea and vomiting were 56.9% and 36.0% respectively, yielding a rate of overall uncontrolled CINV of 59.7%. As similar antiemetic regimens were used for both the MEC and HEC, the latter, expectedly led to a higher risk of uncontrolled CINV (adjusted OR: 2.29; 95% CI: 1.20, 4.39). Although the ondansetron-based antiemetic regimen was shown to be more effective (adjusted OR: 0.48; 95% CI: 0.25, 0.91) than the granisetron-based regimen, it appeared to be less cost-effective (ICER: MYR22.17 per additional CINV-free patient). The ICER was also considerably affected by the dosage and brand of antiemetics used.
CONCLUSION: The findings indicate that the CINV management in Malaysia is generally suboptimal. Hence, a revision of the current practice is warranted, preferably to be supplemented by the evidence from the economic evaluation.

KEYWORDS: health economics, West Malaysia, antiemetics, chemotherapy, cost-effectiveness analysis
NMRR ID: NMRR-15-2480-25897

OP-56 (Oral)

THE STABILITY STUDY OF EXTEMPORANEOUS PREPARATIONS PREPARED IN THE OUTPATIENT PHARMACY OF HOSPITAL TUANKU FAUZIAH (HTF) STORED BASED ON PATIENT'S SETTING

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INTRODUCTION: Extemporaneous preparation is defined as the preparing, mixing, assembling, packaging and labeling of medicinal products based on a prescription order from a licensed practitioner for the individual patient. However, there are questions remain in terms of stability of the extemporaneous preparation after being dispensed and stored by patients.
OBJECTIVES: This study was to investigate the stability of five extemporaneous syrups prepared using both simple syrup and X-temp® Syrup in the outpatient pharmacy of HTF when stored in different conditions.
METHOD: The materials used were simple syrup, X-temp syrup, Baclofen 10mg, Propranolol 40mg, Frusemide 40mg, Clonazepam 2mg and Spironolactone 25mg tablets were obtained from outpatient pharmacy of HTF. All extemporaneous preparations were prepared according to standardized METHOD in the Ministry of Health (MOH) Extemporaneous Formulation 2015. The prepared syrups were then stored in either household cupboards or inside the domestic fridge in sets of two separate bottles. For each set, one was stored for 14 days while the other was stored for a period of 30 days. At the end of each duration, the syrups were assessed in terms of visual and odour, pH level and sterility. The syrups were considered stable if no changes detected in each criteria.
RESULTS: All extemporaneous syrups prepared using X-temp® were stable up to 30 days when stored in both conditions except for Propranolol syrup. As for preparations prepared using simple syrup, all except Baclofen syrup were stable up to 30 days when stored in both conditions.
CONCLUSION: Extemporaneous preparations usingeither vehicle if stored in 2 – 8°C would maintain their stability for up to 30 days. Caregivers are to be advised to always keep their extemporaneous syrup medication in the fridge.

KEYWORDS: quality use of medicines, Perlis, extemporaneous preparation, stability, outpatient
NMRR ID: NMRR-16-296-29084

OP-57 (Oral)

MEDICINAL PRODUCTS AND SERVICES ADVERTISING: A CROSS-SECTIONAL ASSESSMENT OF KNOWLEDGE AND ATTITUDE AMONG PHARMACISTS IN MELAKA (MEPS-PHAM STUDY)

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INTRODUCTION: In 2014, 46.6% of advertisements in pharmacies in Melaka were found to be violating Medicines (Advertisement and Sale) Act 1956, ranking the highest in Malaysia and should be a cause for concern. False, incompliance and misleading advertisements create unrealistic expectations about the benefits and safety of such products and services, with potential adverse consequences to the consumers.
OBJECTIVES: This study aimed to assess knowledge and attitude on medicinal products and services advertising among pharmacists in Melaka, Malaysia.
METHOD: A cross-sectional study was carried out using validated self-administered questionnaire. All analyses were performed using IBM SPSS version 20.0. Descriptive statistics were used to illustrate demographic characteristics and mean scores for knowledge and attitude. Inferential statistics (independent t-test and one-way ANOVA) were used to establish association between study variables. Pearson's correlation was used to identify the association between the knowledge and attitude scores.
RESULTS: Out of 228 pharmacists participated in the study, 153 (67.1%) were from Government sector, with the majority (111, 72.5%) in the age group of 20-30 years while 75 (32.9%) were from private sector, with the majority (28, 37.3%) in the age group of 31-40 years. Mean (SD) scores for knowledge and attitude were 12.0(2.04) and 9.1(1.76) respectively. Age, gender, occupational sector and years of experience as pharmacist were significantly associated with attitude score. There was no correlation between knowledge and attitude.
CONCLUSION: Pharmacists in Melaka have good knowledge, but negative attitude towards medicinal products and services advertising. This study serves as a stepping-stone for further research in the field of medicinal products and services advertising in Malaysia. It also provides an insight to the authority and policy maker to strengthen future advertisement control strategies and awareness programs on legal advertising among pharmacists.

KEYWORDS: quality use of medicines**,** Melaka, advertisement, medicinal product and service, knowledge, attitude, pharmacist
NMRR ID: NMRR-15-2046-28643

OP-58 (Oral)
EXPLORING THE COST OF STAGE C HEART FAILURE IN HOSPITAL QUEEN ELIZABETH II, KOTA KINABALU, SABAH

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INTRODUCTION: Numerous cost-of-illness studies of heart failure (HF) have been published in developed countries but such knowledge is lacking in Malaysia. This makes it harder for the healthcare decision makers to determine research and funding priorities by highlighting areas where inefficiencies may exist.
OBJECTIVES: This study aimed to estimate the mean annual healthcare cost of Stage C HF in Hospital Queen Elizabeth II (HQEII).
METHOD: This study adopted an activity-based costing approach from Ministry of Health's perspective. Data of types and quantities of healthcare components utilized when patients were treated in HQEII between 2013 and 2015 were abstracted retrospectively from the medical records. Unit costs of each component were valued based on published studies and government full-pay tariff. The categorical variables were presented as percentage whereas continuous variable were presented as means with standard deviations (SD). The mean annual cost of HF was expressed in Malaysia Ringgit (MYR) 2014 with 95% confidence interval (CI).
RESULTS: The mean follow up period was 629 (SD 320) days. Ninety-two patients with 85.9% male and mean age 59 (SD 3.5) years were included in this study. During the study period there were 451 outpatient clinic visits and 44 admissions with mean length of stay of 5.2 (SD 6.0) days. The mean annual cost of heart failure was RM 15,071.00, 95% CI (14,746, 15,396) in 2014. Inpatient cost accounted for 90.6% of the total cost which was mainly attributed by percutaneous coronary intervention (PCI) procedures and hospitalization.
CONCLUSION: Cost of PCI procedures and cost of hospitalization were themain cost drivers of HF. Cost saving can be achieved by providing efficient clinical management at outpatient setting to prevent worsening of HF which requires frequent hospitalization. Caution needed when attempting to apply the cost estimates reported by this study to other hospital settings in Malaysia due to generalizability concern.

KEYWORDS: health economics, Sabah, cost-of-illness, , heart failure
NMRR ID: NMRR-15-1661-27979

OP-59 (Oral)
AVAILABILITY, MEDICINE PRICES AND AFFORDABILITY OF SELECTED MEDICINES IN MALAYSIA

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INTRODUCTION: High medicine prices and catastrophic out-of-pocket spending are barriers to treatment access. Unfair prices impose a great burden to the nation in sustainable healthcare provision and render treatment unaffordable for the people.
OBJECTIVES: To generate reliable availability, medicine price and affordability information of selected important medicines in Malaysia's public and private sectors.
METHOD: The study adapted the validated methodology developed by the World Health Organization/Health Action International. A nationwide cross sectional survey with a total of 87 facilities was conducted. Trained data collectors recorded data for the specified dosage forms and strengths of the selected 50 medicines. When available, procurement and patient prices were collected for originator brand and lowest-priced generic equivalent of each medicine.
RESULTS: Overall, average medicines availability was high in the public sector (83.0%) and fairly high (66.7%) in the private sector. In the public sector, average availability of generics (74.8%) was higher than originators (19.4%). However, in the private sector, originators (52.2%) had higher availability compared to generics (49.1%). Comparison of median prices revealed that private sector procured medicines at higher prices as compared to the public sector, whereas private hospitals sold medicines at higher prices compared to retail pharmacies. Compared to International Reference Price (IRP), procurement median price ratio (MPR) of originator brands was much higher in the private sector than the public sector (8.6 vs 1.2), whereas MPR of lowest-priced generics in the private sector was slightly higher than the public sector (2.5 vs 1.6). Generic products were affordable but originators were not affordable for the low-income population.
CONCLUSION: The high availability of generics in the public sector is parallel with the National Medicines Policy (DUNas). Overall public procurement was efficient but pricing policies in the private sector are needed. Sustainable financing for expensive medicines should be considered to safeguard medicines access and affordability.

KEYWORDS: health economics, Selangor, availability, affordability, medicine price, median price ratio (MPR)
NMRR ID: NMRR-16-2476-33791

OP-60 (Oral)

EFFECT OF INDOMETHACIN'S DURATION OF ADMINISTRATION AS A POSITIVE CONTROL IN CARRAGEENAN-INDUCED PAW EDEMA IN RAT MODELS

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INTRODUCTION: Indomethacin has often referenced as the positive control in carrageenan-induced anti-inflammtory studies in rats. However, its duration of administration prior to carrageenan-induction and how this affects the rat model is scarcely reported in the literature.
OBJECTIVES: This study aims at evaluating the effect of indomethacin as positive control in carrageenan-induced paw edema in rat models used in anti-inflammatory studies.
METHOD: Male Wistar rats were divided into four groups (n=6); vehicle-control (C), negative-control (NC), indomethacin-D3 (ID-3), and indomethacin-D1 (ID-1). Both C and NC groups received distilled water (10mL/kg body weight) for three days, while group ID-3 and ID-1 received indomethacin at 10mg/kg body weight for three days and one day, respectively. Carrageenan in saline (1%, 0.2mL/paw) were injected into the sub-plantar region of the rat's hind paw to induce edema in groups NC, ID-3 and ID-1. Paw volume was measured at time points 0, 1, 3, 6, and 24-hours post-induction using a digital water plethysmometer. At 24-hours post-induction, the rats undergo necropsy and whole blood was collected into EDTA tubes for hematological analysis and blood smear count.
RESULTS: At 3-hours, the paw volume in both indomethacin-treated groups was significantly reduced compared to NC group ($p<0.05$). Simultaneously at the same time point, the edema effect induced by carrageenan reached its maximum in the NC group which indicated the presence of prostaglandins and other inflammatory mediators. At 6-hours and 24-hours, the paw volume was apparently reduced in both indomethacin-treated groups. The hematological profile analysis showed that the hematocrit, hemoglobin and red blood cell parameters of ID-3 group were significantly lower compared to both control groups, while hemoglobin of ID-3 was significantly lower when compared to ID-1 ($p<0.05$).
CONCLUSION: In conclusion, rat models dosed with indomethacin for one day prior to carrageenan injection showed sufficient reduction in paw inflammation while minimizing indomethacin's effect on the rats' physiology.

KEYWORDS: research tools, Kuala Lumpur**,** indomethacin, , inflammation, carrageenan, plethysmometer
NMRR ID: NMRR-17-507-35387

OP-61 (Oral)

DEVELOPMENT AND VALIDATION OF THE CHILDHOOD VACCINATION ATTITUDES AND BELIEFS SCALE (CABS)

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INTRODUCTION: There has been an increasing trend in vaccine hesitancy among parents and vaccine preventable disease outbreaks in the nation. As parents' attitudes and beliefs are affected by social, cultural, and political background, therefore it is fundamental to design a survey with local elements and scenario.
OBJECTIVES: To develop and validate the Health Belief Model (HBM) based survey to assess parents' attitudes and beliefs towards childhood vaccination.
METHOD: The survey designed was content validated by an expert panel for its representativeness and clarity. Cognitive debriefing interviews were then conducted to explore the understanding and relevance of the items. Exploratory factor analysis (EFA) was employed to analyze the factor structure of the items while internal reliability was analyzed with Cronbach's alpha.
RESULTS: The content validity index (S-CVI/Ave) was 0.9. Hence, the Childhood Vaccination Attitudes and Beliefs Scale (CABS) is highly valid content. A total of 290 subjects were recruited for construct validity. The EFA provided support for the existence of six factors as proposed in the HBM, which accounted for 63.7% of the total variance for the total of 27 items. Kaiser-Meyer-Olkin Index of 0.83 verified the sampling adequacy for the analysis. Barlett's test of sphericity was statistically significant ($p < 0.05$) ($x^2 = 4165$, df = 351, Sig. = 0.000) indicating correlations between items were sufficiently large for the analysis. Cronbach's alpha coefficient for the six subscales ranged between 0.52 and 0.89. **CONCLUSION:** TheCABS is a valid and reliable instrument for assessing parents' attitudes and beliefs towards childhood vaccination.

KEYWORDS: research tools, Selangor, exploratory factor analysis, health belief, vaccination, immunization
NMRR ID: NMRR-16-1462-32031 (IIR)

OP-63 (Oral)
AN ASSESSMENT OF PARENT'S KNOWLEDGE, ATTITUDE AND PRACTICE (KAP) ON ANTIBIOTIC USE AMONG CHILDREN IN HOSPITAL BUKIT MERTAJAM

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INTRODUCTION: Parent's expectations are shown to have impacted physician's prescribing attitude since parents expect their child to be treated with antibiotic for each and every illness. Parental KAP on antibiotic use for their children is important to be assessed in order to avoid wastage of healthcare resources and emergence of bacterial resistance.
OBJECTIVES: The objective of the study was to assess the parent's knowledge, attitude and practice on antibiotic use among children in Hospital Bukit Mertajam.
METHOD: A cross-sectional study was carried out using self-reporting validated questionnaires from April to June 2016 at outpatient pharmacy in Hospital Bukit Mertajam. Convenient sampling method was used in this study, where parents visiting the pharmacy with prescription for antibiotics for their children were recruited.
RESULTS: Out of 103 respondents, noted most of the respondents still believe that antibiotics could cure viral infection (85%), antibiotics should be given to kids once having fever (60%), antibiotics should be withdrawn once symptoms disappeared (54%). 40% of the parents agreed that antibiotics do not have side effects. Education and age was significantly associated with parents knowledge ($p<0.05$). 43.7% of the parents agreed that their child should take antibiotics as prevention, once other children around infected. 91.3% of the parents never practice purchasing antibiotics without physicians' prescription. However, 62% of the parents do request antibiotics from physicians, 24% of the parents practices storing antibiotics at home for future needs, and 25% of the parents reduces antibiotics dosage deliberately in consideration of safety of their children.
CONCLUSION: This study has demonstrated that parents' knowledge, attitudes and practices on antibiotics are still lacking. Hence, more steps such as patient-physicians time/ patient-pharmacist times, educational/awareness programs should be held to ensure quality antibiotics use and to reduce the emergence of bacterial resistance.

KEYWORDS: quality use of medicines, Penang, antibiotic use, knowledge, attitude, practice, parent
NMRR ID: NMRR-16-1274-29579

OP-64 (Oral)
DEVELOPMENT AND VALIDATION OF ENTRY-POINT CHECKLIST TO ENSURE CONSISTENCY OF DECISIONS MADE AMONGST OFFICERS ON DUTY

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INTRODUCTION: Pharmacy enforcement officers play vital role in ensuring pharmaceutical products sold in Malaysia comply with National Pharmaceutical Regulatory Agency. The ability of officers to verify compliance criteria and making consistent judgement to endorse importation of consignment is important. Cognitive aid in the form of checklist is proposed as a tool to ensure consistent decision made among Sabah entry-point officers.
OBJECTIVES: To develop and validate a checklist that served to ensure consistency in decision making among officers when endorsing consignments at Sabah entry-points.
METHOD: This was a mixed method study involving qualitative and quantitative approaches. A qualitative approach using Delphi method was conducted between 3.6.2016 to 7.4.2017 at CPF Sabah. A preliminary checklist was drafted with 9 domains focusing on "pharmaceutical products" and 4 domains focusing on "entry-points". 8 experts with experience in entry-point (≥8 years) were invited to confirm content validity. Face validity was performed among 10 officers to ensure readability and understanding. Concurrent validity (quantitative approach) was then carried out. A set of consignment forms endorsed in 2016-2017 were sampled to test against criteria in the checklist. 15 officers were required to use the checklist to endorse these consignments. Decisions for these endorsement were censored. The decisions were then compared against the true decision. A sensitivity and specificity analysis was performed to confirm concurrent validity.
RESULTS: Delphi method was applied for three cycles before an absolute concordance was achieved among the experts. Content and face validity was conducted. In sensitivity test, there was a significant difference between standard compliance answer and checklist answer. The percentage by using the checklist is higher than standard compliance answer. This prove that the usage of checklist has 100% sensitivity & specificity.
CONCLUSION: The checklist was validated and it could be served as a tool to improve the consistency in decision making among officers on duty at entry-point.

KEYWORDS: research tools, Sabah, checklist, consistence, validation
NMRR ID: NMRR-17-1005-35965

OP-65 (Oral)

A PROSPECTIVE INTERVENTIONAL STUDY OF SMARTPHONE MEDICATION ADHERENCE APPLICATION AND ITS POTENTIAL BENEFITS TO RETROVIRAL DISEASE (RVD) PATIENTS: PRELIMINARY STUDY

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INTRODUCTION: Adherence remains a significant problem for those who have been prescribed with Antiretroviral Therapy (ART). Patients' knowledge about the disease and treatment may influence their adherence to the treatment plan. Smartphone application is a new approach in improving adherence and patient behaviour, as it is constantly accessible, involving and educating the patient, and offers a source for patient- and medication-specific information.
OBJECTIVES: To determine the percentage of improvement in patient adherence and knowledge after using the iStayhealthy application.
METHOD: A prospective interventional study was conducted at RVD Clinic in HTJS. 33 RVD patients were evaluated from July 2017 to September 2017. Eligible patients were those aged ≥18 years old, on ART medications, CD4 count <500 during enrolment and each owns a smartphone. The iStayHealthy application was downloaded from Android Playstore or Apple Application Store. Information such as missed medications, side effects and illness were recorded in the application. Adherences of the patients were assessed using validated questionnaires from AIDS Clinical Trial Group (ACTG) questionnaires while patients' knowledge were assessed using validated questionnaires. Patients were interviewed using these questionnaires on their first and follow up visits after a month. Data were analyzed using descriptive statistics and Paired T-test.
RESULTS: Of the 33 respondents, 85% (n=28) aged between 20-40 years old and 75% (n=27) of respondents were on ART treatment between 1-5 years. There was a statistically significant increase in adherence and knowledge mean score, which is 31.8% (p=0.001) and 14.2% respectively (p=0.037).
CONCLUSION: Adherence and knowledge scores among patient has increased after using the application in this study. Based on our findings, this application may have potential to be used for younger patients and those who were newly started on ART treatment. However, due to limited samples, the results must be interpreted with caution.

KEYWORDS: health informatics, Negeri Sembilan smartphone application, adherence, antiretroviral
NMRR ID: NMRR-17-1152-36246

OP-66 (Oral)

INVESTIGATING THE REASON FOR UNCLAIMED MEDICATION IN FLEXY SERVICE AT HOSPITAL BANTING

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INTRODUCTION: FLEXY is a dispensing system where the refill medications are prepared in advance. On the appointment date, patient will be able to collect their supply faster at the pharmacy counter. However, there are patients who dropout from the system and the reasons needs to be investigated
OBJECTIVES: This study aimed to evaluate the reason for unclaimed medication among dropouts' that register in FLEXY service.
METHOD: : A retrospective study was conducted from October 2016 to March 2017 via phone call on 360 patients or caregivers which recruited from patients among patients who had joined FLEXY service, but failed to claim their medications after one week from their appointment. The questionnaire was validated through a pilot study. It comprised common socio-demographic and three domains question; to verify patient understands on FLEXY service, the reason patients failed to claim their medications and how to improve the service.
RESULTS: The majority of respondents was male 65.4% with age more than 55 years,69.1%. Among the top reason for unclaimed medicine, 22.1% claimed they are busy, 20.6% claimed forget to collect their medicine, followed by 18.0% claimed outside of the area, and 17.3% with the reason that they still had supplies of medication at home. Only 12.1% claimed they have no transport to collect their medicines.
CONCLUSION: The results suggest that patients aged more than 55 years old tends to forget to collect the medicines. FLEXY service can be improved with various means such as sending notification using short message service (SMS), prolong the TCA date, using POS Laju and also create awareness about this system

KEYWORDS: impact of pharmacy services, Selangor, unclaimed medication, medication refill
NMRR ID: NMRR-17-738-34883

OP-67 (Oral)

PREVALENCE USE OF AMPHETAMINE-TYPE-STIMULANTS (ATS) AND HIV RISK BEHAVIOURS AMONG CLIENTS IN GOVERNMENT AND PRIVATE METHADONE MAINTENANCE TREATMENT (MMT) PROGRAMS IN KUANTAN, PAHANG

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INTRODUCTION: Methadone Maintenance Treatment (MMT) is proven to reduce HIV infection among opiate drug users. Studies investigating the use of ATS and HIV risk behaviours among clients in MMT programs are still limited
OBJECTIVES: This study aimed to determine the prevalence of ATS use and HIV risk behaviours among clients in government and private MMT programs in Kuatan, Pahang
METHOD: A total of 237 current methadone users were non-randomly recruited through snowball sampling from four government (n=129) and two private (n=108) MMT programs in Kuantan, Pahang. On-site urine tests were done to confirm respondents opiate and ATS use status. A self-report questionnaire was used to collect data
RESULTS: Respondents mean age in this study was 37.70 years (SD=8.49), and mean age of first methadone use was 32.81 years (SD=6.80). The samples average methadone treatment duration was 48.86 months, and average daily dose of methadone was 52.78mg.Patients in private MMT program were used lower dose of methadone than patients in government MMT program (OR: 1.8: 1.09-3.09: p<.026).There are significant differences between patients in private and government MMT programs. Private MMT patients were not satisfied with their methadone program (OR: 2.8: 1.49-5.39: p<.002) and methadone dose (OR: 2.9: 1.61-5.21: p<.001), more likely to use illicit opiates (OR: 4.3: 2.47-7.64: p<.001) and methamphetamine (OR: 1.7: 1.01-2.85: p<.050) in the last 30 days, use less than 50mg of methadone daily (OR: 1.8: 1.09-3.09: p<.026) and used other IDUs injecting equipments in the last 12 months (OR: 2.2: 1.02-4.54: p<.040), compared to patients in government MMT programs
CONCLUSION: Our findings showed that there is concomitant use of illicit substances among clients undergoing MMT treatment. The use of illicit opiates could be attributed to the insufficient dose of methadone, but the use of ATS among MMT population needs to be investigated further.

KEYWORDS: impact of pharmacy services, Pahang, methadone, amphetamine, HIV risk behaviour
NMRR ID: NMRR-15-2448-26899

OP-68 (Oral)

THE IMPACT OF PHARMACIST INTERVENTION ON ANEMIA MANAGEMENT IN CONTINUOUS AMBULATORY PERITONEAL DIALYSIS (CAPD) PATIENTS

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INTRODUCTION: Anemia management in (CAPD) patients who received erythropoeitin stimulating agent (ESA) have demonstrated favorable impacts on clinical and economic outcomes. Pharmacist-managed anaemia in assisting physician may provide better haemoglobin (Hb) target. This may improve patients' quality of life and decrease healthcare cost.
OBJECTIVES: This study was aimed to study outcome of Hb level after implementation of ESA card and counselling.
METHOD: A prospective, randomized controlled study involved patients attending dialysis clinic was conducted from March to October 2017. Fulfilled inclusion criteria patients were randomized into usual care group (n=94) and pharmacist intervention group (n=50). Intervention group received ESA injection counselling based on validated checklist and card while usual care group received standard care. Hb outcome was evaluated pre-and post-intervention. Data was analysed using descriptive and parametric test (SPSSv.22) with p<0.05 considered as statistical significant.
RESULTS: A total of 144 patients with median age of 53 (IQR 41-61) years old were included and 52 % of them were male. Mean baseline Hb of in usual care group and intervention group were 9.9±1.9 and 9.7±1.7g/dL respectively in usual care group and intervention group. Mean Hb was found to be significantly increased post 3 months of monitoring (p<0.01) in which mean Hb of both groups were 10.5±2.1 g/dL (usual care), vs 10.4±1.9g/dL (intervention). Intervention group had higher percentage of increase in mean Hb (7.1% vs 6.8%) in comparison with usual care group. However, mean Hb did not differ significantly between intervention and usual care group. Significance difference was found in mean Hb between adherence in which patients who adhere to ESA significantly contribute to increased Hb (p=0.01)
CONCLUSION: This study suggested that pharmacist interventions including ESA card and counselling are vital in view of the favourable impact on the haemoglobin level.

KEYWORDS: impact of pharmacy services, Terengganu, anemia, continuous ambulatory peritoneal dialysis, pharmacist intervention
NMRR ID: NMRR-17-1038-34514

OP-69 (Oral)

THE CROSS-SECTIONAL STUDY OF ELDERLY PATIENTS' ADHERENCE AND KNOWLEDGE TOWARDS THEIR MEDICATION REGIMES IN KUALA LIPIS HOSPITAL

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INTRODUCTION: Elderly patients often have problem to adhere to their prescribed medications due to various reasons such as complexity of regimen, polypharmacy, a decrease in cognitive and physical functions, and low literacy level.
OBJECTIVES: To determine the adherence and knowledge scores of geriatric patients towards their medication regimen.
METHOD: A cross-sectional observation study was conducted in Outpatient Pharmacy Department (OPD) at Kuala Lipis Hospital, Pahang. The adherence scores were collected via the self-reporting questionnaire whereas patients' knowledge scores were assessed using knowledge assessment form. Data was collected from February 2015 till October 2015 (9 months).
RESULTS: A total of 193 patients were recruited in the study. Generally, the geriatric patients in Kuala Lipis Hospital demonstrated good understanding towards their medications with knowledge score of 90.23% ± 12.82. There was a significant difference in knowledge score across three different age groups of patients (<65 years old, 65 -74 years old and ⩾ 75years old), p =0.018, where age < 65 years old had the highest score. There was also a significant association between knowledge score and the number of medication taken by patients, p=0.001. Besides, this study reported high medication adherence level (86%) among the patients, which was not affected by their demographic characteristics. There was a positive correlation between knowledge score and adherence score, (r=-0.142, p =0.046).
CONCLUSION: High adherence (86%) and high knowledge (90.2%) scores indicated a satisfactory understanding among geriatric patients towards their medications and hence, a better adherence. Higher knowledge score showed significant correlation with higher adherence level.

KEYWORDS: impact of pharmacy services, Pahang, geriatric, adherence, knowledge, medication
NMRR ID: NMRR-15-100-24068

OP-70 (Oral)

NURSES' KNOWLEDGE, ATTITUDE AND PRACTICES IN THE PREPARATION AND ADMINISTRATION OF INTRAVENOUS MEDICATIONS IN PUTRAJAYA HOSPITAL

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INTRODUCTION: Medication safety has long been recognized to be important in the provision of patient care.
OBJECTIVES: Study aimed to determine knowledge, attitude and practice levels of nurses regarding the preparation and administration of intravenous (IV) medications and factors influence.
METHOD: In this descriptive cross-sectional study conducted in HPJ from July to August 2017, all nurses working in the wards regardless of status or shift were included via convenience sampling. A validated questionnaire was used to collect data in this study. Data was analysed statistically using SPSS Version 21.
RESULTS: A total of 205 respondents were included of which 0.8% was nurse supervisor, 3.9% was head nurse and 95.3% was staff nurse. Result showed that respondents' had average level of knowledge (mean score 9.1 ± SD 3.14), attitude (mean score 29.28 ± SD2.58) and good level of practice (mean score 26.7 ± SD 3.04) in administering IV medications. Less than 50% of respondents obtained correct answers for calculation and dosing of IV medications.Furthermore, this study found that practice of preparing and administering IV medications was influenced by experience (p = 0.026) while attitude was influenced by gender (p= 0.038).
CONCLUSION: Nurses in Putrajaya Hospital had an average level of knowledge, attitude and good level of practice in administering IV medications. Therefore, intensive regular training programs need to be carried out for nurses to improve their knowledge.

KEYWORDS: impact of pharmacy services, Putrajaya knowledge, attitude, practice, intravenous medication
NMRR ID: NMRR-17-1205-36101

OP-71 (Oral)

MEDICAL INFORMATION RESOURCES ON MOBILE PHONE AMONG HEALTHCARE PROFESSIONALS: A CROSS-SECTIONAL SURVEY

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INTRODUCTION: Medical information resources (MIR) on smartphone has been widely used among healthcare professionals (HP), assisting in decision making of pharmacotherapy management. The benefit and its utilization in clinical practice among Malaysian HP are unknown.
OBJECTIVES: This study aimed to evaluate the utilization of MIR among Malaysian HP and factors that influenced HP's preference upon installing a MIR on any devices.
METHOD: A survey was sent to HP working in pharmacy, ward and clinic at a tertiary hospital in Pahang. A total of 1000 questionnaires consisted of 22 questions were distributed. The questionnaire sought information on HPs' background and detailed information regarding the use of MIR in their clinical practice.
RESULTS: A total of 532 HP responded to the survey (response rate = 49.7%), with 72.7% (n=109) were pharmacists, 52.2% (n=227) nurses and 46.1% (n=196) doctors. Among these, 99.6% were aware of availability of medical smartphone application (MSA) while 96.4% were aware of medical online database (MOD). Majority of them (95.6%) utilised MSA in their clinical practice with MSA and internet were the most preferred method for searching information. Epocrates is the most preferred MSA used among doctors and pharmacists (14% and 14.1% respectively) while nurses preferred to use MIMS as their source of reference (29.3%). The most preferred MOD among HP were Embase (25.6%), Medline (17.3%), Pubmed (14.9%) and Ovid (14.9%). Among factors that influenced HP preference on MIR were immediate reference, trusted information and easy to understand information.
CONCLUSION: MIR on devices are widely used among HP in Malaysia. Both MSA and MOD are equally utilised, particularly those without registration fee. The use of local government-sponsored MSA such as Micromedex is under-utilised thus promotion used of this application is required.

KEYWORDS: impact of pharmacy services, Pahang, mobile application, healthcare professional, medical information,
NMRR ID: NMRR-17-445-34643 (IIR)

OP-72 (Oral)
INPATIENT ANTICOAGULATION SERVICE: THE NEXT FRONTIER IN ANTICOAGULANT THERAPY

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INTRODUCTION: Anticoagulants are extensively used for the prevention and treatment of venous and arterial thrombosis (VTE) and they are high-risk medications associated with a significant rate of medication errors among hospitalized patients. The pharmacy department in collaboration with Medical Department in Hospital Tengku Ampuan Afzan (HTAA) is seeking to expand anticoagulation services by implementing an Inpatient anticoagulant service (IPACs) providing daily surveillance and dosing consultation for patients receiving anticoagulant.
OBJECTIVES: To identifying the referral reasons to IPACs, percentage of patient with acute VTE received VTE prophylaxis and describing the issues identified by the IPACs in the management of anticoagulant therapy (ACT).
METHOD: A cross sectional, descriptive study conducted in HTAA. All adult patients who referred to IPACs team were recruited.
RESULTS: Of 157 patients seen by IPACs team, 54% are newly started on ACT, 20% are referred for anticoagulant reversal, 8% for bridging therapy, 10% switching of anticoagulant, and 9% for warfarin titration. Nearly 60% patients (n=81) referred for acute VTE with 85% had high risk but only 33% received VTE prophylaxis. Inappropriate dose of IV vitamin K and underutilisation of prothrombin complex concentrate for overwarfarinization as well as doing daily INR leading to improper titration of warfarin were the most problems seen in IPACs.
CONCLUSION: With the clinical experience of IPACs, we create the awareness of VTE prophylaxis and address the issues that related to ACT. IPACs appear to enhance quality of patient care in anticoagulant management. Further research will be conducted in future to determine the impact IPACs.

KEYWORDS: impact of pharmacy services, Pahang, anticoagulation, inpatient
NMRR ID: NMRR-17-2456-36172

OP-73 (Oral)

A 6-YEAR REVIEW OF THE METHADONE MAINTENANCE PROGRAM AMONG REGISTERED PATIENTS IN PERAK

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INTRODUCTION: People who inject drugs are at high risk of contracting HIV, Hepatitits B (HBV), and Hepatitis C (HCV) due to risky injections and sexual behaviours. The Ministry of Health Malaysia introduced the Methadone Maintenance Therapy (MMT) program in 2005 to reduce opioid addiction and disease transmission.
OBJECTIVES: This study examined time to seroconversion and predictors of HIV, HBV, and HCV infections among MMT registered patients in Perak.
METHOD: A retrospective cohort study was conducted among patients registered between 1st January 2010 and 31st December 2015 at six methadone clinics in major hospitals and health clinics. A questionnaire was used to collect socio-demographic data, sexual and drug use history. Test results for HIV, HBV, and HCV were also retrieved from medical records. Kaplan-Meier analyses were performed to determine time to HIV, HBV, and HCV seroconversion. Cox regression analyses were used to examine predictors of seroconversion.
RESULTS: A total of 212 patient records were reviewed. Median survival for HIV, HBV and HCV were 59 (IQR: 40 - 74), 59 (IQR: 40 - 72) and 0 (IQR: 0 - 54) months respectively. Results also showed that infrequent Direct Observation Therapy (HR 10.44, 95% CI: 1.59 – 68.77) and non-usage of condoms (HR 5.92, 95% CI: 1.11 – 31.47) during sexual intercourse predicted HIV seroconversion whilst registration into the MMT program at a later age (HR 1.04, 95% CI: 1.02 – 1.06) predicted HCV seroconversion.
CONCLUSION: This study showed that the usage of condoms, supervised Methadone consumption, and early enrolment are important predictors to seroconversion.

KEYWORDS: impact of pharmacy services, Perak, Methadone therapy, seroconversion, Cox regression analysis
NMRR ID: NMRR-16-474-29613

OP-74 (Oral)
EVALUATION OF PHARMACEUTICAL CARE ISSUES IN PAEDIATRIC CRITICAL CARE OF A TERTIARY REFERRAL HOSPITAL IN PERAK, MALAYSIA: A CROSS SECTIONAL STUDY

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INTRODUCTION: Patients in the Paediatric Intensive Care Unit (PICU) have a higher risk of encountering pharmaceutical care issues (PCIs) because they are critically ill, and prescribed more medications compared to other children. Studies from other countries found that 28.8% to 42.7% of drug-related problems in PICU were due to dosing problems, but local data are limited.
OBJECTIVES: To investigate the prevalence, types of PCIs encountered and the associated factors in the PICU of a tertiary referral hospital in Perak and the acceptance rate of recommendations made by pharmacists in relation to PCIs that were identified.
METHOD: Observational and prospective study in paediatric patients in PICU between March till May 2017. Subjects were conveniently sampled according to the inclusion and exclusion criteria.
RESULTS: 150 patients were admitted to the PICU. Of these, 27 were excluded due to incomplete medical records (n=7) and short length of stay (n=20), leaving 123 patients for review. Most patients were Malay (68%) boys (59%) aged between 2 and 12 years old (51%). Of the 123 patients, 61% had at least one PCI, with a total of 237 PCIs. Most PCIs (79%) were classified as drug-related problems, 4% as patient-related problems, and 17% as other problems. Out of 188 DRPs detected, inappropriate dosing (44%) was most common, followed by inappropriate drug selection (22%) and inappropriate drug administration (15%). A total of 237 recommendations were proposed by the pharmacist, of which 230 (97%) were accepted by the clinician. Patients prescribed 6 or more medications (OR=18.90; 95% CI: 5.25-68.02; p
CONCLUSION: Approximately 61% of PICU patients had at least one PCI. Most PCIs were due to DRPs, of which inappropriate dosing was the most common cause.

KEYWORDS: impact of pharmacy services, Perak, paediatric, critical care, clinical pharmacist
NMRR ID: NMRR-17-451-34485

OP-75 (Oral)

KNOWLEDGE, ATTITUDE AND PERCEPTION TOWARDS ALLERGIC REACTIONS OF PARACETAMOL AMONG GENERAL PUBLIC IN KELANTAN, MALAYSIA

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INTRODUCTION: Recent years, the prevalence of paracetamol allergy in Malaysia becomes great concerns. In Malaysia, the Adverse Drug Reactions (ADR) report 2014 stated that paracetamol is one of the top analgesics as suspected drugs with 213 reports that cause the adverse effect.
OBJECTIVE: We investigated knowledge, attitude, and perception towards allergic reactions of paracetamol (KAP-ARP) among general public in Kota Bharu, Kelantan, Malaysia**.**
METHOD: A cross-sectional survey was conducted using a validated self-administered questionnaire among the general population. A total of 177 respondents participated in this study.
RESULTS: The mean percentage scores for knowledge, attitude and perception towards allergic reactions of paracetamol were 31.7% (SD 23.6), 53.1% (SD 19.2) and 53.3% (SD 23.9), respectively. This study revealed that respondents demonstrated a poor level of knowledge, a fair level of attitude and negative perception towards allergic reactions of paracetamol.
CONCLUSION: Information campaigns are essential to adjust people's current line of thought regards to allergic reactions of paracetamol.

KEYWORDS: quality use of medicines, Kelantan, knowledge, attitude, perception, allergic reaction, paracetamol
Research ID: CUCMS/CRERC/ER/020

OP-76 (Oral)
PROVISION OF PROFESSIONAL PHARMACY SERVICES BY COMMUNITY PHARMACIES: FINDINGS FROM A CROSS-SECTIONAL STUDY IN THE STATE OF SARAWAK, MALAYSIA

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INTRODUCTION: Professional pharmacy service provision is fast becoming a mainstay of community pharmacy practice, facilitating appropriate use of medicines and management of chronic diseases. Community pharmacies in Malaysia are expected to provide professional pharmacy services, despite the lack of remuneration frameworks.
OBJECTIVES: The aim of this study is to characterise the professional pharmacy services landscape in Sarawak, Malaysia, including reimbursement for these services and barriers faced.
METHOD: A questionnaire survey was sent by post to 184 eligible community pharmacies in Sarawak, Malaysia early 2017. Replies were received via postage-paid return mail or collected by hand and analysed.
RESULTS: 80 responses were received (response rate: 44%). 98% of respondents offered at least a single type of professional pharmacy service. However, there is a lack of variety in the types of services offered, which was mainly confined to health screening tests including blood pressure (95%) and blood glucose monitoring (91%). Only about a quarter of respondents provided smoking cessation and weight management services. Most health screening tests incur out-of-pocket payments, whereas other services are largely delivered free of charge. Lack of remuneration (73%), manpower (60%) and customer demand (54%) were the main barriers noted.
CONCLUSION: A vibrant service provision landscape is mutually beneficial for both community pharmacists and their consumers. Development of a proper framework for more services as well as broad-based remuneration scheme will be beneficial to drive this agenda forward.

KEYWORDS: impact of pharmacy services, Sarawak**,** community pharmacy practice, reimbursement, barriers.
NMRR ID: NMRR-15-1806-28351

OP-77 (Oral)
FACTOR AFFECTING MEDICATION ADHERENCE AND ANTICOAGULATION CONTROL IN PATIENTS TAKING WARFARIN

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INTRODUCTION: Medication adherence is the key for treatment successful in chronic diseases. Warfarin has been widely used to prevent stroke and thrombus formation despite its narrow therapeutic range and fatal adverse reactions. Poor adherence to warfarin may be one of the common barriers to obtain favourable anti-coagulation outcomes.
OBJECTIVES: To examine medication adherence rate and its contributing factors among patients taking warfarin in Hospital Putrajaya, and the correlation between knowledge**on warfarin** and medication adherence towards anti-coagulation control.
METHOD: This is a cross-sectional study, enrolled patients who were on warfarin and attended the Medical Specialist Clinic at Putrajaya Hospital from November to December 2017, using a self-administered questionnaire. Adherence was measured using 4 items,**comprises of**frequency, dosage, time, and precautions **when taking** warfarin**following medical advice.**Adherence was defined if patients scored 0 as total scores of 4 items. The factors that may influence patients' adherence were modelled using binary logistic regression. Good anti-coagulation control measured by 70% INR level within therapeutic range. Correlation between medication adherence and anti-coagulation control were measured using chi square test.
RESULTS: A total of 163 patients were included in the study. Good medication adherence were observed in 150 (92%) of the enrolled patients. Gender, race and education background significantly influenced patients' adherence to medication. Patients who were adhered had greater understanding about warfarin (79.1%) compared to non-adherent patients. However, there were no correlation observed between warfarin adherence and knowledge towards good anti-coagulation control.
CONCLUSION: Knowledge of medication exerts significant influence on medication adherence in patients taking warfarin. However, being adherent to medications does not correlate to good anti-coagulation control. Future study may consider evaluating modifiable risk factors that can exert better anticoagulation and health outcomes.

KEYWORDS: impact of pharmacy services, Putrajaya**,** adherence rate, warfarin, anticoagulation
NMRR ID: NMRR-17-2915-38441

OP-78 (Oral)
A REVIEW OF LONG-TERM ORAL PROTON PUMP INHIBITOR (PPI) USE IN A TERTIARY HOSPITAL

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INTRODUCTION: Long-term use of proton-pump inhibitors (PPIs) could lead to unwanted adverse effects, namely hypomagnesemia, increase risk of myocardial infarction, osteoporosis/bone fracture and worsening of renal function
OBJECTIVES:
This study aimed to evaluate the long-term use of oral PPIs, to identify the appropriateness of monitoring parameters and long-term adverse complications in patients treated with PPIs in Hospital Putrajaya.
METHOD: This was a retrospective cohort study enrolled patients aged 18 years and above, who were prescribed with oral PPIs in Hospital Putrajaya for more than 6 months, in year 2016. Patients who had PPI initiated from other healthcare facilities were excluded.
RESULTS: A total of321 patients were recruited, mean duration of PPIs prescribed was 31.1 ± 29.9 months. General Medicine discipline prescribed the most PPIs (51.4%), followed by Surgical (32.1%) and Rheumatology (7.2%). The indication of long-term use of oral PPI as decided in the Drug Therapeutic Committee (DTC) was for gastroesophageal reflux disease (GERD), endoscopic-proven ulcer and prophylaxis for dual anti-platelet therapy. It was found that 67% of the long-term PPIs uses were not prescribed according to the DTC decision. Monitoring on long-term adverse effects was found to be lacking. Only 86% of long-term patients had renal profile, 26% calcium level, 19% magnesium level and 3% bone mineral density (BMD) done periodically. Chronic kidney disease (CKD) or worsening CKD was observed in 2.1% patients (n=6/277), 22.2% (n=2/9) had osteoporosis/fracture and 1.6% (n=1/61) patients developed hypomagnesemia after long-term use.
CONCLUSION: Majority of the prescriptions for PPIs were not indicated for long-term use as per local clinical pathway. Monitoring parameters such as BMD, calcium, magnesium level, renal profile and electrocardiogram should be performed periodically when long-term PPIs therapy is indicated.

KEYWORDS: quality use of medicines, Putrajaya**,** proton pump inhibitor, prescribing practice, complication.
NMRR ID: NMRR-16-2635-32227

OP-79 (Oral)
KNOWLEDGE REGARDING SERIOUS SIDE EFFECTS OF CLOZAPINE AMONG REGISTERED NURSES AND ASSISTANT MEDICAL OFFICERS IN HOSPITAL PERMAI JOHOR BAHRU

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INTRODUCTION: Clozapine is a second-generation antipsychotic that is used in patients with treatment-resistant schizophrenia and uncontrolled suicide thoughts. Despite its superior efficacy over other antipsychotics, its use has been limited due to some of its potentially life-threatening side effects. Medical staffs such as nurses and assistant medical officers (AMOs) play an important role in the long-term management of psychotic patients.
OBJECTIVES: To assess the knowledge of psychiatric nurses and AMOs regarding the serious side effects of clozapine
METHOD: Cross-sectional study using a validated questionnaire developed based on 3 experts' opinion. Participants were selected using systematic random sampling.
RESULTS: A total of 103 nurses and 37 AMOs completed the questionnaire with mean total scores of 8.4 and 6.6, out of a potential maximum score of 18, for nurses and AMOs respectively. Generally, nurses performed better than AMOs, with 47.6% of nurse and 10.8% of AMOs passing the questionnaire (≥50% correct answers). Based on multiple regression analysis, personnel who claimed to have received adequate information during training were more likely to score badly in the test (p=0.008). There was a trend that personnel who has higher education level was more likely to pass the test (p=0.103).
CONCLUSION: There is a large gap in the basic knowledge among psychiatric nurses and AMOs about clozapine and its side effects, where it is more significant among the AMOs. Nurses and AMOs who had no knowledge in clozapine should receive adequate training before handling patient who receiving clozapine. Periodic assessment such as using tests or questionnaires could help to identify personnel who required training on handling patient who receiving clozapine.

KEYWORDS: quality use of medicines, Johor Bahru**,** antipsychotic, knowledge, side effects
NMRR ID: NMRR-17-952-35066

OP-80 (Oral)
STUDY ON PUBLIC KNOWLEDGE AND ATTITUDE TOWARDS ANTIBIOTIC USE AMONG COMMUNITY AT BACHOK DISTRICT

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INTRODUCTION: Antibiotic compliance is a major concern in ensuring optimal pharmacotherapy as poor compliance will lead to antimicrobial resistance. Limited information regarding public knowledge and attitudes towards antibiotic particularly at Bachok district, Kelantan.
OBJECTIVES: This study aims to assess the level of knowledge, attitudes and its associated factors among community in Bachok, Kelantan.
METHOD: A cross sectional prospective study using a validated questionnaire was conducted from June 2016 until July 2017, in four randomly chosen health care clinics under Bachok District Health Office. Data were entered and analysed using IBM Statistical Program for Social Sciences (SPSS) version 22. The descriptive METHOD and multiple logistic regressions were applied to answer the objectives of the study.
RESULTS: A total of 360 respondents was involved, with prevalence of good knowledge was 22.8% (95% confidence intervals [CI]: 18.75, 27.39) and good attitude was 57.5% (95% CI: 52.34, 62.50). Multiple logistic regressions showed that occupation related to health sector (adjusted odds ratio [OR]: 4.96; 95% CI: 2.51, 9.78; $p<0.001$) and good attitude (adjusted OR: 20.97; 95% CI: 7.37, 59.66; $p<0.001$) were significantly associated with good knowledge. While age (adjusted OR: 4.84; 95% CI: 2.42, 9.71; $p<0.001$) and good knowledge (adjusted OR: 22.51; 95% CI: 7.90, 64.15; $p<0.001$) were significantly associated with good attitude.
CONCLUSION: Poor knowledge and attitude towards antibiotic use show that awareness were still low among community in Bachok. It was also noted that both good knowledge and good attitude were related to each other. Increasing awareness towards the importance and compliance of antibiotic use is vital in order to prevent antibiotic resistance and also financial wastage.

KEYWORDS: impact of pharmacy services, Kelantan**,** knowledge, attitude, antibiotic use
NMRR ID: NMRR-17-2829-35614

OP-81 (Oral)

A PROSPECTIVE STUDY ON THE USAGE OF INTRAVENOUS VANCOMYCIN IN ADULT PATIENTS AT SELAYANG HOSPITAL

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INTRODUCTION: Increased in resistant of gram-positive bacteria has caused a surge in the usage of vancomycin which leads to substantial misuse of empirical vancomycin treatment, which eventually caused the emergence of vancomycin-resistant *Enterococcus* sp (VRE) especially in Asian countries. This antibiotic resistance leads to consequences such as urgent need of new antibiotic development, prolonged hospitalization and higher cost of treatment.
OBJECTIVES: This study aimed to evaluate the appropriateness of vancomycin usage based on Centers for Disease Control and Prevention (CDC) criteria at 0-hour and 72-hour, and the risk factors associated with vancomycin misuse.
METHOD: This is a prospective study performed on adult patients who were started with intravenous vancomycin at Selayang Hospitalfrom April 2017 to September 2017. Data were prospectively obtained via drug utilization record and patients' data were acquired using electronic medical record. All patients were followed up until death or hospital discharge.
RESULTS: At 0-hour, majority of the vancomycin cases started empirically were inappropriate. From all the empirical cases, only 10 cases of vancomycin were de-escalated according to the final culture. The study also found out that 31 cases of vancomycin therapy were continued empirically after 72 hours; in Nephrology (n=17), Anesthesiology (n=7), Medical (n=4), Surgical (n=1), Orthopedic (n=1), and Hepatology (n=1) disciplines, even without substantial evidence from final microbiological results. Out of 126 cases, only 35 cultures isolated showed sensitivity to vancomycin. Inappropriate usage of vancomycin was associated with patient's age <60 years old, presence of mechanical ventilation and presence of central venous catheter.
CONCLUSION: In conclusion, there is a need of hospital policy in guiding vancomycin initiation especially in patient's age <60 years old, with the presence of central venous catheter and mechanical ventilation, in order to reduce the misuse of vancomycin.

KEYWORDS: quality use of medicines, Selangor**,** vancomycin, appropriateness, risk factors
NMRR ID: NMRR-17-1600-34959

LIST OF POSTER PRESENTATIONS

No	Presenting Author	Title
PP-01	Ting Chuo Yew	Awareness On Know Your Medicine Campaign And The Appropriate Use Of Medicines Among Sarawak Consumers
PP-02	Ting Chuo Yew	Knowledge And Practice Of Beauty Salon Personnel Towards Regulations Of Cosmetics: Preliminary Findings From The State Of Sarawak, Malaysia
PP-03	Khairulanwar Bin Burhanuddin	Predicting Oral Drug Absorption In The Older Population: An In-Vitro-In-Vivo Correlation (IVIVC) Approach
PP-04	Lau Boon Tiang	Prevalence Of Potentially Inappropriate Medication (PIM) Among Elderly Patients In A District Hospital: A Cross-Sectional Study
PP-05	Tan Guo Hong	Antibiotic Prescribing Practice For Paediatric Outpatients Across Non-Specialised Regional Hospitals In Kedah State, Malaysia
PP-06	Wan Nurul Huda Binti W. Hasan	Topical Treatment Adherence Amongpsoriatic Patients: A Single Center Study
PP-07	Rosdi Md Zin	Incidence Of Error Before Dispensing At Outpatient Pharmacy, Hospital Melaka
PP-08	Hamiza Aziz	Qualitative Exploration Of Factors For Medication Adherence Among Subsidized And Self-Paying Patients In Malaysia
PP-10	Nur Hazalina Md Salleh	Trends And Patterns Of Strong Opioid Prescribing In Cancer Pain
PP-11	Syazzana Bt Dzulkifli	Retrospective Audit On Carbapenem And Cephalosporin Antibiotics Usage In Hospital Rehabilitasi Cheras
PP-12	Mohamad Syafuan Bin Fadzil	The Use Of Complementary And Alternative Medicines Among Type 2 Diabetes Mellitus Patients In Hospital Tuanku Fauziah
PP-13	Mohammad Rizalmazli Bin Salim	Quantitative Analysis Of Illegal Sex Stimulant Products Containing Sildenafil Distributed In Klang Valley Using Ultra-High-Performance Liquid Chromatography (UHPLC)
PP-14	Ganesh Sritheran Paneerselvam	Health Related Quality Of Life Among Patients With Skin Disorders
PP-15	Nur Amalina Binti Dellemin	Development And Validation Of A Questionnaire On Knowledge, Attitude And Perception Towards Allergic Reactions Of Paracetamol
PP-16	Aiza Adlina Abdullah	Predicting Pharmacokinetics Of Biomolecules (Monoclonal Antibodies)
PP-17	Aslina Binti Ashaari	Efficacy And Safety Of Warfarin In Geriatric Patient With Nonvalvular Atrial Fibrillation In Hospital Tuanku Ja'Afar Seremban
PP-18	Tang Kah Wong	Study Of The Efficacy Of Local Application Of Gentamicin In The Prevention Of Catheter-Related Infections Among Haemodialysis Patients

PP-19	Teo Kui Yuan	Knowledge, Attitude, And Practice (KAP) Of Nurses In The Preparation And Administration Of Intravenous (IV) Medications: Linguistic Validation Of Questionnaire In Malay Version
PP-20	Siti Nuraidah Binti Mamat	Evaluation On Effectiveness Of Clinical Pharmacist-Led Educational Program In Intensive Care Nurses' Knowledge And Practices Regarding Medication Administration Through Enteral Tubes
PP-21	Tew Mei Mei	Pharmacist-Managed Diabetes Clinic In Malaysia - Does The Number Of Follow-Up Visits Really Matter?
PP-22	Mohd Farizh B Che Pa	Comparing The Clinical Effectiveness Of Levothyroxine Intake Before Breakfast Versus At Bedtime In Patient With Hypothyroidism
PP-23	Aishah Binti Mohd Shah	Study Of Workload Among Clinical Pharmacists In The Medical Wards In The Form Of Standard Minimum Requirement In Hospital Tuanku Ja'Afar Seremban
PP-24	Ang Ju Ying	Inadequate Self-Care Behaviors Among Malaysian Diabetic Patients: The Need For Action By Hospital Pharmacists
PP-25	Ignatius Leon	Using Local Microbiological Data To Determine Susceptibility Pattern For Treatment Of Hospital-Acquired Pneumonia
PP-26	Lee Chee Ming	Pattern Of Acute Poisoning And The Antidote Usage; A Retrospective Study At Emergency Department Hospital Selayang In 2015
PP-27	Poh Wen Tsin	Implementation Of Crispr-Cas9 System To Modify Genes In Yeast
PP-29	Norazila Abdul Ghani	Returned Medication In Outpatient Pharmacy Of Hospital Sultanah Bahiyah
PP-30	Mumtaz Binti Mohamad Ghausillah	Public Knowlegde And Attitudes Towards Antibiotics Usage In Perlis: A Cross Sectional Study
PP-31	Sharini Sha'Ari	Assessment Of Vancomycin Initial Dosing And Subsequent Trough Concentration In Paediatric Patients In Hospital Tuanku Ja'Afar Seremban
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PP-34	Lim Ern Sze	The Impacts Of Pictorial And Conventional Labelled Topical Medication On The Patient'S Understanding
PP-35	Nurhanna Syahida Binti Shukran	A Qualitative Study In Tablet Splitting: Exploring Patient Experiences At Hospital Tuanku Fauziah (HTF)
PP-36	Nur Mardhiya Binti Darnalis	Evaluation Of Initial Vancomycin Weight-Based Loading Dose In End Stage Renal Failure Patients
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PP-38	Norazila Abdul Ghani	Risk Factors In Type 2 Diabetes Mellitus (T2Dm) Among Adolescents In The State Of Kedah, Malaysia: A Cross-Sectional Pilot Study

PP-39	Ruzmayuddin Bin Mamat	Reasons For Amphetamine-Type-Stimulant (Ats) Use Among Clients In Government And Private Methadone Maintenance Treatment (Mmt) Programs In The District Of Kuantan, Pahang
PP-40	Nuwairoh Bt Mohamed Nasir	Assessment Of Public Knowledge And Perception Towards Childhood Vaccination In Perlis, Malaysia

PP-01 (Poster)

AWARENESS ON KNOW YOUR MEDICINE CAMPAIGN AND THE APPROPRIATE USE OF MEDICINES AMONG SARAWAK CONSUMERS

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INTRODUCTION: Inappropriate use of medicine is a serious public health issue. Malaysia has launched Know Your Medicine (KYM) campaign in 2007 to promote appropriate use of medicines (AUOM). However, little studies are done to evaluate the extent of awareness level towards the KYM campaign and AUOM among Sarawak population.
OBJECTIVES: To explore the awareness level of consumers on the KYM campaign and on AUOM in the state of Sarawak, Malaysia.
METHOD: A cross-sectional survey was conducted from 1st June to 31st August 2015 using a structured self-administered questionnaire adapted from the National Survey on the Use of Medicines III. Multi-stage sampling was employed in which stratified sampling was done to confine similar sample size between urban and rural areas. Pearson's chi-square test was conducted to detect statistical significance between urban and rural respondents with SPSS v21.0.
RESULTS: A total of 267 respondents, with 49.1% and 50.9% from urban and rural population respectively. Only 32.8% and 19.9% of respondents from urban and rural respectively had attended the KYM activities ($p<0.05$). From the awareness of the AUOM, urban respondents had a significant higher proportion of recognising generic and brand name of medicine (73.3% vs 39.7%, $p<0.001$). However, both groups reported poor awareness on proper disposal of medicines (<25%) and availability of Meditag™ hologram stickers as anti-counterfeiting measure (<50%).
CONCLUSION: The results of this study provide insights on the extent knowledge gap of KYM Campaign and AUOM among Sarawak population. Efforts to increase such awareness need to be perpetuated and be periodically evaluated.

KEYWORDS: quality use of medicines, Sarawak, awareness**,** Know Your Medicine Campaign, appropriate use of medicines
NMRR ID: NMRR-16-2304-33382

PP-02 (Poster)

KNOWLEDGE AND PRACTICE OF BEAUTY SALON PERSONNEL TOWARDS REGULATIONS OF COSMETICS: PRELIMINARY FINDINGS FROM THE STATE OF SARAWAK, MALAYSIA

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INTRODUCTION: Malaysia regulates all cosmetics in the market to ensure its safety and quality through enforcing notification of cosmetics under Control of Drugs and Cosmetics Regulations 1984.
OBJECTIVES: This study investigated the knowledge and practice of beauty salon personnel (BSP) towards the regulation of cosmetics.
METHOD: A cross-sectional survey was conducted in four major cities of Sarawak from 13th to 31th March 2016. Sampling frame through the search of website using key terms was obtained and only those with clear location address stated were selected. Universal sampling was employed to select all 86 beauty salons throughout the four cities. A structured questionnaire was developed and pre-tested to measure the knowledge and practice of BSP towards the regulations of cosmetics.
RESULTS: Due to the sensitivity of the study topic, only 31 of the BSP (36.0%) provide written consent to participate. Notwithstanding 71% of BSP were aware that every cosmetic in Malaysia needs to have notification number issued by Ministry of Health, only 19.4% of them were aware of how the cosmetic notification number looks like, and almost all of them (96.8%) did not know how to apply for it. Moreover, only 38.7% of them would verify notification status of cosmetics before selling. Furthermore, a mere 6.5% of the BSP would apply for the notification number when they imported cosmetics.
CONCLUSION: The findings alert the relevant authorities about the extant knowledge and practical level of BSP on regulations of cosmetics. It highlights the need for more comprehensive studies with remedial interventions in the future to improve the current situation.

KEYWORDS: quality use of medicines, Sarawak**,** cosmetic regulation, knowledge, practice
NMRR ID: NMRR-16-2221-33483

PP-03 (Poster)
PREDICTING ORAL DRUG ABSORPTION IN THE OLDER POPULATION: AN IN-VITRO-IN-VIVO CORRELATION APPROACH

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INTRODUCTION: The world population is undergoing an ageing phenomenon, with population aged > 65 years projected to be >2 billion (2050). On average, this population takes >5 medications daily (mostly oral) for multiple comorbidities. Thus, there is a need to investigate oral absorption in this population.
OBJECTIVE: To investigate oral absorption in the elderly population using in-vitro dissolution tests in suitable media, integrated with the physiologically based pharmacokinetic (PBPK) model.
METHOD: The oral absorption of the geriatric population was simulated using the SimCYP software. Steps involved: (1) establishment of in-vitro-in-vivo correlation (IVIVC) models with paracetamol, warfarin and isoniazid for internal validation, and modified-release metoprolol for external validation, (2) development of paracetamol and isoniazid geriatric IVIVC models; and (3) prediction of geriatric plasma concentration using dissolution profiles in the developed model for comparison across different age groups and gastrointestinal pH conditions.
RESULTS: Geriatric IVIVC models for paracetamol and isoniazid were developed and validated internally and externally. For paracetamol, correlation between in-vivo deconvoluted dissolution from geriatric plasma concentration profile and in-vitro dissolution performed with phosphate buffer, demonstrate point-to-point correlation with prediction error (PE) of -2.75 for area under the curve (AUC) and 7.68 for maximum plasma-concentration (C_{max}). The isoniazid geriatric IVIVC demonstrate the best correlation in hydrochloric acid, with PE=0.05 for AUC and -7.25 for C_{max}. For both paracetamol and isoniazid, comparison of predicted geriatric pharmacokinetics parameters showed significant differences ($p<0.05$) in AUC, C_{max}, elimination rate constant (K_{el}), volume of distribution (V_d) and clearance (CL) between adult and different geriatric age groups but did not show any difference between stomach and duodenum pH in 85-98 years age population.
CONCLUSION: The results show that the pharmacokinetic changes in the elderly population are more pronounced in the distribution, metabolism and elimination than the absorption phase, specifically for paracetamol and isoniazid compounds.

KEYWORDS: research tools**,** Birmingham, geriatric, physiologically based pharmacokinetic model, oral, absorption
NMRR ID: NMRR-18-507-40904

PP-04 (Poster)
PREVALENCE OF POTENTIALLY INAPPROPRIATE MEDICATION AMONG ELDERLY PATIENTS IN A DISTRICT HOSPITAL: A CROSS-SECTIONAL STUDY

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INTRODUCTION: Medication-related problems are common and often preventable among elderly patients.
OBJECTIVES: This study aimed to investigate the prevalence of potentially inappropriate medication (PIM) prescribed for elderly patients and the factors associated with PIM.
METHOD: This was a cross- sectional study conducted in a district-level hospital of Malaysia. The admission medication histories of patients aged 60 years old and older were assessed by clinical pharmacists between June and December 2015. The presence of PIM was screened using American Geriatrics Society 2015 updated Beers criteria and additional clinical histories were retrieved via electronic medical record.
RESULTS: Of 218 medication histories obtained, 61.9% of elderly patients were found being prescribed with at least one PIM. The top three PIM to avoid were proton-pump inhibitor (13.8%), prazosin (9.2%) and metformin/glibenclamide (7.8%). On the other hand, the most common PIM to be used with caution in older adults detected was diuretic (loop diuretic 14.7%, thiazides 13.8%, potassium–sparing diuretic 6.4%). Factors associated with PIM were older age ($p=0.031$), presence of more co-morbidities ($p<0.001$), and higher number of medications ($p=0.010$). Of all co-morbidities, ischemic heart disease and heart failure were found to be associated with PIM ($p=0.008$ and $p=0.011$, respectively).
CONCLUSION: The prevalence of PIM detected in this district-level hospital was high. Efforts should be taken to reduce the number of PIM prescribed for older adults in the future.

KEYWORDS: quality use of medicines, Negeri Sembilan, elderly**,** potentially inappropriate medication, risk factors
NMRR ID: NMRR-16-2689-31499

PP-05 (Poster)
ANTIBIOTIC PRESCRIBING PRACTICE FOR PAEDIATRIC OUTPATIENTS ACROSS NON-SPECIALISED REGIONAL HOSPITALS IN KEDAH STATE, MALAYSIA

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INTRODUCTION: Inappropriate and excessive use of antibiotics is common in both adults and children worldwide. In response to the increasingly severe antimicrobial resistance, the National Antibiotic Guidelines (NAG) was revised by the Ministry of Health, Malaysia, in 2014, and was since then used as the main reference to guide antibiotic prescribing practices in public healthcare facilities.
OBJECTIVES: To explore the patterns of antibiotic utilisation in paediatric patients at the outpatient department, and to assess the adherence level of antibiotic prescribing to NAG.
METHOD: A cross-sectional study was undertaken at four non-specialised regional hospitals in Kedah State, Malaysia. All prescriptions with at least one oral antibiotic, prescribed for outpatients below 13 years of age, between 1st January and 31st March 2017, were reviewed. Information which includes patient's age, weight, diagnosis, and type and dosage of antibiotics prescribed were recorded. Prescribed antibiotic regimens were then compared to NAG recommendations.
RESULTS: Of 3,359 paediatric prescriptions reviewed, 1,194 (35.5%) contained at least one oral antibiotic. The patients were mostly male (53.1%), with a mean age of 5.52±3.44 years. Antibiotics were most commonly prescribed for otorhinolaryngology infections (73.6%), followed by skin and soft tissue infections (13.1%), and lower respiratory tract infections (4.6%). The most frequently prescribed antibiotics were amoxicillin (34.9%), phenoxymethylpenicillin (25.6%), and cloxacillin (15.3%). Non-adherence to the NAG's recommendations was found in 71.8% (653) of the prescriptions, particularly in the drug selection (35.8%) and the dosage used (64.1%).
CONCLUSION: Vast majority of the antibiotics prescribed were not in line with the NAG recommendations, suggesting of potential inappropriate antibiotic use. This warrants a well-planned approach to improve the paediatric antibiotic prescribing practice among the non-specialised hospitals in Kedah State, Malaysia.

KEYWORDS: pharmacoepidemiology, Kedah**,** antibiotic prescribing, outpatient paediatric, adherence
NMRR ID: NMRR-17-910-35784

PP-06 (Poster)
TOPICAL TREATMENT ADHERENCE AMONG PSORIATIC PATIENTS: A SINGLE CENTER STUDY

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INTRODUCTION: There have been few studies of treatment adherence towards topical products in Asian, specifically in Malaysian population with psoriasis. Understanding towards medication adherence is important to have better treatment outcomes.
OBJECTIVE: This study aimed to determine patient's knowledge on disease and topical treatment; and factors associated with adherence toward topical treatment among psoriatic patients in Dermatology Clinic, Hospital Serdang.
METHOD: A cross-sectional study was conducted from April to October 2017 among psoriatic patients in Hospital Serdang using a validated 35-structured questionnaire. The questionnaire assessed patient's knowledge on disease, adherence and satisfaction towards topical treatment of psoriasis. Adult patients ageing from 18 years old, diagnosed with psoriasis and currently receiving psoriatic topical treatment in Hospital Serdang were recruited. The association between adherence and satisfaction, knowledge on disease and on topical treatment were examined using Pearson's chi-squared test.
RESULTS: A total of 132 patients participated in this study. Out of these patients, 36 (27.5%) complied with treatment, 61 (46.6%) moderately adhere and 34 (26.0%) did not adhere to topical treatment. The three major reasons for non-adherence were the topical treatment that are oily to use (49.5%), inconvenient to use (40%) and patients have no time to use(26%). There was no association observed between adherence and patient's satisfaction (p=0.057). Similarly, there was no association observed between patient's knowledge and adherence on topical treatment (p=0.484).
CONCLUSION: This study findings suggest that majority of psoriatic patients moderately adhered towards topical treatment. Therefore, a simplified and individualized topical regimen should be taken into account.

KEYWORDS: quality use of medicines, Selangor, topical treatment**,** adherence, psoriatic patients
NMRR ID: NMRR-17-2755-38853

PP-07 (Poster)
INCIDENCE OF ERROR BEFORE DISPENSING AT OUTPATIENT PHARMACY, HOSPITAL MELAKA

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INTRODUCTION: Dispensing error may result in significant effect to patient. Study in error before dispensing, types of error and factors associated may help in minimizing errors in the future.
OBJECTIVES: To **s**tudy the incidence of errors before dispensing, types of error and factors associated with error at Outpatient Pharmacy of Hospital Melaka.
METHOD: A cross sectional study focusing on number and types of detected errors before dispensing medication and contributing factors during office hours. Data was recorded in a designated form provided at Outpatient Pharmacy. Results were analyzed using descriptive statistics via SPSS programme analysis.
RESULTS: Out of 19,820 prescriptions filled, 219 prescriptions (1.1%) had error before dispensing that were detected and recorded. Incorrect quantity of medication supplied was the most popular type of error, with 24.54% recorded, whilst expired medication and labelling error with wrong patient information was cited as the least popular, with 0% occurrence. Key performance indicator (KPI) of waiting time was the highest contributing factor for errors at 24.66% whilst feeling unwell, unclear TCA and inexperience, which made up "other" factors, were cited as the least popular at 3.65%. Another contributing factor was prescriptions with nine or more items which made up of 52.6% of errors as opposed to those with less than nine items.
CONCLUSION: Study found that the incidence of error before dispensing was 1.1%, with incorrect quantity, missing out drugs and wrong medication supplied were the most popular types of error. KPI of waiting time and being understaffed were the biggest contributing factors to errors before dispensing. The need for more thorough counter checking before medications are dispensed is important to reduce errors.

KEYWORDS: impact of pharmacy services, Malacca**,** outpatient pharmacy, dispensing errors, factors
NMRR ID: NMRR-16-2579-33106

PP-08 (Poster)
QUALITATIVE EXPLORATION OF FACTORS FOR MEDICATION ADHERENCE AMONG SUBSIDIZED AND SELF-PAYING PATIENTS IN MALAYSIA

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INTRODUCTION: Numerous studies have evaluated factors for medication adherent among patients with chronic diseases. However, the factors influencing medication adherence among subsidized patients with chronic diseases, for whom medication costs may not be a constraint, remain unexplored.
OBJECTIVES: To explore potential factors that may influence subsidized and non-subsidized (self-paying) patients' adherence to medication.
METHOD: Subsidized and self-paying patients were identified at public and private healthcare institutions in three states of Malaysia. Patients were then purposively selected for semi-structured, face-to-face interviews according to their medication adherence status (including adherent and non-adherent patients), which was measured using the Medication Event Monitoring System (MEMS). Adherence was defined if patients had 80% and more of the percentage of days in which dose regimen was executed as prescribed. During the interviews, patients were asked to provide reasons for their medication adherence or non-adherence as well as their predicted medication-taking behavior if they were required to pay for the National Health Insurance Scheme. The patient interviews were audio recorded and transcribed verbatim. Data were analyzed using thematic analysis with NVivo 11 software
RESULTS: Thirteen subsidized and 12 self-paying patients were interviewed. The themes found in both groups were similar. The factors that influenced adherence to medication include the *"perceived importance of quality of life"* and "*perceived benefitorvalue of the medications."* A unique factor reported by patients in this study included "*perceived value of the money spent on medications"*; more specifically, patients adhered to their medications because they valued the money spent to buy/receive the medications. Patients perceived that paying for the proposed national health insurance scheme might have led to medication non-adherence.
CONCLUSION: Medication adherence among subsidized and self-paying patients was influenced by many factors. A unique factor for medication adherence among these patients includes perceptions of the value of money spent on medications.

KEYWORDS: quality use of medicines**,** Putrajaya, medication adherence, subsidized medication, self-paying,
NMRR ID: NMRR-14-1255-2247

PP-10 (Poster)
TRENDS AND PATTERNS OF STRONG OPIOID PRESCRIBING IN CANCER PAIN

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INTRODUCTION: Drug therapy with opioid is the mainstay of cancer pain management, where strong opioid being the first-line treatment for moderate to severe pain. In local setting, the utilisation of weak opioid are common compared to strong opioid. Limited data is available describing in details on opioid prescribing pattern, especially in cancer pain management, in local setting.
OBJECTIVES: To describe the trends of the commonly prescribed strong opioids for cancer pain in an outpatient care setting.
METHOD: This is a cross sectional study, conducted in Out-patient Pharmacy, Hospital Sultan Ismail Johor Bahru. Prescriptions of morphine, oxycodone, and fentanyl issued for the period of 2008 to 2015 were reviewed. Annual number of prescriptions and patients, oral morphine equivalent (OMEQ) dose and defined daily dose (DDD) / 1000 patients per day were measured in repeated cross-sectional estimates.
RESULTS: A total of 3,618 prescriptions of the three strong opioid analgesics were prescribed in 1,557 patients, consisting of 57.5% female patients with mean age of 55.68±13.11 years, during the 8-year study period. Morphine was the most frequently prescribed opioid in cancer pain (69.8%), followed by oxycodone (25.7%) and fentanyl (4.4%). The greatest increased in annual number of prescriptions was observed for oxycodone (10,880%). Early in 2008, morphine was the dominating opioids and over the eight years its usage has been declined to two-folds from 0.13 to 0.07 of DDD / 1000 patients per day. In contrast, oxycodone prescribing rose tremendously from 0.01 in 2010 to 0.20 of DDD / 1000 patients per day in 2015.
CONCLUSION: There has been a huge increase in strong opioid prescribing and changes in pattern of opioid prescribing in cancer pain management over the study period. Morphine was the most frequently prescribed, but the utilization of oxycodone increased markedly over time.

KEYWORDS: pharmacoepidemiology & drug safety**,** Johor, prescribing pattern, strong opioid, cancer pain
NMRR ID: NMRR-16-1907-31595

PP-11 (Poster)
RETROSPECTIVE AUDIT ON CARBAPENEM AND CEPHALOSPORIN ANTIBIOTICS USAGE IN HOSPITAL REHABILITASI CHERAS

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INTRODUCTION: Antibiotic resistance is a critical problem faced worldwide. In view of increasing consumption of carbapenem and cephalosporin antibiotic in Hospital Rehabilitasi Cheras, an audit has been conducted to determine the usage and the rationale use of these antibiotics comparing to National Antibiotic Guideline 2014 (NAG 2014).
OBJECTIVES: This study aimed to determine the usage and the rationale use of carbapenam and cephalosporin in HRC.
METHOD: All adult patients who had started carbapenem and cephalosporin antibiotics in the ward from June 2014 to June 2016 were included. Patients with incomplete medical records or transferred out during the course of antibiotic were excluded.
RESULTS: There were 64 cases of which carbapenem and cephalosporin antibiotics were prescribed. Majority of the patients (52%) were male with mean age of 46years old. Meropenem was the most preferred carbapenem antibiotic for all of the ESBL infection (35%) and Ceftazidime was the most prescribed cephalosporin antibiotics (47%) detected in the ward. The antibiotics were prescribed mostly as a definitive treatment (45%) and only 17% was given as an empirical treatment. Urinary tract infection (UTI) was the most common infection (49%), followed by 38% as a prophylaxis for urodynamic studies (UDS) and pneumonia (7%). Majority of the antibiotics (51%) were prescribed in concordance to the NAG 2014. However, Ceftazidime of which 80% was given as a prophylaxis for UDS was not concordance to the guideline.
CONCLUSION: In conclusion, majority of the antibiotics prescribed in HRC were in concordance to the National Antibiotic Guidelines (NAG). Meropenem was the most preferred carbapenem antibiotic for all of the ESBL infection and ceftazidime was the most prescribed cephalosporin antibiotics.prophylaxis for urodynamic studies (UDS). Concerted effort such as Antibiotic Stewardship Program should be taken to ensure the rational use of antibiotics for all the patients.

KEYWORDS: impact of pharmacy services, Kuala Lumpur**,** antibiotics, carbapenem, cephalosporin
NMRR ID: NMRR-16-1317- 31340

PP-12 (Poster)

THE USE OF COMPLEMENTARY AND ALTERNATIVE MEDICINES AMONG TYPE 2 DIABETES MELLITUS PATIENTS IN HOSPITAL TUANKU FAUZIAH

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INTRODUCTION: The cause of diabetes is a mystery, although both genetics and environment appear to play roles. Complementary and Alternative Medicine (CAM) is defined as a group of diverse medical and healthcare systems, practices, and products that are not generally considered part of conventional Western medicine. Nowadays, majority of patients used CAM because they needed more control on their diabetes.
OBJECTIVES: To understand the prevalence, types, expenditures, attitudes, beliefs, and perceptions of CAM use among patients with type 2 diabetes mellitus (T2DM) in this hospital.
METHOD: This is a descriptive, cross-sectional study involving 111 T2DM patients at HTF. This study was conducted from February to April 2016. All patients were interviewed with a questionnaire adapted from a previous study conducted by Siew et al. Data analysis was done using SPSS v.20 to identify predictors of CAM use.
RESULTS: The prevalence of CAM use was 50.5 percent. Females (67.9%) were the most frequent CAM users compared to males (32.1%). Majority of the users were Malays (98.2%). Diet supplement (48.2%) were the most widely used, followed by spiritual/religion master therapy (32.1%), massage therapy (17.9%) and reflexology (7.1%). The median of the expenditure on CAM usage was RM0.00(30.00) per month. Age group of 35-60 years old was 3.21 times more likely to use CAM compared to the other group (OR 3.21; 95%CI 1.47,7.01; p=0.003).
CONCLUSION: The highest prevalence use of CAM was among the Malay females. Majority of them used CAM primarily due to recommendations by their friends without disclosing their use towards their respective physicians. Apart from that, most of these patients had been a keen user of herbal supplements as they were more affordable and easily available.

KEYWORDS: quality use of medicines, Perlis, attitude, complementary alternative medicine, diabetes mellitus
NMRR ID: NMRR-16-365-29692

PP-13 (Poster)
QUANTITATIVE ANALYSIS OF ILLEGAL SEX STIMULANT PRODUCTS CONTAINING SILDENAFIL DISTRIBUTED IN KLANG VALLEY USING ULTRA-HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY (UHPLC)

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INTRODUCTION: Illegal sex stimulants were sold widely and cause noticeable problem in Malaysia. Despite the problem appears to be non-resolving, there is no report of the concentration of the phosphodiesterase type 5 enzyme inhibitor (PDE-5i) Sildenafil in illegal sex stimulants distributed in Malaysia. Quantitation of sildenafil content in the illegal sex stimulant can give valuable information for consumer education and enforcement activities.
OBJECTIVES: This study aimed to quantify amount of sildenafil in illegal sex stimulants using validated Ultra-High-Performance Liquid Chromatography(UHPLC) method.
METHOD: The chromatographic separation of sildenafil compound was performed on a Purospher® STAR RP-18 endcapped column (50 mm x 2.1 mm i.d., 2µm particle size), at 30 ºC. The isocratic mobile phase was acetonitrile:water (35:65; v/v) with 0.1% trifluoroacetic acid at a flow rate of 0.2 mL/min. The reading of sildenafil was taken using Shimadzu LC-20AT at 245 nm. Samples were prepared with acetonitrile:water (50:50;v/v) and the volume injected was 0.1 µL. The method was validated according to International Conference on Harmonization (ICH) guidelines. Ten (10) illegal sex stimulants were used for the quantification.
RESULTS: The retention time of sildenafil was 2.65 min. This developed method showed good specificity and linearity (>0.999) over concentration of 1 to 100 µg/mL. The LOD and LOQ values were determined to be 0.816 µg/mL and 2.473 µg/mL, respectively. The precision and accuracy of the method were within acceptance range. The developed method was then applied to determine the amount of sildenafil in the illegal sex stimulants. All of the samples tested positive with sildenafil and the content range were found to be from 45.53 mg to 147.69 mg.
CONCLUSION: The amount of sildenafil in illegal sex stimulants were successfully quantified using UHPLC. The present method is reliable and offers advantages in term of speed and low cost of reagents.

KEYWORDS: research tools, Kuala Lumpur**,** sildenafil, illegal sex stimulants, UHPLC
NMRR ID: NMRR-17-3183-38997

PP-14 (Poster)
HEALTH RELATED QUALITY OF LIFE AMONG PATIENTS WITH SKIN DISORDERS

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INTRODUCTION: Skin diseases are worldwide common problem. It affected every aspect of patients' quality of life (QOL) including physically, socially and psychologically.
OBJECTIVES: The purpose of this study was to assess QOL in skin diseases patients using Dermatology Life Quality Index (DLQI) questionnaire and to identify factors associated with it.
METHOD: A cross-sectional design was conducted in outpatient dermatology clinic of tertiary hospital between July to October 2017. Acne, psoriasis and atopic dermatitis (AD) patients (n=145) were selected using convenience sampling and were interviewed using DLQI questionnaire during their scheduled follow-up appointments in dermatology clinic.
RESULTS: Out of three skin diseases, psoriasis patients had the highest prevalence with 39.3% followed by AD (34.5%) and acne (26.2%). Patients' QOL was largely impacted with mean score 10.5 especially on work/school domain. Furthermore, we identified several factors; namely age, working environment, concurrent skin diseases, usage of supplement for their skin disease and type of food as aggravating factors, that may influence patients' QOL impairment.
CONCLUSION: Our findings revealed skin disease had negatively affected individual QOL with different level of aspects. Among the three diseases, patients with AD had the worst impact on QOL. Significant predictors of QOL did not related solely to skin diseases but also other factors such as type of food and working environment.

KEYWORDS: clinical research, Selangor, dermatology, quality of life, skin disease
NMRR ID: NMRR-1773935268

PP-15 (Poster)
DEVELOPMENT AND VALIDATION OF A QUESTIONNAIRE ON KNOWLEDGE, ATTITUDE AND PERCEPTION TOWARDS ALLERGIC REACTIONS OF PARACETAMOL

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INTRODUCTION: National Pharmaceutical Regulatory Agency (NPRA), Ministry of Health Malaysia has received 1018 adverse drug reactions reports related to paracetamol with 1972 adverse events from year 2000 to February 2015. Serious skin reactions including Stevens-Johnson syndrome (SJS), toxic epidermal necrolysis and acute generalised exanthematous pustulosis (AGEP) may be developed as a result of allergic reactions of paracetamol.
OBJECTIVES: This study aimed to develop and validate a questionnaire regarding Knowledge, Attitude and Perception towards Allergic Reactions of Paracetamol (KAP-ARP) among general population.
METHOD: Content and face validity of the KAP-ARP were determined by four experts and 20 respondents, respectively. A questionnaire with 36 items consisted of 16 Knowledge, 9 Attitude and 11 Perception items was distributed to 177 respondents. Exploratory factor analysis (EFA) was performed for construct validity. Cronbach's alpha was used to determine reliability of the questionnaire.
RESULTS: EFA constructed 13 Knowledge, 8 Attitude and 8 Perception items. The final KAP-ARP questionnaire is reliable based on its internal consistency reliability (Knowledge: $\alpha = 0.78$; Attitude: $\alpha = 0.63$; Perception: $\alpha = 0.70$).
CONCLUSION: A valid and reliable questionnaire which is useful for measuring KAP-ARP among general population has been developed.

KEYWORDS: research tools, Malaysia, validation, knowledge, attitudes, practice, allergic reaction
Research ID: CUCMS/CRERC/ER/020

PP-16 (Poster)
PREDICTING PHARMACOKINETICS OF BIOMOLECULES (MONOCLONAL ANTIBODIES)

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INTRODUCTION: Monoclonal antibodies (mAbs) are considered a large molecules and exhibit complex pharmacokinetics (PK) and pharmacodynamics (PD) behaviour. Physiologically based pharmacokinetic (PBPK) models, with the integration of the structural and physicochemical data of drugs, and the body physiology, can provide a realistic characterisation of the systemic disposition of mAbs.
OBJECTIVES: To predict pharmacokinetic parameters of mAbs in different populations and to identify causes of population variability, by using virtual clinical trials.
METHOD: A simulator software (Simcyp®) was used as a population-based simulator for drug modelling and simulation of PBPK models for virtual populations. The model was validated using a small molecule compound (quetiapine). Subsequently, population pharmacokinetics prediction were conducted and validated for mAbs (adalimumab and etanercept).
RESULTS: Validation of quetiapine, adalimumab and etanercept was successful with all observed data found to be within the 5th (lower) and 95th (upper) centile of the simulated results. Simulation of adalimumab and etanercept pharmacokinetics, particularly in the geriatric population have demonstrated an increase in C_{max} and area under the curve (AUC) ($p<0.05$). An increase in cardiac output as well as a decrease in tissue blood flow and endogenous IgG were associated with the pharmacokinetics changes. A similar trend of C_{max} and AUC were seen in the pregnancy population with an associated increase in cardiac output. In contrast, the cirrhotic population had decreased C_{max} and AUC ($p<0.05$), which were related to an increase in endogenous IgG. For the obese population, pharmacokinetics was affected (decreased C_{max} and AUC) only in etanercept administered via a subcutaneous route. Related changes include increased body mass index and reduced cardiac output.
CONCLUSION: Pharmacokinetic prediction based on PBPK models shows that pharmacokinetics parameters of etanercept and adalimumab vary across different populations.

KEYWORDS: cinical research**,** physiologically based pharmacokinetic, monoclonal antibodies, Simcyp®
NMRR ID: NMRR-40923

PP-17 (Poster)
EFFICACY AND SAFETY OF WARFARIN IN GERIATRIC PATIENT WITH NONVALVULAR ATRIAL FIBRILLATION IN HOSPITAL TUANKU JA'AFAR SEREMBAN

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INTRODUCTION: Nonvalvular atrial fibrillation patients need long-term oral anticoagulant. Warfarin has a narrow therapeutic index, high potential for interaction with food, drugs and can cause bleeding. Geriatric patients are at risk of bleeding.
OBJECTIVES: In this study, the efficacy and safety of warfarin and their relationship with other factors have been studied in geriatric of warfarin clinic.
METHOD: Patient's data were retrieved from the hospital medical record, and hospital computerized system. Warfarin therapy is normally presented with the fluctuation of TTR values. TTR values were calculated by Rosendaal and Traditional METHOD. Statistical analysis tests used were chi-square, t-test, ANOVA, correlation and regression when appropriate with p-value <0.025 (2 tails) is considered significant. Efficacy is defined as good when TTR>65% and the safety assessment defined as INR>3 which related risk of bleeding.
RESULTS: There were 84 patients met the inclusion criteria. In term of efficacy, only 44% achieved TTR >65%.The mean TTR for the one year period was 60.1% ±19.6% (Rosendaal method) and 51.9% ±18.6% (Traditional method). In term of safety, from 1073 INR readings, INR>3 was 17.39% of total INR. There were 8 patients admitted due to over-warfarinization which representing 9.4% of total admissions with mean INR 5.4 ± 1.58 while mean weekly dosing was 13.6 mg and mean TTR was 50.6%. There were three predictors of efficacy, number of missed dose, number of concurrent medication, number of visited warfarin clinic can explain 6.8%, 2.1% and 36.3% of the variance in TTR values (p-value<0.025).
CONCLUSION: A majority of geriatric patients did not achieve efficacy, and a few of them had a risk of bleeding. Thus, in order to increase majority of geriatric patients achieve efficacy and safety of warfarin therapy, more efforts and appropriate strategies are needed.

KEYWORDS: clinical research, Negeri Sembilan**,** geriatric, warfarin, efficacy
NMRR ID: NMRR-16-1650-32282

PP-18 (Poster)
STUDY OF THE EFFICACY OF LOCAL APPLICATION OF GENTAMICIN IN THEPREVENTION OF CATHETER-RELATED INFECTIONS AMONG HAEMODIALYSIS PATIENTS

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INTRODUCTION: The use of local application of antibiotic has a beneficial effect on CRBSI. However, some study shows prolonging antibiotic ointment application probably offers no advantage.
OBJECTIVES: To determine efficacy of local gentamicin cream in the prevention of catheter-related infections in haemodialysis patients.
METHOD: A cross sectionalstudy involved 60 patients with insertion of non-tunnelled internal jugular venous catheters (IJC) in Hospital Kulim. 30 patients randomly prescribed with local gentamicin cream while the other 30 patients were not given after insertion of IJC. Patients were follow up within 6 months after the IJC insertion.
RESULTS: The study found 21 patients in gentamicin group been reported with CRBSI while 19 patients in the other group. There are no significant relationship between the use of local gentamicin application in preventing CRBSI ($p = 0.785$). However, our study found, patient's education level ($p = 0.001$) and type of occupation ($p < 0.001$) affect the rate of CRBSI incidence.
CONCLUSION: Among haemodialysis patients with non-tunnelled IJC, local application of gentamicin cream shows no additional effect on preventing CRBSIs. Improvement on patient education on IJC care will have beneficial effect in preventing CRBSI.

KEYWORDS: clinical research, Kedah**,** catheter-related infections, gentamicin cream, non-tunnelled internal jugular catheters
NMRR ID: NMRR-16-2145-31594

PP-19 (Poster)
KNOWLEDGE, ATTITUDE, AND PRACTICE (KAP) OF NURSES IN THE PREPARATION AND ADMINISTRATION OF INTRAVENOUS (IV) MEDICATIONS: LINGUISTIC VALIDATION OF QUESTIONNAIRE IN MALAY VERSION

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INTRODUCTION: Nurses are among the healthcare providers who mostly involved in IV medication administration in hospital. To our knowledge, there is limited of validated questionnaire in Malay version that can be used to assess the KAP of nurses in the preparation and administration of IV medications in Malaysia.
OBJECTIVES: This linguistic validation is aimed to produce a translated version of questionnaire on KAP of nurses in the preparation and administration of IV medications in Malay version, for use in research and clinical practice.
METHOD: Permission was taken from the authors of the original validated questionnaire. A five-member translation team conducted the translation using the following process: production of two independent forward translations, comparison and reconciliation of the translations, backward translation of the first reconciled version, comparison with the original questionnaire and the backward version, producing the second reconciled version, pilot testing and review of translation, and finalization. The reliability and validity of the Malay version were evaluated based on the data collected from 30 nurses working in wards of Hospital Tuanku Ampuan Najihah. Cronbach's alpha coefficient calculation and face validity was used to assess the reliability and validity respectively.
RESULTS: Linguistic equivalence and psychometric properties were checked to ensure optimal transfer of original message from English to Malay. During cognitive debriefing and review processes, the translated Malay version of questionnaire was found to be easily comprehensible and appropriate for the KAP to be measured. Face validity was confirmed by the nurses involved. Evaluation of reliability measured by Cronbach's alpha coefficient calculation had produced a result of 0.725 (>0.7).
CONCLUSION: The translated questionnaire in Malay version is a reliable and valid measure of nurses' KAP in the preparation and administration of IV medications, which can be applied for researches in Malaysia.

KEYWORDS: research tools, Negeri Sembilan**,** Malay language, linguistic validation, intravenous medications
NMRR ID: NMRR-18-118-39858

PP-20 (Poster)
EVALUATION ON EFFECTIVENESS OF CLINICAL PHARMACIST-LED EDUCATIONAL PROGRAM IN INTENSIVE CARE NURSES' KNOWLEDGE AND PRACTICES REGARDING MEDICATION ADMINISTRATION THROUGH ENTERAL TUBES

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INTRODUCTION: Nurses play a major role in preparing, monitoring, and administrating medication to patients. Inappropriate medication administration through enteral feeding tube may lead to reduction of drug efficacy and increased adverse effects as well. There is no standard guideline or protocol regarding this special administration, hence, the nurses' knowledge and may differ from hospital to another.
OBJECTIVES: The objectives of this study were to evaluate effectiveness of clinical pharmacist-led educational program in progressing nurses' knowledge and practices regarding medication administration through enteral tube.
METHOD: This interventional study was conducted from May to September 2016, involving all intensive care nurses of Hospital Sultanah Nur Zahirah (HSNZ). The self-administered questionnaire and nurse's observational checklist were used as a study instruments. The questionnaire was filled by all nurses during pre-interventional phase. A series of continuous medical education and drug booklet were provided to all nurses by a clinical pharmacist during interventional phase. Nurses were evaluated again after 2 months. At pre and post-intervention phases nurses were observed regarding their practice to administer drugs via enteral tubes as well.
RESULTS: From our study, age (r=0.392, p=0.005, 95% CI 0.025, 0.134), (r=0.601, p=<0.001, 95%CI 0.028, 0.064) and working experience (r= 0.395, p=0.005, 95% CI 0.032, 0.167), (r=0.603, p<0.001, 95% CI 0.035, 0.079) were the significant predictors for nurses knowledge and practice, respectively.The knowledge and practice of the nurses also found to be significantly different before and after clinical pharmacist-led educational program (p<0.001, 95% CI 0.000, 0.058) and (p=0.013, 95% CI 0.000, 0.059) respectively.
CONCLUSION: The knowledge and practices of nurses were associated with age and working experience. There was a significantly different in term of knowledge and practice among nurses in Intensive care unit after our program.

KEYWORDS: impact of pharmacy services, Terengganu**,** knowledge and practices, medication administration, enteral tubes
NMRR ID: NMRR-16-1489-29896

PP-21 (Poster)
PHARMACIST-MANAGED DIABETES CLINIC IN MALAYSIA - DOES THE NUMBER OF FOLLOW-UP VISITS REALLY MATTER?

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INTRODUCTION: Since the past decade, the pharmacist-managed Diabetes Medication Therapy Adherence Clinic (DMTAC) has been introduced across public healthcare settings in Malaysia and was shown to improve the medication adherence and glycemic control of diabetic patients. However, no studies had examined the impact of the number of follow-up visits on the glycemic control.
OBJECTIVES: To identify the relationship between the number of follow-up visits and the glycemic control and to assess the effectiveness of the DMTAC in optimizing the glycemic control of diabetic patients.
METHOD: Retrospective cohort study. All type 2 diabetes mellitus patients, made at least four follow-up visits to the pharmacist-managed DMTAC during May 2014 and April 2016, and had their HbA1C levels tested once each before enrolled in the DMTAC and within the same month of the last follow-up visit, were included.
RESULTS: A total of 53 patients (28 male and 25 female) with a median age of 57 years were included in the study. Irrespective of the number of follow-up visits, the HbA1c and FBS of the patients were found to reduce by 1.3% (p<0.001) and 2.8mmol/L (p<0.001), respectively. However, only 21% of them managed to achieve the targeted HbA1c level. Of all the patients who failed to achieve the targeted HbA1c level, more than half had made at least 8 follow-up visits to the DMTAC. Higher baseline HbA1c (OR: 2.34; 95% CI: 1.14, 4.79) and FBS (OR: 1.41; 95% CI: 1.02, 1.95) levels were more likely to lead to a non-optimized HbA1c level.
CONCLUSION: Despite the effectiveness of the DMTAC in improving the glycemic control, majority of the patients did not achieve targeted level. Number of follow-up visits to the DMTAC is not a determinant of the targeted outcome, and should not be used as discharging criteria in DMTAC.

KEYWORDS: impact of pharmacy services, Kedah**,** DMTAC, pharmacist, diabetes mellitus
NMRR ID: NMRR-16-488-30164

PP-22 (Poster)
COMPARING THE CLINICAL EFFECTIVENESS OF LEVOTHYROXINE INTAKE BEFORE BREAKFAST VERSUS AT BEDTIME IN PATIENT WITH HYPOTHYROIDISM

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INTRODUCTION: Levothyroxine absorption following oral administration is the lowest when taken with food. Several studies have suggested that the administration of levothyroxine at bedtime as an alternate in comparison to the conventional before breakfast dosing.
OBJECTIVES: The study objective was to compare the clinical effectiveness of levothyroxine administration, either in the morning or at bedtime on serum TSH and T4 levels and to determine the effect of administration time of levothyroxine on patient's quality of life (QoL).
METHOD: A prospective, interventional study was conducted at the Endocrinology Clinic, Hospital Tuanku Ja'afar, Seremban from May to November 2017. Hypothyroid patients were assigned to either before breakfast or at bedtime regime through convenient sampling. After 12 weeks, serum thyroid hormones were tested and QoL variables were assessed using the 36-Item Short Form Health Survey and compared with baseline. Primary outcome measured were the changes in TSH and T4 whereas the secondary outcome were QoL, serum creatinine, liver function, BMI, heart rate and blood pressure.
RESULTS: 35 patients completed the 12 weeks study period and were available for data analysis. The serum TSH and T4 level showed improvement in bedtime regime group compared to morning group, in which the mean TSH level reduced from 2.46 ± 1.34 mIU/L to 1.79 ± 0.99 mIU/L ($p = 0.13$) while the mean T4 level increased from 15.25 ± 2.65 pmol/L to 15.73 ± 3.28 pmol/L ($p = 0.51$). Secondary outcomes such as quality of life assessment, blood pressure, heart rate and laboratory results (albumin, ALP and ALT) showed no significant difference between morning and bedtime groups.
CONCLUSION: Our study showed the bedtime administration of levothyroxine is non – inferior in improving serum TSH and T4 in hypothyroid patients in comparison to the morning regime. However, no marked improvements were found in the quality of life variables in both administration times.

KEYWORDS: clinical research, Negeri Sembilan**,** levothyroxine, TSH, T4, bedtime
NMRR ID: NMRR-17-1179-36125

PP-23 (Poster)
STUDY OF WORKLOAD AMONG CLINICAL PHARMACISTS IN THE MEDICAL WARDS IN THE FORM OF STANDARD MINIMUM REQUIREMENT IN HOSPITAL TUANKU JA'AFAR SEREMBAN

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INTRODUCTION: Clinical pharmacist dealing with many tasks. Workload of clinical pharmacist divided into three parts: clinical activities in the ward, non-ward activities and others.
OBJECTIVES: To evaluate time related workload of clinical pharmacist in medical wards in Hospital Tuanku Ja'afar, Seremban
METHOD: The study was conducted by self-reporting of six clinical pharmacists through filling in data collection form between Monday to Friday from 8.00am to 5.00pm which accounts 8 hours of working process for a month .
RESULTS: The data reveals that the pharmacist spent 38.6% of their total time in the ward. The main activities in the ward were ward rounds which signifies 34.5% followed by 31.5% of combination activities such as preparing CP2, CP1 or counselling during ward round. The pharmacists spent 13.6% in non ward activities where the main activity were documentations 37.2% followed by medication therapy adherence clinic 23%, quality assurance 20.1%, provisionally registered pharmacist presentation 15.36% . Balance 38.1% of time was spent in other activities such as course work, time-off, annual leave and public holiday. 9.7% of time was not recorded by the pharmacists. The result showed that only 62.2% of CP1 and 68.9% of CP2 were done by clinical pharmacists involved.
CONCLUSION: In summary, other activities and non ward activities affect the workload of the pharmacist which led to not achieve minimal requirement in the ward activities. Thus, in order to increase the minimum requirement, more pharmacists should be place in the ward.

KEYWORDS: impact of pharmacy services, Negeri Sembilan**,** clinical pharmacist, workload
NMRR ID: NMRR-17-2315-37940

PP-24 (Poster)
INADEQUATE SELF-CARE BEHAVIORS AMONG MALAYSIAN DIABETIC PATIENTS: THE NEED FOR ACTION BY HOSPITAL PHARMACISTS

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INTRODUCTION: Self-care behaviors are strongly associated with clinical outcomes of diabetes management.
OBJECTIVES: This study aimed to determine the prevalence and risk factors of inadequate self-care behaviors among patients with type 2 diabetes mellitus (T2DM) through screening by hospital pharmacists.
METHOD: A cross-sectional study was undertaken for nine months at a public tertiary care center in Perak. Self-care behaviors of 103 patients with T2DM were evaluated using the 16-item Diabetes Self-Management Questionnaire (DSMQ), and the scores were dichotomized to represent "adequate" (≥6 out of 10) and "inadequate" (<6 out of 10) self-care behaviors. The risk factors for inadequate self-care behaviors were identified using logistic regression analysis.
RESULTS: The participants recorded a mean DSMQ score of 7.48±1.32, and 16 (15.5%) of them were found to have inadequate self-care behaviors. Among the four subscales assessed, the "Health-Care Use" had the highest score (8.36±1.99), while the "Physical Activity" had the lowest score (6.82±2.56). Patients with a duration of T2DM less than one year (OR: 12.00; 95%CI: 1.80, 80.05; p=0.010) and between six to ten years (OR: 7.11; 95% CI: 1.36, 37.31; p=0.020) were found more likely to have inadequate self-care behaviors, as compared with those with a disease duration greater than 10 years.
CONCLUSION: Noticeable proportions of patients with T2DM in Perak had inadequate self-care behaviors, and were found to be associated with the disease duration. This study suggests a more active role for hospital pharmacists in monitoring and improving the diabetes management of patients.

KEYWORDS: impact of pharmacy services, Perak**,** self-care, diabetes mellitus.
NMRR ID: NMRR-15-1193-24276

PP-25 (Poster)
USING LOCAL MICROBIOLOGICAL DATA TO DETERMINE SUSCEPTIBILITY PATTERN FOR TREATMENT OF HOSPITAL-ACQUIRED PNEUMONIA

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INTRODUCTION: Hospital-acquired pneumonia (HAP) and ventilator-associated pneumonia (VAP) are the second most common causes of nosocomial infection in hospital and reported as the highest mortality rate compared to other hospital acquired infection. Different regions have different rate of antimicrobial resistance and pathological pattern.
OBJECTIVES: This study aims to establish HAP and VAP pathogens' microbiologal data and its susceptibility towards empirical antibiotics in intensive care unit (ICU) settings, Selayang Hospital.
METHOD:A retrospective observational study of ICU patients (age ≥ 18 years) with positive bacterial respiratory culture admitted from January to December 2015 was included in the study.
RESULTS: Out of 80 isolates, 78 were gram-negative pathogens and two were gram-positive pathogens, with total of 76 cases of pneumonia. The most common pathogens were *Acinetobacter baumannii, Pseudomonas aeruginosa,* and *Klebsiella pneumoniae* which were associated with 51%, 20% and 11% of pneumonia respectively. Among the empirical antibiotics started, carbapenems was the most frequent (42%), followed by cephalosporins (20%) and anti-pseudomonal penicillins (19%). When data from multi-drug resistant *A. baumannii* were excluded, empirical antibiotic did not provide susceptible antimicrobial coverage in 65%of all isolates. Of those isolates, 37.5% were not appropriate due to empirical use of non-susceptible cephalosporins and aminopenicillins. *A. baumannii* were only found in late onset HAP and VAP (p = 0.001) whereas *P. aeruginosa* can be found equally in both early onset and late onset.
CONCLUSION: This study was able to determine common pathogens and its susceptibility data in our setting. Guidelines complemented with local microbiological data provide better coverage compared to treatment based on guidelines alone. The result of this study recommends the use of dual antibiotic therapy only in late onset pneumonia without positive culture.

KEYWORDS: clinical research, Selangor, antibiotic resistance, microbiological, nosocomial pneumonia
NMRR ID: NMRR-15-2440-25828

PP-26 (Poster)
PATTERN OF ACUTE POISONING AND THE ANTIDOTE USAGE; A RETROSPECTIVE STUDY AT EMERGENCY DEPARTMENT HOSPITAL SELAYANG IN 2015

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INTRODUCTION: Acute poisoning is a significant health problem all over the world. In Malaysia, nationwide data on poisoning pattern is infrequent and lacking.
OBJECTIVE: The aim of the study was to evaluate the pattern of acute poisoning in patients attending Emergency and Trauma Department, Hospital Selayang, Selayang, Selangor in 2015.
METHOD: The study was a retrospective case reviewof all poisoned patients admitted to Hospital Selayang in 2015. Data collected were concerning demographic parameters of the patients, information about the agent(s) implicated and approach in acute poisoning management.
RESULTS: There were 319 poisoning incidents recorded. Males outnumbered females throughout the poison cases (n=164,51.4%). The predominant mode of poisoning was accidental poisoning (n=216, 67.7%). Patients between 16 to 30 years constituted (n=139, 43.6%) of all cases. Animal and plant toxins were the predominant agents implicated (n=180, 56.4%). A higher rate of poisoning involving animal and plant toxin was seen among Chinese ethnic group (n=47, 58%) and Malay ethnic groups (n=90, 73.2%). On the other hand, a higher rate of poisoning associated to drugs (n=34, 38.6%), household products (n=15,17%) and pesticides (n=8, 9.1%) was seen among Indian ethnic group. The most commonly used antidote was N-acetylcysteine as part of the treatment for the poisoning caused by drugs (n=22, 78.58%).
CONCLUSION: Pattern of acute poisoning admissions in Emergency and Trauma Department, Hospital Selayang were associated with a higher percentage of Malay ethnic group, male subjects, accidental in nature and involving animal and plant toxins.

KEYWORDS: pharmacoepidemiology & drug safety, Selnagor, acute poisoning, antidote, emergency department
NMRR ID:NMRR-16-1479-30545

PP-27 (Poster)
IMPLEMENTATION OF CRISPR-CAS9 SYSTEM TO MODIFY GENES IN YEAST

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INTRODUCTION: The discovery of Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR)-associated protein (Cas) system represents a breakthrough in gene editing. CRISPR-Cas9 enables genome targeting by means of inducing double-strand break (DSB) in the genome and using cellular DNA repair process. CRISPR-associated endonuclease Cas9 has shown successful site-specific genomic loci targeting in the presence of a single guide RNA (sgRNA) which consist of CRISPR RNA (crRNA) and *trans*-activating RNA (tracrRNA). The specificity of the DNA cleavage is achieved by complementary sequence binding of crRNA to the DNA sequence of interest that has a protospacer adjacent motif (PAM) located next to it.
OBJECTIVES: To optimise the transformation of *Schizosaccharomyces pombe* (*S. pombe*) and to use CRISPR/Cas9 toolset to mutagenise the *ade6* gene in a wild type strain of *S. pombe*.
METHOD: The wild type strain is first-transformed with a plasmid vector expressing Cas9 from an *adh1* promoter. The second transformation is followed, using a plasmid expressing the sgRNA construct from *rrk1* promoter and homologous template that contains *ade6-M210* mutation. The constructed sgRNA has *ade6* sequence which drives Cas9 to this locus. Therefore, Cas9 cleaves the *ade6* gene and this double-strand break is repaired by homologous recombination (HR) using the template DNA carrying the *ade6-M210* mutation. Adenine mutants can be identified because the resulting colonies are red in Edinburgh Minimal Media Glutamate (EMM-G) media with low adenine.
RESULTS: The first transformation to produce pMZ222 Cas9 expressing plasmid was successful. However, failed to observe the red colonies in EMM-G media with low adenine in the second transformation.
CONCLUSION: The yeast transformation protocol is optimal, whereby Cas9 expressing plasmid was obtained successfully. However, optimising the *ade6-M210* HR cassette synthesis in introducing the *ade6-M210* mutation warrants further research.

KEYWORDS: research tools, Selangor, Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR)/Cas9; Genome Editing; **NMRR ID:** NMRR-40840

PP-29 (Poster)
RETURNED MEDICATION IN OUTPATIENT PHARMACY OF HOSPITAL SULTANAH BAHIYAH

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INTRODUCTION: Returned medication not only can reduce drugs wastage but it can also prevent drug abuse, drug poisoning incident, as well as reduce environmental pollution. Hence, this returned medication could represent financial loss, possible treatment failure and/or over prescription.
OBJECTIVE: This study was conducted in analyzing medications that have been returned according to their pharmacological groups and estimated cost as well as evaluating the relationship between patient characteristic with factor that contribute to returned medications.
METHOD: This study was being carried out at Outpatient Pharmacy, Hospital Sultanah Bahiyah by using hospital database and data collection form that were distributed to patient who came to the Outpatient Pharmacy Department to return their unused or expired medication from January 2016 to June 2016.
RESULTS: 301 patients return their medication during study period with 55.5% patients were female; mean age of 55 years old and 52.5% patients was Malay. Cardiovascular drugs is the most common pharmacological group of drug that frequently being returned by patient (161,783 tablets, 36.64%) followed by nutrition and blood disorder drugs (129,216 tablets, 31%). The total cost involved estimated as RM 129,374.72 for 6 month returned medications. Besides, the most common factors that contribute to returned medication were because of change in medication therapy, extra medications and patients' non-compliance. There was a non-significant relationship between patients' characteristic and the cost and total number of returned medications.
CONCLUSION: This study finding may help for the improvement of patient care as well as a reference for policy makers to review back the two month supply prescribing policy in order to reduce financial loss.

KEYWORDS: quality use of medicines, Kedah, medicines disposal, unused medicines, outpatient pharmacy
NMRR ID: NMRR-34003

PP-30 (Poster)
PUBLIC KNOWLEGDE AND ATTITUDES TOWARDS ANTIBIOTICS USAGE IN PERLIS: A CROSS SECTIONAL STUDY

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INTRODUCTION: Antibiotic resistance is increasing worldwide.Prevalence of bacterial resistance varies in different geographical areas, and it was correlated with the utilization of antibiotics in the general population.
OBJECTIVE: This study was conducted to assess public knowledge and attitudes towards antibiotic usage in Perlis, Malaysia.
METHOD: A validated self-administered questionnaire survey was distributed among public in three main parliament areas of Perlis using quota sampling method, from August to October 2017. The questionnaire from previous study by Lim et al. was used with permission and the data was analyzed using SPSS version 20.0.
RESULTS: A total of 384 completed questionnaires were collected. 51% respondents were found to have good knowledge (score ≥6) and 45.1% have good attitude (score≥6). The mean knowledge score was 5.01 (SD=2.19)and mean attitude score was 5.60 (SD=3.00). As for knowledge, majority of respondents still perceived that antibiotics would work on viral infections in common colds and coughs. In terms of attitude, 74% of the study population expected antibiotics for treatment of coughs and colds while 65.1% of the respondents expected that taking antibiotics would improve recovery. 53.6% of the respondents will stop taking antibiotic when they start feeling better. Age and employment sector were found to be significantly associated to both knowledge and attitude. There was a positive correlation (r=0.581) between knowledge and attitude scores.
CONCLUSION: This study has identified people with better knowledge would have appropriate attitude regarding antibiotics usage. Hence, educational programme such as antibiotic awareness campaigns and patient counselling are very important in order to promote appropriate utilization of antibiotics among public in Perlis.

KEYWORDS: quality use of medicines, Perlis, antibiotic, attitude, knowledge, Malaysia, public, survey
NMRR ID: NMRR-17-2853-38768

PP-31 (Poster)
ASSESSMENT OF VANCOMYCIN INITIAL DOSING AND SUBSEQUENT TROUGH CONCENTRATION IN PAEDIATRIC PATIENTS IN HOSPITAL TUANKU JA'AFAR SEREMBAN

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INTRODUCTION: Vancomycin has a narrow therapeutic index and age-dependent pharmacokinetics. Staphylococcus aureus exposure to trough level of
OBJECTIVE: This study aims to evaluate the initial vancomycin dosing and the resultant trough concentration in paediatric patients.
METHOD: In this retrospective observational study, universal sampling was used. All therapeutic drug monitoring (TDM) records of paediatric patients admitted to Hospital Tuanku Ja'afar Seremban (HTJS) between January 2014 and May 2016 were analysed. All 30 patients treated with intravenous vancomycin without documented renal disease were included in the study.
RESULTS: 56% (n=16) were neonates and 44% (n=14) were infants. All of the patients were from the neonatal intensive care unit. The most common clinical indication of vancomycin was for nosocomial infection (80%; n=24). The mean weight for neonates and infants were 1.72±1kg and 1.88±0.94kg respectively. The five initial dosing regimen recognized were 45mg/kg/day (60%; n=18), 30mg/kg/day (16.7%; n=5), 40mg/kg/day (13.3%; n=4), 60mg/kg/day (6.7%; n=2), and 65mg/kg/day (3.3%; n=1). The proportions of those achieving therapeutic range (10-20mg/L) was 56.7% (n=17), sub-therapeutic (20mg/L) was 16.7% (n=5). The distribution of trough level was significantly different between those who received =45mg/kg/day and >45mg/kg/day (p=0.045). The proportion of those who achieved the target therapeutic range (10-20mg/L) in the 2 dosing groups were 59.3% (n=16) and 33.3% (n=1) respectively.
CONCLUSION: This study shows that initial dosing of =45mg/kg/day is more likely to achieve the targeted therapeutic range of 10-20mg/L compared to initial dosing of >45mg/kg/day.

KEYWORDS: clinical research, Negeri Sembilan, vancomycin, trough concentration, paediatric
NMRR ID: NMRR-16-2343-33139

PP-32 (Poster)
PREDICTING PHARMACOKINETICS OF DRUGS IN PREGNANT AND NON-PREGNANT WOMEN

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INTRODUCTION: Pregnant women are typically exempted from any actual studies due to various reasons. Due to the medico-legal and ethical reasons, pharmaceutical industries reluctant to include this group during drug development studies.
OBJECTIVE: This study aimed to investigate the pharmacokinetics of pregnant group compared to the non-pregnant group using Physiologically-Based Pharmacokinetic (PBPK) Model.
METHOD: Simulation study done by using Simcyp software. Three steps were involved in the simulation; 1) Validation of Simcyp by using a selected small molecular weight compound which is Quetiapine, 2) identification of in-vivo pharmacokinetic model for selected compounds used in pregnancy in various studies and 3) prediction of the pharmacokinetics for pregnant women in various gestational stage, changes of phenotyping and genotyping being studied.
RESULTS: Comparison of predicted pregnant pharmacokinetics parameters for Metoprolol showed significant differences ($p<0.05$) in AUC, C_{max}, and clearance (CL) between pregnant and non-pregnant population. However, there was no pharmacokinetics difference between this two populations in Darunavir. The clearance profile of metoprolol is more pronounced in pregnant group compared to non-pregnant group while vice versa for Darunavir. In term of genotyping, Chinese pregnant population demonstrated the slowest metabolizer for Metoprolol while Japanese pregnant population is the fastest metabolizer. However, in Darunavir, the pharmacokinetic profile shown similar between all ethnicity. Last but not least, with regards to phenotyping, poor metabolizer shows higher AUC, C_{max} compared to extensive metabolizer for metoprolol while in Darunavir the results is not statistically significant difference ($p<0.001$).
CONCLUSION: The changes in pregnancy population were more pronounced in clearance compared to other pharmacokinetics parameters specifically for Metoprolol and Darunavir compounds. Therefore it is suggested that dose adjustment should be done during pregnancy.

KEYWORDS: clinical research, Birmingham, pregnant, metoprolol, darunavir, pharmacokinetics
NMRR ID: NMRR-18-510-40710

PP-33 (Poster)

PRIOR ANTIPLATELET USE AND CLINICAL OUTCOMES IN THOSE UNDERGOING PERCUTANEOUS CORONARY INTERVENTION

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INTRODUCTION: Antiplatelets are used as primary prevention in patients with high cardiovascular risk, in secondary prevention as well as treatment of acute coronary syndrome (ACS). Studies have assessed the benefits of prior antiplatelet use in reducing all-cause mortality or coronary artery disease readmissions; however, there is lack of data on the impact of prior antiplatelet use on the successfulness of and development of complications during hospitalization post primary percutaneous coronary intervention (PPCI).
OBJECTIVE: To evaluate whether prior antiplatelet use is associated with better clinical outcomes than non-prior antiplatelet use.
METHOD: Patients were identified from the PPCI patients' list in Hospital Serdang between May 2015 and November 2016. Data were collected via the electronic Hospital Information System (eHIS). Patients were grouped according to whether they were prior antiplatelet (PAP) users or non-antiplatelet (NAP) users. PAP users are defined as those who use antiplatelet agents within 30 days before admission (not immediately before PPCI). Outcome measures (cardiovascular (CV) events and bleedings) during hospitalization were compared using logistic regression analysis adjusted for important clinical factors. Cardiovascular events include ACS, stroke, stent thrombosis and death.
RESULTS: A total of 227 patients [male 89%, median age 54 years] were included. Of these, 25.6% were PAP users and 72.2% were NAP users. During hospitalization, CV events for PAP and NAP were 5.2% vs 4.3% respectively (adjusted OR=1.22; 95% CI 0.30-4.94; p=0.774). On the other hand, bleeding complication was 5.2% for PAP users and 4.3% for NAP users (adjusted OR=1.33; 95% CI 0.32-5.58; p=0.695).
CONCLUSION: Prior antiplatelet use before PPCI was not associated with lower risk of CV events and bleeding complications during hospitalization in patients who had PPCI after adjustment for common factors. However, this is a small retrospective analysis and need exploring in future studies.

KEYWORDS: clinical research, Selangor, prior antiplatelet use, percutaneous coronary intervention
NMRR ID: NMRR-17-1166-35048

PP-34 (Poster)

THE IMPACTS OF PICTORIAL AND CONVENTIONAL LABELLED TOPICAL MEDICATION ON THE PATIENT'S UNDERSTANDING

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INTRODUCTION: An effective topical treatment is highly dependent on patients' understanding on the instruction printed on the labels.
OBJECTIVE: This study aimed to compare the patients' understanding on pictorialand conventional labels in topical therapy, and to evaluate patients' opinion towards both comparing groups.
METHOD: This study was conducted by interviewing the patients using a content validated structured questionnaire, which includes indication, site, sequence, frequency, time and duration. Patients were selected using convenient sampling, and were assigned into control group (conventional label), and interventional group (pictorial label) using simple randomization. The data were then be analyzed by using chi-square analysis and Fisher exact test. Mann-Whitney test was used to correlate the total understanding across the groups, genders, ethnics, and education levels.
RESULTS: 100 patients were recruited into this study. The results showed that patients in interventional group have better understanding compared with patients in control group ($p<0.001$). The comprehension p-values of patients in interventional group (n=53) are indication (n=52, $p<0.001$), site (n=53, $p<0.001$), sequence (n=51, $p<0.001$), frequency (n=51, $p<0.001$), time (n=53, $p<0.001$), duration (n=53, $p<0.001$). However, there are no significant different in correlation of the genders, ethnics, and education levels, with the comprehension scores.
CONCLUSION: Pictorial label has improved patient's understanding on drug instruction compared to conventional label. Patients recommend to include pictorial label in all types of medication to improve patient's understanding.

KEYWORDS: impact of pharmacy services, Kedah, pictogram, conventional labelling, topical medication
NMRR ID: NMRR-16-2491-32537

PP-35 (Poster)
A QUALITATIVE STUDY IN TABLET SPLITTING: EXPLORING PATIENT EXPERIENCES AT HOSPITAL TUANKU FAUZIAH (HTF)

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INTRODUCTION: Tablet splitting is a practice where tablets of higher strengths are broken into halves, or quarters to provide the patient with the prescribed dose. However, there are problems associated with this process. The accuracy of dividing the tablets will depend on the patients, tablets, device and technique used.
OBJECTIVE: The main purpose of this study was to assess patients' experience towards tablet splitting.
METHOD: This was a qualitative study that explored 30 patients' experience on tablet splitting from September 2015 to January 2016. The subjects were among the outpatients and inpatients of HTF recruited using purposive sampling METHOD. Semi-structured interviews were conducted to consented patients until saturation was achieved. The data was then analyzed by thematic analysis
RESULTS: The study showed that most of the patients splitted the tablets by themselves while others required assistance from family members. Interviews revealed that most of the subjects splitted the tablet by hand. Most of the subjects also claimed that they were compliant to the split dose prescribed while some still missed their doses due to various reasons. Majority of the subjects split the tablets prior to consumption and a few of them split the tablets days before consuming. Half of the subjects agreed that there were no problem for them to split the tablets.
CONCLUSION: Patients in this study split the tablets by hands or other devices but are unsure about the proper method to prevent the tablets from getting crushed. There was no clear impact that tablet splitting affected compliance.

KEYWORDS: quality use of medicines, Perlis, qualitative study, tablet splitting, compliance
NMRR ID: NMRR-15-2237-28449

PP-36 (Poster)
EVALUATION OF INITIAL VANCOMYCIN WEIGHT-BASED LOADING DOSE IN END STAGE RENAL FAILURE PATIENTS

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INTRODUCTION: Appropriate dosing of antibiotic may reduce the development of antimicrobial resistance. There are many references of vancomycin dose in end stage renal failure (ESRF) patients. In our local setting the current practice is to give vancomycin dose of 20mg/kg as initial loading dose.
OBJECTIVES: This study aimed to determine the adequacy of current initial vancomycin dose by reviewing the resultant trough level.
METHOD: This observational study was conducted from December 2016 until December 2017. All ESRF patients who started with intravenous vancomycin, on high flux dialyzer if haemodialysis is done, and sampling time on day 3 after initiation of vancomycin were included. Descriptive statistics were used to depict the demographic data and proportions of patients achieving therapeutic range and those not achieving therapeutic range. Percentage of patients that achieved subtherapeutic (<15 mg/L), therapeutic (15.1 – 20.0 mg/L) and supratherapeutic level (>20.1 mg/L) were calculated.
RESULTS: Out of 35 patients, majority achieved therapeutic level (n=18, 51.4%) followed by subtherapeutic level (n=15, 42.9 %) and only 5.7% (n=2) achieved supratherapeutic level. The overall mean ± SD serum vancomycin concentration is 15.3 ± 3.6 (95% CI, 14.1 to 16.5 mg/L).However, no associations between age, race, urine output, gender and dialysis with vancomycin level were identified.
CONCLUSION: This study revealed that initial vancomycin weight based loading dose of 20mg/kg is adequate to be used in ESRF patients. Nevertheless, further study with larger sample size is needed to evaluate other factors that may affect vancomycin level.

KEYWORDS: clinical research, Kedah, vancomycin, end stage renal failure, Methicillin-Resistant Staphylococcus Aureus
NMRR ID: NMRR-16-1783-32736

PP-37 (Poster)
SUPPLY, DEMAND AND NEED OF PHARMACIST IN MALAYSIA; PROJECTIONS UNTIL 2030

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INTRODUCTION: A situational analysis of Human Resource for Health (HRH) in Malaysia was conducted for 2016-2030. In developing a strategic vision and plan, it is crucial to have an optimal number workforce to ensure the aim Universal Health Coverage (UHC) is achieved.
OBJECTIVE: This study focuses on the Supply, Demand and Need of pharmacist in Malaysia until 2030 to assist policy makers identify future need of pharmacist based on current production trends.
METHOD: System Dynamic using Vensim software as a tool was used to project the supply of pharmacist until 2030 as this method is able to simulate the dynamic behaviour of complex healthcare services.The models analyse the number based on previous trends of employment. The Need in the model refers to 100 percent requirement of pharmacist to attend to all direct patients care services, enforcement, regulatory and administrative duty. Demand refers to the requirement of pharmacist using retrospective utilization data. Gap analysis is done by comparing between projected Supply versus Demand and Need.
RESULTS: The study shows the projected supply of pharmacist will meet the Demand by 2029. However, the projected Supply will not meet the Need even by 2030. In 2016, the actual number of pharmacist was 10,508 and to achieve the Need another 37,773 newly registered pharmacist are needed. The projected density Need for pharmacist in Malaysia in 2017 is 4.8 per 10,000 population and goes up to 11.7 per 10,000 population in 2030, which is lower than average OECD countries 10 - 11 per 10,000 population.
CONCLUSION: With the current student intake estimated 2,000 per year for local intake and 200 per year for overseas graduate, Malaysia will be able to meet the Need somewhere beyond 2030. Thus, a coordinated feedback mechanism is required to balance the country's pharmacist supply and demand and need.

KEYWORDS: health informatics, Putrajaya, pharmacist, projections, human resource, Malaysia
NMRR ID: NMRR-14-903-21795

PP-38 (Poster)
RISK FACTORS IN TYPE 2 DIABETES MELLITUS (T2DM) AMONG ADOLESCENTS IN THE STATE OF KEDAH, MALAYSIA: A CROSS-SECTIONAL PILOT STUDY

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INTRODUCTION: Type 2 Diabetes Mellitus (T2DM) is currently considered one of the main chronic diseases affecting society, in all biological and economy-social stages. T2DM was considered rare among adolescents: however various authors have reported increased incidence among adolescents in recent years.
OBJECTIVE: This study aimed to identify risk factors for T2DM among adolescents in Kedah and assessing their knowledge on obesity and risk of diabetes mellitus.
METHOD: Questionnaires were distributed to probe the sociodemographic, sedentary and dietary lifestyle and physiological aspects. Biochemical evaluation was conducted in assessing BMI and blood glucose level.
RESULTS: Approximately 38.7% of the participants were overweight and 82.25% were sedentary. About 48.4% of the participants have at least two risk factors of T2DM which were in looming condition. Overall knowledge score was poor; mean±SD total score was 25.97±19.45 which suggested the participants were not being exposed or acknowledged on obesity and the risk factors of diabetes mellitus.
CONCLUSION: A comprehensive strategy and approach need to be established by the Malaysian healthcare system to improve prevention and control of T2DM among adolescents.

KEYWORDS: clinical research, Kedah, risk factors, diabetes mellitus, obesity, adolescents
NMRR ID: NMRR-16-2093-32627

PP-39 (Poster)
REASONS FOR AMPHETAMINE-TYPE-STIMULANT (ATS) USE AMONG CLIENTS IN GOVERNMENT AND PRIVATE METHADONE MAINTENANCE TREATMENT (MMT) PROGRAMS IN THE DISTRICT OF KUANTAN, PAHANG

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INTRODUCTION: The use of amphetamine-type-stimulants (ATS) during methadone maintenance treatment (MMT) program can adversely affect treatment adherence and fuel HIV spread.
OBJECTIVE: This study aims to investigate the reasons for ATS use among clients in MMT program.
METHOD: 237 current methadone users participated in this cross-sectional study. Respondents were recruited through snowball sampling from four government (n=129) and two private (n=108) MMT facilities in Kuantan, Pahang. All the surveys were conducted via face-to-face interviews, and respondents were also screened for illicit drug use.
RESULTS: The respondents mean age in this study was 37.7 years. Half (50%, n=118/237) were above 38 years old, majority Malays (96%, n=228/237) and only 17% (n=39/237) were unemployed.The clients average daily methadone dose in this study was 52.78mg. Fifty-five percent (n=130/237) used less than 50mg of methadone dose daily, while 45% (n=107/237) used >51mg of methadone. More than one-third (35%, n=86/147) self-reported using ATS 1 to 3 days a week, while 26% (n=61/147) used ATS >4 days a week. Seventy-five percent (n=179/237) have current methamphetamine and amphetamine use history (90%, n=214/237). The main reasons given for using ATS include to improve work productivity (85%, n=202/237), to increase energy (83%, n=196/237), to feel happy (72%, n=170/237), to increase self-confidence (67%, n=158/237), to reduce methadone dependence (51%, n=120/237), to ease methadone side-effects (40%, n=95/237), to ease psychological problems (39%, n=92/237), to increase sex performance (37%, n=87/237), and as a sex stimulant (32%, n=77/237).
CONCLUSION: Our results provide an insight on the high occurrences of ATS use among clients in MMT program in Malaysia. Perhaps, the use of ATS could be attributed to the insufficient dose of methadone, as well as treatment misconceptions. Future studies must make an attempt to determine the HIV risk behaviours of ATS users in MMT program.

KEYWORDS: impact of pharmacy services, Pahang, amphetamine, Methadone Maintenance Treatment (MMT),.
NMRR ID: NMRR-15-2448-26899

PP-40 (Poster)
ASSESSMENT OF PUBLIC KNOWLEDGE AND PERCEPTION TOWARDS CHILDHOOD VACCINATION IN PERLIS, MALAYSIA

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INTRODUCTION: Childhood vaccination protects children from a variety of serious communicable diseases. However, in Malaysia there are growing numbers of parents questioning the safety and necessity of routine childhood vaccination, hence refusing immunization. This increases the risk of vaccine preventable diseases.
OBJECTIVE: Our study aimed to assess knowledge and perception of the public towards childhood vaccination and their associations with demographic factors.
METHOD: A cross-sectional study was conducted from August to December 2017 in Perlis. Through convenient sampling, validated questionnaires were distributed to Perlis citizens aged above 18 year-old. The data was analyzed using SPSS v20.0.
RESULTS: Of 387 participants included in the study, majority (n=229, 59.2%) of the respondents were female, university graduates (n=271, 70%), and Muslims (n=347, 89.7%). The results revealed that (n=252, 65.1%) of the public have good knowledge while (n=254, 65.6%) of the public have good perception towards childhood vaccination. Most of them (n=227, 58.7%) obtained the information from social network, followed by healthcare provider (n=226, 58.4%) and television (n=211, 54.5%). There is a significant association between gender, age, educational background, occupation and income with the level knowledge and perception towards vaccination ($p<0.05$). Marital status and children also has significant association with perception.
CONCLUSION: The study showed that citizen in Perlis has acceptable knowledge and perception on some aspects related to childhood vaccination. Educational interventions should be focused on lower income group of the society in improving the public knowledge and perception on the childhood vaccination.

KEYWORDS: pharmacoepidemiology & drug safety, Perlis, knowledge, perception, childhood, vaccination
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