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SPECIAL TOPIC

E-CIGARETTES & ITS HEALTH EFFECTS

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E-CIGARETTES AND ITS HEALTH EFFECTS

HAMI HANANI ABDUL RAZAK

BACKGROUND

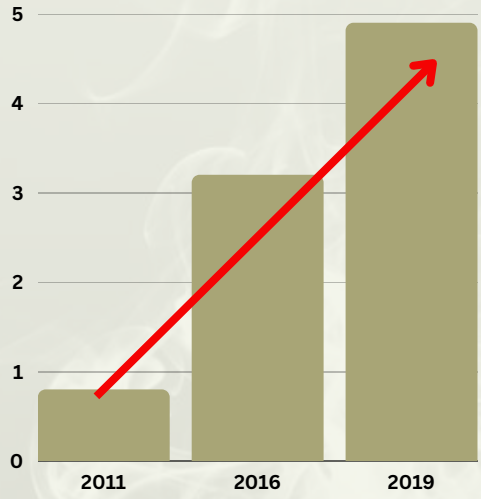

Diagram 1.0 Percentage of EC Smokers in Malaysia 2011-2019

E-cigarettes (ECs) have become more prevalent worldwide, particularly among children and young adults. In Malaysia, 0.8% of those over 15 years old used ECs for at least 30 days in 2011. In 2016, 3.2% of Malaysians over the age of 18 had used ECs. Prevalence among Malaysians above 15 years old reached 4.9% by 2019. In that same year, 7.5% of Malaysian teenagers aged 15 to 19 and 14.7% of young adults aged 20 to 24 used ECs compared with less than 5% of adults aged above 30 years.[1] These numbers are quite alarming as EC has been found to be associated with several potential health effects.

INTRODUCTION

The term "electronic cigarette," often known as "e-cigarettes," "electronic nicotine delivery systems," or "ENDS," refers to battery-operated devices featuring a heating element that emits inhalable aerosols. EC contains glycerol, propylene glycol, and a few flavoring ingredients with or without nicotine. The development of EC device technology has advanced significantly which can currently be divided into generations. First-generation ECs, often known as cigalikes, are identical as conventional cigarettes (CCs). Second-generation ECs are referred to as vape pens and resemble fountain pens, whereas third-generation ECs are known as advanced personal vaporizers or mods. Most vapers in Malaysia utilize third-generation ECs. The major difference between EC and CC is there are no tobacco leaves in ECs hence the emitted vapors are free of tars and carbon monoxide.[2]

Figure 1.0 Different Types of ECs

HOW E-CIGARETTES WORK?

EC devices usually come with four main components including a cartridge or pod that contains liquid solution with varying concentrations of nicotine, flavorings, and other chemicals, an atomizer as heating element, a power source (typically a battery) and a mouthpiece that the user inhales through.[3]

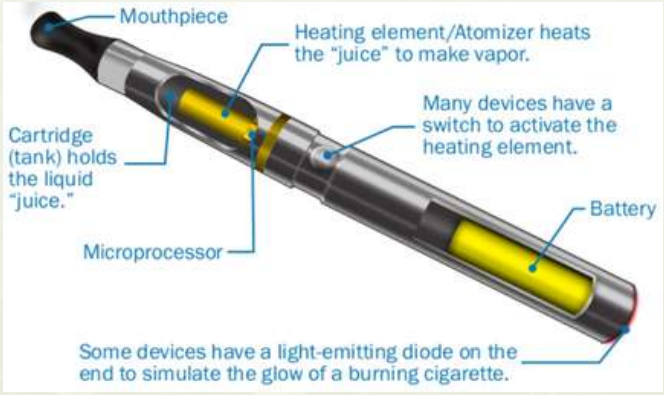

Figure 2.0 Parts of ECs

The heating elements in the EC will start to vaporize the solution in the cartridge when the power button is activated. Then, it produces aerosol that can be inhaled by the user. Refill solutions which contains variable concentrations of nicotine and flavor such as strawberry and cherry that come with or without glycerine and propylene glycol. These two chemicals are the most commonly used solvents for nicotine as when they are heated, they produce an aerosol that resembles the cigarette smoke. The refills have been widely available in the global market that can be purchased from almost anywhere, retail outlets and online stores.[4]

POTENTIAL HEALTH EFFECTS OF E-CIGARATTES

Many EC users (also known as vapers) think that using ECs is less dangerous than smoking CCs. As a result, vapers believe that using ECs to stop smoking is a completely safe option since EC reduces users' exposure to a number of toxicants and carcinogens contained in combustible tobacco cigarettes. Nonetheless, the amount of released reactive oxygen radicals appears to be comparable with CCs[5]. Less serious side effects such as throat and mouth irritation, vomiting, nausea, and coughing may be visible in current vapers. The use of refillable electronic e-cigarettes and the potential exposure to e-liquids containing highly strong nicotine have recently been found by the European Commission to be potentially harmful to public health. It is also discovered to have negative effects on the development of the brain and lungs and other body parts.[6]

What is in EC aerosol?

- **Nicotine**
- **Ultrafine particles that can be inhaled deep into the lungs**
- **Flavoring such as diacetyl, a chemical linked to a serious lung disease**
- **Volatile organic compounds**
- **Cancer-causing chemicals**
- **Heavy metals such as nickel, tin, and lead**

Brain Development and Addiction

Nicotine has been reported to be

- **Highly addictive**
- **Toxic at high dose**
- **Toxic to developing fetus**
- **Harmful to brain development of adolescent and young adult**
- **Harmful to pregnant woman**

When a person vapes an e-cigarette, the nicotine in the e-liquids is easily absorbed from the lungs into the bloodstream. Nicotine promotes the release of the hormone epinephrine (adrenaline) from the adrenal glands once it reaches the bloodstream. The central nervous system is stimulated by epinephrine, which also raises heart rate, blood pressure, and respiration. Like most addictive substances, nicotine activates the reward circuits in the brain and raises dopamine levels, a neurotransmitter that promotes rewarding behaviors. Despite the risks to their health and wellbeing, some people continue to use nicotine due to the pleasure it causes when it interacts with the reward circuit[3]. It is very alarming when used by non-smokers, e-cigarettes can lead to nicotine addiction, and there is concern that children could start smoking after using e-cigarettes.[1]

Cardiovascular System

E-cigarettes elevated both diastolic blood pressure and heart rate in smokers, but to a lesser extent when compared with tobacco cigarettes. It has also been discovered that EC is associated with oxidative stress and endothelial cell dysfunction. These two conditions are crucial factors in developing cardiovascular disease. The key factor for these cardiovascular effects is attributed to nicotine content in the EC as nicotine induces endothelial dysfunction, angiogenesis, inflammation, and lipogenesis, which may increase thrombosis risk and develop coronary disease. Carbonyl compound which includes aldehydes, such as formaldehyde, acetaldehyde, and acrolein produced from thermal degradation of propylene glycol and glycerol in EC also contributes in damaging the cardiovascular system (Table 1.0).[7]

Carbonyl Compound	Cardiovascular effects
Acrolein	Increase blood pressure, increase risk of thrombosis, cardiomyopathy, impair vascular repair capacity, vascular injury, increase risk of cardiac ventricular arrhythmia and reduce cardiac contractility
Formaldehyde	Alter heart rate and blood pressure, induce cardiac oxidative stress, alter cardiac contractility and increase risk of thrombosis
Acetaldehyde	Increase heart rate and blood pressure

Table 1.0 Table of Carbonyl Compunds and its Cardiovascular Effects

Respiratory System

Several chemicals, including those added to e-liquids and those created during the heating/vaporizing process, are released into the lungs during the inhalation. Certain cig-a-like brands' e-liquids have significant concentrations of nickel and chromium, which may come from the vaporizer's nichrome heating coils. Cigar-a-likes may also contain trace amounts of cadmium, a toxic metal that can lead to breathing issues and disease.[3] Exposure to e-cigarettes may increase the incidence of acute airway blockage in patients with pre-existing airway illness[7].

It has been also demonstrated that EC vapor can alter the composition of the surfactant in the lung, specifically alveolar, resulting in anomalous gas exchange. The organic solvent in the e-liquid, disturbed the gas exchange and disrupted the surfactant layer. After inhaling EC vapor, gas exchange disturbance can occur due to the changes in transcutaneous oxygen tension and impaired lung performance which may result in long-term problems with hypoxia and hypercarbia.[8]

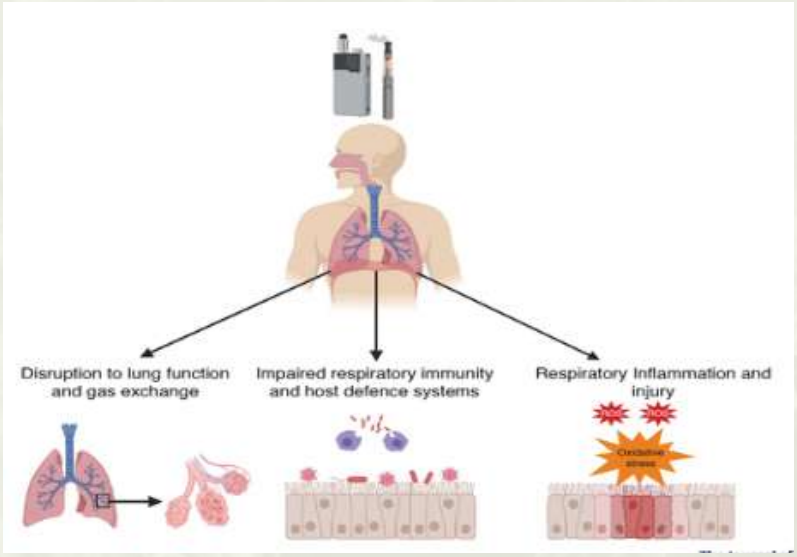

Figure 3.0 Respiratory Effects of EC

Continuous exposure of inhaled toxins toward the lung epithelial surface cause impairment of mucociliary clearance which reduces pulmonary function and elevates the risk of infection. Inflammation or infection can cause lung injury especially in long duration. In 2019, the first case of e-cigarette or vaping use-associated lung injury (EVALI) has been identified.[8]

CONCLUSION

The widespread and rising use of e-cigarettes in Malaysia is worrisome as it costs more risk and lesser benefit to our health. Future studies should therefore establish the short- and long-term adverse consequences of e-cigarette use on both active and passive users, as well as provide mechanistic insights into these effects, under realistic conditions. These in turn ought to direct and mold policy for additional evidence-based vaping control in this country.

TRIVIA

EVALI is a serious inflammatory condition that damages the lung. The symptoms are shortness of breath, fever and chills, cough, vomiting, diarrhea, headache, dizziness, rapid heart rate and chest pain. The results of chest x-ray will show a hazy spot indicating tissue damage.

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(TB) TUBERCULOSIS

BACKGROUND[1,2,3]

By: Idham bin Zaharudie & Farah Nabilah Binti Ahmad Supian

Tuberculosis (TB) is an airborne disease caused by *Mycobacterium tuberculosis*, predominantly affecting individuals in their prime adulthood. Its transmission occurs through the inhalation of infectious droplets released by coughing, sneezing, or spitting. While the lungs are the primary site of infection, TB can also involve other organs such as the kidneys, brain, spine, and skin. Despite its high mortality rate, TB is currently preventable and curable. Treatment typically involves the use of antibiotics, tailored to the type of TB (latent or active).

From 2021 to 2022, Malaysia witnessed a 17% increase in reported cases of tuberculosis (TB), accompanied by a 12% rise in mortality rates. On a global scale, TB holds the 13th position as a leading cause of death and stands as the second most fatal infectious disease.

ETIOLOGY[4,5]

TB is caused by various species within the *Mycobacterium tuberculosis* complex, predominantly *M. tuberculosis*, but occasionally involving *M. canetti*, *M. microti*, *M. africanum*, and *M. bovis*. Certain strains of the bacteria, such as Beijing and Haarlem strains, have been linked to heightened drug resistance. TB transmission occurs through airborne particles, although it necessitates prolonged exposure to an infected individual in a confined space for successful transmission to occur.

PATHOGENESIS[6,7]

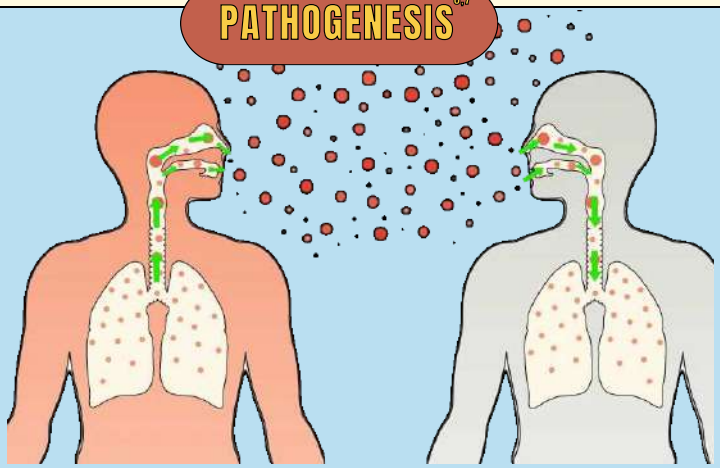

Fig 1. Transmission of TB[6]

a) Transmission:
TB bacteria can spread through the air when an individual with active pulmonary TB coughs, or sneezes. These activities produce mycobacteria-laden droplet nuclei that can remain suspended in the air for hours. When inhaled, the bacteria settle in the lungs and can travel through the bloodstream to other body parts, such as the kidney, spine, and brain.

b) Post inhalation outcome:
- No infection
- Infected, but infection is cleared
- Infection contained but bacilli continued to be carried in dormant state without symptomatic disease, AKA latent TB infection
- Develop progressive TB disease

SYMPTOMS[8]

Current cough

Weight loss

Haemoptysis

Night sweats

Fever & chills

TYPES OF TB[9]

Latent TB	Active TB
TB bacteria lives but does not grow in the body	TB bacteria grows in the body
Cannot spread from person to person	Can spread from person to person
Exhibit no symptoms	Exhibit symptoms of cough, fever, weight loss, night sweats
Positive result on TB skin test and blood test	Positive result on phlegm
Normal appearances in chest x-ray	Abnormalities in chest x-ray

MANAGEMENT

REGIMEN[8, 10]

6 months

2 months **EHRZ**	4 months **HR**
Isoniazid (INH), Rifampicin (RIF), Pyrazinamide (PZA) and ethambutol (EMB)	Isoniazid (INH), rifampicin (RIF)

ACTIVE TB[9]

Drug	Mechanism of action	Dose range (mg/kg)	Side effect
Isoniazide*	• Inhibit the synthesis of bacterial cell wall • Activate the bacterial catalase–peroxidase enzyme KatG in Mycobacterium tuberculosis (Mtb)	• 5 (4-6) • Max dose: 300 mg/daily	• Dizziness with sensations of spinning • Constipation • Nausea and vomiting • Dry mouth • Difficulty when urinating
Rifampicin	Inhibits the synthesis of bacterial RNA by binding to the beta subunit of DNA-dependent RNA polymerase, blocking RNA transcription	• 10 (8-12) • Max dose: 600 mg/daily	• Headache • Tiredness • Nausea and vomiting • Visual disturbances • Muscle weakness • Numbness • Menstrual disturbances • Inability to concentrate
Pyrazinamide	Converted to pyrazinoic acid in susceptible strains of Mycobacterium which lowers the pH of the environment	• 25 (20-30) • Max dose: 2000 mg/daily	• Nausea and vomiting • Loss of appetite • Tiredness • Joint and muscle pain
Ethambutol	Impaired the synthesis of mycobacterial cell wall by inhibition of arabinosyl transferase	• 15 (15-20) • Max dose: 1600 mg/daily	• Dizziness • Visual disturbances

Table 3: First-line anti-TB drug dosage and adverse drug reaction

*Pyridoxine 10 mg/day should be given to patients on isoniazid. Patient with high risk neuropathy: Pyridoxine 30 mg/day

LATENT TB[9]

Drug	Duration	Interval	Dose range (mg/kg)
Isoniazid (6H/9H)	6 or 9	Daily	5 (max 300 mg)
Isoniazid + Rifampicin (3HR)	3	Daily	INH: 5 (max 300 mg) RIF: 10 (max 600 mg)
Rifapentine + isoniazid (3HP)	3	Weekly	INH: 15 (max 900 mg) RPT: <50 kg, 750 mg >50 kg, 900 mg
Rifampicin (4R)	4	Daily	10 (max 600 mg)

Table 4: Recommended dosage for LTBI treatment in adults

= Preferred, unless contraindicated

Fixed-dose Combination (FDC)

The use of FDC drugs simplifies therapy, reduces the likelihood of missing a component of a multidrug regimen, and improve adherence

- AKuriT-2: isoniazid 75 mg and rifampicin 150 mg
- AKuriT-4: isoniazid 75 mg, rifampicin 150 mg, ethambutol 275 mg and pyrazinamide 400 mg

DOSING[8]

Body weight (kg)	Number of FDC tablets daily
30-37	2
38-54	3
55-70	4
> 70	5

Table 2: Recommended dose for FDC in adults

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DRUG UPDATES

Mesalazine 1g/100ml Enema

A. DESCRIPTION

Mesalazine, also known as mesalamine or 5-aminosalicylic acid (5-ASA), is an active moiety of sulfasalazine. It is an anti-inflammatory agent, structurally related to the salicylates and non-steroidal anti-inflammatory drugs like acetylsalicylic acid, which is active in inflammatory bowel disease.

B. REGISTRATION NUMBER

MAL19912742AZ.

C. PRICE

RM142.00 / pack of 7's.

D. DEPARTMENT

Medical (Gastroenterology).

E. PRESCRIBER CATEGORY

A (Consultant/Specialist).

F. INDICATION IN FUKKM

Inflammatory bowel disease of ulcerative colitis and Crohn's disease.

G. DOSE AND ADMINISTRATION

1 tube of enema at bedtime.

H. MECHANISM OF ACTION

Although the mechanism of action of mesalazine is not fully understood, it is believed to possess a topical anti-inflammatory effect on colonic epithelial cells.

Mucosal production of arachidonic acid metabolites, both through the cyclooxygenase pathways, like prostanoids, and through the lipoxygenase pathways, such as leukotrienes and hydroxyeicosatetraenoic acids, is increased in patients with chronic inflammatory bowel disease, and it is possible that mesalazine diminishes inflammation by blocking cyclooxygenase and inhibiting prostaglandin production in the colon.

I. ADVERSE REACTIONS

Common:

- **Dermatologic**: Rash (Up to 6%; paediatrics, 5%)
- **Gastrointestinal:** Abdominal pain (2.2% to 18%), diarrhoea (Up to 8%; paediatrics, 5%).
- **Neurologic:** (2.9% to 14%; paediatrics, 5%)
- **Other:** Pain (Up to 14%)

Serious:

- **Cardiovascular:** Myocarditis, pericarditis.
- **Dermatologic:** Stevens-Johnson syndrome.
- **Gastrointestinal:** Exacerbation of ulcerative colitis (Pediatrics, 12%).
- **Hematologic:** Agranulocytosis, aplastic anemia.

J. PRECAUTION

- **Cardiovascular:** Cardiac hypersensitivity reactions (myocarditis and pericarditis) have been reported; use caution in patients with conditions predisposing them to myocarditis or pericarditis.
- **Dermatologic:** Severe photosensitivity reactions have been reported in patients with pre-existing skin conditions (such as dermatitis and eczema); avoid sun exposure, wear protective clothing, and use a broad-spectrum sunscreen when outdoors.
- **Gastrointestinal:** Avoid use in patients at risk of upper gastrointestinal tract obstruction. Prolonged gastric retention of mesalazine may occur in patients with upper gastrointestinal obstruction or pyloric stenosis.
- **Renal:** Nephrolithiasis has been reported including stones with 100% mesalazine content which are radiotransparent and undetectable by standard radiography or CT. Ensure adequate fluid intake during treatment.

K. USE IN SPECIFIC POPULATION

- **Hepatic impairment:** Caution is recommended in patients with impaired liver function. Liver function parameters like ALT or AST should be assessed prior to and during treatment, at the discretion of the treating physician.
- **Renal impairment**: Mesalazine is contraindicated for use in patients with severe renal impairment (CrCl < 20 ml/min).
- **Paediatric use**: Mesalazine should not be used in children 12 years of age and under, as there is limited experience with this age group.
- **Pregnancy:** Mesalazine is known to cross the placental barrier. The are no adequate and well-controlled studies of mesalazine enema use in pregnant women. Use with caution during pregnancy.
- **Lactation:** Mesalazine is excreted in breast milk. There is limited experience of the use of mesalazine in lactating women. Hypersensitivity reactions like diarrhoea in the infant cannot be excluded. If the infant develops diarrhoea, breast-feeding should be discontinued.

L. CONTRAINDICATION

- Hypersensitivity to mesalazine, other salicylates (including aspirin) or aminosalicylates, or to any product component.
- Patients with severe liver or renal impairment.

M. STORAGE

Store below 30°C. Do not refrigerate or freeze. Store in the original package, as the product is sensitive to light.

N. PHARMACIST ROLE

- Counsel patient/caregiver to use sunscreen, wear protective clothing and avoid tanning beds due to potential photosensitivity effects.
- Counsel patient to maintain adequate fluid intake to prevent formation of stones in the kidney.
- Tell patient to report symptoms of severe cutaneous adverse reactions.
- Advise patient to report symptoms of worsening liver function or upper gastrointestinal tract obstruction.
- Advise patient to report symptoms of acute intolerance syndrome.
- Advise patient not to stop taking the medication, exceed the dose recommended or change the dosage without checking with a doctor or pharmacist.

O. REFERENCES

Product information leaflet, FUKKM, QUEST3+, MIMS Gateway, Micromedex.

By: Muhammad Hafizul Aniq bin Khairul Hafidz

DRUG UPDATES

Methylphenidate HCl 20 mg LA Capsule

A. DESCRIPTION

This medication is used to treat attention deficit hyperactivity disorder - ADHD. It works by changing the amounts of certain natural substances in the brain. Methylphenidate belongs to a class of drugs known as stimulants.

B. REGISTRATION NUMBER

MAL05092201ACRZ.

C. PRICE

RM 138.39 / pack of 30's.

D. DEPARTMENT

Psychiatry.

E. PRESCRIBER CATEGORY

A*

(Consultant/Specialist for specific indications only).

F. INDICATION IN FUKKM

For the treatment of attention deficit hyperactivity disorder (ADHD).

G. DOSE AND ADMINISTRATION

20 mg once daily to be taken in the morning. Dosage be adjusted in increments to a maximum of 60 mg/day.

H. MECHANISM OF ACTION

While its exact mechanism is unclear, methylphenidate has been shown to act as a norepinephrine and dopamine reuptake inhibitor (NDRI), thereby increasing the presence of these neurotransmitters in the extraneuronal space and prolonging their action.

There is a dose-related effect of psychostimulants on receptor stimulation, where higher doses are shown to increase norepinephrine (NE) and dopamine (DA) efflux throughout the brain which can result in impaired cognition and locomotor-activating effects.

In contrast, low doses are found to selectively activate NE and DE neurotransmission within the prefrontal cortex which is an area of the brain thought to play a prominent role in ADHD pathophysiology, thereby improving clinical efficacy and preventing side effects.

I. ADVERSE REACTIONS

Common

- **Gastrointestinal disorder**: Nausea, dry mouth.
- **Metabolism and nutritional disorder**: Decreased appetite.
- **Psychiatric disorders**: Nervousness, insomnia, restlessness.
- **Nervous system**: Tremor, headache, drowsiness.

Uncommon:

- **Psychiatric disorders:** Hallucination, hyperactivity.
- **Musculoskeletal disorders:** Muscle cramps**.**
- **Hepatobiliary disorders:** Abnormal liver function.

J. PRECAUTION

- **Cardiovascular:** Avoid use in patients with known structural cardiac abnormalities, cardiomyopathy, serious heart arrythmia, coronary artery disease or other serious heart diseases.
- **Cardiovascular:** Blood pressure and heart rate increases have been reported. Monitoring recommended.
- **Neurologic**: May lower seizure threshold. Discontinuation may be necessary.
- **Concomitant use:** Avoid alcohol during therapy.
- **Psychiatric:** Preexisting psychotic disorder may be exacerbated. Monitoring recommended.
- **Psychiatric:** Aggressive behavior and hostility have been reported. Monitoring recommended.
- **Growth retardation:** Long-term use may cause weight loss and growth suppression in children. Monitoring recommended.
- **Reproductive:** Priapism, persistent and painful erection of the penis, has been reported in both pediatric and adult patients.

K. USE IN SPECIFIC POPULATION

- **Pregnancy:** Information regarding the use of methylphenidate in pregnant women is limited. Use is not recommended unless the potential benefit outweigh the risk.
- **Lactation:** Methylphenidate is distributed into breast milk. Avoid use of Methylphenidate while breast feeding.
- **Hepatic impairment:** No specific dosage recommendation available.
- **Renal impairment**: No specific dosage recommendation available.

L. CONTRAINDICATION

- Hypersensitivity to methylphenidate or any of the excipients.
- Concomitant use of monoamine oxidase inhibitor (MAOIs) or use within 14 days of MAOIs discontinuation.
- Familial history or diagnosis of Tourette's syndrome.
- Glaucoma.
- Marked agitation, anxiety, and tension; may aggravate symptoms.
- Motor tics.
- Pre-existing cardiovascular disorders including severe hypertension, cardiomyopathies, myocardial infarction, potentially life-threatening arrhythmias and channelopathies.

M. STORAGE

Store below 30 °C.

N. PHARMACIST ROLE

- Counsel patient on common side effects such as headache, loss of appetite, weight loss, insomnia, and nervousness.
- Counsel patient/caregiver to report symptoms of serious cardiovascular effects.
- Counsel caregiver that growth rate and weight may be slowed in children using this drug.
- Instruct patient to report marked anxiety, tension, or agitation.
- Counsel patient to report symptoms of priapism.
- Advise patient to avoid alcohol while using the drug.

O. REFERENCES

Product information leaflet, FUKKM, QUEST3+, MIMS Gateway, Micromedex.

By: Muhammad Aizat Bin M Nazeri

V-KEN STUDY: ASSESSMENT OF VANCOMYCIN PHARMACOKINETIC PROFILES WITH EFFICACY & NEPHROTOXICITY IN MALAYSIAN POPULATION

Sakina Nur Najah Abdul Jabar, Dr Janattul Ain Jamal, Nurul Hidayah Salleh, Norsyafika Kamarudin, Navin Kumar Thamilarajan, HTAA

INTRODUCTION

Vancomycin is a tricyclic glycopeptide antibiotic, exhibiting time-dependent bacterial killing. It is commonly used to treat severe or resistant staphylococcal (example: methicillin resistant Staphylococcus aureus (MRSA)) and enterococcal infections as well as for moderate infections in penicillin-allergy patients. There are varies of Vancomycin pharmacokinetics/pharmacodynamics (PK/PD) studies done including T>MIC, the ratio of the area under the serum drug concentration-versus-time curve (AUC) and the MIC (AUC/MIC), and the ratio of maximum serum drug concentration (Cmax) and the MIC (Cmax/MIC) in determining the best indicator for Vancomycin efficacy. Based on the above mentioned studies, AUC/MIC is the preferred predictor and is correlated with positive clinical outcomes. A 0-24hour AUC/MIC (AUC0-24h/MIC) equal to or more than 400 mg.h/L is associated with clinical success in certain bacterial eradication. Vancomycin-induced nephrotoxicity can be seen after several days of Vancomycin exposure to the patient but it is reversible adverse effect. Another rare adverse event related to Vancomycin is ototoxicity, which is irreversible, associated with Vancomycin concentration of more than 80 mg/L. However, there is lack of data on Vancomycin concentration related to this event.

OBJECTIVE

Due to this paradigm shifting from targeting trough concentration of Vancomycin to determining the AUC0-24h/MIC and lacking of local data on this matter, this study aims in evaluating the AUC0-24h/MIC thresholds of local population and its relation with Vancomycin efficacy and nephrotoxicity. It also aims in identifying the actual trough concentration for the local population in association of AUC0-24h/MIC threshold in term of optimal outcome.

METHODOLOGY

This is a single-centre, retrospective, cohort study involving all hospitalized adult subjects treated with intermittent infusion of Vancomycin, with two measured Vancomycin concentrations at steady state. Subjects with creatinine clearance of less than 15 ml/min, pregnant women, defaulted treatment of Vancomycin and TDM sampling error were excluded. Patient clinical condition for efficacy and nephrotoxicity were analyzed based on the medical and microbiology data were traced for two weeks or lesser if patient was discharged, transferred out or deceased after the Vancomycin was started to the patient. Beckman Coulter AU 680 Analyzer from Microgenics Corporation, USA analyzed the serum concentration of Vancomycin in the current hospital setting with the dynamic range of 2.5 – 100 mg/L. The MIC of Vancomycin was determined by Epsilometer test (E test). Creatinine clearance was calculated using the Cockroft-Gault equation while the pharmacokinetics parameters were evaluated by using one-compartmental pharmacokinetic model which is modified Sawchuk-Zaske method and the average AUC0-24H/MIC was computed by using trapezoidal rule. All data was analyzed using Statistical Package for the Social Sciences (SPSS) Software Version 26.

V-KEN STUDY: ASSESSMENT OF VANCOMYCIN PHARMACOKINETIC PROFILES WITH EFFICACY & NEPHROTOXICITY IN MALAYSIAN POPULATION

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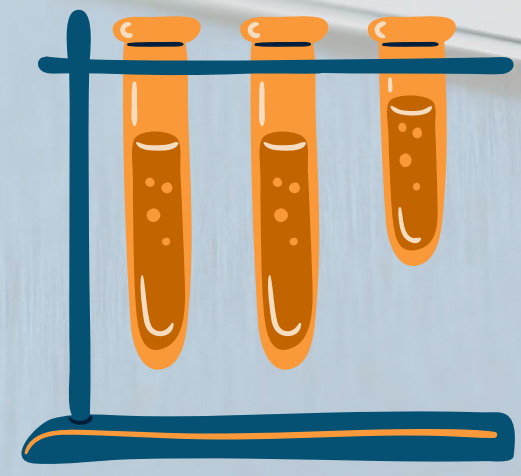
RESULT

22 subjects were enrolled in this study. Most of the subjects were male (68.2%) with mean age of 51 years old (±SD: ±16), with normal baseline creatinine clearance. 77% of subjects with culture showing presence of organisms indicative for Vancomycin such as MRSA, Enterococci sp., methicillin-resistant coagulase negative staphylococcus species, Rhodococcus sp., and Corynebacterium striatum.

A scatterplot showed that the strong relationship between AUC0-24h/MIC of efficacy and trough concentration of efficacy was positive and linear and did not reveal any bivariate outliers. The correlation between AUC efficacy and trough efficacy was statistically significant (p <.001). The regression equation for predicting the trough from AUC in term of efficacy is y=-6.12+0.04x. The r2 for this equation was .970. On the other hand, the similar relationship was seen between AUC0-24h/MIC of nephrotoxicity and trough concentration of nephrotoxicity, with statistically significant correlation (p=.008). The regression equation for prediction of nephrotoxicity from the e AUC0-24h/MIC of nephrotoxicity is y=-10.25+0.04x. The r2 for this equation was 0.968.

18% of the samples showing evidence of nephrotoxicity with AUC0-24H/MIC (median+IQR) of 710.14+904.58 and related trough concentration of 21 mg/L. Meanwhile, 82% of samples showed clinical success with AUC0-24H/MIC (median+IQR) of 481.49+200.53 and related trough concentration of 13 mg/L..

23 pharmacokinetic profiles of Vancomycin were obtained in this study in which 14 profiles were tabulated from pre-dose and post-dose concentrations at steady state and the remaining 9 profiles were tabulated from two post-dose concentrations at steady state. There is no significant difference between these two sampling methods in obtaining the pharmacokinetic parameters (p=.90).



CONCLUSION

The AUC0-24h/MIC of local population related to efficacy was more than 400 mg.h/L and nephrotoxicity was greater than 600 mg.h/L. Meanwhile, the median trough concentration associated with the desired AUC0-24h/MIC threshold for efficacy was 13mg/L and for nephrotoxicity was 21mg/L.

DEVELOPMENT AND VALIDATION OF QUESTIONNAIRE ON KNOWLEDGE AND PERCEPTION OF STROKE AMONG PUBLIC HEALTH

Dr. Sahimi Binti Mohamed, Yasmin bt Ibrahim, NorulAdilla Binti Zakaria, Noratiqah bt Sanusi, Yau Qi Xian, HTAA

INTRODUCTION

Stroke is a public health concern as it contributes to major morbidity and mortality. A well-validated instrument which suits local lifestyle and culture in Malaysia is needed to assess both knowledge and perception of the public regarding stroke. This can help in designing approaches to raise the awareness of the public towards stroke.

OBJECTIVE

This research aims to develop a valid and reliable self-administered questionnaire to evaluate the public knowledge and perception of stroke.

METHODOLOGY

This questionnaire aimed to assess the public on knowledge and perception of stroke and it was developed in Malay language. The development and validation of the questionnaire was divided into 2 phases. Phase 1 includes literature review to develop an item pool, content validity by experts and face validity by randomly chosen people from the public, while Phase 2 determines the construct validity, internal consistency, test-retest reliability and item analysis of the questionnaire by administering the questionnaires to the public in Hospital Tengku Ampuan Afzan (HTAA).

RESULT

The content validity Index (CVI) for both knowledge and perception domains of the questionnaire are 0.9 while the face validity showed that most of the questions are clear and understandable. After modification, the Cronbach's Alpha of knowledge domain is 0.678 while the Cronbach's Alpha of perception domain is 0.745, indicating that the internal consistency of the questionnaire is acceptable. The intraclass correlation coefficient (ICC) of the knowledge domain is 0.805, indicating good test-retest reliability. The item analysis supported the deletion of questions 2, 6 and 21 of the knowledge domain. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) showed that the sample size used was adequate for factor analysis. The principal component analysis (PCA) showed that there are 6 components in the knowledge domain and 5 components in the perception domain.

CONCLUSION

The questionnaire is a valid and reliable tool that can be used to assess the stroke knowledge and perception of the public in Malaysia as shown by the results of the validity and reliability tests.

KEPENTINGAN MINUM AIR KOSONG

Kementerian Kesihatan Malaysia

Agenda Nasional Malaysia Sihat

MyHEALTH

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sihatmilikku

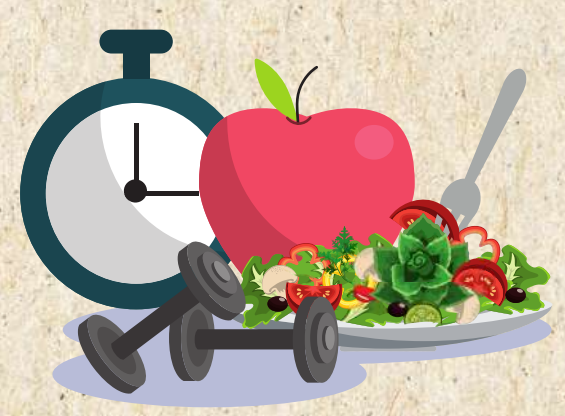
SCAN ME

PHARMACY ACTIVITY

BIGGEST LOSER

Challenge 2023

PharmCare
Hospital Tengku Ampuan Afzan



15th Feb - 15th June 2023

Be the best version of you!

All participants gathered for the prize giving ceremony

Our head of department, Pn. Zuhaini, joined the ceremony to give prizes to the winners

Congratulation!

Male

1st

En. Mohamad Haziq bin Abu Othman

2nd

En. Abdul Qayyum bin Mat Zaid

3rd

En. Ezzad Ashraff bin Ashim

Female & Consolation

Winners

1st Pn. Ainul Mardhiyyah binti Zameram

2nd Pn. Sharifah Norhafizah binti Syed Ahmad Japilus

3rd Pn. Nur Anisah binti Ahmad

Consolation Prize

Pn. Nurzuraini binti Yusof | Pn. Fairuz binti Abdul Malek | Pn. Shafiatul Haslinda binti Abd Aziz

ADVENTURE TRAVEL

PHARMHIKE

Let's Go Hiking!

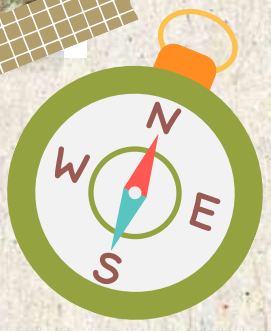
5th August 2023

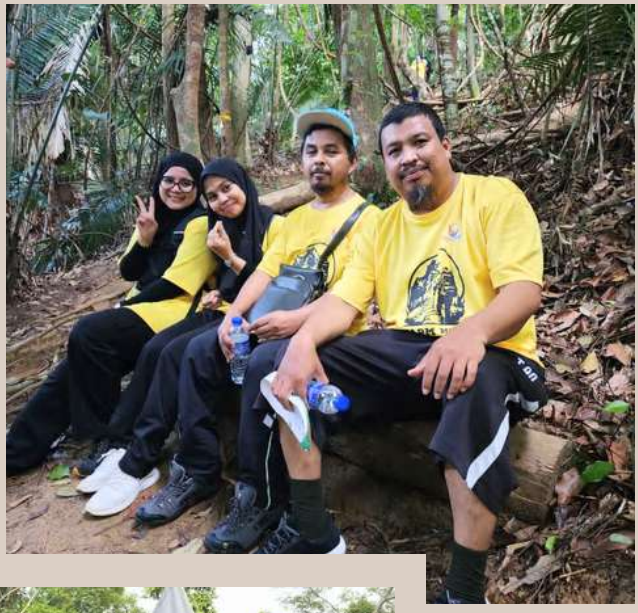
Taman Eko Rimba, Bukit Pelindung Jungle Trail

PharmCare
Hospital Tengku Ampuan Afzan

The top 14 participants that arrived early at the final check point

Warming up session before hiking






Phar
Hospital Tengku


EXPLORE
TRAVEL

Congratulation!


Nur Afiqah Amir Azhar


Nur Aniza Musa


Mohd Riduan Mohd Azmi


Yeoh Mei Yin


Choo Yai Wen


Nuraini Arshad


Muhammad Dzulkiefly Sidek


Siti Fatimah Aziz


Mohamad Haziq Abu Othman


Azra Farzana Fazil


Nurul Shuhada Athirah Abdul Rahim


Aryani Ahmad


Nurul Najahani Zainudin


Shahida Kamaruzaman


Ng Ghia Chee


Fairuz Abdul Malek


Shaff Kamil Omar Ali


Abdul Qayyum Mat Zaid


Siti Sarah Ilias

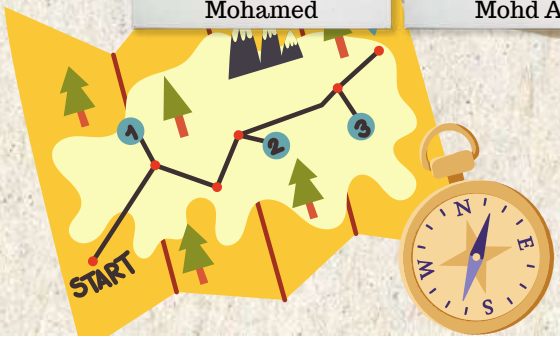

Soh Shen-ni


Arni Hayati Mohamed


Siti Nur Nadzirah Mohd Aziz


Nur Ain Atiqah Yousry


Michella Tan Sheau Yee



Lucky Draw Winners

PHARMACY ACTIVITY

Pertandingan Permainan Tradisional

9 - 10th August 2023

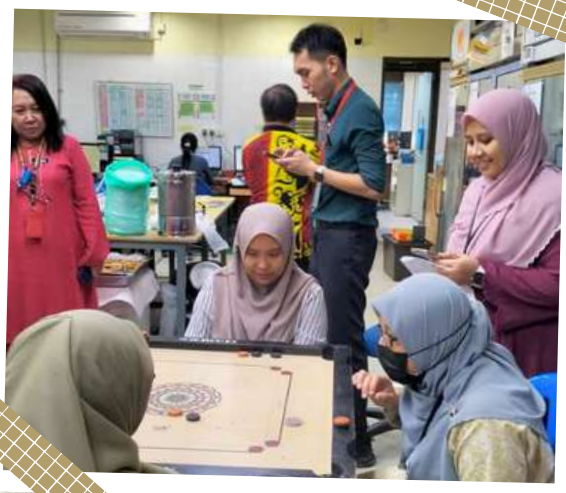
Ruang UOD FBW

PharmCare
Hospital Tengku Ampuan Afzan

Dam Haji

Pn. Zuhaini also participated in this game

Karom



Congkak

Pn. Zuhaini participated in congkak game as well

Congratulation!

Dam Haji

En. Shaff Kamil Omar Ali

Pn. Adawiyah Khairul Fadzil

Pn. Hawa Samsudin

Karom

En. Ezzad Ashraff Ashim
& En. Mohd Shahruerwan
Khairuddin

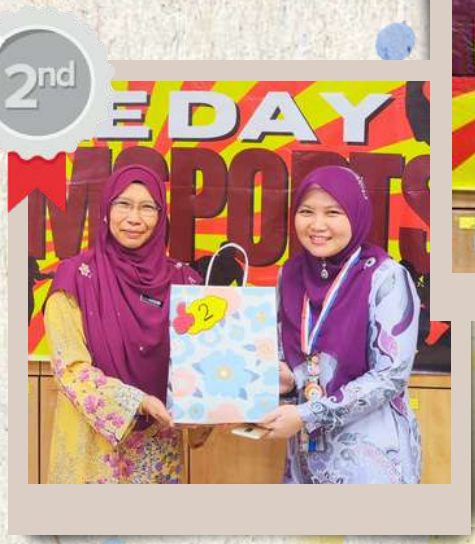
Pn. Nurzuraini Yusof &
Cik Thilaga a/p Manogaran

Pn. Fatin 'Izzati Shamsudin & Pn.
Nursasni Ain Abd Samad

Congratulation!

Congkak

Pn. Nur Hasanah Ismail



Pn. Nor Akma Idayu Mohd Yusoff

Pn. Fatin 'Izzati Shamsudin

JANGAN SEGAN MENEGUR PEROKOK

Nyatakan rasa tidak selesa kepada orang yang merokok termasuk rokok elektronik atau vape di sekeliling anda. Namun, tegurlah dengan cara yang paling berhemah dan sopan.

Tatacara menegur

- Mula dengan niat yang baik
- Guna perkataan yang baik
- Luah dengan sopan dan berhemah

*Dapatkan bantuan **Berhenti Merokok di Quitline 03-88834400** atau kunjungi **Perkhidmatan Berhenti Merokok** di fasiliti kesihatan berhampiran.*

KEMENTERIAN KESIHATAN MALAYSIA

Agenda Nasional Malaysia Sihat

MyHEALTH for life

MyHEALTHKKM

sihatmilikku

SCAN ME

PHARMACY BULLETIN BIL. 2/2023

Happy Independence Day, Malaysia !

31 AUGUST 1957