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## EMPIRICAL QUALITY EVALUATION OF COMMON BRANDS OF CEFTRIAXONE SODIUM INJECTION MARKETED IN THE NORTHERN REGION OF NIGERIA

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### ABSTRACT

*Information related to the quality of ceftriaxone sold in northern Nigeria is limited. Therefore, we aimed to evaluate the quality of different brands of ceftriaxone sodium injections marketed in Kano State, Nigeria. Thirteen different brands of ceftriaxone sodium for injection (three samples per brand) were obtained from patent medicines vendors, pharmacies and a government drug store in Kano State, Nigeria. The quality of these brands was assessed using physicochemical quality-control tests (colour, appearance, labelling, pH, weight uniformity and percentage of content). The results obtained from these tests were checked for compliance with the standards specified in British Pharmacopoeia 2009 (BP 2009) and the United States Pharmacopoeia 2016 (USP 2016). All the 13 (100%) brands were registered with the National Agency for Food and Drug Administration and Control (NAFDAC). The samples were imported brands from other countries and passed tests for colour and pH. However, 1 of the 13 samples did not pass the labelling inspection and only 4 (30.8%) brands were found to fulfil the requirements for physical appearance. Twelve (92.3%) of the 13 evaluated brands were found to have an acceptable percentage of content within a range of 95%–105% based on BP 2009 standards. The tested brands of ceftriaxone sodium injection being marketed in Kano State, Nigeria were found to have variable compliance regarding the BP 2009 and USP 2016 specifications. Therefore, there is a need for relevant regulatory agencies to embark on more post-marketing surveillance to ensure the quality of medicines in Nigeria.*

**Keywords:** Ceftriaxone sodium, Pharmaceutical quality control, Substandard medicines, Brands, Northern Nigeria

# CROSS-SECTIONAL STUDY ON THE ATTITUDE AND PERCEPTION OF HEALTHCARE PRACTITIONERS TOWARDS MEDICATION ERRORS IN A NIGERIAN TERTIARY HOSPITAL

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## ABSTRACT

*This study was carried out to evaluate the attitude and perception of healthcare professionals towards medication errors. A cross-sectional study was carried out using a semi-structured questionnaire administered to nurses, pharmacists and physicians at the University College Hospital, Ibadan, Nigeria. Data was analysed with descriptive and inferential statistics. Most of the study participants, 444 (55.5%) and 472 (59.0%) had excellent attitude and perception of medication errors, respectively. Most of the healthcare practitioners (89.1% nurses, 71.8% pharmacists and 66.7% physicians) disagreed with the statement that medication errors are unavoidable and are merely expected daily mistakes. It was observed that 35.5%, 37.6% and 66.7% of the nurses and pharmacists and physicians, respectively, agreed with the statement that persons responsible for medication errors should be liable for legal actions. Suggestions made by the healthcare professionals on measures to prevent medication errors included recruitment of new staff to increase in staff strength (32.8%), training on medication errors (21.4%), legible handwriting of prescribers (9.4%). Prevalence of unreported medication errors by the study participants was 24.9%. Reasons for not reporting medication error committed included that it was trivial and had no adverse effect on the patient (32.3%), excess workload (26.9%), fear of reprimand (17.7%). The healthcare professionals displayed excellent attitude and perception of medication errors. Increase in staff strength and training on medication errors were major measures suggested by the study participants to prevent medication errors.*

**Keywords:** Medication errors, Healthcare professionals, Attitude and perception, Hospital pharmacists, Cross-sectional study

## OPTIMISATION OF CURCUMIN MICRO-EMULSIONS USING PALM OIL

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### ABSTRACT

*Curcumin is a natural hydrophobic polyphenol derived from the curcuminoids of Curcuma longa. Curcumin is commonly known as turmeric and it gains the interest of scientific and clinical researchers as it exhibits great pharmacological benefits such as anti-cancer, anti-inflammatory and anti-oxidant properties. Nevertheless, curcumin is still not an approved drug in clinical settings due to its poor aqueous solubility and low oral bioavailability. Therefore, self-micro-emulsifying drug delivery system (SMEDDS) was used as an approach to enhance the solubility and bioavailability of curcumin. Microemulsion was devised in a pre-formulation phase using surfactant (Tween 80), a co-surfactant (polyethylene glycol, PEG 400), a lipid phase (palm oil) and an aqueous phase (water). Ternary phase diagram was used to identify the self-micro-emulsifying region in a formulation. Five of these formulations (F1, F2, F4, F7 and F10) were found to be stable with no phase separation is observed upon overnight storage. All of the five formulations (except F4) possessed high percentage of transmittance (86%– 100%), which signified the formation of a stable micro-emulsion when they were diluted in 1:100 ration by water. Curcumin micro-emulsions were formulated by loading curcumin into F1, F2, F7 and F10. Only F1 and F2 curcumin micro-emulsions exhibits a clear appearance, however, F7 and F10 forms a turbid solution, which indicate the formation of emulsion. The results indicated that F1 and F2 which contain high surfactant/co-surfactant-to-oil ratio 9:1 is optimum to formulate the curcumin micro-emulsions.*

**Keywords:** Curcumin, Micro-emulsion, Self-micro-emulsifying drug delivery system

# PREVALENCE OF PERCEIVED DEPRESSIVE SYMPTOMS AND ITS ASSOCIATION WITH STAGES OF HEART FAILURE AMONG OUTPATIENTS IN A PUBLIC HOSPITAL IN MALAYSIA

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## ABSTRACT

*Heart failure patients with depression usually have poor prognosis. This study aimed to determine the prevalence of perceived depressive symptoms among outpatients with heart failure and its association with New York Heart Association (NYHA) class. This was a cross-sectional survey conducted at Heart Failure Clinic in Hospital Pulau Pinang (HPP) over 3 months period starting Jan 2020 using convenience sampling method. All patients were included except patients under 18 years old, pregnant patients, diagnosed with psychiatric or depressive disorders and heart failure in-patients. A validated English and Malay version of Patient-Health questionnaire-9 (PHQ-9) was used for screening of depressive symptoms. High scorers ( $\geq 10$ ) were regarded as depressive. Results were reported in percentage or median  $\pm$  interquartile range (IQR). Fisher's exact test with 95% confidence interval was used. A total of 177 patients were recruited. The prevalence of perceived depressive symptoms among heart failure outpatients in HPP was 14.1%. NYHA class was significantly associated with depressive status ( $p = 0.003$ ). Depressive symptoms were common among these outpatients diagnosed with heart failure. Higher NYHA class suggested higher depressive symptoms score. Screening for perceived depression especially patients with higher NYHA class was recommended.*

**Keywords:** Heart failure, Prevalence, Depressive symptoms

# MOLECULAR DOCKING, DRUG-LIKENESS AND SwissADME EVALUATIONS OF THE INTERACTIONS OF 2'-SUBSTITUTED TRICLOSAN DERIVATIVES WITH *Plasmodium falciparum* ENOYL-ACYL CARRIER PROTEIN REDUCTASE

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## ABSTRACT

*The orthodox process of investigating lead molecules are lengthy and laborious one that in most cases leads to minimal success. Molecular docking analysis provides an alternative path to drug discovery through the interactions of two or more complexes. Molecular docking studies were performed on the 12 theoretically designed derivatives of 2'-substituted triclosan against a plasmodium falciparum enoyl-acyl carrier protein reductase (Pf-ENR) protein target as well as predicting their drug-likeness and SwissADME properties. The docking studies was carried out using the Molegro Virtual Docker (MVD) where the molecular interactions between the ligands and the target protein were studied. The docking analysis revealed 5-(((5-chloro-2-(4-chloro-2-hydroxyphenoxy)benzyl)amino)methyl)benzofuran-6-ol (Re-rank docking score = -145.497 kcal/mol) as the most stable derivative. The compounds were all found to completely concord with the Lipinski rule regulations, in addition to the molar refractivity as well as the number of rotatable bonds appearing within acceptance limits. All compounds except 2-5 and 7 show high gastrointestinal absorption, are non-inhibitors of cytochrome P450; CYP1A2 and CYP2C19 except CYP2C9, they lacks BBB penetration, and only compounds 2-7, and 12 were found to inhibit P-gp substrate. The findings suggest that some of the derivatives tend to increase the oral bioavailability of the substrate and are most of them cannot be used in the treatment of cerebral malaria. These results may lead to future optimisation of the designed derivatives for improved antimalarial agents.*

**Keywords:** Molecular docking, Drug-likeness, ADME, 2'-substituted triclosan, Pf-ENR protein

## **COMPARATIVE EFFECTIVENESS OF *Channa striatus* EXTRACT VERSUS GLUCOSAMINE SULPHATE FOR THE TREATMENT OF PRIMARY KNEE OSTEOARTHRITIS: A RANDOMISED CONTROLLED TRIAL**

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### **ABSTRACT**

*Channa striatus*, an indigenous freshwater fish, has been shown to treat knee osteoarthritis, but no study has been done to compare its effectiveness with other oral therapy. This study aimed to compare the effectiveness of oral *Channa striatus* extract and glucosamine sulphate in knee osteoarthritis symptoms and physical function. This is a double-blind randomised controlled trial, conducted among 78 patients with primary knee osteoarthritis. Patients were assigned to receive either 500 mg/d of *Channa striatus* or 1500 mg/d of glucosamine sulphate for 6 months. The main outcome measures were pain, stiffness and physical function, as assessed by the Western Ontario and Mc Master Osteoarthritis Index (WOMAC) at baseline, three- and six months post-randomisation. Seventy-three patients completed the study (*Channa striatus*,  $n = 37$ ; glucosamine sulphate,  $n = 37$ ). There was no significant between-group difference in the WOMAC index. However, the within-group comparison pointed to a significant improvement in all the WOMAC domains in both groups from baseline to six months. The effectiveness of *Channa striatus* shows no difference from that of glucosamine sulphate in reducing the symptoms of knee osteoarthritis. *Channa striatus* could be a new alternative treatment for the management of knee osteoarthritis.

**Keywords:** *Channa striatus*, glucosamine, Knee osteoarthritis, Randomised controlled trial

## **A RETROSPECTIVE ANALYSIS OF MEDICATION ERRORS AT A TERTIARY HOSPITAL IN A NORTHERN STATE OF MALAYSIA**

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### **ABSTRACT**

*The occurrence of medication errors (MEs) can lead to serious clinical outcomes and represents a significant concern for healthcare providers and policymakers. This study aims to analyse the characteristics of MEs reported at the Hospital Raja Permaisuri Bainun (HRPB), Ipoh in 2019. This was a retrospective study conducted by reviewing 1,045 ME reports at HRPB from 1 January to 31 December 2019. Out of this, 97.5% of errors were classified as near-misses, while 84.6% of the patients took the medications in actual errors committed. There were 91.1% of errors in the wards. The incidence of ME is more inclined to happen to geriatrics patients (n = 387; 37.1%), while majority of actual errors occurred in paediatric patients. The prescribing stage (97.4%) was believed to be the source of MEs and accounted for almost the entire reported cases. Cases of wrong dose contributed to more than half of the overall errors. About 99% of the errors had no harmful effect on the patient's health conditions. Drug for the cardiovascular system was the most common drug class involved in ME. Staff factor was believed to be the principal contributing factors that lead to ME. Majority of the MEs were detected and reported by the pharmacist. This study showed that most medication errors are near-misses. With the establishment of MERS, incidents of ME can be reported and analysed. A better understanding of the characteristics of MEs can contribute towards better management in preventing MEs.*

**Keywords:** Medication errors, Near misses, Prescription errors, Drugs, Outcomes

## **DRUG UTILISATION EVALUATION OF HUMAN ALBUMIN SOLUTION IN TAWAU HOSPITAL, SABAH, MALAYSIA**

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### **ABSTRACT**

*Human albumin solution (HAS) which is available in government hospitals in Malaysia, mostly supplied by National Blood Centre, Malaysia. Due to high usage of HAS, it is a strain to meet the demands nationwide. Moreover, HAS is very expensive. This study was a retrospective observational study evaluating drug utilisation of HAS in Hospital Tawau, Sabah. A name list of 61 patients who had received HAS between a 6-month period from 1<sup>st</sup> January to 30<sup>th</sup> June 2019 were sent for medical records tracing. Forty-eight prescriptions of HAS were evaluated and later categorised as 'proven indication' or 'unproven indication' with the aid of an internally prepared guideline. The result of this study indicates 12 (25%) out of 48 prescriptions were for 'unproven indications'. Possible wastage due to 'unproven indications' was 29 vials which was 20% of the total HAS usage in this study, estimated to cost RM7,804 (USD1,880). Major surgery with serum albumin level of 20g/L and above (55.2%), paracentesis with ascitic fluid removed of less than 5L (24.1%) and hypoalbuminemia without justified comorbid or diagnosis (20.6%) being reasons for possible wastage of HAS in this study. The percentage of possible wastage of HAS reflected in this study was not as high as other published research done in other countries, mainly due additional steps required for prescribing HAS in our facility (filling-up the Blood Plasma Product Request Form) and also the need to obtain approval from the Director General of Health Malaysia if it was prescribed for other than the approved indications.*

**Keywords:** Drug utilisation evaluation, Drug use evaluation, Human albumin solution, Drug utilisation review, Albumin



## CLINICAL CHARACTERISTICS OF INDIVIDUALS DIED WITH COVID-19 IN MALAYSIA

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### ABSTRACT

*Battling the COVID-19 pandemic still is the main agenda of many countries in the world today. This study aims to describe the clinical characteristics of COVID-19-related deaths in Malaysia in 2020. Data was obtained from the daily press conference on the COVID-19 situation in Malaysia. Only information on daily deaths were collected for the purpose of this study. A total of 471 COVID-19 deaths reported in Malaysia in 2020. Number of deaths reported for the age categories < 65 years old and ≥ 65 years old were almost equal. Majority of deaths were reported among male (66.2%), Malaysian (82.8%), from the state of Sabah (56.3%) and with comorbidities (75.4%). Commonly reported comorbidities were hypertension (53.1%), diabetes mellitus (37.6%) and heart disease (17.4%). Gout was more prevalent and attributed to significant rate of mortality in individuals ≥ 65 years old (6.1%;  $p = 0.011$ ), whereas obesity (5.8%;  $p = 0.003$ ) and asthma (4.5%;  $p = 0.040$ ) was more prevalent and attributed to significant rate of mortality in individuals < 65 years old. Heart disease was more prevalent among males ( $n = 64$  [20.5%]; [ $p = 0.013$ ]) and obesity was more prevalent among women ( $n = 11$  [6.9%]; [ $p = 0.003$ ]). Furthermore, presence of comorbidities was significantly higher in Malaysians ( $p < 0.001$ ) with two and more comorbidities ( $p = 0.007$ ). Early detection of risk factors for critical conditions is urgently required to provide adequate supportive treatment.*

**Keywords:** Comorbidities, COVID-19, Died, Malaysia, Public data

## **EXPLORING PHARMACISTS' EXPERIENCES ABOUT RENEWAL OF ANNUAL LICENSE OF PRACTICE IN NIGERIA**

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### **ABSTRACT**

*Consistent with the global best practices, pharmacists practicing in Nigeria are mandated by law to renew their professional licenses annually. However, there is limited data regarding pharmacists' experience with the renewal of practice licenses in Nigeria. Therefore, we aimed to provide this data. A cross-sectional study was conducted in an online survey (using Google Form™). Eligible participants were registered pharmacists in Nigeria. A questionnaire (link) that examines experiences towards renewing their license was developed and validated. The survey link was shared with the participants via social media platforms, namely, Facebook, WhatsApp and Twitter. A total of 349 pharmacists responded to the survey, of which 313 (89.7%) completed the questionnaire. Of these respondents, 276 (88.2%) reported renewing their licenses annually. Among those who do not renew their licenses, the high cost of license renewal is 18 (48.6%), a cumbersome process 9 (24.3%), and licenses not required in their place of work 8 (21.6%) were the common reasons for not renewing their licenses. Participants indicated a preference in the online method of license renewal 277 (88.5%). Of the respondents, 43.5% and 64.2% disagreed with linking*

*the Mandatory Continuing and Professional Development (MCPD) and payment of professional associations' dues with re-licensure, respectively. Twenty (6.4%) rated the performance of the Pharmacists Council of Nigeria (PCN) as excellent and 143 (45.7%) as good. A high proportion of pharmacists (276 out of 313) renew their practice licenses in Nigeria. However, a reasonable number of pharmacists 82 (29.7%) in this study reported inconsistent attitudes towards license renewal. Therefore, there is a need for interventions to encourage pharmacists to renew their licenses annually.*

**Keywords:** Pharmacist, Licence, Nigeria, Profession, Regulation