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HOSPITAL PHARMACY

A STUDY ON THE MANAGEMENT OF UNCONTROLLED DIABETES IN MEDICAL WARDS OF HOSPITAL KUALA LUMPUR

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OBJECTIVES: To identify the characteristics of patients admitted to the hospital for uncontrolled diabetes and evaluate the efficacy of therapy given.

METHODS: Retrospective method was used whereby medical records of eligible patients were reviewed from August to December 2003. Data on demography, diabetes history, precipitating factor for uncontrolled diabetes, insulin therapy, glycemic control, and incidence of hypo-glycemia were recorded in a standard form. Glycemic control was classified as 'good', 'suboptimal' and 'poor' based on the percentage of readings that fell in the specified target range of 4 to 9 mmol/L.

RESULTS: Majority of patients hospitalized for uncontrolled diabetes was elderly (mean age 58 years) and of Malay race (54%). Most of them were Type 2 diabetes patients (73%) and had previous history of diabetes (94.5%). The incidence of uncontrolled diabetes was higher in patients who had relatively shorter duration of diabetes ($p<0.05$). Infection (40%) was found to be the main precipitating factor for uncontrolled diabetes followed by medication non-compliance (30%). The initial dose of insulin prescribed did not depend on the patient's RBS level ($p>0.05$). Only 37.8% of subjects showed 'good' glycemic control during their stay in the ward. The discharge date of patients did not depend on whether their RBS levels reached normal range or not ($p>0.05$). The incidence of hypoglycemia was 32%.

CONCLUSION: The outcome of the management of uncontrolled diabetes in hospital is still poor and health care professionals should work as together as a multidisciplinary team to ensure optimal therapeutic outcome of the patient.

TUBERCULOSIS AND DIABETES: BLOOD GLUCOSE LEVEL AND LEUKOCYTE COUNT: ARE THEY CORRELATED?

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BACKGROUND: Diabetes mellitus (DM) is considered a complex disease characterized by abnormal carbohydrate, fat and protein metabolism. Diabetic patients are more susceptible to a wide range of infectious diseases of bacterial, fungal and parasitic in origin. Tuberculosis (TB) is one of those infectious diseases that are frequently seen in diabetic patients. T-lymphocytes and monocytes are important in host defense against mycobacteria.

OBJECTIVES: This is a pilot study for PhD program in the area of diabetes and tuberculosis. The main objectives are: (1) to assess if DM patients have quantitatively abnormal leukocyte and platelet

counts, (2) to compare DM to TB with respect to leukocyte and platelet counts, and (3) to identify if there is any correlation between leukocyte count and blood glucose level.

RATIONALE: Although significant number of studies related to the immune dysfunction and pathogenesis of DM were published, this topic remains as an area of research. Studies related to the immunity in diabetic patients require re-evaluation. Most of these studies extracted their results from small samples. In addition to that, results of these studies are not matching, and some times shows contradictory conclusions.

METHODS: Groups studied included: DM (118 patients), TB (115 patients), DM-TB (76 patients) and Control subjects (118 patients). Retrospectively leukocyte count, platelets, and blood glucose levels of these groups were compared.

SETTING: Hospital Pulau Pinang.

RESULTS: DM patients showed quantitatively higher lymphocyte and neutrophil count. TB patients showed the lowest lymphocyte count. Combined lymphocytopenia-neutrophilia was observed in all groups for severely ill patients. Depending on the severity of illness, lympho-cytopenia-neutrophilia may have resulted from migration of lymphocytes to the area of inflammation at the expense of circulating peripheral lymphocytes and this abnormal distribution of lymphocytes normalized after the correction of inflammation. The inflammation could be due to excessive release of hormones and/or catechloamines, injury/surgery, infection or others. Thrombocytosis was observed in TB and DM-TB groups. Although it is not clear, thrombocytosis might have resulted from tuberculous infection.

CONCLUSION: Compared to other groups, DM patients had the highest average lymphocyte and neutrophils. TB patients had the lowest lymphocyte count, which may have resulted from infection and/or malnutrition. Thrombocytes of the TB and DM-TB patients were elevated, may be, as a result of TB infection.

PHARMACEUTICAL CARE SERVICE IN PATIENTS WITH AIDS

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BACKGROUND: AIDS patients need to be on several medications including antiretroviral agents, as well as medications for treatment and prevention of opportunistic infections. Those medications especially antiretroviral agents possess several characteristics that can cause drug related problems (DRPs). High adherence rate (>95%) is required for successful treatment but is also associated with high incidence of adverse drug reactions and drug-drug interactions. Pharmaceutical care service could potentially reduced drug related problems in these patients.

METHODS: All outpatients with AIDS who were on antiretroviral therapy and come to HIV clinic at Songklanagarind Hospital were invited to meet clinical pharmacists in the counseling room located at outpatient pharmacy. Pharmacists reviewed patients' information and interviewed patients to identified actual and potential DRPs. Pharmacists' interven-tions to solve or prevent DRPs included the provision patient education and discussion with other health care providers. Patient's information and pharmaceutical care services for each patient were recorded in patients' profile. Patients were followed up and monitored for DRPs every time they came for clinic visit. Outcome assessments included; number, characteristics and clinical significance of each pharmacist's intervention, and adherence rate to antiretroviral agents.

MANAGEMENT OF CHEMOTHERAPY INDUCED NAUSEA AND VOMITING (CINV) IN ADULT PATIENTS RECEIVING HIGHLY EMETOGENIC CHEMOTHERAPY AGENTS

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Chemotherapy induced nausea and vomiting are common complications of chemotherapy administration. The single most important factor influencing the frequency with which acute nausea and vomiting develops after treatment with antineoplastic chemotherapy is the emetogenic potential of the chemotherapy administered. This study was conducted to evaluate the management of chemotherapy induced nausea and vomiting in adult patients receiving highly emetogenic chemotherapy agents. A total of 35 patients were included in this descriptive and prospective study. They were interviewed either verbally or via telephone for five days after their chemotherapy administration. This study had more female patients (71.4%), common age group between 51–60 years old (34.3%), 63% were Malays and the highest percentage of cancer was breast cancer (37%). Most patients had received at least one cycle of chemotherapy (37%). Antineoplastic drugs from risk level 4 were the most common group of chemotherapy drug administered (80%). The combination of intravenous granisetron and dexamethasone was the most common antiemetic combination used during pre-chemotherapy (91%). Over the 5 days patients had improvement on nausea (50%), vomiting (87.5%) during the acute and delayed phase. Combination of oral dexamethasone and metoclopramide was the highest prescribed (56%) in the study and during the acute and delayed phase. These patients had improvement (18.5%) and maintained (40.5%) their emesis response during the 5 days. All patients (7.4%) who were prescribed oral granisetron and dexamethasone postchemotherapy had 100% complete response from emesis. Although 48% of patients did not comply, 34% of them had no emesis. There is good association between the levels of emetogenicity of chemotherapeutic agents with frequency of emesis ($p<0.05$). Most patients with level 5 emetogenicity agents had emesis (86%). Overall, combination of dexamethasone and metoclopramide had good control of chemotherapy induce nausea and vomiting but about 20% of patients will require a different combination.

CHANGES OF RENAL FUNCTION IN FORTY-TWO CRITICALLY ILL PATIENTS FOLLOWING DIFFERENT DRUG MANAGEMENT IN THE INTENSIVE CARE UNITS AT HOSPITAL UNIVERSITI KEBANGSAAN MALAYSIA

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OBJECTIVE: This study is performed to identify the changes in kidney function of critically ill patients in the Intensive Care Unit at Hospital Universiti Kebangsaan Malaysia (HUKM) following different drug managements**.**

METHODS: This study was conducted retrospectively and involved 42 patients (n = 42) who were admitted to Intensive Care Units at HUKM. Sampling and collection of data were done at the record office in four months starting from December 15, 2003 to March 15, 2004. To be included in this study, the patients should be more than 18 year old and had remained in the intensive care unit for at least two consecutives days to enable sufficient data to be collected and compared. The patients should be on at least one type of drug that would have an effect on the renal either positive-effect drugs or negative-effect drugs or both. At least two serum creatinines at different times were needed. They should not be on hemodialysis or had undergone renal transplantation at the time the data were collected. The following variables: age, gender, race, body weight, date of admission and date of discharge, main diagnosis, previous chronic health status, drug therapies and their indications, route of drugs administration, time at which drug was administered and stopped and any dosage

adjustment after the occurrence of renal impairment were recorded. Daily serum creatinine levels in mg/dl and other possible mechanisms or etiologies of renal impairment were also recorded. The creatinine clearance of each individual patient was calculated and compared. Drugs that are known to increase the serum creatinine levels would be marked as positive-effect drugs whilst drugs that are known to reduce the serum creatinine levels would be marked as negative-effect drugs. At the end of the study, 53 conditions (n = 53) at which the creatinine clearances of the subjects were either increased, decreased or remain unchanged following the administration of both types of drugs, have been gathered and evaluated.

RESULTS: Out of 42 subjects (n = 42), 54.77% were female. Chinese subjects were the most predominant race (57.14%), followed by Malays (33.33%), and Indians (9.53%). Subjects ranged from 60–69 years old (mean 57.97 ± 14.14). A paired-sample t-test procedure was used to find whether there is a significant different in the creatinine clearance level before and after drug treatment. The mean creatinine clearance before the treatment was 62.46 mL/min ± 33.36 and that after the treatment was 58.73 mL/min ± 33.89. There was a decline in the mean value of the creatinine clearance post treatment ($p>0.05$) from 28 subjects who had renal impairment, 39% of them died after receiving treatment. Those who survived might either be fully recovered, required haemodialysis or on pharmacological treatments. A significant relationship ($p<0.05$) between the creatinine clearance of the subjects with renal impairment and the death or survival rate was obtained. Frusemide (57.10%), dopamine (30.95%), noradrenaline (28,57%), bumetanide (23.81%), noradrenaune + dobutamine (21.43%) and dobutamine alone (4.76%) were positive-effect drugs that was used most frequently during the period of study. On the other hand, the negative-effect drugs were used extensively in the study and ranked as follows: Sedative agent (78.57%), antibiotics (76.19%), opiod (74.43%), H_2 antagonist (35.71%), non-opiod analgesics (14.29%), beta-blockers (11.90%), antiepiletic (11.90%), nitrates (7.14%), digoxin (7.14%), theophylline (7.14%) and non steroidal anti inflammatory drugs (2.38%). From 53 conditions (n = 53), the usage of these positive-effect drugs caused creatinine clearance to decrease than it caused the creatinine clearance to increase or remain unchanged ($p<0.05$). The administration of more than three positive-effect drugs in these subjects resulted in reduced creatinine clearance. Whilst, there were not much difference in the creatinine clearance values of the subjects following the negative-effect drugs administrations even though the declining of creatinine clearance of the subjects was seen more than the increment in their values ($p>0.05$). The decline in creatinine clearance observed in subjects who used more than three negative effect drugs and also it would be more related to the highly used of antibiotics (28), sedative agent (22), opiod (19) and H2 antagonist (8).

DISCUSSION: The number of patients who acquired renal impairment in the ICU setting following the ICU treatments was apparent. The death (39%) among renally-impaired subjects should not be disregarded. Drugs that are described in many journals for the treatment of renal impairment have not shown to increase the renal functions of the subjects. Drugs that are known to deteriorate renal function had not shown larger effect on the renal function of the subjects.

CONCLUSION: It appeared that the effects of drugs on the renal function of critically ill patients were unpredictable, thus, close monitoring of renal function for critically ill patients with multiple drugs therapy is needed.

WORK ANALYSIS MODEL OF HOSPITAL PHARMACY SERVICES: A CASE STUDY IN OUTPATIENT DISPENSING SERVICES AT BANPHAI HOSPITAL, THAILAND

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The application of work analysis to measure hospital pharmacy work is important to identify work problems and causes. The work analysis model in outpatient dispensing services at BanPhai Hospital, Thailand was established to measure used time in work of operators, delayed time in queue of work, waiting time of patients, standard time in work of operators, how operators spent their time, medication error, and satisfaction of patients. The used time and the delayed time were measured by prescription stamped-time technique. Stopwatch time study technique was used to measure the standard time. Work sampling technique was used to determine how operators spent their time. Self-report questionnaires of satisfaction and medication error forms were used to determine patients' satisfaction and medication error. The data were collected during November 2004 to April 2005. The results showed that the waiting time of patients (20.06 minutes) in outpatient pharmacy service is quite similar to the standard of Thai Hospital Pharmaceutical Association (20 minutes). However, the delayed time in queue (17.27 minutes) was quite long when compared with the used time (2.79 minutes) and the standard time (5.41 minutes). In addition, the operators spent 17.96% of their time in non-productive activities especially in idle, personal, and absence. So, the waiting time of patients can be more improved by reducing the delayed time in queue and non-productive time of operators. The pre-dispensing error was a problem (3.48%) and the used time in work of operators (2.79 minutes) is twice less than the standard time (5.41 minutes). Thus, it was important to remind operators to work step-by-step following Standard Operating Procedure (SOP). Work analysis model was helpful and can be applied to evaluate and improve the efficiency of hospital pharmacy work.

FLUCTUATION PATTERN OF SODIUM, POTASSIUM AND FLUID IN THE FIRST FEW DAYS OF PATIENTS RECEIVING PARENTERAL NUTRITION

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Using a prospective descriptive study design, the fluctuation pattern in sodium, potassium, and fluid profiles was evaluated in adult surgical and medical patients receiving parenteral nutrition (PN). The study took place at Hospital Kuala Lumpur (HKL) from mid February to mid April 2003. Thirty patients were included in the study. The principal findings in this study show that it was common for hyponatraemia to occur within the first 48 hours of initiation of PN, the fall in sodium level was noted in 60% of patients after starting PN. The mean decline in sodium levels was 3.27 ± 1 mmol/L ($p<0.05$) in the initial stages of PN administration. The incidence of hyponatraemia was 16.7% in patients with pre-PN regimen (the dextrose-saline drips) within the first 48 hours of starting PN, and 16.7% after the cessation of PN. Hypokalaemia was noted in 36.7% of patients before and after starting PN, and the incidence was 23.3% after cessation of PN. An increase in positive fluid balance was noted in the majority of patients (96.7%) after starting PN. There was an average increase in positive fluid balance of 97.4 ± 220 ml per day per patient after starting PN. The findings confirm that the administration of PN is associated with disturbances in sodium, potassium and water balance. The changes may be clinically significant in hospitalized patients who are rnetabolically stressed. Close monitoring of electrolytes and fluid status can help in the early detection and correction of disturbances associated with PN.

OBSERVATIONAL STUDY ON DRUG ADMINISTRATION ERRORS IN A HOSPITAL WARD

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BACKGROUND: Drug administration errors are the second most frequent type of medication errors, after prescribing errors but the latter are often intercepted. This means that administration errors are more likely to reach the patients and have higher potential to cause harm. Therefore, the present study was conducted to determine the frequency and types of drug administration errors in a hospital ward and to suggest measures to reduce such errors.

METHODS: A researcher was stationed in the ward concerned for 15 days to observe any drug administration during that time. All observations were recorded in a data collection form and later compared with the drugs prescribed for the patient.

RESULTS: A total of 1118 administrations were observed in 66 inpatients with 135 drug administration errors recorded. This means 12.1 errors per 100 drug administrations. The most common types of drug administration errors were incorrect time (25.2%), followed by incorrect technique of administration (16.3%). Others included incorrect drug preparation, incorrect dose and omission errors (10.4% each). When the 10 most commonly administered drugs were considered, dexamethasone had the highest error rate (30.8% of doses) followed by metoclopramide (21.4%), allopurinol (16.6%) and tranexamic acid (12.2%). Intravenous bolus route were more likely to be associated with an administration error (40.0%) than intravenous infusion (10.1%) or oral routes (7.9%) ($p<0.001$).

CONCLUSIONS: It was concluded that a system for double-checking should be implemented and measures to reduce incorrect time of administration should be developed. In addition, awareness programmes should be conducted to reduce the incidence of drug administration errors.

INTEGRATED PHARMACEUTICAL CARE FOR RESPIRATORY PATIENTS AT CHANGHAI HOSPITAL

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Since the concept of pharmaceutical care was introduced into China early in 1990s, Professor Jin-Hong Hu proposed "Integrated Pharmaceutical Care", and advocated Chinese pharmacist to take part in the clinical practice focusing on patients. It took several years for Chinese pharmacists to carry out the idea in the clinical practice. This paper reviewed our experiences on the clinical pharmaceutical practice from 1998 to present in the Department of Respiratory at Changhai Hospital, the academic hospital of Second Military Medical University (SMMU) in China. Since 1998, our pharmacist started participating in ward rounds at the Division of Respiratory. Great efforts have been made to conclude a promising concept — Integrated Pharmaceutical Care, which is composed of participating in ward rounds, providing drug information, analyzing and treating adverse drug events, and designing individual treatment plan. The individualized plan was accomplished by monitoring patient's therapeutic concentration of drug, and recording and organizing history of pharmaceutical care. With our consistent and continuous endeavors, the Integrated Pharmaceutical Care has been put into practice in our hospital, and has been proved to provide much better care to our patients. Our pharmacists synergistically worked with physicians, nurses and other health care providers together and directly provided pharma-ceutical care to patients. Moreover, we obtained our first hand experiences from working with other health care providers and patients. Although that

is just the beginning of clinical pharmacists trying to provide pharmaceutical care to patients face to face, and the starting point for pharmacist work together with doctors and nurses, the experiences over the last seven years gives exploration of pharmaceutical care practice. Clinical pharmacist is a new profession in Chinese hospital. Pharmaceutical care practice in China is just beginning. As there is still no mature mode of pharmaceutical care practice, as the Clinical Pharmacy Center of the PLA, Changhai Hospital of SMMU has made great efforts in taking many tasks in these fields through various approaches. Several young pharmacists with Master or Doctor Degree devote themselves into this practice. After several years of hard working, primary experiences in certain areas were gained, and a basic team of clinical pharmacists was formed. The most important achievement is the establishment and maintenance of a good cooperation with health care providers of other disciplines. Based on this, can we enrich our practice skill continuously and establish a practical model to provide good pharmaceutical care to our patients. With continuous efforts, we can do our utmost to improve the development of clinical pharmacy in China. Our goal is to put the Integrated Pharmaceutical Care into practice in more broad range in the future.

AN ACCURACY OF THE DETECTION OF IV-PO SWITCHING CANDIDATES USING DOCTOR ORDER SHEET SCREENING

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Hospital pharmacists have an important role in the parenteral-oral (IV-PO) drug-switching program especially in detecting the switching candidates. Review of medical charts is used as the standard practice. When resources are limited, screening of doctor order sheet is an alternative. We conducted a study at Khon Kaen Hospital, Thailand in April 2004 to determine the accuracy of doctor order sheet screening approach at the pharmacy unit when compared with the medical chart review at patient wards. Based on the switching guideline, a total of 75 prescriptions were screened for the IV-PO switching candidates by four pharmacists who had experience in pharmaceutical care services of at least 2 years. The process was repeated 2 weeks thereafter to determine the measure reliability. The sensitivity and specificity of the detection varied across the pharmacists, ranging from 0.087 to 0.413 and 0.828 to 0.897, respectively. Overall probabilities of the correct detection for the 4 pharmacists were 0.440, 0.573, 0.373 and 0.560. The probabilities that a positive prediction was correct were 0.700, 0.792, 0.444 and 0.842. The probabilities that a negative prediction was correct were 0.400, 0.471, 0.364 and 0.464. There was variation between the order sheet screening and the medical chart review within each pharmacist. The level of agreement for each individual pharmacist was 97.8% (kappa = 0.91), 71.7% (kappa = 0.41), 82.6% (kappa = 0.11) and 100.0% (kappa = 1.00), respectively. The screening of doctor order sheets at the pharmacy unit could detect the switching candidates in approximately half of the actual candidates and could be used when well-trained pharmacists were in charge.

PATTERN OF DRUG UTILIZATION IN GOVERNMENT HOSPITALS IN SANA'A PROVINCE

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BACKGROUND: Over prescribing, multiple drug prescribing, misuse of drugs, use of unnecessary expensive drugs and overuse of antibiotics are common problems of irrational drug use by prescribers.

OBJECTIVES: To study the behaviour of prescribers regarding drug-prescribing practice and to assess the drugs use pattern at outpatient clinics in public hospitals.

MATERIALS AND METHODS: The study population was limited to the public quaternary health care facilities in Sana'a capital trust (four government hospitals). The study was designed using the methods described in the World Health Organization (WHO) manual, "How to investigate drug use indicators" (WHO/DAP 1993). The study was generally comparative, cross-sectional and prospective.

RESULTS: From 1200 prescriptions, about 39.7% of the drugs did not adhere to the Yemen Essential Drugs List and 51.9% of prescriptions contained antibiotics. The average number of drugs per prescription was 2.6 ± 1.3 drugs, the percentage of antibiotics from all drugs prescribed was 23.8%, 86.1% of drugs prescribed were branded drugs, the average number of antibiotics per each patient received antibiotics was 1.2 ± 0.4, the percentage of injections prescribed was 31.8%, and the percentage of vitamins/tonics prescribed in all prescriptions was 35.0% in all hospitals studied. The mean cost of prescription was US$8.60 while the mean cost of antibiotics per each patient was US$6.80 and the percentage of all antibiotics cost of all prescriptions was 40.2%.

CONCLUSIONS: These results provide useful information on prescribing behaviour as well as patterns of drugs use. The pattern showed that there were various drugs use problems among the government hospitals—public quaternary health care facilities. Effective interventions and advocacy activities are needed to ensure rational and safe drug use among patients.

COMPREHENSIVE PHARMACEUTICAL CARE FOR PATIENTS WITH CHRONIC KIDNEY DISEASE

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Patients with end-stage renal disease suffer from many co-morbidities and most patients require chronic complex pharmacotherapeutic regimens that require constant and thorough monitoring. At the University of Illinois at Chicago Medical Center Dialysis Unit, approximately 150 chronic hemodialysis and 20 CAPD patients receive comprehensive care by an interdisciplinary team, of which the pharmacist is an integral member. The pharmacist is responsible for the pharmacotherapy of all the patients in the unit. During daily patient care rounds, the pharmacist assists in the assessment of goal dry weight, coordinates care between various clinics and hospitals, and manages disease states such as hypertension, diabetes mellitus, anemia, and renal bone disease. Recommendation on therapeutic modifications to ensure renal/dialysis dosing to avert drug interactions and adverse effects is another function of the pharmacist. Clinical and laboratory drug monitoring, pharmacokinetic analysis, patient drug history and education are also provided. The pharmacist participates in a multidisciplinary monthly review of laboratory results for all the patients. Specifically, the pharmacist is responsible for the dosing and monitoring of erythropoietin for the treatment of anemia. We devised a maintenance regimen for intravenous iron supplementation and found such regimen superior to intermittent supplementation in optimizing

response to erythropoietin. The pharmacist is also responsible for the complex pharmacotherapeutic regimens for treating renal bone disease which may include phosphorus binders, vitamin D analogs and calcimimetic agent. There are several new agents that are available recently and our group has conducted many studies to assess the efficacy and safety of these new agents. We will present in detail our role in maintaining rational pharmacotherapy, the judicious use of the different drugs for treatment as well as the impact of our efforts in attaining the therapeutic goals as specified in the National Kidney Foundation Kidney Disease/Dialysis Outcome Quality Initiatives (K/DOQI) clinical practice guidelines.

PEAK (C_2) AND TROUGH (C_0) MONITORING OF CYCLOSPORINE IN LONG TERM RENAL TRANSPLANT PATIENTS

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OBJECTIVES: The aims of this study were (1) to compare the variability of C_2 and C_0 monitoring of cyclosporine, and (2) to evaluate safety, in terms of adverse events and complications, associated with dosage adjustment based on either C_2 or C_0 monitoring.

METHODS: A retrospective review of the medical records of long-term renal transplant patients followed-up at Hospital Tuanku Ampuan Rahimah (HTAR), Klang was carried out. Demographic data, donor type, current immuno-suppressant regimen, concurrent medical problems, and concurrent drugs were obtained. Variability of C_2 and C_0 monitoring was assessed from the coefficient of variation (CV) of dose-adjusted peak and trough levels, respectively. The effects of dosage adjustment of CSA based on either C_0 or C_2 on clinical parameters such as blood pressure, serum creatinine, uric acid, liver function tests and lipid status were assessed. Adverse events and complications were also noted.

RESULTS: Data on 44 patients were extracted (male:female = 24:20). The majority of patients received cadaveric organs, and most patients (55%) were on a triple-immunosuppresive regimen consisting of cyclosporine, azathioprine and prednisolone. Hypertension was the most common concurrent medical problem (89%). Metoprolol and cefuroxime axetil were the most commonly prescribed antihypertensive and antibiotic respectively. C_2 monitoring showed less variability compared to C_0 [12.7 ± 18.2 % versus 33.2 ± 24.4% ($p<0.05$)]. There was no significant difference in the adverse events or complications associated with dose change based on either C_2 or C_0 monitoring. The two most common complications observed were hypertension (41%) and infection (39%).

CONCLUSION: C_2 monitoring shows less variability compared to C_0. However, adverse events associated with dosing regimen based on either method of monitoring do not show any significant difference.

CURRENT STATUS OF PHARMACIST-OPERATED DRUG INFORMATION CENTERS IN INDONESIA

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OBJECTIVE: Pharmacist-operated drug information centers (DICs) in Indonesia were surveyed and the result was used as a baseline for developing drug information services in Indonesia.

METHODS: In the period June 2003 to September 2004, Drug and Food Information Center (DFIC) as a National Drug Information Center (NDIC) conducted a survey by distributing questionnaires to

300 pharmacists who joined workshops or seminars that were conducted by professional organizations or drug information centers. The pharmacists were from the institutions that were identified to have an organized DIC, defined as a center that regularly accepts requests from public and healthcare professionals, regardless of the location or affiliation of these professionals. The survey included topics such as affiliations, funding, staffing, resources, performance, and barrier for training.

RESULTS: Two hundred and four pharmacists responded (68%) of which 128 (63%) came from institution that has provided drug information services (DIS). The locations of the institutions spread from the west to east part of Indonesia, which is mainly in Java (69%). Hospital based DIC (56%) became the majority of affiliation of DIC, followed by Drug Authority based DIC (22%) and community based DIC (13%). Government funding was more dominant (60%) in developing DIC compared to private funding which was 40%. Sixty percent of these institutions provided drug information, which ranged from 1–10 every month. Forty-four percent of the service was conducted by part time pharmacist followed by full time pharmacist (33%). Institutions that have not yet conducted DIS mentioned that human resources were the most serious barriers in starting providing the services. The other obstacles/ barrier was the lack of literature and computer facility. Most institutions have not yet used literature on CD and still used books as the main resources/reference in providing DIS. Internet access was only available in 55% of institution providing the DIS.

CONCLUSION: The numbers of DICs have increased since the first establishment of DIC in Fatmawati Hospital on 1992. This condition is followed by the increase in the number of drug information pharmacists. DIC services continue to be comprehensive. Respondents concluded that training is a basic priority needed to develop their DIS. This survey also supports DFIC as NDIC in conducting training programme in providing DIS. Further efforts should be done to increase the number of the institution as well as the number and quality of the pharmacist in the provision of drug information.

PHARMACEUTICAL CARE ISSUES IN RENAL TRANSPLANT PATIENTS

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Pharmacist's role in the care of renal transplant patients is becoming increasingly important. This study was conducted to identify the pharmaceutical care issues relevant to the management of pre and post renal transplant patients and to develop a pharmaceutical model care plan for the patients. A total of 31 renal transplant patients between the age of 16–64 years old, admitted to Hospital Selayang, between January 2000 and March 2004 were included in this study. The patients' records were retrieved, screened and their managements were reviewed prospectively. A total of 298 pharmaceutical care issues were identified, with an average of 9.6 ± 2.67 issues per patient. The number of care issues for patients admitted for transplantation were higher (59.7%) compared to post-transplant patients (40.3%). The largest category of pharmaceutical care issues was on the special requirements of specific services (42.3%) followed by therapeutic drug choice (27.8%), predisposing patient factors (12.8%) and adverse drug reaction/interactions (11.1%). There was a significant relationship between pharmaceutical care issues and duration of hospital stay ($p<0.01$). Most of the issues were identified during the first 20 days of their hospital stay. Four co-morbidities were also identified namely urinary tract infection (UTI) (38.7%), hypertension (58.1%), hyperlipidaemia (35.5%) and diabetes mellitus (25.8%). There was a significant relationship between the number of pharmaceutical care issues and UTI ($p<0.05$). A pharmaceutical model was developed based on the issues identified with a view that its implementation will help to ensure an excellent and holistic approach in the management of renal transplant patients.

HYPERGLYCEMIA FOLLOWING HEAD TRAUMA

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BACKGROUND: Severe head injury is associated with a stress response that includes hyperglycemia.

OBJECTIVES: To examine the effect of severity of head trauma on blood glucose in a series of patients died as a result of head injury and to compare them with those who had been discharged with good outcome.

SETTING: 2nd March Teaching Hospital, Sebha, South Libya.

MATERIALS AND METHODS: (Retrospectively), we reviewed the clinical course, Glasgow Coma Scale (GCS) and Injury Severity Score (ISS) and the Blood Glucose Level (BGL) of 297 consecutive head injured-patients. The patients were divided into two groups: group I (96 died patients) and group II (201 good outcome patients). Data analyses were carried out (descriptive statistics, Pearson correlation) using SPSS ver. 13 September 2004.

RESULTS: The major cause of traumatic brain injury (TBI) was road traffic accidents (RTA) 209; 70%. The admission blood glucose level in the fatal group was greater than in the good outcome group (13.889 ± 7.5, 8.1393 ± 4.2). Only 8.3% of critical patients had euglycemia and 45% of good outcome patients had a normal BGLs. Euglycemia (4.2–6.4 mmol/L) was found in about 55% of the patients. There was no difference between the admission BGL and that of 24 hours post-injury in 56 patients of group I (12.87 mmol/L ± 6.09, 12.96 mmol/L ± 7.46). Blood glucose and ISS were significantly correlated only in bad outcome patients. On the other hand, good outcome patients had a GCS, which was inversely correlated with blood glucose.

CONCLUSION: Hyperglycemia is very common in severe TBI but has no effect in predicting the severity of brain injury. Nutrition and insulin therapy should be used in the treatment of patients with hyperglycemia to decrease its effect on traumatic brain in order to improve the prognosis.

SURVEY OF PHARMACISTS BEHAVIOR MODE IN OUTPATIENT CLINIC

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OBJECTIVE: To understand the outpatient needs for a pharmacist during prescribing and dispensing.

METHODS: Questionnaires were filled out by outpatients from ophthalmology department at a teaching hospital in Beijing. Items listed in the questionnaire included personal information, indication, reimbursement style, number of drugs per prescription, explanation obtained from physician's consultation, instruction obtained from pharmacist's consultation, reading and understanding of the leaflet insert, patient's compliance, patient's knowledge of drug use and storage.

RESULTS: Outcome of the investigation was analysed and evaluated. It suggested that pharmacist needed to improve their skills both in communication and in specialty.

CONCLUSION: There are at least two sections that should be improved in our daily work. One is to improve our communication skills with patients, doctors and nurses. The other is to pursue continuing education process, which could help us to serve better.

CLINICAL PHARMACY SERVICE EXPANSION IN A PHILIPPINE PRIVATE TERTIARY CARE HOSPITAL

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The experience in the implementation of a Clinical Pharmacy Service Expansion Program (CPSEP) in a tertiary care hospital in the Philippines is described. The program was undertaken to achieve the patient safety initiatives on medication management of St. Luke's Medical Center through a more active involvement of pharmacists in patient care delivery. Pharmacists were envisioned to perform clinical roles that will ensure optimal delivery of drug therapy to all patients. Eighty-five additional pharmacists were hired to complete the 98 staff requirement for a 1:1 ratio of clinical pharmacist to nursing unit projected to cover 32 nursing units in two shifts. The pharmacy department embarked on the project without disrupting the operations of the existing services (i.e. dispensing and compounding, clinical pharmacy-UDDS, and oncology) by: (1) drafting a 3-phase plan of simultaneous training and implementation, (2) restructuring the table of organization from a department into a service, and (3) designing and conducting a clinical pharmacy training program through its research, information and education department in collaboration with the medical director. Clinical pharmacy department spearheaded the implementation of the first phase of the CPSEP whereby 28 clinical pharmacists were fielded in the nine pilot units (i.e. ICU, CCU, Cancer Center 2, Geriatric Center, Pediatric ICU, Nursery, Pediatric Unit, Neurology ICU, Institute of Neuroscience). All 28 pharmacists who have completed the Clinical Pharmacy Training Program were empowered to perform four major clinical roles, which resulted in the identification and documentation of 1,045 interventions in a period of one month. These interventions may be classified according to the four major clinical roles and include: (1) patient chart review, 44.31%, (2) drug therapy monitoring, 25.06%, (3) discharge counseling, 19.04%, and (4) provision of drug information to the professional staff, 11.57%. Performing the identified clinical roles enabled clinical pharmacists to contribute to optimal delivery of drug therapy to patients.

PROBLEMS IN PRESCRIBING AND DISPENSING OF CYTOTOXIC DRUGS IN PAEDIATRIC ONCOLOGY

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Medication errors are significant problems worldwide, which require special attention as they may cause serious adverse effects towards patients. This audit study was conducted prospectively to detect, identify and overcome errors during prescribing and dispensing of cytotoxic drugs for the treatment of leukemia in paediatric cancer patients. It was conducted at the paediatric oncology/hematology ward and cytotoxic drug reconstitution (CDR) pharmacy at the Hospital Universiti Kebangsaan Malaysia (HUKM) for a period of 5 months. Thirty patients were chosen by convenience sampling. A number of 130 prescriptions and worksheets and 111 labels were screened to detect errors. Results showed that a total of 179 errors were detected where 61.5% errors occurred during transcription of information to worksheets, 20.1% were prescription errors and 18.4% were labeling errors. Thirty-six errors were detected during prescribing and the most common type of error was the absence of the dosing frequency for the drugs in the prescriptions (67%). A total of 110 transcription errors involving incomplete patients' names were detected (80%). During labeling

27.2% errors regarding the usage of abbreviations for drugs name were detected. It was found that there was a significant relationship between the type of anticancer drugs (L-Asparaginase) and the occurrence of errors ($p<0.05$). Generally, the service provided by cytotoxic pharmacy was satisfactory as the errors were detected and managed prior to the delivery to the patients.

USING AGGREGATED DATA FOR DRUG UTILIZATION EVALUATION IN A UNIVERSITY HEALTH CENTER

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BACKGROUND: The WHO Drug Use Indicators enable the delineation of drug use patterns, identification of inappropriate use and evaluation of interventional strategies. Reliable databases of medical practices represent a valuable source to study drug use.

OBJECTIVES: This study highlights the drug use pattern in a university health center and further identifies areas of inappropriate use that need to be addressed.

MATERIALS AND METHODS: The university health center compu-terized database was retrospectively searched for the period from July 1, 2003 to May 17, 2005. Prescribed drugs were classified using ATC classification system. Selected WHO/INRUD core prescribing indicators related to rational drug use were calculated. Data were analyzed using SPSS.

RESULTS: Eighty-six percent of the encounters resulted in prescriptions. Average number of drugs per encounter was 2.71% of the prescribed drugs, 14% were systemic antihistamines, 9% were analgesics, 8% were systemic antibacterials and 6% was vitamin C. The percentage of encounters with injections was 0.35% of the injectable drugs, systemic antihistamines were 27%, NSAID were 22% and antispasmodics were 19%. Encounters that resulted in systemic antibacterials represented 19%. Average duration of systemic antibacterials was 5 days. Fifty-eight percent of encounters by children below 5 the age of years with diarrhea resulted in at least one antidiarrheal drug.

DISCUSSION: The results showed qualitative and quantitative drug use problems. Antidiarrheals' use is exceptionally high. With the exception of the percentage of injectables, all other indicators represented high values.

CONCLUSION: The results showed problems related to drug use. Further studies are needed to evaluate adherence to guidelines in disease management and the cost implication of deviations. Proper case management is likely to promote more rational use of drugs and designing quality assurance program would be helpful.

BLEEDING RISK FACTORS WITH ENOXAPARIN FOR NSTEMI/UA IN HOSPITAL UNIVERSITI KEBANGSAAN MALAYSIA (HUKM)

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Low-molecular-weight heparins (LMWHs) are antithrombotic agents utilised in the treatment of acute coronary syndromes. They have been shown to be more effective than unfractionated heparins (UFHs) in reducing ischemic events, which include death, myocardial infarction (MI) and urgent revascularisation. Enoxaparin is one of the products of LMWHs. Its safety and efficacy has been

proven in the ESSENCE and TIMI IIB studies. This study was carried out to identify risk factors that may affect bleeding complications associated with the use of enoxaparin for non-ST-elevation MI (NSTEMI) or unstable angina (UA) in Hospital Universiti Kebangsaan Malaysia (HUKM). This observational, longitu-dinal study was conducted on patients admitted to Coronary Care Unit (CCU), Coronary Rehabilitation Ward (CRW), Medical 1 and Medical 2 at HUKM initiated on enoxaparin for NSTEMI/UA from 22nd of March until 22nd of April 2004. Forty patients were studied with median age of 65 years, male to female ratio of 3:1, diagnosed with NSTEMI (55%) and UA (45%). The calculated average weight-based dosing was 0.96 mg/kg, which was not significantly different from the recommended 1 mg/kg ($p = 0.083$). Forty-five percent of patients developed an episode of bleeding with 83.3% (15 patients) characterised by hematuria. Patients with creatinine clearance of <30 ml/min and female patients were found to significantly affect bleeding incidence ($p = 0.003$ and $p = 0.01$ respectively). Age, enoxaparin dose and duration of therapy, smoking and concomitant aspirin/ticlopidine therapy did not significantly affect the incidence of bleeding. Renal impairment and gender were identified as significant risk factors for bleeding associated with the use of this agent that may require dose adjustments.

STUDY ON FACTORS AFFECTING OVERWARFARINISATION IN IN-PATIENT HOSPITAL UNIVERSITI KEBANGSAAN MALAYSIA (HUKM)

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BACKGROUND: Warfarin is extensively used in Hospital Universiti Kebangsaan Malaysia (HUKM) and is prescribed for a number of indications. Several factors have been established to cause overwarfari-nisation including liver function status, thyroid function status, possible drug interactions, alcohol intake and patients' understanding and compliance. Therefore this study is carried out to identify factors that contribute to the occurrence of overwarfarini-sation in our patient population.

OBJECTIVES: To determine the frequency and factors, which contribute to overwarfarinisation in in-patient setting. This may include: (a) established factors (clinical state, drug interaction, social habit or disease), and (b) patients' understanding of warfarin.

METHODS: A total of 62 patients were enrolled into this study. They were from 10 wards with high usage of warfarin and were followed up over the two and half months' study period. Extensive clinical variables were collected by means of evaluation forms and patients who experienced overwarfarinisation were identified. Patients' under-standings on warfarin before and after counseling by clinical pharmacists were also assessed.

RESULTS: Among the 62 patients who were on warfarin therapy, 21 had experienced overwarfarinisation. Risk factors that have been found to possibly contribute to overwarfarinisation were: poor understanding of warfarin (77.8% in overwarfarinised group vs. 8.3% in normal group, $p<0.001$), altered liver functions (38% in overwarfarinised group vs. 14.6% in normal group; $p<0.05$), altered thyroid function (52% in overwar-farinised group vs. 34.1% in normal group; p = NS) and concomitant use of drugs that can increase INR or risk of bleeding (61.9% in overwarfarinised group vs. 56.1% in normal group, p = NS). Other established factors including alcohol intake and increased in temperature could not be studied due to small sample size. Post-warfarin counseling (by clinical pharmacists) assessment showed 78% patients and 100% caregivers have good understanding. The remaining 11% of patients with unsatisfactory understanding were counseled again with the presence of their caregivers.

CONCLUSION: This study has found a number of predisposing factors that may lead to overwarfarinisation. Since poor warfarin understanding is one of the main factors found, high quality counseling by clinical pharmacists can help to improve patients' understanding and compliance thus to reduce the incidence of overwarfarinisation.

COMMUNITY ACQUIRED URINARY TRACT INFECTION CAUSED BY QUINOLONE RESISTANT *ESCHERICHIA COLI*: VITRO SUSCEPTIBILITY, RISK FACTORS AND TREATMENT OUTCOME

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BACKGROUND: *E. coli* is the most frequent cause of urinary tract infections (UTIs). Quinolones are antimirobial agents of choice for UTIs caused by *E. coli*, especially for outpatients treatment. Even though there is an increasing rate of quinolone resistant *E. coli* (QREC), the information regarding in vitro susceptibility, risk factors, and treatment outcome of UTIs caused by QREC is limited. The purposes of this study were to determine: (1) minimum inhibitory concentration (MIC) of QREC to quinolones, (2) risk factors and treatment outcome of community acquired UTIs caused by QREC.

METHODS: This study was a prospective observational study. The data were collected from May 1 to December 31, 2003 at Songklanagarind Hospital located in southern Thailand. QREC isolates from urine culture were identified and collected from microbiological laboratory department. The isolates were then tested for ciprofloxacin and norfloxacin MICs by E-test method. The clinical data of patients who had community acquired QREC UTIs were collected as follow; demographic data, potential risk factors for QREC UTIs, antimicrobial agent regimen and outcome of treatment. The data of patients whose UTIs caused by quinolone susceptible *E. coli* (QSEC) were also collected as a same manner as patients with QREC UTIs. Those two groups were matched for age, gender, and type of UTI.

RESULTS: Fifty-two isolates of QREC were recovered. MIC90 of norfloxacin and ciprofloxacin were >256 and >32 mcg/ml, respectively. Risk factors of QREC UTIs were aged ≥65 years old (OR, 4.265; 95% CI, 1.101-16.514, p = 0.036), having underlying diseases (OR, 3.959; 95% CI, 1.054-14.874, p = 0.042) and exposure to quinolones (OR, 16.266; 95% CI, 1.760-150.283, p = 0.014). Clinical outcome of quinolone therapy in 19 patients with QREC UTI were compared with 33 patients with QSEC UTI. Failure rate of treatment were not statistically different between patients with QREC UTIs and QSEC UTIs at the end of therapy (3.0% vs. 6.7%, p-value 0.532).

CONCLUSION: MICs of ciprofloxacin and norfloxacin for QREC were very high. Even though clinical outcome of quinolone therapy for QREC UTI was not different from QSEC UTI, clinical study with larger sample size and better study designs was warranted for evaluation of this issue.

PROSPECTIVE AUDIT ON THE PRACTICE OF SINGLE DAILY DOSING OF AMINOGLYCOSIDES

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Single daily dosing of aminoglycosides (SDDA) has been used to maximize bacterial killing and to reduce the potential toxicity. Therefore the objective of this study was to audit the practice of SDDA

regimen in Hospital Pulau Pinang. A prospective evaluation of patients on aminoglycoside dosing regimen and their serum level results was conducted over a period of one month. A total of 117 patients were involved, 69.2% were male and 30.8% were female. Gentamicin accounted for 59% of the aminoglycoside usage, followed by amikacin (38.5%) and netilmicin (2.5%). The mean dose of gentamicin, amikacin, and netilmicin were 3.4 (range, 0.8–6.0) mg/kg/dose, 14.6 (range, 6.92–27.27) mg/kg/ dose, and 3.94 (range, 1.36–5.65) mg/kg/dose respectively. The mean duration of therapy was 8.49 ± 2.66 days. SDDA was used for documented infections 48 (4%), empirically 57.3% and prophylactically in 1.7% of the cases. The clinical outcomes found 48.7% of the cases were cure, followed by 38.5% were failure and 12.8% had some improvement. Pretreatment monitoring including 92.3% of preculture had been done, 94.9% of renal assessment while 76.9% of patients were hydrated to minimize toxicity of aminoglycoside. Throughout the study period, 3 (2.6%) samples were taken at trough level, 18.8% random samples and 78.6% with pre and post-dose samples. The mean value of calculated C_{ssmin} for gentamicin, amikacin and netilmicin were 0.86 ± 2.01 mg/L, 4.14 ± 6.02 mg/L, and 3.26 ± 2.16 mg/L respectively. Aminoglycoside levels of 91 cases were not within recommended range in which 29.3% cases were toxic. The pharmacist recommended changes for 44.4% of cases in which physician followed almost 89.7%. The use of SDDA is well accepted. However a lower dosage regimen and unestablished blood sampling were identified. A standard dosage nomogram with the effort of judicious and quality use of SDDA will ensure better outcome and effectiveness in hospital.

PHARMACIST MONITORING OF WARFARIN-RELATED PROBLEMS IN OUTPATIENT ANTICOAGULATION CLINIC

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This research was carried out to compare patient outcomes between the pharmacist-assisted anticoagulation service and usual medical care in ambulatory patients. This study was conducted in outpatients receiving warfarin therapy at cardiovascular clinic of Mahasarakham Hospital, from October 1, 2003 to September 30, 2004. The patients were randomized into two groups; 29 in the control group and 35 in the study group. These groups were compared for anticoagulation control, warfarin-related problems and patients' knowledge. There were no statistical differences in baseline characteristics of the two groups. The pharmacist identified warfarin-related problems and provided counseling to the study patients. Over a one-year follow-up period, the results showed that the number of patients with optimal INR in the study group (34.0%) were not statistically different from those in the control group (38.3%). Warfarin-related problems in the two groups included bleeding (10.0% vs. 3.1%), thrombo-embolism (0% vs. 0.5%), drug interactions (3.2% vs. 10.9%), and non-compliance (9.3% vs. 9.0%) in the study group versus the control group, respectively. Additionally, knowledge score of the study group was significantly higher than that of the control group (8.34 ± 1.62 vs. 7.19 ± 2.06; $p = 0.027$). As demonstrated in this research, the pharmacist's counseling in anticoagulation clinic could contribute to protect or resolving warfarin-related problems and enhancing patients' knowledge. Therefore pharmacist's role in anticoagulation clinic could improve the patient outcomes.

QUALITY OF LIFE OUTCOME OF BREAST CANCER TREATMENT

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Breast cancer is the second most common cancer in women with a gradual increase of new patients over the last 5–10 years. Current treatments have shown increasing survival rate as well as side effects. The knowledge of treatment effects on patients' quality of life (QOL) results mostly from clinical trials, which are not representative of the population in clinical practice. The aims of this study were to assess QOL of patients with breast cancer at various stages of treatment. Using a cross-sectional design, breast cancer patients receiving care at Khon Kaen Hospital were recruited into three groups: (1) newly diagnosed patients without treatment, (2) patients undergoing chemotherapy treatment, and (3) patients who had completed a chemotherapy course. QOL was assessed using Thai Functional Assessment of Cancer Therapy-Breast (FACT-B) version 4, consisting of five domains: Physical (PWB), Social (SWB), Emotional (EWB) and Functional (FWB) well-beings plus a breast cancer subscale (BCS). Of 153 patients recruited, 43 were in group I, 80 group II and 30 group III. Patient mean age was 51 years (SD = 9.7, range 31–82), mostly married (79.1%) and highest education of elementary school (87.6%). The majority (77%) was in early stage of cancer and the treatment received was mostly surgery plus chemotherapy. There were no differences in patient characteristics among the three groups, except younger patients were found in group II. The FACT-B had good reliability, with Cronbach's above 0.7 in most domains (range 0.48–0.84). Known group validity using performance status was supported. Linear regression analysis was used to compare QOL scores among the three groups, adjusting for age, disease stage, concomitant disease and symptoms of hot flush. Patients undergoing chemotherapy (group II) had lower QOL scores than those prior to treatment (group I) in most domains, particularly in SWB (= –2.4; 95% CI = –4.5 to –0.2, p = 0.03), FW (= –2.4; 95% CI = –4.4 to –0.3, p = 0.02) and BCS (= –2.1; 95% CI = –3.8 to –0.3, p = 0.02). By contrast, patients who had completed a chemotherapy course (group III) showed better QOL than those in group I and II. QOL was greater than before treatment, being statistically significant in PWB with an average 2.1 points (95% CI 0.1–4.0, p = 0.03) and EWB with an average 2.8 points (95% CI 0.3–5.3, p = 0.03). The findings suggest that cancer treatments improve a patient's physical and emotional well-being, with a temporary reduction of QOL scores in the breast cancer subscale, and the social and functional well-being domains while receiving chemotherapy.

A STUDY ON THE ANALYSIS AND PROSPECT OF SECOND COUNSELING SERVICE BY CLINICAL PHARMACIST AT ONCOLOGY CLINIC CENTER

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The major cause of decreasing cancer morbidity is due to the development of health medical examination system, effective working of national preservation of health and therapeutic strategy with a lot of new information annually. In the chemotherapeutic area, drug development is active and we are exerting ourselves to participate in various clinical trials. In the past, we carried out research and development that concerned with decreasing the side effects and increasing the target effects of injectable drugs. However, nowadays we use new and phase 3 study oral anticancer drugs for treatment like Xeloda®, TS-1®, Talceba®, and PTK. In addition, new combination therapy has been recommended. Traditional chemotherapy requires patients to be hospitalized. Nowadays it is possible for cancer patients to be treated with brief chemotherapy injection and oral anticancer drugs in the ambulatory care setting without the need for hospitalization. As a result, patient satisfaction and quality of life improve. As the proportion of oral anticancer drugs is getting bigger, patient

education is becoming more important. The Asan Medical Center is providing a one-time chemo-therapy education to all patients who start the chemotherapeutic regimen. It contains basic principle of the therapy, administration, side effects and nutrition. But in case of oral agents, it is difficult to manage properly because they are usually self-administered. For instance, patients can stop taking medicine because of side effects. On the other hand, they can keep taking medicine in spite of the presence of very serious side effects. Therefore, a one-time education is not enough and periodic observation and education are needed. However, it is impossible to provide re-education periodically. Instead, we provide consultation service when patients need them. In this paper, we report the findings of such consultation service carried out from October 2003 to June 2005 (21 months). The type of service offered was classified according to 6 categories; possible side effects, disease course, examination results, drug-drug interaction, food and nutrition, and others. We compared the results of the first patient education, and evaluated qualitatively the improve-ment in patient education.

EVALUATION OF THE APPROPRIATENESS OF ANTIBIOTIC PRESCRIBING IN GENERAL INTENSIVE CARE UNIT AT KUALA LUMPUR HOSPITAL

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OBJECTIVES: To determine whether infections were bacteriologically proven and whether the prescribed antibiotics were appropriate to the infections.

METHODS: A retrospective study was carried out on patients (aged >15 years) who had been admitted to General Intensive Care Unit (GICU) at Hospital Kuala Lumpur in the year 2004. In order to analyze antibiotic consumption we recorded antibiotic use into three groups: (i) prophy-laxis, (ii) bacteriologically proven infection (BPI), and (iii) non-bactenolo-gically proven infection (non-BPI). Results were analyzed as a comparative and non-interventional study.

RESULTS: The study population consisted of 128 patients (55% male), with median age of 61 years old. Fifty percent of the patients were admitted to GICU under surgery specialty, where the most common surgical procedures done were abdominal procedure. From 128 patients, 69 (54%) were intubated and 59 (46%) were not intubated. Among intubated patients, 62% of the infections were ICU-acquired as compared with 12% of non-intubated patients (chi-square test, $p<0.005$). Of all antibiotics prescribed for therapy, 35% were for respiratory tract infection, 15% for sepsis and 12.5% for abdominal infections. From all the infections ($n = 128$) 55% were bacteriologically proven infection and 45% were non-bacteriologically proven infection. Among ICU-acquired infections (39%), 70% of the infections were bacteriologically proven and 30% were non-bacteriologically proven. Whereas, among non-ICU acquired infections (61%), only 46% of the infections were bacteriologically proven and the rest 54% were non-bacteriologically proven (chi-square test, $p<0.005$). Finally, from total antibiotic consumption 54% were prescribed for BPI whereas 34% were given for non-BPI.

CONCLUSION: We concluded that almost all antibiotics were given for intubated patients and for bacteriologically proven infections. However, the distinction between BPI and non-BPI may help to identify unnecessary antibiotics usage. As respiratory were the single most common infection occurs in ICU, therefore prevention of respiratory tract infections is probably the most effective mode to reduce antibiotic usage in ICU setting.

EVALUATION OF DRUG-DRUG INTERACTION IN GENERAL INTENSIVE CARE UNIT

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The objective was to evaluate the drug-drug interaction (DDI) at General Intensive Care Unit (GICU), Hospital Pulau Pinang. A retrospective study and descriptive analysis of the medication charts from GICU were extracted from Pharmacy Department, Hospital Pulau Pinang. The drugs prescribed were assessed concurrently in accordance with the standard references for DDI. Outcome measures were the frequency and category of DDIs and also the main classes of drugs involved. A total of 51 medication charts were analyzed. It was found the average number of drugs per GICU stay is 14.3 while the average number of drugs per day in GICU is 9.8. A total of 292 possible DDI were identified and only 7 medication charts without any possible DDI. It was found that the number of interactions increases as the number of drugs being prescribed increases. Twenty-seven percent of DDI was classified as clinically significant, 2% was classified as intermediate significant while 71% as not clinically significant. The two most common classes of drugs involved were the cardiovascular drugs and anti-infectives. These two classes of drugs contributed to 84% of clinically significant DDI. In conclusion, about one per three drugs prescribed for GICU were clinically significant DDI. Since critically ill patients are more sensitive to DDI effects, drug monitoring is recommended in order to achieve optimal therapy outcomes.

PREPARING OUR PHARMACY FOR JOINT COMMISSION OF INTERNATIONAL ACCREDITATION (JCIA)

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The Joint Commission of International Accreditation (JCIA) is a well-known, non-profit, private organization established in 1998. It is an international subsidiary of JCAHO (Joint Commission on Accreditation of Healthcare Organization) whose standards are widely adopted by hospitals in the United States. Its main effort is to continuously "improve the safety and quality of patient care around the world". Starting from 2004, our hospital has voluntarily started our application process for JCIA. The objectives are 2 folds: First is to adapt a truly international set of standards in evaluating our entire patient care services. This will permit patients as well as insurance companies to identify and recognize our hospital's standard of care. Second is JCIA provides excellent standard templates with statements of intent for each standard along with measurable elements for assessing compliance. JCIA's standards have helped sustained our hospital's mission which is to provide pioneering, international standard healthcare in China. To be accredited, each department must provide evidence of compliance to each measurable element. JCIA includes a section specifically addressing Medication Use. Within this section are 23 standards with 68 separate measurable elements that are checked during a survey. For pharmacy, it is clear that emphasis be placed on ensuring patient safety in all areas of medication usage. In this presentation, 3 useful tools will be described. These include using a Plan, Do, Check, Act (PDCA) model to identify important but more complicated tasks that often involve multidisciplinary areas. Another tool is setting quality indicators in our daily work routines to monitor how well pharmacy is performing. Last tool to share is also a very critical one: How do we empower our pharmacists to participate in the accreditation process and view it as a continuous learning experience. JCIA is not just about writing polices and procedures and getting the stamp of approval every 3 years. It provides uniform, internationally recognized standards on which an increasing number of hospitals around the world have adopted.

As with all accreditation processes, JCIA is not an easy experience, but certainly a worthwhile one to share with pharmacists and administrators who have similar vision.

IMPLEMENTATION OF CLINICAL PHARMACY PRACTICE IN TIANJIN

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Rational drug use is a common task of all medical staffs worldwide. Clinical pharmacy guarantees rational drug use. It is the core of hospital pharmacy and a discipline that can have a significant impact on the direction of hospital pharmacy in the 21st century. To develop clinical pharmacy, clinical pharmacy regulation must be established; whose bottle-neck is shortage of talent. To solve the problem of talent, Tianjin Hygiene Administrative Department have joined with Tianjin Medical University in holding clinical pharmacy classes to foster clinical pharmaceutical talents from on-the-job hospital pharmacists through standard education, team up and establishing clinical pharmacist positions. Training pharmaceutical staffs at the grass-roots level was carried out aiming at converting conception, establishing a brand-new model of taking patients as core, promoting hospital pharmacy, and transforming and improving rational drug use as a whole. Strategies developed on hospital clinical pharmacy were mentioned in this essay, including:

1. Fully understanding the importance and necessity of clinical pharmacy and strengthening organization promoting and practicing.
2. Forming a complete policy, creating regulation and strengthening standardized management.
3. Fostering high-level clinical pharmacy talent through education necessary to develop clinical pharmacy.
4. Establishing clinical pharmacy research agency to develop clinical pharmacy.
5. Converting conception model and following out the ideas of both clinical pharmacy and rational drug use.
6. Establishing new discipline while giving financial support.

MANAGEMENT OF CHEMOTHERAPY INDUCED NAUSEA AND VOMITING (CINV) IN ADULT PATIENTS RECEIVING HIGHLY EMETOGENIC CHEMOTHERAPY AGENTS

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Chemotherapy induced nausea and vomiting (CINV) are common complications of chemotherapy administration. The single most important factor influencing the frequency with which acute nausea and vomiting develops after treatment with antineoplastic chemotherapy is the emetogenic potential of the chemotherapy administered. This study was conducted to evaluate the management of CINV in adult patients receiving highly emetogenic chemotherapy agents. A total of 35 patients were included in this descriptive and prospective study. They were interviewed either verbally or via telephone for five days after their chemotherapy administration. This study had more female patients (71.4%), common age group between 51 to 60 years old (34.3%), 63% were Malays and the highest percentage of cancer was breast cancer (37%). Most patients had received at least one cycle of chemotherapy (37%) and antineoplastic drugs from risk level 4 were the most common group of chemotherapy drug administered (80%). The combination of intravenous granisetron and dexamethasone was the most common antiemetic combination used during pre-chemotherapy (91%). Over the 5 days patients had improvement on nausea (50%), vomiting (87.5%) during the acute and delayed phase. Combination of oral dexamethasone and metoclopramide was the highest prescribed

(56%) in the study and during the acute and delayed phase. These patients had improvement (18.5%) and maintained (40.5%) their emesis response during the 5 days. All patients (7.4%) who were prescribed oral granisetron and dexamethasone post-chemotherapy had 100% complete response from emesis. Although 48% of patients did not comply, 34% of them had no emesis. There is good association between the level of emetogenicity of chemotherapeutic agents with frequency of emesis ($p<0.05$). Most patients with level 5 emetogenicity agents had emesis (86%). Overall, combination of dexamethasone and metoclopramide provided good control of CINV but about 20% of patients will require a different combination.

LIPID LOWERING DRUG-RELATED PROBLEMS IN OUTPATIENTS WITH HYPERLIPIDEMIA

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The purposes of this study were to determine the frequency of problems related to lipid-lowering drug therapy in ambulatory patients and to evaluate the outcomes of patients attaining the goal of low-density-lipoprotein cholesterol (LDL-C) level. This study was conducted retrospectively at a 200-bed general hospital. Data were collected by reviewing outpatients' medical records. Of a total 137 patients recruited, 69.3% (n = 95) were valid for data completion. The majority of patients were female (n = 68, 71.6%). Mean age of the patients was 61.1 years (SD = ±9.6). The mean values for total cholesterol, HDL-C, LDL-C, and triglyceride levels were 239.3 ± 55.4 mg/dl, 46.5 ± 11.2 mg/dl, 153.2 ± 49.7 mg/dl, and 223.3 ± 209.0 mg/dl, respectively. The percentages of patients who had taken lipid-lowering agents namely as simvastatin, atorvastatin, gemfibrozil, and fenofibrate were 27.2% (n = 28), 13.6% (n = 14), 41.7% (n = 43), and 7.8% (n = 8), respectively. The common co-diseases defined as coronary risk factors included hypertension 77.9% (n = 74), diabetes 50.5% (n = 48) and coronary heart disease 25.3% (n = 24). A total of 74 problems associated with lipid-lowering agents were reported in 59 patients (62.1%). There were 64.4% (n = 38), 33.9% (n = 20), and 1.7% (n = 1) of patients experiencing 1, 2, and 3 drug-related problems, respectively. The most frequent types of lipid lowering drug-related problems were need of additional therapy 41.9% (n = 31), too low dose 24.3% (n = 18), and unnecessary drug therapy 13.5% (n = 10). The remaining problems included nonadherence 9.5% (n = 7), adverse drug reactions 8.1% (n = 6) and drug interactions 2.7% (n = 2). It was found that only 15 patients (14.3%) achieving goal of LDL level with the mean duration of therapy of 19.9 ± 12.4 months. As demonstrated in this study, high proportions of the patients with hyperlipidemia had experienced drug-related problems and had not achieved LDL-C goal. Therefore, pharmacists should extend their roles using pharmaceutical care process for minimizing the occurrences of drug-related problems in patients with hyperlipidemia.

PHARMACEUTICAL CARE FOR THE LIVER CIRRHOSIS TREATMENT (SHOW OUR LIVER DISEASE CLASS)

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We are engaged in the pharmaceutical care of every clinical department in Yamada Red Cross Hospital. We'd like to mention some cases of liver cirrhosis patients as follows. The liver metabolizes nutrients like sugar, lipid, protein, etc. If the liver is damaged, it can cause abnormality in metabolism and results in nutritional insufficiency. For example, liver cirrhosis can cause protein-energy malnutrition. It is the role of pharmacist to educate such patients.

1. Liver disease patient class.
   The physicians (liver specialists) in our hospital have been responsible for patient education of liver disease since 1996. A year later, the pharmacist joined the liver disease patient class. As a result, the content of the educational program expanded to include the pharmaceutical aspects.
2. The effect of branched chain amino acid (BCAA) in taking orally before bed time.
3. The assessment of BCAA in total parenteral nutrition (TPN) in patients with renal failure complication.

We propose about the pharmaceutical care such as the prescription design in every field. The hospital pharmacists are involved in the recommendation of special liver disease prescription designs of infusion drug and so on. They are also responsible for patient nutrition therapy as well as drug therapy outcomes. They are responsible in identifying nutritional problems. Hospital pharmacists must work closely with every member of treatment team to achieve the best patient outcomes.

PRESCRIBING PATTERN AND MONITORING OF CALCITRIOL THERAPY IN A TERTIARY CARE MEDICAL CENTER

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BACKGROUND: Calcitriol has long been shown to be an effective therapy in the management of osteoporosis and renal osteodystrophy. However, it carries the potential risk of causing hypercalcemia and hyperphosphatemia when used without proper monitoring. It is also a costly drug. In recent years, the usage of calcitriol in University Malaya Medical Centre (UMMC) has shown a huge increase.

OBJECTIVES: To define the characteristics of patients prescribed with calcitriol, to determine if monitoring parameters were done following therapy initiation and to assess the adherence of calcitriol prescribing to standard practice guidelines.

MATERIALS AND METHODS: A retrospective review of 200 medical records of patients initiated with calcitriol therapy from January 2002 to December 2003 was done. An analysis of indications and demographic characteristics was done to describe the prescribing pattern. Type and frequency of monitoring before and after therapy initiation were also assessed. Adherence to guidelines was assessed using the Osteoporosis Malaysian guidelines and the Malaysian Renal Replacement Therapy guidelines as references.

RESULTS: Majority of patients who were initiated calcitriol were Chinese (60%) and female (96.5%) with the mean age of 56.6 ± 14.5 years. Most patients, 180 (90%) received calcitriol for the management of various types of osteoporosis. Its use for the prevention of postmenopausal osteoporosis was most common (56%). Of these 180 patients, bone mineral density (BMD) results were found to be osteoporotic in 15.6%, osteopenic in 28.3% and normal in 7.8%. Almost half of them (48.3%) had no BMD measurements done prior to calcitriol initiation. Only 60 patients (30%) had subsequent bone profiles or serum calcium done after calcitriol initiation. Adherence to the Malaysian Osteoporosis and Renal Replacement Therapy guidelines were only 29% and 14.3% respectively.

CONCLUSION: The prescribing of calcitriol can be improved in UMMC by preventing its use for unclear indications. Follow-up laboratory monitoring is also important to prevent the development of side effects.

DEVELOPMENT OF EFFICIENCY PARAMETERS FOR DATA ENVELOPMENT ANALYSIS OF HOSPITAL PHARMACY SERVICE

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A multidimensional analysis of the hospital pharmacy efficiency is rarely been conducted. Most previous studies evaluated the pharmacy perfor-mance using a single ratio analysis. Data envelopment analysis (DEA), a linear programming, has a major advantage that can evaluate the relative efficiency across units that produce multiple outputs with multiple inputs. This study aimed to develop the efficiency parameters that can capture the important outputs and inputs to be used for DEA of hospital pharmacy services. Literature review on the efficiency evaluation of hospital pharmacy services was performed. The inputs and outputs used in previous studies were scrutinized. The Standard of Hospital Pharmacy Practice issued by Ministry of Public Health of Thailand was used as the framework for analysis. For the results, full-time equivalent, number of pharmacists and pharmacy technicians were taken as the major inputs. A preliminary set of the outputs was classified according to the major scope of services. For drug dispensing, quantity parameters included number of prescribed drug items and prescriptions; and quality parameters were waiting time and predispensing errors. For drug purchasing and inventory control, the quantity included expense of the purchased drugs, stock value and quantity of filled drug orders; and the quality included stock turn over rate, and number of drugs that were out of stock, over stock and dead stock. For drug compounding, volume of drug compounding was included. For health consumer protection activities, the quantity was frequency of pharmacy education and surveillance for food safety. For pharmaceutical care, number of pharmaceutical care recipients and degree of the care provided were included for the quantity and quality, respectively. In conclusion, the major outputs of hospital pharmacy services were multifacets. To be evaluated as the service efficiency using the DEA approach, several parameters to be included should reflect the true outputs and inputs of the pharmacy service.

Note: The authors of this article are the graduate students of Khon Kaen University.

DRUG RELATED PROBLEMS AS A CAUSE OF ADMISSION TO THE MEDICAL WARDS OF HOSPITAL PULAU PINANG

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The true prevalence of drug related admissions to the hospitals might actually be higher than mentioned previously in different retrospective studies because of the mode of study. The objective of this study was to analyze the contribution of drug related problems (DRPs) to the overall number of admissions to the medical wards. All admissions to the medical wards and data collection were recorded prospectively over a period of 1 month. The DRPs were divided into five major categories, i.e. adverse drug reactions (ADRs), drug choice, dosing, drug use and interactions problems. The causes of DRPs were categorized into five categories, as drug/dose selection, drug use process, information, patient related factors, logistics and others. Out of 864 patients were admitted, 110 (12.7%) were with DRP. It was found 70 cases (63.6%) DRPs were the absolute reason of admission, while 40 cases (36.4%) DRPs were included as the contributing factor. The highest percentage of DRPs was found among patients age >55 years old. Patient's noncompliance accounted for 39.1% followed by ADRs (33.6%). Intentions towards alternative medicines (11.8%) were the most common cause of patient's non-compliance. Non-steroidal anti-inflammatory drugs (NSAIDs) induced gastritis

was the highest (9.1%) among ADRs. Ten cases (9.1%) were reported as drug abused. The DRP assessment showed that 101 (91.8%) of the DRPs were preventable. DRPs account for a sizeable proportion of all admissions. A large number of DRPs were preventable which highlights the importance of public education on proper use of drugs as well as need of pharmaceutical care.

WORK ANALYSIS MODEL OF HOSPITAL PHARMACY SERVICES: CASE STUDY IN OUTPATIENT DISPENSING SERVICES AT BANPHAI HOSPITAL, THAILAND

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BACKGROUND: The application of work analysis to measure hospital pharmacy work is important to identify work problems and causes.

OBJECTIVES: The work analysis model in outpatient dispensing services at BanPhai Hospital, Thailand was established to measure used time in work of operators, delayed time in queue of work, waiting time of patients, standard time in work of operators, how operators spent their time, medication error, and satisfaction of patients.

MATERIALS AND METHODS: The used time and the delayed time were measured by prescription stamped-time technique. Stopwatch time study technique was used to measure the standard time. Work sampling technique was used to determine how operators spent their time. Self-report questionnaires of satisfaction and medication error forms were used to determine patients' satisfaction and medication error. The data were collected during November 2004–April 2005.

RESULTS: The results showed that the waiting time of patients (20.06 minutes) in outpatient pharmacy service is quite similar to the standard of Thai Hospital Pharmaceutical Association (20 minutes). However, the delayed time in queue (17.27 minutes) was quite long when compared with the used time (2.79 minutes) and the standard time (5.41 minutes). In addition, the operators spent 17.96% of their time in non-productive activities especially in idle, personal, and absence. So, the waiting time of patients can be more improved by reducing the delayed time in queue and non-productive time of operators. The predispensing error was a problem (3.48%) and the used time in work of operators (2.79 minutes) is twice less than the standard time (5.41 minutes). Thus, it was important to remind operators to work step-by-step following Standard Operating Procedure (SOP).

CONCLUSION: Work analysis model was helpful and can be applied to evaluate and improve the efficiency of hospital pharmacy work.

INDICATIONS AND COMPLICATIONS OF TPN: COMPARATIVE STUDY OF NEONATES VS ADULTS

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OBJECTIVE: To evaluate the indications and complications of TPN in neonates and adults patients in Hospital Universiti Sains Malaysia (HUSM).

MATERIALS AND METHODS: Retrospective study on 100 neonates and 83 adults patients treated with TPN in 2003 and 2004. Samples were selected by simple random selection. The incidence of

complication was confirmed by the least possible scores of Naranjo's scale. All data were analyzed using SPSS version 11.0 and appropriate statistical tests were applied.

RESULTS: There were 45.3% adults (63.9% male and 36.1% female) and 54.7% neonates (54% boys and 46% girls). The indications for TPN were 64% preterm, 20% birth complication and 16% congenital problems in neonates. In adults TPN was indicated for gastrointestinal dysfunction (43%) and critical condition (34%). The average TPN days were 11.39 ± 8.9 days in neonates and 6 ± 4.1 days in adults. Our results also showed a significance differences in metabolic complications between neonates and adults (46% vs. 90.4%; $p<0.001$). Majority subjects were suffering from combination of more than one type of complications. Mechanical and infectious complications were the least frequent with no significance difference between the two groups. Ninety-two percent neonates and 42% adults were able to resume normal diet. Thirty-six percent adults and 5% neonates died during TPN.

CONCLUSIONS: The results showed significantly higher incidence of complications and poor outcome in adults. Neonates have better outcome compared to adults receiving TPN.

A COMPARISON OF STANDARD TIME OF WORK BY USING STOPWATCH TIME STUDY, WORK SAMPLING AND EXPERT OPINION STANDARD TECHNIQUE IN OUTPATIENT DISPENSING SERVICES AT NACHUAK HOSPITAL, THAILAND

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BACKGROUND: Various methods of work measurement in hospital pharmacy were studied in Thailand. The most three popular methods for determining standard time of work were stopwatch time study, expert opinion standard and work sampling technique. It is necessary to know the difference between these three methods.

OBJECTIVE: This study compared standard time of work by using stopwatch time study, expert opinion standard and work sampling technique in outpatient dispensing services at Nachuak Hospital, Thailand.

METHODS: Three methods of work measurement were used for comparison. Firstly, stopwatch time study technique in which standard time of work was determined by using stopwatch. Secondly, expert opinion standard technique was used to determine standard time of work by experts' evaluation. Finally, work sampling technique was performed in which staffs' activities were observed and measured standard time of work. Data were collected during January to April 2005.

RESULTS: The outpatient pharmacy service was categorized into four major activities such as: (1) entering prescription data, (2) preparing drugs in prescription, (3) checking drugs and prescription, and (4) dispensing drugs to patient. The standard times of work per prescription were calculated and determined to be 169.2, 200.4 and 214.8 seconds for stopwatch time study, expert opinion standard, and work sampling technique, respectively. For comparing the standard time spent on different tasks as assessed, standard times of work by expert opinion and work sampling technique were higher than stopwatch time study technique by about 18.4% and 26.9%, respectively.

CONCLUSION: It appears that expert opinion standard and work sampling technique can be used as a tool to gain quantifiable measure-ments on standard time of work in hospital pharmacy the same as stopwatch time study technique. Other hospital pharmacy activities can use these comparisons to

provide data that can be useful in choosing work measurement method in hospital pharmacy activities.

EFFECTS OF TOPICAL TREATMENT ON QUALITY OF LIFE OF PATIENTS WITH GLAUCOMA

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A number of new and costly topical treatments for glaucoma are currently available. Unlike older generation drugs such as pilocarpine, new medications are claimed to have fewer side effects and require less frequent administration. Anecdotal data has suggested an improved quality of life (QOL) with these products, but there is no evidence of QOL outcomes reported. The aim of this study was to examine the effects of topical glaucoma treatment on the QOL of Thai patients in a cross-sectional study. Glaucoma patients, who were 18 years or older, were interviewed using the Thai Visual Function Questionnaire 28 (VFQ-28 Thai). The instrument has been adapted from the 25-item National Eye Institute Visual Function Questionnaire to suit Thai patients. It consists of 28 items (11 domains) for general eye disease plus 10 symptoms specific to glaucoma. The scores for each domain range from 0 to 100 with higher scores indicating better QOL. The questionnaire has good reliability, with Cronbach's above 0.7 in most domains (range 0.68–0.89). The validity was established by known group validation using visual acuity. The Mann-Whitney U test was used to compare the QOL scores between those with or without pilocarpine treatment and those with more or less frequency of administration of all topical treatments. Of the 79 glaucoma patients recruited, 46 (58%) were female with average duration of disease 5.7 years. The mean age was 63 years (range 27–86) with highest education of primary school (76%). The median of visual acuity in the better eye was 6/12 and in the worse eye 6/36. The results show that patients without pilocarpine treatment (n = 55) had better QOL scores in all domains, especially in general vision (65 vs. 56; p = 0.02), mental (45 vs. 27; p = 0.03) and role difficulty (46 vs. 32; p = 0.02). Those who applied topical medications less than or equal to three times daily (n = 25) also had higher QOL scores, significant in ocular pain (69 vs. 61; p = 0.02) and role difficulty (54 vs. 28; p = 0.008). The findings have suggested that treatment of glaucoma with pilocarpine and use of all topical medications greater than three times per day can lead to lower QOL of patients.

INVESTIGATION OF DISCHARGE COUNSELING PROVIDED BY PHARMACISTS AT A MEDICAL WARD

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The aims of this study were to determine the frequency and types of drug related problems (DRPs) and to identify types of information provided by pharmacists to inpatients on discharge counseling. This study was performed retrospectively and data were obtained from discharge counseling forms at a male medical ward, Srinagarind University Hospital during September 1, 2004 to January 31, 2005. A total of 137 discharge counseling forms were reviewed by pharmacists. The mean age of patients was 57.0 years (SD = ±15.5) with the range of 1–5 medical conditions. The common patients' medical problems were diabetes mellitus (19.2%), angina (10.9%), cancer (8.3%) and congestive heart failure (7.7%). The median number of prescribed drugs on discharge was 7 (range 1–17). Most of patients (91.2%) received discharge counseling for the first time. Pharmacists provided information on diseases (59.1%), indications for use of medications (87.6%), drug administration (86.9%), adverse

drug reactions (66.4%), drug storage (10.2%) and life style changes (52.6%). Additionally, pharmacists identified a total of 16 DRPs, which were categorized as improper dosage regimen (3.6%), noncompliance (2.2%), additional drug therapy (1.5%), improper drug selection (0.7%), adverse drug reaction (0.7%) and others (2.9%). Pharmacist's interventions were made for every identified DRPs: being suggested to physicians (56.3%), nurses (6.3%) and patients (31.3%). Of all suggestions, 75.0% responded and 25.0% did not respond. The associations between age, underlying diseases, the number of prescribed drugs at discharge and DRPs were not statistically significant ($p>0.05$). However, there was a trend in patients with over two underlying diseases and receiving over seven medications to experience more DRPs. The results indicated that DRPs could be prevented and resolved by using pharmaceutical counseling prior to discharge. This could be of benefit for the improvement of patients' drug therapy.

EVALUATION OF PHARMACEUTICAL CARE NEEDS IN TYPE 2 DIABETES MELLITUS

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Diabetes constitutes a global public health problem. Today about 135 million people are affected and it is estimated that the number in 2025 will be 300 million. The prevalence of diabetes mellitus varies among populations due to differences in genetic susceptibility and social risk factors such as change in diet, obesity and physical inactivity. Diabetes mellitus is a chronic disease that requires long-term medical attention both to limit the development of its devastating complications and to manage them when they do occur. Type 2 diabetes mellitus is a preventable disease and it is a disproportionately expensive disease. The objective of this descriptive and retrospective study is to evaluate the pharmaceutical care needs of type 2 diabetes. A total number of 38 patients were randomly selected for this study, which was conducted in Hospital Universiti Kebangsaan Malaysia (HUKM). The study was carried out to identify pharmaceutical care issues and determine the pharmaceutical care needs in this particular group of subjects and subsequently a pharmaceutical care plan was prepared. The results showed that out of 540 pharmaceutical care issues identified, 24% of subjects required monitoring of their disease states or drugs followed by 20% of subjects who had altered laboratory measurement and 12% of subjects on precaution. It was also found that noncompliance account for 97% of the subjects. The pharmaceutical care activities identified reflected that pharmacists could help to enhance patient compliance as well as pharmaceutical care which lead to better overall healthcare and outcomes in patients of all racial/ethnic backgrounds. In conclusion, a pharmaceutical care plan was prepared which can be adopted for pharmacists in the public sector.

EVALUATION ON MANAGEMENT OF HYPOTENSION IN SEPTIC SHOCK OF INTENSIVE CARE UNIT PATIENTS

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BACKGROUND: Severe sepsis and septic shock are life-threatening complications of infections and is strongly associated with high mortality rate. Septic shock is characterized by persistent arterial hypotension unexplained by other causes. Recent years have seen intense debate as to whether any vasoactive agent is superior to another in terms of improving outcome from septic shock. This study was carried out to evaluate patients' response (MAP) towards inotropes treatment.

MATERIALS AND METHODS: A descriptive, retrospective case note analysis, non-interventional study was carried out with no control group on patients who were admitted to Intensive Care Unit (ICU) Hospital Universiti Kebangsaan Malaysia (HUKM) for sepsis and were treated with inotropes

for severe hypotension, from October 2003 to March 2004. Thirty-nine patients with septic shock whom were not responsive to fluid resuscitation were studied.

RESULTS: It was found that all inotrope regimen, single inotrope (n = 27), double inotropes (n = 28) and triple inotropes (n = 14) produced significant changes in MAP. The highest percentage of MAP increment was shown by noradrenaline (41.5% in single inotrope regimen and 40.2% in combination with dopamine). It was also found that the number of inotropes increases with decreasing value of pre treatment MAP, 64.67 ± 9.48 mm Hg for single inotrope, 62.89 ± 10.68 mmHg for double inotropes and 53.64 ± 11.68 mmHg for triple inotropes.

CONCLUSION: Noradrenaline and dopamine was found to be the first choice of inotropes during the initial treatment and both were shown to be effective. Negative correlation between MAP pre treatment and numbers of inotropes used showed that more inotropes were used with decreasing value of MAP pre treatment. Guidelines on the use of different inotrope regimen according to MAP pre treatment should be documented and standardized in clinical practice. Early management of septic shock is very crucial since this study had shown that septic shock is fatal (mortality rate of 94.87%). Nevertheless, the use of inotropes to improve the MAP was satisfactory.

MEDICATION ADHERENCE AND OTHER ISSUES ENCOUNTERED BY PATIENTS WITH OSTEOPOROSIS

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OBJECTIVES: To assess the adherence of patients with osteoporosis to their medications and to identify measures to improve it.

STUDY DESIGN: Prospective observational study.

METHOD: Patients who attended the osteoporosis clinic of University Malaya Medical Centre (UMMC) from March 2004 to February 2005 were included. Patients were interviewed by a clinical pharmacist, supplied with osteoporosis medications and interviewed again two months later.

RESULTS: A total of 294 patients were included in this study. The most commonly prescribed osteoporosis medications were alendronate (88.0%), followed by calcium supplements (65.5%), calcitriol (9.9%), raloxifene (3.9%), and hormone replacement therapies (2.9%). In addition, 70.4% of the patients were taking complementary medicines such as vitamin C, B, multivitamins and glucosamine. Only 170 (57.8%) patients took their osteoporosis medications exactly as instructed. In general, reasons for non-adherence were: forgetfulness, away from home, busy with other things and side effects. The most commonly reported side effect was gastrointestinal disturbances. Demographic data of patients, diagnosis, knowledge of patients, and the total number of medications prescribed were not significantly associated with alendronate and calcium adherence ($p>0.05$). Only 42.9% of the patients knew the name of their medications. For patients on alendronate, the mean score of patients' knowledge on osteoporosis and alendronate was 68.9 ± 13.4%. The most common question asked by the patients was how to take their alendronate. However, 69.6% patients believed that their quality of life was good.

CONCLUSIONS: Only 57.8% of the patients took their medications exactly as instructed. Patients' knowledge on osteoporosis and their medications required improvement. This indicates a need for pharmacists to counsel these patients.

MANAGEMENT OF CHEMOTHERAPY INDUCED FEBRILE NEUTROPENIA IN PEDIATRIC PATIENTS WITH ACUTE LYMPHOBLASTIC LEUKEMIA

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Febrile neutropenia is a common expected complication after adminis-tration of chemotherapy. It has the potential of serious morbidity and mortality if not treated. This study was conducted to evaluate the management of febrile neutropenia in pediatric acute lymphoblastic leukemia (ALL) patients with emphasis on the types of empiric antibiotic therapy and supportive therapy used. A total of 34 patients with 40 episodes of febrile neutropenia were included in this descriptive and retrospective study recruited through convenience sampling. This study showed that sepsis (25%), upper respiratory tract infection (URTI) (22%) and pneumonia (25%) were found to be the most common neutropenia associated infections. Half of the febrile neutropenia cases (50%) were of unknown origin while the others were caused by gram-negative bacteria (35%) and mixed growth bacteria (15%). Majority of the cases (97%) were treated either with empiric combination (64%) or monotherapy (33%) antibiotics. Amikacin in combination either with piperacillin-tazobactam (38.5%) or with cefepime (38.5%) were the most commonly used monotherapy agent (61.5%). There was no significant improvement in the treatment of infections using empiric antibiotics either in combination or as monotherapy ($p>0.05$). Granulocyte Colony Stimulating Factor (GCSF) was used in a total of 25 cases (62%). This study showed that 80% of the patients treated with GCSF recovered from neutropenia and 75% of them demonstrated significant neutrophil recovery within 1 to 5 days ($p<0.05$) with overall mortality rate of 26%. In conclusion, the use of GCSF plays a major role in the management of febrile neutropenia.

EVALUATION OF THE EFFECTIVENESS OF METERED DOSE INHALER COUNSELING IN INPATIENT OF HOSPITAL UNIVERSITI KEBANGSAAN MALAYSIA (HUKM)

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BACKGROUND: Proper metered dose inhaler (MDI) technique and awareness of disease state are vital for achieving optimal therapeutic outcomes in the management of both asthma and chronic obstructive pulmonary disease (COPD). Hence, clinical pharmacists in Hospital Universiti Kebangsaan Malaysia (HUKM) have been actively providing specialized services targeted to improve patient's understanding on their disease management and also to ensure correct use of inhaled medications.

OBJECTIVE: To evaluate the effectiveness of MDI counseling on improving patients' understanding on asthma/COPD management and their inhaler technique.

METHODS: A total of 50 adult asthmatics/COPD patients were enrolled in the study. These patients were warded and prescribed MDI. Individual understanding about the disease management and inhaler technique (with or without using a spacer-Aerochamber'1) was assessed by means of checklist, both before and after counseling and total scores calculated. The checklist consists of two sections, i.e. (1) patient's knowledge about medications, and (2) MDI technique (with or without spacer).

RESULTS: The total score for patients' knowledge about their medications before counseling was 29% and significantly improved to 78% ($p<0.001$) after the counseling session. The total scores for MDI technique with and without spacer also showed significant improve-ments, 36% vs. 96% and 44% vs. 95% respectively ($p<0.01$). The improvements were also consistent in the number of patients

who had perfect score in each sections of the checklist. Prior to counseling, the percentage of patients with perfect score in part (1) patient's understanding about medications, (2a) MDI technique, and (2b) MDI technique with spacer were 0%, 18.7% and 22%, respectively. After the counseling, these percentages increased significantly to 34%, 84.3% and 88.9%, respectively ($p<0.001$).

CONCLUSIONS: The findings demonstrated that patient education provided by clinical pharmacists lead to significant improvements in both patients' understanding of their medications as well as their inhaler technique. However, further research is necessary to determine whether these improvements are sustained over time.

COMMUNITY PHARMACY

ATTITUDE OF COMMUNITY PHARMACISTS IN SAUDI ARABIA TOWARDS ADVERSE DRUG REACTION REPORTING

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OBJECTIVES: To assess the attitude and behavior of community pharmacists in Saudi Arabia regarding reporting of adverse drug reactions (ADR).

METHODS: A self-administered questionnaire was delivered to a stratified random sample of 240 community pharmacies in Riyadh city. The questionnaire comprised of 27 questions. The first 25 questions covered pharmacists and pharmacy demographics, references available and continuing education activity, general questions aimed at establishing the extent of the respondent's knowledge about the Saudi's ADR reporting system and pharmacists' behavior. One question consists of 27 item explored the pharmacist's attitude to reporting and the factors that either positively or negatively affect his attitude.

RESULTS: The total response rate was 71.7% (172/240). Most of the respondents were expatriate employees (99.4%) with the remainder Saudi pharmacy owners. Only 21 pharmacists (13.2%) were aware of the ADR reporting program in Saudi Arabia. Ninety-seven percent of respondents considered the reporting of ADRs to be integral to their professional duties and all respondents acknowledged the importance of reporting. Four percent of pharmacists surveyed claimed that they had submitted ADR report to Ministry of Health (MOH) and 6.3% of pharmacists claimed that they submitted ADR report to the pharmaceutical company. Several barriers were identified that prevent pharmacists from reporting ADR include, unknown address (68%), reporting form not available (62.8%), do not know how to report (41.7%) and uncertainty concerning causal relationship between ADR and the drug (30.1%). Eighty-four percent of respondents mentioned receiving a feedback from the program would encourage them to report and 83.7% of respondents indicated that publication of ADR bulletin will be important to stimulate reporting. In addition, 29% of the suggestions mentioned educating and training of the pharmacist about the program as an important elements that will improve pharmacists' participation in reporting ADR.

CONCLUSION: Majority of the pharmacists surveyed (86.8%) were not aware of the ADRs reporting program in Saudi Arabia and only 29% of pharmacists were aware that pharmacists in Saudi Arabia can report an ADR to MOH. The results emphasized the importance of establishing continuing efforts to promote ADR reporting program and to overcome the barriers identified by the study.

COMMUNITY PHARMACISTS MONITORING OF PULMONARY TUBERCULOSIS OUTPATIENTS

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BACKGROUND: Directly Observed Treatment, Short Course (DOTS) for pulmonary tuberculosis (PulTB) is a major strategy in the National Tuberculosis Program (NTP) following the World Health Organization (WHO) global plan. Thailand was ranked 16th of 22 high-burden countries 2002 in the WHO global tuberculosis control report. Community pharmacists are one of the health care team that should play a role in improving outcomes in pulmonary tuberculosis outpatients.

OBJECTIVES: To compare clinical outcomes between community pharmacists monitoring patients and control patients receiving normal care.

STUDY DESIGN: Quasi-experimental.

SETTING AND POPULATION: Ninety-nine pulmonary tuberculosis outpatients without HIV co-infection were treated with DOTS category 1 (2HRZE+4HR) between December 2002 and February 2004 at Mahasarakham provincial hospital. Patients who were diagnosed PulTB and had completed intensive phase (second month with sputum converted to negative) volunteered to be monitored and received medications from pharmacists at a University pharmacy. This was the treatment group. Patients who wanted to be monitored only from the hospital were the control group.

INTERVENTION: Pharmaceutical care and refill DOTS.

OUTCOME MEASURES: Clinical outcomes were assessed when the patients completed DOTS (6 months). Following the WHO tuberculosis treatment definition, outcomes were cure rate (sputum conversion at month 6), treatment success rate (summation of cure and completion rate), default rate (lost more than 2 months) and failure rate (positive sputum test at month 6).

RESULTS: Ninety-nine PulTB patients who completed DOTS during the study period were male 61.80%, age 49.52 ± 16.87 years. There were 40 eligible patients in the pharmacists' monitored group and 59 in the control group. Smear positive patients in the pharmacists' monitored group were 65.00% and 47.50% in the control group. Smear positive cases showed a cure rate of 60.00% for the treatment group and 33.90% for the control group ($p = 0.010$). Treatment success rate in the treatment group was 92.50% and 74.60% in the control group ($p = 0.023$). Default rate in the control group was 23.70% (14 cases) and in treatment group was 7.5% (3 cases; $p = 0.036$). The control group had two failure cases but there were none in the treatment group.

CONCLUSION: Community pharmacist monitoring can improve the treatment success rate to achieve the WHO goal (more than 85%) and decrease default and failure rates. The results show that community pharmacists' involvement in a DOTS multidisciplinary team improved clinical outcomes in pulmonary tuberculosis outpatients.

MEDEXPRESS: AN INNOVATION IN COMMUNITY PHARMACY PRACTICE

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Several studies in the Philippines have shown that the role of the pharmacist as a health professional was not fully understood and appreciated by the public. A factor that may have contributed to this fact was the traditional practice of community pharmacy in the country, which focuses solely on the

dispensing of medications. The MedExpress concept of practice is an effort that hinges on the need for the pharmacist to be recognized as a health professional without compromising the cost of medications and quality of service. In February 2005, the first MedExpress pharmacy was opened in Pasig City. It is a three-in-one drugstore, which provides delivery, pick-up and walk-in services including patient medication counseling. The store, throughout its daily operation, employs full-time registered pharmacists for frontline and pick-up dispensing and medication counseling. The store's layout includes the waiting, dispensing, counseling, and pick-up and preparation areas. The waiting area for clients has four computer stations dedicated to the provision of information on available store services, the roles of pharmacists and relevant health issues. Drug information databases were installed on computers at the counseling desks while databases for patient profile and drug prices are made available to the pharmacists at the dispensing area. The computer near the pick-up window is hooked to a call center taking orders from patients via telephone. The preparation of medication orders is done by pharmacy assistants under the supervision of a registered pharmacist. In addition to patient counseling, the pharmacists maintain a database, which enables them to prompt patients on chronic medications in time for medication refill. The store also offers blood pressure and blood glucose monitoring services for walk-in patients. While recent evaluation of patient satisfaction shows high customer satisfaction for the new service, additional time and effort are needed to educate the public on the regulatory aspect of dispensing prescription drugs.

GENERIC SUBTITUTION IN COMMUNITY PHARMACIES OF PENANG AREA

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Promoting generic substitution is the role of pharmacists in reducing the cost and improving the quality of prescribing. In Malaysia, there is no data on this issue. The objectives of this study were to prospectively assess generic substitution practices by community pharmacies in Penang area, to assess whether pharmacists consult the prescriber when promoting this mechanism and to assess patients' acceptance and cost-saving achieved from this practice. A cross-sectional descriptive study by using data collection form was performed. We randomly chose 40 community pharmacies as our sample. Any brand name prescriptions were included in this study. The pharmacists have to record down details of their intervention. During two months period, a total of 156 patients with 158 items and 44 drugs were involved in generic substitution. Sixty-one percent of the cases involved Class B Poisons and 39% are non-prescription drugs (Class C, E and Non-poison). A total of 14.7% of pharmacists did not receive any brand name prescription. Fourty-seven percent of pharmacists consulted the physicians (at least once) and 38.3% never consulted the physicians while promoting generic substitution. Overall, 20.3% of the cases involved consultation with the prescribers. Among cases involving Class B Poisons, only 20.8% informed the prescribers. Majority of the prescribers (81.8%) accepted the suggestions by pharmacists. The patients' acceptance rate was 88%. Using cost and selling price given by pharmacists, calculated cost-saving by pharmacists through generic substitution was RM5864.78 (70%). Total cost-saving by the patients was RM6127.49 (61%). In conclusion, poor communication occurred between pharmacists and physicians. Pharmacists should actively act as prescribing adviser to improve the quality of prescribing.

ANALYSIS OF FACTORS INFLUENCING SELF-MEDICATION BEHAVIOURS BY HOUSEWIVES (STUDY OF COMMON COLD CASES IN SEMOLOWARU, SURABAYA)

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The most common health seeking behavior in the community is the practice of self-medication. Women as mothers have considerable influence in choosing medicine for their family. The study has

two aims: to obtain description of proper self medication behavior in the community and to determine factors related to the practice of self-medication. The research was conducted in the area of Semolowaru village administration, Sukolilo subdistrict, Surabaya on August 2004. Data was collected from 100 respondents, women who have been married and taking medicine for their common cold symptoms using questionnaires. The respondents were selected randomly by simple random sampling method. Results showed that education and knowledge level influenced proper self-medication behavior significantly. The more dominant factor was education level. We found that only 35% of respondents practiced proper self-medication, in term of appropriate medicine classification, type of medicine, dosage, and duration of therapy. Pharmacists must play an active role as counselor and educator to increase appropriate self-medication behavior. Further studies are needed to identify other factors influencing self-medication behavior.

AN EFFORT TO LEAD PHARMACIES AS DRUG INFORMATION CENTER

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Adverse drug events may arise from inappropriate drug information during drug dispensing to patients or consumers by the pharmacist in a pharmacy. Current drug information services only involve providing general information during drug dispensing to patients. The objectives of the study were to investigate the preparedness of pharmacies as drug information centers and the influence of drug information reference guide on pharmacist's performance. Pharmacists in 18 simple randomized pharmacies and 200 randomized consumers in Yogyakarta participated in the study. The pharmacists were divided into three groups, i.e. control, information, guideline provided and the guideline with explanation by investigators. Pretest was conducted by distributing questionnaires to the consumers in order to identify pharmacist performance before inter-vention. Posttest was conducted to know about the influence of intervention upon pharmacist's performance. Descriptive analysis was performed to determine the preparedness of pharmacist. T-test analysis was used to compare pharmacist performance before and after intervention. Results of the study showed that pharmacies in Yogyakarta are ready to serve as drug information centers. However, both print and electronic sources are required to improve the services. The information guidelines with explanation gave a significant effect on improving the performance of pharmacists in these pharmacies.

PHARMACEUTICAL CARE IMPLEMENTATION PROFILE IN MANAGEMENT OF PRESCRIPTION IN SEVERAL PHARMACIES IN EAST JAVA

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Due to the implementation of pharmaceutical care in professional practice in pharmacy, a research concerning pharmacist's pharmaceutical care profile in management prescription has been conducted. Research was conducted using self-assessment cross sectional method using question-naires. It was conducted on pharmacists managing pharmacies in East Java who attended continuing education. The study was a descriptive research, with 105 respondents present at that time. Pharmaceutical care activities, which were measured through the questionnaire included: prescription's administrative status, assessment of drug therapy, drug therapy planning, dispensing, and evaluation of drug therapy. From 105 respondents, it was found that 89% pharmacist evaluated prescription's administrative status. As for assessment of drug therapy, 8% pharmacists gave assessment in their professional practice in pharmacy. We also found that only 2% of pharmacists gave planning for drug therapy. Evaluation of drug therapy was conducted only by 0.1% of

pharmacists. For the dispensing, 99.6% of pharmacists conducted it in their professional practice. From the questionnaire, we can conclude that pharmacists need to improve the quality of pharmaceutical care, which emphasizes on patient's drug therapy.

OVERWEIGHT AND OBESITY, AND PHARMACISTS' ROLE IN OBESITY MANAGEMENT

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Overweight and obesity are one of the major health problems worldwide. They are well understood as the major risk factors of several chronic diseases, contributing to death that could be prevented. In Thailand, the prevalence of overweight and obesity increases rapidly in the last decade. The objectives of the study were to determine the prevalence of overweight and obesity in rural communities, and to seek an opportunity for pharmacists to be involved in weight control management. Data were retrieved from the database of one healthcare center in Mahasarakham, Thailand which contained 905 records of health examinations for all people with age of equal or more than 40 years living in the area. Prevalence of overweight (body mass index, BMI 25–29.9 kg/m^2) and obesity (BMI ≥ 30 kg/m^2) was 23.54% and 5.97%, respectively. The prevalence of overweight and obesity in the age group 40 to 59 years in female were significantly higher than male. The questionnaire was randomly sent to 152 overweight and obese female from the retrieved data with 68.4% response rate. Mean BMI was 28.0 ± 12.2 kg/m^2. Mean weight was 64.2 ± 8.3 kg but the desired weight was 53.7±6.2 kg. Approximately 30% of them had cardiovascular diseases. Of all study samples, only 24% received information about weight control. Fifty-four percents reported that they had tried to lose weight. The subjects, who would like to participate in weight control program through life style modification by pharmacists were 78.8%. In conclusion, the prevalence of overweight and obesity is increasing. However, weight control management was not much recognized by healthcare personnel. There is a room for pharmacist in weight control management.

COMMUNITY PHARMACISTS' ATTITUDE AND PRACTICE TOWARD PSYCHIATRIC PATIENTS: A PILOT STUDY IN PULAU PINANG

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INTRODUCTION: Negative attitudes toward people with mental illness can be attributed to stigma.

OBJECTIVE: The objective of this study was to assess the attitudes and practices of community pharmacists in Penang towards mentally ill patients.

METHODS: This is a cross sectional study, using standard questionnaire adopted from the literature to assess the attitudes and practice of community pharmacists towards mentally ill patients. These question-naires were self-administered to the pharmacists.

RESULTS: Forty-one out of a total 56 pharmacists took part in the survey. The mean age of participants was 34 years old. Female consisted of 63.4% of respondents. Seventy percent of them were graduated from Universiti Sains Malaysia (USM). Fifty-six percent said they did not stock psychiatric medications while 46.3% said they saw patients with mental illness in their pharmacies. Responses to practice questions were very low, which might be due to low frequency of patients seen in these community pharmacies. Sixty-eight percent thought that it was their responsibility to provide pharmaceutical care to patient with mental illness. However, 85.4% agreed that handling patient with

mental illness is more difficult. Respondents agreed with the lack of knowledge and motivations as the barrier for the implementation of care to such patients.

CONCLUSION: In general, community pharmacists in Penang do not commonly participate in psychiatric care but they have positive attitudes towards the mentally ill patients.

PHARMACOECONOMICS

PHARMACOECONOMIC ANALYSIS OF MULTIDRUG RESISTANCE TUBERCULOSIS (MDR-RTB) TREATMENT IN PERSAHABATAN HOSPITAL, JAKARTA, INDONESIA

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A restropective study of patients with culture-confirmed multidrug resistant tuberculosis (MDR-TB) at Persahabatan Hospital, Jakarta (Indonesia) was conducted to determine the differences of the cost effectiveness of MDR-TB treatment using ciprofloxacin 500 mg twice daily-containing regimen and ofloxacin 400 mg daily-containing regimen. For the 60 patients with MDR-TB, 11 patients were treated with ciprofloxacin and the other 49 were included in the ofloxacin group. The treatment outcome is poor with a success rate of approximately 60% of the compliance treatment (46.9% of total patient) in the ofloxacin group and 30% (27.8% of the total patient) for the ciprofloxacin group. The compliance rate of ofloxacin group was 77.5% and 90.9% for ciprofloxacin group. Compared to findings in the published literature, our results showed that the cure rate was slightly less than other study. There was no significant difference between the total cost (Rp.4,312,041.20 ± 1,168,419.08 per patient treated for ciprofloxacin group and Rp.3,747,264.10 ± 1,583,230.12 per patient treated for ofloxacin group, or in Malaysian Ringgit, RM4,312.04 ± 1,168.42 and RM3,747.26 for ciprofloxacin group and ofloxacin group, respectively) required in the treatment of both group (t = 1.11; p-value 0.27). Cost effectiveness analysis had showed that Ofloxacin (total cost per patient cured Rp.14,373,470.606 ± 3,894,730.273 or RM14,373.47 ± 3,894.73) was found to be a better choice compared to ciprofloxacin (total cost per patient cured Rp.6,193,825.030 ± 2,616,909.293 or RM6,193.83 ± 2,616.91) since it was more cost effective. The mean duration of treatment of all groups was 10.68 ± 4.6 months. This cost-effectiveness analysis supports the widespread of ofloxacin usage in the treatment of MDR-TB. However, as this study was held on 1998–1999, the recent application of this study will need more recent data.

ACTIVITY-BASED COSTING FOR OUT PATIENT PHARMACY SERVICE AT NACHUAK HOSPITAL, THAILAND

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BACKGROUND: Activity-Based Costing (ABC) is a widely used costing system that seeks to place an accurate cost on what an organization produces. Its aim is to provide a fair reflection of how costs have been incurred.

OBJECTIVE: To estimate unit cost of outpatient pharmacy service at Nachuak Hospital using ABC model. The result of this study will be applied to determine pharmacy fee at the hospital.

METHOD: This study was a descriptive research. Provider's perspective was performed to estimate the related cost. Data was collected during October 2003 to February 2005.

RESULT: The outpatient pharmacy service was divided into 4 cost centers, which were consisted of 19 activities. Cost drivers were determined by full time equivalent and used value. The unit cost of outpatient pharmacy service at Nachuak Hospital by ABC was 6.83 baht (or US$0.17) per drug item and 25.67 baht (or US$0.65) per prescription. That was less than the dispensing rate of the Ministry of Public Health, Thailand which was 10 baht per item or less than 31.70%. The ratio of Labor cost:Material cost:Capital cost was 15.18:1.00:1.41. Labeling, prescription filling and dispensing activities were the top three highest unit cost per item which showed 125,192.48 baht (or US$3,155.45), 122,289.36 baht (or US$3,082.28), 112,077.44 baht (or US$2,824.89) per year, respectively.

CONCLUSION: This study shows that the ABC model can be applied to improve the operational decision making process at outpatient pharmacy administration. The activities that created high unit cost should be considered. ABC should be performed in other hospitals to monitor the unit cost and to improve the efficiency of pharmacy services.

COST ANALYSIS OF ANTIBIOTIC DRUGS FOR DIABETES MELLITUS OUTPATIENT IN KODYA YOGYAKARTA INDONESIA HOSPITAL

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Diabetes mellitus is a chronic disorder that has been recognized by the Indonesian government as a major public health problem with far reaching consequences not just for its adverse impact on the health of Indonesians, but also for the economic burden it places on the health care systems. The objective of this study is to describe the health care cost for outpatient diabetes mellitus treatment and to examine the cost of illness of different classes of antidiabetic drugs. The medical records of diabetes mellitus type 2 outpatients without compelling indication were retrospectively reviewed. Data were collected for patients treated from January 1, 2004 to December 31, 2004 in Kodya Yogyakarta Indonesia Hospital. Patient data collected included patient data based, drug acquisition cost, medical consultation cost, and laboratory cost. All cost is ax pressed in 2005 Indonesian Rupiahs. We analyzed charts of 100 consecutive patients,of whom 71% are woman and 29% are men. The average age of patient was 61 ± 13 years. The monthly mean costs of type 2 diabetes mellitus were 199.685,00 ± 137.101,00 Rupiahs. Most of the direct medical costs were spent on drugs (96.40%). The control of blood glucose using combination therapy was more frequently attained in patients taking Glibenclamide and Metformin (25%). The combination of Glikuidon-Metformin-Acarbose (21%) has greatest expense, equal to Rp394.400,00. The potential for saving were 6.10% of total drug cost if generic substitutions were prescribed for diabetes mellitus in place of more expensive drugs. In conclusion, we identified that the costs of diabetes mellitus outside of hospitals are mainly dependent on the expenses with blood glucose-lowering drugs. This finding may allow healthcare planners to make better decisions regarding the allocation of funds between competing therapeutic options and priorities.

PRIVATIZATION OF GENERAL MEDICAL STORE (GMS) AND THE PRICES OF ANTICANCER MEDICINES: AN EVALUATION IN MALAYSIAN PERSPECTIVE

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OBJECTIVES: To compare the prices of anticancer medicines before and after privatization of General Medical Store (drug distribution channel) and also to compare procurement prices with the International Reference Prices (IRPs).

METHOD: Retrospective comparison of medicine prices in different years.

RESULTS: A total of 19 medicines were identified as anticancer in the price lists. In a comparison of prices of pre-privatization (1994) with that of post-privatization (1995–1996) a price increase of 7.75% was seen. When 1995–1996 prices were compared with 1997–2000, an average increase of 2.41% was noted. Again an average increase of 29.98% was noted while comparing 1997–2000 and 2001–2003 prices. The prices of plant alkaloids increased to 4.49% in 1994 versus 1995–1996, nominal increase of 0.05% was found in 1995–1996 versus 1997–2000 and prices considerably increased to 30.33% in 1997–2000 versus 2001–2003. Immunosuppressants increased to 9.14, 4.99% and 36.68% respectively, in price comparison of 1994 versus 1995–1996, 1995–1996 versus 1997–2000, and 1997–2000 versus 2001–2003. The prices of antitumor antibiotic fluctuated; decreased to 1.83% in 1994 versus 1995–1996 and increased to 33.58% in 1997–2000 versus 2001–2003. Antimetabolites prices increased to 8.32% in 1994 versus 1995–1996, negligibly increased to 0.53% in 1995–1996 versus 1997–2000 and again increased to 26.72% in 1997–2000 versus 2001–2003. Nitrogen mustards prices varied in all years: increased to 4.11% in 1994 versus 1995–1996, decreased to 8.88% in 1995–1996 versus 1997–2000, and increased to 35.22% in 1997–2000 versus 2001–2003. When the prices were compared between IRP and 2001–2003, 8.97% average increase was found. Highest price was noted for L-Asparaginase 10,000 IU injection (85%) and lowest price was found for cyclophosphamide 00 mg injection (66%), when compared with IRP.

CONCLUSION: Anticancer showed a consistent increase in prices over the years. The trend was similar to our previous studies on cardiovascular and CNS drugs; however the price increase was slightly low between 1997–2000 versus 2001–2003.

APPLYING PHARMACOECONOMIC PRINCIPLES TO ANTIDOTE STOCKING: AN EMERGING CONCERN FOR THE HOSPITAL PHARMACIST

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There has been no systematic study that applies the principles of pharmaco-economics to stocking of essential and general antidotes in the practice of toxicology within the Asia Pacific Region. There are specific conditions that require the immediate use of antidotes. There is an evidenced based consensus guideline developed in the United States that defines essential antidotes as medicines needed within the first hour at the emergency department in order to prevent significant mortality and morbidity. Among the essential antidotes listed are pyridoxine (Vitamin B6) for isoniazid poisoning, cyanide kit and Atropine for organo-phosphate poisoning. It is also necessary to consider the stocking of general antidotes like activated charcoal to limit and prevent the absorption of the poison. Developing countries often find it difficult to allocate hospital pharmacy funds to drugs, which are rarely used. The justification for fund allocation becomes even harder when a sizeable number of the stocked antidotes expire. However, the pharmacist may find himself in a dilemma if

the antidote critical to saving the life of the poisoned patient is not available when the need arises. This presentation aims to present the concept of "toxicoeconomics" in the context of applying pharmacoeconomic principles to the practice of toxicology and proposing future guidelines for antidote stocking by the hospital pharmacy. A country experience on the cost effectiveness of having Pyridoxine as pure Vitamin B6 versus the parenteral preparation of combined Bl, B6 and B12 in the treatment of isoniazid poisoning will be presented as a case study. In the future, we hope to develop a consensus guideline for antidote stocking using the principles of pharmaco-economics adapted to the regional and local situation.

COST-EFFECTIVENESS OF STATIN THERAPY FOR PRIMARY PREVENTION OF THE CORONARY EVENTS IN TYPE 2 DIABETES: THAI HEALTHCARE CONTEXT

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Statin therapy is cost-effective for primary prevention of the coronary events in type 2 diabetes patients. In Thailand, the use of statin in the primary care settings is limited. Therefore, the cost effectiveness analysis with respect to Thai healthcare context is required. The objective of this study was to estimate the incremental cost-effectiveness ratio (ICER) of statin therapy for primary prevention of the coronary events in patients with type 2 diabetes, as compared to no treatment with statin. Markov model was developed using the transition probabilities based on published literatures. Simulations were performed with respect to patients 50–65 years of age for a time-horizon of 20 years. Outpatient care costs were enumerated based on standard treatments using charges. Inpatient care costs were based on DRG. Emergency care costs were derived from administration databases. Cost to charge ratios were applied to obtain the offset costs. Data on utility estimates were obtained from published literatures. Cost and quality adjusted life year (QALY) were discounted at 3%. For a 20-year simulation, costs per patient were 204,311 baht with statin and 222,158 baht with no statin therapy, and benefits were 10.32 and 9.56 QALYs, respectively. The statin therapy is economic dominance. However, during the first three years, statin therapy incurred a higher cost. The cumulative costs with the statin therapy were 10,504 at year 1; 20,931 at year 2; 32,820 at year 3; and 45,546 at year 4; whereas those in the no statin therapy were 7,633; 18,649; 32,155; and 47,079 baht, respectively. The results were robust to all parameter estimates in sensitivity analyses; costs per patients were 199,813 to 262,439 with statin and 199,539 to 277,218 baht with no statin therapy. Statin therapy for primary prevention of the coronary events in patients with type 2 diabetes is cost-effective in Thai-healthcare context.

IMPACT OF IMPLEMENTATION OF ASTHMA CLINIC ON HEALTH COST

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Asthma is a major health problem causing an intense use of health care resources. The economic outcome of asthma clinic set up in general hospital should be evaluated. This study aims to determine and compare total health care costs, based on healthcare provider perspective, between patients receiving care at the asthma clinic and the usual clinic from two general hospitals in Thailand. The hospital administrative electronic databases were used to obtain costs of health care. The patients were interviewed for disease severity, risk factors, and other variables at baseline and at one year thereafter. A generalized linear model with log link function was used to determine the differences in the annual health care costs between the two groups when controlling for the disease

severity and risk factors. The results revealed that among patients in the usual care group (n = 115), those with history of emergency visit or hospitalization with asthma attacks during the past year at baseline had higher likelihood to have these two outcomes during one year when enrolled in the asthma clinic (OR = 10.41, 95% CI = 3.65 to 29.72) and (OR = 27.02, 95% CI = 3.23 to 225.80), as compared to patients in the asthma clinic group (n = 90). Costs associated with scheduled visits at outpatients in the asthma clinic was higher than those in the usual clinic by 36.30% (95% CI = 10.30 to 68.5), whereas costs associated with emergency visit or hospitalization was lower by 62.60% (95% CI = –82.10 to –21.60) and 34.50% (95% CI = –76.80 to 84.90), respectively. The annual total heath care costs in the asthma clinic was lower than those in the usual clinic by 23.20% (95% CI = –41.60% to 9.40%). In summary, the asthma clinic provided better quality of care and better outcomes than the usual clinic. Thus the asthma clinic providing standard of care should be implemented widely, so that quality of care can be improved.

DEVELOPMENT OF A SPREADSHEET PROGRAM TO ESTIMATE RESOURCE USES FOR RENAL REPLACEMENT THERAPY

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The Universal Health Care Coverage (UC) scheme, which provides health insurance for 83% of Thai population plans to cover for renal replacement therapy (RRT) although health care personnel and equipment required are currently insufficient. This study was conducted to develop a spreadsheet program to calculate numbers of patients, and nephrologists, nurses, hemodialysis machines and total budget required for each catchment area. The parameters fixed into the program include incidence rate of patients with end stage renal disease (ESRD), survival rates, proportion of hemodialysis (HD) and continuous ambulatory peritoneal dialysis (CAPD), access rate, unit costs, Consumer Price Index, treatment capacity of an individual nephrologist, nurse, and HD machine, and number of population in the country. Users require putting the following parameters into the program: numbers of population in the local area, prevalence cases with ESRD, and maximum treatment capacity of RRT in the local area. In addition, the program provides information based on different service models which RRT centers would be implemented in the community hospitals. Regarding a study on a catchment area (Mahasarakham Province), the results show that numbers of ESRD patients who need RRT are 543 patients in 2005 and increase to 2,041 patients in 2015. Based on the proportion of CAPD and HD provided of 50:50, numbers of nephrologists, nurses and hemodialysis machines are 4.5, 31.2 and 22.6, respectively in 2005 and increase by 277% in year 2015. Based on patient perspective and societal perspective, total costs are 0.32 and 5.14 million USD in 2005, respectively and increase by 377% in 2015. In summary, universal access to RRT will take a very high expense and need resource uses; therefore the developed spreadsheet program could be helpful to plan for resource and budget allocation for each catchments area.

THE TEST–RETEST RELIABILITY OF BIDDING GAME APPROACH TO ESTIMATE WILLINGNESS-TO-PAY: A PILOT STUDY OF THE HEALTHY HEART AT HOME PROJECT IN CABG PATIENTS, QUEEN SIRIKIT HEART CENTER OF THE NORTHEAST THAILAND

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INTRODUCTION: Contingent valuation method was widely used for determining willingness to pay (WTP) of non-market product or service including health care services. The valid and reliable

methods of eliciting WTP were required to assure that the WTP will be strong enough to be used in the decision making process.

OBJECTIVE: To evaluate the test–retest reliability of bidding game approach to estimate the WTP for Healthy Heart at Home Project (HHH) in coronary artery bypass graft (CABG) patients at Queen Sirikit Heart Center of the Northeast Thailand.

DESIGN: WTP was measured by interviewing CABG patient or patient's payer about their maximum WTP for HHH. This pilot study was divided into two interviewing processes. In the first interview, face-to-face interviewing was used, and then telephone interview was followed up during 2–3 weeks later or called the second interview. The test–retest reliability was performed to evaluate the consistency of WTP.

SETTING: Out patient department of Queen Sirikit Heart Center, Khon Kaen, Thailand. The pilot study was done during November 2004 to April 2005.

PARTICIPANTS: Thirty CABG patients or patient's payer who has been followed up at the out patient department.

RESULT: This pilot study had 8 women and 22 men. The median WTP from first interview equal second interview that was 500 baht (or US$12.60) and interquartile range was 700 baht (or US$17.64). The difference median between the first and second interview by Wilcoxon signed-ranks test showed non-significant ($p = 0.61$). The bidding game technique displayed 83.33% response rate and good reliability (Pearson correlations 0.70).
CONCLUSION: Some evidences showed that the bidding game was reliable. This study determines that bidding game technique is a good technique in estimating the WTP of health care project.

PHARMACEUTICAL EDUCATION

DEVELOPMENT OF CLINICAL PHARMACY EDUCATION AT MEIJO UNIVERSITY

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Meijo University has been offering a one-year graduate course of clinical pharmacy practice education for the past twenty eight years. In April 2003, we reconstructed this course leading to a 2-year Master's degree. The educational philosophy of this Master's course emphasizes the pharmacist's responsibility to pharmacotherapy at clinical sites. Meijo University does not have its own medical facility, so we established a joint Master's course program with the medical school for the clinical training of pharmacy students. The educational features of the Master's course are as follows: (1) problem-based learning (PBL) tutorial education to develop skills for integrating patient information, finding problems and solving them, (2) clinical communication skill, including patient's interview to gather patient's illness-related information, and (3) the clinical clerkship that is carried out in the affiliated university hospital for fifteen months. Students train first the dispensing pharmacy, and then practice nursing. After that, they rotate to several clinical departments for on-the-job pharmacotherapy monitoring. They are trained with medical students and medical residents in the wards under the guidance of physicians who are responsible for the clinical clerkship. We had the first graduates of the Master's course program in March 2005. It was shown that behavioral objectives for students in the clinical training were achieved, based on the findings from a survey to medical preceptors from each department. This survey has suggested that physicians evaluate highly student's growth as a clinical pharmacist. Thus, the target of our education system is to expand the pharmacist's responsibility from dispensing-centered pharmacy to develop more clinical pharmacy

responsibilities in the health care system. We propose a typical model of clinical pharmacy education for pharmaceutical care. This new educa-tional program can be used to improve pharmacy education in Japan.

SURVEY ON AWARENESS OF NECESSITY OF COMMUNICATION SKILL IN PHARMACY EDUCATION

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OBJECTIVE: In Japan from 2006, we held "Communication Education Work-shop for Instructor in Clinical Pharmacy Education" in February 2005 to discuss the importance of communication education to accomplish pharmaceutical care effectively. We surveyed on the awareness regarding the need for communication skill education among participants of the workshop.

METHODS: The respondents of the survey were 18 pharmacy faculties, 14 hospital pharmacists, and 9 community pharmacists. In the workshop, they experienced role-playing in which they performed pharmaceutical interview with simulated patients (SP). Questionnaire surveys were done before and after the workshop. The first questionnaire asked about the current state of communication skill education in the pharmacy education field. The second was done regarding the awareness of necessity for communication education.

RESULTS AND DISCUSSION: According to the result of survey, they understood the importance of communication education before the workshop. However, they pointed out 3 challenges to future education after their experience of skill education at the workshop: (1) They understood that the skill education using the SP at the simulated interview was very meaningful for teaching communication skill; (2) When a pharmacist interviewed a SP in the role-play, the pharmacist had a delicate communication gap with SP. Therefore, after the workshop, some participants have suggested that pharmacy students should be aware that patients are at different levels of mental states and therefore, will have different interpretations to their illness (patient's explanatory model); (3) Their opinions indicated that providing patient-oriented and the right pharmaceutical care depended on the training of pharmaceutical care communication skills.

A COMPETENCY-BASED BACHELOR OF SCIENCE IN PHARMACY CURRICULUM

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The University of the Philippines (UP) College of Pharmacy recently shifted from a 4-year discipline-based curriculum to a 5-year competency-based B.S. Pharmacy curriculum. The revised curriculum which was approved by the UP Manila Curriculum Committee and the University Council last April 2005 will be implemented by academic year, 2005–2006. The revised curriculum, a product of more than three years work by the UP Pharmacy Faculty, took into consideration the global roles and functions of the pharmacist, the output of the 2003 Regional Workshop on the Development of a Pharmacy Curriculum for ASEAN and Western Pacific Region and the Philippine National Competency Standards for Pharmacy. The development of the new curriculum was preceded by a series of assessment of competency needs involving the alumni and students of the College and other stakeholders, as well as a number of faculty workshops on curriculum development. In addition to being competency-based, the revised B.S. Pharmacy Program features a monitored 480-hour internship program as a degree requirement, new patient-oriented and research-based courses and the employment of various learning activities for the students. To support the requirements of the

new curriculum, faculty workshops, acquisition of learning resources and improvement of facilities are the current top priorities of the College Administration. The new curriculum is expected to produce graduates who can competently provide patient-oriented care in the context of social responsibility.

NEW B.S. PHARMACY AND DOCTOR OF PHARMACY PROGRAM: MEETING THE GLOBAL CHALLENGES

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Practice of pharmacy worldwide has undergone tremendous change as a result of numerous developments in Health Care Delivery Systems. The increase in the number of drugs introduced into the market, and drugs taken by a patient, requires the pharmacist to be updated and actively participate in providing pharmaceutical care to the patient and interact with health care professionals. After a series of consultations with pharmacy practitioners in the different area of pharmacy practice, the board of pharmacy and attending the WHO Harmonization Conference on Asian Pharmacy Education, the Philippine Association of Colleges of Pharmacy prepared the new B.S. Pharmacy Program that will equip the pharmacy graduates to meet global challenges. In addition, the Centro Escolar University School of Pharmacy is introducing a 2-year post baccalaureate course leading to Doctor of Pharmacy effective SY 2005–2006.

CLINICAL PHARMACY LABORATORY PROGRAMS

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Recent trend in education of pharmacy is to enhance the practical and clinical pharmacy in the world. In Korea, programs for laboratory practice of clinical pharmacy have been in the undergraduate curriculum at several universities for a decade. We would like to present our undergraduate programs for laboratory experiments for the teaching of clinical pharmacy in Chungnam National University, Korea. There are 10 main experiments in our teaching programs for laboratory practice in clinical pharmacy.

First	Students measure the vital signs and observe physical conditions.
Second	Students measure the blood glucose level and analyze urine.
Third	Students measure the blood chemistry and count the cell components.
Fourth	Students measure the 12 leads of ECG.
Fifth	The pharmacokinetics of drug is simulated by in vitro modeling and the data are fitted by computer programs.
Sixth	Students use the computer program to examine the TDM of theophylline. Individual factors of patients are considered to decide the dosage and the interval of theophylline administration.

Seventh	Students take tetracycline with or without antacid, then collect urine samples and measure the amount of TC excreted in urine.
Eighth	Students measure the alcohol concentration in expiration and estimate the PK in vivo. They also measure the PD by checking sense of balance and walking ability. Then, they fit these PK and PD data to the best PK/PD model selected.
Ninth	Students measure the pulmonary function using the spirometer.
Tenth	Students run the health insurance computer program. The contents of prescription are typed in and the important points to be considered for the medication are recorded.

The above programs would be important to practice and understand the aims and method of clinical pharmacy. We are sure that these trials will play an important role to promote the clinical pharmacy.

NOVEL EDUCATION OF DOCTOR OF PHARMACY STUDENTS IN ADULT TRAVEL IMMUNIZATION AND MASS INFLUENZA PROPHYLAXIS IN PARTNERSHIP WITH A LOCAL DEPARTMENT OF HEALTH

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BACKGROUND: Samford University and the Jefferson County (Alabama) Department of Health (JCDH) have a formal relationship to provide experiential training to pharmacy students in public health. This represents the only opportunity Samford pharmacy students have to practice principles of adult immunization in international travel in a clinical setting**.**

OBJECTIVES: (1) To provide education in travel medicine, with emphasis on vaccines for international travel; (2) to provide hands-on experience in a travel clinic; (3) to teach management skills for mass influenza immunization; and (4) to encourage students to engage in collaborative relationships with local health departments upon graduation.

METHODS: Two faculty members from Samford serve as preceptors for students at the JCDH, with significant instruction provided by a registered nurse and the disease control health officer. Students keep a reflective journal of their experiences.

RESULTS: Results of student evaluations have shown that 100% of students who have completed the rotation with the JCDH (n = 37) are always satisfied (3 point scale: always, frequently, never) with their experience in this area. Student reflective comments are also positive. Students score well on travel and adult immunization questions on their written exam.

CONCLUSIONS: We believe that our interdisciplinary approach to the education of pharmacy students through a local health department in travel immunization and mass influenza immunization is unique. We believe our model is reproducible and could serve as a template for others interested in providing experiential training in this specific area of public health.

LEARNING OBJECTIVES:

1. Identify opportunities for collaboration among schools and colleges of pharmacy, and local health departments.
2. Describe an interdisciplinary process for student education in travel clinics and mass influenza immunization clinics.

3. Identify possible long-term benefits to public health departments that may result from collaboration with a school or college of pharmacy.

PROBLEMS IN CONTINUING EDUCATION FOR JAPANESE PHARMACISTS AND THEIR RESOLUTION

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OBJECTIVES: Faculties of pharmaceutical science in Japan are to start 6-year curriculums in 2006. This reform of the educational system is expected to further improve the quality of pharmaceutical care provided by pharmacists. However, the improvement of education for pharmacists who have already received their license is as important as changing to the 6-year curriculum. To obtain ideas for improving education for Japanese pharmacists in the future, we investigated the American Pharmacist Continuing Education System in the state of Ohio. Furthermore, to find out the problems in Continuing Education for Japanese Pharmacists, we also sent out a questionnaire survey on Japanese Pharmacist Education to all members of the Ehime Society of Hospital Pharmacists.

METHODS: We investigated the American Pharmacist Continuing Education System in the State of Ohio with the cooperation of Pharmacy Service at the Louis Stokes Cleveland Department of Veterans Affairs Medical Center. We made a questionnaire on Japanese Pharmacist Education based on American Pharmacist Continuing Education System, and sent it to 520 member pharmacists (hospital pharmacist: 470, drug store: 47, others: 3) of the Ehime Society of Hospital Pharmacists.

RESULTS AND DISCUSSION: We got answers from 70% members. About 60% of respondents felt dissatisfied with the current Japanese Pharmacist Continuing Education System. A particular point of dissatisfaction was that many respondents felt they were too busy time to attend lecture meetings and were therefore interested in education via the Internet. Thus, an important finding of our questionnaire survey was that the establishment of active learning systems using the Internet would meet the needs of Japanese pharmacists who have already received their license.

PHARMACOKINETICS AND PHARMACODYNAMICS

DOES ST JOHN'S WORT *(HYPERICUM PERMORATUM)* AFFECT THE PHARMACOKINETIC, PHARMACODYNAMIC AND PHYSIOLOGIC EFFECTS OF ESTROGEN-CONTAINING ORAL CONTRACEPTIVE AGENTS?

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St. John's Wort (SJW), a popular herbal product used for mild to moderate depression, is a known inducer of cytochrome P450 (CYP) 3A4 enzyme and P-glycoprotein (P-gp). Since estrogen is a CYP3A4 substrate, SJW may therefore decrease the efficacy of estrogen-containing oral contraceptives (OC). At present, the magnitude and significance of this potential drug interaction have not been clarified. This prospective, single-blind, crossover study is conducted to compare the pharmacokinetic (PK), pharmacodynamic (PD), and physiologic effects of OC with and without concurrent use of SJW. Twenty healthy, non-pregnant, pre-menopausal women between 18–45 years old are being recruited. Subjects take a monophasic OC containing ethinyl estradiol 35 µg and norgestimate 0.25 mg (OrthoCyclen®) daily for six 28-day cycles. In the first 2 cycles, subjects receive on OC alone.

Subsequently, they take OC with placebo for the next 2 cycles, followed by SJW capsules for 2 more cycles. Two separate 24-hour visits to the University Of Illinois Medical Center General Clinical Research Center involving serial blood draw, an endovaginal ultrasound, and completion of a questionnaire are scheduled on day 21 of cycles 4 and 6. The PK parameters, related PD and physiologic effects of ethinyl estradiol, including follicle-stimulating hormone, luteinizing hormone, coagulation factor II and VII activities, and ovarian follicle size are compared between the placebo and SJW phases. Genomic techniques are applied to quantify the magnitude of induction of the CYP3A4 and P-gp genes. Sixteen subjects have been enrolled to date and seven have since completed the study. Based on the results available, no statistically significant difference in the PD and physiologic parameters between placebo and SJW treatments has been detected. The PK and genomic analyses are currently in progress. Once data collection and analyses are completed, the extent and significance of this potential drug interaction will be elucidated.

POPULATION PHARMACOKINETICS OF MEFLOQUINE FOR MALARIA PROPHYLAXIS IN AUSTRALIAN SOLDIERS DEPLOYED IN EAST TIMOR

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AIMS: To study the population pharmacokinetics of mefloquine for malaria prophylaxis in Australian soldiers deployed in East Timor in field conditions.

METHODS: The soldiers were on weekly mefloquine prophylaxis for 26–28 weeks. Following 3 daily loading doses of 250 mg mefloquine base (Lariam) each, oral weekly maintenance of doses of 250 mg were taken by each soldier during military deployment between October, 2000 and April, 2001. The soldiers comprised 154 males and 7 females with a mean (range) weight of 81 kg 53–135kg), height of 177 cm (157–192 cm), and age 26 years (18–51). Blood sampling was performed after the last dose of the loading dose and at week 4, 8 and 16 during maintenance dosing. Mefloquine concentrations were measured by HPLC. Population pharmacokinetic modeling was performed using NONMEM.

RESULTS: A one-compartment model was found to be adequate to describe the mefloquine concentration data. A NONMEM analysis resulted in a population model being developed with inter-occasion variability (IOV) included. The typical population values for clearance (CL), volume of distribution (V) and first-order absorption rate constant (KA) were 1.78 Lh^{-1}, 734 L, 0.41 h^{-1}, respectively. Although weight and sex influenced V, none of these factors had sufficient impact to warrant any dosing changes. The interindividual variability (coefficient variation, CV%) for CL and V were 24.4% and 19.3%, respectively. The IOV for those parameters was 20.8% and 9.5%, respectively. The absorption and elimination half-lives were 1.7 hours and 11.9 days, respectively. The maximum, minimum and average steady state concentration was 887.6 ng/ml, 609.4 ng/ml, and 762.4 ng/ml, respectively. The residual variability was 13.3%.

CONCLUSIONS: The population pharmacokinetics of orally adminis-tered mefloquine prophylaxis has been described with sparse data obtained from Australian soldiers under field conditions. All pharmaco-kinetic parameters were quite similar with previous non-population studies. This finding reinforces the use of loading dose of 250 mg mefloquine for three days and 250 mg weekly thereafter.

MICHAELIS-MENTEN PHARMACOKINETICS OF PHENYTOIN IN INDONESIAN PATIENTS

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BACKGROUND: Phenytoin is a widely prescribed anticonvulsant for the control of seizure disorders. Optimal therapy requires that its administration should be tailored to the needs of each individual due to its narrow therapeutic range and non-linear kinetics (Michaelis-Menten kinetics). Phenytoin metabolism has also been shown to vary in the different ethnic groups. Genetic differences play an important role in determining the steady-state phenytoin concentration. Monitoring for plasma concentrations becomes an important requirement. Therefore, we studied phenytoin pharmacokinetics in Indonesian patients.

MATERIALS AND METHODS: Twelve adults and 12 pediatric epileptic patients were chosen on the basis that they had 2 reliable steady-state phenytoin serum levels at 2 different daily doses and they required an additional adjustment of phenytoin dosage monotherapy, because of either incomplete seizure control or significant evidence of phenytoin toxicity. The characteristics of age and weight of pediatric patients ranged from 5–10 years and from 15–25 kg, respectively. Adult patients ages ranged from 21–30 years and their weight ranged from 38–72 kg. A patient was considered to be at steady-state when a constant dose was administered for at least 2 weeks. Phenytoin concentrations were determined by the fluorescence polarization immunoassay (FPIA). The Michaelis-Menten contants Vmax and Km were derived using 2 steady-state concentrations-dose pairs.

RESULTS: The Vmax and Km values for pediatric were, respectively, ranged from 5.83–13.42 mg/kg/day and from 0.09–2.42 mg/L. The Vmax and Km for adults were, respectively, ranged from 3.78–9.65 mg/kg/day and from 0.71–5.58 mg/L. The pediatric patients had a Km value lower than adult patients. Vmax values of pediatric patients were larger than adult patients. Km was independent of age and weight. Vmax correlated well with weight and age.

CONCLUSIONS: Individualization dosage of phenytoin using Michaelis-Menten parameters need to be done due to the variability to Vmax and Km values.

CYP2D6 POLYMORPHISMS AND SEVERITY OF SCHIZOPHRENIC SYMPTOMS AMONG MALAYS

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BACKGROUND: CYP2D6 is a polymorphic enzyme involved in the metabolism of antipsychotic drugs. It has been detected in the human brain and involved in the catabolism and processing of neurotransmitters.

OBJECTIVES: Our objectives were to investigate the types and frequencies of CYP2D6 variants (CYP2D6*3, *4, *6, *9, *10, *14 and *17) and their relationship with the severity of schizophrenia among Malay schizophrenic patients.

METHODS: One hundred Malay patients with schizophrenia who met DSM-IV criteria were enrolled from the psychiatric outpatient clinic at HUSM. Their age averaged 34 years. The severity of the schizophrenic symptoms was evaluated using the Positive and Negative Symptoms Scale (PANSS). Multiplex allele specific PCR for CYP2D6 polymorphisms were performed. The study was approved by the Research and Ethics Committee of School of Medical Sciences, Universiti Sains Malaysia.

RESULTS: PANSS score averaged 40 for all the patients and range from 30 to 79. DNA from all subjects was successfully amplified. The only mutated allele found was CYP2D6*10 that occurred at a percentage frequency of 41.5%. Only 26% of the patients had genotypes *10/*10. Another 31% had genotypes *1/*10. There was a trend for all the PANSS scores (positive, negative, general and total) to be higher among patients with CYP2D6*10 compared to patients without CYP2D6*10 allele. However, only the differences in the subtotal general PANSS score reached statistical significance.

CONCLUSION: The present results suggested that CYP2D6 activity may have implications in the severity of schizophrenia. However, conclusions are still preliminary. Further work is required to confirm this.

GENETIC POLYMORPHISMS IN THE DIHYDROPYRIMIDINE DEHYDROGENESE (DPD) GENE IN A JAPANESE POPULATION

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Pharmacists can help gene analysis with their background in biology, laboratory experience and specialized abilities. Dihydropyrimidine dehydrogenase (DPD) is the initial, rate-limiting enzyme in the catabolism of 5-fluorouracil (5FU), anticancer drug. A pharmacogenetic syndrome has been described in which DPD deficient patients are at risk for toxicity following administration of 5FU. This study was performed to screen for polymorphisms in the DPYD gene to determine the frequencies of currently known and previously unknown polymorphisms in a Japanese population. Blood samples were obtained from 33 healthy volunteers to isolate genomic DNA. The population, of which the ethnicity was 100% Japanese, consisted of 14 female individuals and 19 males. PCR amplification was performed, followed by a non-RI semi automated single strand conformation polymorphism (SSCP) screening (Genephor SSCP, Amersham Biosience Co.). The DNA samples which showed abnormal pattern in the SSCP screening was applied to DNA sequencing. In total, 13 types of polymorphisms were found in the DPYD gene, of which 9 were previously unknown. A novel polymorphism 2303C>A in exon 19 causes an amino acid change of 768Thr>Lys. Most of the previously unknown polymorphisms were found in introns. The results will be used in future pharmacogenetic studies to explore the influence of the different polymorphisms on DPD protein expression, activity, and substrate specificity. In addition, the results can be used to study the effects of genetic polymorphisms in the DPYD gene on the pharmacokinetic profile of 5FU.

IDENTIFICATION OF CYP450 ISOFORM INVOLVED IN DRUG METABOLISM USING HUMAN LIVER MICROSOMES: A GLICLAZIDE MODEL SUBTRATE STUDY

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By the advent of science and technology in molecular biology, many specific CYP450 isoform have been identified using human liver microsomes (HLM). Some chemical-physical properties values of substrate (P, pK_a, log $D_{7.4}$, a/d2, l/w, SA, vol, E, E_{LUMO}, and μ) to CYP450 isoform are required to identify the specific CYP450 isoform and the use of COMPACT software will enable to predict the dominant CYP450 isoform involved in phase 1 drug metabolism. Gliclazide (GZ) was used in this study as a substrate model. It is a sulfonylurea commonly used in Indonesia and is analogue of tolbutamide and sulfaphenazole. The main metabolites hydroxylation of GZ are 7OHGz, 6OHGz and MeOHGz (MethylOHGz).

OBJECTIVES: The aim of this study was (i) to identify specific isoform of CYP450 to GZ metabolism using human liver microsomes, and (ii) to compare the relative contribution to the 7OHGz, 6OHGz and MeOHGz pathways to metabolic clearance.

METHODS: A high performance liquid chromatography (HPLC) method was established to measure the formation of the three hydroxylated GZ metabolites from incubations of human liver microsomes (HLM). Metabolite retention times were determined by comparing to those of authentic standards. Incubations using human liver microsomes (1 mg/ml), NADPH generating system, GZ (0–2000 μM) in phosphate buffer (0.1 M, pH 7.4) were performed at 37^{O}C for 90 minutes. In addition, 8 competitive based-inhibitors (direction specific isoform) were used to determine the percentage of high relative inhibition to the metabolites of GZ. The CYP450 recombinant (rCYP450) and GZ substrate (0–800 μM) with regenerating system were used for 45 minutes incubation times. The kinetic parameters of K_m, V_{max} dan Cl_{int} from HLM and rCYP450 can be calculated using Eadie-Hoffstee plot (velocity metabolites formation (v) versus (v)/substrate concentration [S].

RESULTS: The characterization of the mean ratio Cl_{int} of metabolites 7OHGz:6OHGz:MeOHGz in HLM were 1:1:2, respectively. Based on the three curves (v) vs. (v)/[S], each metabolite from five samples of HLM showed good linier correlation (monophasic curve) which can be concluded that one CYP450 isoform is dominant. Moreover, good linear correlation was shown for each metabolite to the others and the formation of three metabolites was simultant (parallel). Based on the lowest concentration and chemical-physical properties compared to other inhibitors, sulphaphenazole was found to be the most potent and specific inhibitor for CYP2C9 in GZ metabolism. In addition, the K_m parameter of 3 GZ metabolites using HLM and rCYP2C9 were closely similar which can be interpreted that CYP2C9 is dominant in hydroxylation of Gz to three main metabolites.

CONCLUSIONS: The 3 main metabolites of GZ are 7OHGz, 6OHGz and MeOHGz. The stage of Cl_{int} of the 3 metabolites in HLM and rCYP2C9 were identical. Sulfaphenazole showed the highest percentage of relative inhibition. The CYP2C9 is dominant in hydroxylation metabolism of GZ to 3 main metabolites.

FOOD EFFECT BIOAVAILABILITY STUDIES AND PHARMACODYNAMIC EFFECTS OF FENOFIBRATE SR CAPSULE FOR THE GUIDANCE OF FED BIOEQUIVALENCE

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INTRODUCTION: To provide a standard protocol of food-effect bioavailability and fed bioequivalence, we examined the effects of food on plasma concentrations and the bioavailability of fenofibrate released from sustained-release (SR) capsules as therapy for hypolipidemia.

METHODS: Twenty-four healthy volunteers were used in a randomized, open-label, balanced, three-treatment, three-period, three-sequence, single oral-dose, crossover pharmacokinetic study. A single dose of fenofibrate (SR capsule, 250 mg) was administered on three occasions: after overnight fasting, after consumption of a standard breakfast, and after a high-fat breakfast. Serial blood samples were collected for the next 72 hours. Plasma fenofibric acid concentrations were measured by high performance liquid chromatography, and pharmacokinetic parameters were calculated. Plasma triglyceride concentrations were measured by blood chemistry analyzer (CH-100).

RESULTS: The pharmacokinetic parameters were significantly affected by food intake. The high-fat breakfast affected the rate of absorption of fenofibrate more than did the standard breakfast and fasted conditions. A one-compartment open model with lag time successfully described the plasma concentrations of fenofibric acid. Plasma concentrations of triglyceride at 24 hours decreased significantly after the administration of fenofibrate compared with the concentration at 0 hours ($p<0.05$).

CONCLUSION: In healthy volunteers, the bioavailability of fenofibrate was greater when administered via sustained-release capsules immediately after the consumption of food than after fasting, and the greatest bioavailability occurred when the capsules were taken immediately after a high-fat breakfast. We recommended a randomized, balanced, single-dose, two-treatment (fasted and high fat meal), two-period, two-sequence crossover design for studying the effects of food on the bioavailability of modified-release products.

TRADITIONAL AND ALTERNATIVE MEDICINE

RESEARCH ON USEFULNESS OF JAPANESE HERBAL MEDICINE WITH TAILOR-MADE DIET THERAPY

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To investigate whether bofu-tsusho-san (BF), an oriental herbal medicine, (24mg/day ephedrine and efficacy equivalent to 280mg caffeine, based on the phosphodiesterase inhibitory effect) was effective for decreasing of visceral adiposity and insulin resistance in a total of 81 Japanese women [body mass index (BMI) 36.5 ± 4.8 kg/m^2] with Impaired glucose tolerance (IGT) and insulin resistance (IR), who have been treated with a low-calorie diet (5,016 kj/day: 1,200 kcal) and exercise regimen (1,254 kj/day: 300 kcal), were randomized to placebo (n = 40) or BF treatment (n = 41) (3 times a day). IGT is

a predictor of not only Type 2 diabetes, but also cardiovascular disease and other complications of diabetes. An association between abdominal obesity and the risk of IGT was reported. Greater visceral adiposity also increased the risk of IGT. After treatment of 24 weeks, the BF group lost more abdominal visceral fat than the placebo group (47.1% [93.2 cm^2] vs. 20.4% [36.3 cm^2]). The BF group had lower fasting serum insulin level ($p<0.05$), lower insulin area under the curve ($p<0.05$) and lower level of HOMA-IR (Homeostasis model assessment of insulin resistance) ($p<0.01$) than placebo group. Moreover, after 24 weeks treatment with BF, the adjusted resting metabolic rate in the active group was mildly higher than the value in the placebo. Decreasing of waist circumference, however, was significantly greater in the BF than in the placebo during 24 weeks; (BF: 17.3 cm, $p<0.01$ vs. 0 week, $p<0.05$ vs. 12 weeks and Placebo: 9.3 cm, $p<0.05$ vs. 0 week). In conclusion, it was suggested that, in Japanese obese women with IGT, the treatment for 24 weeks with BF was effective and safety to decrease visceral fat and to improve insulin resistance.

THE USE OF COMPLEMENTARY AND ALTERNATIVE MEDICINES AMONG PRE-OPERATIVE PATIENTS

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BACKGROUND: Complementary and alternative medicine (CAM) use is increasing in popularity worldwide. We do not know the full pharmacological and toxicological properties of CAM. Reports on adverse drug reactions had been received, and the investigators perceived that continued use of CAM would result in serious implications to patients who continue to consume before surgery leading to pre-operative and post-operative adverse events. The objectives of the survey were to investigate the incidence of CAM consumption among pre-operative patients, to quantify the types of CAM consumed and to determine patients and healthcare provider awareness towards CAM management before surgery.

MATERIALS AND METHODS: A prospective, cross-sectional survey using a one-page pharmacist-assisted questionnaire. Subjects included were all pre-operative patients who were able to communicate and aged over 12 years old.

RESULTS: A total of 44 patients were enrolled into the study of which 27 (61.4%) were males and 17 (38.6%) were females. The majority of them were Malays (52.3%), followed by Chinese (36.4%), Indians (9.1%) and 2.3% from other races. Of these patients, 19 (43.2%) of them admitted taking CAM before. Only 11 patients (25%) confessed they that had use at least one type of CAM within 2 weeks before surgery. Females (54.5%) used CAM more than men (22.7%). None of the patients informed their doctors regarding CAM use. This study also indicated that 39 patients (88.6%) had not been asked on CAM use during admission and 90.9% patients were not aware of the adverse effects of CAM. Only 5 patients had been asked about CAM use during admission by doctors or other health care workers. The types of CAM consumed among others, include spirulina, Tongkat Ali, mengkudu and ginseng.

CONCLUSIONS: Information about the use of the complementary medicines should be obtained during pre-operation admissions.

RECENT CASES OF PHARMACEUTICAL ADULTERANTS IN SLIMMING SUPPLEMENTS

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Dietary supplements have recently been gaining popularity among the Japanese public due to increasing health awareness. The presence of therapeutic medicinal ingredients intentionally added to supplements has been reported. Such supplements are worrying and, without prior knowledge regarding these additional drugs, potential hazards to health cannot easily be avoided. In this study, we investigated such supplements to screen for pharmaceutical adulterants using a combination of GC/MS, LC/MS and HPLC/photodiode-array systems. Adulterants detected for weight reduction were; Thyroid hormone prescribed for the symptoms of hypothyroidism, which increases the rate of oxygen consumption as a metabolic stimulant. Fenfluramine, the appetite suppressant that has been banned in the United States since 1997 due to damage inflicted on the heart valves. N-nitroso-fenfluramine (fenfluramine derivative) manufac-tured to escape periodic surveillance programs, which has caused life-threatening liver damage. Mazindol, a sympathomimetic amine similar to an amphetamine and the only approved drug for the treatment of obesity in Japan, which affects the central nerve in the hypothalamus and decreases the appetite. Sibutramine, mainly affects two chemicals called noradrenaline and serotonin and promote a feeling of being full or having eaten enough, but has also been reported to cause increased blood pressure in some patients. Although such supplements are potentially hazardous to health, people are unaware of the risks since they generally do know that drugs have been added. In the case of pharmaceuticals, extensive efficacy and safety testing must be conducted before they can be approved for sale. However, since dietary supplements are considered to be nutritional foods rather than pharmaceuticals, such testing is often not conducted. Furthermore, the public sentiment that dietary supplements are not harmful in any way frequently leads to overuse and clinical problems. It would therefore be useful for pharmacists to provide advice to consumers and health care professionals regarding the benefits and risks of dietary supplements.

POPULATION PERCEPTION ON HERBAL TREATMENT AT PHARMACY OUTPATIENT SETTING

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Even though there is insufficient scientific data to support the effective-ness of herbal treatment, many Malaysian used herbal treatment as alternative medicine. The objectives of this study are: (i) to evaluate herbal user and their perception on herbal treatment; and (ii) to determine the correlation between perception and some demographic data. This is a prospective study with convenient sampling conducted at the outpatient pharmacy, Hospital Pulau Pinang. The self-answered questionnaires regarding herbal treatment were distributed to patients and non-patients at these setting. The subjects were voluntarily involved. Data obtained were analyzed with SPSS 11.00 program. It was found 62% (n = 192) of this population used herbs, more than half were males (63%). Their mean age was 44.2 years old (range 14–87). The majority were Malay, followed by Chinese, Indian and others. Most of them had moderate education level. More than half (60.9%) said their monthly income were RM1000 or less. Many of them used herbs for specific diseases (41%), followed by general health care (38%), for energy (10.9%) and others (<5%). Many of them take herbs only

when needed or take herbs every day. Herbal expenses were reported to be between RM10–RM50 in a month. About half of them believed (50.6%) the effectiveness of herbal treatment. Only a few patients did not belief (4.7%) in herbal therapy, while less than 10% were not sure. It was found there was no significant correlation between perception and age, education level, incomes and herbal expenses. In conclusion, more than half of population at pharmacy outpatient setting used herbs and believed the effectiveness of herbal therapy. Perception on the herbal effectiveness involved complex parameters.

FACTORS ASSOCIATED WITH HERBAL USE AMONG MULTIETHNIC SECONDARY CARE PATIENTS: A CROSS SECTIONAL SURVEY

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The use of herbal medicine in Malaysia has gained popularity. However, the pattern and factors associated with such use among secondary care patients have not been widely studied. Many patients use herbal therapies in conjunction with allopathic treatment but only 30% of patients disclosed their herbal use to physicians. The objectives of the study were: (1) to describe the pattern of herbal use by medical patients and to identify the factors associated with such use; and (2) to construct a structured documentation of herbal use among medical patients. Data was collected using structured interview for patients admitted to Medical Ward at Hospital Pulau Pinang between March–May 2005. Convenience sampling was used. The association between various factors and use of herbs was analysed using univariate and multiple logistic regression. A total of 250 patients were included in the analysis. Overall, 42.4% of surveyed patients (n = 106) indicated use of herbs, with variability among ethnic group: 47.1% Chinese, 45.3% Malay and 32.1% Indian. It was found that higher education level significantly associated with herbal use ($p<0.05$). Significant number of patients (89.8%) did not disclose the herbal use to physicians with majority of Chinese (92.5%) patients, followed by Malay (91.7%) and Indian (83.3%). The main reason for non-disclosure was "doctor never asked" (53.6%). In conclusion, Chinese patients reported the highest rate of herbal use but were the least likely to disclose their use to physicians. These findings were important for health professionals to ensure medication safety and to recognize the potential risk of drug-herb interactions.

EFFECT OF DRY EXTRACT GRANULAE FROM JATI BLANDA LEAVES (*GUAZUMA ULMIFOLIA* L) ON MALE RAT RENAL FUNCTION AND ON RENAL HISTOLOGY

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Jati blanda (*Guazuma ulmifolia* L) has been used as an antiobesity and antihiperlipidemia. The comprehensive use of this preparation must be supported by scientific data proving its safety. Therefore, an experiment is done to evaluate the effect of this preparation on rat renal function. The experiment used 24 male rats from Spraque dowley strain, which were randomly divided into four groups. Groups I, II and III were given the preparation extract of Jati blanda leaves in the following doses: 2 g/kg rat bw; 4 g/kg rat bw; and 8 g/kg bw, whereas group IV as a normal (control) group was given water only. The extract was given orally once a day, continuously for 90 days. On the 91st day the rats were operated. Plasma was collected to determine creatinine and urea concentration by spectrophotometer. Renal histology was examined by microscopic technique. The result of one way ANOVA test showed that there was no significant difference between groups I, II, III compared to group IV for creatinine and urea concentration, and also for the histological examination. We conclude that modern preparation of Jati blanda has no effect on the renal function.

PHARMACEUTICAL TECHNOLOGY

PHARMACEUTICAL INCOMPATIBILITY FOR PARENTERAL ADMIXTURE

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The glycyrrhizin parenteral preparation has been used clinically as an anti-allergic and anti-hepatitis agent for over 50 years. This parenteral preparation is generally mixed with cysteine and glycine because of the protection of pseudo-aldosteronism that is abnormality of electrolytes like hypertension, and hypokalemia originating from the mineralcorticoid like effect of glycyrrhizin. In glycyrrhizin parenteral preparation, cysteine is very reactive to oxidation-reduction reaction. We tried to test the pharmaceutical incompatibility with some parenteral admixtures. From this test, we found some new inconvenient facts that were related to cysteine and sodium bisulfite that works for an antioxidant agent contained as follows. Cysteine in parenteral admixtures mixed with glucose solution, showed about 20% decrease within 2 or 3 hours at room temperature. In the case of mixed vitamin preparation containing activated thiamine derivatives, cysteine showed very rapidly a 100% decrease within 1 hour. In general, the effect on parenteral admixture was judged by changes in color, turbidity and pH change. We did not see any changes on the general appearance. We estimated the chemical reaction among admixtures that induced cysteine complex added to glucose or thiamine preparation. In the case of admixtures with vitamin preparation containing activated thiamine derivatives, the activated thiamine derivatives are cleaved into thiamine. The occurrence of thiamine cleavage depended on the time and the concentration of bisulfate ion. It is very important for clinical staffs to know the data mentioned above.

FORMULATION OF PELLETS THROUGH SIEVING FOLLOWED BY SPHERONISATION

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Pellets prepared using extrusion spheronisation process is limited by the rheological properties of the wet mass during extrusion and by the excipients that can be used in pellet formulation. For example, some polymers impart excessive elastic properties to the wet powder mass, which in turn resulted in extrudates being too elastic for spheronisation. Moreover, consolidation of the pellets during extrusion spheronisation also resulted in pellets that do not readily disintegrate. The aim of this study was to evaluate a simple sieving and spheronisation method for preparing pellets. The pellets consisted of lactose, microcrystalline cellulose (MCC), crospovidone, polyvinylpyrrolidone K90 (PVP) and paracetamol as a model drug. It was noted that the moisture content, spheronisation speed and residence time could influence the pellet formulation and properties. Pellets obtained were less dense and easily disintegrated compared to those prepared using ram extrusion and spheronisation. Pellets of size range 0.8–1.25 mm were selected for *in vitro* drug release study. The amount of drug released was quantified using UV spectrophotometry. The results showed that 75–80% drug was released within half an hour even at high excipient to drug ratio. It is concluded that the current method is easy, simple, less time consuming and economical for the preparation of pellets.

STABILITY AND COMPATIBILITY OF TAXOL WITH VARIOUS DRUGS DURING SIMULATED Y-SITE ADMINISTRATION

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This study evaluated the compatibility and stability of taxol with ondansetron, ranitidine, vancomycin and cephalosporins in 5% dextrose injection and 0.9% sodium chloride injection during simulated Y-site administration. Two stock solutions of taxol 0.3 and 1.2 mg/mL and each stock solutions of ondansetron 0.03, 0.1 and 0.3 mg/mL, ranitidine 0.5 and 2 mg/mL, vancomycin 1, 5 and 10 mg/mL and cephalosporins 20 mg/mL were prepared in glass bottles. Two mL of taxol stock solution was mixed with 2 mL of each stock solution. Samples were removed at room temperature at time zero, one, two, four and twelve hours for immediate assay. All solutions were prepared in triplicate, and each drug was assayed in duplicate. At the time of sampling assay and before any dilution, each sample was visually inspected for clarity, color and precipitation. The pH was also determined. Taxol in concentrations of 0.3 and 1.2 mg/mL was stable when mixed with either ondansetron (0.03 or 0.3 mg/mL, as the hydrochloride salt), ranitidine (0.5 or 2.0 mg/mL, as the hydrochloride salt), vancomycin (1, 5 or 10 mg/mL, as the hydrochloride salt) or cephalosporins 20 mg/mL and stored in glass containers for twelve hours. No precipitates, color changes, or haziness was seen. The changes in pH were minor.

PHARMACOLOGY

HISTOLOGICAL ASSESSMENT OF CELLS AND ANTIHYPERGLYCAEMIC EFFECT OF ETHANOL EXTRACTS OF *A. PANOCULATA* ON STZ-INDUCED DIABETIC RATS

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In type 1 diabetes mellitus, 80–90% of β cells are destroyed and typical histological destruction of β cells seen. Thus, it is important to assess histologically the effect of the drug or extracts treatment on the β cells of Islet of Langerhans, the target organ of the models used. At the same time the study would allow to determine the correlation between treatment and the degree of glycaemia and the destruction of β cells. Two staining methods were utilized to assess the viability of β cells. These included hematoxylin and eosin (H&E) and modified Gomori's staining methods. The blood glucose and the insulin levels were also determined in order to correlate the findings. Six groups of streptozotocin-induced diabetic rats (nv = vv6) were treated orally either with metformin (0.5 g/kg body weight), distilled water, 20%, 50%, 95% ethanol or water extracts of *A. paniculata* (0.5 g/kg body weight) twice daily for fourteen days respectively. The modified Gomori's staining method abled to show the β cells destruction compared to H&E staining. Streptozotocin 65 mg/kg i.p.) destroyed 87.49% of β cells and the rats could survive with the remaining 12.51% of the β cells. The study also showed that 14 days treatment of ethanol extracts (20, 50 and 95%) and water extract of *A. paniculata* increased the β cells population of streptozotocin-induced diabetic rats ($p<0.01$). Moreover, the blood glucose levels in 50% and 95% ethanol extracts treated rats were significantly reduced ($p<0.05$).

THE EFFECT OF OPIATE AGONIST AND ANTAGONIST ON TESTICULAR AND RENAL 11-HYDROXYSTEROID DEHYDROGENASE OXIDATIVE ACTIVITY IN NORMAL AND ADRENALECTOMIZED RATS

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The enzyme 11β-hydroxysteroid dehydrogenase (11β-HSD) catalyzes the reversible oxidative inactivation of cortisol to cortisone in man, and in rats, from corticosterone (B) to 11-dehydrocorticosterone (A). This occurs in various tissues, thus providing protection from glucocorticoid's deleterious effects during stress. Two isoforms have been characterized, termed 11β-HSD1 and 11β-HSD2. Endogenous opiate peptides are present in the pituitary, adrenal medulla and gonads and are released during stress. The aim of the present study was to determine the effects of the opiate agonist (morphine) and antagonist (naloxone) on testicular and renal 11β-HSD oxidative activity and plasma T concentrations in adult male Wistar rats. Morphine and the opioid antagonist naloxone were administered in normal (N) and adrenalectomized (ADX) male Wistar rats. 11β-hydroxysteroid dehydrogenase oxidative activity was determined by analyzing the percentage conversion of B to A, and plasma T concentrations were determined using commercially available total T kit. This study indicated that the action of morphine on 11β-HSD oxidative activity is tissue specific. Exposure to high dose of morphine (10 mg/kg body weight) reduced testicular 11β-HSD oxidative activity in N whereas in ADX rats the enzyme activity was increased. Plasma T levels in both normal and ADX rats were reduced by morphine. The reducing effects occurred via the opiate receptors in both the testicular enzyme activity and plasma T levels. Thus, our findings further support the involvement of T in the control of testicular 11β-HSD activity. This study has also shown that morphine causes the involvement of renal 11β-HSD1 more than 11β-HSD2. The elevation of renal 11β-HSD1 oxidative activity in normal rats suggested a protective effect of morphine against hypertension since morphine has been shown to cause hypotension. Naloxone caused a reversal in the above effect in the kidney. We suggest that the lowering effect of morphine on blood pressure is probably partly modulated by its reducing effect on plasma T levels.

ICT IN PHARMACY

AN ONLINE SMOKING CESSATION PROGRAM: EXPERIENCE OF THE MALAYSIA POISON CENTRE

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BACKGROUND: Cigarette smoking has been identified as the most important source of preventable morbidity and premature mortality worldwide. Pharmacists are in a strategic position for dissemination of that awareness. The pharmacist's role in smoking cessation is not new; they have been active in providing face-to-face counseling for many years in United Kingdom (UK), United States of America (USA) and others. In Malaysia, the Malaysian Pharmaceutical Society collaboration with Clearinghouse for Tobacco Control (CTOB) and National Poison Centre has initiated Certified

Smoking Cessation Service Provider (CSCSP) to train community pharmacists as a counselor for such service. Recently, CTOB has introduced another form of smoking cessation program utilizing the call center concept also known as "Quitline" service. The objective of the service is to ensure consistency and standardization of advice given to smokers and passive smokers.

MATERIAL AND METHODS: Quitline is opened to the public in conjunction with "World No Tobacco Day" on 31st May 2005. The services are carried out by the pharmacists in National Poison Centre through telephone. Computer system which is called "Smokefree-Online System" (SOS) was developed to assist in evaluating status of smokers and step by step procedures were given to assist pharmacists in giving advice to smokers. This system is a web-based system whereby to access the system a user must have Internet connectivity. On the server side, an operating system, Windows 2000 is required. The system can be assessed either via a modem (dial-up connection) or lease line. For system operation, Active Server Pages 3.0 (ASP) is utilized. All data are stored in the Simple Query Language (SQL) server database software. ID name and password are required to access this system for security purpose. Smokers were asked to set up one quit date in order to join this program.

RESULTS AND CONCLUSIONS: Within a period of 2 months, a total number of 58 smokers and 2 proxy callers had called the Quitline and from these 52 smokers were enrolled into the program. This paper will describe the experience encountered in providing the Quitline service using the computerized system.

AN EVALUATION OF THE CONTENT AND QUALITY OF MENOPAUSE AND HRT INFORMATION ON THE MALAYSIAN WEBSITES

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The objective of this study is to evaluate the content and quality of currently available Malaysian web-based information about menopause and hormone replacement therapy (HRT), therefore providing guidance for healthcare professionals over which sites are suitable for recommendation to patients. A search of Malaysian websites was conducted using 3 commonly used search engines; Yahoo, Google and MSN with 2 key words "menopause" and "hormone replacement therapy". A sample of 38 sites was generated and evaluated according to predefined general and specific criteria and quality. Each site was assessed using a specific scoring tool. For each medical information criterion, a score of 0–3 was assigned and a score of 1–2 was assigned for each web quality criterion. The mean value of the total score for the medical information was 16.88 (out of a maximum of 36), with a range of 10–24 and for the quality of web sites was 18.69 (maximum 26), with a range of 16–23. Commercial websites has content with low quality, biased or useless information. Few sites provided comprehensive medical information about menopause and hormone replacement. Certain types of ownership were associated with higher quality sites, including the university, community pharmacies and governments. The content and quality of the websites concerning menopause are widely varied and sometimes biased to commercial goals. Therefore, it is recommended that healthcare professionals direct women to sites owned by the universities, community pharmacies and governments.

E-PRESCRIBING: DOES IT REDUCE THE NUMBER OF PHARMACY INTERVENTIONS?

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OBJECTIVE: To determine the effect of electronic prescribing on the frequency of pharmacy interventions.

METHODS: This study was divided into two phases of one-month each: Phase 1 (April 2002) when conventional prescriptions were given to patients, and Phase 2 (September 2002) when electronic prescriptions were used. All prescriptions of patients who attended the Primary Care Clinic of a teaching hospital were included except for those with non-formulary medications or when the patients were admitted to the wards.

RESULTS: A total of 1926 and 1485 prescriptions containing 5093 and 4020 number of drugs were included in Phase 1 and 2, respectively. The number of prescriptions intervened by the pharmacist reduced signifi-cantly from 263 (13.6%) in Phase 1 to only 3 (0.2%) in Phase 2 ($p<0.001$). The number of problems in the prescriptions reduced significantly from 402 in Phase 1 to only 3 in Phase 2 ($p<0.001$). The main problem in Phase 1 was the prescribing of drugs that were not available in the pharmacy (44.5%) whereas this did not occur with e-prescribing. When the prescriptions were screened retrospectively, the number of prescription errors reduced from 3421 in Phase 1 to 116 in Phase 2 ($p<0.001$). The main error of omission was strength or dosage form of the prescribed drug was not stated (44.7% of the errors in Phase 1 and 1.7% in Phase 2).

CONCLUSIONS: With e-prescribing, information about drugs is provided at the optimal point of care between doctor and patient. This reduced the number of pharmacy interventions by more than eighty times and consequently improves the efficiency of the prescribing process significantly.

PHARMACEUTICAL ANALYSIS

RAPID ASSAY FOR DETERMINATION OF URINARY NICOTINE AND COTININE BY GAS CHROMATOGRAPHY-MASS SPECTROMETRY

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Nicotine, a major addictive compound in cigarette smoke is rapidly and extensively metabolized to several metabolites in human. Urinary cotinine, a major metabolite was used as a biochemical marker to determine active or passive smokers due to its longer half life (~20 hours) compared to nicotine (~2 hours). The aim of this study was to develop a simple, sensitive, rapid and high throughput GC-MS assay for simultaneous quantification of nicotine and cotinine. The analytes and internal standard were first basified and followed by liquid-liquid extraction. Anhydrous sodium sulphate was then added to the solvent mixture to trap the moistures. The clear extract obtained was directly injected into GC-MS where Selective Ion Monitoring (SIM) mode was utilized. Calibration curves ranged from 0.5–5000 ng/mL of analytes in urine were established with linear correlation coefficients (R2) greater than 0.997. The limit of detections for both nicotine and cotinine were 0.25 ng/mL. The recoveries of the assay were in the range of 82–101% and 95–104% for nicotine and cotinine, respectively. The inter and intra assay accuracy were between 2.1–10.0% for nicotine and 0.7–12.8% for cotinine. The good inter and intra assay precisions were also achieved for Nicotine (5.0–7.8%) and cotinine (0.7–8.4%). This assay can be used for routine monitoring to assess active smoking and exposure to environ-

mental tobacco smoke. The applicability of the assay was demonstrated in a small scale comparison study between smokers and non-smokers.

METHOD DEVELOPMENT FOR PROTEOMIC ANALYSIS OF HUMAN COLORECTAL CANCER TISSUE

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Colon and rectum are parts of the digestive system. Cancer affecting either of these organs may also be called colorectal cancer. Colorectal cancer is a worldwide public health cancer and it is among the best characterized cancers with regard to the genetic progression of the disease. Colorectal cancer is also a frequent cause of mortality and morbidity in developed, developing and industrialized countries. In Malaysia, cancer of the colorectal ranks second most common cancers and this has also been the case for both male and female. In Malaysia, the Chinese had the higher number of cases, followed by the Indians and the Malays. In this study, a method was developed for analysis of proteins from human colon tissues, whereby proteomics approach was applied for extraction, separation and identification of the proteins. The colon tissues were extracted using sequential and non-sequential protein extraction techniques. In both the techniques, 6 types of protein extraction buffers were developed. The proteins extracted were separated according to their molecular masses by using 10% SDS-PAGE. The gels were then stained with either Commassie blue or silver. The image of the gel was captured using high-resolution scanner. The target protein bands were excised from the gel and proteins were digested In-gel with trypsin. The tryptic peptides were then analyzed using LC/MS/MS, which allows sequencing of the analyzed peptides. The MS/MS product ions spectrum was then search against Mascot protein database search engine. A total of 82 proteins were identified from the normal and cancer tissues. Amongst these proteins, the abundance proteins groups are protein binding proteins, structural proteins, transport proteins, hypothetical proteins and enzymes. In addition, a minority of proteins detected were cytoskeleton-binding proteins, endopeptidase inhibitor proteins, motor activity proteins, channels proteins, defense response proteins, DNA-RNA binding protein, lipoproteins and ATP-binding protein.

SURVEYS ON PUBLIC AWARENESS AND KNOWLEDGE

A STUDY ON PATIENT'S KNOWLEDGE OF IMMUNOSUPPRESSIVE MEDICATION IN POST-RENAL TRANSPLANT PATIENTS OF NEPHROLOGY DEPARTMENT AT KUALA LUMPUR GENERAL HOSPITAL

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BACKGROUND: Renal transplantation remains the therapy of choice for most patients with chronic renal failure. he development of new immunosuppressive agents have reduced complications and prolonged graft survival. Immuno-uppressive drugs prevent the risk of the body's immune responses and have to be taken for life following a transplant. Since immunosuppressive medication plays a big role in preventing organ rejection in post-renal transplant patients, therefore it shall be a pharmacist responsibility to make sure the patients are compliance to their medication. The more the patients understand about immuno-suppressive medication, the less anxiety they would feel and the more compliance they are.

OBJECTIVES: (1) To determine the knowledge of post-renal transplant patients about the indication and side effects of immunosuppressive indication based on demographic factor, and (2) to find the relationship between the lengths of treatment after transplant with the understanding of the immunosuppressive medication.

METHOD: One hundred questionnaires were distributed to post-renal transplant patients that were using immunosuppressive medications. The number of patients that were aware of the indication and side effects of this medicine were recorded based on gender, races, age and length of the treatment after transplant.

RESULTS: The results of patient's understanding of indication showed female patients had better understanding (88.1%) compared to male (84.5%). Others have the greatest percentage of understanding (100%) while Indian has the lowest percentage (69.2%). However, the result showed that the data were not statistically significant ($p>0.5$). Patients in the age group between 40–49 years and 60–69 years had the greatest percentage of understanding the indication of this medicine (100%), while the age group between 7–12 years was the lowest (42.9%). Regarding patient's understanding of side effect, it showed that female had better understanding (88.1%) compared to male (74.1%). In term of races, others have the greatest percentage of understanding (100%), while Indian had the lowest percentage (76.9%). However, the result showed that the data were not statistically significant ($p>0.5$). Patients in the age group of 3–19 years had the greatest percentage of understanding (90%) while the age group of 7–12 years had the lowest percentage (57.1%). In term of relation between the lengths of treatment after transplant with the understanding of the indication of immunosuppressive medication, the results showed that the longer the duration after transplant, the more the knowledge patients had. In term of side effects there was no relationship between lengths of treatment with the understanding.

CONCLUSIONS: From this study, it was found that the understanding of patients based on demographic factor showed that overall percentage of understanding the indication and side effects among different races and gender was 60% and above. However, in term of age overall percentage of understanding (indication and side effects) was 70% and above except for age group 7–12 years old, which was below than 58% and considered poor. Therefore, the group of age between 7–12 years old should be the group that acquires more attention from pharmacists. In terms of relationship between lengths of treatment after transplant with the understanding of indication of the medication, the longer the duration after transplant the more knowledge patients had. However, no specific relation was found. In term of the understanding of side effects, no relationship was found.

COMPARISON BETWEEN PUBLIC AND PRIVATE HOSPITAL PATIENT SATISFACTION WITH PHARMACY SERVICES AT OUTPATIENT DEPARTMENTS: A CASE STUDY IN KALASIN, THAILAND

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Patients' evaluation of care has become a prominent method of assessing the quality of health care services. With growing emphasis on consumerism and competition in the health care system, patients' assessments of care have been advocated as an essential component of quality assessment. Therefore, patients' satisfaction was assessed. The purpose of this cross-sectional descriptive study was to measure patients' satisfaction with outpatient medical services focusing on pharmaceutical care of Kalasin Hospital (public hospital) and Teerawat Hospital (private hospital), and to determine the opinions of stakeholders of both hospitals about the factors that patients felt most satisfied about. In addition, this study was designed to compare patients' satisfaction between both hospitals. Data

was gathered from 150 respondents at each hospital during February to April 2005 using interview with the Satisfaction with Pharmaceutical Services Questionnaire (SPSQ) translated to Thai language. Overall, the results revealed that almost all patients felt that pharmaceutical services were poor but patients' perceived satisfaction levels of Teerawat Hospital were higher than for Kalasin Hospital, significantly in the "physical attributes dimension" and "waiting time item". Patients' perceived satisfaction of Kalasin Hospital was significantly higher in "technical competence dimension" (believable and trustful pharmacists). Most dimensions of SPSQ strongly correlated with the satisfaction with pharmacy services ($r = 0.42–0.84$, $p<0.001$). Important factors from opinions of Kalasin Hospital stakeholders were explanation, consideration (waiting time, personnel and serviceable behavior) technical competence, physical attributes, medical supplies, operation and management system. Teerawat Hospital stakeholders thought the same as Kalasin Hospital except in explanation. The opinions of stakeholders at both hospitals correlated with SPSQ except in the "general dimension". SPSQ did not contain details about medical supplies, operation and management system. The suggestion from this study is that satisfaction of patients at the outpatient pharmacy services department of Kalasin and Teerawat hospital can be increased by improving many factors. Training and workshops for increasing technical skills, explanation and courtesy from the provider, better counseling to patients about how to use drugs, using new technology in the service system as well as providing pleasant, polite and friendly service will all contribute to increasing patients' satisfaction.

STUDENT AWARENESS OF COUNTERFEIT DRUGS IN AJMAN UNIVERSITY OF SCIENCE AND TECHNOLOGY NETWORK, FUJAIRAH CAMPUS

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Drug counterfeiting has steadily evolved from small-scale, opportunistic, activities in less regulated parts of the world to what has become a widespread global threat to consumers and brand owners. Informed estimates put the size of the annual global market in fake drugs somewhere in the region of US$30 billion, representing about 7% of pharmaceutical industry revenue. Even more alarming are results of surveys showing that counterfeit drugs in some countries comprise in excess of 50% of the market. These activities clearly put consumers at risk, threaten corporate and brand integrity, and generate significant cash for organized crime and terrorist groups (mafia). Even countries with highly regulated drug industries such as the United States (US) are not immune to the growing epidemic of fake drugs. Therefore, the presence of National Consumer League or any concerned body should provide information and alerts to consumers concerning counterfeit drugs. Educating people about the ways of counterfeiting drugs would participate in curbing faked drugs. Four hundred and eighty-three students requested to answer the questions pertaining to awareness amongst students. The results showed that 83.9% purchased prescription drugs. Twenty-four percent suspected the drug of being faked. When they were asked in such case, what to do; 56.1% would tell the doctor, 69% would tell the pharmacist and 52.6% would tell drug control agency. On the other hand, 24.4% did not want to do anything. Only 25.7% have an idea about drug counterfeit.

KNOWLEDGE OF ASTHMA AND ITS MANAGEMENT AMONG EDUCATIONAL STUDIES STUDENTS IN A UNIVERSITY AND IN A TEACHING COLLEGE

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Asthma is the most common chronic disease of childhood and is the main cause of school absenteeism. Improvement in teachers' knowledge has been shown to improve asthma in school

children. Earlier study found that school teachers had satisfactory knowledge on causes but not on the management of asthma. The study was aimed to assess the level of knowledge regarding asthma and its management among education students from a university and a teachers training college. Question-naires comprising 26 validated questions were distributed to students of educational studies from the School of Education, Universiti Sains Malaysia (USM) and students of Diploma of Education from the National Teachers Training College (NTTC), Pulau Pinang. The students were given one hour to complete the questionnaires. Data were analyzed using SPSS version 13. Appropriate statistics were used at 0.05 significant levels. Two hundred and ninety-eight USM and 220 NTTC students participated in the study. The results showed that both NTTC and USM students have inadequate knowledge on the causes and treatment of asthma. The study found that students from the NTTC have significantly better knowledge than USM students regarding the causes and treatment of asthma $p = 0.048$ and $p = 0.001$). NTTC students who have listened or read about asthma have better knowledge in both the disease and treatment of asthma ($p<0.05$). Previous exposure to asthma by having family or friends suffering from asthma, seeing patient suffering asthmatic attack and assisting patient during asthmatic attack did not affect the level of knowledge in both NTTC and USM students. We concluded that knowledge on asthma and its management among students from both NTTC and USM were inadequate. The topic on the disease-related management should be included in the education curriculum to improve teachers' knowledge on the disease and its management.

UNDERSTANDING OF PATIENTS AND THE PUBLIC ON TUBERCULOSIS AND IT'S TREATMENT

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INTRODUCTION: Several efforts have been taken but the incidence of TB is still not controlled. Tuberculosis (TB) is among the top ten causes of global mortality, it has been estimated that 8 million people are infected and 1.8 million deaths every year.

OBJECTIVE: To evaluate the knowledge of patient and the public on TB and its treatment. The findings can be used in strategic planning for TB campaign.

METHODS: 1) The prospective study was done in chest clinic, Dungun Hospital in January to March 2005 by distributing the formatted form and interview (patient who could not read) TB patients. (2) Distributing the formatted form to pharmacy out patient in Dungun Hospital (DH) and Kuala Terengganu Health Clinic (KTHC) for public evaluation.

RESULTS: This study involved 22 TB patients (15 male and 7 female) and 100 layman (53 female and 47 male). More than 70% of patients and public knew TB as a dry cough compared to other statements such as TB infected disease, TB cause pulmonary damage and smoking as a triggering factor. Majority of patients and public were aware (about 70%) about the TB symptoms and how TB spreads. Thirty percent of them said TB could spread through blood transfusion and 50% of patient said TB also could spread through food. The understanding and knowledge of patients and public were poor regarding drugs name. Fifty percent of patients and more than 70% of public did not know how long they should take the drugs and 70% of public were not sure about that also.

CONCLUSION: Eventhough the Ministry of Health has given a high priority to control the TB in the country, one of the major problems is the lack of awareness among public. More campaign and awareness programmes targeting the productive age layman must be established. Health care workers, especially those in the pharmacy division, must play a greater role in creating awareness about the disease, promoting early detection, and giving out patient and public education. The time

has now come for health care workers, patients and the public to participate and cooperate in TB control and eradication.

PREVENTIVE BEHAVIOR FOR DIABETES AMONG UNIVERSAL HEALTH CARE COVERAGE BENEFICIARIES

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BACKGROUND: The prevalence of diabetes mellitus (DM) screening is very low although this service is covered by the universal health care coverage program. This study described the variation in preventive behavior among universal health care coverage beneficiaries in rural communities of Thailand.

MATERIAL AND METHODS: Two hundred and eighty-nine benefi-ciaries aged 35–59 years were randomly interviewed using structural questionnaires. The questionnaires included personal history, knowledge and practices relevant to DM preventive behavior of the individuals.

RESULTS: About 38.75% of the beneficiaries had used the screening service for DM. One third was screened at sub district health centers and another third were screened at health mobile units. Need for screening and motivation from health practitioners were the major reasons of screening use (58.04% and 19.64%, respectively). Two third of the beneficiaries who had never used the DM screening ignored annual health care service and 6.21% of them feared the result of screening. For an intention to screen, some nonusers avoided the screening because of feeling of good health (33.33%), fear of screening (3.39%) and fear of the screening result (1.69%). However, others planned to be screened in the future and mostly planned to be screened at their health centers (53.21%), community hospitals (21.10%) and health mobile units (20.18%). The utilization rate, attitude toward health care and health personnel, awareness of the disease, and exercise preference in the user group were significantly greater than in the nonusers ($p<0.01$).

CONCLUSIONS: The beneficiaries who knew the disease, believed in their own susceptibility and believed in the benefit of early detection used preventive care service for DM. Health promotion campaign may encourage positive life style change and the involvement by pharmacist may increase positive perception of preventive practice. In future studies, pharmacist's role in primary care and community participation should be emphasized.

EVALUATION OF PUBLIC'S KNOWLEDGE ON SEXUALLY TRANSMITTED DISEASES (STDs) IN PULAU PINANG, MALAYSIA

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Sexually Transmitted Diseases (STDs) collectively rank among the five most important causes of healthy productive life loss in developing countries. Historically, knowledge about STDs has been very low even in communities where there is high prevalence of STDs. A study was conducted in Pulau Pinang, Malaysia to gather baseline information about public's knowledge of STDs and their sexual activity to help establish control and education programmes. A total of 150 people were surveyed. Convenient sampling technique was employed. Respondents were asked to complete self-administered and anonymous question-naires. Each questionnaire consisted of questions assessing

sociodemo-graphic and knowledge factors, sexual activity and history of STDs of the participants. The mean age of respondents surveyed was 28.7 years. The rate of people who claimed to be sexually active was 13.3%. Males were more sexually active than females. The sexual activity was significantly related to gender and race. Most respondents (55%) began sexual activity at age 15–19. Most of the sexually active respondents (35%) had number of sexual partners in the range of 3–5. Of all the respondents surveyed, 2.6% claimed that they ever had an STD. Mean score on the knowledge questions was 18.98 (highest score 41). The most widely known STD was HIV infection and AIDS (71.9%), followed by syphilis (69.3%) and gonorrhea (33.3%). Trichomoniasis was the least commonly known STD (2.6%). Respondents' knowledge of signs and symptoms and risk groups of STDs was insufficient and there were some misconceptions about these. Main sources of knowledge were newspapers/magazines (75.2%), followed by TV shows/magazines (49.7%), Internet (26.8%) and seminars (15%). The result of this study showed that public's knowledge on sexual health and STDs is insufficient.

ASSESSMENT OF PATIENTS' KNOWLEDGE AND MANAGEMENT OF ACUTE MYOCARDIAL INFARCTION IN HUKM

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Thrombolytics and protective secondary measures can increase patient survival after myocardial infarction (MI). This study was carried out in Hospital Universiti Kebangsaan Malaysia (HUKM) aimed to assess the patients' knowledge on the secondary prevention and management of acute myocardial infarction (AMI). In this study, 40 patients warded in HUKM post-myocardial infarction were conveniently sampled between January and April 2004 and interviewed using a standard questionnaire. Their level of knowledge was scored. Only 55% of the subjects had been counselled by the pharmacists regarding their medications. The topics patients did not know much about were the secondary prevention of MI (6%), the names of their drugs (22.5%) and what should be done if they forgot to take their medications (22.5%). However, there was no significant difference ($p>0.05$) in the total score of patients who had been counselled versus those who had not, although the level of education of patients significantly ($p<0.05$) influenced the total score. A majority (62.5%) of the patients scored a total of 50–74% while 10% had a score of below 50%. A total of 69.2% from 39 patients who survived MI had ST elevation myocardial infarction (STEMI) while 30.8% had non-ST elevation myocardial infarction (NSTEMI). In 91% of the cases, the "pain to needle time" was less than 12 hours. Thrombolytics were given based on the Malaysian Clinical Practice Guidelines 2001. Strepto-inase was given to 86.4% of the patients while 13.6% of patients received alteplase. A total of 68.4% of the patients who received streptokinase developed complications compared to 33.3% of those who received alteplase. The medi-ations patients were discharged with were antiplatelets (97.4%), beta blockers (84.6%), ACE inhibitors (87.2%) and statins (84.6%). The results suggest that there is a need for pharmacists to optimize their roles in providing patient education to coronary heart disease (CHD) patients and in the management of MI.

EFFECT OF WORKSHOP ON THE KNOWLEDGE OF DIABETIC PATIENTS ON DIABETES AND THERAPY

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It is well known that patient education and self-management are important elements in controlling chronic diseases including diabetes mellitus. The aim of the study was to evaluate the effectiveness of

a workshop in improving patient knowledge on diabetic management. The survey was conducted on diabetic patients before and after workshop. In this workshop, the patients are exposed to the knowledge of diabetic patient's rights, controlling and preventing of diabetic complications. This survey was carried out by distributing self-administered questionnaire forms to these patients. Patient's knowledge was evaluated based on their answers on the questionnaire form that covered knowledge on diabetic management and therapy. A total of 35 patients (age ranged 31–60 years old) with the majority of them Malays, participated in this study. The majority of these patients did not have significant family history of diabetes. It was found that their knowledge on diabetic management and therapy improved significantly ($p<0.05$) after the workshop. This showed that the workshop have given additional knowledge to the participants. The survey showed the workshop improved patients' knowledge on diabetic management.

AN EVALUATION OF NON-PRESCRIPTION DRUG PROMOTION ON PRINT ADVERTISING MEDIA IN INDONESIA

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Self-medication with non-prescription drugs is often the most sought after first level of care. The safety and efficacy of self-medication depends on the knowledge and skills in selecting medicines. Medication errors related to the use of non-prescription drugs can be particularly pronounced when consumers lack information or have limited reading skills. Unfortunately, most of users are more exposed to information from commercial source and are not properly equipped with the required practical skills to select medicines appropriately. A research was carried out to identify whether non-prescription drug promotion (included herbal medicines advertisement) on print advertising media in Indonesia fulfilled the regulation concern (Kepmenkes No 386 about drug promotion and Ethical Criteria for Medicinal Drug Promotion, WHO). This research also attempted to identify the type of information received by consumers. The study was conducted by accidental randomly selected 110 advertisement samples (a = 5% and d = 10%) collected from print advertising media in the years 2000–2004. Evaluation of data was carried out descriptively. The results of the study showed that only 1.8% non-prescription drug advertisements fulfilled the regulation. The types of information, which were received by consumers were on active ingredient(s) (80.9%), major indication(s) for use (98.2%), major precaution (9.1%), contra-indications (5.4%), side effects (20.9%), the name of the product or the brand name (100%), name of manufacturer or distributor (93.6%), address of manufacturer or distributor (45.5%), dosage (80.9%), and registration number (82.7%). Our findings showed that 27.3% of advertisements did not write the active ingredient(s) completely or not using INN (international non-proprietary name) to identify the name of the active ingredient. Meanwhile, 44.5% advertisements contained claims of product effectiveness that are unsupported by clinical or other scientific evidence. Some advertisements to the general public did not help people to make rational decision on the use of drugs. We also found drug advertisements, which were aimed for children. Some drug advertisements (herbal medicine advertisement) even promoted certain serious conditions that can be treated only by qualified health practitioner (e.g. cancer, hypertension).

MISCELLANEOUS

A STUDY ON DRUG CLASSIFICATION SYSTEM IN KOREA

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BACKGROUND: Reasonable drug classification is important for public health improvement through optimal drug use and reduction of drug expenditure. It is necessary to review individual drug classification status based on continuous evaluation with accumulated drug use experiences.

OBJECTIVE: The objective of this study was to suggest how to improve current drug classification system in Korea.

METHODS: tilisation pattern of prescription/non-prescription drugs and drug classification related regulations in Korea were investigated. Drug classification and reclassification systems in other developed countries (USA, UK and Japan), and classification status of specific drugs in each country were compared. In addition, opinions by representatives from relevant groups/organizations were collected.

RESULTS: Current drug classification is based on government's classification of 27,962 products into 17,187 prescription (61.5%) and 10,775 non-prescription (38.5%), and which has been developed for the implementation of separation of drug prescribing and dispensing in July 2000. Non-prescription drug proportion has gradually decreased since then. Non-prescription drug use for self-medication is increasing worldwide, and consumer demand for convenient purchase of non-prescription drug in Korea is increasing too. However, public awareness and cultural or health environments view, are more concerned with drug misuse and abuse rather than its advantages from broad supply of non-prescription drugs. Thus, the current two-category (prescription and non-prescription) drug classification is appropriate at the moment, while reclassification should be encouraged. The law allows drug reclassifi-cation, but product holders are not interested in the classification that have no impact on business, and regulatory reevaluation systems are also not affecting drug classification. These are the reasons why there has been no case of reclassification since 2000. Countries like the USA, UK and Japan also have two-category classification system. But in the UK, non-prescription drugs are subclassified into Pharmacy Drug and General Sale List Drug and reclassification for marketed drugs based on continuous drug reevaluation such as renewal system is encouraged. There are some drugs that have a certain classification in Korea but are categorized differently in other countries although the drugs are the same. The three-category classification system like in the UK is recommended to approach carefully under the long-term plan. The provision of information to the public and education to improve public knowledge on medications and the strengthening of self-medication guidance should be advanced to establish appropriate non-prescription drug consumption infrastructure.

CONCLUSION: To improve current drug classification system in Korea, we suggest that drug reclassification system be developed systematically through continuous drug management such as regulatory renewal, and that a detailed guideline on reclassification is established.

IMPORTANCE OF REVISION OF THE CODE OF ETHICS FOR PHARMACISTS TO SOLVE THE CURRENT ETHICAL PROBLEMS

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Compared to other professions, the health profession is highly specialized because it deals with medicine. It is important for a pharmacist to observe and to act along with the code of ethics for pharmacists. In order to contribute to the people truly through pharmaceutical supplies, every pharmacist in every workplace setting is required to perform their tasks with high levels of opinion and knowledge. Recently, the code of ethics of medical workers in Japan, and other countries were studied. We found that each code consists of the following four categories: (1) principles pertaining to patients (individuals); (2) common principles to be practiced; (3) special principles for each health profession; and (4) special principles for each country. The model of the code of ethics for pharmacists was created based on these studies. The model created may be applied to the code of ethics for pharmacists in each country. For instance, to solve the current ethical problems like the control of stimulants drugs and narcotics, prevention of sexually transmitted disease (STD), etc., the code of ethics for the new problems should be added to category 4. The revised code can adequately play the role. Generally, once the code of ethics is developed, it is left for many years so that the next revision may not be done for another 20–30 years. Therefore, the code of ethics should be revised regularly at least every 5–10 years. If the revised code of ethics is observed by pharmacists, they will be thought to have the newest and high level-consciousness to the people.

RELATIONSHIP BETWEEN ACID FAST BACILLUS (AFB) SMEAR TEST AND OTHER DIAGNOSTIC METHODS IN DETECTING TB CASES

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BACKGROUND: Tuberculosis is an infectious disease caused by bacteria from the *Mycobacterium tuberculosis* complex. It is estimated that there are 8.8 million new tuberculosis (TB) cases each year. Despite the continuing developments in TB diagnostic methods, acid fast bacillus (AFB) microscopic test method is still the most convenient especially in rural areas due to the low cost and the ease of handling by the laboratory technicians.

OBJECTIVE: To evaluate the relation between AFB test and other TB diagnostic methods.

METHOD: A total of 249 suspected cases from 3 hospitals and 5 clinics in Penang were subjected to the AFB test. These individuals were also checked to ascertain whether they were subjected to other TB diagnostic tests such as chest x-ray, culture, Mantoux test. Fourty-two cases were excluded for some reasons, while the rest (207 cases) who had complete medical records continued with the follow-up.

RESULTS: Out of the 207 suspected cases, 52 (25.1%) were diagnosed as TB cases. Of the 52 cases, 29 (55.8 %) had positive CXR. Sixteen (55.2%) of the 29 specimens were of good quality and the remaining 13 (44.8%) were of poor quality; however only 11 (68.8%) out of the 16 specimens were positive for both AFB and CXR. Only 2 (15.4%) out of 13 for which the sputum specimen was of low quality were found to be positive for both AFB and CXR. The culture results showed that 8 (15.4%) of the 52 cases were positive. However, only 4 (50%) of the 8 were positive for both AFB and culture. In comparison to the Mantoux test, none of the cases (23) were found to be positive for both AFB and CXR.

CONCLUSION: AFB smear test is still considered as a reliable test for the diagnosis of TB especially in the presence of a good quality specimen.

PATTERN OF ANTIMICROBIAL RESISTANCE IN THE INTENSIVE CARE UNIT, HOSPITAL UNIVERSITI SAINS MALAYSIA, KUBANG KERIAN, KELANTAN IN YEAR 2004

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The distribution of antimicrobial resistant pathogen changes with time, and varies among hospitals and among different locations in the hospital. The objectives of this study were to identify the common microbial isolates in the intensive care unit of Hospital Universiti Sains Malaysia and their resistance patterns in 2004. The WHONET 5.2 software was used to collect the data. Data was taken for the first 10 months of 2004. SPSS versions 10.0 was used to analyze the data. The most common isolates found in 2004 were *Acinetobacter* species, *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Klebsiella* species and *Pseudomonas aeruginosa*. The common bacterial strains found were MRSA (53.4%); MRSE (56.8%); ESBL-producing *Klebsiella* species (63.6%); *Pseudomonas aeruginosa* resistant to ceftazidime (46.4%); imipenem (50%); *Acinetobacter sp*. resistant to imipenem (78.3%); and 90% resistant to third generation cephalosporins. Periodic area-specific antimicrobial surveillance is vital to identify the emergence of bacterial resistance and to assist physicians to initiate appropriate antimicrobial therapy. Clinical pharmacists can play a bigger role in the selection of antibiotic according to the emerging bacterial resistance pattern thus, avoiding the misuse of antibiotics in ICU setting.

CASE REPORTS

GRANISETRON FOR PROPHYLACTIC TREATMENT OF EMESIS INDUCED BY CISPLATIN AND TAXOTERE CHEMOTHERAPY: A CASE REPORT

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A new class of anti-emesis, the 5-hydroxytryptamine 3 receptor (5-HT3 receptor) antagonists, recently has been developed. These drugs were initially found to prevent vomiting due to cisplatin a chemotherapeutic drug with strong emetic effect but subsequent clinical studies have shown that 5-HT 3 receptor antagonist s are also effective in controlling vomiting induced by other anti cancer drugs and radiotherapy. A 45 year-old Malay female was admitted for her first cycle of cisplatin and docetaxel chemotherapy treatment for her right breast cancer. She has been diagnosed to have right side medullary breast cancer. Her breast cancer was surgically treated followed by radiation three years ago. Her chemotherapy regime was adriamycin and cyclophosphamide. Surgical biopsy showed no residual tumour and no lymph nodes involvement. Chest x-ray, abdomen ultrasonography and mammography showed no evidence of metastasis. Fine Needle Aspiration Cytology showed no diagnostic material. She complained of pain of her chest and back. A bone scan revealed an infiltration to the sixth rib of sternum. CT-thorax showed there was a soft tissue mass at the right anterior chest wall involving the pectoralis major muscle. The diagnosis was recurrent cancer with early metastasis. On this regime, cisplatin was given 110 mg in 1 L normal saline for 3 hours and Taxotere 110 g in 500 ml for one hour. Intravenous granisetron 3 mg with IV dexamethason

8 mg and dexamethason tablet 4 mg QID were given half hour before chemotherapy. Other medications given included voltaren tablet 50 mg TDS, lactulose syrup 20 ml ON. During this chemotherapy, the patient was generally comfortable and did not complain of any nausea and vomiting. One day after this cycle, the patient complained of constipation and headache. It was considered to be the side effect of granisetron. Cisplatin and Taxotere chemotherapy is effective in breast cancer but the side effects of this treatment include potentially debilitating nausea and vomiting. Successful anti emetic therapy can enable patients to receive chemotherapy to maintain nutrition intake and improve their quality of life.

UNCONTROLLED HYPERTENSION SECONDARY TO GASTROPARESIS-INTERFERING MEDICATIONS ABSORPTION: A CASE REPORT

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Gastroparesis is a problem of delayed gastric emptying, which is one of diabetes mellitus (DM) complications. One of gastroparesis complications is interfering with oral absorption of medications. The objective of this communication is to discuss a case of uncontrolled hypertension secondary to gastroparesis-interfering oral medications absorption. A 52 year-old Indian male was presented to the hospital on December 23, 2004 with chief complaints of nausea and vomiting especially after taking meals, which increased in severity four days prior to hospitalization. He has been diagnosed with gastroparesis since April 2004. His other medical problems included diabetes mellitus (DM), hypertension (HTN), ischemic heart disease and chronic renal disease. He was treated with oral medications for his medical problems and metoclopramide 10 mg IV, TDS for his gastroparesis. The patient's vital sings were stable except his blood pressure, which increased since day-2 of hospitalization despite that vomiting and nausea were diminished. He was discharged with uncontrolled HTN. His uncontrolled hypertension is suspected to be due to gastroparesis-interfering with oral absorption of antihypertensive medications. This is due to the fact that his fluid status was normal and his oral antihypertensive medications prescribed were sufficient. Metoclopramide was found to be insufficient to treat his gastroparesis. Thus, erythromycin which is a potent pro-kinetic should be considered for short duration of therapy. In conclusion gastroparesis may interfere with oral absorption of medications and cause a significant therapeutic failure.

AMPHOTERICIN B-INDUCED PERSISTENT HYPOKALAEMIA IN ACUTE RENAL FAILURE PATIENT

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We report a case of amphotericin B-induced persistent hypokalemia in acute renal failure patient secondary to snake bite. A 55 year-old Chinese man who was hyperkalemic (K^+6.3 mmol/L) and on renal replacement therapy for his acute renal failure due to systemic envenomation with sea snake bite developed persistent hypokalemia after the administration of amphotericin B, which not responded to correction with potassium supplement. It is well documented in the literature that amphotericin B-induced hypokalaemia in normal renal function patient showed a good response after potassium supplementation. In this patient hypokalemia was not resolved although discontinuation of amphotericin and the addition of potassium supplementation. In conclusion it was found that, patient who developed renal failure secondary to snake bite is more sensitive to amphotericin B-induced hypokelemia. Close monitoring and sufficient potassium supplement are necessary to prevent severe hypokalemia. If hypokalemia still persists, discontinuation of the medication should be considered.

INAPPROPRIATE MANAGEMENT OF DIABETIC FOOT INFECTION

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INTRODUCTION: Foot infections in patients with diabetes cause substantial morbidity and frequent visits to health care professionals and may lead to amputation of lower extremity. The major predisposing factors to these infections are foot ulceration, peripheral vascular disease and various immunological disturbances.

CASE REVIEW: A 46 year-old Indian man with history of diabetes mellitus for 10 years (type II) and pulmonary tuberculosis (PTB) was presented to the hospital on March 2005 due to multiple discharging sinus on lower limb along with numbness and paresthesia. The patient claimed to be having cough with greenish-yellow sputum and occasional blood streak for around 20 days prior to hospitalization, shortness of breath on exertion and fever. On day 1, the patient developed skin rashes after receiving 2/3 dose of cloxacillin. The patient's vital signs were stable except for his body temperature, which was persistently high (feverish) during the course of hospitalization. On admission, renal function tests were normal for both serum creatinine and urea. Although the patient was on insulin therapy and despite the use of sliding scale, strict diabetic diet, the dilemma of erratic glucose control continued during the course of hospitalization.

DISCUSSION: Initial antimicrobial treatment of limb-threatening infections requires broad-spectrum antibiotics because these infections are frequently polymicrobial in nature. The patient was given IV cloxacillin plus IV Unasyn®. Since both are of the penicillins group and no major differences exist between their coverage, there is no rationale of their simultaneous use. Cefuroxime (Zinacef®) was also given for three days but was later discontinued. Other antibiotics prescribed were Flagyl® and erythromycin but the fever persisted.

CONCLUSION: Inappropriate choice of antibiotic as well as the wound care techniques applied in the management of this case was inadequate.

DIAGNOSTIC AND MANAGEMENT CHALLENGES IN THE TREATMENT OF BLOOD CULTURE NEGATIVE INFECTIVE ENDOCARDITIS: A CASE REPORT

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Blood Culture Negative Infective Endocarditis (BCN-IE) ranges from 5–27% of the total incidence of infective endocarditis (IE), could be because of prior administration of antibiotics, inappropriate handling of the sample before culture, or because of fastidious organisms that require incubation period more than 48–72 hours. We report a case of BCN-IE in a 15 year-old Malay male with a history of Tetralogy of Fallot (TOF), who was admitted for the correction of TOF. He presented with fever, SOB, malaise and vegetation on tricuspid and mitral valve. His condition was diagnosed as IE and he was initially treated with penicillin and gentamicin combination. Although there were no culture positive reports available, several other antibiotics were later added to his regimen. His fever did not settle during his one-month stay in the ward but no attempts were made to send the culture for fastidious organisms and using prolong incubation techniques. Penicillin often in combination with gentamicin, remain the cornerstone for empiric therapy because the most likely causative organisms are Gram positive cocci (30–40%). However, the use of ampicillin-sulbactam (Unasyn®) in combination with gentamicin gives better coverage against anaerobes. Ceftriaxone (Rocephine®) 2 g/day for 4 weeks as well as vancomycin with gentamicin are also recommended for BCN-IE. Special

diagnostic techniques such as broad-spectrum polymerase chain reaction (PCR), or in non-autonomic traditional blood culture system with longer incubation period (>6 days) should be considered. Pharmacist should play their role in the rational use of antibiotics as well as use of proper diagnostic techniques in challenging situations like this.

TREATMENT ERROR LEADS TO DECOMPENSATED LIVER CIRRHOSIS IN WILSON'S DISEASE: A CASE REPORT AND LITERATURE REVIEW

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A 33 year-old Chinese female was diagnosed as having Wilson's disease in a private hospital. Penicillamine tablet 250 mg OD was prescribed. However, intolerance developed and therapy was discontinued without alternative treatment. Five months later, she developed decompensated liver cirrhosis with hepatic encephalopathy. Upon admission to the general hospital, the physician planned to start Trientine, which is an alternative for penicillamine. However, Trientine is not a registered medicine in Malaysia. Application for Trientine supply needs at least 3 months. She finally died of sepsis and decompensated liver failure. Chelating agent is the mainstay of treatment in Wilson's disease, which is an inherited disorder of hepatic copper metabolism. Therapy must be instituted and continued for life once diagnosis is confirmed. Interruption of therapy can be fatal or cause irreversible relapse. D-Penicillamine is the chelating agent of choice. However, its unfavourable side effects profile leads to discontinuation of therapy in 20–30% patients. In most case reports, cessation of penicillamine without replacement treatment cause rapid progression to fulminant hepatitis, which is fatal unless liver transplantation is performed. In this case, discontinuation of penicill-amine was not replaced by Trientine. As a result, this patient's conditions deteriorated drastically within five months. One recent study supports the combination therapy of Trientine and zinc in patients with decompensated liver cirrhosis. This combination is capable to reverse the liver failure and prevent the need of liver transplantation. However, zinc is also not a registered medicine in Malaysia. Therefore, liver transplan-tation is the only treatment option for this patient.

PERSISTENT HYPERTENSION POST-NOREPINEPHRINE THERAPY IN A SEPTIC SHOCK PATIENT WITH DIABETIC KETOACIDOSIS

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Septic shock patients usually require a potent vasoconstrictor such as norepinephrine (NE) to increase blood pressure (BP). So far, there have been no reports of NE and post-NE therapy induced persistent hypertension in septic shock patients. The objective of this communi-cation is to document a case of persistent hypertension post-NE therapy in a septic shock patient with ketoacidosis. MNN was a 41 year-old Malay male, admitted to the general intensive care unit of Hospital Pulau Pinang on March 30, 2004 due to septic shock and diabetic ketoacidosis. On admission, the patient's blood pressure was 70/50 mmHg. Norepinephrine was given for 3 days with dosage (ug/kg/min) of 0.2 for Day 1 (Dl), 0.12 (D2), 0.04 (D3). His BP increased to 140/78 mmHg on Day 3. However, after discontinuation of NE, his BP continued to increase until it reached a maximum of 180/108 mmHg on D6. His BP remained above 160/100 mmHg from D7 to Dll. Enalapril, metoprolol and frusemide were added to control the BP during this period. The patient was discharged home with oral enalapril 7.5 mg bd. Renal and liver did not contribute to this problem since both organ functions were within normal range. Other medications (ranitidine, Vitamin K, antibiotics, antifungal, insulin, midazolam and morphine) that the patient received were not likely to cause hypertension. Even

though NE is a vasoconstrictor it has a short-half life. Thus, the raised in BP was suspected due to the patient's underlying hypertension. Slight increase in the hydration status also contributed to the increase in BP. In conclusion, NE is not likely to cause hypertension. The patient's underlying hypertension and intravascular volume contributed to the persistent hypertension.

PERSISTENT/RECURRENT FEVER DURING TREATMENT OF INFECTIVE ENDOCARDITIS: A CASE STUDY

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Infective endocarditis (IE) is the infection of the endocardium commonly affecting the heart valves. The fever associated with IE usually resolves within three days after initiation of drug therapy, and defervescence occurs in 90% of patients by the end of the second week of treatment. A 29 year-old Chinese female was referred from a private institution for recurrence of IE symptoms. She experienced intermittent spiking fever during the course of treatment. The initial spike of the fever was related to both the extensive infection of the valve ring and/or treatment failure. This was shown by multiple progressions of mitral valve vegetations on echocardiography and the fever subsided when penicillin was substituted with ceftriaxone, respectively. The later episode of spiking fever was most probably due to drug hypersensitivity reaction and/or thrombo-phlebitis as it coincided with the occurrence of rashes and thrombo-phlebitis in this patient, which resolved spontaneously on withdrawal of ceftriaxone. Based on literature findings, the most common cause of persistent fever in IE patient is extensive infection of the valve ring. Recurrent fever, the main type of fever during the third and fourth treatment weeks, was caused by hypersensitivity reaction to β-lactams. The delayed adverse reactions during β-lactam treatment of ≥ 10 days were recurrent fever in 28% and rash in 13% of IE patient. In conclusion, the cause of persistent/recurrent fever in IE patient should be identified so that appropriate measures can be undertaken to optimize patient outcome.

INAPPROPRIATE ANTIBIOTIC USE IN THE MANAGEMENT OF LEPTOSPIROSIS WITH HEPATORENAL SYNDROME: A CASE REPORT

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OBJECTIVE: To report a case of inappropriate use of antibiotics in the management of a patient with leptospirosis with hepatorenal syndrome.

CASE SUMMARY: A 61 year-old Indian man with a history of jungle trekking was diagnosed with probable leptospirosis infection in view of pneumonia, hepatorenal syndrome and low platelet. While in the chest ward, the patient was treated with vancomycin due to growth of coagulase negative staphylococcus (CNS). Other antibiotics included ceftazidime, doxycycline and C-penicillin. There was no growth of MRSA or pseudomonas. Upon discharge, renal function, liver function and platelet count were still not fully optimized. Patient was also still complaining of cough and abdominal pain, which could be a manifestation of phase 2 of leptospirosis. Patient was discharged home despite these conditions and without first obtaining the serology results.

DISCUSSION: The incidence of resistance to vancomycin is increasing and the widespread use of vancomycin has led to the emergence of CNS isolates with reduced susceptibility to vancomycin. Both C-penicillin and doxycycline have the same spectrum of coverage, i.e. it covers gram positive, negative and atypical organisms. Sodium penicillin G is also recommended as the standard

antimicrobial agent for the treatment of moderate-to-severe leptospirosis, whereas doxycycline is usually used as either prophylaxis, or treatment of mild leptospirosis.

CONCLUSIONS: Reducing inappropriate antibiotic use is the best way to control the emergence of resistance. Patient should be taken off doxycycline and vancomycin, and started on gentamycin and cefuroxime for eradication of CNS infection. As far as possible, vancomycin use should be reserved for MRSA infections, whereas ceftazidime should be reserved for pseudomonal infections.

WARFARIN-PARACETAMOL INTERACTION INDUCED BLEEDING: A CASE REPORT

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We present a case of severe bleeding induced by warfarin interaction with acetaminophen. A 30 year-old Malay female was admitted due to cough and flu-like symptoms for 4 days. She is a known case of valvular heart disease with MVR and was on warfarin tablet 8 mg since then. All the while her INR was around 4 sec (PT was 51 sec and APTT was 52 sec) and hemoglobulin was 15 g/dL. During admission she was treated empiri-cally for 1–3 days with Augmentin® (PO) and doxycycline (PO) and followed by Unasyn® (PO). These medications were stopped after culture and sensitivity results were known. After paracetamol (PCM) 1 g QID was given for high-grade fever, the patient developed internal and external bleeding (gum bleeding), body hematoma and heavy menstrual period with INR 6.4 sec (PT was 80.2 sec and APTT was 62 sec) and hemoglobulin 8.4 g/dL. The antibiotics that patient received were not likely to cause bleeding, because these medications were given in short duration and the bleeding episode occurred after the antibiotics were stopped. PCM was suspected because bleeding occurred while she was on this medication; Naranjo algorithm (drug-adverse effect relationship) revealed that this effect is probable. There are many reports that documented warfarin-PCM enhanced bleeding tendency. In conclusion the risk of warfarin-PCM induced bleeding is clinically significant and special precaution should be taken in patients with high risk of bleeding.

ALLERGIC REACTIONS ASSOCIATED WITH CIPROFLOXACIN: A CASE REPORT

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We report a case of severe allergic reaction associated with ciprofloxacin. A 30 year-old Malay female was admitted due to cough, flu-like symptoms and low-grade fever for 4 days. She had a history of penicillin and aztreonam allergy. She was diagnosed with chest infection and was started empirically on Augmentin® (PO), doxycycline (PO) and Unasyn® (PO). On day 4, her culture and sensitivity test showed that she was infected with *Pseudomonas* sp. All antibiotics were stopped and she was started with ciprofloxacin 250 mg twice daily (PO) for 1 week. Unfortunately, the patient developed allergic reactions manifested by dyspnea, vomiting, urticaria and high-grade fever. The drug was stopped, but the vomiting stayed until the second day and fever persisted for 3 days. Ciprofloxacin was suspected to cause allergic reaction since there was no other drug given at that time that could cause the allergic reaction. Furthermore, the reactions developed just after 30 minutes of the first dose. Assessment using the Naranjo algorithm (drug-adverse effect relationship) revealed that this effect is definite. Even though there are reports documenting ciprofloxacin causing allergic reactions, no desensitization has been done for the patient who is already allergic to some β-lactam antibiotics. In conclusion, although ciprofloxacin allergic reaction rarely happens (less than 1:1000 rate), it could be life threatening. If ciprofloxacin needs to be used in this kind of patient, desensitization protocol should be followed which could be life saving.