PHARMACEUTICAL TOXICOLOGY RESEARCH DIVISION

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The Pharmaceutical Toxicology Research Division, established under National Poison Control Centre, involves in 3 major area activities: to conduct research projects on drug-related poisoning and toxicity, to provide information and analytical services to the health sector on prevention, control and management of drug poisoning, and to conduct education and training to health personnel concerning poisoning and toxicology. Provision of services includes drug screening and identification in cases of unknown poisoning, quantification of drug levels to support treatment in cases of acute poisoning and provision of poison information to medical doctors and health care professionals in selected major hospitals for poison control and management.

RESEARCH PROJECTS

1. ENVIRONMENTAL HEALTH

1.1. POISON EPIDEMIOLOGY

1.1.1. Monitoring of poisoning cases at Poison Treatment Centre, New Yangon General Hospital (2016)

Epidemiological studies on poisoning are done with the aim to increase the awareness, understand the potential public health impact, establish causal links between exposure and disease and preparedness of laboratory diagnostic methods and clinical management schemes. Registry from the Department of Hospital Records and Poison Treatment Centre, New Yangon General Hospital, diagnosed and treated as poison cases, categorized under ICD-10, T36 to T65, basic codes 284 and 285 were collected and analyzed. Out of total admissions in the year 2016, 14.6% (1084/7445) were identified as poisoning. Acute poisoning is mainly seen in the young adults (18-25 years) 44%(472/1084) followed by working age group (26-40 years) 28% (306/1084), and it is the same for last three years.

Female were more likely than males to report acute poisoning in 2016 (63.5%, 688/1084 vs. 36.5%, 396/1084) similar to previous years. Most of the poisoning cases were dependents, including students, 45.7% (496/1084) followed by those who run their own business 30.6% (332/1084) which is the same as the last three years. Most patients 87.3% (946/1084) recovered and were discharged without undue consequences. Mortality rates due to acute poisoning for last three years were more or less around 3% but in 2016, it increased to 4.15% (45/1084) in spite of treatment. The main cause of poison mortality for 2016 was insecticide poisoning (37.8%; 17/45) followed by herbicide poisoning (28.9%; 13/45). The trend of poisoning cases was shown in the table below.

Year	**2013**	**2014**	**2015**	**2016**
Total Admission to NYGH	7727	7071	6980	7445
Total Admission to Poison Treatment Centre **(%)**	820 (10.6)	805 (11.4)	1034 (14.8)	1084 (14.6)
Drug Poison				
Analgesic (Paracetamol, Aspirin, Diclofenac etc.)	93	76	112	123
Antihistamine(Chlorpheneraminemaleate, Cetrizine, Cyproheptadine etc.)	147	156	173	179
CNS drug (Benzodiazepine, Escitalopram etc.)	61	72	78	87
Narcotic (Opioid, Amphetamine, Methadone etc.)	-	-	14	29
Vitamins and Minerals	-	-	12	7
Slimming Drugs	-	-	4	1
Traditional Medicine	10	12	7	8
Unknown	96	56	55	66
Antihypertensive	-	-	-	12
Mixed drug	-	-	-	21
Others (antibiotics, anticancers, CVS drugs, Lipid lowering drugs)	17	48	52	29
Chemical Poison				
Herbicide	-	24	24	23
Insecticide	94	76	139	190
Rodenticide	85	95	94	52
Corrosive (acids)	22	24	30	35
Alcohol derivative (methanol, methylated spirit)	51	53	51	74
Petroleum derivative (diesel, gasoline, kerosene)	11	16	25	14
Household chemicals (thinner, detergent)	47	48	65	75
Gas (CO, cyanide)	8	18	22	24
Others	-	-	-	6

1.2. ANALYTICAL PHARMACOLOGY

1.2.1. Pharmaceutical equivalence and bioequivalence of three brands of Levofloxacin tablets in healthy volunteers

This study was performed to compare pharmaceutical quality, in vitro dissolution test and oral bioavailability of the three brands (high price, medium price and low price) of Levofloxacin in Myanmar. For pharmaceutical equivalence, pharmacopeial tests (uniformity of weight, content of active ingredient, uniformity of content, disintegration, dissolution tests) and non pharmacopeial tests (tablet hardness, length, width and table thickness) were done. General appearance and physical characteristics of all three brands were consistent and lied within the acceptable range of pharmacopeial specifications (BP, USP). The UV and FTIR spectra obtained from three brands of levofloxacin tablets were also comparable with standard levofloxacin spectrum. For bioavailability study, three brands of levofloxacin 500 mg were given to eight healthy volunteers with two weeks wash out period and plasma concentrations were measured using HPLC-UV method. The plasma concentration-time data were found best fitted to one-compartment model with first-order kinetics. The pharmacokinetic parameters were not significantly different among three brands indicating that they have comparable bioequivalence. But there is great difference in price (900 kyats, 400 kyats, 100 kyats) for these three brands. The finding of this study helps the clinicians in choosing the drug with same efficacy at a cheaper price.

Brand	**Pharmacokinetic Parameters of Levofloxacin** (mean±SD)						
	C_{max} (µg/mL)	T_{max} (hr)	$T_{1/2ab}$ (hr)	$T_{1/2el}$ (hr)	AUC_{0-25} (µg/mL.hr)	V_d (L)	CL (L/hr)
Levo-denk	8.32±2.60	1.31±0.37	0.43±0.16	7.84±3.19	84.72±25.24	69.25±25.36	5.82±2.85
LVZ	7.18±1.55	1.44±0.18	0.50±0.20	8.39±2.49	90.72±39.54	59.58±18.93	5.33±2.77
Livox	8.60±2.25	1.25±0.38	0.66±0.24	7.62±1.79	89.93±29.08	66.75±28.16	5.47±1.95

SERVICE PROVIDED

1. ACADEMIC

Sr.	Name	Course	Responsibility
1.	Dr. Min Wun	Post-graduate students (MMedSc, MPharm) 1st year MMedSc (Pharmacology) 1st year MMedSc (Med: Juris) 1st year MPharm 1st year MNSc 2nd year MMedTech Research Methodology	Examiner/ Supervisor/ Co-supervisor / Teaching, Training Lecturer
2.	Dr. Khin Hnin Pwint	1st year MMedSc (Pharmacology) 1st year MMedSc (Med: Juris) 1st year MPharm 1st year MNSc 2nd year MMedTech	Teaching, Training
3.	Daw Moe Moe Aye	1st year MMedSc (Pharmacology) 1st year MPharm	Teaching, Training

2. LABORATORY

2.1. Screening and analysis of drugs and other poisons from biological and non-biological samples in acute poisoning

Laboratory services to 422 patients on screening and analysis of drug poisoning has been provided to hospitals including unknown poisoning 61.1% (258/422) and serum paracetamol concentration 38.9% (164/422).These tests were done for 831 blood samples and 460 urine samples. Requests for screening and identification were mainly from the Poison Treatment Centre, NYGH and some requests from Yangon General Hospital, Yangon Children Hospital, Yankin Children Hospital, 500-beded specialist Hospital and No (2) Military Hospital.

2.2. Poison Information Services

Pharmaceutical Toxicology Research Division is actively involved in poison information service to provide appropriate informative answers to the clinicians and the public throughout the country.