PHARMACEUTICAL TOXICOLOGY RESEARCH DIVISION

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The Pharmaceutical Toxicology Research Division, established under NPCC, 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 doctors and health care professionals in selected major hospitals for poison control and management.

RESEARCH PROJECTS

1. ENVIRONMENTAL HEALTH

1.1 PHARMACO-EPIDEMIOLOGY OF POISONING

1.1.1 Monitoring of poisoning cases at New Yangon General Hospital (2011 to 2015)

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 Center, 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 2015, 14.8% (1034/6980) were identified as poisoning. Acute poisoning is mainly seen in the young adults (18-25 years) 43%(445/1034) followed by working age group (26-40 years) 31% (318/1034), and it is the same trend for five consecutive years. Female were more likely than males to report acute poisoning in 2015

(62.6%, 647/1034 vs. 37.4%, 367/1034) similar to previous years. Most of the poisoning cases were dependents 29.7% followed by those who run their own business 27.7% which is the same as the last four years. Although most patients 83.3% (861/1034) recovered and were discharged without undue consequences, 2.6% (27/1034) expired in spite of treatment. Mortality rates due to acute poisoning across five years (2011-2015) were more or less similar around 3%. The main cause of poison mortality for 2015 was herbicide poisoning (8/27; 29.6%) followed by pesticide poisoning (5/27; 18.5%). The trend of poisoning cases was shown in the table below.

Year	**2011**	**2012**	**2013**	**2014**	**2015**
Total Admission to NYGH	6120	6736	7727	7071	**6980**
Total Admission to Poison Treatment Centre	511	597	820	805	1034
(%)	**(8.3)**	**(8.9)**	**(10.6)**	**(11.4)**	**(14.8)**
Drug Poison					
Analgesic (Paracetamol, Aspirin, Diclofenac etc.)	60	70	93	76	112
Antihistamine(Chlorpheneramine maleate, Citrizine, Cyproheptadine etc.)	93	96	147	156	173
CNS drug (Benzodiazepine, Escitalopram etc.)	67	117	61	72	78
Narcotic (Opioid, Amphetamine, Methadone etc.)	-	-	-	-	14
Vitamins and Minerals	-	-	-	-	12
Slimming Drugs	-	-	-	-	4
Traditional Medicine	11	13	10	12	7
Unknown	37	46	96	56	55
Others	48	16	17	48	52
Chemical Poison					
Herbicide	-	-	-	24	24
Pesticide	50	37	94	76	139
Rodenticide	33	26	85	95	94
Corrosive (acids)	-	-	22	24	30
Alcohol derivative (methanol, methylated spirit)	-	-	51	53	51
Petroleum derivative (diesel, gasoline, kerosene)	-	-	11	16	25
Household chemicals (thinner, detergent)	-	-	47	48	65
Gas (CO, cyanide)	-	-	8	18	22
Others	99	145	-	-	-

1.2. ANALYTICAL PHARMACOLOGY

1.2.1. Bioavailability study of locally formulated Carvedilol tablet and market sample in rabbit

This study was performed to compare pharmaceutical quality, in vitro dissolution test and oral bioavailability of the locally formulated carvedilol tablet (sample B) with a market sample (sample A) using a rabbit model. Quality parameter tests were done according to United States Pharmacopoeia. Although the disintegration time of locally formulated carvedilol was very fast, the results of both samples were within limits. The percent content was determined by UV-Vis Spectrophotometric method and the mean assay contents in sample A and B were 98.61%±0.6409 and 102.71%±1.4686 respectively. The bioavailability study of these samples was done using six rabbits. The C_{max}, T_{max}, K_{el} and $t_{½el}$ of sample A were 798±19.88 ng/mL, 1.5hr, 0.27±0.01 h^{-1} and 2.53±0.11 hr respectively and sample B was 807.8±23.96 ng/mL, 1.5hr, 0.26±0.01h^{-1} and 2.62±0.06 hr respectively. The area under the

concentration-time curve ($AUC_{0\text{-last}}$) and ($AUC_{0\text{-}\alpha}$) for sample A were 3597.16±170.98 ng/mLhr and 4078.11±205.69 ng/mL hr respectively and for sample B, 3833.02±255.26 ng/mL hr and 4302.89±445.19 ng/mL hr respectively. Therefore, there were no significant differences between the pharmacokinetic parameters of the samples.

SERVICES PROVIDED

1. ACADEMIC SERVICES

Sr	Name	Course	Responsibility
1.	Dr. Min Wun	Post-graduate students (MMedSc, MPharm)	Examiner Supervisor
		1st year MMedSc (Pharmacology)	Co-supervisor
		1st year MMedSc (Med: Juris)	Teaching
		1st year MPharm 1st year MNSc	Training
		Workshop on Research Methodology (2015)	Lecturer
2.	Daw Moe Moe Aye	1st year MMedSc (Pharmacology) 1st year MPharm	Teaching, Training

2. LABORATORY SERVICES

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

Laboratory services to 283patients on screening and analysis of drug poisoning has been provided to hospitals including unknown poisoning 60.4% (171/283) and serum paracetamol concentration 39.6% (112/283). These tests were done for 751 blood samples and 235 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, No.(2) Military Hospital, North Okkalapa Hospital and Thingangyun Sanpya 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.