PARASITOLOGY RESEARCH DIVISION

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Parasitology Research Division has been linked with National Malaria Control Program to fulfill the research needs to solve the priority disease problem of National Health Plan, mainly on anti-malarial drug resistant studies and molecular analysis. Parasitology Research Division is now taking responsibility to do molecular analysis of the samples collected from nationwide sentinel sites under "Malaria Indicator Survey". Parasitology Research Division is the only place capable of testing *in vitro* sensitivity of antimalarials. Real time reporting to NMCP focusing on therapeutic efficacy status of currently using drugs and updated molecular information has been made through strong collaboration with WHO and University of Maryland.

RESEARCH PROJECTS

1. COMMUNICABLE DISEASES

1.1 MALARIA

1.1.1 DRUG RESISTANT MALARIA

1.1.1.1 New surveillance tools for malaria elimination in Myanmar

For this project, sample collection surveys were conducted during September 2015 from proposed 3 study sites namely Shwe Kyin, Madaya, and Buthidaung. From each study site, 200 samples of whole blood and filter paper samples were collected via finger prick of apparently healthy persons. DMR is taking responsibility to do molecular analysis of all samples collected from different study sites by different collaborating partners (DMR, MMA, CPI, Burnet, and PSI). A total of 1791 whole blood and 1788 filter paper samples were properly registered and stored at (-80°C). Ultra sensitive quantitative PCR (USqPCR) method (Level of Detection = 16 parasite/mL) was applied to detect asymptomatic parasitemia. Percent of infected samples with any malaria detected by USqPCR, among 9 study sites varied in the range of 1.0% - 23.2%.

Malaria positivity at DMR 3 study sites detected by RDT and USqPCR

Study site	Positivity by RDT				Positivity by USqPCR			
	P.F	PV	Mixed PF+PV	Total infected	PF	PV	Mixed PF+PV	Total infected
Shwe Kyin (n=200)	1 (0.5%)	2 (1%)	0	3 (1.5%)	1 (0.5%)	3 (1.5%)	0	4 (2%)
Madaya (n=200)	0	0	0	0	1 (0.5%)	7 (3.5%)	1 (0.5%)	9 (4.5%)
Buthidaung (n=200)	0	0	0	0	9 (4.5%)	26 (13%)	2 (1%)	37 (18.5%)
Combined (n=600)	1 (0.16%)	2 (0.33%)	0	3 (0.5%)	11 (1.83%)	36 (6%)	3 (0.5%)	50 (8.33%)

1.1.1.2 Pilot studies of the molecular epidemiology of drug-resistant malaria in Myanmar (2013-2015)

Field surveys were carried out to Kawthaung township during February 2015 and to Buthidaung township during September 2015 for recruitment of study participants. Clinically suspected malaria cases were screened for malaria infection by RDTs (Rapid Diagnostic Test) and confirmed by microscopy. In Kawthaung study sites, out of 520 screened cases, 27 cases (5.2%) showed malaria parasite positive. *Plasmodium falciparum* contributed 12 cases and *P.vivax* was 15 cases. Confirmed *P. falciparum* with parasite count $\geq$10,000/mm^3 were selected for the study. In Buthidaung study site, 930 clinically suspected malaria cases were screened for malaria infection. There were 42 malaria positive (4.5%), 25 cases of *P.falciparum* and 17 cases of *P.vivax*. Total 37 criteria matched participants (12 from Kawthaung and 25 from Buthidaung) were recruited for the study. Capillary blood samples from enrolled patients were collected on to the filter papers. Collected 37 filter paper samples were shipped to University of Maryland in November 2015. Molecular analyses found that the prevalence of drug resistance molecular markers among Kawthaung samples showed very high for SP (*dhfr*108 mutation = 100%, *dhps* 437 mutation = 100%) and CQ resistance (pfcrt 76 mutation=78.4%) were highly prevalent but mefloquine resistance markers (*pfmdr1* multiple copy number prevalence = 18.5%) were low among the samples from Kawthaung study sites.

1.1.1.3 Monitoring of drug resistant malaria by therapeutic efficacy trial and molecular tool

The therapeutic efficacy trial of chloroquine on *Plasmodium vivax* was conducted in Kawthaung township, Tanintharyi Region during February 2015. Up to February 2016, a total of (2768) clinically suspected malaria cases were screened for malaria parasite by RDT (rapid diagnostic test) and confirmed by microscopy. Malaria parasite positivity rate by RDT was 5.2% (143/2768). Among infected cases, *Plasmodium falciparum* was 27.9% (40/143) and *Plasmodium vivax* was 72.1% (103/143). A total of 70 criteria matched and microscopically confirmed *Plasmodium vivax* cases were enrolled in the study. Out of enrolled (70) participants, (18) cases were lost to follow up and only 52 cases completed 28 days follow up. Two cases out of 52 cases showed parasite positive on Day3 but ACPR (adequate clinical and parasitological response) was found to be 100% with no treatment failure during 28 days follow up.

1.1.1.4 K13 gene sequence analysis of the samples collected in Therapeutic Efficacy Study (TES) in Buthidaung, Rakhine State

In order to monitor artemisinin resistance in the Western part of Myanmar, detection of K13 mutations of samples collected from TES studies is compulsory. A total of 70 *P. falciparum* infected cases in artemether-lumefantrine (A-L) trial, and 57 *P.f* cases in dihydroartemisinin-piperaquine (DHA-PIP) trial were recruited during malaria transmission season of 2013-2014. A total of 70 samples from A-L trial group and 57 samples from DHA-PIP trial were included in K13 gene analysis in Advanced Molecular Research Center. K13 genes of *P.falciparum* were amplified by PCR. Successfully amplified PCR products were purified using Big Dye and Motage PCR purification kit and then sequenced by Applied Biosystems (3500XL) sequencer. Analysis of K13 sequence was made using Sequencher software and Bioedit software to align & remove the gaps. K 13 propeller gene sequence of 3D7 was retrieved from Genebank (ID; AL844509.2) and applied as the reference sequence to locate the mutation point/s in the samples. Twenty percent of both AL, and DHA-PIP treated samples were randomly selected and sent out to University of Maryland for validation. DMR's lab results were found 100% consistent with those of University of Maryland. The findings of the study approved two critical facts: (1) there was the absence of K13 mutation among ACT sensitive samples, (2) K13 mutations in *P.falciparum* has not yet emerged in Myanmar-Bangladesh border. However continuous monitoring of drug resistance by therapeutic efficacy and molecular surveillance is strongly recommended as K13 mutation could emerged independently.

1.1.2 FIELD RESEARCH ON MALARIA

1.1.2.1 Efficacy and safety of artemether-lumefantrine (A-L), and dihydroartemisinin-piperaquine (DHA-PPQ), for the treatment of uncomplicated *Plasmodium falciparum* malaria and chloroquine (CQ) for *Plasmodium vivax* malaria in sentinel sites (2014 - 2015)

Study site (1) Buthidaung, Rakhine State

The study was started with artemether-lumefantrine combination trial and after completion of proposed sample size for A-L, DHA-PPQ trial followed. A total of 3864 clinically suspected malaria cases were screened for malaria parasite by RDT and confirmed by microscopy for speciation and counting. Malaria parasite prevalence was 6.8% (260/3864) by microscopy. Among positive cases, *P. falciparum* contributed 72.24% (190/260), *P. vivax* contributed 22.05% (58/260) and mixed infection (both *P.f* and *P.v*) was 5.7% (15/260). Out of 190 *P.falciparum* infected cases, 142 cases were found eligible for the therapeutic efficacy trial. A total of 72 cases were enrolled in A-L trial and 70 were included in DHA-PQ trial. In the A-L trial, enrolled patients were treated with artemether-lumefantrine combination (usual adult dose 4 tabs twice daily for three days) and followed clinically and parasitologically up to day 28. Two cases recurred infection with *Plasmodium vivax* on day 21 and were excluded from the study. There was no case of persistent parasitemia on day 3.There was no treatment failure case and no case of recurrent parasitemia, nor fever case during 28days follow-up. Therefore therapeutic efficacy of A-L was 100% Adequate Clinical and Parasitological Response (ACPR). In DHA-PPQ trial, a total of criteria matched 70 subjects were enrolled and treated with DHA-PIP (compound tablet of 40mg dihydroartemisinin and 320 mg piperaquine phosphate, at the dosage of 3 tabs given daily for 3days) and followed clinically and parasitologically up to day 42 . However 13 cases failed to complete their 42 days follow up and one case was excluded from the study as *P. vivax* infection was noted on day 21.

Therefore total 56 cases were eligible for analysis. Out of 56 enrolled, there was no parasite positive case on day 3 or recurrent parasitemic case during 42 days follow-up. Therefore ACPR was 100%. In chloroquine trial against *Plasmodium vivax,* criteria matched 57 cases were recruited and treated with total 25mg/kg dose for 3days (10mg/kg at D1, 10mg/kg at D2, 5mg/kg at D3). Treated patients were followed clinically and parasitologically up to day 28. Among them, 7 cases were loss to follow up and only 50 cases were eligible for analysis. Two cases out of 50 enrolled cases, were found recurrent parasite positive with *Plasmodium vivax* on day 21. Therefore ACPR was 96% and late treatment failure rate was 4%. Slide validation was made by External Validator assigned by WHO during September 2015 and the results of the study did not changed after validation.

Therapeutic efficacy status (Buthidaung, Rakhine State)

Study drug	**A-L (PF)**	**DHA-PPQ(PF)**	**CQ (PV)**
Site	Buthidaung	Buthidaung	Buthidaung
Total enrolled patients	72	70	57
Total patients (completed follow up days)	70	56	50
Loss to follow up (patients)	0	13	7
Exclusion from enrollment	2 *P.vivax* on D 21	1 *P. vivax* on D 21	0
Parasite positivity at Day 1	N=24 (34.3%)	N=16 (28.37%)	N= 9 (18%)
Parasite positivity at Day 2	N=1 (1.4%)	N= 5 (8.9%)	N= 1 (2%)
Day3 parasite persistence	N=0 (0%)	N=0 (0%)	N=0
Recurrence	0	0	2(*P.v* on D21)
Parasitemia at Day0	Median = 1182/µL Min. = 960/µL Max. = 8650/µL	Median = 4434/µL Min.= 480 /µL Max.= 134040/µL	
Parasitemia at Day1	Median = 240/µL Min. = 12/µL Max. = 6312/µL	Median = 60/µL Min. = 24/µL Max. =360/µL	
Parasitemia at Day 2	60/µL	Median = 12/µL Min. = 12/µL Max. = 24/µL	
ACPR	100%	100%	96%
Late treatment Failure Late clinical failure Late parasitological failure	0%	0%	 0% 4% (2/50)

Study site (2) Myawaddy, Kayin State

Case recruitment for the study was conducted for 3 months in the Myawaddy township in 2014. The research team moved to Pha-Pon township because of security reason in Myawaddy and continue recruitment of cases till 2015. The total 31cases of *Plasmodium vivax* who met selection criteria were enrolled in the study. Chloroquine recruited which met with criteria in which two cases of recurrence on Day 28 has been found. All *P.vivax* cases were completed for day 28 follow up. The 28 cases of *P.falciparum* were recruited which met with criteria for dihydroartemisinim- piperaquine efficacy and 18 cases were completed for 42 days follow up in which six cases were found Day 3 parasitaemia.

Study site (3) Mawtaung, Tanintharyi Region

In Mawtaung study site, Taninthayi Region, the study team conducted active case detection surveys covering Mawthaung, Tharabwin, Palaut, and Myeik during 2014-2015 malaria transmission seasons. A total of criteria matched 28 *Plasmodium falciparum* cases and 29 *Plasmodium vivax* cases were recruited. One out of 27 enrolled cases showed persistence of parasitemia on Day 3 and recurrent parasitemia on Day 14. Genotyping to distinguish recrudescence and re-infection is ongoing.

1.1.2.2 Burden of malaria and co-infections in pregnant women

A longitudinal study of pregnant women was conducted in Shwe Kyin and Madaya townships to estimate the prevalence of asymptomatic malaria over time and co-infections including HIV and intestinal helminthes. A total of 750 pregnant women making their first antenatal visit to a rural health center were enrolled during 2013-2015, and followed monthly for clinical and laboratory evaluations. Blood was collected for hemoglobin measurement, microscopic and PCR analysis of *P. falciparum* and *P. vivax* malaria, and rapid diagnostic testing of HIV. Out of 3120 samples available for detection of malaria parasite by real time PCR, 42 samples (5.6%) showed malaria parasite positive. HIV infection was positive in only one participant. Median hemoglobin level of study participants was 10.4 mg% (range 9.5-11.2). Among risk factors, being second pregnancy was found to be strongly associated with *Plasmodium vivax* infection (OR 23.6 (2.66-208.9)(95%CI), p=0.0045). Preliminary data suggests that the burden of asymptomatic malaria in pregnancy in Myanmar is higher than expected at some sites, and heterogeneous across the study sites. An alternative effective intervention is recommended to prevent malaria in pregnancy and more sensitive tools for detection of asymptomatic malaria are critically important.

1.2 PARASITIC DISEASES

1.2.1 Prevalence of helminthic infestation among pregnant women living in Shwe Kyin Township

A cross sectional study was conducted to determine the helminthic infestation rate among pregnant women in Shwe Kyin township during 2013 and 2014. A total of 373 pregnant women attending at 6 rural health centers of Shwe Kyin township were included in the study. Stool samples were collected at their first antenatal visit and transferred to laboratory of Shwe Kyin township hospital within 3 hours. Routine examination of stool samples were carried out by the trained laboratory technicians. Total helminthic infestation rate was 22.7% (87 out of 373), *Ascaris lumbricoides* was the most common and contributed 44.5% of total helminthic infestation (39 out of 87). Surprisingly there were 4.6% of schistosomiasis cases among infected stool samples. Schistosomiasis is trematodal infection via contaminated freshwater contact. Shwe Kyin is famous for its fermented fish production. Having uncooked fermented fish is their risky but traditional dietary habit.

Intestinal helminthes infestation among pregnancy in Shwe Kyin Township

Helminthes	Number of infection positive	
Total helminth infestation	87/373	(22.7%)
Ascaris lumbricoides	39 /87	(44.8%)
Trichuris trichura	25/87	(28.7%)
Hook worm	9/87	(10.3%)
Schistosoma mekongi	4/87	(4.6%)
Enterobirus vermicularis	4/87	(4.6%)
Clonorchis sinensis	3/87	(3.4%)
Fasiolopsis buski	2/87	(2.3%)
Paragonimus westermani	2/87	(2.3%)
Tape worm	2/87	(2.3%)
Others	6/87	(6.89%)

2.1 TRADITIONAL MEDICINE

2.1.1 Antimalarial effect of extracts of five plants combination

Antimalarial activities of five plants combination [*Samanea saman* (Jacq.) Merr. (leaf), *Dactyloctenium aegyptium* Linn., *Brucea javanica* (Linn.) Merr. (seed), *Plumeria alba* Linn. (root) and *Ferula foetida* Regal. (seed)], were investigated by *in vitro* drug sensitivity testing technique (WHO 1987 method). Chloroquine was used as control antimalarial drug and *Plasmodium falciparum* infected 20 blood samples were included in the study. Methanol extract of five plants combination was subjected to undergo *in vitro* drug sensitivity testing. Seven dosages of methanol extracts (6.25µg/mL, 12.5µg/mL, 25µg/mL, 50µg/mL, 100µg/mL, 200µg/mL and 400µg/mL) were selected to study. Effective dose (ED) was calculated by using WHO/probit Calculus software. ED50 was 19.5µg/mL compared to ED50 of chloroquine 0.00018µg/mL. With the reference described in Phillipson *et al* (1991), methanol extract of five plants combination was suggested to have high activity (ED50= <20µg/mL).

SERVICES PROVIDED

ACADEMIC

Sr.	Name	Course	Responsibility
1.	Dr. Kay Thwe Han	M.Med.Sc (Microbiology)	Teaching and Thesis Supervision
2.	Daw Aye Than	M.Med.Sc (Microbiology)	Demonstration
3.	Daw Kyin Hla Aye	M.Med.Sc (Microbiology)	Demonstration

LABORATORY

Routine Examination of stool – 10 samples
Malaria parasite detection by microscopy and Rapid Diagnostic Tests – 17 samples

PARASITOLOGY RESEARCH DIVISION (POL)

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Medical Technician(1)	…	U Mya Moe BSc(Zoology)(YU)
Research Assistant (2)	…	U Win Htay Hlaing BSc(Chemistry)(YU)
Research Assistant (3)	…	Daw Yee Mon Myint BA(Myanmar)(MU)
	…	Daw Nilar Moe Khaing BSc, MSc(Zoology)(Monywa University)
Nurse (3)	…	Daw Khaing Khaing Lin BSc(Zoology)(MU)
Research Assistant (4)	…	Daw Myint Myint Khin
	…	U Lai Lian Maung BA(Geography)(Pakokku University)

Parasitology research division is mainly involved in research activities relating malaria research such as therapeutic efficacy studies, malaria epidemiology studies and studies for antimalarial traditional plant extracts. Moreover, the division also conducts the studies on vector borne diseases like dengue infections, and studies on tropical acute febrile illnesses.

RESEARCH PROJECTS

1. COMMUNICABLE DISEASES

1.1 MALARIA

1.1.1 Efficacy and safety of artemether-lumefantrine and dihydroartemisinin-piperquine phosphate for the treatment of uncomplicated *Plasmodium falciparum* malaria, and chloroquine for *P. vivax* in Mu-se township (Northern Shan State) and Myit Kyi Nar township (Kachin State)

This study aims to assess the efficacy of the current first and second line treatment policy. Study Sites are, (1) Banbwe Health Centre is located on the Mandalay –Mu-se highway road and (2) Tanphe Health Centre (Myit Kyi Nar Township) is located on the Myit Kyi Nar – Pu Tar O highway road and is 23 miles away from Myit Kyi Nar town proper. The study is conducted during the malaria transmission season, from June to December 2015 using WHO standard guidelines. This surveillance study is a one-arm prospective evaluation of clinical and parasitological responses to directly observed treatment for uncomplicated malaria. Clinically suspected malaria patients were examined by microscopic examination and people with uncomplicated malaria who meet the study inclusion criteria are enrolled. Then they were treated on site with artemether-lumefantrine or dihydroartemisinin & piperaquine phosphate for the treatment of uncomplicated *P. falciparum* malaria and chloroquine for *P. vivax* and monitored as 28 days for artemether-lumefantrine and 42 days for dihydroartemisinin & piperaquine. The findings revealed that Adequate Clinical and Parasitological Response (ACPR) was 116/120 (96.7%) for artemether-lumefantrine, 112/112 (100%) for dihydroartemisinin & piperaquine phosphate and 96/96 (100%) for chloroquine in study sites of Upper Myanmar. The study showed that the anti-malarials recommended for treatment of uncomplicated malaria in Myanmar are quite effective with high ACPR status.

1.1.2 Comparison of microscopic examination and Rapid Diagnostic Test (RDT) for diagnosis of vivax malaria

Malaria is one of the priority health problems in Myanmar. Provision of early diagnosis and appropriate treatment at primary health care setting is one of the National Malaria Control Strategies. The accuracy of the diagnosis is critical to the management of the malaria. Supervision and quality control of malaria microscopy were done at 103 malaria microscopic centers by laboratory technicians from central and state/regional VBDC teams in 2013. Diagnosis of malaria is usually made by both clinical and laboratory examination. Routine laboratory diagnosis is made by microscopic examination of Giemsa stained blood smear. It is the standard diagnostic method of malaria infection in Myanmar. It needs experience and skill of the technician. It is labor-intensive and needs at least 30 minutes to have a result. Often false positive and false negative results are obtained due to lack of efficiency of laboratory technician and also due to poor staining, unclean slides. RDT test have been introduced for laboratory diagnosis of malaria since 1993 based on detection of species specific antigen or antibody. The study can provide information about sensitivity and specificity of RDT for vivax malaria diagnosis in comparison to microscopic examination. Blood was taken as a single prick as routine collection and tested with RDT SD BIOLINE Malaria p.f/p.v test. The early and accurate diagnosis of malaria can provide the prompt treatment. The study was started on 26-10-2015 and doing field survey to collect the samples in Wetwun and Naungcho Townships. After data collection, data checking was done daily for completeness and consistencies. And data entry also was done. Among the participants, 33.8% were female and 66.2% male. Age of the participants was 28.1 ± 15.7 years. About the history of malaria among the participants, 3.3% had malaria. On RDT examination, 11% had showed pv positive and on microscopic examination 11.2% showed pv positive. And the malaria suspected patients will be recruited up to 385 completions. After completion of 385 participants recruitment, data entry, data analysis and report writing will be done.

1.1.3 Study on anti-malarial drug activity of 3 traditional medicinal plants using *In vitro* method

The 95% ethanol extracts of Tasay art (*Bidens pilosa* Linn.), Kasaut poat (*Cassia occidentalis* Linn.) and methanol extracts of five plants combination; (*Samanea saman* (Jacq.) Merr. (leaf), *Dactyloctenium aegyptiun* Linn. (the whole plant), *Brucea javanica* (Linn.) Merr. (seed), *Plumeria alba* Linn. (root) and *Ferula foetida* Regal. (seed) were detected by *In vitro* antimalarial drug susceptibility test to find out their effectiveness. The leaves were air-dried under shade. One hundred grams of (Tasay art and Kasaut poat) powder samples and five plants combination power samples were successively extracted with 95% ethanol and methanol respectively by Soxhlet apparatus for 6 hours. Then the extracts were evaporated by Rotary evaporator, separately. Thick and thin blood films were prepared from three hundred and twenty clinically suspected malaria patients. *In vitro* drug sensitivity test was performed following the micro-technique of *In vitro* micro-test (mark II). The assessment was made by counting the number of schizonts against 200 asexual parasites in each film. The number of schizonts in the control were taken as 100 percent base line for the assessment of schizont maturation in the various drug wells. Blood sample with a schizont maturation of less than 10% in the control wells were not used for evaluation. The effective dose value was calculated using Wernsdorfer W.H (1995) software. In this study, the result showed that 95% ethanol extracts of Tasay art and Kasaut poat showed IC_{50} value 576.9µgm/ml and 539.4µgm/ml. Methanol extract of five plants combination showed IC_{50} value 19.5 µgm/ml. IC_{50} value of chloroquine was 0.00018µgm/ml. If IC_{50} value is more than 200µgm/ml, it is deemed to have no activity. If IC_{50} value is less than or equal to 50µgm/ml, it indicates promising anti-plasmodial activity. If IC_{50} value is less than 20µgm/ml, it denotes high activity. Therefore, Tasay art and Kasaut poat have no activity but five plants combination shows high anti-plasmodial activity.

1.1.4 Therapeutic efficacy study using Artemisinin-based Combination Therapies for *Plasmodium falciparum* in Myanmar-India and Myanmar-China border

Globally, malaria remains a major public health problem with about 198 million cases of malaria having occurred in 2013 and an estimated 584,000 deaths. Myanmar which lies in South-East Asia and is one of the 31 highest malaria burden countries in the world with 333,871 reported cases in 2013. The emergence of artemisinin resistance in the Greater Mekong Sub-region (GMS) which involves Myanmar and four other countries (Cambodia, Thailand, Vietnam and Lao) is thus a matter of major national and international concern. Without knowledge on failures and resistance, it is difficult to initiate appropriate containment activities, and guide treatment policies which may allow resistant parasites to survive and spread silently. This paper aims to report on treatment failures with three routine ACT combinations (artemether-Lumefantrine, AL), Artesunate-mefloquine, AS+MQ, and Dihydroartemisinin-Piperaquine, DHA+PPQ) used for uncomplicated *P. falciparum* malaria in Myanmar for the year 2012 and 2014. A retrospective analysis of routine malaria surveillance data on therapeutic response to three types of ACTs in 2012 and 2014 were conducted. The study population included a total of 470 patients aged six years and above (excluding females 12-17 years) with microscopically confirmed uncomplicated *P. falciparum* malaria. For 2012, this included 129 patients on AL and 119 on AS-MQ. For 2014, there were 75 on AL and 147 on DHA-PPQ. The data sources are the excel databases of routine monitoring of treatment response from the sentinel sites. Information on ACT related side-effects were sourced from case reporting forms. Data in the excel sheet were used to assess treatment response including treatment failures. Data were entered (and validated) from case report forms into EpiData software for data entry and analysis (version 3.1 for entry and version 2.2.2.182 for analysis, EpiData Association, Odense, Denmark). The findings revealed that Adequate clinical and Parasitological Response (ACPR) was 190/204 (93.1%) for AL, 113/119 (95.0%) for AS+MQ and 140/147 (95.2%) for DHA+PPQ in study sites of Upper Myanmar.

1.2 DENGUE INFECTION

1.2.1 Evaluation of Dengue infection detection with NS1 antigen, IgM and IgG antibodies in patients with acute febrile illnesses

In Myanmar, early diagnosis and good supportive care are crucial management for dengue cases. Among the available diagnostic kits detecting NS1 antigen, Ig M and Ig G antibodies, clinician are increasingly using NS1 antigen detection as the favourable diagnostic test recently. Studies evaluating the sensitivity and specificity comparison among NS1 antigen, Ig M and Ig G antibodies detections are very limited. Moreover, the association between NS1 detection and clinical severity was not evaluated yet. Therefore, this study aims to discover the diagnostic and prognostic value of NS1 antigen detection. It is a Laboratory and hospital based cross-sectional descriptive study. The paediatric patients with acute febrile illness diagnosed as dengue infection according to WHO guidelines 2009 and admitted as in-patients in Paediatric unit of 300 bedded General Hospital, Pyin Oo Lwin were included in the study. The study is conducted during June 2014 and November 2015. Dengue duo NS1, IgM and IgG (BIOCREDIT, Korea) diagnostic test kits are used in diagnosis of dengue infection detecting both antigen (NS1) and antibody (IgM and IgG). Then, the patients are assessed their clinical conditions and severity by medical clinicians. Treatments are provided according to 2009 WHO guideline. The laboratory findings and clinical examinations are recorded into the data collection form by well trained observers. Then, recorded data are being compiled, coded, entered into computer by using SPSS 20.0 version software. A total

of 200 cases are studied. The findings showed that detection of NS1 antigen, IgG antibody and IgM antibody were observed in 20(10%), 26(13%) and 29(14.5%) patients, respectively. Regarding the clinical signs and symptoms, nausea or vomiting, skin rashes, aching pain, mucosal bleeding, abdominal pain, lethargy and dengue shock syndrome were observed in 33.5%, 13.4%, 8.4%, 17.6%, 16%, 4.4% and 4.4% of patients, respectively. According to analysis, the severity and prognosis of the disease may be guessed by examining the NS1 antigen in blood with rapid diagnostic testing.

1.3 INFLUENZA INFECTION

1.3.1 Detection of human influenza virus infection with rapid diagnostic testing

Human influenza or flu is a viral infection transmitted among people through direct contact and air borne transmission. It is caused by influenza virus type A, B and C. the most common symptoms are fever, chills, cough, aching pain, sneezing and runny nose. Human influenza cannot be diagnosis by clinical confirmation alone because its illnesses may be similar to other infections. Rapid influenza diagnostic testing (RIDT) of antigen can provide more accurate detection on human influenza infection. A descriptive study was done in a clinic of Pyin Oo Lwin Township in order to find out prevalence of human influenza virus infection from July 2014 to December 2015. The patients who attended clinic with Influenza like Illness were included in the study and their nasal swabs were taken and tested with RIDT (Quick Navi-Flu rapid test, Japan). Among the total 1380 participants, male were 750(54.3%) and female were 630(45.7%). Mean age (± SD) was 24.3(± 18.2) in year. The youngest was one and the oldest was 82 years old. Mean body temperature (± SD) in Celsius was 38.4(±0.8). Mean duration of onset of clinical symptoms of influenza was 2.0(± 1.2) in days. Fever, cough, runny nose, muscle pain, joint pain, head ache and diarrhoea were observed in 1303(94.3%), 1310(94.9%), 1132(82.0%), 531(38.5%), 869(63.0%), 689(49.9%) and 41(3.0%), respectively. According to results of rapid diagnostic testing, influenza type A and type B were detected in 261(18.9%) and 94(6.8%) participants, respectively. Moreover, type A or type B positive cases (n=351) were significantly observed in the months from June to November of both years than other months (p=0.001). Therefore, human influenza infection is common in rainy season in the study area and rapid influenza diagnostic testing is helpful in diagnosis and treatment decision.

SERVICES PROVIDED

ACADEMIC

Sr. No.	Name	Course	Responsibility
1.	Dr. Moe Kyaw Myint	The scientific committee of 8th APCRSHR	Primary abstract reviewer