

## CLINICAL RESEARCH DIVISION

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Clinical Research Division is primarily involved in research activities of the following programme areas: communicable diseases such as dengue hemorrhagic fever and non-communicable diseases with emphasis on cardiovascular diseases and snake bite.

## RESEARCH PROJECTS

### 1. COMMUNICABLE DISEASES

#### 1.1 DENGUE HEMORRHAGIC FEVER

##### 1.1.1 Impact of Glucose-6-Phosphate Dehydrogenase deficiency on Dengue infection in Myanmar children

It is suggested that G6PD deficiency may increase the viral load due to alteration in redox state of immune cells, and thus, also affect the clinical severity of patients with Dengue infection. This study aims to determine the association between G6PD deficiency and Dengue infection. Dengue infection was screened by rapid diagnostic test (Standard Diagnostics, Korea). Out of 212 samples, 209 samples were tested for G6PD within 24 hours of sample collection by spectrophotometric assay (Randox Laboratories Limited, UK). G6PD genotyping of three previously known mutations in Myanmar (Mahidol, Kaiping and Mediterranean) were done in 135 children by Real-time Multiplex PCR at Korea University, Guro hospital. Dengue infection was confirmed by both conventional (127 samples) and

quantitative real-time RT-PCR (122 samples) using Pan-dengue Primer at Korea University, Guro hospital. Total of 212 children (107 boys and 105 girls) with mean aged  $7.7 \pm 2.9$  years were included in the study. The prevalence of G6PD deficiency was 14.6% (31/209) according to quantitative assay (<60% residual enzyme activity of study population) and 19% (26/135) according to Mutation analysis. The prevalence of severe dengue was 26% (29/212) and that of dengue with warning sign and without warning sign were 45% (96/212) and 29% (54/212), respectively. Younger age ( $6.9 \pm 2.8$  vs.  $8 \pm 2.9$  yrs), symptoms like nausea and vomiting (85.2% vs. 59.5%), lethargy (94.4% vs. 32.9%) and abdominal pain (64.8% vs. 34.8%), signs like hepatomegaly (94.4% vs. 73.4%), abdominal tenderness (40.7% vs. 10.1%) and prostration (42.6% vs. 3.8%) and haematological parameters like lower platelet count ( $72.9 \pm 55.5$  vs.  $135.6 \pm 69.6 \times 10^3/L$ ) and higher leucocyte count ( $7.4 \pm 5.4$  vs.  $4.5 \pm 2.7 \times 10^9/L$ ) on admission were associated with severe dengue infection and the findings were statistically significant. Among 26 samples with G6PD mutation, Mahidol mutation was found in 25 (96%) and Kaiping mutation was found in 1 (4%) of Myanmar children with G6PD gene mutation.

## **2. NON-COMMUNICABLE DISEASES**

### **2.1 CARDIOVASCULAR DISEASES**

#### **2.1.1 Potential risk factors of cardiovascular diseases among adolescent students at two selected schools in Yangon**

A cross-sectional descriptive study was conducted at the No.2 State High School, North-Okkalapa Township and No.4 State High School, Ahlone Township, Yangon in 2016. A total of 230 students, 108 students from North-Okkalapa and 122 students from Ahlone, with a mean age of  $14.24 \pm 1.05$  years were recruited to determine the proportion of selected cardiovascular diseases (CVD) risk factors and the relationship between the cardiovascular risks and background characteristics of the students. Background characteristics such as age, sex, parental education, occupation and lifestyle related risk factors of CVD were collected. Anthropometric measurements, blood pressure and venous blood sample were also taken for determination of random blood sugar and total cholesterol using standard procedures. Regarding the CVD risk factors, the most prevalent risk factors were having inappropriate diet like fried snack and fast food (about 95% each), followed by preference of salty food (77.4%) and physical inactivity (51.7%). Overall, about 28% and 15% of students were found to have high blood pressure and overweight or obesity, respectively. The average value of random serum total cholesterol was  $119.02 \pm 48.6$  mg/dL and 3.5% of students was higher than the recommended total cholesterol level. The average random blood sugar was  $94.28 \pm 10$  mg/dL and no one had high blood sugar level as a risk for CVD. Relationships were found between girls and preference of salty food like fish-paste, dried fish, dried prawn ( $p < 0.05$ ). Students whose mothers are less educated also have more preference of salty food ( $p < 0.05$ ). The most prevalent risk factors are modifiable and therefore play an important role in the prevention of CVDs in their later life. School based educational intervention is required to increase knowledge and awareness about risk factors of CVDs in order to reduce the burden of CVDs.

## 2.2 SNAKE BITE

### 2.2.1 Validation of clinical features and diagnostic tests for snakebite envenoming in Magway Region, Myanmar (2016)

A prospective diagnostic study was conducted in Aunglan, Taungdwingyi and Natmouk township hospitals in Magway Region. It was aimed to assess the sensitivity and specificity of the rapid diagnostic tests (RDT) and PCR-aided sequencing of snake trace DNA from bite site swabs for snake species identification in patients with envenomed snakebites. Rechecking of test kit results and DNA analysis will be done in Goethe University, Germany. Demographic, epidemiological and clinical data were recorded in the case report forms (CRF), and 4 ml of venous blood was taken. Two ml was used for 20-minute whole blood clotting test. Serum from 2 ml of blood was used for RDTs on site (200µl) and the rest was stored frozen at -20°C. Snakes brought by the victims were labelled with patient ID number and preserved in Ethanol at room temperature for morphological identification. Trace DNA of biting snake was collected by rubbing a sterile cotton swab on the bite site. A total 130 cases (36 from Aunglan, 46 from Taungdwingyi and 48 from Natmouk Hospitals) were recruited. They included 74 clotted cases and 56 non-clotted cases. The median age of the victim is 35 years (range; 8-73 years) and the interval between bite and admission is 1.5 hours (range; 15 min-24 hours). Preliminary testing with RDT test strips on site was performed on 90 Russell's viper cases (64 clotted cases and 26 non-clotted). Among 20 systemic envenomed cases (out of 26 non-clotted), 8 cases were found to be positive with RDT for Russell's viper. RDT test strip is specific and no cross reaction with other snake bite patients serum (2 Green pit vipers, 1 Spitting cobra and 1 Nygan Saung).