IMMUNOLOGY RESEARCH DIVISION

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During the year under report, the Immunology Research Division was mainly involved in communicable diseases such as Tuberculosis, Viral Hepatitis, Dengue Haemorrhagic Fever, Sexually Transmitted Infections and non- communicable disease as cervical cancer by cervical cytology screening.

RESEARCH PROJECTS

1. COMMUNICABLE DISEASES

1.1. TUBERCULOSIS (TB)

1.1.1. Diagnosis of tuberculous lymphadenopathy by polymerase chain reaction and loop mediated isothermal amplification methods in HIV seropositive patients

Tuberculous lymphadenitis is a common form of extra-pulmonary tuberculosis (EPTB) among HIV patients with lymphadenopathy. This study aimed to determine the *Mycobacterium tuberculosis* (MTB) in HIV seropositive patients with cervical lymphadenopathy using different diagnostic tools. A hospital and laboratory based cross-sectional descriptive study was conducted in 2014-2015. A total of 60 cervical lymph node aspirated fluid samples from the Thakayta Specialist Hospital were tested for MTB using different diagnostic tools which are the conventional methods (Ziehl-Neelsen staining for acid-fast bacilli (AFB) smear and culture on Lowenstein-Jensen medium), and the molecular methods [Polymerase chain reaction (PCR) & loop mediated isothermal amplification (LAMP)]. In this study, 48 cases (80%) were male and 12 (20%) were female. Mean age of the patients was 39 years (SD=10.1). On macroscopic examination of lymph node aspirate, 55 cases (92%) had caseation and 5 cases (8%) had clear fluid. MTB positivity & negativity, sensitivity, specificity, positive predictive value and negative predictive value of the different diagnostic tests were shown in table (1).

Table (1).MTB positivity & negativity, sensitivity, specificity, positive predictive value and negative predictive value of the different diagnostic tests

	AFB smear	PCR	LAMP	Culture
MBT +ve	48.3% (29/60)	75% (45/60)	75% (45/60)	51.7% (31/60)
MBT -ve	51.7% (31/60)	25% (15/60)	25% (15/60)	48.3% (29/60)
Sensitivity	84% (95%CI=66%to95%)	90% (95%CI=74%to98%)	81% (95%CI=63%to93%)	-
Specificity	90% (95%CI=73%to98%)	41% (95%CI=24%to61%)	31% (95%CI=15%to51%)	-
PPV	90% (95%CI=73%to98%)	62% (95%CI=47%to76%)	56% (95%CI=40%to70%)	-
NPV	84% (95%CI=66%to95%)	80% (95%CI=52%to96%)	60% (95%CI=32%to84%)	-

Culture can take up to 8 to 10 weeks. Molecular tests can be performed within 1-3 hours. Although molecular methods i.e, PCR and LAMP are useful with high sensitivity (90% Vs. 81%) respectively and they could identify scanty amount of TB-DNA, AFB-smear (sensitivity 84%) with macroscopic visible caseation is a reliable diagnostic method which is simple, cheap and generally available at district hospitals in low-resource settings.

1.2 VIRAL HEPATITIS

1.2.1 Prevalence of Hepatitis B and C viral infections in Myanmar

According to the Global Burden of Disease estimates, Hepatitis B (HB) and Hepatitis C (HC) together caused 1.4 million deaths in 2010, including deaths from acute infection, liver cancer and cirrhosis. Treatment of these infections has been shown to reduce the risk of developing liver cancer and deaths and new antiviral agents against HB and HC viruses are also being developed. This study was aimed to determine the prevalence of HB and HC viral infections in Myanmar as a nationwide survey and to describe the associated factors of transmission route of these infections. A cross sectional study was conducted in general population aged between 15 to 80 years, both gender, of 18 townships, selected from 7 States, 7 Regions and Naypyitaw Union Territory from May to November 2015. A total of 5547 subjects after taking informed consent were tested for HBs antigen and anti-HCV antibody by one step qualitative immunochromatographic assay HBsAg device with sensitivity 100%, specificity 100% and anti-HCV antibody device with sensitivity 100%, and specificity 94% [Standard Diagnostic (SD) Corporation, Korea]. More than half of the study population (58.6%) was 20-39 years age group and about 70.2% (3894/5547) were female and 29.8% (1653/5547) were male. 68.3% of the study population was married and 28.9% were never married. The family size ranged from one to seventeen and average was 4.8 (SD=2). An average prevalence for HB and HC among those townships was 6.5% (95%CI= 4.3-9.8) and 2.7% (95%CI=1.3-5.1) respectively. Two out of 5547 in this study had both HB and HC viruses. The highest prevalence of HB infection was 12.3% (95%CI= 9.0-16.5) in Yangon Region and the lowest was 3.3% (95%CI=1.8-6.0) in Magway Region. Regarding HCV prevalence, the highest was 10.3% (95%CI=7.5-14.2) in Mon State and the lowest was 0.3% (95%CI=0.1-2.3) in Bago Region and Chin State. There were a significant difference in the prevalence between townships from all States and Regions. The highest HBV prevalence

(7.4%, 95%CI=6.2-8.8) was found in 30-39 years age group but the highest HCV prevalence (7.3%, 95%CI=5.5-9.7) was found in 50-59 years age group and no anti-HCV positivity among <20 years age group. Male had significantly higher prevalence of both infections than female gender (8.9% vs. 5.5%, p<0.001 for HBV, 3.5% vs. 2.3%, p=0.009 for HCV). It was found that the significant associated factors for HBV were (1) male gender, (2) history of liver disease or hepatitis, and (3) history of household contact of infection. For HCV, the significant associated factors were (1) age >50 years, (2) male gender, (3) blood transfusion, (4) dental treatment, (5) surgical operation, (6) history of liver disease or hepatitis, (7) history of household contact of infection and (8) history of DM. In this study, only 3.4% (95%CI= 1.8-6.1) of the population gave history of complete HB vaccination and it pointed out that the complete HB vaccination essentially needs to be recommended for all age group. This study will provide the evidence-based prevalence data to National Hepatitis Control Program which can lead to follow up the surveillance of these infections and to advocate the donors and the policy makers to reduce the disease burden on the health care system.

1.1. SEXUALLY TRANSMITTED INFECTIONS

1.1.1. Determination of Human Papillomavirus (HPV) genotypes in Vulva Tumour

HPV is a sexually transmitted infection that increases the risk of cervical cancers, including vulva cancer and cervical cancer. The risk of vulvar cancer increases with age, though it can occur at any age. Protection against HPV infection may help many women reduce their vulvar cancer risk. This study detected the oncogenic HPV infection and genotypes in vulva cancers by a cross-sectional descriptive study in 2015. A total of 59 biopsy tissue sample from the growth of vulva cancer were collected from Central Women Hospital, Mandalay within 2014-2015. Mean age of the patients were 60.14 years. HPV-DNA testing and genotyping were performed by polymerase chain reaction and restriction fragment length polymorphism (PCR-RFLP). Firstly, DNA extraction was performed using Qiagen DNA extraction kit. Consensus sequence primer pairs within the E6 and E7 open reading frame were used to amplify oncogenic HPV genotypes (HPV-16,-18,-31,-33,-35,-52,-58). Restriction enzymes were used for determination of specific HPV genotypes. Oncogenic HPV were identified in 8.5% of vulva cancers (5/59). The most frequent genotypes were HPV-16 (80%) and HPV-31 (20%). This research provided the valuable information in understanding the burden of HPV associated vulva cancers and the consideration of the effectiveness of prophylactic HPV vaccination in not only cervical cancer but also non cervical cancers. The remaining causes of vulva cancer were unidentified.

2. NON COMMUNICABLE DISEASES

2.1. CANCER

2.1.1. Screening of the cervical cytology in women attending Cervical Cancer Screening Clinic, DMR within six years (2010-2015)

Pap smear was taken from women attending cervical cancer screening clinic (CCSC), DMR for conventional cytology. During six years (from 2010 to 2015), a total of 4,877 women were screened. The age distribution of women attending the CCSC was 27.2 % in 15 to 35 yrs age group, 64.3% in 36 to 55 yrs age group and 8.5% in 56 yrs and above age group. The most frequent age distribution was 36-55 yrs age group. The proportion of different cervical cytology was shown in Table (2). All pre-cancer and cancer cases were

referred to the specialist hospital. Early detection of cervical abnormalities by cytology could reduce the morbidity and mortality caused by cervical cancer.

Table (2). Proportion of different cervical cytology of women attending Cervical Cancer Screening Clinic, DMR within six years (2010-2015)

Cytological Diagnosis / Year	**2010**		**2011**		**2012**		**2013**		**2014**		**2015**		**Total**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Normal	**242**	**30.3**	**520**	**54.2**	**412**	**51.1**	**529**	**53.5**	**353**	**50.9**	**256**	**40.8**	**2312**	**47.4**
Abnormal														
• Inflammatory	479	86.0	389	88.4	333	84.3	373	81.1	281	82.4	334	89.8	2189	85.3
• Atypical Squamous Cells ASC-US/ Atypical Glandular Cells AGC-US	44	7.9	41	9.3	38	9.6	35	7.6	33	9.7	24	6.4	215	8.4
• Mild Dyskaryosis / Koilocytosis	27	4.8	7	1.6	13	3.3	10	2.2	18	5.3	12	3.2	87	3.4
• Moderate Dyskaryosis	4	0.7	3	0.7	7	1.8	41	8.9	4	1.2	1	0.3	60	2.3
• Severe Dyskaryosis	1	0.2	0	0.0	0	0.0	1	0.2	2	0.5	1	0.3	5	0.2
• Carcinoma in Situ / Squamous Cell Carcinoma	2	0.4	0	0.0	4	1.0	0	0.0	3	0.9	0	0.0	9	0.4
Subtotal	**557**	**69.7**	**440**	**45.8**	**395**	**48.9**	**460**	**46.5**	**341**	**49.1**	**372**	**59.2**	**2565**	**52.6**
Total	**799**	**100**	**960**	**100**	**807**	**100**	**989**	**100**	**694**	**100**	**628**	**100**	**4877**	**100**

SERVICES PROVIDED

ACADEMIC

Sr.	Name	Course	Responsibility
1.	Dr. Aye Aye Lwin	MMedSc (Pathology) MMedSc (Microbiology) MMedSc (Pharmacology) MMed Tech(Medical Laboratory Technology) BMedTech (Medical Technology) Workshop on Research Methodology (2015)	Teaching, Training and Demonstration Facilitator
2.	Dr. Mu Mu Shwe	MMedSc (Pathology) MMedSc (Microbiology) MMedSc (Pharmacology) MMed Tech(Medical Laboratory Technology) BMedTech (Medical Technology)	Teaching, Training and Demonstration
3.	Dr. Ohnmar Kyaw	Workshop on Research Methodology (2015)	Facilitator
4.	Dr. Nan Cho Nwe Mon	MMed Tech(Medical Laboratory Technology) BMedTech (Medical Technology	Demonstration Teaching
5.	Daw Kyi May Htwe	MMed Tech(Medical Laboratory Technology) BMedTech (Medical Technology) MMed Tech(Medical Laboratory Technology) BMedTech (Medical Technology)	Demonstration

LABORATORY TESTS

Sir No.	Laboratory tests	Tested Samples
1.	Blood Sugar	15
2.	Lipid profile	36
3.	Cholesterol	23
4.	Triglyceride	11
5.	Uric acid	53
6.	ALT(Alanine aminotransferase)	9
7.	AST (Aspartate aminotransferase)	7
8.	ASO (Anti-streptolysin O)	45
9.	RA (Rheumatoid arthritis)	27
10.	Urea	26
11.	Creatinine	28
12.	(a) Urea, Creatinine and LFT in Rats from Pharmacology Research Division	40
	(b) ALT, AST in Rats from Pharmacology Research Division	41
	(c) Lipid Profile in Rats from Laboratory Animal Services	6
13.	Cervical Cancer Screening Clinic (Pap Smear)	628