

EPIDEMIOLOGY RESEARCH DIVISION

Deputy Director & Head	...	Dr. Ko Ko Zaw MBBS(IM1), MPH(Epidemiology & Biostatistics) (Boston University)
Research Scientist	...	Daw Moe Thida BSc (Zoology)(RASU)
Research Officer	...	Dr. Su Latt Tun Myint MBBS(UM1), MPH (UOPH)
	...	Dr. Nyein Su Aye MBBS(UM1), MPH (UOPH)
	...	Dr. Aung Ye Naung Win MBBS(UM2)
	...	Dr. Nyi Nyi Zayar MBBS(UM2), MPH (UOPH)
	...	Dr. Kyaw Min Htut MBBS(UM1)
	...	Dr. Phyo Aung Naing MBBS(UM1), MPH(UOPH)
	...	Daw Khin Thet Thet BSc(Physics)(YU)
	...	Daw Cho Cho Myint BA(Economics)(WC), Diploma in Social Work(YU)
	...	Daw Kyi Kyi Mar BSc(Mathematics) (YU)
Research Assistant (2)	...	Daw Tin Tin Wai BSc(Mathematics)(YU)
Research Assistant (3)	...	U Aung Soe Min
	...	Daw Zin Mar Aye BSc(Botany)(YUDE)
	...	Daw Lwin Lwin Ni BSc(Mathematics)(DU)
Research Assistant (4)	...	Daw Lwin Ni Ni Thaug BA(Law)(YUDE)
	...	Daw Ni Ni Htay Aung BA(Geography)(YUDE)
	...	Daw Zar Chi Thein Naing BA (Public Policy)(YUDE)
Laboratory Attendant	...	U Kaung Set
	...	U Myint Shwe

Epidemiology Research Division mainly focuses research activities on HIV/AIDS, cardiovascular diseases, diabetes, water and sanitation and maternal, newborn and child health care.

RESEARCH PROJECTS

1. HEALTH POLICY AND HEALTH SYSTEMS RESEARCH

1.1 MATERNAL, NEWBORN AND CHILD HEALTH

1.1.1 Community based end-line assessment on knowledge and practices for MNCH and WASH in Homalin Township, Sagaing Region

The community based end-line assessment was conducted in Homalin Township of Sagaing Region during May to August 2016 to determine knowledge and existing practices of community regarding maternal, new born, child health and water, sanitation, hygiene (WASH) and infectious diseases as an end-line information after community intervention. The total of 440 women who have children less than 60 months were interviewed face-to-face using structured questionnaires. Comparing to the baseline study, higher percentages of respondents were more aware of danger signs during antenatal period (85% vs 93%). Their main preference as the first place to seek treatment for emergencies was sub-centres (32.9%).

In current assessment, proportion of women who showed their pregnancy to the skilled birth attendants was reduced than the baseline although they were aware of danger signs during AN period. At the end-line assessment, slightly higher percentage of women delivered their last child at home (80% vs 82.5%), and also at township hospital (5% vs 7%). Even though their deliveries were assisted by nurses/LHV/midwives (23.2%) and AMW (30.2%), unskilled assistance of traditional birth attendants (24.8%) and parents/relatives (5.7%) were still reported in the end-line. Higher proportion of participants from end-line were aware of the danger signs in delivery such as “vaginal bleeding” (40% vs 50.2%), “prolong delivery of placenta” (16% vs 19.5%), “fits/convulsion” (12% vs 29.3%) and “high fever” (7% vs 19.5%) than the baseline. Around 38% of respondents received post natal (PN) care for more than four times during first 45 days of delivery. However, PN care received from the skilled health providers was not high such as doctor (public/private) (9.3%) and nurses/LHV/midwives (21.1%). Nearly 30% of respondents received PN care from auxiliary midwife. Although they had a contact with skilled providers, respondents stated the danger signs for neonates were very low proportion. However, approximately 27% of respondents revealed that station hospital and sub-centre were the first place to seek care for newborns with danger signs. At the time of the survey, 62.1% (269/433) of mothers still breastfed their youngest child. The awareness of duration of exclusive breast-feeding less than six months was 77%. Only 30.7% of respondents could show the vaccination cards. For care of under-five children, nearly 70% of mothers recognized high fever as the important danger sign for immediate treatment. Around 40% of respondents had noticed acute diarrhoea in under-fives within past two weeks and 40% of respondents recalled that the child had suffered from cough/difficult breathing during past two weeks. Regarding WASH, around 78% of households received drinking water from tube wells followed by river/pond/stream/surface water (25.5%). Most of them kept drinking water in jars with any cover (384/440; 87.3%). Majority of the households strained their drinking water with cloth filter (311/381; 81.6%) but this purification method was subjected to easy contamination. Despite the high coverage of sanitary latrines (433/440; 98.4%), open defecation habits still existed (7/440; 1.6%) in some area. Only 35% (154/440) of respondents reported that they had washed their hands after wiping a child following defecation and only 25.2% reported hand-washing prior to feeding their children that required improvement. Most 60.2% (265/440) of households reported dumping into water bodies that required attention as a risk for contaminating water sources. In addition, an access to MNCH services provided at rural health facilities, drinking water sources and sanitation practices were not up to the satisfactory level. Therefore, strengthening of community awareness is important to improve MNCH and WASH practices.

1.1.2 Community based end-line assessment on knowledge and practices for MNCH and WASH in Loikaw, Shadaw and Mese townships of Kayah State

The community based end-line assessment on knowledge and utilization of health services concerning maternal, new-born and child health (MNCH) and water, sanitation and hygiene (WASH) has been conducted in 3 townships (Loikaw, Shadaw and Mese) of Kayah State during May to August 2016. Total 440 women having children less than 60 months were interviewed face-to-face using structured questionnaires. Comparing to baseline, higher proportions of participants from end-line were more aware of the danger signs during antenatal period. In particular, vaginal bleeding was the most common sign stated by 52.5% of the respondents. Their main preferences as the first place to seek treatment were the sub-centre (17.4% vs 33.3%) and the station hospital (3.8% vs 10.5%). Much higher percentage of respondents from end-line delivered their child at health centres, in which nearly one-third utilized state hospital/township hospital (21.3% vs 25.7%). Importantly, proportion of respondents using skilled birth attendants (48.8% vs 67%) were higher than that of baseline

especially by doctors from both public and private sector (19.2% vs 33.2%) and nurse/LHV/midwife (21.7% vs 27%) which was in a satisfactory condition at the end-line. Most of respondents (415/440; 94.3%) knew the danger signs during delivery. Nearly 70% of respondents received post natal (PN) care for more than three times during first 45 days of delivery which was higher than baseline (49.7%). Among 440 participants, (424/440; 96.4%) had awareness on danger signs in neonate during PN period which was significantly higher than the baseline (216/521; 41.5%). Postnatal care by unskilled traditional birth attendants and parents/relatives was lower in this end-line that was satisfactory. Moreover, the rate of breast feeding reported in the end-line study was almost universal (99.3%). Higher proportion of the children from the end-line received BCG vaccination (89.3% vs 90.7%), oral polio vaccination (87.9% vs 90%) the pentavalent vaccination (79.8% vs 87.3%) and measles vaccination (53% vs 61.1%) than baseline. Higher proportion of participants from end-line had awareness of danger signs for their children. Comparing to baseline study, 22% (97/440) of respondents had noticed acute diarrhoea of their child within past two weeks and 31.8% (140/440) of respondents recalled that their child had suffered from cough/difficult breathing within past two weeks. Of whom, higher proportion of respondents sought treatment mainly from nearby health facilities than baseline. Regarding WASH, results indicated that higher proportion of households from the end-line survey used an unimproved source of water supply (surface water) than those from the baseline. Only one-third of households from both baseline and end-line assessment reported their source of water supply from improved sources (protected shallow well and piped-in water). Comparing to baseline, higher proportion of respondent from end-line reported boiling (88.8% vs 90.9%), and straining with cloth filters (42.5% vs 81.4%) than baseline. Nearly hundred percent of participants from end-line used latrines and open defecation habits was decreasing (4.9% vs 0.5%) compare to the baseline assessment. Their practices of disposing waste into the undesirable places were lower in the end-line which had the potential risk to contaminate the water sources. Higher proportion of respondents from end-line reported that they had washed their hands after defecation (74.8% vs 86.1%), before eating (64.2% vs 79.3%), before food preparation (28.9% vs 47.3%), after wiping a child following defecation (15% vs 40.7%), and before feeding their child (7.6% vs 29.8%). Therefore, their hand washing practices after defecation was satisfactory and higher percentages were found for hand-washing in the end-line assessment. As for the waste disposal, higher proportion of respondents from end-line reported burning (66.2% vs 71.8%), dust bin (28.3% vs 29.3%) and buried (2.4% vs 8.6%) than those from baseline. Based on the findings from end-line assessment, it was found out that much improvement in knowledge, awareness and practices concerning maternal, newborn and child health and WASH were seen after the intervention.

1.1.3 Towards best practices in provision of maternal and newborn health care services: challenges experienced by midwives in three townships, Yangon Region

Maternal, newborn and child health (MNCH) services are mainly provided by midwives who are the backbone in primary health care services. To date, midwives are bogged down with multiple activities due to the expansion of public health programmes and increased population growth. Therefore, this study aimed to identify the challenges experienced by midwives in the provision of MNCH services in study townships and to explore the provider perspectives for the better implementation of MNCH services. A cross-sectional study was conducted in Hlegu, Htantabin and Hmawbi townships of northern Yangon district in June 2016 by using a mixed methods approach. Altogether 30 midwives involving ten from each township were participated in focus group discussions (FGD). Participants were from different levels of health facilities in which most of them were from rural health sub centres (n=19). Majority said that patient compliance and workload were the

main challenges to accomplish the tasks. Besides, transportation problem was critical especially in Htantabin Township. The residents from rural areas opted for home deliveries by traditional birth attendants and their preference was usually due to an easy access and low cost. Moreover, the respondents stated that they had to pay for transportation and photocopying of official documents. The research findings further indicated that midwives from the peri-urban areas faced poor patient compliance, overburdened workload and transportation problems. Thorough understanding of current challenges encountered by midwives in peri-urban as well as rural areas required attention in township microplanning for improving MNCH services.

1.1.4 Assessment on Knowledge and Perception towards Contraceptive Measures among Dagon University Students

Adolescents are in critical transitional period of an individual's life in which both physical and psychological changes take place. The problems and issues arising from such changes can lead to the adverse health effects if not handled properly. University students are the great potential resources and being adolescents, they face with many challenges including sexual behaviours such as pre-marital sex as globalization occurs. Additionally, poor communication and less access to source of RH information could lead to unsafe sex practices among youth. Risk taking behaviours in RH could produce the negative impacts such as early pregnancy and sexually transmitted infections (STIs) including HIV/ AIDS which are threatening more on the health of adolescent people in comparing with other age groups. The primary objective is to assess the reproductive health communication and behaviours among students of Dagon University, University of West Yangon and Yangon University of Foreign Languages. A cross-sectional study was conducted in Dagon University, University of West Yangon and Yangon University of Foreign Languages (YUFL) in July 2016. The two former universities are located in the east and west of Yangon, away from the downtown area and there are many private places near them. In contrast, YUFL is almost in the centre of the city. Total 456 students in both sexes were recruited in which seventy-six students from the second and third years were involved respectively from each university. Data collection was done with privacy and confidentiality. Out of 456 students, 60% were female and 40% were male. Mostly known contraceptive measure was three-month depo injection (65%) and the most suitable method for adolescents was emergency contraceptive (EC) pill (45%). Overall mean knowledge score on EC pill was (68%). Majority of respondents (60%) communicated reproductive health (RH) issues with their parents mainly about menstrual problems in female (75%) and HIV/ AIDS and STIs in male (70%). Source of information of RH was mainly from internet accounted for 70% of respondents. Most of the students (92%) opposed to premarital sex. In concerning with sexual behaviours, 60% of study population sought health services in health care personnel for their reproductive health problems. Although 95% knew how HIV is transmitted, only 55.7% knew the signs and symptoms of STIs including HIV/ AIDS. In spite of easily accessible source of information, their knowledge about reproductive health and STIs/AIDS is still limited. It is therefore necessary to provide effective and confidential reproductive health services to young people.

1.1.5 Digging beneath the Iceberg: Identifying the Expanded Programme on Immunization Status of Mobile Migrant Children in Delta Region, Myanmar

Migration affects the National Immunization Coverage and influence the spread of infectious diseases. The study aimed to determine the immunization status and factors influencing immunization of migrant children. A cross-sectional descriptive study was conducted in 87 villages in Bogale and Mawlamyinegyun Townships during 2014 focused

on internal migrants who are moving around within the country. A total of 493 migrant mothers having children under two-year old were selected by snowball sampling after collecting migrants information from Basic Health Staffs (BHSs) in each village and then interviewed with semi-structured questionnaires. Fifteen Focus-Group-Discussions with migrant mothers and Key-Informant-Interviews with 56 Voluntary Health Workers, 25 BHSs and 12 Village Health Committee members were performed. Migrants were identified into four types - inbound migrants (222/493, 45%), outbound migrants (194/493, 39.4%), mobile hawkers (25/493, 5.2%) and local mobile (52/493, 10.5%). Out of 493 migrant children, 111 (22.5%) had not received any dose of EPI. Only 35 (17.8%) of aged 17 to 24 months year old migrant children received first dose of measles vaccine. Number of children with complete immunization was highest in local mobiles who frequently travel outside of their residential villages for not more than one month (5/20, 25%) and lowest in hawkers (1/9, 11.1%). More than two third of migrant mothers said migration was the main reason of missing EPI and nearly half of them refused EPI because of their misbeliefs. Majority of migrant mothers were not aware of the date and place of immunization at their destination villages. A few claimed transportation barriers and travel expenses to the place of immunization. Some BHS stated migrants were not included in their immunization due lists. BHS could not be able to determine which dose to administer because migrant mothers could not tell the dose that had been given. Some migrant mothers also did not have immunization cards. Majority of BHS suggested the local authority and employers could support them by collecting and sharing lists of under 2-year old migrant children. In the study, only 17.8% of 17 months to 2 years old migrant children received full dose of EPI while 90.5% of children in general population of study townships received it. In conclusion, there should be a strong collaboration between health care providers, local authorities and employers to be able to get information of migrants. There should be a specific service delivery for migrants ensuring the better childhood immunization coverage.

1.1.6 Accessibility and utilization of post natal care among rural mothers at primary health care level in Myanmar

(Please refer to annual review of Health Systems Research Division)

1.1.7 Out-of-Pocket Expenditure on Maternal and Child Healthcare services among rural households in selected township

(Please refer to annual review of Medical Statistics Division)

1.2 HEALTH SYSTEMS STRENGTHENING

1.2.1 Time and Motion Study on Patient Flow at First Point-of-Care Units in Tertiary Care Hospitals from the Public Sector, Myanmar (2016)

The improved understanding of complexity in patient flow and waiting time could enhance timely and effective case management. This study aimed to elicit the strength of health staff, patient flow, waiting time and challenges observed at first point-of-care units in six tertiary care hospitals from the public sector in Yangon and Mandalay cities, 2016. A cross-sectional, observational and non-intervention study design was used. The duration of the study was six months (July to December, 2016). The study was conducted in Yangon General Hospital (YGH), Central Women Hospital (CWH), Yankin Children Hospital (YKCH), Mandalay General Hospital (MGH), Mandalay Women Hospital (MWH) and Mandalay Children Hospital (MDCH). The research teams recruited new patients attending

the first point-of-care units to observe the waiting time continuously (starting from arrival and during assessment until final decision by the medical officer). Two weekdays and one weekend were sampled to represent the one week of patient flow process time to be noted round-the-clock. Trained data collectors observed and noted down the specific times (arrival time into the system, each stage of patient care process, discharge out of the system) for the selected patient visit. Data collectors synchronized the time of their wrist watches and stopwatches from their mobile phones. The patient flow analysis (PFA) methodology encompassed *both qualitative data from brief observation notes and quantitative time logs* to ascertain areas for improvement in patient care delivery. Findings indicated higher workload for health staff in these hospitals and the mismatches between supply and demand might affect the patient waiting times and efficiency. The observers at YKCH reported the highest arrival rates of patients in both weekdays and in the weekend especially during the day shift (23 patients per hour and 20 patients per hour, respectively). The referral cases were higher in YGH, MGH, and CWH ranging from 40-45% compared to the remaining hospitals. Less urgent cases had to wait for two hours or more and a maximum of over six hours due to overcrowding, fewer numbers of health staff especially at night shifts and at weekends, prolonged waiting time for ancillary investigations such as X-ray, ultrasonogram and other laboratory investigations to support relevant decisions. Strikingly at YKCH, 86% of patients arrived were allowed to go home at night shifts indicating the predominance of low acuity conditions. The proportion of non-urgent cases visited six tertiary care hospitals (combined) was around 32.1% (291/907) indicating the requirement to improve and strengthen the referral systems through urban health centres especially during day time at week-days. Thorough instructions were critical for those who were allowed to go home with cautiousness to continue medications and to aware of other danger signs that might need an immediate return to the hospital. Prolonged waiting time of more than 4 hours was noted in 13.8% of cases visited YGH (16/116) indicating the cases visited with complex conditions which required series of ancillary investigations and initial treatment at first point-of-care unit prior to admission. The study indicated the relevant requirements in further strengthening of triage system in hospital management policies including fast tracks and thorough screening of non-urgent cases as critical. Capacity building of health teams to improve efficiency required attention.

1.2.2 Assessment of knowledge and skills of BHS on major NCDs and the essential supplies and equipments at the primary health care level for major NCDs

Increasing trend of morbidity and mortality due to Non-Communicable Diseases (NCDs) was found in developing countries including Myanmar. NCDs account 59% of deaths in Myanmar in 2014 according to World Health Organization (WHO) estimates, mainly due to cardiovascular diseases (CVD), diabetes, cancer and chronic respiratory diseases (CRD). The study aims to assess service availability and readiness of NCDs by assessing the critical inputs (guidelines, trained staff, equipment, diagnostic capacity, medicines and commodities) in public health facilities at different levels and private hospitals. This study was conducted in 201 health facilities by using pretested WHO Service Availability and Readiness Assessment (SARA) questionnaire. Readiness score was calculated as weighted values to represent the country level. Facilities were stratified by type and randomly selected, including all public health facilities and all registered private hospitals. Face-to-face interviews were applied and confirmed by direct observation. Most hospitals offered services for diabetes, CVD, CRD, and most Rural Health Centres (RHCs) and sub-RHCs provided CVD and CRD services. However, RHC (70%) and sub-RHCs (48%) offered diabetes services. Availability for cervical cancer diagnosis was highest among general to district hospitals (77%) and lowest at township-level hospitals (12%). Except for

cervical cancer, both guidelines and trained staff were generally non-existent for NCDs service-offered facilities. Although most hospitals offered services in cervical cancer had a trained staff; highest in township-level public hospitals (60%) and lowest in private hospitals (5%), they lacked the guidelines. Concerning diabetes, the hospitals had better capacities for blood glucose testing and metformin availability than the RHCs and sub-RHCs. The majority of the hospitals had injectable insulin except township-level hospitals. For CVD, availability of different tracer equipment except oxygen were 5% in RHCs and the most available medicine was calcium-channel blocker and the least was hydrochlorothiazide tablets in all facilities. Regarding CRD, the availability of equipment, drugs and commodities were higher in hospitals than in other health facilities. However, specialized and private hospitals did not have peak flow meter, spacers, and salbutamol inhalers. Service availability of cervical cancer was noted in 60% of township hospitals (highest) and 5% of the private hospital (lowest). Overall readiness scores are 48% (Diabetes), 48% (CVD), 39% (CRD), and 50% (Ca Cervix) respectively. This study highlighted that health facility enhancement are needed concerning NCDs as part of the health systems strengthening in Myanmar, and it can help the health programmes in countrywide resource generation and allocation for NCDs services.

1.2.3 Assessment of utilization of Urban Health Centres in Yangon and Mandalay Regions

(Please refer to annual review of Health Systems Research Division)

1.2.4 Primary Health Care Systems Strengthening in Hlegu Township at Yangon Region, Myanmar: Baseline Studies (2015-2016)

(Please refer to annual review of Health Systems Research Division)

2. **COMMUNICABLE DISEASES**

2.1 HIV/AIDS

2.1.1. Mindfulness-integrated reproductive health (Mind-RH) package for improving psychological behaviours and reproductive health knowledge among adolescents with parental HIV infection

(Please refer to Medical Statistics Division)

2.2 TUBERCULOSIS

2.2.1 Service availability and readiness assessment of tuberculosis in public and private health facilities, Myanmar

Myanmar is among the 30 highest TB burden countries worldwide. In 2014, 141,975 cases of TB and 5,632 cases of MDR-TB were recorded. TB incidence rate was 369, prevalence rate was 457 and death rate was 53 per 100,000 per year. (TB Control Achievement of National Tuberculosis Programme, 2014). In this study, we investigate the service availability and readiness assessment of TB in public and private health facilities, Myanmar. This study is part of the comprehensive National Services Availability and Readiness assessment (SARA) in Myanmar and aimed to assess Tuberculosis service availability and readiness of public and private health facilities. A cross-sectional study was done among randomly selected 201 health facilities (HF); 166 public facilities and 35 private facilities) from all states and regions in 2014. After getting informed consent, interviewing

and observations were done by trained medical officers. WHO standard SARA questionnaire was adapted into Myanmar context and pre-tested. Service availability assessment included the availability of services for TB diagnosis, drug prescription, and management and treatment follow-up of TB patients. Among 201 facilities, majority of facilities reported to offer TB services - from 69% of sub-RHCs to 100% of general, state and district hospitals. The readiness assessment was done among facilities that reported to offer TB services, and it was based on three domains and 12 tracer items. As guidelines and trained staff are well in place, the services in public health facilities were higher than private hospitals. For diagnosis, 97% of public hospital and 94% of private hospital could diagnose TB. Concerning TB medications, (68%) of private hospitals and (60%) of the general, state and district hospitals had the availability of all first-line TB drugs. However, the RHCs and sub-RHCs were not provided with first-line TB drugs because the medicines were kept at their respective TB control teams and directly provided to the patients. The findings provided the effective input to National TB programme and also gave information about resources and services needed in prevention and treatment of TB in Myanmar.

1. NON-COMMUNICABLE DISEASES

3.1 CARDIOVASCULAR DISEASES

3.1.1 The role of betel quid in the risk of acute myocardial infarction

Cardiovascular diseases (CVD) account for nearly 30 percent of all deaths in low and middle income countries. In the recent years, non-conventional risk factors or markers such as areca nut chewing and Apolipoprotein A have been proposed for acute myocardial infarction (AMI), a major CVD. Among them, betel quid chewing is particularly relevant to Asian countries like Myanmar where this practice is quite prevalent. The relative importance of conventional risk factors for AMI may vary from country to country. Therefore, this study aims to determine the independent association of betel quid chewing and the risk of acute myocardial infarction and to assess the strength of association between conventional risk factors and acute myocardial infarction using a sex and age-matched case-control study design. The study was conducted at Department of Cardiology, Yangon General Hospital from January 2016 to October 2016. Patients who were admitted at the Department of Cardiology and diagnosed as AMI by cardiologist was recruited as cases. One age-matched (up to 5 years older or younger) and sex-matched and unrelated (not first-degree relative) visitor of a cardiac patient was recruited as a control within 2 weeks of recruitment of each case. One hundred and fifty cases and the equal number of controls were recruited. Interviews using pretested structured questionnaires, physical examinations and random blood tests by dry chemistry were performed in the same manner in cases and controls. For the risk of AMI, unadjusted OR was 1.01 (95% CI=0.42, 2.44, $p=0.98$) for former chewers and 1.04 (95% CI=0.63, 1.72, $p=0.88$) for current chewers. At binary multiple logistic regression, adjusted OR (95% CI) were 1.34 (0.48, 3.71) for former chewing and 0.68(0.34,1.34) for current chewing; 3.22 (1.26, 8.23) for former smoking and 8.07 (3.77, 17.3) for current smoking; 0.48 (0.20, 1.16) for former drinking and 0.73 (0.32, 1.67) for current drinking; 0.42 (0.23, 0.77) for regular exercise; 0.71 (0.33, 1.53) for fruit and vegetable 1-2 servings per day, 0.27 (0.13, 0.57) for fruit and vegetable 3-4 servings per day and 0.33 (0.11, 1.05) for fruit and vegetable 5+ servings per day; 3.95 (1.26,12.36) for deep fried food consumption; 1.30 (0.36,4.63) for salty food 1 time per day, 2.35 (1.28, 4.31) for 2-3 times per day; 0.97 (0.51, 1.82) for some periods of general stress, 2.32 (0.99, 5.46) for several periods or permanent stress; and 3.47 (1.64, 7.33) for diabetes. It can be concluded that betel quid chewing is not an important risk factor of AMI in the adult study population of Yangon and surrounding areas.

However, the control of betel quid chewing remains a priority health intervention in Myanmar because it is an established risk factor for oral cancer. The study highlighted that the most important and potent risk factors of AMI were smoking, consumption of deep-fried foods and diabetes in order of strength of association. Also, psychological stress played an important role in the development of AMI. The study further revealed that the strong protective factors of AMI were regular exercise and daily high consumption of fruits and vegetables. High priority should be given to control smoking and diabetes to curb the disease burden of AMI in Myanmar. Communities and families should be educated to adopt regular exercise and healthy diet, especially, avoidance of deep fried foods and salty foods and to encourage high consumption of fruits and vegetables. Stress management and mental health should be an essential component of prevention and control of cardiovascular diseases. Together with data on prevalence of these risk factors in Myanmar, strengths of association of important risk factors elucidated from this study can be used to estimate the population attributable risk of acute myocardial infarction.

3.2 DIABETES

3.2.1 Treatment seeking behaviours and compliance of treatment in diabetes patients living in rural area

To achieve the good quality of life in diabetes patients, early diagnosis and taking regular treatment is important before suffering subsequent complications. The study aimed to determine the current condition of treatment-seeking behaviour and compliance of treatment in diabetes patients living in rural areas. A cross-sectional study conducted in Thanatpin Township, Bago Region in 2016 included structured interviews of 288 diabetes patients and 60 Basic Health Staff and measurement of glycosylated hemoglobin (HbA1c) for all diabetes patients. Over 80% of respondents (237/288) were women. Their mean age was 55.5 ± 10.27 years ranged from 28 to 84 years. Nearly 43% (125/288) of respondents had not completed primary education. Half of the respondents were farmers and 25% of respondents were housewives. Nearly 30% of respondents (86/288) had monthly household income less than 100,000 kyats. The average year of duration of having diabetes was 4 years (range less than a year to 29 years) diagnosed either by doctors (60%; 179/288) or by HA and MWs (10%, 28/288). Just over half of respondents (53%, 152/288) sought diabetes care at private clinics followed by rural health centre (18%, 53/288). Major reasons for seeking care at private clinics included: recommended by another person (38.8%, 59/152), trust on health care (33.6%, 51/152) and satisfied with care (27%, 41/152). The major reason for choosing RHC to seek care (62.3%, 33/53) was easy accessibility. Only half of the respondents who sought care at private clinics, continued seeking care in that clinics whereas 72% (38/53) of respondents continued treatment at RHC. Approximately 20% of respondents did not continue follow-up visit regularly. The main reason cited for discontinued care was that they resume normal well-being with no signs and symptoms. Around 70% of respondents (202/288) did not receive health education about eating more vegetables, and importantly 16.7% of them, (48/288) did not get information to avoid sweet food. Moreover, nearly 45% (128/288) had not received education to do regular exercise. In addition, nearly 70% (196/288) had not received counseling for regular follow up and half of the respondents (50%, 144/288) did not receive education for regular glucose monitoring. About one-fourth of respondents (72/288) did not get counseling for taking regular medicine. About (95%, 271/288) respondents take oral hypoglycemic drugs and only (3.5%, 10/288) take insulin injection to control diabetes. However, almost half of respondents (46.5%, 134/288) had not managed their diet to control diabetes. Only half of the respondents (48%, 138/288) strictly followed the instruction of regularly taking medicine. Only (36/276, 13%) of respondents,

who were tested by HbA1c test, achieved the recommended goal of a HbA1c level (<7%). Results indicated poor provision of health education and counseling by health care personnel especially in life style modifications with regular follow-up and treatment. Reliance of private clinics to seek diabetes care rather than RHC, station hospitals and township hospitals may lead to increase out-of-pocket expenditure, irregular follow-up and poor compliance. Therefore, public sector health facilities in rural areas should be integrated with intensive training and provision of facilities and equipment for diabetes care.

3.3 TOBACCO

3.3.1 Awareness and attitude of married couples on risk of smoking and smokeless tobacco on pregnancy in selected rural area.

(Please refer to annual review of Health Systems Research Division)

3.4 HAEMATOLOGICAL DISORDERS

3.4.1 The distribution of HLA-A alleles frequencies in (8) Major ethnic groups of Myanmar

(Please refer to annual review of Blood Programming Division)

3.5 NUTRITION

3.5.1 Development of equation for prediction of total body water by using deuterium dilution method and bioelectrical impedance analysis (BIA) among children

(Please refer to annual review of Nuclear Medicine Division)

SERVICES PROVIDED

ACADEMIC

Sr. No.	Name	Course	Responsibility
1.	Dr. Ko Ko Zaw	MPH Epidemiology Lectures for Master of Public Health (MPH) Training at University of Public Health MPTM training at University of Medicine 1 (Yangon), University of Medicine 2 (Yangon) Workshop on Research Methodology at DMR Quantitative skills for Medical Oncology M.Sc Students	Lecturer/Supervisor /External examiner Lecturer/External examiner Lecturer Lecturer
2.	Dr. Su Latt Tun Myint	Ministry of Health and Sports Newsletter	Editorial board member

EPIDEMIOLOGY RESEARCH DIVISION (POL)

Deputy Director & Head	...	Dr. Thida MBBS, MMedSc (Public Health) (UMM)
Research Scientist	...	Dr. Phyu Phyu Thin Zaw MBBS (UMM), PhD (Epidemiology) (Prince of Songkla University, Thailand), Postdoctoral Study (Asia Health Policy, Stanford University, USA)
Research Officer	...	Dr. Kyaw Ko Ko Htet MBBS (UMM), MSc (Epidemiology) (Prince of Songkla University, Thailand)
	...	Dr. Kyaw Zayar Lynn MBBS (UMM)
	...	Dr. Kyaw Thu Hein MBBS (UMM)
Research Assistant (3)	...	Daw Yee Yee Myint BSc (Physics) (MU)
	...	Daw Nwe Nwe Kyaw BSc (Physics) (UDE), Dip. Marketing Management (MRCC)
	...	Daw Sandar Htay BSc (Physics) (UDE)
	...	Daw Phyu Phyu Khaing BA (Geography) (UDE)
	...	U Min Htut Kyaw BA (Economics) (UDE)

Epidemiology Research Division mainly focuses research activities on reproductive health, tuberculosis, HIV/AIDS, and metabolic diseases.

RESEARCH PROJECTS

1. HEALTH POLICY AND HEALTH SYSTEMS RESEARCH

1.1 REPRODUCTIVE HEALTH

1.1.1 Facility assessment for reproductive health commodities and services (2016)

A nation-wide survey across public health services with a representative sample of health facilities over all states and regions was undertaken since 2014 to track RHCS indicators, such as the availability of RH commodities, supply chain (including cold chain) systems, staff training and supervision; availability of guidelines and protocols, Information Communication Technology and method of waste disposal. In this survey, it also obtained the views of clients about the quality and cost of services through exit interviews. A cross sectional descriptive study design was conducted in 356 health facilities including 172 at primary level, 161 at secondary level, and 23 at tertiary level. Out of the 356 facilities surveyed; 131 were located at urban and 225 were at rural areas. Department of Medical Research (Pyin Oo Lwin Branch) mainly carried out data collection activities with assistance of Department of Public Health and Department of Medical Services. Survey findings revealed that at primary level health facility (HFs), 84.3% offered at least three modern contraceptive methods. For secondary and tertiary level HFs, 62.5% could offer at least five modern contraceptives. On the day of assessment showed that implant and ECP were highest stock-out contraceptive methods. The rate for “at least one method stock-out” was higher for primary level HFs. Overall 48.6% of the HFs had available all the seven including the two essential lifesaving maternal and RH medicines. Urban rural difference was significant (63% vs. 40%, $P < 0.001$). The main source of supplies of contraceptives was the Township Health Departments (48.9%) which was utilized by 68% of the facilities in the rural area. Most of HFs especially secondary and primary levels stated that the interval between order and receipt was irregular (42% and 41%, respectively). Availability of cold chain was higher in

tertiary and secondary level HFs (100% and 84%) and too much less in primary level HFs (34%). More than 80% was electric system and less than 25% was ice box. About two third (66%) of HFs had trained staff for birth spacing services but trained staff for implant was only 17%. Only 23.3% of HFs received supervisory visits at every six to twelve months. Supervision was mostly related to logistics, reporting and clinical treatment. Most frequently available guidebook was “Job aid for antenatal care” (77%) and “Guidebook for antenatal care” (68%). Regarding the guide for BS, 57% of HFs had “Checklist for BS”. “National guidebook for BS” was available at 33% of HFs only. “Guide for waste disposal” was least available at only 21% of HFs. Most frequent uses of mobile phone and smart phone were for routine communication, consultation and medical indent. Waste was disposed by burying (44%), burning (33%) and incineration method (8%) of HFs. About 11% said that they had spent some amount for medicine from the clinic (about 1500 kyats) and 7% had spent for to buy medicine from outside (about 1000 kyats). Clients were generally satisfied with the quality of services from FP providers. Favorable response for situation of clinic was in high rates. Most of visitors expressed that they were satisfied about cleanliness and privacy at the health centre.

1.1.2 Baseline practices and coverage of maternal newborn and child health care in Kanpetlet Township, Southern Chin State, Myanmar

Current practices of Maternal and Newborn and Child Health (MNCH) and responses to complicated MNCH issues were explored in Kanpetlet Township, Chin State during 2016 for an effective MNCH promotion through community network activities. A cross-sectional study using both qualitative and quantitative methods was conducted with 200 mothers who had children of age 2 years or less and 25 health care providers. Among the eligible mothers, 37.5% was from hard-to reach villages which was not possible to reach by car in any season. Eighty-three percent had at least one antenatal care (ANC) with a skilled birth attendant (SBA) for their last pregnancy and 33.1% completed 4 ANC visits. The SBA rate was 34.5% and 61.0% had at least one postnatal care (PNC) with SBA. The rate of contraceptive use was 36.5%. Mother’s compliance to the supportive emergency obstetric referral was satisfactory. Ninety-five percent of mothers started demand breast feeding soon after delivery and almost all mothers kept their newborns warm. Most of the mothers from the hard-to-reach villages could not seek skilled health care providers in case of newborn emergencies. There was a common practice of applying charcoal powder or traditionally accepted materials to the infected umbilicus. Out of 212 children aged ≤ 2 years, measles vaccination coverage was 96.4%. The supplementation of vitamin A and anthelmintics during last 6 month was 87.6% and 59.0%, respectively. The prevalence of acute respiratory tract infections, acute diarrhoea and suspected malaria was 86.7%, 76.4% and 4.7% respectively. About 39% of mothers reduced the amount of feeding to their ill child. Self-medication with antibiotics to the ill child was common. The median day of seeking any health care of the ill child was 2 days. In regression analysis, mothers who knew at least three postnatal danger signs were more likely to have delivery with SBA compared to the reference category (AOR=6.6, 95% CI = 1.35-32.19, $p=0.02$) and to use contraception (AOR=8.0, 95% CI = 1.72-37.42, $p=0.005$). Delivery with SBA reduced half among mothers from hard-to-reach villages (AOR=0.4, 95% CI = 0.22-0.91, $p=0.02$) and it happened even among mothers who knew availability of maternal support group in her village (AOR=0.4, 95% CI = 0.2-0.93, $p=0.03$). Mothers who received PNC from SBA only if there were newborn or maternal complications. Current practices and responses to MNCH care among mothers are still weak and promotion of MNCH activities is essentially needed in Kanpetlet Township.

2. COMMUNICABLE DISEASES

2.1 TUBERCULOSIS

2.1.1 Cost-effectiveness of the interventional model for detecting pulmonary tuberculosis among contacts in Myanmar

National guidelines concerning household contact tracing for pulmonary tuberculosis (TB) vary reflecting different case detection and cost estimation. The objective of this study was to determine cost spent for detecting one TB case among household contacts comparing modified conventional with interventional models in Mandalay City, Myanmar. The research team recruited a total of 174 household contacts of randomly selected 40 index TB cases from township TB registers of seven townships of Mandalay City during January to August 2016. Case detection and cost estimation for diagnostic procedures in modified conventional and interventional models were calculated. The modified conventional model included screening signs and symptoms, sputum examination for those with positive signs and symptoms and chest X-ray (CXR) if there was a negative sputum. The interventional model included CXR, sputum examination if abnormal CXR and Xpert MTB/RIF assay for negative sputum results. Both models were stratified into household contacts aged ≥ 15 years ($n=115$) and those aged <15 years ($n=59$). The interventional model revealed higher case detection rate that covers both age strata compared to the modified conventional model. Cost per TB case detected was US\$35.41 in an interventional compared to the modified conventional model. The probability of intervention being cost-effective with threshold at US\$100 per case detected was 81% (83% for those aged ≥ 15 years and 65% for those aged <15 years). The interventional model was more cost-effective to detect one more pulmonary TB in contacts compared to modified conventional model particularly for those aged ≥ 15 years. Investigating cost estimation of other procedures among contacts aged <15 years should be conducted.

2.1.2 Prevalence of positive tuberculosis among household contacts of tuberculosis patients and its determinants in Myanmar

Contact tracing of household members of patients with pulmonary tuberculosis (TB) is recommended. However, actual implementation is limited. The objective of this study was to assess the prevalence of TB among household contacts and to ascertain the determinants and distribution of TB in Mandalay City, Myanmar. A cross sectional study was conducted from January to August, 2016. Out of randomly selected 40 index TB cases from township TB registers of Mandalay City during 2015, their respective 174 household contacts were included in this study. All 40 index TB cases were visited and interviewed and sputum specimens were collected from household contacts aged ≥ 15 years for smear and Xpert MTB/RIF examinations. All contacts had chest X-ray (CXR) performed in the responsible facilities. Out of 174 household contacts, 66.1% (115/174) were aged ≥ 15 years and 33.9% (59/174) were aged <15 years. Contacts aged ≥ 15 years had positive TB in 12.2% (14/115) and those aged <15 years had 16.9% (10/59). Determinants of positive TB among contacts were being a caretaker of an index TB (Adjusted odds ratio (AOR)= 10.4, 95% CI= 3.0-34.9, $p<0.001$), smoking (AOR= 6.4, 95% CI=1.4-28.5, $p=0.044$), passive-smoking (AOR= 4.0, 95% CI=1.2-12.6, $p=0.017$) and drinking alcohol (AOR= 4.6, 95% CI= 1.02-20.83, $p=0.015$). The extraordinary arrangement of transportation for all contacts was organized to achieve CXR. Close contact, smoking and drinking alcohol were predominant risk factors among others. Logistics management and financial administration are important to strengthen contact tracing.

2.2. HIV/AIDS

2.2.1. Needs of clients and providers relating to quality HIV prevention and care services for key population

A qualitative study was conducted with purposively selected female sex workers (FSW), men who have sex with men (MSM) and intra venous drug users (IVDU) who took treatment from National AIDS Programme (NAP) and two International Non-Governmental Organizations (INGOs) in Mandalay, Lashio and Monywa from 1st August 2015 to 31st July, 2016. At least four clients from each key population were selected from both NAP and INGOs. In addition, key informant interviews were done including regional officers, administrative staff and technical staff from NAP and INGOs. All interviewed FSW, MSM and IVDU reported that the utilization of HIV/STI services was higher in their respective society. All providers reported that the utilization rate among 10-24 years age group of key populations was increasing over trends and more significant in INGOs but it was lower than that of adult population over 24 years old. At the HIV/STI service centre of NAP and INGOs, diagnostic and treatment services were mostly accessed by the adult population but less used by the young key population. During an outreach activity, the young key population had more exposure on using diagnostic and treatment services of HIV/STI services compared to adult group. Reasons for less utilization of HIV/STI services explored were clients' perspectives including perceived threats of having HIV/STI, overcrowding and less confidentiality at services and providers' perspectives including absence of peer, being shy and stigmatization, choice of provider and long distance to HIV/STI services. Clients created model HIV/STI service that they wanted to access regarding the location, structure, characteristics of staff and services available. The most favorable things among FSW, MSM and IVDU at HIV/STI services were confidentiality, privacy and good communication skills. While having enough counseling time is essential for FSW and MSM, skillfulness of provider in treatment is important for IVDU. Diagnosis and treatment of HIV/STI is mainly provided at NAP. Diagnosis test for HIV/STI is available at INGOs but only a few INGOs provided treatment for STI. The NAP had enough drug and test kits supply throughout the year but some INGOs at peripheral level had shortage of drugs and test kits. Although staff is enough for running day-to-day service, skillful staff are needed including counselors, technical staff etc. to initiate other activities such as mobile clinic, outreach activities and community based education programme of HIV/STI services. To promote utilization of HIV/STI services among young and key population, it is needed to have regular and frequent outreach activities, to organize one stop service with enough providers and drugs supply and to ensure favorable services for all.

SERVICES PROVIDED

ACADEMIC

Sr.	Name	Course	Responsibility
1.	Dr. Phyu Phyu Thin Zaw	Interviewer training on time-motion study on patient waiting time at the emergency departments of tertiary care hospitals from public sector	Trainer
2.	Dr. Kyaw Ko Ko Htet	Workshop on Prioritizing new research areas for maternal and reproductive health in Myanmar	Facilitator