MEDICAL STATISTICS DIVISION

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Medical Statistics Division has been actively engaged in conducting research projects in areas of HIV, Malaria, reproductive health and services such as statistical consultation, data analysis provided to researchers and post-graduate students.

RESEARCH PROJECTS

1. COMMUNICABLE DISEASES

1.1. HIV/AIDS

1.1.1 Grouped mindfulness training for improving psychological and reproductive behaviors among adolescents with parental HIV infection
(Please refer to Annual Report of Epidemiology Research Division)

1.1.2 Assessment on cascade of prevention of mother-to-child transmission services received by HIV positive mothers during 2012 and 2014, Myanmar
(Please refer to Annual Report of Epidemiology Research Division)

1.2 MALARIA

1.2.1 Preference and acceptability study of insecticide treated clothing in Mon State, Myanmar

This study was carried out during 2014 and 2015 in collaboration with National Malaria Control Program (NMCP) and Malaria Consortium being conducted in Thanphyuzayat Township, Mon State. A cluster randomized cross-over trial investigated the preference and acceptability of insecticide treated clothing (ITCs) by rubber plantation workers. Altogether 234 rubber tappers (both sexes) in 16 rubber plantation clusters were enrolled in a two-arm trial (ITC versus non-treated clothing-NTC) and randomly allocated to the order of clothing distribution. Structured questionnaires and 32 focus group discussions were conducted at baseline and three follow-ups. Preliminary findings suggested that acceptability of ITC and NTC was very high and perception of the clothing as ‘good’ in both arms. There was no significant difference between two arms at the 5% level. Around 94% (95% CI: 92.1-97.3) of respondents in both arms reported liking the clothing overall, and perceived the clothing to reduce mosquito bites (92.1% [89.4-95.6]), provide warmth (91.6% [88.5-94.9]), be pleasant to wear for night time work (95.6% [93.4-98.1]), easy to clean

(92.1% [89.4-95.6]), and comfortable (93.8% [91.2-96.7]). Focus Group Discussions also revealed the acceptance of ITCs. However, the lack of significant difference in perceived protection of ITC versus NTC against mosquitoes may be explained by low mosquito biting pressure due to the dry season. Thus, high acceptability and adherence demonstrate that ITC could be an effective strategy for outdoor malaria prevention among night time workers who are beyond the reach of core vector control strategies.

1.2.2 Retrospective Study of Gametocytemia and Hematological Profile in *Falciparum* Malaria

Gametocytes, the sexual stage of malaria parasites, play a major role in disease transmission. Anaemia and a few other factors have been found to be associated with gametocytaemia in falciparum malaria. Intestinal parasitic infection, a usual cause of anaemia, is common in these patients but its synergistic roles in the gametocyte development are not yet known. This retrospective data collection was conducted from hospital records of patients admitted to Bangkok Hospital for Tropical Diseases, Thailand. Medical records of in-patients infected with P. *falciparum* malaria between 1990-2000 were reviewed. The study was approved by Ethics Committee of the Faculty of Tropical Medicine (FTM ECF-019-03). 216 males with Plasmodium malaria infection were included. All patients were randomized to nine different anti-malarial regimens. The overall prevalence of gametocyte carriage rates were 59.7% (n=192/216) detected first either before (31%, n= 67) or after (58%, n= 125) the treatments. Among 220 patients who underwent stool examinations, 158 (75%) had intestinal parasitic infection (24.1% hook worm, 41.1% non hookworm and 34.8% mixed infections). Of all gametocytic patients, 46% (99/220) had intestinal parasites. The geometric means of gametocytes in Day0 to Day28 ranged from 19/µL to 568/µL. The admission hematological profiles (RBC, Hb, Hct, platelets and lymphocyte count) were significantly different between patients with and without gametocytes ($P < 0.05$) and also between patients with and without intestinal parasites ($P < 0.05$). There were no significant correlations between the PCT and the GCT. Hematocrit (Hct) was the only variation associated with gametocytaemia ($P =< 0.001$) after controlling for confounding factors (days of fever, splenomegaly, nausea, vomiting, red blood cells, hemoglobin, hematocrit, platelets and lymphocytes). After controlling for the day of fever prior to admission, hematocrit and lymphocyte were risk factors in patients with overall gametocytes. The median hematocrit values were not significantly different in patients with gametocytes with and without intestinal parasites. The median hematocrit values between patients with hookworm infection and other intestinal worm infection (32.5% vs. 35%) were also not significantly different ($P=0.096$). Gametocytaemia in falciparum malaria infection is significantly associated with anemia. A co-infected intestinal parasite(s) is commonly associated with lower hematocrit levels but is not a causal effect of gametocyte development.

1.3 TB

1.3.1 Active Case Finding for TB through mobile teams and community involvement: Process evaluation

(Please refer to Annual Report of Health System Research Division)

2. HEALTH SYSTEMS RESEARCH

2.1 REPRODUCTIVE HEALTH

2.1.1 How women are treated during facility-based childbirth (Phase 1): development and validation of measurement tools in four countries

This multi-country study was carried out in collaboration with Maternal and Reproductive Health Division (Department of Public Health) and WHO/RHR aiming to develop an evidence-based definition and identification criteria of respectful and disrespectful care during childbirth in facilities. In September 2015, data collection was conducted in Bago and Taungoo, Townships of Bago Region by using qualitative data collection methods. A total of 32 IDIs with women who gave birth during last 12 months, 8 FGDs with women who gave birth during last 5 years and 29 IDIs with health care providers including hospital administrators, doctors and nurses participated in this study. Most of the clients decided themselves to deliver at hospital. Some decisions were influenced by midwives, doctors and nurses, and some were influenced by their family members. The two most common factors influenced to deliver at the hospital were difficult labor at home and thinking of baby and mother were at risk in home delivery. The main reasons for preference of hospital were availability of adequate medicines and equipment, safe delivery and presence of kind-hearted and good-natured medical professionals. Clients from rural areas had more caesarean section than those from urban area. Most of the respondents experienced good and respectful care during their facility-based childbirths. However, some of the respondents mentioned that during their hospital stays, they were being scolded concerning with accompanying patient attendants. It was also found that the common problem was concerned with ward guards. From the provider's side, the workload and overload of the patients mostly affect the quality of childbirth care. Regarding the acceptability of pinch or slab during delivery, clients from urban area were more acceptable than those from rural area by the reasons that it was the manner of encouraging or it was done for their sake. The reasons for unacceptable were it made them sad, worried and fear. Most of the clients answered that yell or shout by health workers during labor could not be accepted and they would feel unhappy, sad and angry when they encountered. In spite of not being encountered the experience of refusing to help during labor by health care persons, the portion of clients who were unacceptable to that was significantly higher than those who were acceptable. Most of the clients accepted to physically restrain woman during labor as they thought it was for their sake, to fasten labor and it was some kinds of protection or encouragement. However, some clients answered that they could not accept because they wanted to feel free during struggle period.

2.1.2 Access to maternal, newborn and child health care services among migrants in Bogale and Mawlamyinegyun Townships

A collaborative study among Department of Medical Research, Maternal and Reproductive Health Division and International Organization for Migration had been carried out. The aim was to identify the access to maternal and child health care services among migrants and possible mechanisms to promote the health care utilization among migrant mothers and children. It was conducted in October and November 2014 in two delta townships, Bogale and Mawlamyinegyun, which had highest maternal mortality rates in Ayeyarwaddy Region. The questionnaire survey with 550 migrant mothers having under two years old children, in depth interviews with 26 migrant mothers and key informant interviews with 21 basic health staff, 15 voluntary health workers and 11 village health committee members were performed. Common health problems among migrant mothers and children

and access to maternal and child health services among the migrants were identified. Among 550 migrant mothers, 485 (88.18%) said that they received antenatal (AN) care whilst 95% (459/550) of those received AN Care from health care providers including auxiliary midwives (AMW). However, approximately one fifth of them (100, 21.8%) received all components of AN care. Again, only 40% of these mothers received AN care for at least four times. Skilled delivery was found among just around one third (199, 39.2%) of migrant women. Nearly half (236, 46.5%) of the deliveries were attended by traditional birth attendants. However, migrant mothers with relatively higher education level was significantly more likely to opt for skilled delivery and those sought antenatal care from skilled health personnel ($p=0.002$ and $p<0.001$ respectively). The common reasons for not using skilled birth attendant (SBA) were lack of affordability to cost of delivery (47.6%), no SBA nearby at the time of delivery (36.9%) and difficulty in transportation to reach SBA (21%). The majority (407, 80%) revealed that they received postnatal care after child birth. However, only about half (210, 51.6%) of them sought PN care from skilled providers. The traditional birth attendants were the commonest PN care providers as the migrant mothers frequently delivered with TBA. Among 17 months to 2 years old migrant children, only 35(17.76%) received full dose of EPI. According to qualitative findings, the majority received three doses of pentavalent vaccine and usually missed measles vaccine because they stayed in village for only 6 months during harvest seasons. The main reasons for missing EPI among migrant children were being moving from place to place and not getting information about the date and place of EPI and perceived that they were not eligible to receive EPI at their currently living villages. The first and foremost thing to be carried out to achieving UHC is to ensure the service availability among all population groups. Although not an easy task, there are several possibilities for the inclusion of internal migrants in routine health care delivery system. Those activities may include strengthening collaboration between health workers and local authorities and employers, ensuring for regular recording, registration and sharing information of migrant mothers and children among health workers and local authorities and implementing an incentive mechanism. In addition, solving transportation difficulties for migrants may remain as a short term solution to improve their access to maternal and child health care.

2.1.3 Role of drug shops in provision of contraceptives in selected township, Myanmar

This collaborative study between Department of Medical Research and Maternal and Reproductive Health Division has been conducted during August to November 2014. A cross-sectional study aimed to identify availability and the drug sellers' knowledge and dispensing practice of contraception in Hlaingtharyar Township. The availability, types and brands of contraceptive were assessed by observing 175 drug stores by using a check list. Face-to-face interviews with 175 drug sellers using semi-structured questionnaire and informal discussion with 16 drug sellers were conducted to identify the knowledge and practice of the drug sellers in provision of contraceptives and misoprostol. A mystery client method was also applied in 14 shops one month after data collection to explore the actual dispensing practice of drug sellers. Most of the drug sellers were graduates (65%) and had reported to receive any kind of pharmaceutical training (61.5%). However, only 2.9% obtained the degree on pharmacy. Nearly all (94.8%) did not receive any training relating to contraception. Drug shops provided a wide variety of short term contraceptive commodities. Among others, emergency contraception was the best selling medicine in most of the drug shops (84%) and more frequently bought by male clients. Penorit and similar drugs were available in (57.5%) of shops and (5.8%) sold misoprostol and mifepristone. The drug sellers were asked 44 knowledge items for contraception and 34 items for misoprostol and related drugs. Drug sellers could correctly answer up to 25 questions for contraception and 12

questions for misoprostol and related drugs. Most of the drug sellers did not know anything about the side effects and contraindication of Oral Contraceptive pills (55%), Emergency Contraceptive pills (50%), misoprostol (59%) and mifepristone (84%). The mean knowledge score of drug sellers having pharmaceutical training was significantly higher than those not getting training (13.3 and 10.8, p=0.007). Mystery client study found out that drug sellers sold contraception and misoprostol without asking the prescription. Information regarding appropriate method choice and instructions for use are not spontaneously given and upon asking, a few drug shops told wrong information. Mystery shoppers buying misoprostol revealed that all drug sellers who sold misoprostol provided incorrect dosage and information. Therapeutic abortion is allowed to save the life of mothers in Myanmar. However, misoprostol and similar drugs are available without prescription with the intention of abortion. In addition, the drug sellers could not provide correct dosage and information relating to these medicines. Therefore, proper regulation mechanism is needed to prevent selling of misoprostol and similar drugs incorrectly and illegally.

2.1.4 Role of voluntary health workers in Maternal and Child Health Care for Migrants in Bogale and Mawlamyinegyun Townships, Myanmar

This is a collaborative research between DMR, Maternal and Reproductive Health Division, Department of Public Health and International Organization for Migration (IOM). It aimed to find out the existing situation of Maternal and Child Health (MCH) provided by Voluntary Health Workers (VHW) for migrants and to elicit opinions and suggestions of migrants, Basic Health Staff and VHWs. The study was conducted in 87 villages of Bogale and Mawlamyinegyun Townships by using both quantitative and qualitative methods. Face-to-face interviews with 550 migrant mothers who had under two years old children, 15 Focus Group Discussions with migrant mothers, 30 In depth Interviews with Auxiliary Midwives (AMWs) and 25 Community Health Workers (CHWs) and 42 Key Informant Interviews with Basic Health Staff (BHS), IOM staff and Village Tract Health Committee members were conducted. About 66.5% of mothers have heard of AMW and 60.7% heard about CHW respectively. However, they did not know the term "AMW" or "CHW". Most of the migrant mothers do not know services provided by AMW and CHW while about 40% knew AN care and 36% knew AMW helped in EPI and 35% knew delivery as services provided by AMW. Majority of BHS and VHWs were aware that migrants have less health care services than residents. Some said it was more likely missing child immunization than AN care. Majority of BHS and VHWs said that they provided health care if they came across migrant mothers and children. However, most of them did not try to find migrant families while they were providing routine health care such as EPI and AN care. Although migrants were less aware of VHW and available health care services, role of VHWs in providing MCH services for migrants is crucial. VHWs and BHS faced challenges to provide MCH care for migrants through routine programme. There was a gap in information sharing among administrative authority, VHWs and BHS regarding migrant mothers and children. Lack of Information on migrant mothers and children in Health Management Information System (HMIS) contribute to inaccessibility of MCH services. Inadequate support for VHWs is a weakness for reaching migrants and risk for long term sustainability. Recording and sharing of migrant information was crucial for accessibility of health services by migrants. Dissemination workshops at township level were conducted in Bogale and in Mawlamyinegyun. Dissemination workshop at the national level was done in Naypyidaw and attended by implementing partners form multiple sectors. Recommendations for future plan of action for migrants' MCH were drawn.

2.1.5 Accessibility and utilization of maternal, newborn and children care services among migrant and mobile population in Bogale and Mawlamyinegyun Townships

This is a collaborative study between DMR, Maternal and Reproductive Health Division (Department of Health) and International for Organization for Migration (IOM). This study was conducted to explore the accessibility and utilization of maternal, newborn, and child health services among migrant and mobile population in Bogale and Mawlamyinegyun Townships . Interviewer training and pretesting of the data collection tools was done in October 2014. A total of 1178 face-to-face interviews with mobile and migrant mothers who had delivered within 2 years were done. In depth interview with 39 mothers, key informant interview with 37 basic health staff and 6 IOM staff were also performed. Out of 1187 migrant households, 591 (49.8%) were from Bogale and 596 (50.2%) were from Mawlamyinegyun townships. The studied households have undertaken significant internal migration within the Ayeyarwaddy Region. The migration dynamic is easily guessable as they move from one place to another based on the seasonal opportunity of works. Main reason for migration was availability of jobs at the destination villages/townships (856, 72%) followed by expectation of earning more money (200, 17 %). Nearly half of the studied households (550, 46.3%) had mothers of under two years old children. Among them, 485 (88.18%) said that they received AN Care whilst 95% (459) of those got AN Care from health care providers including AMW. However, all components of AN care were received by approximately one fifth of them (100, 21.8%). Again, only 40% of these mothers received AN care for at least four times. Skilled delivery was found among just around one third (199, 39.2%) of migrant women. Nearly half (236, 46.5%) of the deliveries were attended by traditional birth attendants. However, skilled delivery was more likely to found among migrant mothers with relatively higher education level and those sought antenatal care from skilled health personals ($p=0.002$ and $p<0.001$ respectively). The common reasons for not using skilled birth attendant (SBA) were being unaffordable to cost of delivery (47.6%), no SBA nearby at the time of delivery (36.9%) and difficulty in transportation to reach SBA (21%). Besides, migrant mothers preferred TBA for many reasons. Among 17 months to 2 years old migrant children, only 35(17.76%) received full dose of EPI. According to qualitative findings, majority received three doses of Pentavalent vaccine and usually missed measles vaccine because they stayed in village for only 6 months during harvest seasons. The main reasons for missing EPI among migrant children were being moving from place to place and not getting information about the date and place of EPI and thinking that they were not eligible to receive EPI at their currently living villages.

2.2 OTHER

2.2.1 Health facility assessment survey, Myanmar: Maternal, newborn and child health (Phase 2)

(Please refer to Annual Report of Health Systems Research Division)

2.2.2 Assessment of community needs and gaps after the floods in 2015, Myanmar

(Please refer to Annual Report of Health Systems Research Division)

3 RESEARCH KNOWLEDGE MANAGEMENT

3.1 Annotated Bibliography of Research Findings on Reproductive, Maternal, Newborn, Child and Adolescent Health in Myanmar (2007-2014)

A total of 960 abstracts covering the different scopes of reproductive, maternal, newborn, children and adolescent health (RMNCAH) conducted during 2007 to 2014 were compiled, edited and published as an annotated bibliography. The abstracts were collected from various sources including theses/dissertations, conferences, national and international journals. Abstracts were arranged under the separate sections of reproductive health, maternal health, newborn health, child health and adolescent health. It was published in December 2015 and distributed to enhance utilization of research findings. The bibliography is aimed to serve as a quick guide book not only for an identification of new research area but also for the evidence-based decision making in implementing programs for improvement of RMNCAH.

SERVICES PROVIDED

ACADEMIC

Sr.	Name	Course	Responsibility
1.	Dr. Myo Myo Mon	Research Methodology for PhD students at UM (1), Yangon.	Lecturer
2.		Research Methodology Workshop (2015)	Lecturer
3.		Thesis examination for Master of Public Health Students, University of Public Health, Yangon	External examiner
4.		Final examination for Master of Public Health Students, University of Public Health, Yangon	External examiner
5.		Final examination for Master of Preventive and Tropical Medicine, UM (2), Yangon	External examiner
6.		Research Methodology for PhD students at UM(1), Yangon.	Lecturer
7.		Effective Data Presentation Skill, University of Public Health	Lecturer

MEDICAL STATISTICS DIVISION (POL)

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	…	Daw Thandar Myint BSc(Hons),MSc(Mathematics) (MU)
Laboratory Attendant	…	Daw Pyae Phyo Htwe BA(Geography)(UDE)
	…	U Bo Lin BSc(Mathematics)(Meiktila University)
	…	Daw Aye Mon San BSc(Mathematics)(UDE)
	…	U Ngwe Paw BA(Economics)(UDE)
	…	Daw Khin Yu Mon BA(Myanmar)(UDE)

Medical Statistics Division has been actively participated in conducting research projects in area of reproductive health. Statistical consultation, statistical analysis services are also provided to various researchers from other divisions.

RESEARCH PROJECTS

1. HEALTH SYSTEMS RESEARCH

1.1 REPRODUCTIVE HEALTH

1.1.1 Sexual behaviour and contraceptive practices among adolescent university students in Mandalay District

Adolescent university students can be particularly exposed to high risk sexual behaviour because of change in norms about premarital sexual relationships among educated adolescents together with peer pressure and being away from the family. The objectives of the study are to assess the knowledge of and attitudes towards of contraception among adolescent university students, to describe sexual behavior and contraceptive practice of adolescent university students and to find out the factors affecting contraceptive practices, aiming at improving adolescent reproductive health. A cross-sectional descriptive study was conducted using an anonymised, self-administered questionnaire with adolescents 16-19 years from six universities, three health-related and three non-health related universities. Proportional probability to size (PPS) sampling and stratified simple random sampling were used to obtain the required samples. The mean age of the university students involved in this study was 18 years, where the proportion of female to male was 6:4. More than two-third of students (88%) were recruited from non-health-related universities. Many of the respondents had a good general knowledge about contraception, emergency contraception and condoms. However, they did not have detailed knowledge about contraceptive methods and sometimes they had incorrect knowledge. Similarly, more than half of students had fairly good knowledge about the predisposing factors for STIs and ways to prevent STIs. There was a high percentage of contraceptive use (more than 80%) among adolescent students and 50% of them used some contraceptive method consistently. Their most cited reasons for not using contraception consistently were they did not know about contraceptive method and they were afraid of contraceptive side effects. The study found a high percentage of unwanted pregnancy (64% of students who had an experience of pregnancy) with high percentage of miscarriage among those who became pregnant (67.8%). The result calls for an action for implementing strategies which can increase an effective and consistent contraceptive use among adolescent university students.

1.1.2 Current practices and problems encountered in emergency obstetric care in rural areas of central Myanmar

Complications during pregnancy and childbirth are a leading cause of mortality among reproductive age women in Myanmar. There is little documented experience of the emergency obstetric care (EmOC) and problems encountered at first-level maternal care services in rural areas where maternal mortality is higher than national average. Cross-sectional descriptive study using quantitative and qualitative methods was conducted to explore current EmOC practices carried out by basic health staff in rural areas, and to find out problems encountered in their practices, at Myingyan Township and Kyaukpadaung Township in Mandalay Region. One hundred and nine midwives (MW), two township medical officers, 4 health assistants, 12 under-one mothers, 8 community key informants participated. Majority of the MWs were providing antenatal care services to average 1 to 10 women monthly. One MW was attending five deliveries per month in average. Referral rate was 27% of deliveries. Compliance rate of the referral was 71%. Most of maternal deaths occurred during deliveries at home and nearly half was attended by skilled attendants or traditional birth attendants or both. Post-partum hemorrhage and eclampsia caused two-third of all death. Some of MWs helped for transportation but some could not perform Basic EmOC services. Some MWs accompanied with clients during the referral, but some could not. Some MWs stated that the obstetric problem was out of their capacity and actually needed referral. Some MWs could manage some emergency obstetric problems before referral. Few MWs had confidence to manage preeclampsia with magnesium sulphate injection, intravenous infusion and mucous suction for neonate. Most frequent referrals were with obstetric history of "primigravida" (60%), "elderly gravida" (38%) and "multiparity" (23%). Common obstetric emergencies were "Prolong labour" (45%), "eclampsia" (27%) and "obstructed labour" (22%). Thirty percent of MWs who had experienced of emergency problem could not provide some EmOC services such as oxytocin injection, manual removal of retained placenta and mucous suction for neonate although they perceived they should provide those services. The existing maternal referral system in rural areas needs to be more effective for timeliness and good compliance. MWs' Basic EmOC skill in rural areas should be improved by strengthening training, guidance and supervision.

1.1.3 Social determinants of under-five mortality in Central regions of Myanmar

Understanding familial, educational, economic and occupational factors for the child mortality, can help in improving health service provision, inter-sectoral coordination and community participation for under five children's health. To identify social determinants on under-five child mortality in Central Regions of Myanmar, a cross-sectional analytical study was conducted in area covered by 6 health centers in Pyin Oo Lwin Township, Mandalay Region and 2 health centers in Sagaing Township, Sagaing Region for data collection. One key response each from 40 households (HHs) with history of under-five child(U5) death as "cases" and 40 HHs without U5 death as "control" in each township achieved a sample of 80 HHs with and 80 HHs without U5 death (total 160 HHs). Ages of parents in case and control groups were 29.1$\pm$6.4 years vs. 29.3$\pm$6.3 years for mothers, and 31.1$\pm$7.0 years vs. 31.7$\pm$7.4 years for fathers. Education level of both fathers and mothers in "case" HHs were lower than those of "control" HHs. Previous history death of the child's sibling was higher in "control" HHs (52% vs. 13%, $p<0.001$). Treatment seeking history during the illness of the child was higher in "control" HHs (100% vs. 66%, $p<0.001$). Parents made decision for treatment seeking for children more in "control" HHs than "case" HHs (90% vs. 63%, $p<0.001$). Proportion of "case" HHs was accessible to nearest health center by walking was 49% while "control" HHs was 28% ($p=0.027$). "Case" HHs had more difficulties to reach health center

than “control” HHs (65% vs. 11%, p<0.001). Short waiting time at health centers was expressed more in control group (27% vs. 0%, p<0.001). Multiple logistic regression analysis showed significant risk factors for U5 death were low level of education of mother (OR=4.9, p=0.01), being persons other than parents as main decision maker for treatment seeking for child (OR=13.4, p=0.001), residing at a place where difficult-to-reach to health center (OR=25.5, p<0.001). Preventive factor was having history of siblings’ death at the HH (OR=0.1, p=0.001). This study highlights education status of mothers is important for reducing under-five child mortality. Mothers should have more decision making role for health service utilization and treatment seeking in their families.