The Republic of the Union of Myanmar

Ministry of Health and Sports

Environmental Health in Myanmar

By

Occupational and Environmental Health Division

Department of Public Health

February 2018

1. Air Quality and Health

According to WHO, the combined effects of ambient and indoor air pollution cause about 6.5 million premature deaths every year, largely as a result of increased mortality from stroke, heart disease, chronic obstructive pulmonary disease, lung cancer and acute respiratory infection. More than 80% of people living in urban areas are exposed to contaminants in ambient those levels exceed WHO guideline limits especially in low and middle income countries. The total 3 million people die every year as a result of exposure to ambient air pollution while the total estimated death as a result of indoor exposure to smoke from dirty cook stoves and fuels is 4.3 million annually. With the main aim to reduce health problems resulting from air pollution, Occupational and Environmental Health Division (OEHD) under the Department of Public Health (DOPH), Ministry of Health and Sports is currently carrying out indoor and ambient air quality monitoring activities in Myanmar.

1.1 Indoor Air Quality Monitoring

With the support of WHO, OEHD conducted indoor air quality monitoring survey at selected townships in Myanmar in 2017. Total 57 houses from the rural areas of 4 townships were selected, Hakha Township from hilly region, Hinthada Township from delta region, and Thaungtha and Zeekone Townships from central dry region. The survey included monitoring of parameters related to indoor air quality namely, total suspended particulate matter, PM 2.5, carbon monoxide and carbon dioxide.

In all houses from Hinthada, Thaungtha and ZeekoneTownships, all the tested parameters were within their normal limits. People living in such house use wood for cooking purposes. Most of fuel and the kitchen are usually placed outside the houses in all villages. In some houses in Hakha townships, carbon monoxide and indoor PM 2.5 level was above the reference levels because all of the households in this area had kitchen inside their houses and used wood for daily cooking practice. Moreover, their households were found to be close to the main road.

1.2Ambient Air Quality Monitoring

OEHD regularly monitor ambient air quality at Naypyitaw and Yangon office twice per week. The monitoring parameters are total dust, PM 10, sulphur dioxide and nitrogen

dioxide. Among them PM 10 and total dust level express seasonal variation. In Yangon, PM 10 level was increased during summer and winter seasons in last 3 years. The sulphur dioxide and nitrogen dioxide level was normal throughout the year. But this data are only represented the ambient air quality around the respected two offices in Yangon and Naypyitaw.

In collaboration with Wisconsin University, USA, proficiency testing of ambient air quality monitoring capacity by using High Volume Sampler. The filter papers mounted on the high volume samplers that purposely used to trap particulate matters such as PM10 and PM2.5 etc. were sent to the laboratory of that university and analyzed the chemical contents in the ambient air. It has been carried out now for one year (2017-2018). This result will support as to find out one association of non-communicable disease and air pollution.

2. Water and Health

Water and sanitation is core of sustainable development, critical to the survival of the people and the planet. Goal 6 not only address the issue relating to drinking water, sanitation and hygiene, but also the quality and sustainability of water resources worldwide. The total 663 millions of people are not access to improve drinking water sources and at least 1.8 billion people globally use a source of drinking water that is contaminated with excreta and 2.4 billion people lack access to basic sanitation services such as toilets or latrines. Each day, nearly 1000 children die due to preventable water and sanitation related diseases. Diarrhoea are included in top ten leading cause of morbidity in Myanmar and according to Health in Myanmar 2014 published by Ministry of Health and Sports, it is top fourth in top ten leading cause of morbidity.

2.1 Water Quality Surveillance

OEHD is currently planning to develop water quality surveillance guideline for township level with the support of WHO. By doing so, it would be able to monitor the seasonal trends of water quality in each township so that the prevalence of water related disease could be correlated with the quality of water in the same area.

OEHD conducted Drinking Water Quality Surveillance in Mon state in July 2016. As a pilot project, total 358 samples mainly from common water sources of villages were tested to assess drinking water quality. The parameters tested in this surveillance were pH, Total Dissolved Solid (TDS), Turbidity, Nitrate, Chlorine, Iron, Manganese, Hardness, Sulphate, Arsenic and Coliform levels. Among the 358 samples being tested,

Nitrate – 10 samples > 50 mg/L

Manganese- 69 samples > 0.4 mg/L

Iron – 48 samples > 1 mg/L

Coliform – 34 samples > 20 coliforms /100 ml

TDS – 5 samples > 1000 mg/L

Turbidity – 2 samples > 5 NTU.

As a subsequent activity from this surveillance, water quality testing training for basic health staffs was conducted at Mon State together with delivering of field testing equipment for each township in November, 2017.

2.2. Determination of Arsenic Content in Drinking Water Sources

2.2.1 Arsenic mitigation project in Ayeyarwaddy region

Water sources from 17 townships of middle and northern part of Ayeyarwaddy region were tested. Ponds are main sources for domestic water supply (Selected WS in Kyankhin, Myanaung, Pathein and Kyaiklatttsps). In tested area, about 75% of sources are tube well and about 22% are dug well. Approximately 97% of domestic water are groundwater. The total 29.18 % of tested water sources revealed arsenic content of > 10 ppb (WHO Standard) and 8.19%had that of >50 ppb(National Water Quality Standard) respectively. To be specific, total 2085 (10.87 %) of deep tube wells, 7826 (10.36 %) of shallow tube wells and 244 (0.91%) of dug wells were found to have arsenic content of >50 ppb in this survey.

2.2.2 Arsenic mitigation project in Bago region

In Bago region**,**OEHD tested 91475 samples in 15 Townships. Among tested samples, 37994 samples (41.53%) has Arsenic level > 10ppb and 7665 samples (8.38%) has Arsenic level >50ppb.

2.3. Determination of Fluoride Content in Drinking Water Sources (2012-14)

Intake of more fluoride, results in multidimensional health manifestations, the most common being dental and skeletal fluorosis.

Dental fluorosis is a specific disturbance of tooth formation caused by excessive intake of fluoride during the formative period of dentition. It is one of the health problems of the persons who have taken water with high fluoride content for a long time. It mainly affects children under 8 years.

The discoloration induced by fluorosis particularly in its advanced forms, can cause significant embarrassment and stress to the impacted child, resulting in adverse effects on esteem, emotional health, and career success.

OEHD tested fluoride content in 1114 samples at Wetlet Township in 2012. Among the samples tested, 720 samples (64.64%) had fluoride level of <1.5mg /L and 394samples (35.36%) had fluoride level of >1.5 mg/L.

Reference level	0.00-0.5 mg/L	0.51mg-1.00 mg/L	1.01-1.50 mg/L	1.51-2.00 mg/L	2.01-2.50 mg/L	2.51-3 mg/L
Total Samples-1114	106	252	362	356	28	10
	720			394		

No	Type of water source	<1.5mg/L	>1.5mg/L
1	Drug well	141(43.79%)	181(56.21%)
2	Shallow tube well	530(74.96%)	177(25.04%)
3	Deep tube well	13(27.08%)	35(72.92%)
4	Pond/Lake	36(97.30%)	1(2.70%)
	Total	720(64.64%)	394(35.36%)

Mitigation plan

OEHD in coordination with Oral Health Unit, had done prevalence and severity of dental fluorosis conditions among 702 high school students in Wetlet Township and measured according to the highest TFI score in their dentations. In among them, 637 (90.7%) students suffered dental fluorosis.

- Comprehensive health education and health promotion in the Wet let community and advocacy to the local and regional authority
- Management of dental fluorosis to reduce the psycho-social impacts of children and motivate to use of fluoride free water for drinking and cooking purpose
- Alternative water sources in high risk area

2.4 Impacts of Mining on Water Quality

In Ya Mae Thin Township, Mandalay Region, water samples were taken from four drinking water sources near the gold extraction sites and were tested PH, lead, hardness, turbidity, colour, cadmium, fluoride, iron, nitrate, sulphate, chlorine residual, chloride, arsenic, copper, manganese, mercury, aluminium, boron, chromium, nickel, zinc and cyanide. In all drinking sources, one source increased in chromium level, two sources increased in zinc level, and three sources increased in cadmium level.

For Waste water quality measurement, 12 water samples are taken to test turbidity, arsenic, copper, lead, nitrate, chloride, iron, pH, sulphate, total dissolved solid, chlorine, alkalinity, electro conductivity, mercury, aluminium, boron, cadmium, chromium, nickel, zinc, cyanide and manganese.

In all 12 waste water samples,

- (2) waste water sources increased in cyanide level above reference value
- (6) waste water sources increased in aluminum level above reference value
- (1) source increased in lead level above reference value
- (4) sources increased in boron level above reference value
- (2) sources increased in mercury level above reference value
- (1) source increased in turbidity, chromium, chlorine and iron above reference value
- (6) sources increased in nickel level above reference value
- (8) sources increased in manganese level above reference value
- (2) sources increased in nitrate level above reference value

In Bowsai Lead Mine, Kalaw Township, Shan State (South),OEHD took water sample from 10 drinking water sources in 2017 The tested water lead level in all water sources are within normal reference value (<10ppb). Our division tested (5) drinking water sources for colour, turbidity, arsenic, copper, fluoride, lead, nitrate, chloride, hardness, iron, pH, sulphate, total dissolved solid, chlorine, magnesium, manganese, zinc and lead and all these drinking water parameters are also within normal limit.

2.5. Community Based Water Safety Plan

In Pauk township, advocacy and Training of Trainers (TOT) relating to water safety plan was done on 28-29 May, 2014 and WSP trainings at 41 places, on June ,2014. In Wetlet township, advocacy and TOT was done on 24-25 July, 2014 and WSP training at 49 places on August , 2014. In Myaingtownship, advocacy and TOT was done on 26-27 August.

2.6. Water, Sanitation and Hygiene (WASH)Activities

To achieve MDG Goal 6 which is “Clean Water and Sanitation” in 2030, Myanmar National Strategy and Investment Plan for Rural Water Supply, Sanitation and Hygiene, WASH in Schools and WASH in Health Facilities 2016 – 2030, signed by ministers from 3 ministries, including Ministry of Education, Ministry of Agriculture, Livestock and Irrigation and Ministry of Health and Sports, was published in 2016.The Ministry of Health and Sports is mainly responsible for WASH in all health care facilities. The objective of WASH in health care facilities is to have adequate water supplies, toilets and hand washing facilities for patients, caregivers and staff, and clinical and hazardous waste disposal facilities, waste water drainage and treatment appropriate for the type of health facility, and maintain a clean environment.

It has 4 Components namely,

(a) Water supply in Health Facilities
(b) Sanitation in Health Facilities
(c) Clinical and hazardous waste disposal
(d) Waste water drainage, treatment and disposal.

The scope of health care facilities targets 4 levels of facilities,

(a) Township hospitals
(b) Station hospital
(c) Rural Health Centres
(d) Sub-Health Centres

The workshops for developing investment plan for WASH were held at all states and regions in 2017 and officers from OEHD facilitated in developing investment plan for WASH in health care facilities.

3. Mercury Free Health Care Initiative in Myanmar

As one of the supporting activities for Minamata Convention, the workshop for Mercury Free Health Care Initiative in Myanmar led by OEHD, was held in Yangon in 2013, involving stakeholders from public and private health care industry. Moreover, OEHD conducted a survey to the practice of health care workers on using mercury containing medical devices in 2017. Out of 52 respondents, 90.4% of respondents were using mercury containing medical equipment. Among them, 44 respondents and 32 respondents were using mercury containing thermometer and pressure cuff respectively and total numbers of thermometer used were 431, and total pressure cuff used were 51 and 35 (67.3%) of respondents had experience of mercury containing medical equipment (either thermometer or pressure cuff) damage. 19 (36.5%) of respondents had plan for substitution of non-mercury containing medical equipment like using digital thermometer, digital pressure cuff and non-mercury pressure cuff. Moreover, dentists were using mercury free filling materials for patients. All respondents answered that they had no SOP for cleaning and disposal of damaged mercury containing medical equipment in their hospitals and only 23 (63.9%) of respondents used rubber gloves when cleaning to mercury spill.

As the method of temporary storage, they usually stored in the plastic bag (50%) but 30% of respondents directly disposed into dust bin without any package. Majority (82.3%) of respondents finally disposed the damaged medical equipment into municipal dust bin. No one of respondents had training on proper disposal methods of damaged mercury containing equipment.

4. Solid Waste and Hazardous Waste Management in Myanmar

Myanmar is facing considerable challenges in the area of waste management including health care waste (HCW). OEHD is conducting to ensure that to develop a policy including first ever standard operating procedure (SOP) and guidelines on health care waste management (HCWM) in Myanmar under the World Bank supported Essential Health Services Access (EHSA) program, determining the outputs of to develop SOP for HCWM, to develop guideline/ policy for HCWM, to develop the curriculum in health care personnel training on HCWM, to train to be skilled health staffs exposed to hazardous HCW.

A series of workshops were held to develop SOP on HCWM, led by two national consultants, from March 2017 to January 2018, by Ministry of Health and Sports (MOHS) Myanmar in collaboration with World Bank. The representatives from private sector, public sector, international and non-governmental organizations working in health care setting attended the workshops. In the first and second workshops, the participants discussed the classification, segregation of HCW, emphasized on sharp waste management. In the third workshop, the attendances talked about the storage, transportation of HCW and the final disposal methods suitable for various levels of health care facilities in Myanmar, were discussed in fourth workshop. At present, draft of SOP for HCWM was developed and as next step, guideline/policy for HCWM is going to be developed by conducting a series of workshops led by OEHD.

OEHD is also participating in the project of Myanmar-Norwegian Cooperation on management of hazardous waste in Myanmar, acting as a member of regulatory working group in that project.

5. Health Impact Assessment

Community Health and Safety includes all communicable diseases, non-communicable diseases, injuries, nutritional disorders, psycho-social disorders and issues of well-being that may be changed by a development action and these are mediated by the determinants of health such as gender, poverty, environmental factors, labour, inequality, conflict, participation, resettlement, health & medical services.

Project-related activities may directly, indirectly, and even cumulatively change community exposures to environment-based health risks, such as communicable diseases, equipment accidents, and exposure to hazardous materials or conditions. Projects have the potential to affect a broad range of environmental and social determinants of health either positively or negatively.

To ensure safeguarding and promoting community health and safety in infrastructure development, OEHD is currently on the process of development of the national HIA guideline. Series of workshops were done for guideline development such as meeting for determinants of Health and Environments, Advocacy meeting with EIA review body members respectively. For capacity development on HIA, our division carried out the training together with university of Public Health and gave national training on health impact assessment (Pha An), certificate course on HIA. The audiences were from related stakeholders and from university of medicine and university of community Health.

The HIA guidelines cover community health as well as occupational health and safety but OEHD can only tackle the issues relating to occupational health and safety. The followings are the some examples that the activities of OEHD to assess and reduce the health risks relating to the development projects.

(1) Health Risks Assessment for total 1098 workers from Ta-Gaung Ferro Nickel Factory Htee-Gyaint Township, Sagaing Region.

(2) Health Risks Assessment for community including 184 villagers, 48 students and 93 workers at Moe KyoeSulphuric Acid Plant, KanKone village, Sarlingyi Township, Saggaing Region

6. Toxicovigilance

OEHD is currently receiving the monthly reports about the poisoning cases from some government hospitals in Myanmar. Moreover, OEHD has toxicological and environmental health laboratory attached to Yangon sub-office. The laboratory also cooperates with the poisoning treatment center which is situated in New Yangon General Hospital (NYGH). The laboratory is also a member of laboratory network, collaborating with other governmental and international laboratories and has recently achieved some certifications for chemical analysis. In addition, OEHD is planning to develop poison information center which will provide the 24/7 services to community relating to prevention and management of poisoning cases.

7. Climate Change and Health

Myanmar is already vulnerable to extreme weather events, such as cyclones and floods, and is highly vulnerable to climate change, with Yangon – the largest city – being amongst the top 5 most vulnerable cities to climate change world-wide. Climate change leading to rainfall pattern variation may significantly increase the risk of flooding. Rising temperatures and drought periods are also predicted, alongside increased risk of cyclones and strong winds. Moreover, the incidence of vector-borne diseases and food and water insecurity are expected to increase in Myanmar.

The following are the work plan of OEHD in relation to climate change for the year 2018-2019, with the funding supported by WHO.

(a) Advocacy seminar for health adaption on climate change
(b) Development of a national strategy for climate change and its health impact
(c) Development of the National Health Adaption Plan for Climate Change
(d) Development of SOP for managing the climate sensitive diseases
(e) Provision of training on climate change models and risk assessment to public health staffs
(f) Awareness raising among the community on health impacts due to climate change
(g) Creation of the integrated surveillance database system for climate change and health issues