NUTRITION RESEARCH DIVISION

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The Nutrition Research Division is primarily involved in research activities of the following areas: micro-nutrient deficiencies, protein energy malnutrition, non-communicable diseases.

RESEARCH PROJECTS

1. NON-COMMUNICABLE DISEASES

1.1. MALNUTRITION

1.1.1 Assessment of nutritional status through body composition measurement by deuterium dilution technique in children living in areas targeted agricultural interventions for food security

Agricultural interventions can directly affect food and nutrition security by alterations in the production of nutrient-dense foods and/or income derived through agricultural livelihoods. Therefore, a longitudinal study was carried out to assess the nutritional status of two to five years old children living in *Kyar Hone*, *Kyein Pike, Yaeso*, *Thanpayarkhone* and *Lamutangyi* Village, *Htan Ta Pin* Township, Yangon Region. The first and second time survey were conducted during October 2014 and May 2015 respectively. Selection criteria for intervention villages (*Kyar Hone*, *Kyein Pike* and *Yaeso)* and control (*Thanpayarkhon* and *Lamutangyi)* villages are numbers of farmer population, access to villages and nutrition data of under 5 years old children. Agricultural interventions have been carried out by WelthHungerHilfe (International Non-Governmental Organizations of Food Security Working Group) in intervention villages since June, 2014. Measurements of body weight, height, mid upper arm circumference, and skinfold thickness were done and diet diversity of

children were interviewed with questionnaire and one pre and two post deuterium enrichment saliva samples from those children were also taken. A total of 140 children aged between 2- 5 years at the baseline and 132 children at the second time were participated in the data collection. Mean BMI of children in first and second time data collections were 13.6 2 kg/m^2 vs. 13.65 kg/m^2 and 14.24 kg/m^2 vs. 13.9 kg/m^2 among intervention and control group respectively. Mean BMI do not remarkably change in intervention group but mean BMI decreased at 2^{nd} time measurement in control group. Mean (SD) diet diversity score of children in first and second time data collection were 8.72 (1.3) vs. 8.77 (0.96) and 8.65 (1.31) vs. 9.33 (1.04) among intervention and control group respectively. The diet diversity score was not much difference in intervention group and it was significantly different in control group ($p = 0.08$).

1.1.2 Food and nutrition surveillance among primary school children: Study on diet consumption pattern and nutritional status

The study was aimed to find the nutritional status of primary school children. The study was school based descriptive study and conducted during November, 2014 to February 2015 in basic primary schools, basic middle schools and basic high schools in urban and rural area of Yangon, Mandalay, Taungyi and Mawlamyaing. Weight, height and waist circumferences of 2937 students were measured and haemoglobin concentration of 592 students was measured by Haemocue. A total of 835 students were interviewed to find out the diet consumption pattern. The mean (SD) of height, weight, body mass index(BMI) and waist circumferences of boys and girls were 131.58 (6.89)cm vs. 131.4 (6.98)cm, 26.99 (6.63) Kg vs. 26.37 (5.91)Kg , 15.43 (2.57)Kg/m^2 vs. 15.08 (2.25)Kg/m^2 and 55.69 (8.16)cm vs. 53.62 (6.53)cm respectively. The overall prevalence of stunting, wasting, overweight and obesity were 8.8%, 15%, 4.6% and 3.1% respectively. The mean (SD) of haemoglobin concentration of boys and girls were 11.86 (1.02)g/dL and 11.75 (1.03)g/dL respectively.

Prevalence of wasting, stunting, overweight, obesity and anaemia

	Wasting	Stunting	Overweight	Obesity	Anaemia
Yangon	14.0%	8.6%	6.1%	5.4%	28.4%
Mandalay	19.6%	9.2%	3.3%	2.2%	40.8%
Taungyi	8.9%	8.4%	2.5%	1.6%	43.8%
Mawlamyaing	17.2%	9.0%	6.7%	2.9%	31.8%

(Cut-off for anaemia among 5-11 years old children - < 11.5 g/L).

Concerned with diet consumption pattern, most of the children consumed 3 meals per day. Proportion of children with habit of skipping breakfast, lunch and dinner were 16.0%, 1.9% and 13.4% of respectively.

Consumption of days per week	Meat	Fish	Vegetables	Fruit	Milk
• No consumption	22(2.6%)	123(14.7%)	15(1.8%)	75(9.0%)	303(36.3%)
• 1-2 days per week	393(47.1%)	524(62.7%)	244(29.2%)	377(45.1%)	320(38.3%)
• 3 -5 days per week	349(47.8%)	175(21.0%)	333(39.9%)	253(30.3%)	103(12.3%)
• 6-7 days per week	71(8.5%)	13(1.6%)	243(29.1%)	130(15.6%)	109(13.1%)
Consumption of days per week	Soft drink	Package snack	Instant noodle	Fried meat/ fish ball	Grilled meat
• No consumption	186(22.3%)	246(29.5%)	344(41.2%)	487(58.3%)	516(68.8%)
• 1-2 days per week	453(54.3%)	393(47.1%)	365(43.7%)	229(27.4%)	269(32.2%)
• 3 -5 days per week	115(13.8%)	156(18.7%)	109(13.1%)	98(11.7%)	37(4.4%)
• 6-7 days per week	35(4.2%)	40(4.7%)	17(2.0%)	21(2.5%)	13(1.6%)

In conclusion, it was found that the percentage of wasting in primary school children fell in the 'medium' category (10-19%). The overall prevalence of anaemia (36.1%) indicates that anaemia is moderate public health problem. The findings highlighted the need for continued health promotion efforts to improve nutritional status of primary school children. Continued assessment of nutritional status and monitoring of the nutrient deficiencies in this population is needed. The findings also indicated that Myanmar is now facing double burden of under and over nutrition. Nutrition education about food choices between healthy food and unhealthy food is still needed among primary school children. School should be promoted which can provide healthy snack foods to practice healthy eating habit of school children.

1.1.3 Assessment of malnutrition in elderly persons living in Home for the Aged in Yangon Region

To assess nutritional status and dietary intake of elderly living in institution, the study was conducted in *Hnin Se Gone* Home for the Aged, Yangon Region. A total 131 elderly (male 33.4% and female 62.6%) were included in this study. The dietary intake of the elderly was measured by duplicate portion analysis. All the food (including breakfast, lunch, snacks and dinner) before consumption and leftovers after the meal/snack was weighed and recorded by trained staffs from Nutritional Research Division. Exact quantities of food items and beverages were recorded in grams. Food composition tables and nutrition facts data analyzed in the laboratory of Nutrition Research Division were used for nutrient conversion of food data. Foods which do not have nutrient facts were analyzed at nutrition laboratory, Department of Medical Research. The mean calorie intake of elderly men was 2059.4 ± 193.8 calories and that of elderly women was 1913.7 ± 212.3 calories. The mean intake of carbohydrate, protein and fat for men was 279. 7 ± 2.4 g, 69.7 ± 8 g and 74.4 ± 7 g and those for women was 266.7 ± 2.8 g, 63.8 ± 8.8 g and 66.7 ± 9.2 g respectively. In comparison of dietary intake and Recommended Daily Allowance, 44.3%, 6.9% and 4.6% of elderly had inadequate intake of carbohydrate, fat and protein respectively. Nutritional status of elderly was assessed by measuring height and weight and calculating BMI. BMI <18.5, BMI 18.5-22.9, BMI 23-27.49 and BMI≥27.5 were classified as under-weight, normal, overweight and obesity respectively.

	Under-weight	Normal	Over-weight	Obese	Total
Elderly (men)	6 (12.5%)	19 (39.6 %)	17 (35.4%)	6 (12.5%)	48(100%)
Elderly (women)	13 (16%)	27 (33.3%)	30 (37%)	11(13.6%)	81(100%)
Total	19 (14.7%)	46 (35.7%)	47 (36.4%)	17 (13.2%)	129(100%)

1.2 CARDIOVASCULAR DISEASES

1.2.1 National Survey on prevalence of Diabetes and Non-communicable Diseases - Myanmar

The collaborative research project of Department of Medical Research, Diabetes Project and Department of Health was carried out from September 2014 to January 2015. This cross-sectional population-based survey focused 8,757 adults aged 25-64**.** A multistage cluster sample design was used to produce the representative data for that age range in Myanmar. Socio-demographic and behavioral information, physical measurements (as height, weight and blood pressure) and biochemical measurements (blood glucose and blood cholesterol) were collected. Common risk factors for NCDs were elucidated (please see the table).

Prevalence of major NCD risk factors

NCD risk factors	**Both Sexes**	**Males**	**Females**
Glucose Tolerance			
Mean fasting blood glucose, including those currently on medication for raised blood glucose	92 mg	90 mg	93 mg
Mean 2-hour glucose value after glucose load	125 mg	119 mg	131 mg
Percentage with impaired fasting glycaemia as defined below •plasma-equivalent value of capillary whole blood ≥6.1 mmol/L (110 mg/dL) and <7.0 mmol/L (126 mg/dL)	3.6	4.0	3.2
Percentage with impaired glucose tolerance •2 hour plasma-equivalent value of capillary whole blood after glucose load ≥7.8 mmol/L (140 mg/dL) and <11.1 mmol/L (200 mg/dL)	19.5	15.2	23.9
Percentage with raised fasting blood glucose or currently on medication for raised blood glucose •plasma-equivalent glucose value of capillary whole blood ≥ 7.0 mmol/L (126 mg/dL)	5.9	4.7	7.0
Percentage with raised fasting blood glucose or raised 2-h blood or currently on medications for raised blood glucose •*raised fasting blood glucose*= plasma-equivalent glucose value of capillary whole blood ≥ 7.0 mmol/L (126 mg/dL) •*raised 2-h blood glucose*= plasma-equivalent glucose value of capillary whole blood ≥ 11.1 mmol/L (200 mg/dL)	10.5	9.1	11.8
Tobacco Consumption			

NCD risk factors	Both Sexes	Males	Females
Percentage who currently smoke tobacco	26.1	43.8	8.4
Percentage who currently smoke tobacco daily	20.7	34.0	7.4
For those who smoke tobacco daily			
Average age started smoking (years)	19.8	19.3	22.3
Percentage of daily smokers smoking manufactured cigarettes	28.1	33.4	3.5
Mean number of manufactured cigarettes smoked per day (by smokers Of manufactured cigarettes)	1.5	1.9	0.1
Percentage who currently use any smokeless tobacco product	43.2	62.2	24.1
Percentage who currently any smokeless tobacco product daily	30.3	44.5	16.1
Alcohol Consumption			
Percentage who are lifetime abstainers	68.8	41.9	95.8
Percentage who are past 12 month abstainers	5.7	10.0	1.5
Percentage who currently drink (drank alcohol in the past 30 days)	19.8	38.1	1.5
Percentage who engage in heavy episodic drinking (6 or more drinks on any occasion in the past 30 days)	10.3	20.3	0.3
Fruits and Vegetable Consumption			
Mean number of days fruit consumed in a typical week	2.5	2.3	2.6
Mean number of servings of fruit consumed on average per day	0.7	0.7	0.7
Mean number of days vegetables consumed in a typical week	5.5	5.4	5.6
Mean number of servings of vegetables consumed on average per day	2.1	2.2	2.0
Percentage who ate less than 5 servings of fruit and/or vegetables on average per day	86.6	85.2	87.9
Physical Activity			
Percentage with insufficient physical activity (defined as < 150 minutes of moderate-intensity activity per week, or equivalent)*	15.7	12.5	18.8
Median time spent in physical activity on average per day (minutes) (presented with inter-quartile range)	214	274	177
Percentage not engaging in vigorous activity	74.5	61.1	87.9
Overweight and Obesity			

NCD risk factors	Both Sexes	Males	Females
Mean body mass index - BMI (kg/m^2)	22.3	21.5	23.2
Percentage who are overweight (BMI ≥ 25 kg/m^2)	22.4	14.1	30.8
Percentage who are obese (BMI ≥ 30 kg/m^2)	5.5	2.6	8.4
Average waist circumference (cm)	-	77.3	76.9
Hypertension			
Mean systolic blood pressure - SBP (mmHg), including those currently on medication for raised BP	125	126	124
Mean diastolic blood pressure - DBP (mmHg), including those currently on medication for raised BP	81	81	81
Percentage with raised BP (SBP ≥ 140 and/or DBP ≥ 90 mmHg or currently on medication for raised BP)	26.4	24.7	28.0
Percentage with raised BP (SBP ≥ 140 and/or DBP ≥ 90 mmHg) who were not currently on medication for raised BP *	90.8	93.2	88.7
Lipid profile			
Mean total blood cholesterol, including those currently on medication for raised cholesterol	178 mg	173 mg	184 mg
Percentage with raised total cholesterol (≥ 5.0mmol/L or ≥ 190 mg/dL or currently on medication for raised cholesterol)	36.7	30.9	42.5
Percentage with reduced High-density lipoprotein (HDL<1.03mmol/L or <40mg/dL)	-	40.7	56.6
Percentage with raised Low-density lipoprotein (LDL ≥160mg/dL)	7.3	6.1	8.5
Percentage with raised fasting triglycerides (Fasting TG ≥1.7mmol/L or ≥150 mg/dL)	30.8	32.2	29.4
Cardiovascular disease (CVD) risk			
Percentage aged 40-64 years with a 10-year CVD risk ≥ 30%, or with existing CVD**	12.1	8.5	15.7
Summary of combined risk factors • current daily smokers • less than 5 servings of fruits & vegetables per day • insufficient physical activity • overweight (BMI ≥ 25 kg/m^2) • raised BP (SBP ≥ 140 and/or DBP ≥ 90 mmHg or currently on medication for raised BP)			
Percentage with none of the above risk factors	6.2	6.6	5.7
Percentage with three or more of the above risk factors, aged 25 to 44 years	14.6	13.6	15.7
Percentage with three or more of the above risk factors, aged 45 to 64 years	27.5	25.9	29.3
Percentage with three or more of the above risk factors, aged 25 to 64 years	19.6	18.3	20.9
Cervical Cancer Screening			

NCD risk factors	Both Sexes	Males	Females
Percentage of women aged 30-49 years who have ever had a screening test for cervical cancer	-	-	4.4

** A 10-year CVD risk of ≥30% is defined according to age, sex, blood pressure, smoking status (current smokers OR those who quit smoking less than 1 year before the assessment), total cholesterol, and diabetes (previously diagnosed OR a fasting plasma glucose concentration >7.0 mmol/L (126 mg/dL).

The study indicated that the prevalence of most risk factors for non-communicable diseases was high and evidenced-based preventive measures required strengthening.

SERVICES PROVIDED

ACADEMIC

No.	Name	Course	Responsibility
1.	Dr. Moh Moh Hlaing	MPH	Examiner
		Master of Preventive and Tropical Medicine , University of Medicine (2)	External Examiner
		Workshop on Research Methodology (2015)	Examiner
		1st Year MMedSc (Physiology)	Lecturer Teaching
2.	Dr. Mya Ohnmar	Workshop on Research Methodology (2015)	Facilitator
		1st Year MMedSc (Physiology)	Teaching
3.	Daw Sandar Tun	1st Year MMedSc (Physiology)	Demonstration
4.	Daw Thidar Khine	1st Year MMedSc (Physiology)	Demonstration