Children's Sight and Health Project, Chiang Mai, Thailand

Innumerable young people and adults suffer from health problems, many of them are the result of poor lifestyle, even though much of this information is freely available on the internet. Teachers and students in schools, use and consume vast amounts of wide-ranging information from the internet through hand held devices, but invariably little interest is shown to include health issues related to their own health and bodies.

Health illiteracy problem in the USA has been described as a silent epidemic[1], and Thailand and other Low- and middle-income countries (LMIC) may not be too far behind. Copying the unaffordable practice of illness care model, with little attention to health awareness and prevention, is rampant in LMIC. Thailand, although better in health education and awareness than many other middle-income countries, has had its own share of health illiteracy, and non-communicable diseases (NCDs) form a major part of health problems. Linking health illiteracy to disease, better understanding of health issues and the underlying causes of common illnesses, can transform one's health. The need for this action is acutely sensed in schools.

According to Public Health Ministry, the overweight and obesity rate of Thai children was found to be higher than the target value of 10%. Obesity rate of kids between 2018, 2019 and 2020 has risen to 11.8%, 13.6% and 12.78% respectively.[2] These are scary trends among young children and adolescent, and are more pronounced in the urban areas. The consequences of childhood obesity can be life-long and continue into the next generation. Obese children are more likely to develop NCDs in adulthood than their counterparts of a healthy weight, and girls who remain obese into their childbearing years are more likely to have children who themselves have an increased risk of obesity and associated health problems.[3]

The first step to be healthy is to ensure that the pre-school children are nurtured with proper care and their nutritional needs met to avoid stunting (shortness/thinness for their age). Furthermore, it is important that growth monitoring and nutritional care is continued in schools and health education made an important part of the curriculum. Awareness of preventable causes of disease and other health issues among school children can bring about significant benefits.

Children's Sight and Health project in Chiang Mai is engaged in this very task. The project tests vision in selected schools so that those who have visual impairment can be prescribed eyeglasses, enhancing their ability to read and learn for better comprehension. The project has been in operation in more than 40 schools in Chiang Mai since October 2015. To date over 10,000 students have been tested and around 5-9% of these students were prescribed glasses. A small group of expatriate volunteers, under the guidance of an optometrist, runs this program. Project is financed by several doners. Among them, to mention some, are Rotarians, Hoya Lances, WEDO Asia (materials), Chiang Mai expat club and certain individuals. The group had been contemplating to include health education along with vision testing,

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[1] Editorial. The health illiteracy problem in the USA. lancet.com Vol 374 December 19/26, 2009

[2] link:https://www.bangkokpost.com/thailand/general/2029071/obesity-stunted-growth-in-thai-kids-spur-worries. Bangkok Post 3rd Dec.2020.

[3] Mullan Z, Norris S, Sehghal A. Childhood obesity and its consequences across the life-course. Lancet July 25, 2022.

since the joining of a public health doctor in early 2021. Details of the project are in the link provided.[4] The program is an effort towards Effective Altruism[5] *service*.

The project included health education, along with vision testing, in May 2022 when starting with Chalermprakiet School, Lamphun, Chiang Mai, a boarding school for girls from poor background. The program was made possible due to the foresight and enthusiasm of the School Manager. Plan was to engage teachers and students in understanding the causes of common preventable diseases through dialogue. Addressing nutritional needs among young and adolescent is one of the primary points of entry. Poor nutritional choices and unhealthy lifestyle are the most important underlying reasons leading to malnutrition, which is the precursor to a number of chronic health problems.

To address this, measuring and recording of weights and heights of all students during vision testing was organised with the assistance from the school nurse. It was planned that once all students in the school are measured the data will be analysed and results discussed with the teachers first; followed by student in batches of age groups/classes. Heights and weights among young children are of great importance to them and serves as the best entry point for a dialogue for health concerns of students and an opportunity to discuss preventable health problems. Presenting the finding of their own growth pattern, followed by answering their concerns on any aspect of health, proved to be very effective. Students showed great interest in their weights and heights and wanted to know more about how to improve their physique. For sustainability of this program, it was decided that the school nurse and the physical education instructor, would monitor growth of all students on a regular basis, so that at the completion of this visit, the program continues. Periodic discussions were planned to be continued with the assistance from the project organisers.

Data collected for heights and weights of all 269 students was analysed using WHO Anthro Plus and Microsoft Excel. Decision was also taken to collect teachers' heights and weights to assess their status so that discussions were possible to explain the idea for the program. Their own health queries were also addressed, with the hope that they can provided better support to their students.

Tables below describe the levels of under or overweight assessment of Teachers and Students. Underweight is considered if the Body Mass Index (BMI) is below 18.0; normal, if BMI is between 18.0-24.9. Overweight, if it is 25.0-29.9; and a BMI of 30.0 or more is considered obese. [*BMI=Weight in Kg divided by Height in Mts. twice (kg/mt^2)*].

Body Mass Index = (Weight/Height^2): TEACHERS			
BMI Category	Male (% by column)	Female (% by column)	Total (% by column)
Underweight <18.0	0 (0.0)	2 (8.0)	2 (5.4)
Normal 18.0-24.9	8 (66.7)	14 (56.0)	22 (59.5)
Overweight 25.0-29.9	2 (16.7)	6 (24.0)	8 (21.6)
Obese 30.0-34.9	0 (0.0)	2 (8.0)	2 (5.4)
Severely Obese 35+	2 (16.7)	1 (4.0)	3 (8.1)
Total	12 (100.0)	25 (100.0)	37 (100.0)

Microsoft Excel analysis

[4] https://www.facebook.com/chiangmaichildrenssightproject/

[5] Effective Altruism https://www.effectivealtruism.org/

Analyses of heights and weights for 12 male and 25 female teachers showed normal BMI in 67% of the men and 56% of female teachers. Only two female teachers had a BMI marginally below normal 18, (17.3 and 17.5), perhaps an effect of past under-five stunting, requiring no further attention other than reassurance. Two male teachers were overweight and another two very obese. Overweight was much higher, at 36% among female teachers. Six were overweight, two obese and one very obese. Overweight teachers were offered assistance in addressing their problem.

Body Mass Index (BMI) from WHO Anthro Plus: STUDENTS											
Age Groups & Age in Months		N	Severely Under weight	N	Underweight: Includes severely underweight	N	Overweight: Includes obese and very obese	N	Obese	N	V Obese
Years	Months		% < -3SD		% < -2SD		% > +1SD		% > +2SD		% > +3SD
Total (10-19)	(120-228)	269	1.1	3	3.7	10	11.2	30	1.9	5	0
Total (10-14)	(120-179)	112	0.9	1	4.5	5	14.3	16	1.8	2	0
Total (15-19)	(180-228)	157	1.3	2	3.2	5	8.9	14	1.9	3	0
11	(132-143)	2	0	0	0	0	0	0	0	0	0
12	(144-155)	27	0	0	3.7	1	14.8	4	3.7	1	0
13	(156-167)	37	0	0	2.7	1	24.3	9	2.7	1	0
14	(168-179)	46	2.2	1	6.5	3	6.5	3	0	0	0
15	(180-191)	41	0	0	2.4	1	7.1	3	4.8	2	0
16	(192-203)	38	2.8	1	8.3	3	11.1	4	0	0	0
17	(204-215)	39	0	0	0	0	7.7	3	2.6	1	0
18	(216-227)	37	2.6	1	2.6	1	10.5	4	0	0	0
19	(228-228)	2	0	0	0	0	0	0	0	0	0

NB: Modified version of WHO Anthro+ Analysis, with complex statistics removed.

Note that all students <-2SD (N=10) are moderate or severely undernourished; and of those three are <-3SD meaning severe acute malnutrition. Same applies to the right side of the tail for children over +1SD to <+2 SD (N=30) are overweight, out of which five are obese >+2SD.[6]

As expected, vast majority, (85%) of the students were found to have normal distribution of BMI according to their age. Ten students (3.7%) were found to be with weight below normal for their age and height (<-2SD). There were 30 (11.1%) overweight (>+1SD and <+2SD) and five of them definitely reaching obesity (>+2SD), which is in line with the national figures mentioned earlier. The WHO Anthro Plus is best used as a survey methodology, in this case surveying a group of school children. Individual assessment of students and growth trends can be graphically reviewed, providing an opportunity for advising the student.

Thailand population consists of a number of diverse ethnic groups, especially in the north of Thailand. Data on ethnicity was collected and analysed. Vast majority (72.1%) were Thai. Other ethnic groups in this school included Karen (12.3%), Hmong (11.5%), Lisu (2.2%), Lahu (0.7%) and Shan (1.1%). The number of minority ethnic group students is too small to draw any firm conclusions for levels of

[6] Software for assessing growth of the world's children and adolescents. Geneva: WHO, 2009 (http://www.who.int/growthref/tools/en/).

malnutrition by ethnicity. Perhaps, enrolment of greater number of schools in the program may show significant differences to be commented on at a later date.

Since the data was collected in Microsoft Excel for importing into WHO Anthro+, we analysed this data in Excel as well and came up with slightly different numbers of students that may require attention. Excel analysis of data provides precise number of students in each BMI category, hence practical for group discussions with the affected students. For sustainability of the program, collection of data in Excel spreadsheets is much easier for school nurse/teachers to manage rather than the WHO Anthro+, which is for national and international comparisons. Moreover, Excel data import into WHO Anthro is quite feasible at any stage.

Of the total number of students, 69 (25.7%) were below normal (BMI <18.0), of which 7 (14.5%) were too thin, i.e., BMI <15.0. Vast majority, 187 (69.5%) were found to have normal Body Mass Index (BMI between 18.0-24.9). In all, 13 students (4.9%) were overweight and one of them obese. Whilst, the WHO Anthro Plus analysis is more useful in individual assessment, the Excel analysis provides precise number of BMI categories for group discussions.

A little over quarter of the girls were below BMI 18. None of these girls showed any obvious signs of poor health or weakness, but they were conscious of their short stature and keen to find out ways to gain weight. It is important to note that these girls who are too thin, are largely showing the effects of their early childhood (under-five) undernutrition, resulting in stunting, which unfortunately is a permanent condition. These children often end up being overweight and obese later in life, especially when availability and affordability of food becomes a reality. Stunting being a major problem among Under-5s, which leaves them stunted for the rest of their lives, needs urgent addressing. This opportunity must be availed to educate students, especially female students, of the importance of better nutrition and weaning practices for Under-5s, as most of them will experience motherhood sooner or later.

The trends in overweight among the teenagers were more obvious. Consumption of large quantities of carbohydrates (mainly white rice) and sugars are responsible. Markets are full of processed food such as cheap tinned meats, beverages like coffee with sugar and milk (Local brand 3 in 1), carbonated drinks like coke, sprite and most fruit juices containing high levels of sugars (especially fructose) and preservatives, which are bad for health and are linked to overweight and obesity.[7] Increasingly maturity onset diabetes is linked to overweight and obesity and other chronic diseases such as hypertension, heart disease, some cancers and other health problems. To add to this, if the physical activity (exercise) is limited or absent, it becomes a lethal combination to promote overweight and obesity.

The burden of non-communicable diseases has risen to a level which is unsustainable. It starts early in life because of poverty and ignorance; or a continued lifestyle of poor choices made in our daily dietary intake and lack of physical activity. Any improvements in public awareness of knowledge and attitudes will reduce the burden of chronic disease. There is no better place to start, but the schools; where intellectual imprints are made for life.

[7] Lawrence M and Baker P. Ultra-processed food and adverse health outcomes. Fresh evidence links popular processed foods with a range of health risks. Editorial. *BMJ* 2019;365: I2289.

The data demonstrates that good number of students are either too thin or overweight. This is a starting point to address dietary and lifestyle issues affecting health. A regular assistance of awareness in the schools, with what is considered good for health, can bring about some change. Both teachers and students need help. This opportunity also helps in furthering the discussions with the students on health issues that concern them, such as teenage pregnancy and reproductive health.

The program offers the schools with continued support through three main interventions:

1. Health Education and discussion with each one of the participants in groups (Grade wise);
2. Establish continuity of the program by school taking the responsibility to monitor weights and heights every month to monitor growth;
3. Establish special program of help for those with weight problems (teachers and students) and provide assistance.