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Malnutrition in the Philippines - perhaps a Double Burden?

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Malnutrition in the Philippines – perhaps a Double Burden?

Adequate nutrition and freedom from hunger are basic human rights for all, but malnutrition, especially among children, represents a major global human development problem.

Kreißl Alexandra*

Abstracts

Viel zu viele Filipinos leiden unter einer oder mehreren Formen der Mangelernährung, verursacht durch verschiedene Faktoren wie Armut, Bevölkerung, Politik, Pathologie, Lebensmittelherstellung und Bewahrung der Nahrungsmittel vor Verschwendung und Verlust. Die vier Hauptmangelerkrankungen bei philippinischen Kindern sind Protein-Energie-Mangelernährung (PEM), Vitamin-A-Mangel (VAD), Eisenmangelanämie (IDA) und Jodmangel (IDD). Die Ursache der hohen Sterberaten bei Säuglingen und Kindern ist PEM, wobei es sich vor allem um Kwashiorkor, Marasmus und marasmischer Kwashiorkor handelt. Ländlicher Wohnsitz, schlechte medizinische Versorgung und Armut erschweren zusätzlich die notwendige Behandlung. Aber der beste Weg, um Mangelernährung zu behandeln, ist der Aufenthalt im Krankenhaus, wobei die Stabilisationsphase und Rehabilitationsphase mit eingeschlossen ist.
Vitamin-A-Mangel steht in Zusammenhang mit niedrigem sozioökonomischem Status und stellt ein sehr großes Gesundheitsproblem unter den philippinischen Kindern dar, im Alter von 6 Monaten bis 5 Jahren, und mit der höchsten Prävalenz in West-Mindanao. Eisenmangelanämie ist das meist verbreitete Mikronährstoffmangel-Problem auf den Philippinen. Eine besonders gefährdete Personengruppe sind Säuglinge, im Alter von 6 bis 11 Monaten, mit der höchsten Prävalenzrate im Gebiet Autonomous Region of Muslim Mindanao (ARMM). Im Gegensatz zu VAD und IDA ist Jodmangel der Mangelzustand, den man am leichtesten kontrollieren kann, und zwar mittels Iodierung des Salzes. Im Vergleich zu anderen philippinischen Regionen weist Zentral-Luzon und ARMM eine höhere IDD-Prävalenz unter Kindern, im Alter von 6 bis 12 Jahren, auf.
Im Moment befindet sich dieses asiatische Land auf dem Weg der Besserung, mittels wirksamer Methoden, um für das Überleben von Säuglingen und Kindern zu kämpfen: 1993 bis 1998 fand das vorbildliche Projekt Philippine Plan of Action for Nutrition (PPAN) statt, zur Verbesserung des Ernährungsstatus von Filipinos mit folgenden fünf sehr einflussreichen Programmen: Haus-, Schul- und Lebensmittelproduktion, Supplementation von Mikronährstoffen, Fortifikation von Nahrungsmitteln, Bildung in Bezug auf Ernährungslehre und Nahrungsmittelhilfe. Von 1999 bis 2004 war das Projekt Medium-Term Philippine Plan of Action for Nutrition (MTPPAN) ein würdiger Nachfolger und hat noch mehr Ziele und Verbesserungen erreichen können.

Stichwörter: Mangelernährung, Protein-Energie-Mangelernährung, Kwashiorkor, Marasmus, Defizienz, Adipositas

Far too many Filipinos suffer from one or more forms of malnutrition and it is caused by various reasons like poverty, population, politics, pathology and production of food and preservation of food from wastage and loss. The four major deficiency disorders among Filipino children are protein-energy malnutrition (PEM), Vitamin A Deficiency (VAD), Iron Deficiency Anaemia (IDA) and Iodine Deficiency Disorder (IDD). High fatality rates among infants and children are caused by PEM, especially by kwashiorkor, marasmus or marasmic kwashiorkor. Rural areas, poor medical care and poverty make treatment more difficult. However, the best way to treat malnutrition should be in hospital, including a stabilization phase and a rehabilitation phase.
Vitamin A Deficiency is related to low-socio-economic status and is a major health problem among Filipino children, aged 6 months to 5 years, with the highest prevalence in Western Mindanao. Iron Deficiency Anaemia is the most prevalent micronutrient deficiency problem in the Philippines. The most vulnerable group is infants, aged 6 to 11 months and with the highest prevalence rate in the Autonomous Region of Muslim Mindanao (ARMM). As opposed to VAD and IDA, Iodine Deficiency Disorder is the easiest deficiency to control with simple iodization of salt. Central Luzon and ARMM show a higher prevalence of IDD among children, 6 to 12 years, in comparison to other regions of the Philippines.
This Asian country is on the way to recover with effective methods to fight for infant and child survival: In 1993-1998, the Philippine Plan of Action for Nutrition (PPAN) was an exemplary project to improve the nutritional status of Filipinos with five impact programmes: Home, School and Food Production, Micronutrient Supplementation, Food Fortification, Nutrition Education and Food Assistance. In 1999-2004, the Medium-Term Philippine Plan of Action for Nutrition (MTPPAN) was an appreciate successor and achieved more objectives and improvements.

Keywords: malnutrition, protein-energy malnutrition, kwashiorkor, marasmus, deficiency, obesity

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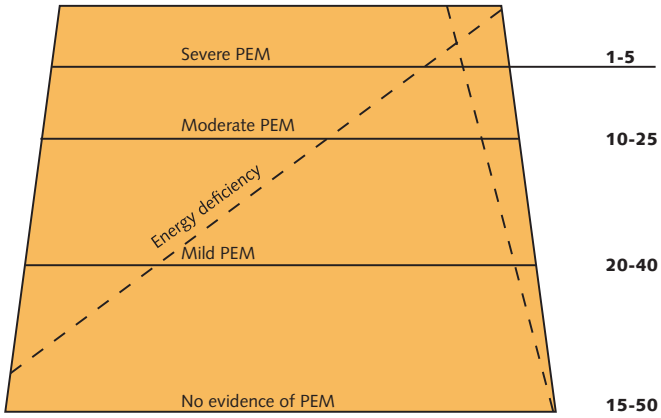
DEFINITION: MALNUTRITION

In 1959, Jelliffe introduced the term "protein-calorie-malnutrition" which has been largely replaced by "protein-energy-malnutrition". Protein-energy malnutrition (PEM), or simply "malnutrition", is characterized by growth failure and continues to be a severe health problem in children in developing countries. The greatest problem regarding malnutrition is in South and Southeast Asia, due the enormous population and the prevalence of underweight children, which is two or three times higher than elsewhere all over the world. However, another major problem in the Philippines is poverty. Particularly primary protein-energy malnutrition is associated with poverty and represents the "iceberg phenomenon". The majority of children have mild malnutrition and form the basis of the iceberg. Far fewer have moderate malnutrition and only few, the top of the iceberg, have severe malnutrition. PEM leads to both, macronutrient deficiency and micronutrient deficiency, the so-called "Global Malnutrition". [3]

The severe forms of protein-energy malnutrition are relatively easy to diagnose from their clinical manifestations. Filipino children are usually found in mild or moderate malnutrition category. The diagnose of mild and moderate forms is mainly based on anthropometry. The prevention and reduction of mild and moderate PEM will automatically reduce severe PEM. [1]

Figure 1: PEM Iceberg[1]



CLASSIFICATION OF PEM

The classification of protein-energy malnutrition is based on examination and anthropometric measurements such as weight-for-age, height-for-age, weight-for-height and measurements include mid-upper arm circumference (MUAC). The problems with these measurements are the differences between observers in their techniques and they do not show the same range of graded differences like the weight of the whole body does. Fundamental for classification of PEM are the definition of "normal" as any value between the 2.5th and the 97.5th percentile, approximately +2 SD of mean values and last but not least reference values. The term "reference" value is especially hard to define. Most of the scientists do not have the same opinion referring to "ideal" height or weight. [1] **The following reference values are used:** "Harvard Standard" (growth dates from 1930–1950, USA) "Tanner-Whitehouse Standard" (growth dates from 1950–1960, England) "NCHS Standard" (National Center of Health Statistics, 1970–1980, USA) [3]

Table 1: Different Types of Classification[3]

Type	% reference	Nutritional class
Gomez Weight-for-age	90-109 75-89 60-74 <60	"Normal" Grade I or mild malnutrition Grade II or moderate malnutrition Grade III or severe malnutrition
Wellcome Weight-for-age	60-79 <60	No oedema-Oedematous Undernourished-Kwashiorkor Marasmus-Marasmic-Kwashiorkor
Waterlow Height-for-age	90-94 85-89 <85	**"Stunting"** Mild Moderate Severe
Weight-for-height	80-89 70-79 <70	**"Wasting"** Mild Moderate Severe

COMMON FORMS OF MALNUTRITION

Protein-energy-malnutrition is subdivided into kwashiorkor, marasmus and marasmic kwashiorkor. Children with PEM are at a higher risk for problems like hypothermia, hypoglycaemia, electrolyte disturbances and serious infection. No clear distinction has been made between growth failure (marasmus and undernutrition) and oedematous malnutrition (kwashiorkor and marasmic kwashiorkor) in terms of clinical conditions and pathology. Even if their treatment is very similar, there are some major hypotheses to explain the different forms of PEM.

Table 2: Differences between Kwashiorkor and Marasmus[1]

Feature	Kwashiorkor	Marasmus
Growth failure	Present	Present
Wasting	Present	Present, marked
Oedema	Present (sometimes mild)	Absent
Hair changes	Common	Less common
Mental changes	Very common	Uncommon
Dermatosis flaky-paint	Common	Does not occur
Appetite	Poor	Good
Anaemia	Severe (sometimes)	Present, less severe
Subcutaneous fat	Reduced by present	Absent
Face	May be oedematous	Drawn in, monkey-like
Fatty infiltration of liver	Present	Absent

KWASHIORKOR

In 1935, Cicely Williams proposed the Ghanaian diagnosis kwashiorkor. This syndrome is a disease of the child deposed from the breast by the birth of the next child. Kwashiorkor mainly occurs in regions where rice, maize, cassava, cruciferae and yams are staple foods. This means that the protein quality may be important. [3] Kwashiorkor is most frequently in children one to three years of age, but it may occur at any age and the hallmark is oedema. [1]

MARASMUS

Marasmus is a form of starvation and occurs at any age, most commonly up to about three and a half years. Some causes are premature birth, breaking off breastfeeding early, vomiting, mental deficiency, tuberculosis and infectious and parasitic diseases such as measles, malaria, diarrhoea and whopping cough. [1]

Table 3: Characteristics of Kwashiorkor [1,3,4]

Moon face: The cheeks may appear to be swollen with either fluid or fatty tissue.
Hair changes such as dyspigmentation, straight, sparse and flag sign. On examination under microscope, plucked hair exhibits root changes, a narrower diameter than normal hair and the tensile strength of the hair is reduced.
Protein deficiency: the malnutrition results from a very low protein diet but contains calories in the form of carbohydrates.
Niacin deficiency which causes pellagra.
Aflatoxicosis
Free radical damage
Excess circulating ferritin
Anaemia: Most cases have some degree of anaemia.
"Dysadaption"
Oedema of both feet: All cases have oedema to some degree and usually start with a slight swelling of the feet and often spreads up the legs, later hands and sometimes the face swell. If oedema is present, press with a thumb on dorsum of foot or above the ankle and the pit takes a few seconds to return to the level of surrounding skin.
Poor appetite
Apathetic: The child prefers to remain in one position and is usually apathetic about surroundings. They are frequently irritable when disturbed or moved, and are nearly always miserable and dissatisfied.
Tearful
Muscleatrophy: This is a typical feature of Kwashiorkor but may not be evident because of oedema.
Diarrhoea: The children often have stool-loss, containing indigestible food, blood or with an offensive smell.
No remark of starvation
Skin changes: desquamation, hypopigmention or hyperpigmention, exudative lesions, "flaky-paint-dermatosis", ulceration spreading over thighs, genitalia, limbs, behind the ears and groin.
Fatty infiltration of the liver: This feature is always found in autopsy of kwashiorkor children.

Figure 2: Child with Kwashiorkor

MARASMIC KWASHIORKOR

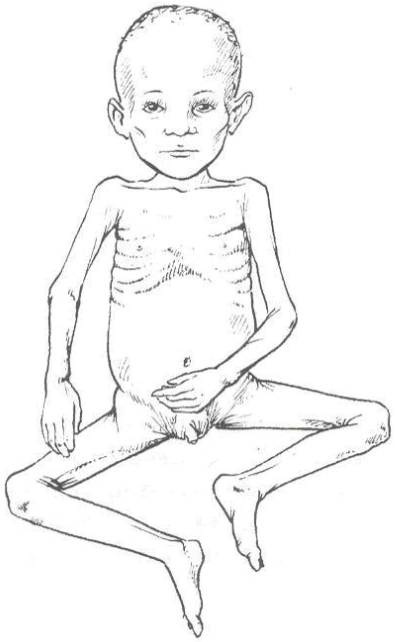
Marasmic kwashiorkor represents another kind of PEM, both symptoms of marasmus and kwashiorkor could occur simultaneously, and many of these children have diarrhoea. [3]

Table 4: Characteristics of Marasmus [1,3,4]

Weight-for-height <70% or -3SD
Very thin and severe wasting of the shoulders, arms, thighs and with visible rib outlines
Child is not getting enough energy and protein from his regular diet to meet his nutritional Needs
Signs of dehydration: This results from severe diarrhoea and sometimes from vomiting
Remark of starvation
Awake, adequate reaction: Marasmic children are alert, quickly interested in something and less irritable and miserable compared with kwashiorkor children
Arched abdomen
Balanced starvation
Severely wasted child and gross loss of subcutaneous fat
Appetite: Children with marasmus usually have a good appetite, some are anorexic and sometimes they make sucking noises

Skin changes: Skin becomes loose and wrinkled, especially around the buttocks and thighs and oedema and flaky-paint dermatosis is not present
"Old man face"
Hair changes: In comparison to kwashiorkor, there is more frequently a change of texture than of colour
Muscle break down: The muscles are always extremely wasted with absent or little subcutaneous fat
Anaemia is usually present among marasmus children

Figure 3: Child with Marasmus [4]



VITAMIN A DEFICIENCY (VAD)

Possible causes of Vitamin A Deficiency are poor absorption of this fat-soluble vitamin, an inadequate intake of both carotene or retinol and an increased metabolic demand. Protein deficiency also has an influence on vitamin A. Retinol (and carotene) is first stored in the liver and then it is transported from the liver to other sites in the human body by a specific carrier protein, the so-called retinol binding protein (RBP). Protein deficiency reduces the synthesis of RBP, which may have an effect on the status of vitamin A. Vitamin A deficiency is the most common cause of blindness in children, especially those who are living in poverty, in the Philippines. VAD causes not only blindness it can also lead to, xerophthalmia, which is a Greek word and means, "drying of the eyes". Besides, it may contribute to higher child mortality rates, especially in children with measles and generally depresses immune response. In general, health, care and adequate food security are necessary to prevent VAD among Filipino children. [1]

Treatment and Prevention

The only sustainable long-term solution for controlling or cutting down VAD is production, availability, improving and consumption of vitamin-A rich foods. In selected Filipino communities, health workers and nutritionists tried to increase children's complementary consumption of foods, above all in vitamin A, with foods containing adequate fat. Breastfeeding is also a weapon against VAD. Particularly exclusively breastfed infants are both protected against xerophthalmia and provided with adequate amounts of vitamin A from the mother. Fortification, a relatively low-cost intervention for governments, is a popular strategy to control VAD. "In a trial in the Philippines, vitamin A and flow-enhancing substances were added to MSG. The public usually purchased 2.4g packets of MSG to add to soups, stews or other foods. It was decided to add 0.1g of the fortificant and to reduce the amount of MSG per packet to 2.3g to maintain the same packet weight.
As the MSG costs more than the fortificant, the packet could thus be sold at the old price. It does no harm if families consume very slightly less salt, sugar or MSG per day." The outcome showed an increase in serum retinol levels from 21.0 to 28.5µg vitamin A/100ml. Medical vitamin A supplements should be used in combination with other prevention methods. A high dose of this fat-soluble vitamin remains for some time in the human body. In former times children aged 1-5 years were protected with 200 000IU of vitamin A from VAD for some weeks but today it is more preferable to provide a regular monthly vitamin A dose. In 1998, the prevalence rate of Vitamin A Deficiency among Filipinos below 5 years was 38%. In 2001, 75.6% of the children in the Philippines received Vitamin A capsule. [19, 1]

VAD and Filipino children

In 1998, the 5th National Nutrition Survey, conducted by the FNRI-DOST, examined the main malnutrition problems among Filipino children and to what extent VAD, IDA and IDD are widespread throughout the country. The following tables show the guidelines and criteria to interpret the data: [6]
Results from 1998 show that about 4 in every 10 Filipino children, aged 6 months to 5 years, have deficient to low vitamin A levels, but compared to the survey in 1993, the vitamin A levels are higher. In 1998, the prevalence of VAD was 8.2% compared with the higher rate of 10.4% in 1993. Vitamin A Deficiency remains a public health problem relating to children, aged 6 months to 5 years, in all regions of the Philippines. At the regional level there is a large difference between south and north. The highest VAD prevalence rate is in Western Mindanao and the lowest one is Ilocos. [5]

Table 5: Guidelines Used for the Interpretation of Plasma Vitamin A Level [21]

Classification Level	Plasma Retinol (µg/dL)
Deficient	<10
Low	10-19
Acceptable	20-49
High	≥50

Table 6: Criteria for Assessing the Public Health Significance [22]

Criteria	Minimum Prevalence
Plasma Retinol less than 10µg/dL (Deficient)	5%
Plasma Retinol less than 20µg/dL (Deficient and Low)	15%

IRON DEFICIENCY ANAEMIA (IDA)

In contrast to Vitamin A deficiency and Iodine deficiency disorders, anaemias occur in both developing and industrialized countries and the most common cause is a deficiency of iron. Protein, vitamin B12, deficiency of folate and VAD are associated with IDA and vitamin E, ascorbic acid, pyridoxine and copper are necessary for erythrocytes production. In Iron Deficiency Anaemia, the erythrocytes appear microcytic and hypochromic. In general, the availability of iron varies greatly and depends on food sources, subdivided into animal and vegetable products. Iron from animal foods, such as meat, is usually better absorbed than from vegetable origin foods such as rice, which is poorly absorbed. A settlement would be a mixture of both sources of food to reduce the differences. [25]

Treatment and Prevention

This micronutrient deficiency is relatively easy and cheap to treat and depends on the cause. The cheapest and most effective treatment method is with ferrous sulphate. The recommended dose is usually 300 mg, which provides 60 mg of elemental iron. In the Philippines, the slow-released preparations will never replace the ferrous sulphate tablets because of the price. Severe anaemia needs intravenous injection, packed cell transfusion or injectable iron preparation such as iron dextran to be treated. However, these are the possibilities but which kinds of treatment are available depend on the hospital.

Iron deficiency anaemia is at the same time the most prevalent and the most difficult to control of the three major micronutrients problem. The recommended iron-rich foods are frequently diets to simultaneously improve vitamin A status. The fortification of foods with iron is complicated and often alters the quality of food. Ferrous sulphate is both cheap and well absorbed but it causes colour changes and affects food consistency. For instance, iron phosphate is poorly absorbed and sodium iron EDTA (ethylene-diamine-tetra-acetate), which is better absorbed, is rarely used. From 1990 to 2004, almost 80 million Filipino individuals were given iron supplements, and more than 11 million schoolchildren got supplementary iron feeding. [10, 1]

IDA and Filipino children

The Fifth National Nutrition Survey used WHO cut-off levels for haemoglobin and FAO/WHO criteria to define the severity of anaemia. [5] The highest Iron Deficiency Anaemia prevalence rate is found among infants, aged 6 months to less than 1 year, at 56.5%. Then a declining IDA prevalence with age is observed, from 1 year-old children to 5-year-old children. In addition, a comparison with 1993 shows that the prevalence rate of IDA among infants, aged 6-11 months, was higher in 1998. The highest prevalence of anaemia, among 6 months to 5 year old children, is in ARMM with 50.6%. As opposed to that rate, the lowest prevalence with 19.8% is in Northern Mindanao. [5] Iron deficiency Anaemia is the only micronutrient deficiency, which is significantly prevalent in all industrialized nations and estimated 30-40% of all preschool children, is iron deficient. [24]

IODINE DEFICIENCY DISORDERS (IDD)

The prevalence of Iodine Deficiency Disorders is exceedingly high in Southeast Asia compared with all other regions of the world. [14] Iodine is generally present in small amounts in water and plants. However, milk and meat are richer sources of iodine and the best natural sources are seafood. The preparation of food plays an important role: cooking reduces the iodine content over half, but in contrast to boiling, frying or grilling reduces by about one-fifth iodine. [26]

Table 7: Normal Haemoglobin Levels [23]

Age	Haemoglobin Levels (g/dL)
6 months – 6 years	11.0
> 6 years – 14 years	12.0

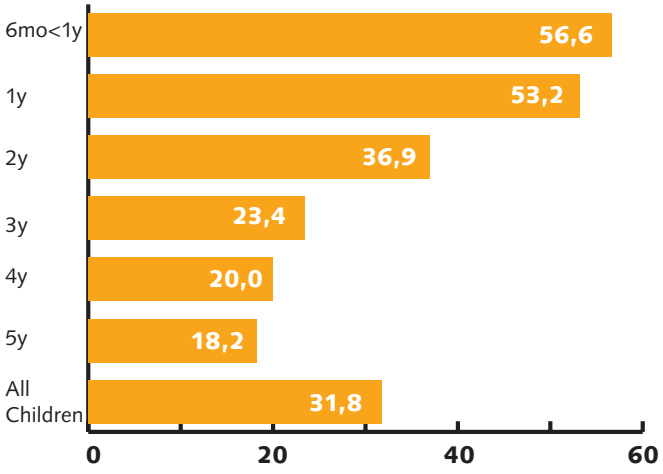
Table 8: Epidemiological Criteria for Assessing Anaemia in the Population [22]

Parameter	Magnitude		
	High	Moderate	Low
Percent of Population with haemoglobin less than the above cut-off points especially for children	≥40.0	10-39	1-9
Percent of population with haemoglobin less than 7.0 g/dL	>10	1-9	<1

Treatment and Prevention

In comparison to VAD and IDA, iodine is the easiest deficiency to control. The treatment of goitre includes taking either 6 mg potassium iodide or Lugol's iodine, which is a very cheap solution and contains 5% iodine and 10% potassium iodide in distilled water. One drop of Lugol's iodine, or IKI (Iodine Potassium-Iodide), should be taken for ten days, and then one drop weekly. One drop also contains about 6 mg of iodine. Some exceptions do not respond to oral iodine dose and surgery is needed especially if the goitre is pressing on the trachea. Nevertheless, this operation requires an experienced thyroidectomy surgeon, resources and after that T4 or thyroid hormones taken for the rest of the patient's life.

Figure 4: Prevalence (%) of Iron Deficiency Anaemia (IDA) among Filipinos [5]



The most strongly and important way of prevention of IDD is salt iodization. Control measurements of Iodine Deficien-

cy are fortification, medical supplementation as a short-term measure, and nutrition education such as reducing the consumption of foods containing goitrogens. The most available medical supplementation is Lipidiol, which provides 480 mg iodine in 1 ml of oil. This supplement can be either taken orally or given by injection, particularly in children it should be given in the buttocks or in the thigh. [1]

IDD and Filipino children

The FNRI-DOST used urinary iodine excretion (UIE) levels for assessing Severity of IDD. [5]
The prevalence of IDD among children, 6 to 12 years, is mild based on a median UIE excretion level of 71.0µg/L. Central Luzon and ARMM have median values more than 100µg/L. Northern Mindanao has moderate Iodine Deficiency Disorders and all other regions have mild IDD. 5 Infants aged 6 months to 1 year of age are the most afflicted group with 66% prevalence rate, and children of 6-12 years have a prevalence of 37.4%. [6]

PROJECTS TO FIGHT MALNUTRITION

This Asian country is on the way to recover with effective methods to fight for infant and child survival: In 1993-1998, the Philippine Plan of Action for Nutrition (PPAN) was an exemplary project to improve the nutritional status of Filipinos with five impact programmes: Home, School and Food Production, Micronutrient Supplementation, Food Fortification, Nutrition Education and Food Assistance.[8,9] In 1999-2004, the Medium-Term Philippine Plan of Action for Nutrition (MTPPAN) was a appreciate successor and achieved more objectives and improvements. [10] In 1998-2003, the Early Childhood Development (ECD) Project was an effective method, to help malnourished Filipino children. For instance, the objective of reduction of dropout rates in elementary schools was reached. Without ECD, only 65% among the 6-9 year-old children have a chance of moving from Grade I to Grade II.[11] The Sangkap Pinoy Seal Program (SPSP) is an effective attempt to improve the micronutrient status, especially among vulnerable groups, in the Philippines.[12] Food products are fortified with Vitamin A, Iron or Iodine or a combination of these micronutrients, based on the Recommended Dietary Allowances (RDA).[13] Direct nutrition actions, actions of the development sector, and sustained and overall economic development provide a solution to address the vicious cycle of malnutrition.[14]

Table 9: Epidemiological Criteria for Assessing Severity of IDD [22]

Severity	Median UIE Level (µg/L)
Severe	<20
Moderate	20-49
Mild	50-99
No Deficiency	≥100

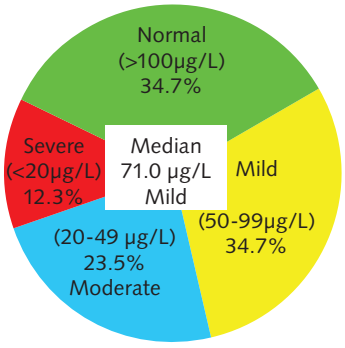


Figure 5: Prevalence of IDD and UIE Levels among Filipinos, 6 to 12 Years old [5]

Table 10: Prevalence of Micronutrient Deficiencies among Filipino Children [7]

Micronutrient Deficiency	Age	Prevalence
VAD	6 months-5 years	8.2
IDA	6 months to < 1 year 1-5 years 6 months-5 years	56.6 29.6 31.8
IDD	6-12 years	35.8

OBESITY

Overweight was considered a minor problem in Asia and a major concern in the Western Pacific. Today overweight and obesity represents an alarming nutrition problem in Asia, particularly in urban areas. The Philippines is culturally, politically and economically very heterogeneous and in some regions it is characterized by malnutrition, some regions by obesity and in others it is characterized by both.

This phenomenon is the "Double Burden" that the Philippines now face. This country will have to develop plans and programmes at the same time to solve both underweight and overweight. [14] The Philippines Association for Study of Overweight and Obesity (PASOO) has been focusing on this growing health problem among children and is trying to create qualified methods to prevent this eating disorder. [6] Causes: Dietary changes and obesity are associated with urbanization.

The everyday Filipino food habits are based on rice-fish-vegetable diet.[5] In general, rural dwellers tend to eat traditional Filipino diets, which are high in rice and low in fat. In urban areas, the same people tend to lose their national, traditional diet and have increased intake of sugar, fat and energy. Workers in urban areas maybe have improved their wages, but they forget that the quality of energy consumed is of utmost importance. In urban areas people tend to find work that is more pleasant, less strenuous and without physical activity, which is associated with weight gain. [16] Ironically, nutritional stunting in early life has been associated with obesity in later years. [17] Particularly longitudinal studies from the Philippines provide strong support for this hypothesis. [14]

With overweight and obesity various health risks such as diabetes, arthritis, hypertension, cardiovascular disease, disease of the gall bladder and psychological disturbances are associated, that is why the highest priority should be the prevention of obesity in infants and young children: exclusively breastfeeding, avoid added sugars and starches when formula is used for feeding, instruction of mothers to avoid feeding until the plate is empty, promotion of adequate micronutrient intake, fruit and vegetable intake, restriction of energy-dense food and soft drink intake, promotion of active lifestyle and limiting TV viewing. [1, 18] The main treatment is to reduce energy intake and increase its expenditure. The prevention of this eating disorder

includes nutrition education and physical activity in schools, family interactions and generally modifying personal environment. [1]

CONCLUSION

The superimposition from malnutrition to obesity among Filipino children is present in some sectors of the population. The majority of Filipinos have not changed their lifestyle or adopted "Western-diets". But the large offers of fast-food chain stores do not make the situation easier. It is necessary to understand the aetiology of obesity in the Philippines to create the best methods to prevent and control the double burden.

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