

Child Malnutrition at Different World Regions in (1990-2013)

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Abstract

Adequate nutrition is essential in early childhood to ensure healthy growth, proper organ formation and function, a strong immune system, and neurological and cognitive development. Child malnutrition – as measured by poor child growth – is an important indicator for monitoring population nutritional status and health. In 2013, about 17%, or 98 million children under five years of age in developing countries were underweight (low weight-for-age according to the WHO child growth standards). Underweight prevalence is highest in the United Nation (UN) region of Southern Asia (30%), followed by Western Africa (21%), Oceania and Eastern Africa (both 19%) and South-Eastern Asia and Middle Africa (both 16%), and Southern Africa 12%. Prevalence below 10% for 2013 is estimated for the UN regions of Eastern, Central and Western Asia, Northern Africa and Latin America and the Caribbean. Childhood malnutrition, including fetal growth restriction, suboptimum breastfeeding, stunting, wasting and Vitamin A and zinc deficiencies, is an underlying cause of death in an estimated 45% of all deaths among children under five years of age.

Key Words: Child Malnutrition, World, Prevalence, Regions.

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1- Introduction

Adequate nutrition, beginning in early stages of life, is crucial to ensure good physical and mental development and long-term health. Malnutrition or malnourishment is a condition that results from eating a diet in which nutrients are either not enough or are too much such that the diet causes health problems (1, 2). It may involve calories, protein, carbohydrates, vitamins or minerals (2). Not enough nutrients is called undernutrition or undernourishment while too much is called overnutrition (3). Malnutrition is often used specifically to refer to undernutrition where there is not enough calories, protein, or micronutrients (3, 4). If undernutrition occurs during pregnancy, or before two years of age, it may result in permanent problems with physical and mental development (2). Extreme undernourishment, known as starvation, may have symptoms that include: a short height, thin body, very poor energy levels, and swollen legs and abdomen (2, 3). Undernourishment is most often due to not enough high-quality food

being available to eat (5). This is often related to high food prices and poverty (2, 5). A lack of breastfeeding may contribute, as may a number of infectious diseases such as: gastroenteritis, pneumonia, malaria, and measles, which increase nutrient requirements(5). There are two main types of undernutrition: protein-energy malnutrition and dietary deficiencies (4). Protein-energy malnutrition has two severe forms: marasmus (a lack of protein and calories) and kwashiorkor (a lack of just protein) (3). Common micronutrient deficiencies include: a lack of iron, iodine, and vitamin A (3). During pregnancy, due to the body's increased need, deficiencies may become more common (6). In some developing countries, overnutrition in the form of obesity is beginning to present within the same communities as undernutrition (7). Other causes of malnutrition include anorexia nervosa and bariatric surgery (8, 9). Efforts to improve nutrition are some of the most effective forms of development aid (10). Some of signs of malnutrition are shown in (Table.1) (11).

Table 1: Some of Signs of Malnutrition

| Site | Sign |
|----------------|--|
| Face | Moon face (kwashiorkor), simian facies (marasmus) |
| Eye | Dry eyes, pale conjunctiva, Bitot's spots (vitamin A), periorbital edema |
| Mouth | Angular stomatitis, cheilitis, glossitis, spongy bleeding gums (vitamin C), parotid enlargement |
| Teeth | Enamel mottling, delayed eruption |
| Hair | Dull, sparse, brittle hair, hypopigmentation, flag sign (alternating bands of light and normal color), broomstick eyelashes, alopecia |
| Skin | Loose and wrinkled (marasmus), shiny and edematous (kwashiorkor), dry, follicular hyperkeratosis, patchy hyper- and hypopigmentation, erosions, poor wound healing |
| Nail | Koilonychia, thin and soft nail plates, fissures or ridges |
| Musculature | Muscles wasting, particularly in the buttocks and thighs |
| Skeletal | Deformities usually a result of calcium, vitamin D, or vitamin C deficiencies |
| Abdomen | Distended - hepatomegaly with fatty liver, ascites may be present |
| Cardiovascular | Bradycardia, hypotension, reduced cardiac output, small vessel vasculopathy |
| Neurologic | Global development delay, loss of knee and ankle reflexes, poor memory |
| Hematological | Pallor, petechiae, bleeding diathesis |
| Behavior | Lethargic, apathetic |

2- Materials and Methods

The current study is a review survey which was conducted to evaluate of status of child malnutrition in (1980-2013) by studying WHO website, Centers for Disease Control and Prevention (CDC), United Nations Children's Fund (UNICEF) and United Nations (UN) websites and scientific texts about this subject. To evaluate the texts and websites, the singular or combination forms of the following keywords were used: "Malnutrition", "Children", "Worldwide" and "WHO regions". To evaluate the electronic databases the following websites were searched: Google, Ministry of Healthcare, Google Scholar, Scopus and PubMed. The results were limited to articles published between 1990 and 2013. Also, library search was performed by referring to the journal archives of libraries, and evaluating the available Persian and English references, and also articles of research-scientific journals, and articles of the annual seminar of Nutrition and Public health.

3- Results

Globally, the proportion of children under five years old who were underweight declined by 10 percentage points between 1990 and 2013, from 25% to 15%. While Africa has experience the smallest relative decrease, with underweight prevalence of 17% in 2013 down from 23% in 1990, in Asia for same period it reduced from 32% to 18% and in Latin America and the Caribbean from 8% to 3%. This means Asia and Latin America and the Caribbean are likely to meet the Millennium Development Goals (MDG) while Africa is likely to fall short, reaching about only half of the targeted reduction. Even if Asia overall is likely to meet the MDG, underweight rates continues to be very high in Southern Asia (30%). This combined with large population, means

that most underweight children live in Southern Asia (53 million in 2013). Rising food prices and the economic crisis may have affected the latest trends in some populations, but it is too early to draw firm conclusions (5, 12, 13).



Fig.1: Symbol of Malnutrition

3-1. Key facts

- Every infant and child has the right to good nutrition according to the Convention on the Rights of the Child.
- Undernutrition is associated with 45% of child deaths.
- Globally in 2013, 161.5 million children under 5 were estimated to be stunted, 50.8 million were estimated to have low weight-for-height, and 41.7 million were overweight or obese.
- About 36% of infants 0 to 6 months old are exclusively breastfed.
- Few children receive nutritionally adequate and safe complementary foods; in many countries less than a fourth of infants 6–23 months of age meet the criteria of dietary diversity and feeding frequency that are appropriate for their age.
- About 800 000 children's lives could be saved every year among children under 5, if all children 0–23 months were optimally breastfed (14-17).



3-2. Wasting and severe wasting

- Globally, 51 million under-five year olds were wasted and 17 million were severely wasted in 2013.
- Globally, wasting prevalence in 2013 was estimated at almost 8% and nearly a third of that was for severe wasting, totaling 3%.
- In 2013, approximately two thirds of all wasted children lived in Asia and almost one third in Africa, with similar proportions for severely wasted children (14-17).

3-3. Overweight

- Globally, 42 million under-five year olds were overweight in 2013, up from 32 million in 2000.
- The trend in overweight is rising in many regions. Between 2000 and 2013 overweight prevalence increased from 11% to 19% in Southern Africa, and from 3% to 7% in Southeastern Asia.
- In terms of regional breakdowns in numbers of overweight children in 2013, there were an estimated 18 million under-fives in Asia, 11 million in Africa and 4 million in Latin America and the Caribbean.
- Low levels and numbers of overweight in children under-five years were observed in the regions of Latin America and the Caribbean, with little change over

the last 13 years. Nevertheless, countries with large populations like Argentina, Bolivia, Brazil, Chile and Peru observed levels of 7% and higher (12-17).

3-4. Underweight

- Globally, 99 million under-five year olds were underweight in 2013, two thirds of which lived in Asia and about one third in Africa.
- The global trend in underweight prevalence continues to decrease; going from 25 per cent to 15 per cent between 1990 and 2013.
- Africa has experience the smallest relative decrease, with underweight prevalence of 17% in 2013 down from 23% in 1990, while in Asia for same period it reduced from 32% to 18% and in Latin America and the Caribbean from 8% to 3%. This means Asia and Latin America and the Caribbean are likely to meet the MDG while Africa is likely to fall short, reaching about only half of the targeted reduction (14-17).

3-5. Levels & Trends in Child Malnutrition (UNICEF-WHO-The World Bank Joint Child Malnutrition Estimates)

The global and regional estimates of prevalence and numbers affected for stunting, underweight, and overweight in (1990–2013) for wasting and severe wasting, by the various regional classification, had been shown in (Figures 2-7) (14-17). Also, regional prevalence and number of stunting, underweight and overweight (1990-2013); the global child malnutrition trend (1990-2013); and regional prevalence and numbers affected for wasting and severe wasting in (1990-2013) had been shown in (Figures.8-10) (14-19).

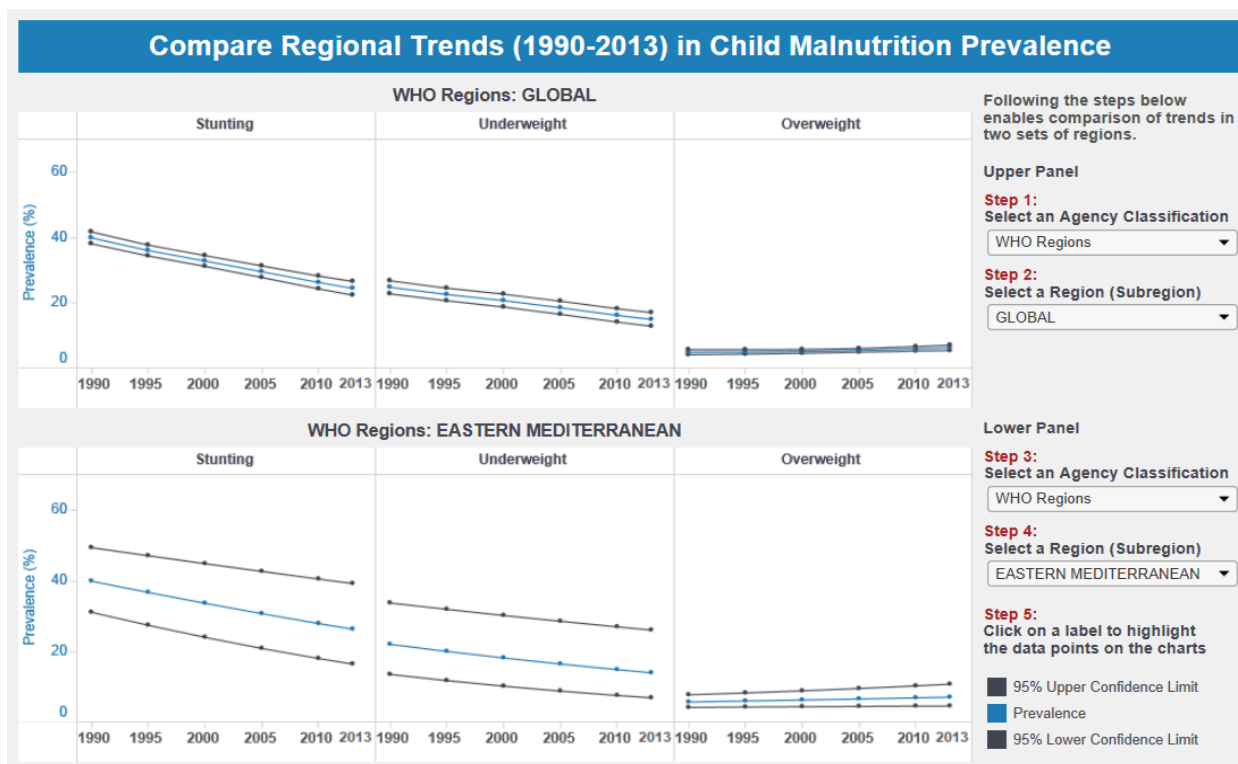


Fig. 2: Compare Global and Eastern Mediterranean Region in Child Malnutrition Prevalence

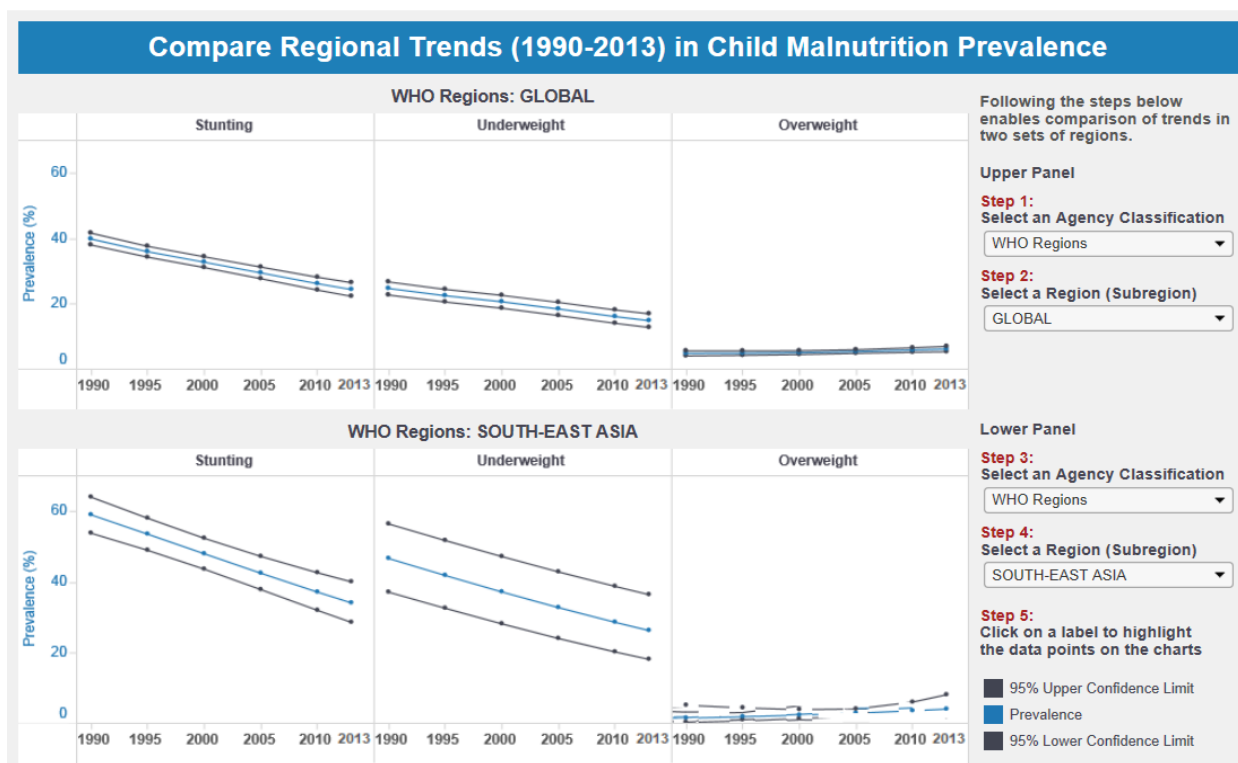


Fig. 3: Compare Global and South-East Asia Region in Child Malnutrition Prevalence

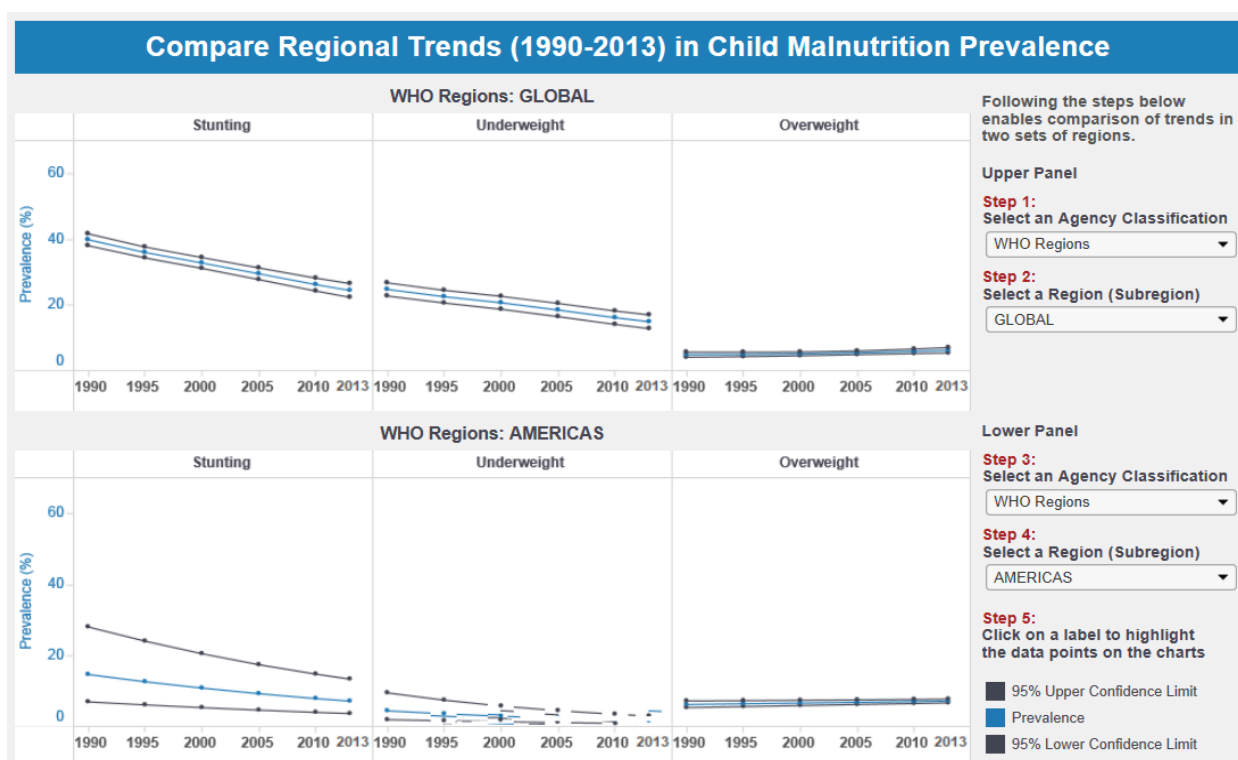


Fig. 4: Compare Global and Americas Region in Child Malnutrition Prevalence

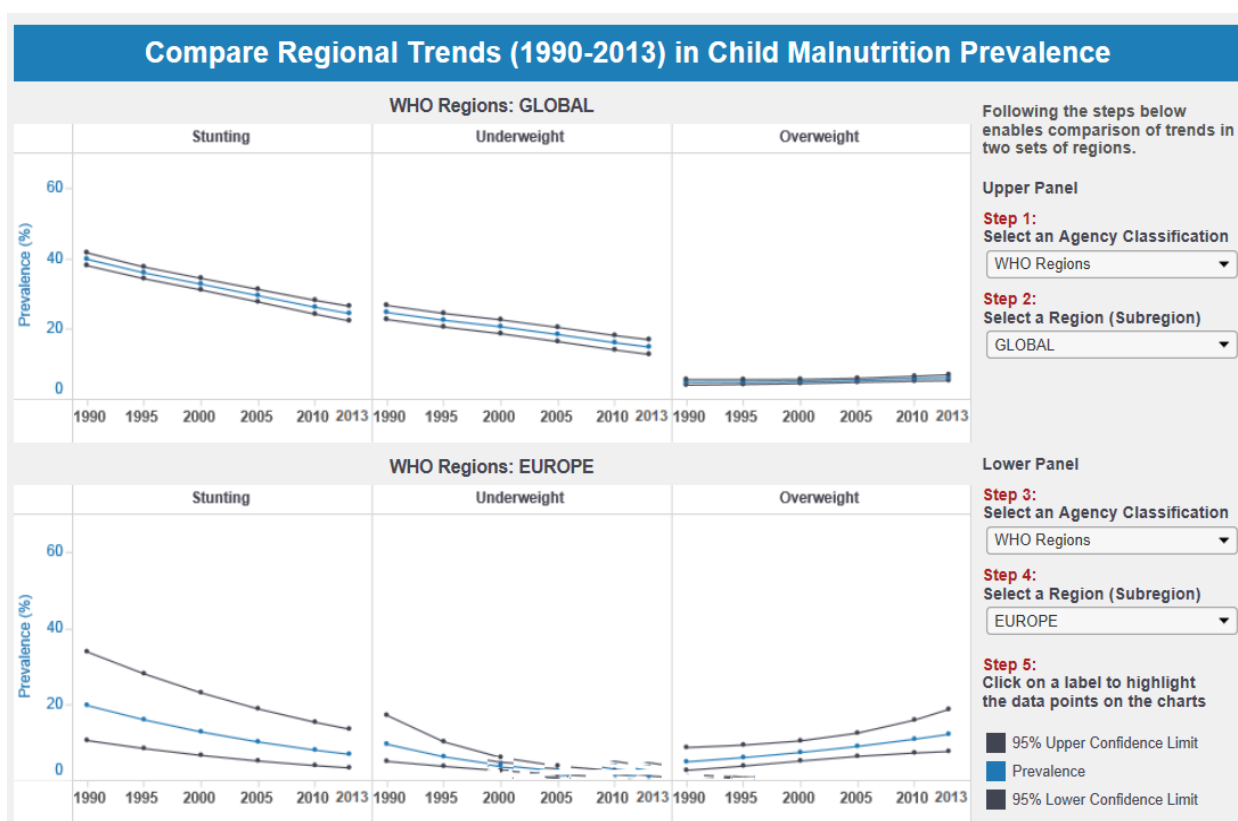


Fig. 5: Compare Global and Europe Region in Child Malnutrition Prevalence

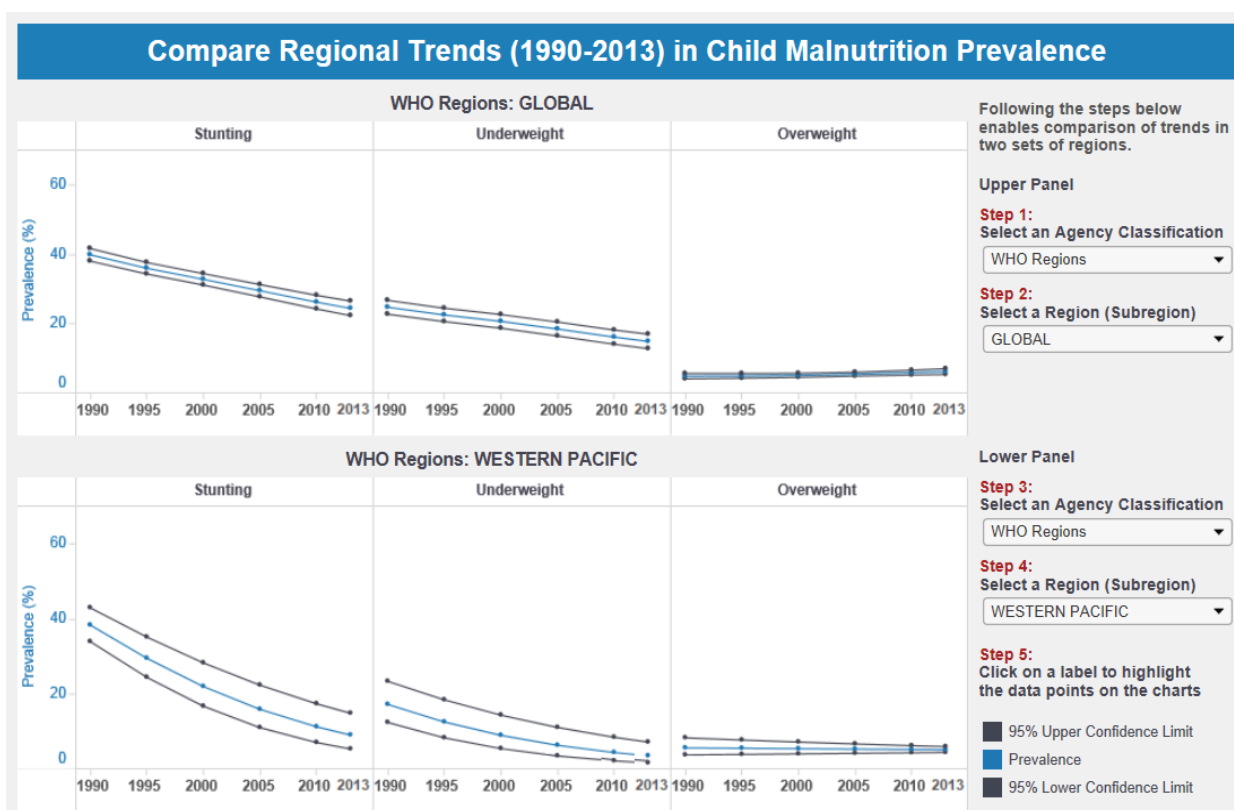


Fig. 6: Compare Global and Western Pacific Region in Child Malnutrition Prevalence

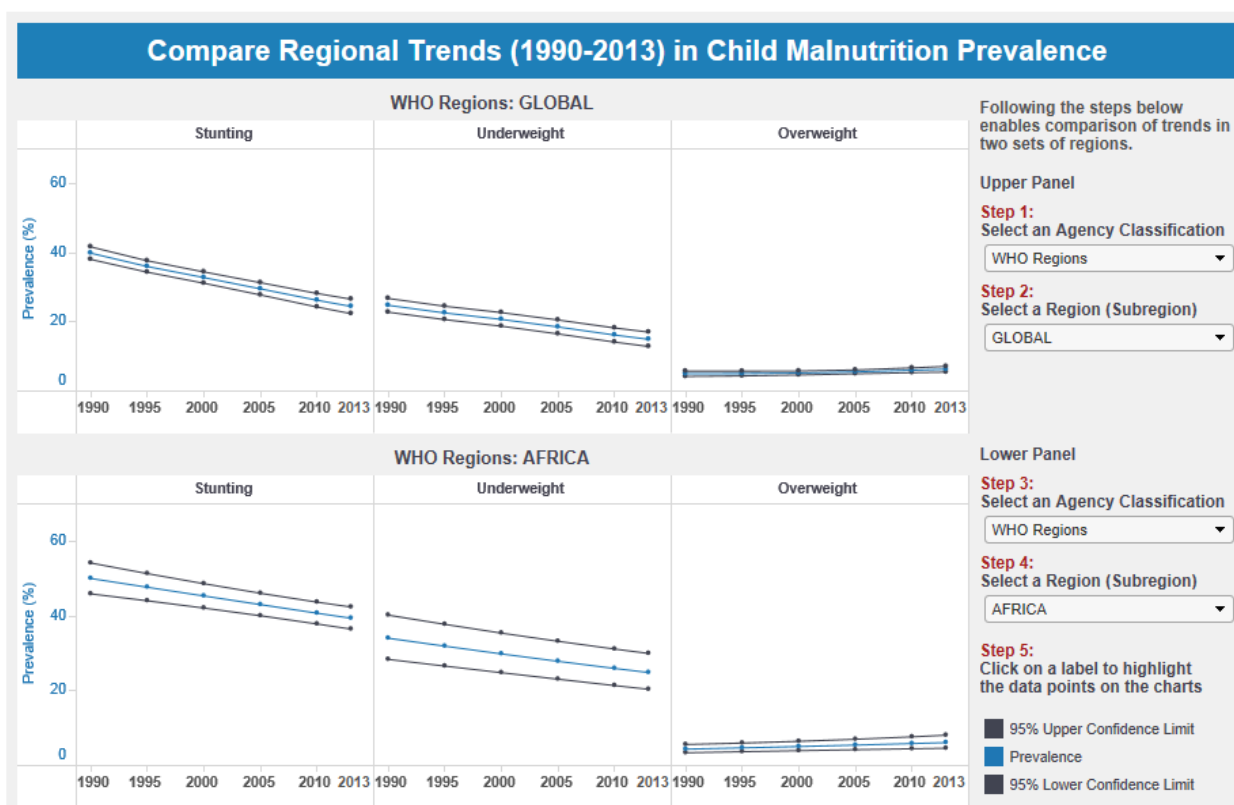


Fig. 7: Compare Global and Africa Region in Child Malnutrition Prevalence

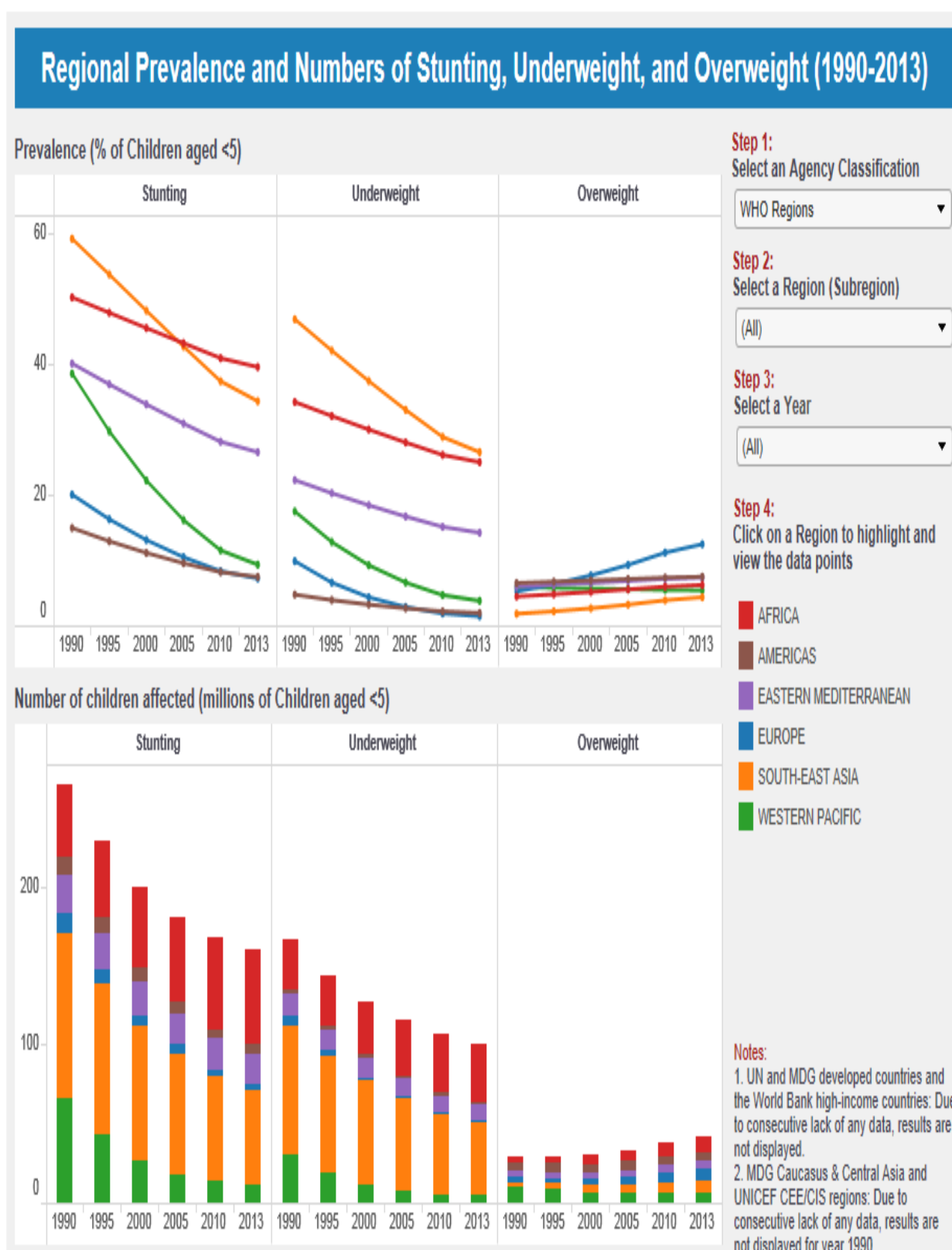


Fig. 8: Regional Prevalence and Number of Stunting, Underweight and Overweight (1990-2013)



Fig. 9: Compare Global trends in Prevalence of Child Malnutrition (1990-2013)

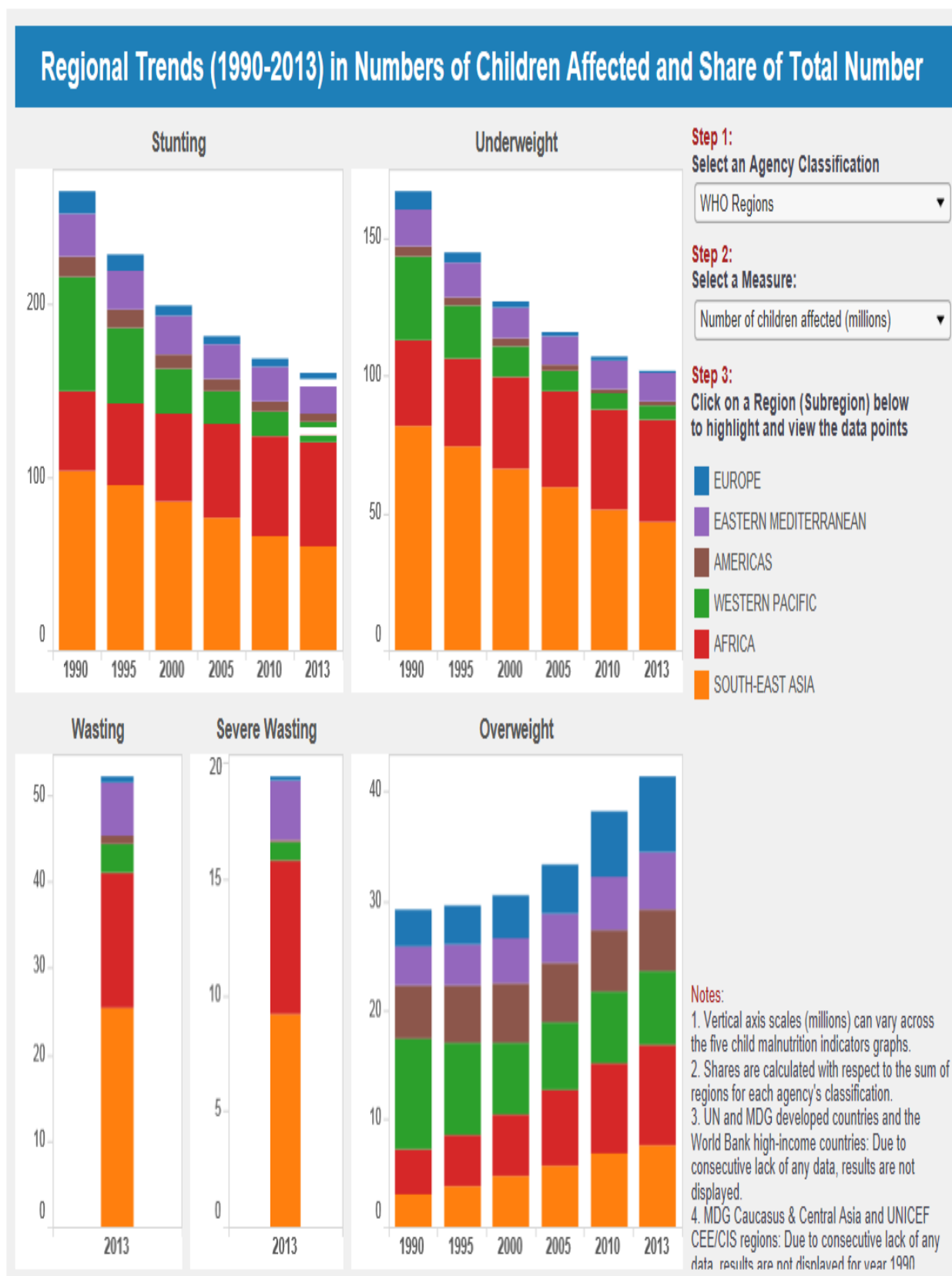


Fig.10: Regional Prevalence and Numbers Affected for Wasting and Severe Wasting (1990-2013)



4- Conclusion

Undernutrition is estimated to cause 3.1 million child deaths annually or 45% of all child deaths. Infant and young child feeding is a key area to improve child survival and promote healthy growth and development. The first 2 years of a child's life are particularly important, as optimal nutrition during this period lowers morbidity and mortality, reduces the risk of chronic disease, and fosters better development overall. Optimal breastfeeding is so critical that it could save about 800 000 under 5 child lives every year.

WHO and UNICEF recommend:

- early initiation of breastfeeding within 1 hour of birth;
- exclusive breastfeeding for the first 6 months of life; and
- the introduction of nutritionally-adequate and safe complementary (solid) foods at 6 months together with continued breastfeeding up to 2 years of age or beyond.

However, many infants and children do not receive optimal feeding. For example, only about 36% of infants aged 0 to 6 months worldwide are exclusively breastfed over the period of 2007-2014. Adequate nutrition, beginning in early stages of life, is crucial to ensure good physical and mental development and long-term health. This action plan illustrates a series of priority actions that

should be jointly implemented by Member States and international partners to achieve, by the year 2025, six global nutrition targets:

- 40% reduction of the global number of children under five who are stunted;
- 50% reduction of anaemia in women of reproductive age;
- 30% reduction of low birth weight
- no increase in childhood overweight;
- increase the rate of exclusive breastfeeding in the first six months up to at least 50%;
- reduce and maintain childhood wasting to less than 5%.

Adequate nutrition is essential in early childhood to ensure healthy growth, proper organ formation and function, a strong immune system, and neurological and cognitive development. Economic growth and human development require well nourished populations who can learn new skills, think critically and contribute to their communities. Child malnutrition impacts cognitive function and contributes to poverty through impeding individuals' ability to lead productive lives. In addition, it is estimated that more than one-third of under-five deaths are attributable to undernutrition. Nutrition has increasingly been recognized as a basic pillar for social and economic development. The reduction of infant and young child malnutrition is essential to the achievement of the Millennium Development Goals (MDGs)—particularly those related to the eradication of extreme poverty and hunger (MDG 1) and child survival (MDG 4). Given the effect of early childhood nutrition on health and cognitive development, improving nutrition also impacts MDGs related to universal primary education, promotion of gender equality and empowerment of women,

improvements of maternal health and combating HIV/AIDS (18-22).

5-Conflict of Interest: None.

6- References

1. "Malnutrition" at Dorland's Medical Dictionary. medical-dictionary.thefreedictionary.com/malnutrition
2. Facts for life (PDF) (4th ed.). New York: United Nations Children's Fund; 2010. pp. 61 and 75. ISBN 978-92-806-4466-1.
3. Young E.M. Food and development. Abingdon, Oxon: Routledge; 2012; pp. 36–8. ISBN 9781135999414.
4. Essentials of International Health. Jones & Bartlett Publishers; 2011. p. 194. ISBN 9781449667719.
5. "Maternal, newborn, child and adolescent health". WHO. Available at: http://www.who.int/maternal_child_adolescent/en/. Accessed in 4 July 2015.
6. Recurrent pregnancy loss (2nd ed.). New Delhi: Jaypee Bros. Medical Publishers; 2007. ISBN 9788184480061.
7. "Progress For Children: A Report Card On Nutrition" (PDF). UNICEF. Available at: http://www.unicef.org/publications/index_336_85.html. Accessed in 4 July 2015.
8. Encyclopedia of human nutrition (2nd ed.). Amsterdam: Elsevier/Academic Press; 2013. ISBN 9780080454283.
9. Stoelting's anesthesia and co-existing disease (6th ed.). Philadelphia: Saunders/Elsevier; 2012. p. 324. ISBN 9781455738120.
10. "An update of 'The Neglected Crisis of Undernutrition: Evidence for Action'" (PDF). Available at: www.gov.uk. Department for International Development. Accessed in 5 July 2015.
11. Grover Z, Ee Looi C. "Protein Energy Malnutrition". *Pediatric Clinics of North America* 2009;56 (5): 1055–68.
12. World Health Organization. Available at: <http://www.who.int/mediacentre/factsheets/fs342/en/>. Accessed in 5 July 2015.
13. World Health Organization. Available at: <http://www.who.int/nutgrowthdb/estimates2012/en/>. Accessed in 5 July 2015.
14. World Health Organization. Comprehensive implementation plan on maternal, infant and young child nutrition. Available at: http://apps.who.int/iris/bitstream/10665/113048/1/WHO_NMH_NHD_14.1_eng.pdf?ua=1. Accessed in July 2015.
15. Global Nutrition Report 2014. UNICEF. Available at: http://www.childinfo.org/malnutrition_dashboard.html. Accessed in July 2015.
16. Global Nutrition Report 2014. WHO. Available at: <http://apps.who.int/gho/data/view.wrapper.nutrition-1-1>. Accessed in July 2015.
17. Global Nutrition Report 2014. World Bank. Available at: <http://data.worldbank.org/child-malnutrition>. Accessed in July 2015.
18. Global Health Observatory (GHO) data 2015. World Health Organization. Available at: <http://www.who.int/gho/en/>. Accessed in July 2015.
19. World Health Organization. Available at: <http://apps.who.int/gho/data/view.wrapper.nutrition-1-4?lang=en&showonly=nutrition>. Accessed in July 2015.
20. Black RE, Allen LH, Bhutta ZA, Caulfield LE, de Onis M, Ezzati M, et al. Maternal and child undernutrition: global and regional exposures and health consequences. *Lancet* 2008; 371(9608):243–60.
20. de Onis M, Blössner MB, Borghi E. Estimates of global prevalence of childhood underweight in 1990 and 2015. *JAMA* 2004;291(21):2600–06.
21. de Onis M, Onyango AW, Borghi E, Garza C, Yang H. Comparison of the World Health Organization (WHO). Child Growth Standards and the National Center for Health Statistics/WHO international growth reference: implications for child health programmes. *Public Health Nutr* 2006;9(7):942–7.
22. Liu L, Johnson HL, Cousens S, Perin J, Scott S, Lawn JE, et al. Global, regional, and national causes of child mortality: an updated systematic analysis for 2010 with time trends since 2000. *Lancet* 2012;379(9832):2151–61.