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Original Research Article

Projection of population of stunted children under five years and anaemic women of reproductive age in thirteen low, upper and high income 100 million+ countries around the world up to 2050

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ABSTRACT

Background: In 2012, the World Health Assembly Resolution 65.6 endorsed a comprehensive implementation plan on maternal, infant and young child nutrition, which specified a set of six global nutrition targets that by 2025. The goals were aimed at reducing stunting, anaemia, low birth weight, no increase in childhood overweight, increase rates of exclusive breastfeeding and reduce and maintain wasting. Out of these an average annual rate of reduction (AARR) of 3.9% for a 40% reduction in reduction in the number of children under five years of age who are stunted and an average annual rate of reduction of 5.2% has been estimated for a 50% reduction in anaemia among women of reproductive age.
Methods: This paper uses demographic techniques to project the number of stunted children under five years and anaemic women for the thirteen 100 million plus countries as of UN population projections, 2017 of Philippines, Ethiopia, Japan, Mexico, Russian Federation, Bangladesh, Nigeria, Pakistan, Brazil, Indonesia, United States of America, India and China using average annual rate of reduction recommended in the world health assembly.
Results: The number of stunted children under five years of age is estimated to be reduced by 27% by 2025, 40% by 2030 and 72% by 2050. The number of anaemic women of reproductive age is estimated to be reduced by 32% by 2025, 46% by 2030 and 85% by 2050.
Conclusions: There is a dire need for accelerating the progress of reduction in stunting prevalence among children under five years and anaemia among women of reproductive age to achieve the global targets in selected high burden countries of India and Nigeria.

Keywords: Stunting, Anaemia, Demographic techniques, Projections, AARR

INTRODUCTION

In 2012, the World Health Assembly Resolution 65.6 endorsed a Comprehensive implementation plan on maternal, infant and young child nutrition, which specified a set of six global nutrition targets that by 2025.[1] The goals were aimed at reducing stunting, anaemia, low birth weight, no increase in childhood overweight, increase rates of exclusive breastfeeding and reduce and maintain wasting. Out of these an average annual rate of reduction (AARR) of 3.9% for a 40% reduction in reduction in the number of children under five years of age who are stunted and an average annual rate of reduction of 5.2% has been estimated for a 50% reduction in anaemia among women of reproductive age. This paper uses demographic techniques to estimate the projected population of stunted children under five years

and anaemic women of reproductive women for the thirteen 100 million plus countries as of UN projections, 2017 of Philippines, Ethiopia, Japan, Mexico, Russian Federation, Bangladesh, Nigeria, Pakistan, Brazil, Indonesia, United States of America, India and China. Seven of these countries hail from Asia, two from Africa, one each from north, south and central America and Europe. Among these 13 countries, there are 2 billion plus and 11, 100 million plus countries, which constitute about 62% of the total population of the world, with about 4.71 billion population. They constitute 55% of the total under five population in the world. 58.1% and 58.6% of the adolescents and youth respectively reside here. 54.6% of the births and pregnancies are from these 13 countries. 57.4% and 60.6% of the adolescent girls 10 to 19 years of age and women of reproductive age of 15 to 49 years reside in these countries respectively. These countries belong to different regions and different economies.[2]

Study objectives

The objective of this paper is to project the population of stunted children under five years and anaemic women of reproductive women for the thirteen 100 million plus countries as of UN projections, 2017 of Philippines, Ethiopia, Japan, Mexico, Russian Federation, Bangladesh, Nigeria, Pakistan, Brazil, Indonesia, United States of America, India and China. The demographic profile of these 13 countries have been presented below:

Table 1: Demographic profile of thirteen, 100 million plus countries in the world, 2017.

Countries/ World	Continent	Region	World Bank Classification of countries, June 2017	Total population in millions	Average annual rate of population change, percent	Proportion of total world population (%)
				2017	2010-2017	2017
Bangladesh	Asia	South Asia	Lower middle income	164.7	1.1	2.2
Brazil	South America	Latin America & Caribbean	Upper middle income	209.3	0.9	2.8
China	Asia	East Asia & Pacific	Upper middle income	1,409.5	0.5	18.7
Ethiopia	Africa	Sub-Saharan Africa	Low income	105.0	2.6	1.4
India	Asia	South Asia	Lower middle income	1,339.2	1.2	17.7
Indonesia	Asia	East Asia & Pacific	Lower middle income	264.0	1.2	3.5
Japan	Asia	East Asia & Pacific	High Income	127.5	-0.1	1.7
Mexico	Central America	Latin America & Caribbean	Upper middle income	129.2	1.4	1.7
Nigeria	Africa	Sub-Saharan Africa	Lower middle income	190.9	2.6	2.5
Pakistan	Asia	South Asia	Lower middle income	197.0	2.1	2.6
Philippines	Asia	East Asia & Pacific	Lower middle income	104.9	1.6	1.4
Russian Federation	Europe	Europe & Central Asia	Upper middle income	144.0	0.1	1.9
United States of America	Northern America	North America	High income	324.5	0.7	4.3
13, 100 million plus countries	-	-	-	4,710		-
World	-	-	-	7,550	1.2	100.0

Source: United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision, Key Findings and Advance Tables. Working Paper No. ESA/P/WP/248[2]
Region and economy classification: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups

METHODS

This paper uses demographic techniques to estimate the population of stunted children under five years and anaemic women of reproductive age in thirteen 100 million plus countries as of UN projections, 2017 of Philippines, Ethiopia, Japan, Mexico, Russian Federation, Bangladesh, Nigeria, Pakistan, Brazil, Indonesia, United States of America, India and China. Seven of these countries hail from Asia, two from Africa, one each from north, south and central America and Europe.[2] The prevalence of moderate and sever stunting (Height-for-Age) has been considered here, which is defined as per cent of children (aged 0–59 months) who are below minus two standard deviations from median height-for-age of the WHO child growth standards. The prevalence of anaemia among women of reproductive age has been considered here. Anaemia is a condition in which the number of red blood cells or their oxygen-carrying capacity is insufficient to meet physiologic needs, which vary by age, sex, altitude, smoking, and pregnancy status (http://www.who.int/topics/anaemia/en/). The cut-off levels for diagnosing anaemia are different for different age groups of population; for children 6-59 months of age, the cut off for anaemia is less than 110 g/l of haemoglobin, for children 5 to 11 years of age, the cut off

is less than 115 g/l of haemoglobin, for children 12 to 14 years of age, the cut off is less than 120 g/l of haemoglobin, for non-pregnant women, the cut off is less than 120 g/l and for pregnant women, the cut off is less than 110 g/l of haemoglobin and for men, it is less than 130 g/l of haemoglobin.

Table 2: Haemoglobin levels to diagnose anaemia at sea level (g/l).

Population	Non- anaemia	Anaemia		
	Non- anaemia	Mild	Moderate	Severe
Children 6 to 59 months of age	110 or higher	100-109	70-99	Lower than 70
Children 5 to 11 years of age	115 or higher	110-114	80-109	Lower than 80
Children 12 to 14 years of age	120 or higher	110-119	80-109	Lower than 80
Non-pregnant women (15 years of age and above)	120 or higher	110-119	80-109	Lower than 80
Pregnant women	110 or higher	100-109	70-99	Lower than 70
Men (15 years of age and above)	130 or higher	110-129	80-109	Lower than 80

Source: WHO. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Vitamin and mineral nutrition Information System. Geneva, World Health Organization, 2011 (WHO/NMH/NHD/MNM/11.1) http://www.who.int/vmnis/indicators/haemoglobin.pdf.

All the computations have been carried out in Microsoft Excel 2013. The formula for the projected estimates are as follows:[3]

1. Projected stunted population at 2025 based on 2017 estimates of stunting prevalence: Proportion of stunted population under five years of age at P_{2025} = Proportion of stunted population at P_{2017}*(1-AARR) $^{2025-2017}$. A geometric or compound annual growth rate formula is used.
2. Projected stunted population at 2030 based on 2017 estimates of stunting prevalence: Proportion of stunted population under five years of age at P_{2030} = Proportion of stunted population at P_{2017}*(1-AARR) $^{2030-2017}$.
3. Projected stunted population at 2050 based on 2017 estimates of stunting prevalence: Proportion of stunted population under five years of age at P_{2050} = Proportion of stunted population at P_{2017}*(1-AARR) $^{2050-2017}$.
4. Projected anaemic population at 2025 based on 2011 estimates of anaemia prevalence from the world health organization: Proportion of anaemic population at P_{2025} = Proportion of anaemic population of reproductive age women at P_{2011}*(1-AARR) $^{2025-2011}$
5. Projected anaemic population at 2030 based on 2011 estimates of anaemia prevalence from the world health organization: Proportion of anaemic population at P_{2030} = Proportion of anaemic population of reproductive age women at P_{2011}*(1-AARR) $^{2030-2011}$.
6. Projected anaemic population at 2050 based on 2011 estimates of anaemia prevalence from the world health organization: Proportion of anaemic population at P_{2050}= Proportion of anaemic population of reproductive age women at P_{2011}*(1-AARR) $^{2050-2011}$.
7. Average Annual Rate of Reduction (AARR) =1-exp (β).
8. Per cent change = $[(P_2-P_1)/P_1]$ *100, where P_1 is population at time point 1 and P_2 is population at the future time point 2.

RESULTS

The estimated number of anaemic women of reproductive age women and stunted children for the year 2025, for the world health assembly goal year and 2030, the SDG goal year and for 2050 have been estimated using the average annual rate reduction of 3.9% for children under five years of age, who are stunted and 5.2% for anaemia among reproductive age. The average annual rate of reduction of 3.9% for a 40% reduction in reduction in the number of children under five years of age who are stunted and 5.2% has been estimated for a 50% reduction in anaemia among women of reproductive age. These AARR have been used in the computations of estimated number of anaemic women and stunted children in future years, up to 2050 by using the methodology suggested by experts[4]. The population of the world is projected to be 8.552 in 2030 and 9.772 billion by 2050. India, which is projected to top the chart, is projected to be 1.513 billion by 2030 and 1.659 billion by 2050, followed by China, which is projected to be 1.441 billion by 2030 and 1.364 billion by 2050.

Estimated number of stunted children under five years of age at 2025, 2030 and 2050: Applying the estimated average annual rate of reduction of 3.9% to achieve the target of 40% reduction in the number of children under five years of age, who are stunted is estimated to be 113.7 million by 2025, 93.2 million by 2030 and 43.4 million by 2050.[5]

Estimated number of anaemic women in the reproductive age at 2025, 2030 and 2050: Applying the estimated average annual rate of reduction of 5.2% to achieve the target of 50% reduction in anaemia among women of reproductive age, the population of anaemic women is estimated to be 363 million by 2025, 287 million by 2030 and 80 million by 2050.

Table 3: Estimated total population at five points of time used for estimation 2011 (Global Anaemia estimate year), for 2017 (most recent completed, calendar year), 2025 (world health assembly goal year) and 2030 (SDG goal year) and a future year time point (2050).

Countries/ World	Total Population, 2011 (millions)	% of world population, 2011	Total Population, 2017 (millions)	% of world population, 2017	Total Population, 2025 (millions)	% of world population, 2025	Total Population, 2030 (millions)	% of world population, 2030	Total Population, 2050 (millions)	% of world population, 2050
Bangladesh	154	2.2	165	2.2	178	2.2	186	2.2	202	2.1
Brazil	199	2.8	209	2.8	220	2.7	225	2.6	233	2.4
China	1,367	19.4	1,410	18.7	1,439	17.6	1,441	16.9	1,364	14.0
Ethiopia	90	1.3	105	1.4	126	1.5	140	1.6	191	2.0
India	1,247	17.7	1,339	17.7	1,452	17.7	1,513	17.7	1,659	17.0
Indonesia	246	3.5	264	3.5	285	3.5	296	3.5	322	3.3
Japan	129	1.8	128	1.7	124	1.5	122	1.4	109	1.1
Mexico	119	1.7	129	1.7	141	1.7	148	1.7	164	1.7
Nigeria	163	2.3	191	2.5	234	2.9	264	3.1	411	4.2
Pakistan	174	2.5	197	2.6	227	2.8	244	2.9	307	3.1
Philippines	95	1.3	105	1.4	118	1.4	125	1.5	151	1.5
Russian Federation	143	2.0	144	1.9	143	1.7	141	1.6	133	1.4
United States of America	311	4.4	325	4.3	343	4.2	355	4.2	390	4.0
13, 100 million plus countries total	4,437	63.0	4,710	62.4	5,030	61.4	5,199	60.8	5,635	57.7
WORLD	7,043	100	7,550	100.0	8,186	100.0	8,551	100.0	9,772	100.0

Note: Author's computations based on United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision, Key Findings and Advance Tables. Working Paper No. ESA/P/WP/248[2].

Table 4: Estimation of stunted children under five years of age based on a 3.9% average annual rate of reduction (AARR) for 2017 (most recent completed, calendar year), as per the target of the world health assembly for 2025 (WHA goal year) and 2030 (SDG goal year).

Countries/ World	Prevalence of moderate and Severe Stunting, 2017 (%)	Estimated number of Under five years children, 2017 (millions)	Estimated number of Under five years children, 2025 (millions)	Estimated number of Under five years children, 2030 (millions)	Prevalence of Moderate and Severe Stunting, 2017 (%)	Prevalence of Moderate and Severe Stunting, 2025 (%)	Prevalence of Moderate and Severe Stunting, 2030 (%)	Estimated number of stunted children under five years, 2017	Estimated number of stunted children under five years, 2025	Estimated number of stunted children under five years, 2030
Bangladesh	36.0	15.2	14.2	13.5	36.0	26.2	21.5	5.5	3.7	2.9
Brazil	7.0	14.8	13.6	12.9	7.0	5.1	4.2	1.0	0.7	0.5
China	8.0	85.1	73.3	68.0	8.0	5.8	4.8	6.8	4.3	3.2
Ethiopia	38.0	15.4	16.4	16.7	38.0	27.6	22.7	5.8	4.5	3.8
India	38.0	119.8	119.8	117.6	38.0	27.6	22.7	45.5	33.1	26.6
Indonesia	36.0	24.7	23.1	22.6	36.0	26.2	21.5	8.9	6.1	4.9
Japan	7.0	5.3	4.9	4.8	7.0	5.1	4.2	0.4	0.3	0.2
Mexico	12.0	11.5	10.8	10.4	12.0	8.7	7.2	1.4	0.9	0.7
Nigeria	33.0	32.4	36.8	40.0	33.0	24.0	19.7	10.7	8.8	7.9
Pakistan	45.0	25.1	25.2	24.9	45.0	32.7	26.8	11.3	8.2	6.7
Philippines	33.0	11.6	12.0	12.1	33.0	24.0	19.7	3.8	2.9	2.4
Russian Federation	-	9.5	8.1	7.2	-	-	-	-	-	-
United States of America	2.0	19.7	21.6	22.0	2.0	1.5	1.2	0.4	0.3	0.3
13, 100 million plus countries total	-	390.2	379.9	372.7	-	-	-	-	-	-
WORLD	23.0	677.9	679.3	680.0	23.0	16.7	13.7	155.9	113.7	93.2

Note: Author's computations based on United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision, Key Findings and Advance Tables. Working Paper No. ESA/P/WP/248.
Source: https://data.unicef.org/wp-content/uploads/2015/12/Technical_Note_AARR_185.pdf.[4]

Table 5: Estimation of stunted children under five years of age based on a 3.9% average annual rate of reduction (AARR) for 2050.

Countries/ World	Projected levels of prevalence of Moderate and Severe Stunting, 2050 (%)	Estimated number of Under five years children, 2050 (millions)	Estimated number of stunted children under five years, 2050 (millions)	Per cent of stunted children to total world population of stunted children under five years of age in 2050 (%)
Bangladesh	10	11.0	1.1	2.5
Brazil	2	11.0	0.2	0.5
China	2	62.4	1.3	3.0
Ethiopia	10	16.8	1.7	3.9
India	10	101.4	10.4	24.0
Indonesia	10	20.8	2.0	4.6
Japan	2	4.5	0.1	0.2
Mexico	3	9.0	0.3	0.7
Nigeria	9	51.6	4.6	10.6
Pakistan	12	25.4	3.1	7.1
Philippines	9	12.0	1.1	2.5
Russian Federation	0	8.0	-	-
United States of America	1	22.5	0.1	0.2
13, 100 million plus countries total	-	-	-	-
WORLD	6	701.7	43.4	100.0

Note: Author's computations based on United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision, Key Findings and Advance Tables. Working Paper No. ESA/P/WP/248. UNICEF. 2017. The State of the worlds' Children 2017: Children in a digital world [5]

Estimated requirement of iron and folic acid supplements (IFAS) for pregnant women

Women suffer disproportionally from many nutritional deficiencies, including iron deficiency (ID) and anaemia. As a significant proportion of the anaemia is estimated to be iron deficiency anaemia, iron and folic acid supplementation has been recommended as the intervention to prevent iron deficiency anaemia. By preventing and controlling iron deficiency and anaemia in pregnancy, the IFA supplementation in pregnancy program supports women's health and nutrition[6]. In order to estimate the requirement for IFAS, number of annual pregnancies and number of pregnancies in any given month have been used here. For a six month supply of 180 IFAS, there would be a requirement of about 27.810 billion tablets for the whole world. The requirement is estimated to vary from 4.950 billion tablets for India to 198 million tablets in Japan for a six months of supply. For an one month of supply for pregnant women, the requirement is estimated to vary from 2.3175 billion to 3.2445 billion tablets around the globe based on two estimates of 50% to 70% respectively of the pregnancies occur in any given month of the total expected annual pregnancies.[7,8]

Per cent change in number of stunted children and anaemic women of reproductive age of 15 to 49 years by 2025 (WHA goal year) and 2030 (SDG goal year) and 2050 (future year):

The number of stunted children under five years of age is estimated to be reduced by275 by 2025, 40% by 2030 and 72% by 2050. The number of anaemic women of reproductive age is estimated to be reduced by 32% by 2025, 46% by 2030 and 85% by 2050.

DISCUSSION

Projection of population of stunted children and anaemic women can help us to understand the quantum of change that is expected considering the rate of progress made. A major proportion of cases of anaemia are considered to be due to iron deficiency, but the proportion probably varies among population groups and in different areas, according to local conditions.

Table 6: Estimation of anaemic women of reproductive age of 15 to 49 years of age based on a 5.2% average annual rate of reduction (AARR) for 2017 (most recent completed, calendar year), as per the target of the world health assembly for 2025 (WHA goal year) and 2030 (SDG goal year).

Country/ World	Prevalence of Anaemia among women, 15 to 49 years of age, 2011	No. of women of reproductive age of 15 to 49 years of age (millions), 2011	No. of women of reproductive age of 15 to 49 years of age (millions), 2017	No. of women of reproductive age of 15 to 49 years of age (millions), 2025	No. of women of reproductive age of 15 to 49 years of age (millions), 2030	Prevalence of Anaemia among women, 15 to 49 years of age, 2011 (%)	Estimated Prevalence of Anaemia among women, 15 to 49 years of age, 2017 (%)	Prevalence of Anaemia among women, 15 to 49 years of age, 2025 (%)	Prevalence of Anaemia among women, 15 to 49 years of age, 2030 (%)	No. of estimated anaemic women, 15 to 49 years of age, 2011 (millions)	No. of estimated anaemic women, 15 to 49 years of age, 2017 (millions)	No. of estimated anaemic women, 15 to 49 years of age, 2025 (millions)	No. of estimated anaemic women, 15 to 49 years of age, 2030 (millions)
Bangladesh	43	42	62	65	65	43	31	20	16	18	19	13	10
Brazil	20	55	73	72	71	20	15	9	7	11	11	7	5
China	20	378	427	394	385	20	15	9	7	76	62	37	28
Ethiopia	19	21	39	47	52	19	14	9	7	4	5	4	4
India	48	318	465	492	499	48	35	23	17	153	162	112	87
Indonesia	23	67	93	97	99	23	17	11	8	15	16	11	8
Japan	22	27	31	28	26	22	16	10	8	6	5	3	2
Mexico	14	32	47	48	49	14	10	7	5	5	5	3	2
Nigeria	49	37	65	82	93	49	36	23	18	18	23	19	16
Pakistan	51	44	69	80	87	51	37	24	18	22	25	19	16
Philippines	25	25	37	41	43	25	18	12	9	6	7	5	4
Russian Federation	21	37	41	41	40	21	15	10	8	8	6	4	3
United States of America	12	73	95	97	99	12	9	6	4	9	8	6	4
13, 100 million plus countries total	-	1,157	1,544	1,583	1,608	-	-	-	-	-	-	-	-
World	29.4	1,813	2,477	2,607	2,689	29	21	14	11	533	529	363	287

Author's computations based on Global Prevalence of Anaemia in 2011, WHO, 2015 http://apps.who.int/iris/bitstream/10665/177094/1/9789241564960_eng.pdf[6]–United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision, Key Findings and Advance Tables. Working Paper No. ESA/P/WP/248.

Table 7: Estimation of population of anaemic women of reproductive age of 15 to 49 years of age based on a 5.2% average annual rate of reduction (AARR) for 2050.

Country/ World	Projected levels of prevalence of anaemia among women, 15 to 49 years of age, 2050 (%)	No. of women of reproductive age of 15 to 49 years of age (millions), 2050	No. of estimated anaemic women, 15 to 49 years of age, 2050 (millions)	Per cent of anaemic women, 15 to 49 years of age to total world population of anaemic women of 15 to 49 years of age in 2050 (%)
Bangladesh	5	47	3	3.8
Brazil	2	48	1	1.3
China	2	243	6	7.5
Ethiopia	2	51	1	1.3
India	6	388	23	28.8
Indonesia	3	77	2	2.5
Japan	3	18	0	0.0
Mexico	2	37	1	1.3
Nigeria	6	104	6	7.5
Pakistan	6	77	5	6.3
Philippines	3	38	1	1.3
Russian Federation	3	27	1	1.3
United States of America	1	82	1	1.3
13, 100 million plus countries total	-	-	-	-
WORLD	4	2,195	80	100.0

Author's computations based on Global Prevalence of Anaemia in 2011, WHO, 2015 http://apps.who.int/iris/bitstream/10665/177094/1/9789241564960_eng.pdf [6]
United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision, Key Findings and Advance Tables. Working Paper No. ESA/P/WP/248.

Table 8: Estimated requirement of iron and folic acid supplements (IFAS) for pregnant women (millions), 2017.

Country/ World	Total Population, 2017 (in millions)	Annual Pregnancies (in millions)	180 IFAS for six months (180 days) (in millions)	Number of pregnancies in a given month @ 0.5[7] (in millions)	Number of pregnancies in a given month @ 0.7[8] in a given month (in millions)	30 IFAS for one month @ 0.5 in a given month (in millions)	30 IFAS for one month @ 0.7 in a given month (in millions)
Bangladesh	165	3.4	612	1.7	2.38	51.0	71.4
Brazil	209	3.2	576	1.6	2.24	48.0	67.2
China	1,410	18	3,240	9.0	12.6	270.0	378.0
Ethiopia	105	3.6	648	1.8	2.52	54.0	75.6
India	1,339	27.5	4,950	13.8	19.25	412.5	577.5
Indonesia	264	5.3	954	2.7	3.71	79.5	111.3
Japan	128	1.1	198	0.6	0.77	16.5	23.1
Mexico	129	2.5	450	1.3	1.75	37.5	52.5

Continued.

Country/ World	Total Population, 2017 (in millions)	Annual Pregnancies (in millions)	180 IFAS for six months (180 days) (in millions)	Number of pregnancies in a given month @ 0.5[7] (in millions)	Number of pregnancies in a given month @ 0.7[8] in a given month (in millions)	30 IFAS for one month @ 0.5 in a given month (in millions)	30 IFAS for one month @ 0.7 in a given month (in millions)
Nigeria	191	8	1,440	4	5.6	120	168.0
Pakistan	197	5.9	1,062	3.0	4.13	88.5	123.9
Philippines	105	2.6	468	1.3	1.82	39.0	54.6
Russian Federation	144	2	360	1.0	1.4	30.0	42.0
United States of America	325	4.5	810	2.3	3.15	67.5	94.5
13 million plus countries total	4,710	87.7	15,786	43.9	61.39	1,315.5	1841.7
World	7,550	154.5	27,810	77.3	108.15	2,317.5	3,244.5

Note: Author's computations based on United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision, Key Findings and Advance Tables. Working Paper No. ESA/P/WP/248.

Table 9: Per cent change in number of stunted children and anaemic women of reproductive age of 15 to 49 years by 2025 (WHA goal year) and 2030 (SDG goal year) and 2050 (future year).

	Per cent change in number of stunted children in 2025 compared to 2017 (%)	Per cent change in number of stunted children in 2030 compared to 2017 (%)	Per cent change in number of stunted children in 2050 compared to 2017 (%)	Per cent change in the number of anaemic women in 2025 compared to 2011 (%)	Per cent change in the number of anaemic women in 2030 compared to 2011 (%)	Per cent change in the number of anaemic women in 2050 compared to 2011 (%)
Bangladesh	- 32	- 47	-81	- 28	- 44	- 86
Brazil	- 33	- 48	-80	-38	- 54	- 89
China	- 37	- 52	-80	-51	- 63	- 92
Ethiopia	- 22	- 35	-71	6	-10	- 69
India	- 27	- 41	-77	-27	- 43	- 85
Indonesia	- 32	- 45	-77	-32	- 47	- 86
Japan	- 32	- 46	-77	-51	- 65	- 92
Mexico	- 32	- 46	-79	-30	- 45	- 86
Nigeria	- 17	-26	-57	4	- 9	- 65
Pakistan	- 27	-41	-73	-14	- 28	- 78
Philippines	- 25	-38	-72	-21	- 36	- 81
Russian Federation	-	-	-	-48	- 60	- 91
United States of America	- 20	-34	-69	- 37	- 51	- 86
13, 100 million plus countries total	-	-	-	-	-	-
WORLD	- 27	- 40	-72	-32	- 46	- 85

Author's computations based on the data of the Global Prevalence of Anaemia in 2011, WHO, 2015 http://apps.who.int/iris/bitstream/10665/177094/1/9789241564960_eng.pdf[6]. United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision, Key Findings and Advance Tables. Working Paper No. ESA/P/WP/248.

Other causes of anaemia include other micronutrient deficiencies (e.g. folate, riboflavin, vitamins A and B12), acute and chronic infections (e.g. malaria, cancer, tuberculosis and HIV), and inherited or acquired disorders that affect haemoglobin synthesis, red blood cell production or red blood cell survival (e.g. haemoglobinopathies). So, this paper tries to estimate the requirement of iron and folic acid supplements for pregnant women considering two scenarios. There is need to focus on high population burden countries like; India and Nigeria, where concerted efforts are needed to bring about an expedited change. This is an attempt to estimate the burden of the stunting and anaemia in future years, which would bring in more focussed attention to the high burden countries.

CONCLUSION

The projection of the future population of stunted children and anaemic women would determine the quantum of efforts required for achieving the global nutrition targets of the world health assembly. There is need to focus on high population burden countries, where the number of anaemic women of reproductive age and children under five years, who are stunted, is alarmingly high. India and Nigeria together are projected to contribute to more than one-third of the stunted children and anaemic women in the world by 2050. Though these two countries are projected to constitute about a fifth of the world's population, they are projected to contribute to a third of the burden of stunted children and anaemic women of reproductive age.

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