Research Article **Open Access**

Prevalence and Determinants of Children Underweight in India

Gita Naik* and Jagannath Behera**

*Ph.D. Scholar, P.G Department of Population Studies.
**Assistant Professor, Fakir Mohan University, Balasore, Odisha.

ABSTRACT

Introduction: In the era of globalization and economic growth, still a significant proportion of children are deprived of getting adequate food. Therefore, child malnutrition is high worldwide. In case of India all forms of malnutrition are high i.e., stunting, wasting, underweight and, anaemia.

Objective: This study aims to assess the prevalence of child underweight and socio-economic determinants of children underweight.

Methods and materials: Present study used fifth round of National Family Health Survey (2019 -21) data. Simple percentage, bivariate analysis, adjusted and unadjusted odds ratio are used for the data analysis purpose.

Results: The prevalence of child underweight in India is around 33%. The highest child under-weight is prevailing in the states of Bihar, Gujarat and Jharkhand. Few north-eastern states show better progress in child under-weight with respect to other parts of India. Prevalence of underweight varies by various demographic and socio-economic background characteristics. Here it is found that, with increasing age of the new-born underweight is increasing. There is marginal difference in gender disparity of under-weight prevalence (33.47% -Male Vs 31.78% -Female). In case of place of residence, the under-weight prevalence is high in rural areas as compared to urban area. Under weight is more prominent among child belonging to scheduled tribe (40%) followed by scheduled caste, other backward class and other caste respectively. More percentage of children belonging to Muslim religion are prone to underweight as compared to children belonging to other religion. Education of the mother and her wealth status are important determinants which are influencing children underweight.

Conclusion: Prevalence of child underweight is high (33%) in India and Bihar stands in first position. Further education level of mother, age of children, birth order, age of the mothers at first child, wealth index and caste are the main controlling factor for underweight among children. However, the most prominent factors are education level of mothers and wealth index for child under-weight.

Key words: *Underweight, ICDS, Supplementary nutrition, Socio-economic background, Birth order, etc.*

INTRODUCTION:

In the era of globalization and economic growth one part of human population is becoming victim of poverty and hunger. Therefore, malnutrition is high worldwide and reduction of child malnutrition became global agenda since Copenhagen Consensus. It is aimed in Millennium Development Goal (MDG) entitled in goal 1 that "eradication of poverty and hunger" and aimed to reduce underweight children within 2015. Further

Address for correspondence :
Gita Naik, Ph.D. Scholar, P.G Department of Population Studies
Fakir Mohan University, Balasore, Odisha.
E-Mail ID: gitanaikgeo@gmail.com
ORCID ID: 0000-0002-3364-8060

ACCESS THIS ARTICLE ONLINE

Quick Response Code:

Available online at :

thirdvoice.voiceforvoiceless.in

continued in Sustainable Development Goal (SDG) also (Khan and Mohanty, 2018). Malnutrition is the result of many factors like basic cause (lack of education, unhealthy environment, poor economic status, lack of resource etc), underlying cause (poor availability of health services, inadequate access to food, lack of care for pregnant mother and child etc) and immediate cause (less care and ignorance for disease, inadequate dietary intake) (Unicef,1984). Economic growth in India is prominently visible but reduction in underweight among Indian child is not that level (Commission GOIP, 2013). In case of India all forms of malnutrition are probably high i.e., stunting, wasting, underweight and, anaemia. As per Global Hunger Index 2022 India ranked 107 and scored 29.1 which is slightly high than last year (Global Hunger Index, 2022). Fifth roundsurveyof National Family Health Survey (2019-2021) highlights that still now all forms of malnutrition are high among under 5-yearage children. Its rate of change slightly improved from NFHS 4 to NFHS 5, but there is the need of rapid improvement. Underweight was 35.8 in NFHS 4 and now it is 32.6 (-3.2 change) in NFHS 5. In this way stunting and wasting is respectively 38.4 (NFHS 4), 35.9 (NFHS 5, -2.5 change) and 21 (NFHS 4), 19 (NFHS 5, -2 change). It was found that Infant and Young Child Feeding (IYCF) and Water Sanitation Hygiene (WASH) are the main controlling factors on children's nutrition in their initial 1000 days (WHO).

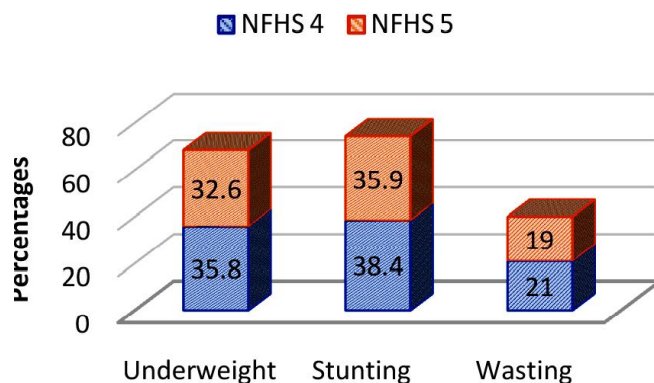### Changes in malnutrition in india

Figure: 1- The Vicious Cycle of Poverty and Malnutrition. Source: H. Vorster, 2010
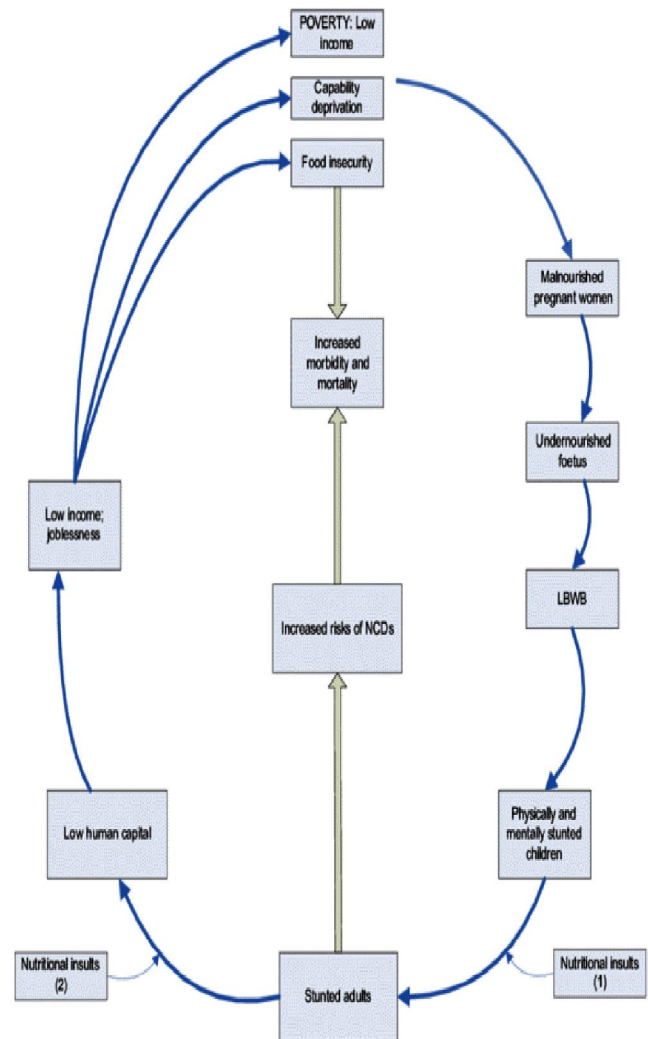
Under five mortality rate and infant death has been declined over the time (SRS Bulletin, 2019). But spatial variation is high. Many states show progress and for many states still infant death and child mortality is high.

Only economic growth does not imply well-being of life in fact with this demographic and health parameters holistically can ensure well-being of life. Magnitude of malnutrition indicators gives the insight view of actual growth and development of any society. Malnutrition deeply effects children and harms health of the child who in future will become human capitals in their adult age. Thus, there is a need for rigorous research under child nutrition (Strauss et.al, 1998; Alderman et.al, 2006). Government of India have taken several initiatives to reduce child malnutrition. Integrated Child Development Services (ICDS) is one of the famous

programs to arrest underweight, stunting, wasting in India. Recently, in 2017 POSHAN Abhiyaan was launched to improve nutritional status among child and mother (Karlsson et.al., 2021). There are the several times questions raised on the proper implementation on ICDS schemes like poor quality supplementary food distribution. Therefore, here remains requirement of rigorous work on evaluation of those schemes. This study is going to analyse available secondary data on child nutrition and role of ICDS scheme in underweight reduction. Present study will help policy makers and NGO workers to work under necessary section of child underweight and ICDS services (supplementary food access).

OBJECTIVES:

1. This study aims to assess the prevalence of children underweight in India.

2. To assess socio-economic determinants of children underweight in India.

MATERIALS AND METHODS:

Present study usedFifth round data of National Family Health Survey, and this survey has been conducted by International Institute for Population Sciences, Mumbai during 2019 to 2021. For data source children's file is used. Generally, child nutrition related all questions are asked to mothers and 231,315 respondent mothers are the target respondent who have within 60 months age baby. This study is national level study and capturing all states and UTs of India. Here dependent variable is under-weight and independent variable is all socio-economic background characteristics of respondent mother and child like age group of children, sex of the child, education level of the mother, wealth index, birth order, mothers age of first birth etc. For data analysis simple percentage, bivariate analysis, adjusted odds ratio is used.

RESULTS:

The prevalence of underweight in India is 32.6%. Table 1 shows state and UT wise distribution of child underweight. In Bihar, Gujarat and Jharkhand this is highest respectively 41.5%, 40.2% and 39.9% and lowest in Mizoram (12.7%), Sikkim (13%) and Manipur (13.7%).
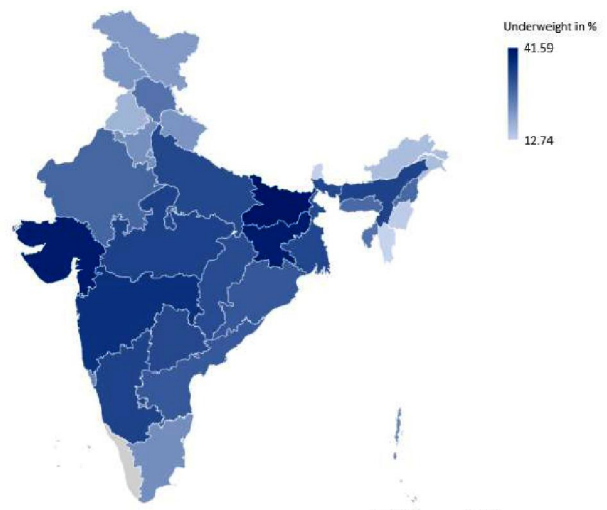

Figure 2: Spatial distribution of underweight in India

Figure 2 demonstrating state and union territory wise spatial variation in child under weight. Table 2 focuses on prevalence of underweight by various demographic and socio-economic background characteristics. Here it is found that with increasing age of the new-born underweight is increasing (27.77% for infant and 34.74% for 48–59-month baby). In case of place of residence, rural area is more sensitive to child under weight (34.37%). Under weight is more prominent among ST child i.e., 39.99% and it is 25.96% among general caste. So, this difference is 14.03% which is high. When see religion wise under-weight than prevalence is more among Muslim (33.87%). Mother's highest educational level is another important predictor variable therefore with increasing this level from illiterate to higher children under-weight is decreasing. Wealth index is one of the important controlling factors for child under-weight. It is 43.7% among poorest household and 20.45% among richest household. Birth order has influence on child under weight, with increasing birth order under-weight is also increasing.

Percentages of Children Underweight by Birth Order

Birth Order	Percentage
Four and more	40.87
Third	36.99
Second	31.98
First	29.05
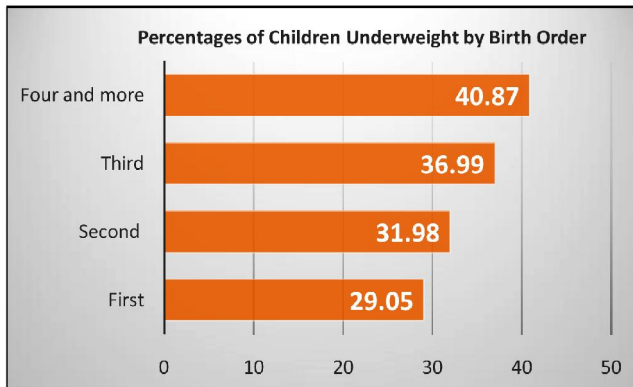
In table 1 and table 2, two different model is given. In model 1 we put only two socio-economic background variables i.e., mother's highest educational level and her wealth status. Here, how these two variables is influencing child under-weight that is showing. We found that odds ratio for higher educated mother is 0.56 (CI: 0.54-0.58) which is less likelihood of having children underweight with comparison to no educated mother. Therefore, with increasing mother's education level children under-weight is decreasing. In case of wealth status situation is quite similar, odds ratio is 0.44 (CI: 0.42-0.45) for richest mother which is less with comparison to poorest mother. Again, with increasing wealth index child underweight is decreasing. So, both these variables are the main determining factor for child under-weight here.

Percentages of Underweight by Wealth Index

Wealth Index	Percentage
Poorest	43.7
Poorer	36.34
Middle	30.34
Richer	25.95
Richest	20.45
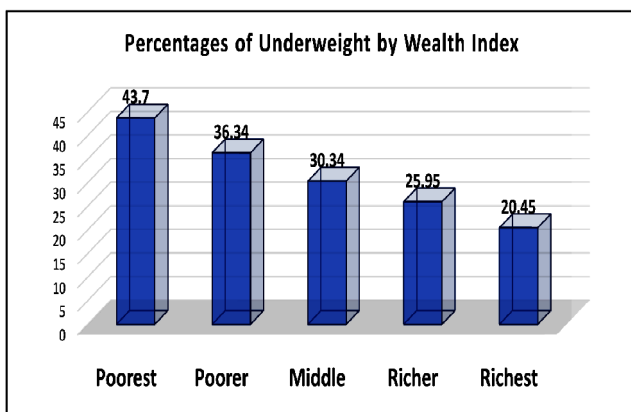
In model 2, we keep other all variables like child age, sex of the child, place of residence, caste, religion, birth order with mother's education level and wealth status. Most of the variables are showing statistically significant relation with child under-weight here. In case of child age, 48–59-month child is more likely to have underweight (OR: 1.32, CI: 1.28-1.37) with comparison

to infant and also found that with increasing child age under-weight is also increasing. Female child has less likelihood for under-weight (OR: 0.89, CI: 0.87-0.91) with comparison to male child. In rural area this likelihood less with comparison to urban area. In case of caste and religion SC children and Muslim children are respectively more likely to have under-weight. With increasing birth order child under-weight is also increasing. In this second model also incorporated mother's educational level and wealth status. Higher educated and richest mother has less likelihood to child under-weight respectively (OR: 0.62, CI: 0.6-0.65; OR: 0.42, CI: 0.4-0.44) with comparison to no educated mother and poorest mother. It shows strong influencing power of mother education and wealth status on child under-weight but other factors of model two also controlling child under-weight.

Table 1: Percentages of child underweight in India, 2019-2021

States	Underweight %
Jammu & Kashmir	21.3
Himachal Pradesh	26.26
Punjab	17.23
Chandigarh	21.06
Uttarakhand	21.56
Haryana	22.04
Delhi	22.1
Rajasthan	28.07
Uttar Pradesh	32.67
Bihar	41.59
Sikkim	13.09
Arunachal Pradesh	15.71
Nagaland	27.67
Manipur	13.73
Mizoram	12.74
Tripura	26.36
Meghalaya	27.38
Assam	33.52

West Bengal	32.94
Jharkhand	39.93
Odisha	30.28
Chhattisgarh	31.98
Madhya Pradesh	33.67
Gujarat	40.28
Dadra & Nagar Haveli	38.68
Maharashtra	36.5
Andhra Pradesh	30.09
Karnataka	33.42
Goa	24.02
Lakshadweep	26.71
Kerala	20.27
Tamil Nadu	22.34
Puducherry	15.72
Andaman & Nicobar	23.69
Telangana	32.56
Ladakh	20.71

Table 2: Prevalence of underweight by different demographic and socio-economic characteristics

Background characteristics	Underweight %
Age group of children	
Infant	27.77
12-23 month	31.28
24-35 month	34.31
36-47 month	34.82
48-59 month	34.74
60	36.11
Sex of the child	
Male	33.47
Female	31.78
Place of residence	
Urban	27.82
Rural	34.37
Caste	
SC	35.61
ST	39.99
OBC	32.11
General	25.96
Religion	
Hindu	32.81
Muslim	33.87
Christian	27.04
Others	27.29
Highest educational level of mothers	
No education	42.42
Primary educated	37.7
Secondary educated	30.83
Higher educated	21.28
Wealth index	
Poorest	43.7
Poorer	36.34
Middle	30.34
Richer	25.95
Richest	20.45
Current working status of mother	
No	32.18
Yes	33.47
Mothers age at first birth	
Less than 15	40.08
16-24	33.57
25-33	27.11
34-42	26.35
More than 42	31.17
Birth order	
First	29.05
Second	31.98
Third	36.99
Four and more	40.87

DISCUSSION:

Present study was done to see current prevalence of child underweight across the states of India and major contributing factors on child underweight.Improvement is visible but very less percentage of child underweight reduced from NFHS 4 to NFHS 5.Many salient findings are identified in this study. Like, found that spatial

heterogeneity in under-weight is high across the different states of India. Still now prevalence of children under-weight is high in India. Few cluster states like Bihar, Uttar Pradesh, Jharkhand, Chhattisgarh, Madhya Pradesh and Gujarat shows high prevalence of children under-weight.

Another important finding is children under-weight has many influencing demographic and socio-economic determinants, among them mother's education level, wealth status, children's age, sex of the child and caste shows statistically significant association with child under-weight. It is also found that highest education level of the mother and her better wealth status bringing down child under-weight. In previous study found that poverty is one of the important factors which create burden on child under-weight (Duncan, 2001). Similarly, mother's education level linked negatively with child under-weight. It implies with increasing education level of the mother child under-weight is decreasing. This finding is found in many previous literatures also (Abuya, 2012; Mishra, 2000). Under the National Health Mission and National Nutrition Mission aimed to work in the field of child and maternal health by Govt. of India. One of the important objectives of those program is to fight against child malnutrition. Therefore, 9046.17 crore rupees sanctioned in 2017 (Falcao, 2015; Murray, 2014).

Table 3: Adjusted Odds Ratio Model

Socio-economic determinants Confidence Interval Highest educational level of mothers				
	OR	p-value	L. L.	U.L.
No education®				
Primary educated	0.912	0.000	0.882	0.943
Secondary educated	0.799	0.000	0.778	0.821
Higher educated	0.627	0.000	0.601	0.654
Wealth Index				
Poorest®				
Poorer	0.778	0.000	0.757	0.800
Middle	0.660	0.000	0.640	0.681
Richer	0.544	0.000	0.525	0.563
Richest	0.428	0.000	0.409	0.447
Child age group				
Infant®				
12-23 months	1.216	0.000	1.177	1.256
24-35 months	1.346	0.000	1.303	1.390
36-47 months	1.334	0.000	1.292	1.378
48-59 months	1.327	0.000	1.285	1.370
60	1.410	0.000	1.259	1.580
Sex of the child				
Male®				
Female	0.890	0.000	0.873	0.908
Place of residence				
Urban®				
Rural	0.924	0.000	0.898	0.951
Caste				
SC®				
ST	0.969	0.058	0.938	1.001
OBC	0.948	0.000	0.924	0.974
General	0.757	0.000	0.731	0.784
Religion				
Hindu®				
Muslim	1.045	0.007	1.012	1.080
Christian	0.533	0.000	0.510	0.557
Others	0.644	0.000	0.609	0.681
Birth order				
First®				
Second	1.074	0.000	1.048	1.100
Third	1.136	0.000	1.102	1.170
Four and more	1.155	0.000	1.118	1.194

Note: ®: Reference category

Conclusion:

Under-weight is the outcome of many factors but it is the mainly biological phenomena. This biological event adjacent with respondent's socio-economic background characteristics. Present study describing spatial variation of children under-weight in various states of India and major contributing socio-economic factors in it. Findings of this study may be useful for government and public health workers, here need integrated approach which can reduce poverty, increase women's education and child malnutrition. Special attention and focus need to

counter child malnutrition as well as under-weight in India in present scenario.

REFERENCES

1. Sharma, H., Singh, S. K., & Srivastava, S. (2020). Socio-economic inequality and spatial heterogeneity in anaemia among children in India: Evidence from NFHS-4 (2015–16). Clinical Epidemiology and Global Health, 8(4), 1158-1171.

2. Imai, K. S., Annim, S. K., Gaiha, R., & Kulkarni, V. S. (2012). Does Women's Empowerment Reduce Prevalence of Stunted and Underweight Children in Rural India? . DP2012-11, Kobe University.

3. Kumar, A. S. (2007). Why are levels of child malnutrition not improving?. Economic and Political Weekly, 1337-1345.

4. Ulahannan, S. K., Wilson, A., Chhetri, D., Soman, B., & Prashanth, N. S. (2022). Alarming level of severe acute malnutrition in Indian districts. BMJ global health, 7(4), e007798.

5. Grebmer, K.V., et al., (2022), Global Hunger Index Food System and Transformation and Local Governance. Welt hunger hilfe.

6. National Family Health Survey -5 (2019-2021). Ministry of Health and Family Welfare, IIPS, USAID.

7. Kapil, U. (2002). Integrated Child Development Services (ICDS) scheme: a program for holistic development of children in India. The Indian Journal of Pediatrics, 69(7), 597-601.

8. Saxena, N. C., & Srivastava, N. (2009). ICDS in India: policy, design and delivery issues. IDS Bulletin, 40(4), 45-52.

9. Bose, K., Biswas, S., Bisai, S., Ganguli, S., Khatun, A., Mukhopadhyay, A., & Bhadra, M. (2007). Stunting, underweight and wasting among Integrated Child Development Services (ICDS) scheme children aged 3–5 years of Chapra, Nadia District, West Bengal, India. Maternal & child nutrition, 3(3), 216-221.

10. Singh, K. J., Chiero, V., Kriina, M., Alee, N. T., & Chauhan, K. (2022). Identifying the trend of persistent cluster of stunting, wasting, and underweight among children under five years in northeastern states of India. Clinical Epidemiology and Global Health, 18, 101158.

11. Petrikova, I. (2022). The role of complementary feeding in India's high child malnutrition rates: findings from a comprehensive analysis of NFHS IV (2015–2016) data. Food security, 14(1), 39-66.

12. Mason, J., Bailes, A., Beda-Andourou, M., Copeland, N., Curtis, T., Deitchler, M., ... & Vance, G. (2005). Recent trends in malnutrition in developing regions: vitamin A deficiency, anemia, iodine deficiency, and child underweight. Food and nutrition bulletin, 26(1), 59-108.

13. Nandy, S., Irving, M., Gordon, D., Subramanian, S. V., & Smith, G. D. (2005). Poverty, child undernutrition and morbidity: new evidence from India. Bulletin of the World Health Organization, 83, 210-216.

14. Imai, K. S., Annim, S. K., Kulkarni, V. S., &Gaiha, R. (2014). Women's empowerment and prevalence of stunted and underweight children in rural India. World Development, 62, 88-105.

15. Varghese, J. S., & Stein, A. D. (2019). Malnutrition among women and children in India: limited evidence of clustering of underweight, anemia, overweight, and stunting within individuals and households at both state and district levels. The American journal of clinical nutrition, 109(4), 1207-1215.

16. Rajaram, S., Zottarelli, L. K., & Sunil, T. S. (2007). Individual, household, programme and community effects on childhood malnutrition in rural India. Maternal & child nutrition, 3(2), 129-140.

17. Singh, J. P., Kariwal, P., Gupta, S. B., Singh, A. K., & Imtiaz, D. (2014). Nutritional status and morbidity among school going children: A scenario from a rural India. Sch J App Med Sci, 2(1D), 379-83.

18. Mukhopadhyay, S. (2015). The intersection of gender, caste and class inequalities in child nutrition in rural India. Asian Population Studies, 11(1), 17-31.

19. Dixit, P., Gupta, A., Dwivedi, L. K., &Coomar, D. (2018). Impact evaluation of integrated child development services in rural India: Propensity score matching analysis. Sage Open, 8(2), 2158244018785713.

20. Gurung, C. K., & Sapkota, V. P. (2009). Prevalence and predictors of underweight, stunting and wasting in under-five children. Journal of Nepal Health Research Council.

21. Bloss, E., Wainaina, F., & Bailey, R. C. (2004). Prevalence and predictors of underweight, stunting, and wasting among children aged 5 and under in western Kenya. Journal of tropical pediatrics, 50(5), 260-270.

22. Ssentongo, P., Ssentongo, A. E., Ba, D. M., Ericson, J. E., Na, M., Gao, X., ... & Schiff, S. J. (2021). Global, regional and national epidemiology and prevalence of child stunting, wasting and underweight in low-and middle-income countries, 2006–2018. Scientific reports, 11(1), 1-12.