COMPLEMENTARY FEEDING PRACTICES AND UNDERWEIGHT STATUS AMONG CHILDREN AGE 6-23 MONTHS IN INDIA

SHREYANS RAI[1], SAYEED UNISA[2]

ABSTRACT

A child's health status in the early days of life impacts growth and other functioning. Physical, as well as cognitive growth, is hampered by childhood undernutrition. Even after many interventions, childhood undernutrition remains a challenge for many low-income countries, particularly in Asia and sub-African countries. Intensified nutrition action can help countries in achieving the target of zero-hunger, i.e., SDG 2. Stunting, wasting, and underweight reflect poor nutrition, which in children leads to retarded growth. According to the latest round of National Family Health Survey (NFHS 4), 36% of Indian children were underweight. After six months, when breast milk is no longer sufficient to meet the a child's nutritional requirements, especially for energy and micronutrients, the complementary feeding process is expected to begin. In most countries, malnutrition rises sharply during the period from 6 to 23 months of age, and the deficits acquired at this age are difficult to compensate for later. Despite the numerous benefits of appropriate complementary feeding practices during early childhood, it has been previously shown that timely complementary feeding rates in South Asian countries were grossly inadequate. An updated Infant and Young Child Feeding (IYCF) indicator (2008) contains eight core and seven optional indicators for assessing the infant and child feeding practices. Strategies to improve IYCF are a vital component of the child survival and development programs of many nations, supported by UNICEF and WHO. During the past decade, there has been considerable improvement in

[1] *Ph.D. Research Scholar, International Institute for Population Sciences (IIPS), Mumbai, India*

[2] *Professor and Head, Department of Mathematical Demography & Statistics, International Institute for Population Sciences (IIPS), Mumbai, India*

breastfeeding practices in many countries; however, similar progress has not been made in the area of complementary feeding. This paper's objective is to assess the association between feeding indicators like minimum dietary diversity, minimum meal frequency, minimum acceptable diet, and underweight among children in the age group six to 23 months using NFHS 4 data. The results show that underweight decreases with improvement in feeding practices. It suggests that knowledge of improved IYCF practices would improve the nutritional status of children aged six-23 months. This study indicates that poverty plays an essential role in determining feeding practices, which is supported by the results in this study. It was observed that children who were able to get the minimum acceptable diet had a 22% lower risk of being underweight. Findings from this study also suggest that improvement in the quality, as well as the frequency of the diet, will help reduce the soaring underweight levels among children. Results from this study focus on the appropriate and timely introduction of complementary feeding and dietary diversity in determining the nutritional status of children among the age group six-23 months.

Keywords: IYCF, underweight, diet diversity, acceptable diet, meal frequency

Introduction

After the Second World War, there was a tremendous decline in mortality rates worldwide. However, high morbidity due to illness is still a major concern. Even after so many interventions, childhood undernutrition is yet a challenge for many low-income countries, particularly in Asia and Sub-African countries.[1] Children can reach their growth potential if they are nurtured in healthy environments, and their caregivers follow recommended health, nutrition, and care practices. A child's health status in the early days of life has impact on growth and other functioning. Physical, as well as cognitive growth, is hampered by childhood undernutrition.[2,3] In addition to its direct relation to the second goal of the Sustainable Development Goal (SDG 2), namely, zero hunger, reducing undernutrition is also a key factor underpinning several other SDGs.[4] Intensified nutrition action can help countries in achieving this target.

Globally, child undernutrition is the underlying cause of 3.5 million deaths, 35% of the disease burden in children under five years of age, and 11% of total global disability adjusted life years.[5] Undernutrition puts children at higher risk of dying from common infections, increases the frequency and severity of such infections, and delays recovery. Stunting, wasting, and underweight reflect poor nutrition, in children leads to retarded growth.[6] The magnitude of underweight is highest in South Asia, as compared to any other region.[7] According to the latest round of National Family Health Survey (NFHS 4), 36% of Indian children are underweight.[8]

The span between pregnancy and a child's first two years of life is considered to be "a critical window of opportunity," for preventing growth faltering.[9] After six months, when breast milk is no longer sufficient to meet a child's nutritional requirements, a complementary feeding process begins especially for energy and micronutrients. Malnutrition rises sharply during the period from six to 23 months of age in most countries, and the deficits acquired at this age are difficult to compensate for later on. Despite the numerous benefits of appropriate complementary feeding practices during early childhood, it has been previously shown that timely complementary feeding rates in South Asian countries are grossly inadequate.[10] In introducing complementary foods,

feeding behaviour of mothers change; and mothers and caregivers adopt various feeding practices that may not comply with standards for optimal infant feeding.[11] Simple, valid, and reliable indicators are crucial to track progress and guide investment to improve nutrition and health during the first two years of life. Since the 1990s, various indicators for assessing breastfeeding were developed by WHO. An updated IYCF indicator (2008) contains eight core and seven optional indicators for assessing the infant and child feeding practices. Core indicators contain early initiation of breastfeeding, exclusive breastfeeding for six months, continued breastfeeding for one year, the introduction of solid, semi-solid or soft food, minimum dietary diversity, minimum meal frequency, minimum acceptable diet, and consumption of iron-rich or iron-fortified foods. Seven optional indicators include children ever breast-fed, continued breastfeeding at two years, age appropriate breastfeeding, predominant breastfeeding under six months, duration of breastfeeding, bottle feeding, and milk feeding frequency for non breastfed children.[9] Strategies to improve IYCF are a vital component of child survival and development programs of many nations, supported by UNICEF and WHO. The scientific rationale for this decision is clear, with steadily growing evidence underscoring the essential role of breastfeeding and complementary feeding as significant factors in child survival, growth, and development.[9,12,13] After decades of research and validation, these indicators were developed after assessing the nutrition of children.[14]

There is a considerable improvement in on the socio-economic front in recent years. Yet, an improvement in the nutritional status of females and children lags behind. Infant and young child feeding practices directly affect the nutritional status of children under two years of age and, ultimately, impact child survival. Improving infant and young child feeding practices in children 0–23 months of age is therefore critical to improved nutrition, health, and development of children. During the past decade, there has been considerable improvement in breastfeeding practices in many countries. However, similar progress has not been made in the area of complementary feeding.[5] Among the complementary feeding indicators, diet diversity emerges as particularly important.[15] Until now, indicators used in population-based surveys to measure IYCF practices have focused mostly on breastfeeding. The lack of evidence and consensus on simple indicators of appropriate feeding practices in children six–23 months of age has hampered progress in measuring and improving feeding.

It is only recently that analysis examining associations between the gamut of the WHO recommended IYCF indicators and child anthropometry[16] has emerged. These indicators are increasingly used in programmatic and research settings to inform assessment, targeting, and monitoring and evaluation efforts, analysis of the associations between these indicators and child anthropometric outcomes are needed to develop an understanding of the strengths and potential limitations of the indicators when used for different purposes. This understanding may lead to a more informed process for selecting indicators and metrics of child diets and feeding practices in different contexts. It is possible to construct these indicators from the data of Demographic and Health Surveys (DHS).[17]

The objective of this paper was to find the prevalence of underweight among children in the age group six to 23 months using national representative DHS data. Also, to assess the association

between feeding indicators like minimum dietary diversity, minimum meal frequency, minimum acceptable diet, and underweight among the children among the age group six to 23 months.

Methodology

NFHS 4 data has been used in this study, for analyzing the prevalence of underweight among the children in the age group six to 23 months as well as to find the association between various factors. For estimating underweight amongst children, individuals whose weight-for-height Z-score is less than two standard deviations below the median of the reference population were considered to be underweight.

An updated IYCF indicator contains eight core and seven optional indicators for assessing the infant and child feeding practices. For this current study, we have considered three of the feeding core indicators, namely minimum dietary diversity, minimum meal frequency, minimum acceptable diet. These three indicators are restricted to the age group 6 to 23 months.

For calculating minimum dietary diversity:

A minimum dietary diversity of four out of seven food groups fed during the day or night preceding the survey:

a) Grains, roots, and tubers

b) Legumes and nuts

c) Dairy products (milk, yogurt, cheese)

d) Flesh foods (meat, fish, poultry and liver/organ meats)

e) Eggs

f) Vitamin A-rich fruits and vegetables

g) Other fruits and vegetables

For calculating minimum meal frequency:

A minimum meal frequency of:

a) Two or more solid or semi-solid feeds for breastfeeding children age six-eight months, or 3 or more solid or semi-solid feeds for breastfeeding children age nine-23 months, or

b) Four or more solid or semi-solid or milk feeds for non-breastfeeding children age six-23 months.

For calculating the minimum acceptable diet:

A minimum acceptable diet based on minimum dietary diversity and minimum meal frequency they are fed during the day or night preceding the survey:

a) Breastfed children – minimum dietary diversity and minimum meal frequency as above.

b) Non-breastfed children – minimum dietary diversity but excluding the dairy products category (four out of six groups) and minimum meal frequency and two or more milk feeds.

Statistical Analysis

Descriptive statistics and bivariate analysis are used to estimate the proportion of underweight. Bivariate analysis is also used for understanding the socio-economic as well as demographic differentials in the prevalence. Multivariate analysis is also used for checking the association of selected socio-economic and demographic factors with the prevalence of underweight. Binary logistic regression is used in terms of multivariate analysis because of the nature of the outcome variable. The outcome variable is divided into two categories, namely not overweight or obese and obese (coded as 0 and 1, respectively). IYCF practiced amongst children and its association with the nutritional status of the children was analyzed using a binary logistic model.

The results are presented in the form of an Odds Ratio (OR) with a confidence interval of 95%. It explains the probability that a child of an exposed group will be overweight or obese to the probability that a child of an unexposed group will develop the same. The calculations were adjusted by using appropriate weighs wherever required.

Propensity score matching (PSM) is an innovative statistical method that is useful in evaluating the treatment effects when randomized clinical trials are not available. The paper's main aim was to make a comparison among those children who consumed the required food and those who did not. Propensity score matching helps by allowing matching to be based on a score function of observable characteristics.

Matching Variables: Many variables have a significant impact on overweight or obesity among children. Matching based on a large number of variables ensures a better chance that propensity score matching assumptions hold. Socio-economic and demographic variables like sex of the child, place of residence, and wealth quintile of the household were matched for both treatments as well as a control group.

Results

Proportion of children who are underweight

Table 1 provides the proportion of children among the age group 6 to 23 months who are underweight. Kids belonging to rural areas had a higher proportion of being underweight (36%) compared to the ones belonging to urban areas (27%). Gender differentials in the proportion of underweight can also be seen. Male child (35%) had a higher proportion of being underweight compared to a female child (31%). Kids belonging to other religions (27%) had a lower proportion of being underweight compared to kids belonging from Hindu (34%) or Muslim religion (33%). Children belonging to Scheduled Caste (37%) and Scheduled Tribe (44%) had a very high proportion of being underweight compared to kids belonging to Other Backward Class (33%) and Others (25%). A significant difference can be seen among the proportion based on the wealth index. Almost half the children belonging to the poorest were underweight while it was even less than 20% for children belonging to the richest wealth quintile. The education of the mother also had an association with the proportion of children being underweight. As the education level of the mother raised, the proportion of children being underweight drastically reduced. Slight variation can also be seen region-wise as the proportion of underweight was highest in Eastern (38%) and Central India (40%), whereas lowest in Southern (26%) and North-Eastern states (24%).

Association of underweight with other socio-economic covariates

Table 2 shows the association of underweight among children in the age group six to 23 months with other socio-economic and demographic covariates. Children belonging to rural areas had lower odds of being underweight (OR: 0.89) compared to urban areas. The female child was less likely to be underweight to the male child. Other religions had lower odds (OR: 0.77) of being underweight compared to Hindus. The odds ratio was higher for Scheduled Caste (OR:1.34), Scheduled Trible (OR: 1.33) and Other Backward Class (OR: 1.24) compared to Other Castes, it was around 34% more for schedule caste, 33% more for scheduled tribe and 24% more for other backward caste children as compared to children from other castes. Odds ratio confirmed that with an increase in wealth index and education level of the mother, there was a

decline in the risk of being underweight among the children. As compared to children from the poorest wealth quintile, children from the richest wealth quintile were 68% less likely to be underweight, and children from the middle wealth quintile were 63% less likely to be underweight. As compared to no educated mothers, primary educated mothers were 11% less likely to be underweight. The highest educated women's children were 4% less likely to have underweight children as compared to non-educated women's children. Southern and North-Eastern regions had lower odds compared to the Northern region, while Western and Central region's children had higher odds of being underweight.

Minimum dietary diversity and underweight

Table 3 shows the association of minimum dietary diversity (IYCF indicator 5) and underweight among children in the age group six to 23 months. Other associated socio-economic and demographic covariates were controlled. Children who had minimum dietary diversity, i.e., who were consuming food from at least four groups out of seven, had lower odds (OR: 0.91) of being underweight compared to those who do not. Rural children with minimum dietary diversity were 11% less likely to be underweight as compared to urban children. Female children having minimum dietary diversity were 20% less likely to be underweight as compared to male children.

In comparison to Hindu children, children from other relisgions were 33% less likely to be underweight. The odds of underweight children having minimum dietary diversity were more for scheduled caste, scheduled tribe and other backward castes in comparison to children of other religions. Southern religion children having minimum dietary diversity were 8% less likely to be underweight as compared to northern region children.

Table 4 illustrates matching estimates. Propensity score matching eliminates most of the bias attributable to matching covariates. The difference in mean outcome in the matched samples can be used to obtain an estimate of the average treatment effect of treated children. The unmatched sample estimate shows that children who had minimum dietary diversity were 7% less likely to be underweight compared to children who did not. The average treatment effect on the treated (ATT), average treatment effect on the untreated (ATU), and average treatment effect (ATE) show the estimates after matching. ATE shows that, on average, there is an 18% less probability of being underweight for children having minimum dietary diversity.

Minimum meal frequency and underweight

Table 5 shows the association of minimum meal frequency (IYCF indicator 6) and underweight among children in the age group six to 23 months. Children who consumed the minimum number of meals had lower odds of being underweight compared to the ones who did not (OR: 0.94).

Rural children who consumed the minimum number of meals were 11% less likely to be underweight as compared to urban children. Female children who consumed the minimum number of meals had lower odds (OR: 0.79) of being underweight as compared to male children. On comparing a Hindu child from who consumed the minimum number of meals, children from other relisions were 33% less likely to be underweight. The children who consumed the minimum number of meals, the odds of them being underweight was higher for scheduled caste, scheduled tribe and other backward caste children, (OR: 1.33),

(OR: 1.33) and (OR:1.24) respectively. The poorest children who consumed the minimum number of meals, in comparison to them, the odds of wealthiest children being underweight was lower.

Table 6 illustrates matching estimates for children having minimum meal frequency. Calculated ATT values in the treated group and control group were 0.28 and 0.12, respectively, which means that underweight decreased by 16% because of having minimum meal frequency. Similarly, ATU clearly shows that amongst the children who did consume minimum meal frequency, the chance of becoming underweight would have decreased from 31% to 1.5%. Here, ATE shows that, on average, there is 11% less probability of being underweight for children having minimum meal frequency.

Minimum acceptable diet and underweight

Table 7 shows the association of minimum acceptable diet (IYCF indicator 7) and underweight among children in the age group six to 23 months. Other socio-economic and demographic covariates were adjusted. Children who had a minimum acceptable diet had lower odds of being underweight (OR: 0.92) compared to others who did not. Rural children who had a minimum acceptable diet had lower odds of being underweight as compared to urban children. Female children who had a minimum acceptable diet had lower odds of being underweight (OR: 80) as compared to male children. As compared to Hindu children who had a minimum acceptable diet, children from other religions were 33% less likely to be underweight. Richest wealth quintile children who had a minimum acceptable diet had lower odds of being underweight as compared to poorest wealth quintile children. Children who had a minimum acceptable diet and were having higher educated mothers, the odds of them being underweight were lower (OR: 0.52) as compared to non-educated mothers. The odds of underweight children for primary and secondary educated mothers for the same were (0.89) and (0.52), respectively.

Table 8 illustrates matching estimates for a minimum acceptable diet. The average treatment effect (ATE) is -0.22. That means children having a minimum acceptable diet will have a 22% lower chance of being underweight compared to children who do not have. That means children who had a proper combination of diverse food with a minimum number of meals had a lower risk of being underweight.

Discussion

The paper examined the prevalence of underweight and its association with feeding practices. Three core indicators - Minimum Dietary Diversity, Minimum Meal Frequency, and Minimum Acceptable Diet - of Infant and Young Children Feeding practices have been taken to establish the relationships between feeding practices and underweight. It is important to note that there is an 18% less probability of being underweight for children having minimum dietary diversity in comparison to those who do not have minimum dietary diversity.

The results show that the underweight among children decreases with improvement in feeding practices. It suggests that knowledge of improved IYCF practices would improve the nutritional status of children aged six-23 months.

Poverty is associated with the nutritional status of children, which is related to poor diets and feeding practices. Household food insecurity is one of the by-products of poverty. It has been seen that high food insecurity is accompanied by high stunting, wasting and underweight.[18] Apart from the role

of poverty in household food insecurity there are other factors like agricultural patterns and climatic conditions which impact the availability of food and affect the nutritional status of individuals.[19] This study has demonstrated a negative and statistically significant association between wealth and underweight.

Improved feeding practices are key to improvement in child nutrition, and especially in the reduction of diseases where underweight is linked as an underlying cause.[20] The analysis indicate that children who were able to meet the three core indicators had a lower chance of being underweight. This finding is consistent with the evidence that dietary diversity and adequacy of diets during the six months to 23 months are vital for the growth of the children. The minimum meal frequency indicator, which requires meeting complementary feeding guidance of solid, semi-solid, and soft food, has been highly associated with underweight.[18] This study also identifies the association of underweight with minimum meal frequency. The number of underweight children in India indicates the inadequate provision of solids, semi-solids, and soft food amongst children aged six-23 months. The increased levels of underweight point towards persistent dietary inadequacy. The minimum acceptable diet indicator reflects the integrated importance of dietary diversity as well as the frequency of complementary feeding. The findings from this study suggest that improvement in the quality, as well as the frequency of the diet, will help reduce the soaring underweight levels among children.

However, the problem of childhood undernutrition is multi-faceted, especially in developing countries. Improving poverty, food security, and diets, in turn, is necessary but might not be sufficient for the improvement in nutritional statuses of the children. The analysis also shows an association between a mother's education underweight. In a similar context, urbanization also has a role to play in the nutritional status of the children.

Results from this study focus on the appropriate and timely introduction of complementary feeding, dietary diversity, as well as other important socio-economic factors along with maternal education. As per this study, the factors mentioned above are considered to be the most assuring ones in improving the nutritional status of children.

Conclusion

The results from this study widely highlight the importance of IYCF practices as an indicator of nutritional status among children aged six-23 months. The results indicate two crucial points in context to the nutritional status of infants and young children in India: (i) dietary diversity and adequacy of meals. To reduce the risk of underweight, it is vital to have the quality of diet and minimum frequency of complementary feeding during six-23 months. Along with improvements in diet, concurrent development in maternal education and other socio-economic indicators is required to target the increasing levels of underweight children.

This study significantly implies that poor faulty complementary feeding practices are associated with poor nutritional outcomes. In India, IYCF practices have been inappropriate and identified many times previously as a vital intervention to improve the nutritional status of children.[21] However, it should be duly noted that increasing the mother's knowledge of IYCF practices cannot be neglected.

Table 1

The proportion of underweight among children in the age group 6 to 23 months

Characteristics	Proportion	N
Type of place of residence		
Urban	26.73	17,922
Rural	35.73	47,601
Sex of the child		
Male	35.31	34,207
Female	31.04	31,316
Religion		
Hindu	33.72	51,735
Muslim	33.02	10,689
Others	26.59	3,099
Caste		
SC	37.01	14,236
ST	43.89	6,808
OBC	33	29,709
Others	24.95	12,489
Wealth Index		
Poorest	48.11	16,058
Poorer	37.46	14,310
Middle	30.55	13,467
Richer	24.44	12,141
Richest	17.08	6,547
Highest Education Level of Mother		
No education	45.87	17,811
Primary	37.75	8,919
Secondary	28.82	31,183
Higher	16.77	7,610
Region-wise distribution		
Northern	33.41	16,396
Southern	26	11,677
Western	31.87	11,880
Eastern	37.92	17,388
North-eastern	24.11	2,272
Central	39.88	5,910
Total	**33.27**	**65,523**

Table 2

Adjusted effect of socio-economic and demographic covariates on underweight

Characteristics	OR (95 percent C.I.)
Place of Residence	
Urban®	
Rural	0.89 *** (0.85, 0.94)
Sex of the child	
Male®	
Female	0.80 *** (0.77, 0.82)
Religion	
Hindu®	
Muslim	0.99 (0.94,1.05)
Others	0.77 *** (0.71, 0.83)
Caste	
Others®	
SC	1.34 *** (1.26,1.42)
ST	1.33 ***(1.24,1.42)
OBC	1.24 *** (1.18,1.31)
Wealth Index	
Poorest®	
Poorer	0.73 *** (0.69,0.76)
Middle	0.57 *** (0.54,0.60)
Richer	0.43 *** (0.40,0.46)
Richest	0.32 *** (0.30,0.35)
Highest level of education	
No education®	
Primary	0.89 *** (0.84,0.94)
Secondary	0.73 *** (0.70,0.76)
Higher	0.52 *** (0.48,0.56)
Region-wise distribution	
Northern®	
Southern	0.90 *** (0.84,0.97)
Western	1.11 *** (1.05,1.17)
Eastern	1.07 *** (1.02,1.12)
North-eastern	0.46 *** (0.42,0.50)
Central	1.18 *** (1.12,1.26)

Note: * P<0.10; ** P<0.05 & *** P<0.01 level of significance

Table 3

Adjusted effect of minimum dietary diversity on underweight

Characteristics	OR (95 percent C.I.)
Minimum Dietary Diversity	
No®	
Yes	0.91 *** (0.87,0.95)
Place of Residence	
Urban®	
Rural	0.89 *** (0.85,0.94)
Sex of the child	
Male®	
Female	0.80 *** (0.77,0.82)
Religion	
Hindu®	
Muslim	1 (0.94,1.05)
Others	0.77 *** (0.71,0.83)
Caste	
Others®	
SC	1.34 *** (1.26,1.42)
ST	1.33 *** (1.24,1.42)
OBC	1.24 *** (1.18,1.31)
Wealth Index	
Poorest®	
Poorer	0.73 *** (0.69,0.76)
Middle	0.57 *** (0.54,0.60)
Richer	0.43 *** (0.41,0.46)
Richest	0.32 *** (0.30,0.35)
Highest level of education	
No education®	
Primary	0.89 *** (0.84,0.94)
Secondary	0.73 *** (0.70,0.77)
Higher	0.52 *** (0.48,0.57)
Region-wise distribution	
Northern®	
Southern	0.92 ** (0.86,0.99)
Western	1.10 *** (1.04,1.17)
Eastern	1.07 *** (1.02,1.13)
North-eastern	0.46 *** (0.43,0.50)
Central	1.19 *** (1.12,1.26)

Note: * P<0.10; ** P<0.05 & *** P<0.01 level of significance

Table 4

Matching estimates show an impact assessment of Minimum Dietary Diversity on underweight in children

Minimum Dietary Diversity	Treated	Controls	Difference	S.E.	T-stat
Un-matched	0.250600343	0.315927799	-0.07	0.00	-13.00
ATT	0.250600343	0.124614065	0.13	0.21	0.00
ATU	0.315927799	0.053877814	-0.26		
ATE			**-0.18**		

Notes: Here treated group 1= having minimum dietary diversity and 0 = not having minimum acceptable diet; outcome variable 1 = underweight; 0 = non underweight.

Table 5

Adjusted effect of minimum meal frequency on underweight

Characteristics	OR (95 percent C.I.)
Minimum Meal Frequency	
No®	
Yes	0.94 *** (0.91,0.98)
Place of Residence	
Urban®	
Rural	0.89 *** (0.85,0.94)
Sex of the child	
Male®	
Female	0.79 *** (0.77,0.82)
Religion	
Hindu®	
Muslim	0.99 (0.94,1.05)
Others	0.77 *** (0.71,0.83)
Caste	
Others®	
SC	1.33 *** (1.26,1.42)
ST	1.33*** (1.24,1.42)
OBC	1.24 *** (1.18,1.31)
Wealth Index	
Poorest®	
Poorer	0.73 *** (0.69,0.76)
Middle	0.57 *** (0.54,0.60)
Richer	0.43 *** (0.40,0.46)
Richest	0.32 *** (0.30,0.35)

Highest level of education	
No education®	
Primary	0.89 *** (0.84,0.94)
Secondary	0.73 *** (0.70,0.77)
Higher	0.52 *** (0.48,0.56)
Region-wise distribution	
Northern®	
Southern	0.9 *** (0.84,0.97)
Western	1.10 *** (1.04,1.17)
Eastern	1.07 ** (1.01,1.12)
North-eastern	0.46 *** (0.42,0.49)
Central	1.18 *** (1.12,1.26)

Note: * P<0.10; ** P<0.05 & *** P<0.01 level of significance

Table 6

Matching estimates show an impact assessment of Minimum Meal Frequency on underweight in children

Minimum Meal Frequency	Treated	Controls	Difference	S.E.	T-stat
Unmatched	0.280861981	0.313519168	-0.03	0.00	-7.80
ATT	0.280861981	0.082298615	0.20	0.19	1.00
ATU	0.313519168	0.015968248	-0.30		
ATE			**-0.11**		

Notes: Here treated group 1= having minimum meal frequency and 0 = not having minimum acceptable diet; outcome variable 1 = underweight; 0 = non underweight.

Table 7

Adjusted effect of minimum acceptable diet on underweight

Characteristics	OR (95 percent C.I.)
Minimum Acceptable Diet	
No®	
Yes	0.92 ** (0.87,0.99)
Place of Residence	
Urban®	
Rural	0.89 *** (0.85,0.94)
Sex of the child	
Male®	
Female	0.80 *** (0.77,0.82)
Religion	
Hindu®	
Muslim	0.99 (0.94,1.05)
Others	0.77 *** (0.71,0.83)
Caste	
Others®	
SC	1.34 *** (1.26,1.42)
ST	1.33 *** (1.14,1.42)
OBC	1.24 *** (1.18,1.31)
Wealth Index	
Poorest®	
Poorer	0.73 *** (0.69,0.76)
Middle	0.57 *** (0.54,0.60)
Richer	0.43 *** (0.40,0.46)
Richest	0.32 *** (0.30,0.35)
Highest level of education	
No education®	
Primary	0.89 *** (0.84,0.94)
Secondary	0.73 *** (0.70,0.77)
Higher	0.52 *** (0.48,0.56)
Region-wise distribution	
Northern®	
Southern	0.91 ** (0.84,0.98)
Western	1.10 *** (1.04,1.17)
Eastern	1.07 ** (1.02,1.13)
North-eastern	0.46 *** (0.42,0.50)
Central	1.18 *** (1.12,1.26)

Note: * P<0.10; ** P<0.05 & *** P<0.01 level of significance

Table 8

Matching estimates show impact assessment of Minimum Acceptable Diet on underweight in children

Minimum Acceptable Diet	Treated	Controls	Difference	S.E.	T-stat
Unmatched	0.249705305	0.31	-0.06	0.01	-8.40
ATT	0.249705305	0.04	0.20	0.18	1.10
ATU	0.306873907	0.040382073	-0.26		
ATE			**-0.22**		

Notes: Here treated group 1= having minimum acceptable diet and 0 = not having minimum acceptable diet; outcome variable 1 = underweight; 0 = non underweight.

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