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Inter-Relationship between Undernutrition in Children and Literacy in Districts of Rajasthan

Ajay Bharti[1], Bharat Lal Meena[2]

Abstract:
Rajasthan is among the States with the highest prevalence of malnutrition in children under the *age of five years. As per NFHS-4, About 32% of the children in Rajasthan are stunted, 17% are Wasted, 8% are Severely Wasted and 28% are underweight. This research paper explores the possible interplay between Undernutrition in Children and Literacy in Districts of Rajasthan to see whether Districts that perform better in Literacy (especially in Women's Literacy) record better nutritional outcomes. Correlation and Regression analysis are used to study the relationship between Undernutrition among children under five years of age and Literacy in Districts of Rajasthan at 33 Districts using data from the National Family Health Survey-4 for the year 2015/16 and Census 2011. Some studies have found a strong association between maternal education and Undernutrition. We find that Male and Female Literacy has a Moderate Negative correlation coefficient with Wasted & Underweight Children and a Low correlation coefficient with Stunted Children. There is a need to do better on the Male & Female Literacy rates for improvement in Undernutrition.*

Keywords: *Undernutrition, Children, Male Literacy, Female Literacy, Nutrition, Districts of Rajasthan.*

Background

Undernutrition occurs when children do not consume enough calories, protein or micronutrients to maintain good health. It is common globally and may result in both short and long-term irreversible adverse health outcomes. Undernutrition is one of the leading causes of childhood mortality worldwide.

As per NFHS-4, Rajasthan is among the States with the highest prevalence of malnutrition in children under the age of five. About 32% of the children in Rajasthan are stunted, 17% are Wasted, 8% are Severely Wasted, and 28% are underweight.

Review of Literature

Khattak, U. K. et al. (2017) carried out a case-control study to look into the relationship of parental education with malnutrition in Pakistan and the developing world in general. They recommended that parents' education, especially females' education, in the rural and semi-urban areas should be encouraged and given due importance. Parents' education status is one of the most important determinants of malnutrition. Educated parents are more probable to employ better child-care practices than uneducated parents. According to their study, 52.3 percent of children of the uneducated mother and 50 percent of children with an uneducated father were found to have malnutrition. In comparison, only 37.1 percent of children of the educated mother and only 40.8 percent of children with an educated father were found to have malnutrition.

Gulati ashok et al. (2012) explored that access to sanitation facilities, women's Literacy, health care for women and child care practices are important determinants of malnutrition among children and adults. They suggest that Women's nutrition status, their position in the household and society and their education can play a very significant role not only in the well-being of the women but also in the nutritional status of their children.

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Smith et al. (2003) explored the relationship between women's status and children's nutrition in three developing regions: South Asia, Sub-Saharan Africa (SSA), and Latin America and the Caribbean (LAC). They observed that If women and men have equal status in society, the number of underweight children drops significantly.

Smith and Haddad (1999), in a cross-country analysis of 63 countries from 1970 to 1996, estimated that improvements in women's education are the most critical factor in the reduction of child malnutrition, accounting for 43% of the total reduction that took place during the period.

Dev et al. (2007) observed that an educated household member and women's empowerment strongly influence participation in education and child-related safety nets.

Hasan MT at el. (2016) According to a study done in Bangladesh, children of mothers with secondary or higher education were at a lower risk of childhood stunting (risk ratio (RR): 0.86), underweight (RR: 0.83) and wasting (RR: 0.82) as compared to children of uneducated mothers.

Objective

This research paper explores the possible interplay between Undernutrition in Children and Literacy in Districts of Rajasthan to see whether Districts that perform better in Literacy (especially in Women's Literacy) record better nutritional outcomes.

Methods:

For this purpose, Correlation and Regression analysis are used to study the relationship between Undernutrition among children under five years of age and Literacy in Districts of Rajasthan at 33 Districts using data from the National Family Health Survey-4 for the year 2015/16 and Census 2011. We regress the dependent variable with the independent variables individually.

The significance of variables with the level of significance is denoted as follows:

* Significant at 1% level of significance

** Significant at 2% level of significance

*** Significant at 5% level of significance

Status of Undernutrition in Children

Table 1: Undernutrition in Children in Districts of Rajasthan (%)

S.No.	District	Stunted	Wasted		Underweight
		Children under 5 years who are Stunted (%)	Children under 5 years who are Wasted (%)	Children under 5 years who are Severely Wasted (%)	Children under 5 years who are Underweight (%)
1	Ajmer	33.5	31.6	12.2	39.6
2	Alwar	41.8	18.5	8.7	35.6
3	Banswara	50	30.8	12	50.7
4	Baran	40.2	28.5	10.6	41.1
5	Barmer	36.6	25.9	9.1	39.6
6	Bharatpur	47.6	14.6	6.7	30.9
7	Bhilwara	35.5	33.8	12.9	42.6
8	Bikaner	33.7	24.4	9.5	33.2
9	Bundi	38.4	27.7	8.6	43.4
10	Chittorgarh	37.4	23.8	8.7	41.9
11	Churu	31.2	21.7	9.4	27.1
12	Dausa	33.8	15.3	6	28.1
13	Dholpur	54.3	15.8	4.8	39.8
14	Dungarpur	46.8	37.5	16.1	53.4

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S.No.	District	Stunted	Wasted		Underweight
		Children under 5 years who are Stunted (%)	Children under 5 years who are Wasted (%)	Children under 5 years who are Severely Wasted (%)	Children under 5 years who are Underweight (%)
15	**Ganganagar**	29.1	20.6	5.8	29.3
16	**Hanumangarh**	35	20.7	7.6	23.4
17	**Jaipur**	35.7	12.8	4.2	25.2
18	**Jaisalmer**	37.4	21.9	10.2	37.4
19	**Jalore**	45	27.2	9.1	42.7
20	**Jhalawar**	38.1	31.8	13.9	47.2
21	**Jhunjhunu**	32.5	13.6	5	19.5
22	**Jodhpur**	40.3	23.8	9	38.6
23	**Karauli**	45.5	18.9	5.8	35.7
24	**Kota**	32	27.7	7.6	39.7
25	**Nagaur**	39.1	18.4	7	31.4
26	**Pali**	44.4	21.7	6.5	41.3
27	**Pratapgarh**	46.3	38.2	15.1	54.6
28	**Rajsamand**	38.6	28.9	11.8	38.8
31	**Sawai Madhopur**	39.4	16.4	5.5	34.4
29	**Sikar**	28.4	11.5	4.1	20.5
30	**Sirohi**	42.3	36.6	15.6	50.4
32	**Tonk**	32	23.6	5	37.3
33	**Udaipur**	47.5	29.9	11.4	52
Rajasthan		***31.8***	***16.8***	***8.0***	***27.6***
Range		25.9	26.7	12.0	35.1
Mean		39.1	24.1	9.0	37.8
Standard Deviation		6.36	7.35	3.38	9.16
Coefficient of variation		16.27	30.54	37.76	24.26

Source: NFHS 4 (2015-16)

Table 1 shows that About 32% of the children in Rajasthan are stunted, 17% Wasted, 8% Severely Wasted and 28% of the children are underweight. 30 Districts have a greater value of Stunted Children than the state value. 26 Districts have a greater value of Wasted Children than the state value. 28 Districts have a greater value of underweight Children than the state value.

There is the highest rate of Stunted Children is in Dholpur. Pratapgarh has the highest rate of Wasted and Underweight Children. Sikar has the lowest rate of Stunted and Wasted Children. There is the Lowest rate of Underweight Children is in Jhunjhunu. There is a difference of about 26, 27, 12 and 35 points in maximum and minimum values of stunted, Wasted, Severely Wasted and underweight Children, respectively.

Children under five years who are Severely Wasted and Wasted have more significant variability in district-wise Undernutrition in Children. Children under five years who are Stunted have less variability in district-wise Undernutrition in Children.

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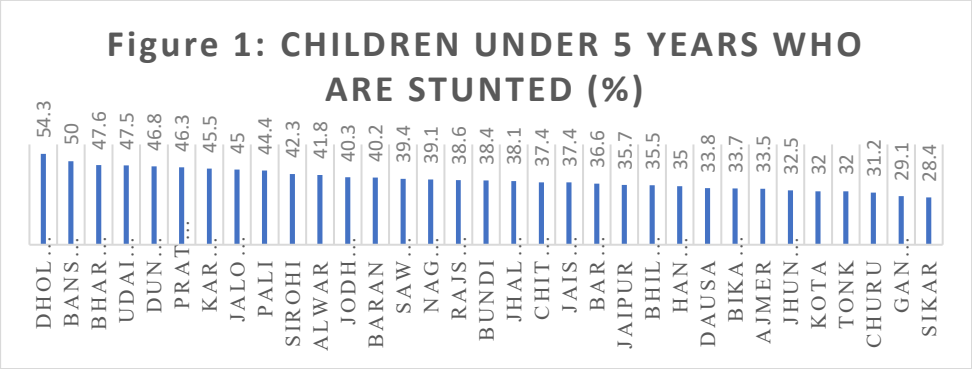
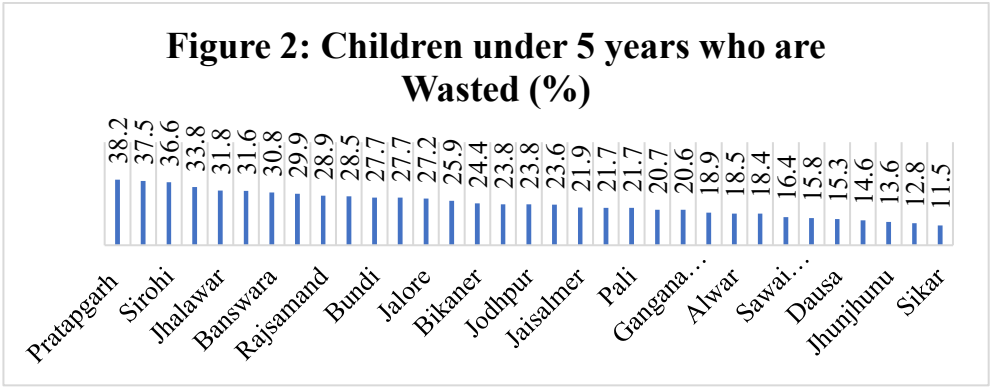
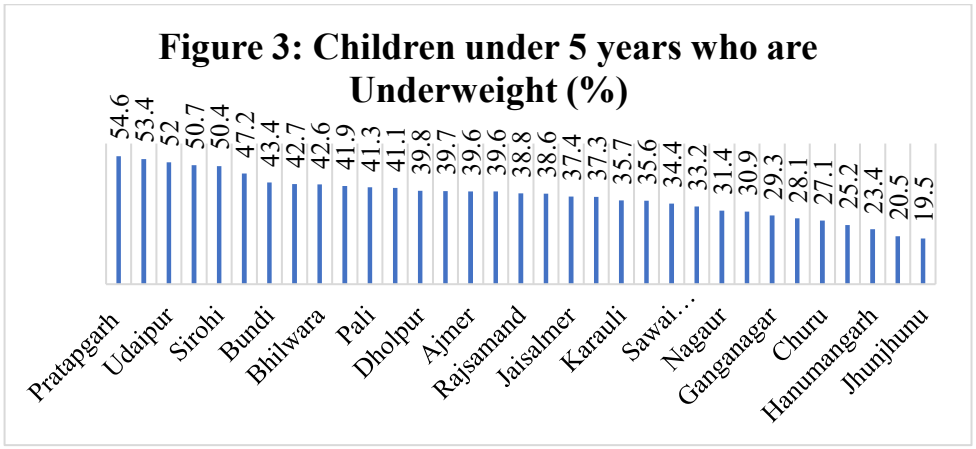


As per Figure 1, Dholpur has the highest stunting rate at 54.3%, followed by Banswara at 50% and Bharatpur at 47.6%. Sikar has the lowest stunting rate at 28.4%, followed by Ganganagar29.1% and Churu 31.2%.



As per Figure 2, Pratapgarh has the highest rate of wasting at 38.2%, followed by Dungarpur at 37.5% and Sirohi at 36.6%. Sikar has the lowest stunting rate at 11.5%, followed by Jaipur at 12.8% and Jhunjhunu at 13.6%.



As per Figure 3, The survey shows that Pratapgarh has the highest number of underweight children at 54.6%, followed by Dungarpur at 53.4% and Udaipur at 52%. Jhunjhunu has the Lowest rate of underweight children at 19.5%, followed by Sikar at 20.5% and Hanumangarh at 23.4%.

Status of Literacy in Districts of Rajasthan

Table 2: Literacy Rate (%) in Districts of Rajasthan

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S. No.	District	Literacy Rate (%)		
		Overall (Male + Female) Literacy Rate (%)	Males Literacy Rate (%)	Females Literacy Rate (%)
1	Ajmer	69.33	82.44	55.68
2	Alwar	70.72	83.75	56.25
3	Banswara	56.33	69.48	43.06
4	Baran	66.66	80.35	51.96
5	Barmer	56.53	70.86	40.63
6	Bharatpur	70.11	84.1	54.24
7	Bhilwara	61.37	75.27	47.21
8	Bikaner	65.13	75.9	53.23
9	Bundi	61.52	75.44	46.55
10	Chittorgarh	61.71	76.61	46.53
11	Churu	66.75	78.78	54.04
12	Dausa	68.16	82.98	51.93
13	Dholpur	69.08	81.22	54.67
14	Dungarpur	59.46	72.88	46.16
15	Ganganagar	69.64	78.5	59.7
16	Hanumangarh	67.13	77.41	55.84
17	Jaipur	75.51	86.05	64.02
18	Jaisalmer	57.22	72.04	39.71
19	Jalore	54.86	70.67	38.47
20	Jhalawar	61.5	75.75	46.53
21	Jhunjhunu	74.13	86.9	60.95
22	Jodhpur	65.94	78.95	51.83
23	Karauli	66.22	81.41	48.61
24	Kota	76.56	86.31	65.87
25	Nagaur	62.8	77.17	47.82
26	Pali	62.39	76.81	48.01
27	Pratapgarh	55.97	69.5	42.35
28	Rajsamand	63.14	78.42	47.95
31	Sawai Madhopur	65.39	81.51	47.51
29	Sikar	71.91	85.11	58.23
30	Sirohi	55.25	69.98	39.73
32	Tonk	61.58	77.12	45.45
33	Udaipur	61.82	74.74	48.45
Rajasthan		***66.11***	***79.19***	***52.12***
Mean		64.6	78.0	50.3
Range		21.7	17.4	27.4
Standard Deviation		5.80	5.03	6.86
Coefficient of variation		8.98	6.45	13.64

(Source: Census 2011)

Table 2 shows that According to Census 2011, About 66% of the population of Rajasthan were literate, including about 80% Male Literacy & 52% Female Literacy. 19 Districts are below State's overall literacy percentage. 21 Districts are below state Male and Female literacy percentages.

There is the highest rate of Males Literacy in Jhunjhunu. Kota has the highest rate of Female and Overall Literacy (Male & Female Both). Jalore has the lowest rate of Overall Literacy and Female Literacy. There is the Lowest rate of Male Literacy in Banswara. There is a difference of about 22, 17 and 27 points in

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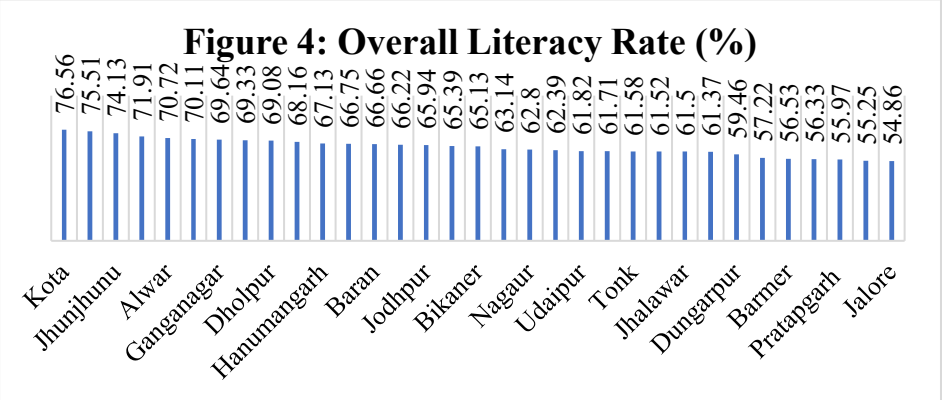
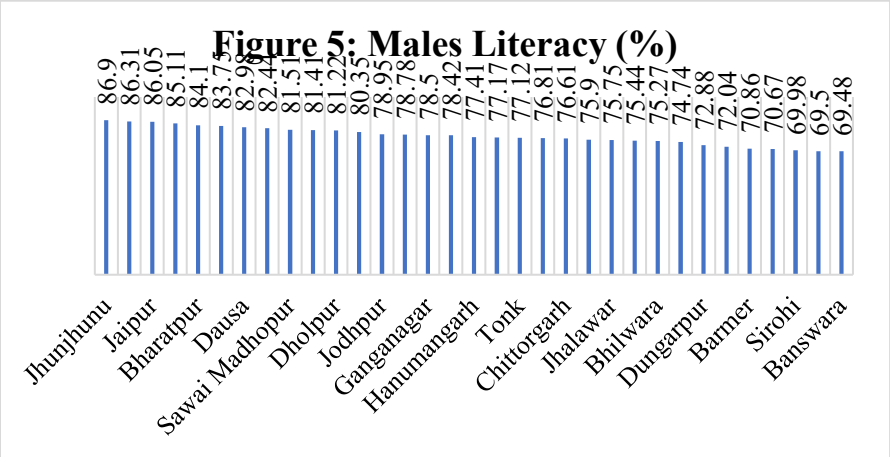
maximum and minimum values of Overall Literacy (Male & Female Both), Males Literacy and Females Literacy Rate, respectively.

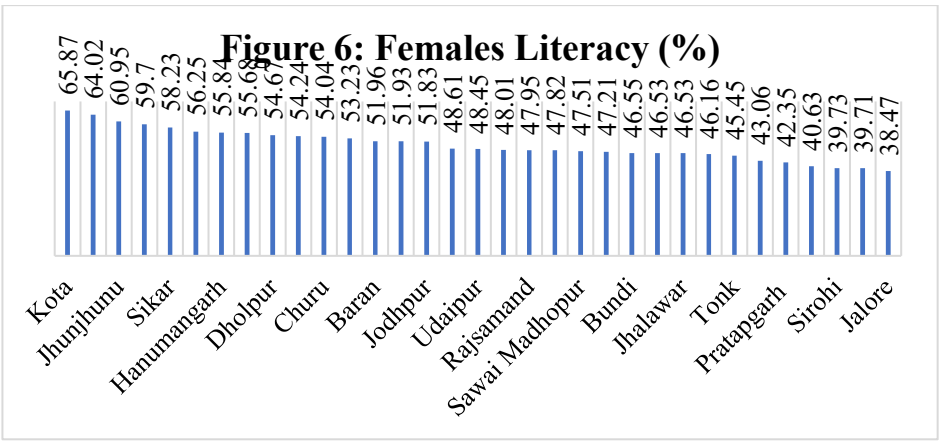
Female Literacy Rate has greater variability in districts and Males Literacy has less variability in districts.



As per Figure 4, Kota has the highest overall literacy rate (Male & Female Both) at 76.56 percent, followed by Jaipur at 75.51 and Jhunjhunu at 74.13 percent. Jalore has the lowest literacy rate at 54.86 percent, followed by Sirohi at 55.25 and Pratapgarh at 55.97 percent.



As per Figure 5, Jhunjhunu has the highest rate of Males Literacy at 86.9 percent, followed by Kota at 86.31and Jaipur at 86.05 percent. Banswara has the Lowest rate of Males Literacy at 69.48 percent, followed by Pratapgarh at 69.50 and Sirohi at 69.98 percent.



As per the Figure 6, Kota has the highest female literacy rate at 65.87 percent followed by Jaipur at 64.02 and Jhunjhunu at 60.95 percent. Jalore has the Lowest Female Literacy rate at 38.47 percent followed by Jaisalmer at 39.71 and Sirohi at 39.73 percent.

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Results

Correlation between Undernutrition and Literacy

The correlation coefficients (r) of the Literacy variables with the Variables of Undernutrition are discussed below:

Table 3: Correlation Coefficient (r) between the Literacy and Stunted Children

S. No.	Variable	r with Stunted Children
1.	Overall (Male + Female Both) Literacy Rate (%)	-0.401***
2.	Males Literacy Rate (%)	-0.359***
3.	Females Literacy Rate (%)	-0.426**

Table 3 shows that Overall (Male + Female Both) Literacy Rate, Males Literacy Rate and Females Literacy Rate have a Low but Significant Negative correlation coefficient (0.25 to 0.50) with Stunted Children. i.e., Female Literacy have a strong relationship with Stunted Children.

Table 4: Correlation Coefficient (r) between the Literacy and Wasted Children

S. No.	Variable	r with Wasted Children
1.	Overall (Male + Female Both) Literacy Rate (%)	-0.644*
2.	Males Literacy Rate (%)	-0.698*
3.	Females Literacy Rate (%)	-0.528*

Table 4 shows that Overall (Male + Female Both) Literacy Rate, Males Literacy Rate and Females Literacy Rate have a Very Significant Moderate Negative correlation coefficient (0.50 to 0.75) with the Wasted Children. i.e., Overall Literacy, Male Literacy and Female Literacy have a strong relationship with Wasted Children.

Table 5: Correlation Coefficient (r) between the Literacy and Severely Wasted Children

S. No.	Variable	r with Severely Wasted Children
1.	Overall (Male + Female Both) Literacy Rate (%)	-0.622*
2.	Males Literacy Rate (%)	-0.662*
3.	Females Literacy Rate (%)	-0.526*

Table 5 shows that Overall (Male + Female Both) Literacy Rate, Males Literacy Rate and Females Literacy Rate have a Very Significant Moderate Negative correlation coefficient (0.50 to 0.75) with the Severely Wasted Children. i.e., Overall Literacy, Male Literacy and Female Literacy have a strong relationship with Severely Wasted Children.

Table 6: Correlation Coefficient (r) between the Literacy and Underweight Children

S. No.	Variable	r with Underweight Children
1.	Overall (Male + Female Both) Literacy Rate (%)	-0.698*
2.	Males Literacy Rate (%)	-0.697*
3.	Females Literacy Rate (%)	-0.640*

Table 6 shows that Overall (Male + Female Both) Literacy Rate, Males Literacy Rate and Females Literacy Rate have a Moderate Negative correlation coefficient (0.50 to 0.75) with the Underweight Children. i.e., Overall Literacy, Male Literacy and Female Literacy have a strong relationship with Underweight Children.

Table 7: Range-wise Indicators of Literacy Correlated with Indicators of Undernutrition (as per table 3, 4, 5 & 6)

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Range	Indicators			
	Children under 5 years who are Stunted (%)	**Children under 5 years who are Wasted (%)**	**Children under 5 years who are Severely Wasted (%)**	**Children under 5 years who are Underweight (%)**
0.25 to 0.50	• Overall (Male + Female Both) Literacy Rate (%) • Males Literacy Rate (%) • Females Literacy Rate (%)			
0.50 to 0.75		• Overall (Male + Female Both) Literacy Rate (%) • Males Literacy Rate (%) • Females Literacy Rate (%)	• Overall (Male + Female Both) Literacy Rate (%) • Males Literacy Rate (%) • Females Literacy Rate (%)	• Overall (Male + Female Both) Literacy Rate (%) • Males Literacy Rate (%) • Females Literacy Rate (%)

Table 7 shows that Overall (Male + Female Both) Literacy Rate, Males Literacy Rate and Females Literacy Rate have Moderate Negative correlation coefficient (0.50 to 0.75) with the Wasted, Severely Wasted & Underweight Children and Low Negative correlation coefficient (0.25 to 0.50) with the Stunted Children.

Conclusions & Suggestions

Overall Literacy (Male + Female Both) Rate correlates significantly with Undernutrition. i.e., Districts that perform better in Overall Literacy record better nutritional outcomes. Education can play an essential role in eliminating/reducing Undernutrition. Especially, Mother education has been associated with Childcare practices (in particular breastfeeding within 1 hour after birth), Diet-care practices (provision of appropriate food preparation) and access to health services (in particular vaccination). Thus, there is a need to do better Male & Female Literacy rates to improve Undernutrition.

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