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DOI: <https://doi.org/10.5281/zenodo.15168185>**Research Article****KMF Publishers**  
[www.kmf-publishers.com/phas/](http://www.kmf-publishers.com/phas/)OPEN  ACCESS**Impact of Women's Health and Economic Condition on Children's Nutritional Status: A Correlation Analysis**<sup>1</sup>Urvisha J. Mataliya; <sup>2</sup>Dr Vijay S. Jariwala<sup>1</sup>Research Scholar, Post Graduate Department of Economics, Sardar Patel University, Gujarat, India<sup>2</sup>Research Guide & Associate Professor, Post Graduate Department of Economics, Sardar Patel University, Gujarat, India**ABSTRACT**

A child's nutritional status is affected by the socio-economic conditions of households and the mother's nutritional status. An undernourished girl becomes an undernourished mother who gives birth to the next generation of undernourished children. Therefore, the study's objectives are to inquire about the nutritional status of children, progress related to women's health indicators, and the socio-economic conditions of households in all the districts of Gujarat. Moreover, the study also analysed the correlation between the children's District Nutritional Index (DNI) value with the Household Condition Index (HCI) value and the Women's Condition Index (WCI) value. Data were utilised from the NFHS-5 report. Regarding child nutritional status, the results show that Junagadh and Porbandar districts have achieved the first rank, meaning they have the lowest percentage of malnourished children. Panchmahal district has obtained the last rank, meaning that it has the highest percentage of malnourished children because it is a tribal district of Gujarat and comparatively less developed than other districts of Gujarat. Regarding household socioeconomic conditions, Rajkot and Ahmedabad have achieved the first rank, while Dahod district has obtained the last. Banaskantha and Panchmahal obtained 2nd and 3rd last rank in this category, respectively. If we consider women's health conditions, we find that the Navsari district has achieved the first rank, while the Banaskantha district has obtained the last rank, which means the status of women in terms of health is worse. Spearman's rank correlation has been computed to assess the relationship between the Children's DNI with HCI and WCI values. There is a positive correlation between the Children's District Nutritional Index (DNI) and the Household Condition Index (HCI), with a Spearman's rank correlation coefficient of  $r = 0.61$ , which is statistically significant ( $p < 0.001$ ). Additionally, the correlation between the Children's DNI and the Woman's Condition Index (WCI) is also positive, with a correlation coefficient of  $r = 0.53$ , and it is statistically significant at the 0.001 level. The rationale behind this positive relation is logical because nutritional status improves when socio-economic and women's conditions are improved.

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## INTRODUCTION

Deficiencies, excess or any imbalance in a person's intake of energy and nutritional consumption are referred to as malnutrition (WHO, 2020). Malnutrition in children is a common public health problem across the globe (Matariya et al., 2017). Poor child health undermines social and economic outcomes and traps countries in the vicious cycle of malnutrition (Singh et al., 2016). As per National Family Health Survey (NFHS) -5, 39 per cent of children under 5 years are stunted, which is 0.5 per cent higher than NFHS -4 (2015-16) data. The percentage of Wasted and severely wasted children are 25.1 per cent and 10.6 per cent, respectively, which is also higher than the previous report of NFHS-4. Moreover, 39.7 per cent of children under 5 years are underweight, while 3.9 per cent are overweight, as per NFHS – 5 data.

In 2012, World Health Assembly (WHA) resolution 65.6 sanctioned an extensive plan for 2025 on maternal and children nutrition. If the current trend continues, stunted children under 5 years of age are estimated to be 128 million in 2025 against a target of 100 million. At present, the prevalence rate of anaemia in women is 29.4 per cent, which is against the target of 14.7 per cent. Accelerated growth is required to achieve the target of low birth weight. On the other side, the prevalence rate of overweight children is continuously increasing. A healthy diet must be made more affordable for everyone to achieve Sustainable Development Goal (SDG) No. 2, "Zero Hunger," by 2030. In 2020, around 3.1 billion individuals could not afford a healthy diet

(FAO, IFAD, UNICEF, 2022). Apart from the economic perspective, various socio-economic and socio-demographic variables such as age, sex, birth order, mother's education, and mother's occupation are the factors that affect the nutritional status of children (Tigga et al., 2015) (Umallowala et al., 2022). According to UNICEF, an unhealthy household environment is also one of the underlying factors which cause childhood malnutrition.

This research examines the nutritional status of children in the 33 districts of Gujarat, considering the socio-economic conditions of households and the health status of women. The study also aims to correlate the economic and women's health conditions with the nutritional status of children.

## LITERATURE REVIEW

Matariya et al. (2017) assess the impact of environmental factors on the child's nutritional status. The study was carried out from August to December 2015 in the public, community, and urban health centres in Rajkot. The children's socioeconomic status was assessed using Kuppuswamy's socioeconomic scale, while macro and micro-environmental factors were assessed using Briscoe's and Elizabeth's scales. Logistic regression showed that males were 1.6 times more likely to be undernourished than girls. Children who drank unfiltered water were 2.2 times more likely to suffer from undernutrition. Children whose mothers had unsanitary hands and clothes were 1.8 times more likely to be undernourished. Children whose mother or head

of household had less than a secondary level of education were 2.8 and 8.4 times more likely to be undernourished, respectively. The results also showed that children who fell into the fair and poor category for Elizabeth's micro-environmental scale had 2.05- and 2.41 times higher odds of being undernourished than those in the good category. Briscoe's scale for sanitation did not find any statistically significant results (Matariya et al., 2017).

Gupta et al. (2022) Researchers identified severe acute malnutrition risk factors among under-five children from urban Surat, Gujarat. The study was carried out between August to September 2019. The study includes all the children registered at the Anganwadi centre of the west zone of Surat. Data collection was done through questionnaires. WHO Anthro software was used to analyse the anthropometric data. The odds ratio was used to estimate the risk factor of malnutrition. Results showed that out of 584 children, 26.2 per cent of children suffered from undernutrition, and 8.7 per cent of children were severely acutely malnourished. Results showed that children with low birth weight were almost 4.85 times more likely to be malnourished. Children who were bottle-fed were 5.41 more likely to be malnourished. Children with a poor appetite had 2.89 times higher chances of being malnourished. Additionally, children from joint families were about 3.84 times more likely to be malnourished as compared to those children who belonged to the nuclear family (Gupta et al., 2022).

Umallawala et al. (2022) explored community-level determinants of undernutrition among children under 5 years of age in Devbhumi Dwarka district of Gujarat. They observed children for three consecutive days using an ethnographic approach. A total of 60 children and their mothers were studied. Of the 60 children, 30 were malnourished, and 30 were well-nourished. Thematic analysis was used to analyse the data. They came up with seven variables that affect malnutrition: lack of knowledge, improper feeding practices, lower socio-economic status, poor sanitation and hygiene practices, lack of food variety, inadequate usage of health facilities, and birth complications (Umallawala et al., 2022).

Ishwarji et al. (2019) assessed the prevalence of undernutrition, regional variations, and its determinants among children under 5 in all the districts of Gujarat. Firstly, 20 AWCs were selected from each district, and then 20 households with children under five years of age were selected from each AWC. A total of 12,925 children were studied. Data were collected using a questionnaire. Multivariate logistic regression was performed to identify the factors associated with undernutrition. The results showed that the prevalence of underweight, stunting, and wasting was higher in the central, south, and north regions compared to the Saurashtra and Kachchh regions. Multivariate logistic regression indicated that age, gender, ST communities, illiterate mothers, kutcha houses, lower socio-economic groups, absence of sanitation facilities, and absence of separate kitchen facilities were significantly

associated with undernutrition (Ishwarji et al., 2019).

## OBJECTIVES OF THE STUDY

- To examine the nutritional status of children across all districts of Gujarat based on NFHS-5 data
- To examine the health status of women and the socio-economic conditions of households across all districts of Gujarat based on NFHS-5 data
- To assess the rank correlation between the children's District Nutritional Index (DNI) rank with the Women's Condition Index (WCI) rank and the Household Condition Index (HCI) rank

## METHODOLOGY

In this research, three indices have been constructed, namely children's District Nutritional Index (DNI), Household Condition Index (HCI), and Women's Condition Index (WCI). Children's DNI consists of five indicators of malnutrition, namely stunted, wasted, severely wasted, underweight and overweight. All these indicators represent the negative aspects of nutritional status. The Household Condition Index (HCI) consists of four variables: electricity, drinking water, clean fuel and sanitation facility. The HCI is a measurement tool of the economic condition of households. The Women Condition Index (WCI) is a composite index consisting of four variables: institutional birth, mothers who had at least 10 years of schooling, Antenatal care, and mothers who married before the age of 18.

All the variables of HCI and WCI, except for mothers' marriage before the age of 18, are positive indicators of women's health, while marriage before the age of 18 is considered a negative indicator.

To construct the indices (DNI, HCI, WCI), researchers converted the actual values of each indicator into normalised values. All the data were taken from NFHS-5 (2019-21). NFHS-5 data were collected in two phases. Phase 1 data were collected from June 2019 to January 2020, and phase 2 from January 2020 to April 2021. Information was collected from 636,699 households (Ministry of Health and Family Welfare, 2020). As discussed, some variables are positive indicators, while others are negative indicators; therefore, we used the standard formula to calculate the normalised values.

For positive indicator =  $(X_i - \text{Mini}) / (\text{Maxi} - \text{Mini})$

For Negative indicators =  $(\text{Maxi} - \text{Mini}) / (\text{Maxi} - \text{Mini})$

After obtaining the normalised value, examples 1, 2, and 3 were utilised to construct children's DNI, HCI, and WCI. Equal weightage was assigned to all the variables because all variables are equally important, considering nutritional status. The value of all the indices lies between 0 and 1. Getting one or closer to 1 indicates a better condition, while zero or closer to 0 indicates a worse situation.

Table 1 presents the actual values of malnutrition indicators, their normalised values, DNI values, and the corresponding DNI rank for the 33

districts of Gujarat. Table 2 shows the actual values of economic indicators, their normalised values, HCI value, and corresponding HCI rank, while Table 3 shows the actual values of women’s health indicators, their normalised values and WCI values and corresponding WCI rank for the 33 districts of Gujarat. Table – 4 compares children’s DNI rank with the HCI and WCI rank. Spearman rank correlation was used to inquire about the association between the children’s DNI rank and the HCI and WCI ranks, using IBM SPSS statistics 25. Maps were generated using Paintmaps.com.

## RESULTS

Regarding the DNI rank for children, Table 1 shows that Junagadh and Porbandar districts have achieved the first rank, indicating that they have the lowest percentage of malnourished children. Panchmahal district obtained the last rank, meaning that Panchmahal district had the highest percentage of malnourished children. Map 1 shows the regional variation in children’s DNI.

Suppose we consider the socio-economic conditions of households; Table 2 shows that Ahmedabad and Rajkot districts have achieved the first rank with an HCI score of 0.96, meaning they are more economically developed. The HCI values of Banaskantha and Panchmahal are 0.30 and 0.34, respectively. Banaskantha district has obtained the last rank, meaning that the lowest percentage of households have some necessities like electricity, drinking water, sanitation, and clean fuel. Panchmahal district also has the same socio-economic condition. Map 2 shows the regional variation in terms of HCI. In terms of women’s health, Table 3 shows that the Navsari and Rajkot districts have obtained the first and second ranks, respectively, indicating that, in terms of women’s health progress, they are performing the best. Banaskantha district has obtained the last rank, indicating that policymakers should emphasise women’s health in Banaskantha district. Map 3 shows regional variation in terms of WCI.

Table – 1 Spearman’s rank correlation between children's DNI and HCI

Correlations			Children District Nutritional Index Value	Household Condition Index Value
Spearman's rho	Children District Nutritional Index Value	Correlation Coefficient	1.000	.618**
		Sig. (2-tailed)	.	.000
		N	33	33
	Household Condition Index Value	Correlation Coefficient	.618**	1.000
		Sig. (2-tailed)	.000	.
		N	33	33

\*\* . Correlation is significant at the 0.01 level (2-tailed).

In the case of children's DNI value and HCI value, results show that Spearman’s rank

correlation is significant  $\rho(33) = 0.618, p < 0.01$ . There is a positive correlation between

children's DNI and HCI. So, we can interpret that improving household economic conditions improves the children's nutritional status.

Table – 2 Spearman’s rank correlation between children's DNI and WCI

Correlations			Children District Nutritional Index Value	Women Condition Index
Spearman's rho	Children District Nutritional Index Value	Correlation Coefficient	1.000	.527**
		Sig. (2-tailed)	.	.002
		N	33	33
	Women Condition Index	Correlation Coefficient	.527**	1.000
		Sig. (2-tailed)	.002	.
		N	33	33

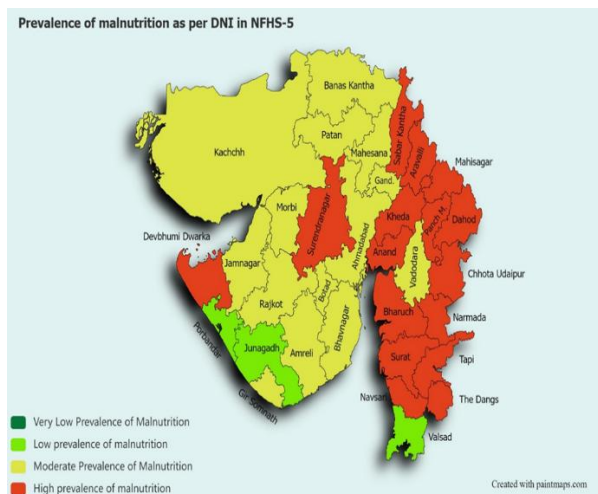
\*\* . Correlation is significant at the 0.01 level (2-tailed).

If we consider the relation between children’s DNI and WCI, the Spearman rank correlation is significant ( $\rho(33) = 0.527, p > 0.01$ ). There is a positive correlation between children's DNI and WCI. So, we can conclude that the higher the value of WCI, the better the children's DNI.

### CONCLUSION

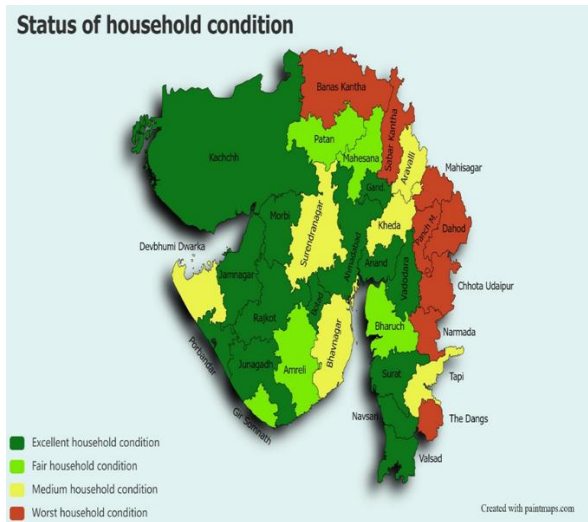
This study found a significant correlation between children’s DNI and HCI and between children’s DNI and WCI. Improving the economic conditions of households and women’s health will lead to an improvement in the nutritional status of children. It is also essential to prioritise the more vulnerable districts regarding the economic conditions and the health status of children and women. When focusing on decentralised planning, district-level analysis becomes more critical. This study is also helpful for identifying high-priority districts and for intersectoral coordination among various departments such as health, social welfare, and women and child development.

Map – 1 District-level disparities in terms of children's nutritional status



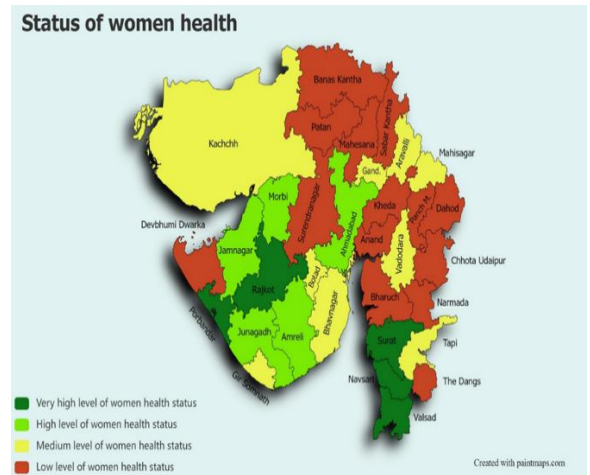
Source – Authors' calculations

Map – 2 District-level disparities in terms of household condition



Source - Authors' calculation

Map – 3 District-level disparities in terms of women's health status



Source -Authors' calculations

Table – 1 Actual values, normalised values, children's district nutritional index value and children's district nutritional index rank of 33 districts of Gujarat for NFHS- 5

Sr. No	Districts	Actual values					Normalized value					DNIV	DN IR
		Stunted	Wasted	Severely wasted	Underweight	Overweight	Stunted	Wasted	Severely wasted	Underweight	Overweight		
1	Ahmedabad	35.5	17.5	7.4	34	4.6	0.53	0.99	0.86	0.69	0.45	0.70	3
2	Amreli	35.3	23.7	7.2	30.6	6.8	0.54	0.73	0.87	0.82	0.17	0.62	6
3	Anand	38.4	28.6	10.9	46.6	3.8	0.46	0.52	0.65	0.24	0.55	0.48	13
4	Aravali	47.1	29	9.3	47.2	3.3	0.22	0.50	0.75	0.21	0.62	0.46	15
5	Banaskantha	39	25.5	8.5	44.1	1.2	0.44	0.65	0.79	0.33	0.88	0.62	6
6	Bharuch	40.9	24.5	8	45.5	4.7	0.39	0.69	0.82	0.28	0.44	0.52	11
7	Bhavnagar	32.6	29.6	6.3	39.5	1.8	0.61	0.48	0.92	0.49	0.81	0.66	5
8	Botad	32.2	26	9.6	32.3	5.8	0.62	0.63	0.73	0.75	0.29	0.61	7
9	Chhotaudepr	48.6	28.4	13.8	48.1	4.8	0.18	0.53	0.49	0.18	0.42	0.36	17
10	Dahod	55.3	27.6	13.4	53	5.8	0.00	0.56	0.51	0.00	0.29	0.27	19
11	Devbhumi Dwarka	30.2	26.1	17.2	36.2	4.9	0.68	0.63	0.29	0.61	0.41	0.52	11
12	Gandhinagar	38.1	30.6	9.9	44.6	0.5	0.46	0.44	0.71	0.31	0.97	0.58	8
13	Gir Somnath	44.4	18.5	4.9	30.3	5	0.29	0.95	1.00	0.83	0.40	0.69	4
14	Jamnagar	28.4	23.8	12.5	28.9	3.6	0.73	0.72	0.56	0.88	0.58	0.69	4
15	Junagadh	37.3	17.3	7.1	26.4	4.4	0.49	1.00	0.87	0.97	0.47	0.76	1
16	Kachchh	37.5	20.2	10.6	33.4	2.6	0.48	0.88	0.67	0.71	0.71	0.69	4
17	Kheda	37.3	30.9	12.1	39.5	2.5	0.49	0.42	0.58	0.49	0.72	0.54	10
18	Mehsana	31	28.2	12	41.4	1.5	0.65	0.54	0.59	0.42	0.85	0.61	7
19	Mahisagar	43.4	26.2	12	49	2.6	0.32	0.62	0.59	0.15	0.71	0.48	13
20	Morabi	32.9	25.2	12.5	32.3	4	0.60	0.67	0.56	0.75	0.53	0.62	6
21	Narmada	47.2	23	9.9	52.8	3.1	0.22	0.76	0.71	0.01	0.64	0.47	14
22	Navsari	36.8	29	9.3	43.6	3.4	0.50	0.50	0.75	0.34	0.60	0.54	10
23	Panchmahal	47.1	35.7	19.7	51.9	3.4	0.22	0.22	0.14	0.04	0.60	0.25	20
24	Patan	50.5	20.9	6.5	42.3	3.1	0.13	0.85	0.91	0.39	0.64	0.58	8
25	Porbandar	18.2	21.8	14.2	25.5	3.9	1.00	0.81	0.46	1.00	0.54	0.76	1
26	Rajkot	38.9	17.6	7.3	37	8.1	0.44	0.99	0.86	0.58	0.00	0.57	9
27	Sabarkantha	37	33.1	16.6	41	4.9	0.49	0.33	0.32	0.44	0.41	0.40	16
28	Surat	36.1	26	14.7	32.5	5.3	0.52	0.63	0.43	0.75	0.36	0.54	10
29	Surendra Nagar	39.2	27.1	8.8	41.8	5.2	0.43	0.58	0.77	0.41	0.37	0.51	12
30	Tapi	41.7	36.6	17.1	51.8	1.9	0.37	0.18	0.29	0.05	0.79	0.34	18
31	Dang	37.6	40.9	22.2	53.1	1.1	0.48	0.00	0.00	0.00	0.90	0.27	19
32	Vadodara	42.3	20.1	5.2	39.9	6.4	0.35	0.88	0.98	0.48	0.22	0.58	8
33	Valsad	37.8	23.2	9.1	34.8	0.3	0.47	0.75	0.76	0.66	1.00	0.73	2

Source - Computed data from NFHS-5 &amp; Authors own calculation

Table – 2 Actual values, normalised values, household condition index value and household condition index rank of 33 districts of Gujarat for NFHS – 5

Sr.No	Districts	Actual values				Normalized values				HCI v	HCIR
		Electricity	Drinking water	Sanitation	Clean fuel	Electricity	Drinking water	Sanitation	Clean fuel		
1	Ahmedabad	99.5	98.7	86.4	89.7	0.96	0.89	1.00	1.00	0.96	1
2	Anreli	99.6	97.8	73.3	65.6	0.97	0.79	0.74	0.64	0.78	12
3	Anand	98	99.7	82.1	65.1	0.82	1.00	0.91	0.63	0.84	8
4	Aravali	96.5	98.5	56.3	47.9	0.68	0.87	0.40	0.37	0.58	21
5	Banaskantha	91.1	93.6	53.9	45.6	0.17	0.32	0.36	0.33	0.30	28
6	Bharuch	98.2	97.2	77.7	60.2	0.84	0.72	0.82	0.56	0.74	13
7	Bhavnagar	96.9	95.1	72.9	59.8	0.72	0.49	0.73	0.55	0.62	19
8	Botad	99.3	99.2	72	63	0.94	0.94	0.71	0.60	0.80	10
9	Chhotaudepur	95.3	97.4	53	25.7	0.57	0.74	0.34	0.03	0.42	22
10	Dahod	89.3	91	35.9	26.8	0.00	0.03	0.00	0.05	0.02	29
11	Devbhumi Dwarka	98.7	93.9	73.4	61.2	0.89	0.36	0.74	0.57	0.64	18
12	Gandhinagar	97.8	99.7	84.6	76.9	0.80	1.00	0.96	0.81	0.89	5
13	Gir Somanath	99.5	98.2	74.3	46.8	0.96	0.83	0.76	0.35	0.73	14
14	Jamnagar	98.9	99.7	86.6	81.6	0.91	1.00	1.00	0.88	0.95	2
15	Junagadh	99.3	97	81.7	67.2	0.94	0.70	0.90	0.66	0.80	10
16	Kachchh	99.2	96.8	85.8	67.2	0.93	0.68	0.98	0.66	0.81	9
17	Kheda	96.9	97.7	63.3	48	0.72	0.78	0.54	0.37	0.60	20
18	Mehsana	97.7	97	72.1	63.1	0.79	0.70	0.71	0.60	0.70	15
19	Mahisagar	95.2	94.8	44.4	47.4	0.56	0.46	0.17	0.36	0.39	24
20	Morbi	99.9	98.3	80.1	73.6	1.00	0.84	0.87	0.76	0.87	6
21	Narmada	92.7	96.8	54.6	31.3	0.32	0.68	0.37	0.12	0.37	25
22	Navsari	98.7	97.4	80.1	70.2	0.89	0.74	0.87	0.71	0.80	10
23	Panchmahal	95.5	91	58.9	43.6	0.58	0.03	0.45	0.30	0.34	27
24	Patan	98.3	99.4	73.1	62.6	0.85	0.97	0.73	0.59	0.79	11
25	Porbandar	99.8	96.2	85.7	76.9	0.99	0.61	0.98	0.81	0.85	7
26	Rajkot	99.6	99.5	85.4	83.6	0.97	0.98	0.98	0.91	0.96	1
27	Sabarkantha	95.3	90.7	61	58.7	0.57	0.00	0.50	0.53	0.40	23
28	Surat	99.3	98.9	82	88.6	0.94	0.91	0.91	0.98	0.94	3
29	Surendra Nagar	99.4	96.9	63.8	56.9	0.95	0.69	0.55	0.51	0.67	17
30	Tapi	97.6	99	70.2	45.5	0.78	0.92	0.68	0.33	0.68	16
31	Dang	95.9	91.2	71.7	23.4	0.62	0.06	0.71	0.00	0.35	26
32	Vadodara	97.9	99.5	85.6	78.1	0.81	0.98	0.98	0.83	0.90	4
33	Valsad	98.6	98	85.3	73.1	0.88	0.81	0.97	0.75	0.85	7

Source - Computed data from NFHS-5 &amp; Authors own calculation

Table 3 Actual values, normalised value, women condition index value and women condition index rank of 33 districts of Gujarat for NFHS -5

Sr. No.	Districts	Actual values				Normalized values				WCI V	WCI R
		School	Marriage	Antenatal	Institutional	School	Marriage	Antenatal	Institutional		
1	Ahmedabad	42.7	17.5	77.8	94.5	0.84	0.75	0.56	0.78	0.73	6
2	Amreli	27.2	10.5	92.6	90.1	0.36	0.91	0.95	0.61	0.71	7
3	Anand	32.2	28	64.2	96	0.51	0.50	0.21	0.84	0.52	18
4	Aravali	34.7	27	73.8	92.2	0.59	0.52	0.46	0.69	0.57	14
5	Banaskantha	17.6	37.3	56.1	92.9	0.06	0.28	0.00	0.72	0.26	26
6	Bharuch	31.5	16.8	65.7	91.1	0.49	0.76	0.25	0.65	0.54	17
7	Bhavnagar	26.3	18	70.9	94.2	0.33	0.74	0.38	0.77	0.56	15
8	Botad	22	13	82.7	93.5	0.19	0.85	0.69	0.75	0.62	12
9	Chhotaudepur	20.3	27.5	81.2	85.7	0.14	0.51	0.65	0.44	0.44	21
10	Dahod	23.1	29.9	70.9	92.5	0.23	0.46	0.38	0.71	0.44	21
11	Devbhumi Dwarka	15.8	11.6	76.6	94.8	0.00	0.89	0.53	0.80	0.55	16
12	Gandhinagar	37.9	32.6	71	97.8	0.69	0.39	0.39	0.91	0.60	13
13	Gir Somnath	30.8	9.9	80.7	87.1	0.47	0.93	0.64	0.49	0.63	11
14	Jamnagar	35.3	6.8	73.8	96.5	0.61	1.00	0.46	0.86	0.73	6
15	Junagadh	35	11.2	72.5	97.4	0.60	0.90	0.42	0.90	0.71	7
16	Kachchh	24.1	19	84.2	97.4	0.26	0.71	0.73	0.90	0.65	10
17	Kheda	24.2	49.2	61.2	95.2	0.26	0.00	0.13	0.81	0.30	25
18	Mehsana	32.6	32.3	56.6	97.3	0.53	0.40	0.01	0.89	0.46	20
19	Mahisagar	33.9	30.7	76.6	93	0.57	0.44	0.53	0.73	0.57	14
20	Morabi	35.4	8.9	75.1	94.8	0.61	0.95	0.49	0.80	0.71	7
21	Narmada	22.6	29.5	83.4	81.7	0.21	0.46	0.71	0.28	0.42	22
22	Navsari	47.7	15.7	94.7	99.3	1.00	0.79	1.00	0.97	0.94	1
23	Panchmahal	28.4	34.1	88.7	88.4	0.39	0.36	0.84	0.55	0.54	17
24	Patan	22.6	35.4	79.8	98.6	0.21	0.33	0.61	0.95	0.52	18
25	Porbandar	35.9	10	92.1	100	0.63	0.92	0.93	1.00	0.87	4
26	Rajkot	42.6	12.1	93.5	99.3	0.84	0.88	0.97	0.97	0.91	2
27	Sabarkantha	31.1	27	73.2	89.4	0.48	0.52	0.44	0.58	0.51	19
28	Surat	44	13.1	93.4	97.7	0.88	0.85	0.97	0.91	0.90	3
29	Surendra Nagar	23.3	19.5	57.5	85.6	0.24	0.70	0.04	0.44	0.35	24
30	Tapi	32.5	25.3	91	92.9	0.52	0.56	0.90	0.72	0.68	8
31	Dang	20.7	30.2	90.2	74.5	0.15	0.45	0.88	0.00	0.37	23
32	Vadodara	46.4	22.8	65.9	95.9	0.96	0.62	0.25	0.84	0.67	9
33	Valsad	45.6	19.4	92.5	96.5	0.93	0.70	0.94	0.86	0.86	5

Source – Computed data from NFHS-5 &amp; Authors' own calculations

Table – 4 Children District Nutritional Index, Household Condition Index and Women Condition Index rank of 33 districts of Gujarat for NFHS-5

Sr. No	Districts	DNI	HCI	WCI
1	Ahmedabad	3	1	6
2	Amreli	6	12	7
3	Anand	13	8	18
4	Aravali	15	21	14
5	Banaskantha	6	28	26
6	Bharuch	11	13	17
7	Bhavnagar	5	19	15
8	Botad	7	10	12
9	Chhota Udaipur	17	22	21
10	Dahod	19	29	21
11	Devbhumi Dwarka	11	18	16
12	Gandhinagar	8	5	13
13	Gir Somnath	4	14	11
14	Jamnagar	4	2	6
15	Junagadh	1	10	7
16	Kachchh	4	9	10
17	Kheda	10	20	25
18	Mehsana	7	15	20
19	Mahisagar	13	24	14
20	Morabi	6	6	7
21	Narmada	14	25	22
22	Navsari	10	10	1
23	Panchmahal	20	27	17
24	Patan	8	11	18
25	Porbandar	1	7	4
26	Rajkot	9	1	2
27	Sabarkantha	16	23	19
28	Surat	10	3	3
29	Surendra Nagar	12	17	24
30	Tapi	18	16	8
31	Dang	19	26	23
32	Vadodara	8	4	9
33	Valsad	2	7	5

Source - Authors' calculations

Example – 1 for DNI

• Example (Ahmedabad)  
 =Sum (stunted, wasted, severely wasted, underweight, overweight) \*1/5..... (1)<sup>1</sup>  
 = Sum (0.53+0.99+0.86+0.69+0.45) \*1/5

<sup>1</sup> Mothers who had at least four antenatal care

= (3.52) \* 1/5

= 0.70

Example 2 for HCI

• Example (Ahmedabad)

=Sum (Electricity, Drinking water, Sanitation, Clean fuel) \*1/4..... (2)<sup>2</sup>

= Sum (0.96+0.89+1+1)

= (3.85) \*1/4

= 0.96

Example – 3 for WCI

• Example (Ahmedabad)

=Sum (Antenatal care, Marriage, Education, Institutional birth) \*1/4.....(3)<sup>3</sup>

= Sum (0.84 + 0.75 + 0.56 + 0.78) \* 1/4

= (2.93) \* 1/4

= 0.73

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<sup>2</sup> Mothers who had married before the age of 18 years

<sup>3</sup> Mothers who had 10 years or more year of schooling

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