A study of the association between nutritional status of mothers and their children- A case of India and Karnataka state

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Abstract

Background: A woman's nutritional status has important consequences for her health and of her children. By considering the importance of the situation maternal and child nutritional status was the subject of a series of research in recent years.

The objectives of the study: To identify the association between nutritional status of mothers and their children and to estimate the effects of socio-economic and maternal factors on nutritional status of children. For the secondary data analysis Pearson correlation is used. For the analysis of the primary data, the study made use of statistical tools such as chi-square for the analysis of association.

Results: Below normal Body Mass Index or underweight among women have, significant correlation with all indicators of children malnutrition, they are significant at 1% level of significance. Chi square results shows that the nutritional status of the mothers and that of their preschool children have a positive correlation which was statistically significant (p=0.05). The association between low birth weight and nutritional status of children is also significant at 1 %level.

Conclusion: Nutritional status of children is positively associated with that of women. Better maternal nutritional status is essential for the overall growth and development of children and unless the mother's nutritional status is improved, the child's nutrition and health status cannot be expected to improve.

Introduction

The study of nutritional status of women and children is considered significant, as it has provided a broader perspective to the studies done on Women and children health and nutritional status. The assessment of the ground reality of nutritional status of women and children becomes very significant in the present context. It is necessary to understand whether nutritional

status of children is determined by entirely on socioeconomic factors or part by maternal factors. Hence there is a need for comprehensive and detailed assessment of the problem with an in-depth study of the problem.

Socioeconomic conditions and domestic hygiene practices influence the nutritional status of children. Maternal health and nutritional status also affect the health and nutritional status of children. Maternal nutrition influences fetal growth and birth weight (ACC/SCN, 1992). The presence of an inter-generational link between maternal and child nutrition means a small mother will have small babies who in turn grow to become small mothers. Malnourished mothers are more likely to give birth to malnourished newborns, perpetuating the intergenerational transmission of poverty. Some findings on the relationship between maternal and child nutrition showed that a high proportion of low birth weight and stunted children were observed among malnourished mothers.

Conceptual frameworks developed by UNESCO, WHO, KNM demonstrate the theory of the sequence of cause and effect of malnutrition problem. As stated in the framework malnutrition has an intergenerational cycle in India. A malnourished mother will give birth to a low birth weight baby; the low birth weight baby will grow as a malnourished child, then to a malnourished adolescent, then to a malnourished pregnant woman, and so the cycle continues.

Objectives of the study

1. To identify the association between nutritional status of mothers and their children in India and in Karnataka state
2. To estimate the effects of socio-economic and maternal factors on nutritional status of children

Methodology

Data source

The present study was based on both primary and secondary data and which were collected from various sources. The secondary data was collected from the published documents such as National Family Health Surveys, district level household survey, Women and Child development Department, Economic Surveys and published books on nutritional status of women and children of all India and Karnataka state.

Scope of the study

The present Study has focused at national level, all 29 states. Karnataka state is the study region at macro level. Comparable data were not available for mother and their own children for national and state level. To examine the association between nutritional status of mothers and their children Mysore district is selected for the collection of primary data at micro level.

Sampling Technique and the Sample Size

Two-stage random sampling technique was adopted for the selection of Anganwadi and nursery schools in the district. Five Anganwadis were selected from each Taluk for the study, a total of 35 Anganwadi and 7 nursery schools were selected in study area, out of 35 anganwadis 7 from urban

and 28 from rural. Since nurseries are not as common as in urban areas the 7 nursery were taken from urban areas only.

Sample size: to determines the size of the sample the formula given by Cochran (1977) has been used in the study: The sample consists of 248 living mothers and their 384 children. While selecting the mothers, the mothers with two or more children were selected. Hence there was a difference between sample size of children and mothers. Out of this total sample size of 384, 55 children were identified from each of the six Taluks and 54 children from one Taluk. The sample size was further stratified as 40 children from rural and 15 from urban areas from each Taluk.

Statistical Tools Used

For the secondary data analysis Pearson correlation is used. For the analysis of the primary data, the study made use of statistical tools such as chi-square for the analysis of association between nutritional status of mothers and their children. Linear regression analysis was applied to check the effectiveness of different socio-economic and maternal factors on nutritional status of sample children in the study region.

Correlation between nutritional status of women and children in India

Women constitute a substantial section of the Indian society with more than two-thirds of the people in rural areas with the same proportion of women living in rural areas. A malnourished anaemic woman is more likely to deliver a baby with low birth weight and such a baby is likely to carry with the handicap throughout its life span, and so on[1]. Ramalingaswami, Jonsson, and Rohde (1996) analyzed high level of child malnutrition in India and they attributed this problem mainly to social status of women.

According to the NFHS-4 survey 22.9% of the women who were underweighted in India; highest 1 in 3 women were underweighted in Bihar. Compared to other developed states, Gujarat is lagging behind; nearly one in 3 women was underweighted in Gujarat. There is a significant rural-urban difference in the prevalence of women underweight. In India 1 in 5 women who are over weighted are obese. Overweight and obesity is more prevalent in urbanized and developed states like Tamilnadu, Goa, and in Andhra Pradesh. Gujarat and Maharashtra have equal prevalence of overweight are obesity. There is a significant Rural-urban difference in the incidence of overweight in India; it is in the favour of rural women, it implies that overweight and obesity is more prevalent in urban areas. Anemia is an important growing risk factor in the country. More than half of the women are anemic (53%). Highest anemia ranges from 79.5% in Dadar and Nagarhaveli. The incident of anemia is more among the developed states like Maharashtra, Andhra Pradesh, and in Goa.

The top five ranking States which have low prevalence are Nagaland, Mizoram, Manipur, Arunachal Pradesh, Sikkim, Meghalaya and Kerala. The lowest five performing States include Chandigarh, Andhra Pradesh, Gujarat, Telengana and Bihar with low ranks. States such as Punjab, Tamilnadu, Tripura, Karnataka, and Rajasthan are medium ranked States. The better performing

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[1] Petro Medrano,(2007)Women, food for work, and Human development: Millennium Lecture', retrieved from www.mssrf.org

five States and UTs in ranks belong to North-East region. None of the developed States does appear in the list of top six States except Kerala. Surprisingly, Gujarat and Andhra Pradesh States show dismal picture in all women nutritional indicators. States like Kerala, Assam, Chhattisgarh, Jammu and Kashmir, Karnataka, Rajasthan, and Uttarakand have performed better than other States. Kerala has performed better in BMI status and anaemic status but the highest prevalence of obesity brought down average ranking.

Nutritional status of children across states indicates the top five ranking States having low prevalence of malnutrition and these States include Mizoram, Manipur, Nagaland, Kerala, Jammu and Kashmir, and Himachal Pradesh. Poor performing five bottoms most States are Jharkhand, Madhya Pradesh, Gujarat, Bihar, Rajasthan, and Karnataka. States such as Punjab, Tripura, Tamilnadu, Tripura, and Andhra Pradesh, Sikkim are medium ranked States. In child nutritional status, except Kerala, none of the so called developed States appeared in the list of top five places.

Better performed states in women's nutritional indicator have done well in children nutritional indicators also. Study found that nutritional status of children is associated with that of women.

Relationship between nutritional status of women and children in Karnataka

NFHS-4 reveals that one in 5 women were underweighted in Karnataka (20.7%), there is a significant rural-urban difference as well as regional disparities. Dakshina Kannada, Kodagu, Ramanagara, Mandya and Udupi districts did well in women nutritional status. Poorly performing bottom most districts are Kalaburgi, Yadgir, Bellary, Koppal, Raichur and Vijayapura. Bangalore Rural, Chikmagalur, Hassan, Mysore and Uttara Kannada districts have not reached the expected level. In children malnutrition also Dakshina Kannada, Kodagu, Ramanagara, Mandya and Udupi performed well. Districts like Kalaburgi, Yadgir, Bellary, Koppal, Raichur and Vijayapura struggled behind.

Districts which are performing well in women nutritional status have done well in children nutritional status also.it imply that there is a relationship between nutritional status of women and children. Hence it can be concluded that nutritional status of mothers is a major determinant of the nutritional status of children. It is also found that good or better socio-economic condition definitely gets reflected in the nutritional status of women and children in Karnataka.

Results and discussion

To test the relationship between nutritional status of women and children across states in India, Pearson correlation is used :

From the Table 1 it is observed that the indicators of mother's malnutrition have correlation with children's malnutrition. Below normal Body Mass Index or underweight among women have, significant correlation with all indicators of children malnutrition, they are significant at 1% level of significance. All correlations are positive. It indicates that underweight of women would lead to an increase in the incidence of stunting, wasting, underweight and anaemia among children. Correlation co-efficient of 0.672 means 1% increase in underweight will lead to an increase of stunting by 0.672%.Similarly, wasting increases by r value of 0.648, underweight

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by 0.881% as a result of increase of underweight by 1%. Similarly anaemia among children increases by 0.424% given 1% increase in underweight of women.

Further, it is observed that there is a negative correlation between overweight/ obese of women and malnutrition of children. However, wasting and anaemia among children has no significant correlation with overweight of women. Only stunting and underweight have statistically significant correlation with overweight. Both variables have statistically significant correlation at 1% level of significance. If overweight increases by 1%, stunting decreases by 0.718%. Similarly, underweight decreases by 0.522% given 1% increase in overweight of women. The third important indicator of women malnutrition is anaemia; this indicator too has statistically significant correlation with all the indicators of children malnutrition. If anaemia among women increases by 1%, wasting of children increases by 0.513% with overweight of children increasing by 0.550% and anaemia among children increasing by 0.834%. However, correlation coefficient value of 0.304 of stunting is less significant at 10% level of significance.Two-tailed Pearson correlation result reveals a positive correlation between nutritional and anaemic status of women and children in India.

Table.1

Correlation result of Nutritional Status of Women and Children in India

		Stunting	Wasting	Underweight	Anemia
Women underweighted	Pearson Correlation	.672**	.648**	.881**	.424**
	Sig. (2-tailed)	.000	.000	.000	.010
	N	36	36	36	36
Overweight/obese	Pearson Correlation	-.718**	-.274	-.522**	.055
	Sig. (2-tailed)	.000	.106	.001	.749
	N	36	36	36	36
Anaemia in Women	Pearson Correlation	.304	.513**	.550**	.834**
	Sig. (2-tailed)	.071	.001	.001	.000
	N	36	36	36	36

Note: ** Correlation is significant at 0.05 level (2-tailed).

Table 2 explains the correlation of nutritional status of women and children in Karnataka. It is observed that the prevalence of underweight (below normal Body Mass Index) among women has no statistical significant correlation with all indicators of child malnutrition viz., stunting, wasting, underweight and anemia. Similarly, anemia of women has no significant correlation with all indicators of child malnutrition. Only overweight/obesity among women has statistically significant correlation with stunting, wasting, underweight and anemia of children. All the

correlation coefficient is statistically significant at 1% level of significance. If there is 1% increase in overweight of women, stunting of children decreases by 0.575%. It implies that overweight and obesity are emerging as a new problem in children among countries undergoing the 'nutrition transition'. The increasing evidence of an association between stunting and obesity suggests that obesity could represent a major problem for developing countries in the future.

Likewise, wasting and underweight of children decrease by 0.0472 and 0.574% respectively. Further, chance of anemia among children decreases by 0.626 given 1% increase in overweight of women. The overweight, an important indicator of women malnutrition correlation with stunting, wasting, underweight and anemia in Karnataka resembles or substantiates with that of the value of correlation coefficients. At India level Women underweight and anemia have significant correlations with stunting, wasting, underweight and anemia. However these correlation coefficients are insignificant at Karnataka level.

Table 2

Summary of Pearson correlation

		Stunting	Wasting	Underweight	Anemia
Women Underweight(BMI below normal)	Pearson Correlation	.238	-.267	.103	.200
	Sig. (2-tailed)	.205	.154	.587	.288
	N	30	30	30	30
Anemia in Women	Pearson Correlation	.101	-.053	.018	.307
	Sig. (2-tailed)	.594	.783	.923	.099
	N	30	30	30	30
Overweight/Obese Women	Pearson Correlation	-.575**	-.472**	-.574**	-.626**
	Sig. (2-tailed)	.001	.009	.001	.000
	N	30	30	30	30
Low Birth Weight	Pearson Correlation	-.563**	-.423*	-.610**	-.492**
	Sig. (2-tailed)	.001	.020	.000	.006
	N	30	30	30	30

Note:** Correlation is significant at the 0.05% level (2-tailed)

Association between Nutritional status of Women and Children

To test the association between nutritional status of Mothers and their children primary survey conducted in Mysore district of Karnataka. 248 mothers and their 384 children anthropometric details were measured and analyzed (Table 3).

Table 3

Nutritional Status of Mothers and their Children

Variable	Normal	Moderate	Severe	Overweight	χ2
Nutritional Status of Mothers:					
Underweight	51(45.94%)	25(22.52%)	23(20.72%)	12(10.81%)	
Normal	106(57.60%)	37(20.10%)	32(17.39%)	9(4.89%)	χ2 =9.774
Overweight	31(51.66%)	18(30%)	8(13.33%)	3(5%)	df. 9
Obese	16(53.33%)	8(26.66%)	5(16.66%)	1(3.3%)	p=0.05**
Total	203(52.86%)	88(22.91%)	68(17.70%)	25(6.51%)	
Low Birth Weight:					χ2=26.556
Underweight	41(43.29%)	19(19.59%)	32(32.98%)	5(4.12%)	df.6
Normal	162(56.44%)	69(24%)	36(12.54%)	20(6.97%)	P=0.000***
Total	203(52.86%)	88(22.91%)	68(17.70%)	25(6.51%)	

Note: *** significance at 1% level.

Table 3 provides the data on the relationship between nutritional status of children and their mothers. Results show that malnutrition cases are the highest among children of underweight mothers. This indicated that mothers with normal body weight give birth to babies with normal birth weight. The nutritional status of the mothers and that of their preschool children have a positive correlation which was statistically significant. Low birth weight babies were born to undernourished mothers whose baby weight was subnormal. Low birth weight infants grow as undernourished children. The association between low birth weight and nutritional status of children is also significant at 1 %level. Results of the study show significant positive association between maternal nutritional status and children nutritional status.

To analyze the effect of socio-economic background on nutritional status of children, the socio-economic variables such as Place of Residence, Caste of children, Gender of children, Nutritional status of mother, Married age of mothers, Family income, Breastfed within an hour of birth, Number of children, Occupation of mother.

Table 4

Results of Linear Regression Analysis of Nutritional Status of Children

Unstandardized Coefficients					
	B	Std. Error	T	Sig.	
(Constant)	2.036	.459	4.439	.000	F=2.334
Place of Residence	-.231	.107	-2.161	.034**	Sig=.011

Caste of children	.043	.056	.767	.444	R2= 0.059
Gender of children	-.078	.097	-.797	.426	
Nutritional status of mother	-.102	.057	-1.796	.073*	
Age of children	-.071	.034	-2.086	.038**	
Married age of mothers	-.051	.067	-.768	.443	
Family income	.048	.078	.621	.535	
Number of children	.084	.088	.957	.339	
Breastfed within an hour of birth	.396	.150	2.643	.009***	
Occupation of mother	-.017	.061	-.287	.774	

Note: ***1%, **5%, *10% significance.

Summary of results on the impact of socio-economic characteristics on nutritional status of children is shown in Table 4 It is inferred that overall regression model with F value of 2.334 is significant at 5 % level of significance (p-value = .011) with the adjusted R^2 of 0.059. Of all the independent variables having an impact on nutritional status of children, feeding within an hour of birth is statistically significant at 1 % level of significance. Its β□□beta) coefficient is 0.396 which means probability of feeding within an hour of birth will increase nutritional status of children by 0.396. On the other hand, place of residence and ages of children are statistically significant at 5 % level of significance. Further, nutritional status of mother with Beta coefficient of -0.102 is also statistically significant but at 10 % level of significance (p-value = 0.073).

Conclusion

Nutritional status of children is associated with that of women, and it is reflected in good nutritional status of children. Even after almost 70 years of independence, the health condition of women and children does not seem to have improved in the country. Better maternal nutritional status is essential for the overall growth and development of children and unless the mother's nutritional status is improved, the child's nutrition and health status cannot be expected to improve.

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