



Original Research Article

Rotated Factor Matrix for Factor Influencing on Nutritional Status of Pre-School Children in Sivaganga District

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Received: 15/05/2014

Revised: 04/06/2014

Accepted: 04/06/2014

ABSTRACT

Background: the present study explore factor which influence on nutritional status of pre-school children in Sivaganga district. **Methods:** A four-tier proportionate stratified random sampling design is a unique feature of this study. Factor analysis has been used in the present study to find out the variables grouped along with child nutritional status in a factor. Totally 120 households were covered in the sampling group, at the rate of 60 households in rural and 60 households in urban. **Result and discussion:** the first factor: The Eigen value equal to 6.58 and explained 29 per cent of the total variation. The factor loadings of the variables in the first factor are Mother Education (0.870), Monthly Income (0.847), Household Expenditure (0.837), Father Occupation (0.828), Wealth Status (0.800), ICDS (0.754). The Second Factor: The Eigen value 3.165 and explained 14.384 per cent of the total variation. The factor loadings of the variables in the second factor are Type of Family (0.852), The Family Size (0.849), Mother nutritional knowledge (0.721), The Third Factor: Eigen value 2.230 and explained 10.136 per cent of total variation. The factor loadings of the variables in the third factor are Mother Age (0.919), Father Age (0.914). The Fourth Factor: Eigen value 1.522 and explained 6.916 per cent of total variation. The factor loading of the variable under this factor is Type of House (0.761), Distance to the health centre (0.619), Sex of the Head of the Family (0.581), Religion (0.521). (i) Type of House (0.761). The Fifth Factor: Eigen value 1.333 and explained 6.060 per cent of the variation. The factor loading of the variable under this factor is community (0.832), Health Checkups (0.699), Location (0.549), The Sixth Factor: Eigen value 1.218 and explained 5.534 percent of the variation. The factor loading of the variable under this factor is birth order (0.791). **Conclusion:** The findings in this study have confirmed many issues about the risk factors for childhood malnutrition which have been known for decades. It is remarkable that almost halfway into the 21st century, the same factors still abound. This calls the impact of the various intervention programmes used in this wise in the past to question and demands a reverberated approach. Women empowerment promises improved family finances, better food security and better childhood nutrition. This is worth trying in the study region.

Key words: Malnutrition, Children, Factor Analysis, Eigen value

INTRODUCTION

Malnutrition problems are the result of unsatisfactory food intake or severe and repeated infections, or a mixture of both. These conditions are closely linked to inadequate access to food, neglected care for mothers and children, insufficient health

services and an unhealthy environment.^[1]

These parameters are reflected in the standard of living of a population, and whether its basic needs are met, for example with adequate food and healthcare. Disturbances in nutrition, regardless of etiology, invariably affect the health of

mothers and child growth.^[2] Approximately 38 million children are born in south Asia and one in eight fails to survive to the age of 5 years. Approximately 3 million of these child deaths are directly or indirectly associated with malnutrition.^[3] These babies are born with impaired growth due to poor nutrition during foetal life. The worst crime among many human faults and errors is abandoning a child, thereby neglecting the foundation of a life. Many needs can wait but a child cannot, because his bones are being formed, his blood is being made and his senses are being developed. A child needs to be attended to and tended. In this context, the present study aims at assessing, factor which influence on Nutritional Status of Pre-School Children in Sivaganga District of Tamilnadu.

Theoretical Frame Work:

In neoclassical framework, health care, age, income and education, environmental and lifestyle factors, and genetic factors are viewed as the influence of health. An individual begins with a stock

of health, which depends on the genetic factors of the individual. As time goes on, the individual's age, and the health stock depreciates. The rate of depreciation depends on the rest of the influence mentioned above. Given these influence, the production function for health can be constructed as $H = f(HC, t, Z)$, in which, HC stands for health care, t stands for time, and Z is the other influence of health. Before moving on to the concept of health care, it is important to point out that in the neoclassical framework, health is overall viewed as influenced by individual preferences and responsibilities despite of the existence of those socioeconomic factors such as income, education and environment. "Regardless of the level of income and education, health status depends to a large degree on personal behavior. Lifestyle factors including diet are important influence of nutritional status. The observed relationship between nutritional status and socioeconomic status is interesting."^[4]

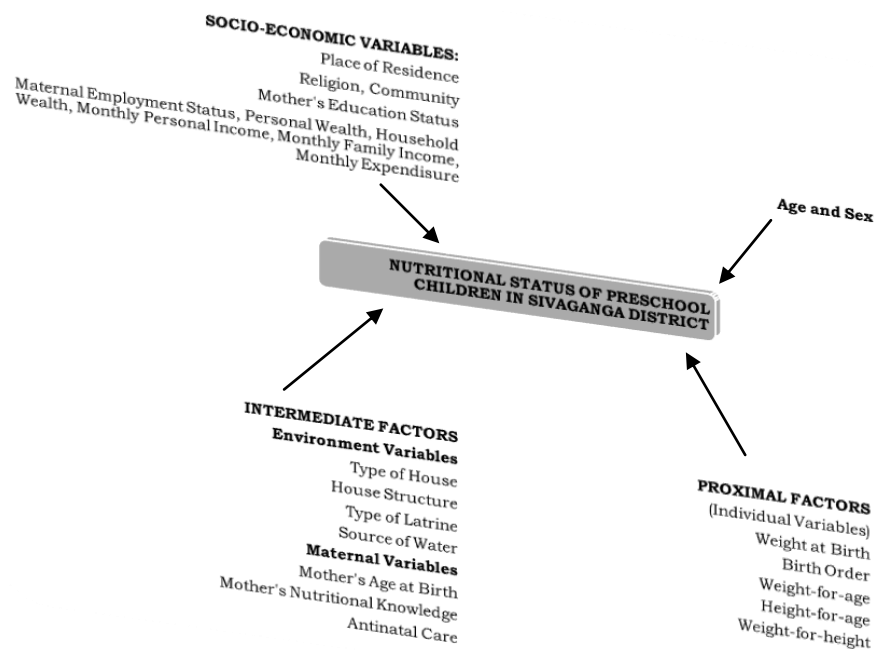


Figure 1: Conceptual Framework of The Factor Influence On Nutritional Status Of Preschool Children In Sivaganga District.

MATERIALS AND METHODS

A four-tier proportionate stratified simple random sampling design is a unique feature of this study. The first stages of sampling involve selection of the district in Tamilnadu based on agro-climatic conditions. Sivaganga district have been selected out of thirty two districts with underdeveloped and lowest agro-climatic conditions (rain < 800mm). In the District 90, 277 (38.4 %) families are living Below Poverty Line (BPL). This category is resource-poor in terms of assets, skills and credit availability which results in low productivity. Majority of BPL families did not own a single piece of land. Out of total landless BPL families 32.58% belong to SC categories and 56.24% and 11.16% OBC and others, respectively. (Source: Annual Employment Report of Sivaganga District (AERD), 2006-2007). Income wise 78.73% of SC –BPL families earned less than Rs.500 per month and 78.78% in case of OBC-BPL families and 66.29% from other BPL families. Around 15,461 families earned less than Rs.250 per month and 8,329 families earned anywhere between Rs.500-Rs.1, 500. (Source: Annual Employment Report of Sivaganga District (AERD), 2006-2007). Sivaganga District has been declared as an 'Industrially Backward' district in the State by District Industries Centre.

In the second stage of sampling involved the selection of the block in sivaganga district. As per 2001 census, the total child population in sivganga district is 132891 at the rate of 71.95 percent in rural and 28.05 in urban. It constitutes 1.84 percent of the state child population. The district covered six talk namely devakottai, Ilayangudi, karaikudi, manamadurai, sivaganga and thirupattur. Out of six talk, the present study investigate two talk namely sivaganga talk and karaikudi talk because these two talk representatively possessing the characteristic of regional

qualities of the district, it was selected by the area sampling method. The factors considered were rainfall, sex-ratio, female literacy, and female labour participation rate and child population.

The third stage of sampling involved the selection of the villages and wards. Two villages namely Thamarakki and Somanathamankalam were selected in sivaganga taluk, and Kazhaivasal and Vairapuram wards were selected in karaikudi taluk. Theses selected villages and wards have had highest child population and households.

The fourth stage of sampling is the selection of the households in each of the two villages and two wards on the basis of their income categorising them such as low income, middle income, and high income groups. In order to obtain a symmetrically representative sample of rural and urban households, a random selection of ten households in each of the above three income categories. Totally 120 households were covered in the sampling group for the present study, at the rate of 60 households in rural and 60 households in urban.

RESULT AND DISCUSSION

Factor analysis has been used in the present study to find out the variables grouped along with child nutritional status in a factor. Table-1 presents rotated factor matrix for socio-economic, environmental and biological factors influencing nutritional status of pre-school children in Sivagangai district. Factorial investigations are conducted for 19 variables selected. The selected 19 variables are location, religion, community, mother education, type of family, family size, father and mother age, type of house, sex of the head, wealth status, monthly income, food expenditure, birth order, antenatal care, mother knowledge of nutrition, distance to the health center, ICDS beneficiary.

Table -1 Rotated factor matrix for factor influencing on nutritional status of pre-school children in sivaganga district.

Sl.No	Variables	F1	F2	F3	F4	F5	F6	h ²
1	Mother education	0.870	0.006	0.126	0.210	0.014	0.024	0.818
2	Monthly income	0.847	0.166	0.156	0.129	0.033	0.219	0.836
3	Food expenditure	0.837	0.202	0.096	0.003	0.026	0.148	0.773
4	Father occupation	0.828	0.055	0.093	0.042	0.126	0.041	0.716
5	Wealth status	0.800	0.124	0.257	0.066	0.098	0.110	0.748
6	ICDS	0.754	0.076	0.104	0.189	0.435	0.086	0.817
7	Type of family	0.301	0.852	0.020	0.226	0.189	0.414	0.848
8	Family size	0.279	0.849	0.045	0.075	0.140	0.068	0.828
9	Knowledge of nutrition	0.164	0.721	0.102	0.381	0.032	0.378	0.675
10	Mother age	0.044	0.103	0.919	0.302	0.447	0.114	0.861
11	Father age	0.159	0.072	0.914	0.110	0.047	0.023	0.890
12	Type of hose	0.102	0.026	0.044	0.761	0.062	0.093	0.593
13	Distance to the health centre	0.085	0.103	0.563	0.619	0.021	0.015	0.771
14	Sex of the head of the family	0.140	0.030	0.145	0.581	0.192	0.128	0.431
15	Religion	0.016	0.107	0.043	0.521	0.087	0.209	0.383
16	Community	0.093	0.165	0.073	0.067	0.832	0.291	0.747
17	health checkups	0.353	0.028	0.022	0.019	0.699	0.089	0.626
18	Location	0.067	0.354	0.363	0.375	0.549	0.032	0.789
19	Birth order	0.306	0.186	0.020	0.209	0.008	0.791	0.789
	<i>Eigen value</i>	6.583	3.165	2.230	1.522	1.333	1.218	
	<i>% of variation</i>	29.923	14.384	10.136	6.916	6.060	5.534	
	<i>Cumulative percentage of variation</i>	29.923	44.307	54.443	61.359	67.419	72.953	

Source: computed

Of the 19 socio-economic, environmental, and biological variables selected for factor analysis six factors have been extracted. They, all joined together have explained 72.973 per cent of the total variation in all the variables included.

The First Factor:

The Eigen value equal to 6.58 and explained 29 per cent of the total variation. The factor loadings of the variables in the first factor are Mother Education (0.870), Monthly Income (0.847), Household Expenditure (0.837), Father Occupation (0.828), Wealth Status (0.800), ICDS (0.754).

i. Mother Education (0.870)

Literacy and schooling are important indicators of the quality of life, which help to measure the poor's ability to take advantage of the income-earning opportunities, which in turn, may influence food intake and health-seeking behaviour. In the study region majority of the mothers are literate. Among the sample literate population, the largest concentration is found in the distribution of primary education. The diffusion of general primary education has a long-run cumulative effect on economic development. According to UNESCO "functional literacy is normally reached at the end of four or more years of schooling".^[5] This means that a person who has completed at least four years of

schooling may not relapse into illiteracy. According to human development report in sivaganga district (2007) reveals that Rates of literacy among the population (aged seven years and older) have raised considerable in the sivagangai district in the past ten years. The 2001 census recorded literacy rates of 66 per cent; up from 52 percent in 1991 male literacy level grew even more from 64 per cent to 76 percent in the same period. Equally encouraging was the phenomenal growth in the literacy rate for females, which went up from 41 per cent to 57 per cent between 1991 and 2001. Certainly, both the gender has contributed for the general rise in literacy rate, in which the rates of growth of females (16 percent) outdo the male 12 per cent. The gap between the male and female rates has therefore narrowed from 23 percent in 1991 to 19 per cent in 2001. Despite these accomplishments on the literary front, the districts performance is marginally ahead of nation but far behind the state.

ii. Monthly Income (0.847),

The shift in household nutritional status paradigm from food supply to food access has led many policy makers and development practitioners concerned with food and nutrition issues, to emphasize the role of household income as a determinant of food security. It is worth recalling Sen again, whose work focused attention on the lack of access to food by households and individuals because of low incomes.^[6] In the study area the majority of the respondents are earned below Rs.3000. The per capita income of the district and its growth rate was below the state income (Rs 12,717) and growth rate (4.57). In Tamil Nadu, Sivaganga occupied the 21st position in 1993 and was pushed further backward to the 24th place among 30 districts during 2001-02. This clearly illustrates the widening of the gap in per capita income between Sivaganga and other district of the state.

iii. Household Expenditure (0.837)

Household food expenditure pattern is an excellent indicator of existing economic condition of a community and behaviour of variables like food consumption and calorie / protein intake in relation to the level of food expenditure is the important input of nutritional analysis.^[7] The household expenditure can be defined as the cumulative monetary values of consumption of various groups of food items such as Cereals, Pulses, Vegetables, Green Leaves, Fruits, Oils and Fats, Meat Products, Milk and Milk Products, Sugar, Spices and Condiments and Beverages and Consumption of various groups of non-food items such as Fuel and Lighting, Clothing and Cosmetics, Education, Medical Expenses, Recreation, Transport, Household Maintenance, Narcotics and Social and Religions Expenditure. In the study area the Majority of the respondent's monthly income spent on food by the respondent households is Rs.4001-5000. The results show that the average monthly food expenditure is the highest in urban households than rural households in sivaganga district. The striking variations in the level of expenditure among the two categories reflect the prevailing gross inequalities in income. An informal interview which the researcher had with the respondents reveals that in almost all households, expenditure always exceeds income and the deficit is met by debts. This has also been the finding of other researchers.

iv. Father Occupation (0.828),

Occupation is a deciding factor for annual income and their level of consumption and saving. The majority of the fathers are skilled labours in the study area. Over the past 10 years, the proportion of working population engaged in agricultural activities indicated a sharp decline from 79.72 per cent in 1991 to 62.25 per cent in

2001. Yet, a substantial proportion of the work force was engaged in agriculture, and a very small section was found engaged in industry and services. This is a clear indication of the prevalence of large scale disguised unemployment in agriculture. Thus the above picture on occupational structure of the district clearly illustrates the backwardness of the district economy (HDR 2007).

v. Wealth Status (0.800)

Lack of an adequate asset base has much to do with poverty and in turn malnutrition. Assets are classified into five broad categories, namely, (a) Income Generating Assets, comprising of land, livestock and trees (b) Financial Assets (c) Liquid Assets comprising of small livestock and jewellery (d) Household Durable and (e) Household Structures. In the study area, 48 percent of the respondent's households are having assets worth below Rs. 50,000 in rural. Whereas urban areas 27 percent of the respondent's household are having assets worth Rs. 100001-200000. The large variations in the possession of household assets among the urban and rural household, the scarce assets may make these poor households vulnerable to malnutrition.

vi. ICDS (0.754),

ICDS is today the largest community based outreach programme for holistic early child development. It is a crucial link between disadvantaged communities both the primary health care and education systems. ICDS scheme is a pioneer scheme taking care of the welfare of the Mother and Child. Through the Integrated Child Development Services Scheme, Tamil Nadu has improved overall nutrition and health status of its young children. ICDS and AWC also witness 39 percent mothers' participation in various health and nutrition education classes in the study region.

The second factor:

The Eigen value 3.165 and explained 14.384 per cent of the total variation. The factor loadings of the variables in the second factor are Type of Family (0.852), The Family Size (0.849), Mother nutritional knowledge (0.721),

a. Type of Family (0.852)

Type of Family is said to have a considerable impact on child health performance. There are divergent views on family type and fertility. According to one group, the joint family operates to keep low level of fertility compared with nuclear family. It reveals that the family systems in rural areas have been changed from joint family to nuclear family due to modern civilization. These changes have taken place initially in the metropolitan cities and urban areas and this impact has percolated to the rural areas. This has been witnessed the majority of the respondents (53 per cent) fall under the category of nuclear family structure in the study area among the overall samples. It observes that the labour market, characterised by a high degree of unemployment, does not confer any special advantage to a joint family. On the other hand uncertainty of finding work, especially in the lean seasons, may make intra-family income sharing difficult for joint families. That is why families get divided more frequently among the poor than the non-poor. This is also the finding of the researcher while interviewing the women respondents of the rural households, where the tendency is more towards the nuclear family.^[8]

b. The Family Size (0.849)

Family size is a deciding sector for income, consumption and investment. A larger proportion of respondent households have medium size families in the study region. Family size in relation to food expenditures has received wide attention for its effect on the nutrient intake of individuals. But, it has its limitations too.

Though, this variable is important in determining the level of living of a household, it should also be noted that large households need not necessarily be marked by destitution.^[9]

c. *Mother nutritional knowledge (0.721)*

When the level of knowledge is increased, the proportion of children among of the 'normal' nutritional status category is also increased. Children's nutritional status is thus proved to be very closely associated with the level of nutritional knowledge. This suggests that nutrition knowledge may operate as a vigilant overseer in maintaining the health and nutrition of the children. This is, indeed, a practical policy oriented finding.

The third factor:

Eigen value 2.230 and explained 10.136 per cent of total variation. The factor loadings of the variables in the third factor are *Mother Age (0.919)*, *Father Age (0.914)*. The family composition is generally held to be the second best determinant of household consumption next to income. This variable influences not only the quantum of consumption, but also the composition of household demand and magnitude of the "Engel Elasticities". The age structure of the Indian population is an issue of great concern to planners. It has been found that nutritional problems affect mainly children in the pre-school age (1–5 years), particularly among the poor socio-economic groups of the population. Differentials in under-nutrition can be observed while comparing different age groups of the sample population. The findings from such type of analysis would help the planners to devise short-term strategies to improve the nutritional status of the vulnerable groups in the population.^[10]

The fourth factor:

Eigen value 1.522 and explained 6.916 per cent of total variation. The factor

loading of the variable under this factor is *Type of House (0.761)*, *Distance to the health centre (0.619)*, *Sex of the Head of the Family (0.581)*, *Religion (0.521)*.

i. Type of House (0.761)

Dwelling unit is one of the economic indicators of development. The status of house is classified into two viz own and rented. In the study region 21 percent of the respondents have been living rented house. The rental value of the house in urban areas also increases rapidly due to industrialization and migration. Own house settlement may increase consumption and investment.

ii. Distance to the health centre (0.619)

Geographical access, the distance which must be travelled in order to use health services is one aspect of access which is often overlooked, but which presents barriers of cost, time and inconvenience. Although there is some evidence that increasing distance from health services inhibits the use of primary and secondary care, and that it is associated with a range of poor health outcomes, in the study area 52 percent of the respondent have a distance 1-2 Km travelled to access primary health care services.

iii. Sex of the Head of the Family (0.581)

Gender is one of the deciding factors for decision making in social institution. In the study area 62 percent of households are headed by male. It shows that the male heads lead the family and bear the entire responsibility of the family including healthcare consumption. Female headship is a useful targeting indicator for anti-poverty programmes. This headship variable in the two location provided opportunities to compare the variations in the food intake and nutritional status of family members in the sivaganga districts.

iv. Religion (0.521)

Several social scientists have analysed differentiation and inequalities among rural households in India by using the concept of caste and religion, which is considered to be deep-rooted and all pervasive in the Indian Society. [11] The study region the majority of children belong to Hindu religion.

The fifth factor:

Eigen value 1.333 and explained 6.060 per cent of the variation. The factor loading of the variable under this factor is community (0.832), Health Checkups (0.699), Location (0.549),

i. Community (0.832)

Malnutrition is generally considered as the function of poverty. Studies on poverty have shown that the incidence of poverty is related to caste hierarchy and the poverty level increased as the households become marginalized in the caste hierarchy. But researchers like Kathleen Gough have established that economic differentiation has affected almost every caste and that the community/caste is no longer homogenous in occupation and wealth. [12] In the study area relatively more number of castes is characterized as Backward Community and is reflected among the overall samples. Therefore strengthening of public health sector is essential.

ii. Health Checkups (0.699)

Utilization of different systems of medicines would reduce occurrence of morbidity. Anganwadi centre's health checkups services were received by 48 percent preschool children.

iii. Location (0.549)

Child nutrition outcomes in developing countries have been characterised by large rural-urban disparities over the last few decades. A substantial body of empirical studies shows that average child nutrition outcomes in urban areas are significantly better than in rural areas in a large cross-section of developing countries. In the study

area majority of the pre-children were normal the proportion is higher in urban areas than rural areas.

The sixth factor:

Eigen value 1.218 and explained 5.534 percent of the variation. The factor loading of the variable under this factor is birth order (0.791). Garcia, and Jancito (1988) observed nutritional intakes to be decreasing with birth order in the rural areas.

CONCLUSION

Finally the study concluded that, there are no fundamental differences in the characteristics that determine child nutrition outcomes in urban and rural areas. Differences in the levels of a limited number of socio-economic characteristics – maternal education, spouse's education and the wealth index (incorporating household asset ownership and access to drinking water and sanitation) contribute a major share of rural-urban disparities in the lowest quantiles of child nutrition outcomes. Differences in the strength of association between socio-economic characteristics and child nutrition outcomes account for less than a quarter of rural-urban disparities at the lower end of the malnutrition distribution. Public health interventions aimed at overcoming rural-urban disparities in child nutrition outcomes need to focus principally on bridging gaps in socio-economic endowments of rural and urban households and improving the quality of rural infrastructure. Improving child nutrition outcomes in developing countries does not call for fundamentally different approaches to public health interventions in rural and urban areas.

The findings in this study have confirmed many issues about the risk factors for childhood malnutrition which have been known for decades. It is remarkable that almost halfway into the 21st century, the same factors still abound. This calls the impact of the various intervention

programmes used in this wise in the past to question and demands a reverberated approach. Women empowerment promises improved family finances, better food security and better childhood nutrition. This is worth trying in the study region.

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How to cite this article: Subburaman C. Rotated factor matrix for factor influencing on nutritional status of pre-school children in Sivaganga district. *Int J Health Sci Res*. 2014;4(7):203-211.
