

# Physiological Health and Wealth Status of Children in Thanjavur Corporation, Tamil Nadu, India-A Geo-Spatial Study

T. Ponnyin Selvi\* and S. Vadivel\*\*

\*Department of Geography, Kunthavai Naacchiyaar Govt. Arts College for Women (Autonomous)  
Thanjavur-613 007, India

\*\*Post Graduate and Research Department of Geography, Government Arts College (Autonomous)  
Kumbakonam-612 001, India

\*Corresponding author's email: ponnygeo [AT] gmail.com

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## ABSTRACT---

*Introduction: At every stage of life, health is robustly associated with socio-economic status such as income, educational attainment, and occupational prestige. These relationships evidencing that the children from low-income households weigh less at birth, are more likely to be born prematurely, and are increasingly at greater risk for chronic health conditions as they grow. Childhood health is in turn positively related to a number of later outcomes, including skills, scholastic achievement, and adult economic status. In adults, it is also a well-established fact that individuals with higher incomes enjoy better health outcomes.*

*Objectives: 1) To study the socio-economic and demographic profile of the children, 2) To identify the wealth and physiological health conditions of children and 3) To examine the spatial patterns of wealth and physiological characteristics of children in Thanjavur Corporation.*

*Sample: Stratified Random sampling method used for the present study. There are 51 wards, 24 children from each Wards aged between 0 to 6 years, totally 1224 children were selected from Thanjavur Corporation and they are the respondents for the present study.*

*Methodology: This study is based on the measurements of physiological characteristics such as children's circumference of head, chest and waist hip, length of arm and leg, and their body weight and height. Body Mass Index (BMI) was calculated dividing weight and height meter square. Wealth index (WI) was also measured (Kuppuswamy, 2003) with reference to respondent's family monthly income, educational status and occupation. Then the mean values are inserted in to the ArcGIS software and physiological and wealth index maps of children aged less than six years are generated. This spatial variations and relationships are proved by the Pearson Correlation.*

*Conclusion: There is no significant relationship between the variable head circumference, chest circumference and waist-hip circumference with wealth index, but there is a significant relationship with the variable length of leg and arm length with wealth index. Nowadays, small family norms, noon meal scheme, Anganwadi nutrition food programme and parental care are keeping children in well physiological growths.*

**Keywords---** Child health, Physiological health, Wealth Index,

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## 1. INTRODUCTION

We cannot deny the advantages of having more income or wealth. The well-known link between economic resources and being able to afford health and medical care, their influence on health has received relatively more attention from the general public and policy-makers, despite a large body of evidence from studies documenting strong and pervasive relationships between income, wealth and health. The evidence tells us that these relationships are based not just on how economic resources can affect our access to medical care, but also on how they enable us to live in safer homes and neighbourhoods, buy healthier food, have more leisure time for physical activity, and experience less health-harming stress. Understanding the importance of the links between income, wealth and health we can inform policies aiming to achieve better health for all while reducing social disparities in health. The physiological growths of children are highly influenced by their family wealth. The first six years of early childhood represents the most critical stage in children's life, when the basic foundations are laid for cognitive, social and emotional language, psychomotor development and cumulative lifelong learning.

## 2. OVERVIEW

A socio-economic focus on spatial and social injustice in consumption, access to services and standards of living are studied (Benzeval, et al., 1995; Acheson, 1998; Graham, 2000). Work in health geography employing Geographical Information System (GIS) and spatial analysis has been followed (Parker and Campbell, 1998; Wall and Devine, 2000; Schweikart and Kistemann, 2000; Sabel et al., 2000; Kim et al., 2000; Boyle et al., 1999; Gatrell and Bailey, 1996). Rates of low birth weight, which has been linked to child development and to chronic conditions later in life, are highest among infants born to low-income mothers (Blumenshine P, et al., 2010; Blumenshine P, et al., 2009). Children in poor families are about seven times as likely to be in poor or fair health as children in families with incomes at or above 400 per cent of the federal poverty level (Blumenshine P, et al. 2009). Other findings indicate that lower-income children experience higher rates of asthma, heart conditions, hearing problems, digestive disorders and elevated blood lead levels. The greater levels of wealth are also linked with better health including self-rated health, obesity and other cardiovascular risk factors and lower mortality (Pollack CE, et al., 2007; Krueger PM, et al., 2003; Hajat A, et al., 2010; Robert S, et al., 1996). The mortality risk decreased with increasing levels of wealth among white adult men, even after taking income and insurance status into account (Hajat A, et al., 2010). Many studies that have included community-level measures of economic resources have found associations with illness and mortality independent of individual-level economic measures (Diez Roux AV, et al., 2010; Kawachi I, et al., 2003; Pickett KE, et al., 2001; Robert SA, et al., 1998). While the degree of income inequality within a society has also been linked with health (Wilkinson RG, et al., 2006), the nature of this association remains controversial (Wilkinson RG, et al., 2006; Lynch J, et al., 2004 part-1 and 2).

## 3. STUDY AREA

Thanjavur is the headquarters of the Thanjavur District. The city is an important agricultural centre located at 10.80 N and 79.150 E in the Cauvery Delta and is known as the "Rice bowl of Tamil Nadu". It is administered by a municipal corporation consist of 51 wards, covering an area of 36.33 km<sup>2</sup> (14.03 sq mi). According to 2011 census, Thanjavur Corporation had a population of 222,943 with a sex-ratio of 1,042 females for every 1,000 males, much above the national average of 929. A total of 19,860 were under the age of six, constituting 10,237 males and 9,623 females. Scheduled Castes and Scheduled Tribes accounted for 9.22 percent and 21 percent of the population respectively. The average literacy of the city was 83.14 percent, compared to the national average of 72.99 percent.

## 4. IMPORTANCE OF THE PRESENT STUDY

India is a home of the largest number of children in the world and, 29 percent constitutes children in the age between 0-5 years. They are the future pillars of our nation. National data establishes that approximately 100 million children are in the poorest wealth quintile. One half of all the poor children belong to the Scheduled Castes and Scheduled Tribes groups and they continue to be at a significant disadvantage. In India about 1.83 million children die annually before completing their fifth birthday due to preventable causes. In India alone there are approximately 60 million children who are underweight and the prevalence is higher in rural areas compared to urban areas. The number of malnourished children in India is among the highest in the world. This condition is due to underweight and because of low dietary in-take, excessive work and chronic infections. Major indicators related to maternal and child health shows that the situation in Tamil Nadu is considerably better than that in India as a whole. There are, however, several challenges that face the public health system. Children represent the future, and ensuring their healthy growth and development ought to be a prime concern of all societies.

Health, as one of the vital indicators of social well-being of the people is by and large derivative of socio-economic development of a place. The health of a child could also be understood in relation to low production, poverty, and poor health service, low income, over or under nutrition. Hence, the present study has been focused to study the socio-economic, demographic, environmental, anthropometric, health care, status and problems in health care. The study has also made an attempt to probe into the major dimensions.

## 5. AIM AND OBJECTIVES

The aim of the present study is to evaluate the child health conditions in Thanjavur Corporation and it has the following objectives:

- 1) To study the socio-economic and demographic profile of the children,
- 2) To identify the wealth and physiological health conditions of children and
- 3) To examine the spatial patterns of wealth and physiological characteristics of children in Thanjavur Corporation.

## 6. METHODOLOGY

This study is based on the measurements of physiological characteristics such as children's circumference of head, chest and waist hip, length of arm and leg, and their body weight and height. Body Mass Index (BMI) was calculated dividing weight and height meter square. Wealth index (WI) was also measured (Kuppuswamy. 2003) with reference to respondent's family monthly income, educational status and occupation. This survey by direct observation method, 1224 children respondents have been selected based on *Stratified Random* sampling procedure. This information

was entered into SPSS for the application of statistical technique to find out the mean values of above mentioned variables. These variables are assumed to be the vital factor in determining the physiological health status of children. Then these mean values are inserted in to the ArcGIS software and physiological and wealth index maps of children aged less than six years are generated. This spatial variations and relationships are proved by the Pearson Correlation. The interpretation and findings are based on the above.

## 7. FINDINGS

### Spatial Pattern of Physiological Health and Wealth Status

#### 1. Head Circumference

The figure – 1 show the children’s mean Head Circumference (HC) aged less than 6 years. This is clearly indicating that the very low HC found in the ward 22, 33, 45 and 49. The low HC originated in the 4,9,12,16,17,18,25,31,38,43,46,48 and 51 wards. The medium HC are identified in the wards of 3,13,19,21,24,26,29,34,35,40,44 and 47. The high and very high HC are established in the wards of 1,14,15,20,23,27,28,30,32,37,41,42 and 50 and 2,5,6,7,8,10,11,36 and 39 respectively.

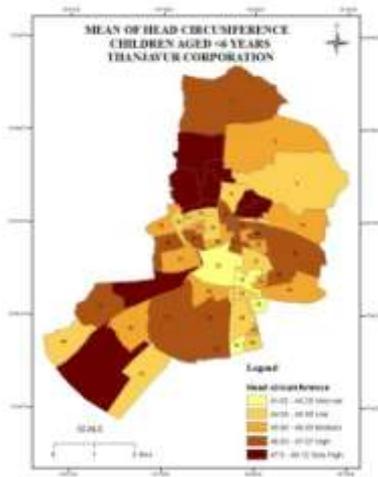


Figure-1

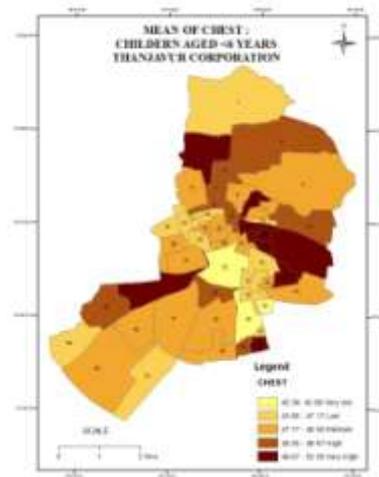


Figure-2

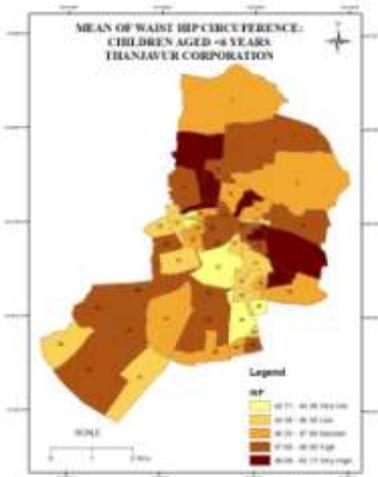


Figure-3

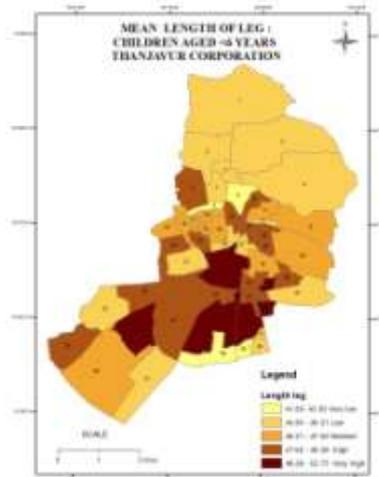


Figure-4

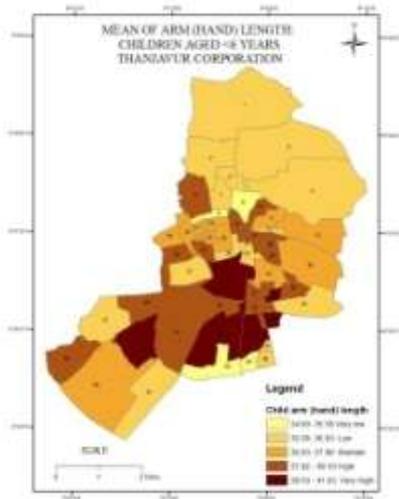


Figure-5

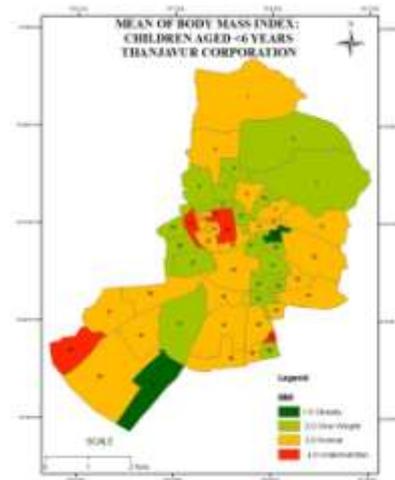


Figure-6

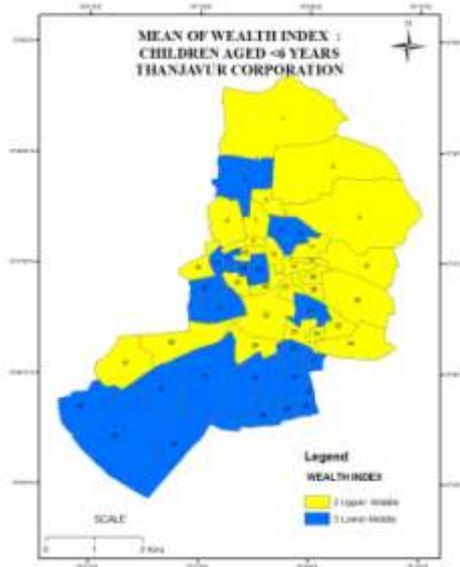


Figure -7

## 2. Chest Circumference

The figure - 2 is illustrating the mean Chest Circumference (CC). The very low CC is registered in the ward 22, 45 and 46. The low CC comes out in the wards of 1, 12, 16, 17, 18, 19, 23, 31, 33, 38, 43, 47 and 51. The wards 4, 6, 9, 11, 20, 21, 24, 25, 26, 27, 34, 39, 40, 41, 42, 44 and 50 are having medium CC. The high CC is recorded in the wards of 3, 5, 7, 8, 13, 15, 35, 37 and 49. The very high CC is emerged from the wards of 2, 10, 14, 28, 29, 30, 32, 36 and 48.

## 3. Waist-Hip Circumference

The very low Waist-Hip Circumference (WHC) is noticed in the wards- 17, 22, 45 and 46 (Figure - 3). The low WHC perceived in the wards of 12, 18, 19, 21, 27, 31, 33, 38, 43 47 and 51. In 1, 4, 9, 11, 16, 23, 24, 34, 41, 44, 49 and 50 wards medium WHC is identified. The high WHC registered in the wards of 3, 5, 6, 13, 14, 15, 20, 25, 26, 29, 35, 36, 37, 39, 40, 42 and 48. The very high WHC is found in the areas of 2, 7, 8, 10, 28, 30 and 32.

## 4. Length of Leg

The figure-4 explains the mean Length of Leg (LL) of children aged less than 6 years. The ward 8, 9, 49, and 50 are having very low LL. The low LL of children is in the wards of 1, 2, 3, 4, 5, 7, 12, 21, 26, 27, 37, 44, 47, 48 and 51. The wards 11, 13, 16, 17, 18, 19, 24, 25, 30, 31 and 39 are having medium LL. The high LL is found in the wards of 6, 10, 14, 15, 20, 23, 28, 29, 32, 33, 35, 36, 38, 41 and 43. The very high LL is exhibited in the wards 22, 34, 40, 42, 45 and 46.

## 5. Arm Length

The mean Arm Length (AL) of children in map, Figure – 5 is illustrating that the very low AL is found the wards of 8, 9, 49 and 50. The low AL is perceived in the wards 1, 2, 3, 4, 5, 7, 12, 21, 26, 27, 37, 44, 47, 48 and 51. Medium LL is established in the wards of 11, 13, 16, 17, 18, 19, 24, 25, 30, 31 and 39. The wards 6, 10, 14, 15, 20, 23, 28, 29, 32, 33, 35, 36, 38, 41 and 43 are having high LL. The very high LL is located in the wards of 22, 34, 40, 42, 45 and 46.

## 6. Body mass Index

The mean Body Mass Index (BMI) map, figure 6 shows that the obese children are living in the wards 28 and 51. The overweight children are registered in the wards of 3, 4, 5, 6, 7, 8, 10, 15, 19, 20, 21, 27, 29, 31, 33, 34, 41, 43 and 48. The normal BMI children are in the wards 1, 2, 9, 11, 12, 13, 14, 17, 22, 23, 24, 26, 30, 32, 35, 36, 37, 39, 40, 42, 45, 46, 49 and 50 and the under nutrition children are living in the wards 16, 18, 25, 38 and 47.

## 7. Wealth Index

The Wealth Index (WI) map, Figure - 7 is clearly indicating the living areas of Upper-Middle and Lower-Middle class people. In Thanjavur Corporation the upper-middle class people are living in the wards of 1, 3, 4, 5, 6, 7, 8, 11, 12, 13, 14, 15, 16, 19, 22, 23, 26, 27, 28, 29, 30, 32, 33, 34, 35, 36, 37 and 44. In the wards 2, 9, 10, 17, 18, 20, 21, 24, 25, 31, 38, 39, 40, 41, 42, 43, 45, 46, 47, 48, 49, 50 and 51 the lower-middle class people are living.

## 8. DISCUSSION

### Relationship of Physiological Variables with Wealth Index

The following table shows the associated variables with wealth index. It explains that the variable head circumference of children with wealth index are having strong negative significant relationships ( $P = -0.406$ , Sig- 0.003). It is clearly indicating that the increasing wealth index with decreasing child head circumference. It is also evidently proved that at the time of birth/new born baby child's head circumference was larger. When they grow, their head circumference started to decrease. Therefore, the family wealth index is not influencing the child head circumference.

**The Associated Variables with Wealth Index**

Sl. No	Variable Name	Mean	Std. Deviation	Pearson Correlation	Sig. (2-tailed)
1	Head Circumference	46.48	1.468	-0.406**	0.003
2	Chest Circumference	48.06	2.166	-0.533**	0.001
3	Waist-Hip Circumference	47.00	1.960	-0.484**	0.001
4	Length of Leg	46.69	2.293	0.293*	0.037
5	Arm Length	37.65	1.607	0.311*	0.026
6	Body mass Index	15.85	1.611	-	-

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

\* Correlation is significant at the 0.05 level (2-tailed).

Similarly, the variable children's chest circumference and wealth index are having strong negative relationships ( $P = -0.533$ , Sig- 0.001). It is indicating that the increase of chest circumference with the decrease of wealth index. This is also clearly explaining that the wealth of the family is not affecting the growth of children's chest circumference.

The variable waist hip circumference with wealth index is having strong negative association ( $P = -0.484$ , Sig- 0.001). This is clearly explaining the increase of waist hip circumference with the decrease of wealth index. As a result, the wealth is not concerned with the growth of waist hip circumference of children.

The variable children's length of leg with wealth index is having positive significant relationships ( $P = -0.293$ , Sig- 0.037). This undoubtedly reveals the increase of children's length of leg with the increase of wealth index. This is evidently confirming that there is a positive impact of wealth on children's leg length.

The children's arm length with wealth index is having positive significant relationships ( $P = -0.293$ , Sig- 0.026). This is noticeably illustrating the increase of wealth with the increase of children's arm length. Therefore, the wealth of family affects the children's arm length.

It is interesting to note that there is no relationship between body mass indexes with wealth index.

## 9. CONCLUSION

This study clearly shows the spatial pattern of children's physiological characters. However, there is no significant relationship between the variable head circumference, chest circumference and waist-hip circumference with wealth index, but there is a significant relationship with the variable length of leg and arm length with wealth index. Nowadays, small family norms, noon meal scheme, Anganwadi nutrition food programme and parental care are keeping children in well physiological growths. Therefore, this study shows that the wealth of the family is having less impact on children's growth in Thanjavur Corporation.

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