

An economic analysis of housing environment and health status of rural households in Sivaganga district of Tamil Nadu

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Abstract

Background/Objectives: The environmental is which people live greatly influences this health. A degraded environment means a lower quality of life, loss of productivity and higher health care costs. The world health organization has recently released profiles of environmental burden of disease for 192 countries and these country problems provide on estimate of the health impact from three major risk factors are unsafe water sanitation hygiene, Indoor air pollution from cooking fuel use and outdoor air pollution. India is totally home to one of the most degraded environmental in the world and is paying a very heavy health and economic price for it. In this context this study examines the impact of housing environment on the health status of the rural households in Sivaganga District is undertaken.

Methods: The required data for this study were selected from 120 rural households in Thiruppuvanam Block to get a sample of 40 households from each of these three selected villages giving an area sample of Thiruppuvanam Block in Sivaganga District in Tamil Nadu, India.

Findings: Sixty-three percent of the respondents in general stated that the household waste was disposed in roadside because the garbage was not collected properly from the corporation people. Three-fourths of the respondents perceived that the waste water gets disposed through street in general. Sixty-eight per cent of the respondents stated that there was mosquito trouble in the locality, which was spelled out more by the respondents from Good Housing Environment (89 %) followed by Fair Housing Environment (69 %) and Poor Housing Environment (48 %). It shows that the drainage facility in the locality was not sufficient in the study area. Correlation result confirms that, housing environment has favourable effect on the health status of children, adult and aged persons.

Application: It becomes necessary to focus the underprivileged areas such as rural and slums, and underprivileged segments of the population such as children and aged. Therefore, the households falling under this category should be brought to the notice of the concerned authorities of various socio-economic and health development programmes.

Keywords: Environment, Drainage, Garbage, Health Status, Karaikudi, Sivaganga

1. Introduction

The environmental is which people live greatly influences this health. A degraded environment means a lower quality of life loss of productivity and higher health care costs. Environmental quality is an important direct and indirect determinant of human health deteriorating environmental conditions are a major contributory factor to poor health and quality of life and hinders sustainable development poor environmental quality is directly responsible for around 25% of all preventable ill health in the world today with diarrhea diseases and respiratory infections [1]. In [2] has recently released profiles of environmental burden of disease for 192 countries and these country problems provide on estimate of the health impact from three major risk factors unsafe water sanitation hygiene: Indoor air pollution from cooking fuel (or) solid fuel use and outdoor air pollution. India is totally home to one of the most degraded environmental in the world and is paying a very heavy health and economic price for it. According to recent estimates, premature death and illness due to major environmental health risks accounts for nearly 20% of the total burden of disease in India 18% of the total burden of disease in India such as diarrhea diseases; hepatitis, tropical cluster diseases and respiratory infections in tanks and children under the age of five.

A large part of this burden was the result of the death of infants and children refulgence 1 and 4 years of age [3]. Environmental health risks fall into two broad categories: Traditional hazards related to poverty and lack of development such as lack of safe waste inadequate sanitation and waste disposal indoor air pollution and vector born disease (for example) malaria [4]. Modern hazards caused by development that lacks environmental safeguards such as urban air pollution and exposure to agro – industrial chemicals and waste. Much of the disease burden in rural India is due to respiratory disorder, namely, asthma, bronchitis, tuberculosis and pneumonia. In low resource settings these diseases may be attributed to exposure to indoor air pollution, solid cooking fuels, poor housing conditions, biomass cooking fuel, low education, poor sanitation, mal nutrition, irregular medical treatment and the comparative high cost of drugs. In rural Tamilnadu, there is strong correlation between the economic status of the household and access to water supply and sanitation [5]. Thus among rural households, the poor suffer most severely from the health effects of a bad household environment.

So this number of factors in the household environment may influence health negatively, though lack of access to piped water and lack of sanitary facilities are often considered key indicators of in healthy housing, leading to high diseases burdens in rural areas. Factors such as high level of noise, poor indoor and outdoor air quality, inadequate refuse storage and collection facilities, poor food storage and preparation facilities, temperature extremes and high humidity, overcrowding, poor lighting inadequate or inappropriate construction material, building defects and pests may also influence health significantly. In this context this study tries to focus on “An Economic analysis of Housing Environment and Health Status of Rural Households in Sivaganga District of Tamilnadu” is undertaken.

1.1. Techniques of classifying the household environment and health status

Household environment is a major threat to human health. Poor households are characterized by poor sanitation, poor water supply, inadequate garbage disposal, and healthy indoor air pollution and overcrowding. Housing environment has been calculated from the score values assigned for living facilities, water facilities, sanitation facilities, drainage facilities and environmental protection measures. The actual overall score values are classified into three categories such as poor housing environment (less than mean-SD), fair housing environment (mean \pm SD) as limits, and good housing environment (more than mean + SD value).

Health status is measured in terms of incidence of morbidity or illness or disease. Health status may be strongly associated with age, gender and socio economic circumstances [6]. Health status is derived from the score values assigned for children, adult and aged persons’ air borne diseases, water borne diseases and non-communicable diseases. Calculating health status, the research classified the household members into no illness as ‘good’, any one illness as ‘fair’ and more than one illness as ‘poor’.

2. Method of study

The study was based on the primary data collected from a random sample of 120 households from Thiruppuvanam Block, Sivaganga district.

Table 1. Details of block wise rural population

Panchayat union	No. of Village	Total households	Total population	Density of population
Sivaganga	43	30,060	1,18,107	266
Kalayarkoil	43	27,891	1,07,458	157
Manamadurai	39	18,746	71,926	194
Thiruppuvanam	45	23,176	93,857	295
Ilayangudi	55	23,007	86,680	192
Tirupathur	40	20,034	79,629	226
Singampuneri	30	15,099	60,691	263
Sakkottai	26	16,270	66,357	204
Kallal	44	23,187	88,117	190
Devakottai	42	18,800	76,037	182
Kannankudi	17	7,265	29,764	127
S. Pudur	21	10,938	47,451	292

Source: www.census2011.co.in [7]

For the present micro level study, the unique feature of three-tier area sampling design were executed to get a random sample of 120 households from Thiruppuvanam block, Sivaganga District. The first stage of sampling involved in the selection of one block in Sivaganga District. According to census 2011, out 12 blocks in Sivaganga district, Thiruppuvanam block has been selected on the basis of high density of population. In second stage, on rural area of thiruppuvanam block, three villages were selected out of 45 villages, on the basis of highest number of households and population. The selected villages are Keeladi (5,140), Kondagai (3,921) and Kalugerkadai (3,897). In the third stage, from each of these selected three villages, a disproportionate stratified random sample of 40 households were selected so as to get 120 households in Thiruppuvanam block in Sivaganga District as shown in Table 1.

3. Objectives

The housing environment and health status among rural people is explored in the present paper by addressing the following three objectives: firstly to portray the socio-economic conditions of the sample households; secondly to identify the components of household environments of the sample households; thirdly to analysis the determinants of health status of the sample households and lastly to suggest suitable policy measures to improve the household environment and health status of rural households.

4. Results and Discussion

1. Housing environment details of sample households

This section deals with the socio-economic and demographic characteristics and the household environment of the respondents. Housing Environment has been calculated from the score values assigned for living facilities (9-18), water facilities (4-11), sanitation facilities (7-16), drainage facilities (1-6) and environmental protection measures (1-7). The actual overall score values for housing environment range from 29 to 52, and this score values are classified into three categories such as poor housing environment (PHE) for the score values of 29-34, with the score 34 is equal to one (less than mean-SD), fair housing environment (FHE) for score values of 35-43 with (mean \pm SD) as limits, and good housing environment (GHE) for score values of 44-52 with score 44 is equal to one (more than mean + SD value).

Table 2. Demographic and social characteristics of the sample households

Socio-Economic Characteristics	PHE (n=40)	FHE (n=45)	GHE (n=35)	Overall (N=120)
<i>Family composition</i>				
Children	31.1	19.0	21.6	102(23.9)
Adult	39.2	48.4	41.6	184(43.2)
Ageing	29.7	32.7	36.8	140(32.9)
<i>Marital status</i>				
Married	92.5	87.0	86.0	106(88.0)
Widowed	7.5	13.0	14.0	14(12.0)
<i>Religion</i>				
Hindu	85.0	82.0	80.0	99(83.0)
Christian	15.0	18.0	20.0	21(17.0)
<i>Caste</i>				
Backward Caste	7.5	24.0	17.0	20(17.0)
Most Backward Caste	85.0	45.0	66.0	77(64.0)
Scheduled Caste	7.5	31.0	17.0	23(19.0)
<i>Type of family</i>				
Nuclear	87.5	80.0	85.7	101(84.2)
Joint	12.5	20.0	14.3	19(15.8)
<i>Education</i>				
Illiterate	42.5	35.6	54.3	52(43.3)
Literate	57.5	64.4	45.7	68(56.7)
<i>Average years of Schooling</i>	5.2	5.7	4.2	5.1
<i>Average Household Income</i>	17945	17185	25025	20350

Source: Computed from primary data

Table 2 examines the demographic and economic characteristics of the respondents. It was found that one third school children (31.1%) were from poor housing environment (PHE) as compared to fair (19%) and good (21.6%) housing environments. There were more adult members in the fair housing environment (48.4%) followed by adult members in the GHE and (41.6%) and FHE (39.2%).

As far as the marital status of the respondents is concerned, the majority of the respondents were married (88%) as compared to widowed (12%). However, the married respondents were more from PHE (93%) and the widowed respondents were more from GHE (14%). When we see the social characteristics of the respondents in terms of their religion and caste, majority of them were from Hindu religion (83%) as compared to Christian (17%), which indicates the majority of the Hindus in Indian population. The percentage of Hindu respondents was more from PHE (85%) and that of Christians was more from GHE (20%). Most of the respondents were from Most Backward Caste (MBC) in general followed by Scheduled Caste/Scheduled Tribe (19%) and Backward Caste (17%). The social characteristics of the people differ by the type of family in which they live also. There has been a significant change in the family system of India due to inevitable processes in the society resulted through migration, urbanization, and globalization. It was found that majority of the respondents were from nuclear families (84%) as compared to joint families (16%). Educationally speaking, less than half of the respondents were illiterate (43%). The average number of years of schooling was 5.1 years in general. However, it was higher among respondents who were from FHE (5.7 years) followed by PHE (5.2 years) and GHE (4.3 years). Among the housing environment category, GHE household respondents were getting more income (Rs.25025) than other housing environment category.

Table 3. Details of living facilities of the sample households

Socio-Economic Characteristics	PHE (n=40)	FHE (n=45)	GHE (n=35)	Overall (N=120)
<i>House Type</i>				
Pucca	20.0	18.0	20.0	23(19.0)
Semi Pucca	5.0	16.0	17.0	15(13.0)
Kaccha	75.0	67.0	63.0	82(68.0)
<i>Kitchen Type</i>				
Indoor with Partition	25.0	17.8	22.9	26(21.7)
Indoor without Partition	42.5	20.0	11.4	30(25.0)
Separate Indoor Kitchen outside the House	7.5	6.7	20.0	13(10.8)
Open air Kitchen outside the House	25.0	55.6	45.7	51(42.5)
<i>Fuel Category</i>				
Wood	55.0	33.3	20.0	44(36.7)
Dung	7.5	8.9	5.7	9(7.5)
Kerosene	2.5	11.1	8.6	9(7.5)
Gas	35.0	46.7	65.7	58(48.3)
<i>Type of drinking water</i>				
Untreated water	82.5	66.7	62.9	85(70.8)
Treated /Boiled water	17.5	33.3	37.1	35(29.2)
<i>Type of Toilet</i>				
Open area	85.0	64.4	28.6	73(60.8)
Private Toilet	15.0	35.6	71.4	47(39.2)
<i>Disposal of household waste</i>				
Official dumps	2.5	2.2	2.9	3(2.5)
Collection point	22.5	31.1	42.9	38(31.7)
Road side	75	66.7	54.3	79(65.8)
<i>Disposal of waste water</i>				
Street	80.0	71.1	71.4	81(74.2)
Inside the kitchen garden	20.0	28.9	28.9	31(25.8)

Source: Computed from primary data

Table 3 shows the percentage distribution of respondents by their living facilities such as type of house, types of kitchen and fuel. It was found that more than two-thirds of respondents (68%) had kaccha houses in general. But it was more among respondents from PHE (75%) as generally expected. As far as the pucca houses are concerned, more or less same level is noticed among the respondents in all the three categories. It shows that the type of houses of the respondents exists irrespective of level of their housing environment.

More than half of the respondents' households were with open air kitchen outside the house. 43% of the respondents' households were with the open air-kitchen outside the house in general. It was more among respondents' households from FHE (56%). 48% of the respondents use gas as fuel in their households in general. 66% of the respondents' households from FHE use gas. In contrast to this fact, 55% of the respondents' Households from PHE used wood as fuel in their households.

As far as the drinking water concerned, the untreated drinking water facility was found among the 71% of the respondents' households in general which was in 83% of the households from PHE. It was found that about two-thirds of respondents used open area toilet by their locality (61%) in general. Use of open area toilet was more among the respondents from PHE (85%) as compared to the respondents from FHE (64%) and GHE (29%). The result was found that most of the respondents in general stated that the household waste was disposed in roadside, and the proportion of such respondents from PHE was higher followed by FHE and GHE (54%). It was found that about three-fourths of the respondents perceived that the waste water gets disposed through street in general. This perception has been observed by 74.2% of the respondents.

2. Health status details of the sample households

In this section deals with the health problems of the sample households portrayed under housing environment category. Health status has been calculated from the score value assigned for air borne diseases, water borne diseases and non-communicable diseases and the researcher give the score values from the household members into no illness as 'good', any one illness as 'fair' and more than one illness as 'poor' to calculate the health status. Health is an important component of human development.

Table 4. Details of health problems of the sample households

Details	Household Environment			
	PHE	FHE	GHE	Total
Health Problem				
Nil	21	66	91	178
Any 1 Problem	44	54	19	117
Any 2 Problems	36	24	9	69
Any 3 Problems	15	9	6	30
Air Borne Diseases				
Measles	5	4	--	9
Asthma	14	6	--	20
Tuberculosis	14	7	--	21
Blindness	9	5	--	14
Wheezing	8	4	--	12
Water Borne Diseases				
Cold/Fever	19	14	1	34
Diarrhea	9	3	--	12
Typhoid/Malaria	9	9	2	20
Jaundice	7	6	--	13
Air Borne Diseases				
Measles	5	4	--	9
Asthma	14	6	--	20
Tuberculosis	14	7	--	21
Blindness	9	5	--	14
Wheezing	8	4	--	12
Water Borne Diseases				
Cold/Fever	19	14	1	34
Diarrhea	9	3	--	12
Typhoid/Malaria	9	9	2	20
Jaundice	7	6	--	13
Non Communicable Diseases				
Diabetes	9	6	10	25
Blood Pressure	6	6	7	19

Source: Computed from primary data

The health status depends upon the number and type of health problems coupled with other factors which affect the household population. Health is an important component of human development. The health status depends upon the number and type of health problems coupled with other factors which affect the household population. Table 4 depicts the number of health problems of children, adult and the aged. The results from the table reveal that the household which had no health problems were more among all the categories of household population especially it was found more in GHE. It shows that more number of health problems is affected more from PHE due to their less economic affordability to health.

The respondents' household members were affected by the air-borne diseases such as measles, asthma, tuberculosis blindness, headiness, and wheezing. It was found that majority of them were affected by tuberculosis (21) followed by asthma (20), blindness (14), wheezing (12) and measles (9). It is remarkable that more household members from PHE were affected by air-borne diseases as compared to FHE and no one household member was affected from GHE. The number of respondents' household members affected by water-borne diseases such as cold/fever, diarrhea, typhoid, malaria and jaundice. It was found that majority of the household members were affected by cold/fever (34) followed by typhoid/malaria (20), jaundice (13) and diarrhea (12). Most of them from PHE (44) were affected by the water-borne diseases as compared to the respondents' household members from FHE (32) and GHE (3). The number of respondents' household members affected by non-communicable diseases such as diabetes and blood pressure. It is remarkable that majority of the GHE household members were affected by diabetes (10) blood-pressure (7) as compared to household members from FHE and PHE.

3. Correlation analysis for verifying first hypothesis

1. Objective

Housing environment has favorable influence on the health status of rural population.

2. Framework of analysis

The most common measure of correlation is the Karl Pearson product-moment coefficient of correlation (r). This measure expresses both the strength and direction of linear correlation. This is measured by the formula:

$$r = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{[N \sum X^2 - (\sum X)^2][N \sum Y^2 - (\sum Y)^2]}}$$

Where, r = Pearson correlation coefficient

N = Total number of pairs of X and Y

X = Score on the X variable

Y = Score on the Y variable

Correlation is a measure of relationship between two variables. With the objective to verify the relationship between the housing environment and health status of the children, adult and aged persons, the first hypothesis is formulated. In this hypotheses, wealth (x_1), Household income (x_2), Education (x_3), Family size (x_4), total score value of Housing environment (x_5) are X variables and Health status (y) is a Y variable are considered to perform the correlation analysis.

The Table 5 describes the results of correlation analysis. The Table shows that the housing environment and other variables have favorable influence on the health status of children, adult and aged persons. It implies that increasing the level of income, education and family size will leads to reduce the health problems of the children, adult and aged persons.

In case of household wealth, there is very low positive correlation with health status which is not significant. On the other hand, household income, mother's education and family size have low positive correlation with health status which is significant. It is interesting to note that in the level of housing environment, there is relatively higher positive correlation with health status and it is highly significant. Its values are 0.406 in children, 0.468 in adult, 0.327 in aged persons and 0.398 in overall.

Table 5. Correlation of health status with housing environment and other determinants

Category	Health Status			
	Children	Adult	Aged	Overall
Household Wealth (x_1)	0.002 (0.986)	0.036 (0.623)	0.104 (0.223)	0.047 (0.329)
Household Income (x_2)	0.245* (0.013)	0.207* (0.005)	0.575** (0.000)	0.099* (0.041)
Mother's Education (x_3)	0.197* (0.047)	0.322** (0.000)	0.436** (0.000)	0.329** (0.000)
Family Size (x_4)	-0.044 (0.661)	0.394** (0.000)	0.172* (0.042)	0.261** (0.000)
Housing Environment (x_5)	0.406** (0.000)	0.468** (0.000)	0.327** (0.000)	0.398** (0.000)

** . Correlation is significant at 0.01 level *Correlation is significant at 0.05 level

So in addition to household income, mother's education and family size variables and housing environment is found to be the most influencing factor on the health status of children, adult and aged persons. The results of the correlation analysis indicate that, aged person's household income (0.575) and education (0.436) are relatively higher correlation compared to children and adult persons. But regarding their family size, adult has higher correlation (0.394). It confirms the first hypothesis that, housing environment has favorable effect on the health status of children, adult and aged persons.

5. Summary and Conclusion

On the whole in rural setting of Thiruppuvanam block in Sivaganga District, Majority of them were from Hindu religion as compared to Christian, which indicates the majority of the Hindus in Indian population. As far as the marital status of the respondents is concerned, the majority of the respondents were married. More than four fifth of the respondents were from nuclear families as compared to joint families. Educationally speaking, less than half of the respondents were illiterate followed by literates and the average number of years of schooling was 5.1 years in general. Among the housing environment category, GHE household respondents were getting more income than other housing environment category. More than two-thirds of respondents had kuccha houses in general. But it was more among respondents from PHE as generally expected. Most of the respondents' households from GHE separate indoor kitchen outside the house, and gas as fuel. Most of the households used untreated water which requires sincere attention of the water facility and sanitary officers of the locality. Most of the respondents in general stated that the household waste was disposed in roadside, and the proportion of such respondents from PHE was higher.

Most of the adults are affected by health problems as they are mostly the bread-winners of the family, and they are affected more from PHE due to their less economic affordability to health. By their Air borne diseases, Majority of them were affected by tuberculosis followed by asthma and this is more from PHE. By their water borne diseases, Majority of the household members were affected by cold/fever followed by typhoid/malaria and this is mostly from PHE. Household income, mother's education and family size have low positive correlation with health status which is significant. It is interesting to note that in the level of housing environment, there is relatively higher positive correlation with health status and it is highly significant. It confirms that, housing environment has favourable effect on the health status of children, adult and aged persons.

It becomes necessary to focus the underprivileged areas such as rural and underprivileged segments of the population such as children and aged in various development programmes to ensure the sustainable development among all socio-economic segments of the population. The needy population such as illiterate, poor, rural, children, women and aged should be made aware of various development programmes by government and voluntary organizations at village, taluk, district, national and international levels to make the relation between socio-economic, demographic and health conditions, and the household environment smooth and constructive.

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