

COST OF SICKNESS AMONG PRE-SCHOOL CHILDREN IN SELECTED
RURAL AND URBAN AREAS

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A STUDY OF THE COST OF SICKNESS AMONG PRE - SCHOOL
CHILDREN IN SELECTED RURAL AND URBAN AREAS

I. INTRODUCTION

"What is development if it is not to better the lives of people? And how can their lives be bettered if they do not, as children receive such basic necessities as proper nutrition, access to health services, portable drinking water and an education that will enable them to realise their full potential and make a constructive contribution to their societies?" - WALDHIEM (1).

Children are the world's greatest resource. Hence Investment in child development is an investment for the future of the nation. However children in India are still struggling to have their needs fulfilled and because they are small and often malnourished, they do not always survive the struggle. Their life is hardest in the economic systems, where basic services like health; safe water and shelter are inadequate and funds to provide them are scarce. But something must be done because more than half of the deaths in developing countries occur among children under five years of age. It is because the needs of children must

be recognised and fulfilled that the United Nations had declared 1979 as the International Year of the Child. The aim of this declaration was to focus public attention on the plight of the child and to promote active changes to improve the quality of childhood. The welfare of children is closely linked to economic and social progress. By dedicating a year to the child, the United Nations hoped that ~~at~~ the nations of the world would recognise the rights of children and take action to ensure that all children enjoy their rights. One of the major reasons for the declaration of a special year for the child is that at least 350 million children in developing countries who are still without minimum basic services in health care, nutrition, education and water supply are remembered the National Plan. There are rapid and low cost ways of providing these basic services to the neediest children. Areas where the government services are still inadequate can be helped a great deal if the local communities can choose village level workers from among themselves to be trained to deliver simple basic services and provide the people with health care, sanitation, food and nutrition education, clean water and community education.

Malnutrition is attributed to poverty, poor food production, inequitable distribution and faulty consumption, ignorance

of the mothers about nutrition, various other economic and social factors and lacuna in the technological development. Malnutrition in the early years reduce, the productive capacity of the adults because it leads to stunted growth and mental retardation of the young. Malnutrition saps the energy and stamina which are essential for satisfactory work, it increases the chances of children becoming poor readers and poor writers. This leads to defects in neuro-intergrative functioning, school failures and subsequent subnormal adaptive abilities. This chain of events constitutes a vicious circle. Good health permits full participation in personal, family, social and political activities. On the other hand, ill-health increases the cost of living ~~of~~(1) reducing the availability of labour (2) impeding the productivity of employed workers and capital goods (3) wasteing current resources, particularly nutrients and (4) delaying (retarding) the development of natural resources.

To achieve the objectives of child health, the health of the community in general has to be adequately emphasised because the adults of today comprise the man power which is to be fit enough to earn and procure the needed services for the children. So far no study on the cost of health

have been done. To find out the cost of health, a hypothesis was framed that there is no significant difference in the mean cost of sickness prevailing among the rural pre-school children and urban pre-school children.

The objectives of the study were as follows:

1. To analyse the prevalence of diseases among pre-school children which may affect their future growth;
2. To make a study on the cost of sickness among the pre-school children;
3. To make a comparison between the cost of medical services among urban and rural children;
4. To know how far malnutrition leads to prevalence of sickness among pre-school children.

II. REVIEW OF LITERATURE

The Review of Literature is under the following headings:

- A. IMPORTANCE OF THE CHILD
- B. THE PRE-SCHOOL CHILD
- C. HEALTH AND NUTRITIONAL STATUS OF CHILDREN
- D. THE EXTENT OF INFANT MORTALITY
- E. CAUSES OF INFANT MORTALITY
- F. MALNUTRITION AND CHILD HEALTH
- G. EXTENT OF MALNUTRITION
- H. REASONS FOR MALNUTRITION
- I. TYPES OF DISEASES
- J. IMPORTANCE OF BREAST FEEDING
- K. IMPORTANCE OF GOOD NUTRITION
- L. STUDIES UNDERTAKEN

II. REVIEW OF LITERATURE

The Review of literature is under the following headings:

I. IMPORTANCE OF THE CHILD:

The child of today is the Citizen, Parent, Leader, and Ruler of tomorrow. The Environment provided to him at each stage of his growth and development will determine what sort of a man he will become. It is because the needs of children must be recognised and must be fulfilled - that the United Nations has declared 1979 the International Year of the Child. The year has truly helped to review and re-affirm the concern of the United Nations and its member countries for the present conditions and future well being of the children of all Nations. The first and foremost role that every person should play is to be conscious of the rights of children, their problems, their vulnerability and their birth rights of love, affection and security which are being denied to them frequently. Millions of children are crying

out for the fulfillment of their basic privileges and the need for better life. According to the 1971 census of India, 228 million children were below the poverty line and among whom 186 million live in the villages. Childhood being the foundation period of life, a healthy beginning, and a positive direction need to be given by the parents, teachers and community. Children are buds that are on the threshold of blossoming into lovely flowers filling the air with their sweet fragrance. If we deny them the basic amenities of life, the buds will not blossom, but will wilt and dry.

" A child is a person who is going to carry on what you have started. He is going to sit where you are sitting, and when you are gone, attend to those things which you think are important. You may adopt all the policies you please; but how they are carried out depends on him. He will assume control of your Cities, States and Nations. He is going to move in, and take over your Churches, Schools, Universities and Corporations. All your books are going to be judged, praised or condemned by him. The fate of humanity is in his hands. "

-: ABRAHAM LINCOLN.....:

B. THE PRE - SCHOOL CHILD 'The Child in need'

The child in need in India is the pre-school child. He belongs to either a low ^socio-economic status or low nutrition status or both.

Children in the age group zero to four years constitute 14.4 per cent of the population as against about less than 10 per cent in the advanced nations. Thus the age composition of pre-school children in India is unfavourable from the nutritional and health care point of view as they constitute the most vulnerable segment of the population.

C. HEALTH AND NUTRITIONAL STATUS OF CHILDREN:

Children in the underprivileged sections are in a deplorable state of deprivation. They face every day lack of nutritious food, health care, sanitary environment, education and all that goes to make a childhood a strong base for the future. Dr.H.Mahler, Director General of World Health Organisation, in his message for the World Health Day has observed that the early years in a child's life are crucial in laying

the foundation of good health and improving the quality of life. Making a pointed reference to the high rate of infant mortality in the developing world, Mahler observed that though this human loss was colossal in itself, the prospects for the large number of survivors were also bleak because of the adverse environmental conditions prevailing in a large section of the world. Due to such conditions they will not enjoy fruits of good health or develop their full human potential.

The most formidable obstacles to Social progress are (a) disease, (b) ignorance and (c) poverty. These perpetuate themselves in forming a very tragic circle. The circle cannot be broken by an attack on one front alone; a concerted attack must be made on the whole. In most parts of the world, programmes of Health Education, Nutrition and Community Development are organised in a vertical fashion. There should be collaboration and co-ordination between the various agencies in developing a package of services for the people.

D. THE EXTENT OF INFANT MORTALITY:

In the developing regions of the World, the infant mortality is about 140 to 200 per 1000 live births as compared to only 9.6 to 27 per cent in developed countries. Thus the

difference in infant mortality between developed and developing countries is 5 to 20 times. In India, the infant mortality rate is 122 per 1000 live births; 40 per cent of all the deaths in India occur among children below 5 years of age. Every month, approximately 1,00,000 children die as a result of malnutrition. Of all the infant deaths, 30 per cent occur within one week of birth, 20 per cent between one week to one month, 27 per cent between one to six months and 23 per cent between six to twelve months. In the lowest age group (zero to 12 months) 50 per cent of deaths are due to dysentery, diarrhoea, respiratory disease and gastro-intestinal disorders. In the 1 to 4 years group, mortality seems to be specifically related to respiratory, digestive and parasitic diseases. These, in turn, are aggravated by poor environmental sanitation, over crowded living conditions and malnutrition for all or which poverty and ignorance are at the root. Ignorance or simple health precautions take a heavy toll.

E. CAUSES OF INFANT MORTALITY:

Infantile diarrhoeas, dysenteries and other diseases related to unhygienic conditions are the principal causes of infant mortality. Furthermore, infants like older children are

susceptible not only to childhood diseases but to most of the infectious diseases that threatens adults. Communicable diseases are the major causes of morbidity and mortality among children. The spectrum of communicable disease is so wide that only a combination of measures can control even a few of the most serious disorders. Pertussis is still epidemic and one of the principal causes of death among infants and children. (Park 1972). A study from West Bengal gave a mortality rate of 0.005 per 1000 population per year (Saha 1966) Diphtheria is highly prevalent in a survey in Bombay demonstrated that 70 per cent of children were affected indicating early infection and 5.5 per cent children were carriers (Bhayan 1967). As estimated 1.4 million infants and children die from cholera, diarrhoeal diseases in the country annually. An epidemic type of Hepatitis in Delhi (1955 to 1956) produced 40000 cases in 6 weeks. Typhoid is still widespread with an incidence of between one and 22 per 1000 population per year (Patnik, 1967). The only vaccines available against respiratory infections, and which can be contemplated for use in India within the foreseeable future, are those against smallpox, tuberculosis, diphtheria, pertussis and possibly measles. Others available are too expensive for large scale use, and no vaccines exist against the majority of the multiplicity of viral respiratory diseases of childhood.

F. MALNUTRITION AND CHILD HEALTH:

Malnutrition is attributed to poverty, poor food production, inequitable distribution and faulty consumption, ignorance of the mothers about nutrition and various other economic and social factors and lacunae in technological development. Malnutrition in the early years reduce the productive capacity of the adults because it leads to stunted growth and mental retardation of the young. Malnutrition saps the energy and stamina which are essential for satisfactory work. It increases the chances of children becoming poor readers and poor writers. These lead to defects in neurointegrative functioning, school failures and subsequent sub-normal adaptive abilities. This chain of events constitutes a vicious circle.

G. EXTENT OF MALNUTRITION:

Malnutrition amongst Indian children remains one of the two main killers of childhood (the other being diarrhoea). It is a social disease, which can only be tackled by nutrition education of the people, study of local foods and realising the cost of malnutrition. Malnutrition affects nearly half of all children below the age of 5 years. 17.4 to 18.9 per cent are suffering from varying degrees of energy-protein-malnutrition.

H. REASONS FOR MALNUTRITION:

It is mainly because of the structure of the society itself that limits its capacity to obtain basic needs for many of its members. Ignorance is in many cases the most important cause of malnutrition, particularly in the case of small children whose mothers do not know how to feed them properly. Another important factor responsible for malnutrition in small children is due to common infectious diseases resulting from an unsanitary environment, among them diarrhoeal diseases, measles, whooping cough, malaria and tuberculosis. The solution to nutritional problem is to increase the food production and ensure its equitable distribution. The total cost of malnutrition, to a nation is made up of a number of components, some evident and others not so evident. The cost of treating clinical malnutrition includes the cost of drugs, hospitalisation, transportation and food, cost of treatment of diseases and the invisible cost of loss of income to the family, when attending to the sick child during hospitalisation.

I. TYPES OF DISEASES:

The diseases of childhood are of two types:

1. Deficiency diseases and
2. Infectious diseases.

Deficiency Diseases:

<u>Disease</u>	<u>Symptoms & Causes</u>	<u>Results</u>
1. Iron deficiency anaemia:	Inadequate intake of iron.	Growth will be retarded
2. Vitamin A Deficiency	Inadequate availability of foods rich in vitamin A	The child will not be healthy & will be affected by blindness
3. Pellagra	Low contents of the amino-acid tryptophane which is a precursor for the vitamin nicotinic acid in the body	It affects its victims with severe skin & digestive disturbances it can even cause mental deterioration.
4. Fluorosis	Excessive intake of flouride through water, flourides have a predilection for teeth where they get deposited and lead to physical inabilities	Physical inability

5. Vitamin C
deficiency

It causes scurvy. Scurvy
People ~~scurvy~~ who
cannot get fresh
fruits & vegetables
suffer from this
disease.

Infectious diseases:

<u>Disease</u>	<u>Symptoms & Causes</u>	<u>Results.</u>
1. Diphtheria	It is due to bacterial germs which lodge usually at the back of the throat forming a white membrane & this may spread to the windpipe obstructing breathing in the child	Health will be affected & breathing will be difficult.
2. Whooping Cough	It is highly contagious from child to child spreading by droplets from coughing especially in the early stages.	The child begins to have troublesome fits of coughing during which the face reddens and the child may vomit.
3. Smallpox	It appears after 2 or 3 days of fever. it is first seen on the face as small raised pimples slightly reddish.	It results in fever headache, vomiting & the child should be isolated absolute

4. Chickenpox

This is due to different bacterian germs through the eruption, ^{which} resembles smallpox

The disease is mild. The health of the child will be affected

5. Measles

This is a highly contagious disease caused by a virus which begins with symptoms suggesting an ordinary fever or feverish cold, running nose, watery eyes & cough.

Health will be affected & Proper treatment should be given

6. Infantile Paralysis

This is a short illness of vague fever followed by paralysis of some of the muscles in the body.

The child finds it difficult to use one or both arms or legs or some individual muscles.

7. Diarrhoea

This is due to mumps gaining entrance to the babies digestive tract through the feeds.

The child will become weak and the feeds have to be protected specially carefully from flies and contamination by unclean hands and the feeding utensils must be sterilised.

J. IMPORTANCE OF BREAST - FEEDING:

In most parts of India, infants, after birth, are breast - fed. This practice has great health significance and contributes much to the survival of the children in the very poor conditions in which they live. For atleast, their first 3 to 4 months of life, they receive from the milk the best possible nourishment and in addition protection against the common infections, particularly from the deadly diarrhoeal diseases ^{to} which they are heavily disposed. Unfortunately the practice of breast-feeding is rapidly declining, particularly in the poor urban areas, but also among some rural populations. This is a result of changes in the structure of societies and of the influence of culture and values of the industrialised world. The consequences are disastrous. Weaning is a critical period and during that period breast milk is not sufficient to satisfy the nutritional requirement of the child and other foods must be added. Children are very often deprived of the additional food they need. The result is that their growth starts to slow down, they become apathetic, react less to social and psychological stimuli and are more susceptible to infectious diseases and all manifestations of chronic mal-

nutrition. Recent works on breastfeeding have also established that mothers supply of milk to the baby makes it immune against a number of diseases of childhood - Gastro-intestinal, respiratory and general infection. It has also been pointed out by workers on breast milk that artificial milk paves the way to obesity which results in diabetes, hyperpiesis and coronary thrombosis in adult life.

K. IMPORTANCE OF GOOD NUTRITION:

Children below 5 years constitute over 15% of the Indian population. The nutritional status of such a vast segment of the population cannot be ensured through state sponsored feeding programmes. Even if special feeding programmes for pre-school children are organised, if the economic conditions of the family are so poor that the diets of other members in the family are highly inadequate, then the so called supplements will become substitutes either partly or wholly. The need for supplementary feeding programmes for pre-school children will be in inverse proportion to our success in the matter of removal of socio-economic disparities and improvement of economic and living standards of our people. The feeding programmes by themselves cannot bring about any significant transformation in

in the nutritional status of the community unless it is accompanied by environmental sanitation and transformation in the nutritional status of the community. The high incidence of water-borne gastrointestinal infections common among children serve as a conditioning factor in precipitating nutritional deficiencies. The nutrition experts groups of India has discussed the nutritional requirements of both adults and children of different age groups.

A Pre - School child requires:

Protein	(g)	:	17 to 22
Calcium	(g)	:	0.4 to 0.5
Iron	(mg)	:	15 to 20
Vitamin A	(Iu)	:	2,000 to 2,400
Thiamin	(mg)	:	0.6 to 0.8
Riboflavin	(mg)	:	0.7 to 0.8
Folic acid	(mg)	:	50 to 100
Vitamin B12	(mg)	:	0.5 to 1.9
Vitamin C	(mg)	:	30 to 50
Vitamin D	(iu)	:	200
Calories		:	1,200 to 1,500

These can be supplied by	Gm.
Gereals	: 150 to 200
Pulses	: 50 to 60
Green leafy vegetables	: 50 to 75
Other vegetables & roots	: 30 to 50
Fruits	: 50
Milk	: 300 to 300
Fats and oils	: 20 to 25
Meat, Fish or Eggs	: 30
Sugar	: 30

L. STUDIES UNDERTAKEN:

1. Relevance of Small Family to Health and Happiness:

Malnutrition and population growth are interrelated. Family size affects inversely the nutritional status. Studies on the Nutritional Status and Mental Ability of Children of Pre-school Age by Devadas et al (1972, 1973) have reported higher number of malnourished children among larger families than in smaller families. Devadas (1974) studied the family size; calorie and protein intake and nutritional status of

125 children with reference to their height and weight and clinical picture. The study revealed that children from small size families (below 5) had a better nutritional status than children from larger families (above 5).

2. ICMR instituted a country-wide survey to assess the diet intake and nutritional status of rural pre-school children, among whom malnutrition is widely prevalent, which were conducted at 6 different centres - Calcutta, Poona, Vellore, Hyderabad, Bombay and Delhi. Datas were collected using proper statistical methods by workers specially trained in techniques of diet and nutritional surveys. Also information on food intake of children was collected by directly questioning the mother about the food consumed by children.

Result:

The dietary intake of protein appeared to be adequate to meet the recommended allowances of ICMR, 1.75 g. per kg. of body weight, the intake was actually 1.9 g. per kg. The intake of calorie falls far short of recommended allowances of 1.200 even on the basis of existing body weight. The intake was

84 calories per kg., 810 calories per day. The diets of children were found to be inadequate with respect to vitamins and minerals - particularly riboflavin, ascorbic acid, vitamin A, iron and calcium. In order to examine the adequacy of protein of diets, the NDP calories percentage is calculated which indicates the protein content and protein quality of the diet in relation to its calorie content. In all the six areas the NDP was found to be above the value of 4, which is the recommended allowance indicating that the protein intake was adequate.

3. The nutrition Research Laboratories of Coonoor, India during 1955 to 1957 examined 4,536 children of pre-school age in 10 regions of South India. They were chosen from families having less than 100 rupees (21 dollars at that time) monthly income per family. Height and weight measurements showed an extreme retardation in growth. A positive history of recurrent diarrhoea was obtained from 25 per cent of the children examined, and various smaller percentages for other clinical signs of malnutrition. Frank Kwashiorkor^{KOR} cases are supposed to be sent to the hospital and constituted 5 to 16 per cent of the paediatrics in patient admission. The survey examined children at home whom it found nearly 1 per cent to be cases of kwashiorkor and 1.7

per cent to be cases of advanced marasmus. They were at their home without any medical attention. Taking the incidence of kwashiorkor at its lowest, at 1 per cent the region with its population of 95 million would have 120,000 frank cases of kwashiorkor at any given time.

4. A study made by L'Organisme de Recherches sur l'Alimentation et la nutrition Africains of the villages of Pampinquine in Senegal, Western Africa, showed incidence of kwashiorkor in 28 per cent of the zero to 1 year olds, and 53 per cent of the 1 to 2 year olds. Signs of other deficiencies were found in 2 to 10 per cent of the children. Dietary studies were interpreted as showing a deficiency of 6 per cent in calories and 50 per cent in protein. The daily intake of protein was 7 g.

5. A recent study carried out by The National Institute of Nutrition, Hyderabad, covering over 15,000 rural households spread over 9 states of the Indian Union showed that the per capital income was less than 1 rupee a day in over 40 per cent of the rural households with such low levels of income, even if 75 per cent of that income is spent on food, it will be impossible for the families to feed themselves adequately.

The surveys revealed marked dietary inadequacy and evidence of widespread malnutrition both in children and adults.

6. Nutrition and Resistance to Infection:

Duffer and Sernaw (1973) in their study on 'Patterns of mortality in childhood' in Latin America noted that among children under 5, nutritional deficiency was associated with 61 per cent of deaths from infectious disease, compared with only 33 per cent of deaths from other causes.

7. From the Punjab and Guatemala, Scrimshaw et al (1963) reported that severely malnourished children had 4 times as many episodes of diarrhoea as their adequately nourished counterparts. After reviewing measles in many countries, Morley (1973) estimated that the malnourished child may have mortality upto 400 times higher than his well nourished contemporaries. Malnourished measles cases continue to excrete giant cells much larger (8 to 28 days) than adequately nourished patients (1 to 8 days) and consequently are probably infectious for much longer (Scheifele, 1972). Their malnutrition is a danger to themselves and others.

6. A semi-longitudinal intensive study, intended primarily to study the relationship between growth and health in a sample of pre-school children in Newcastle during the year 1968 to 1971. All the children were under observation at frequent intervals and qualitative information on food pattern during infancy and weaning was obtained. Families were recruited from 3 General Medical Practices, one in a prosperous residential area and the other two in postwar housing estates. The sample was deliberately biased to include an excess of families from the upper and the lower ends of the socio - economic spectrum.

M. PROGRAMMES FOR CHILDREN:

The various programmes for children are as follows:

1. Special Nutrition Feeding Programme for Pre - School Children:

The programme of Union Social Welfare Department for feeding of pre-school children in urban slums and tribal areas was taken up in 1970 - 71 as part of new initiative announced by the Prime Minister in her budget speech in 1970 / 71. It was envisaged that the nutritious foods would be supplied

under the scheme in 1970/71 for 6.5 lakhs children in the age group zero to 3 years. The benefits of the programme were extended to children in the age group zero to 6 years as well as pregnant women and nursing mothers during 1971/72. The supplements consists of 300 calories, and 10 to 15 gms of protein for children and 500 calories and 25 gms, Protein for pregnant women and nursing mothers. The scheme proposed periodical medical check up for beneficiary children. Along with feeding, efforts are made to undertake immunisation of beneficiaries. Improvement in the appearance of children and haemoglobin content of their blood and weight would be assessed from time to time. In tribal areas, locally produced foods and gift foods are used. As CARE gift commodities are in use widely in many areas, cost of food on an average has been estimated to be within 22 paise per beneficiary per day. So far about 33 lakhs beneficiaries have been covered under this scheme. There are about 26,000 feeding centres operating in the country under this programme today.

2. Applied Nutrition Programme:

The ANP is primarily an educational effort and aims to develop progressively a co-ordinated and comprehensive national programme of education and training in Applied Nutrition

and related subjects with the object of establishing in effect a field service to improve local diets through the production, preservation and use of protective foods. A provision of Rs.10 crores has been made in the IV five year plan for the setting up of 450 new additional blocks under this programme. It is estimated that by September, 1972, about 335 ANP blocks have been set up under this programme. Under this scheme, feeding is carried out at balwadis, health centres, mahila mandal buildings or ~~smi~~^{mi}far centres. At the state level, usually the department of community development is responsible for implementing the programme.

3. Composite Nutrition Programme:

Realising that the ANP and the Family and Child Welfare Programme would be able to cover only limited area during the IV five year plan the composite nutrition programme was initiated to cover the residuary area. The core of this programme is Nutrition Education and its particular application is through Demonstration Feeding. The programme is to be implemented by State Governments through official and non-official agencies. The programme has 5 components - (a) Nutrition education through mahila mandal; (b) Strengthening the supervisory machinery for Womens Programme; (c) Encouragement of Economic

activities of Mahila Mandels; (d) Training of Associate Women Workers and (c) Demonstration Feeding.

4. Family and Child Welfare Programme:

This programme was introduced in 1967/68 as a centrally sponsored scheme and had its focus on health and nutritional care of pre-school children in rural areas besides education of mothers and young women in child care and home management. By the end of the IV Plan, 51000 children are expected to be covered under this scheme.

5. Feeding Children through Balwadis:

Services for pre-school children include regular health check up, immunisation against contagious diseases, supplementary feeding, habit formation and socialisation through games and recreation. A provision of 15 paise per child per day has been made for meeting food expenses under the programme. Allowing for fuel and other items to be supplied through local contribution, total costs per child per day of the food is expected to be around 25 paise. Supervision of balwadis is undertaken by officers of State Social Welfare Boards.

Suggestions for Improvement:

The Committee on pre-school feeding programme after a review of the special nutrition feeding programmes implemented in various states have suggested various improvements. (1) Immunisation programme for children and supply of drinking water could be adequately provided (2) Adequate space and shelter for feeding programme will have to be properly ensured at feeding centres (3) Organisational machinery at ground level will have to be evolved to implement the programme without interruption. (4) Effective supervision, guidance and follow-up at different levels will have to ^{be} ensured for this programme and (5) there is need for bringing together literates on health care, nutrition and other related aspects, which could be utilised by the workers in the field.

Governmental Steps:

The direction and guidance provided by the Health Survey and Development Committee (Bhore Committee 1946) and the Health Survey of Planning Committee (Mudaliar Committee 1961) have provided the chief basis of health planning in India.

The V Plan tried to provide minimum public health facilities integrated with family welfare and nutrition for vulnerable groups - children, pregnant women and nursing mothers. The accent of the scheme during the period has been on - (1) increasing the accessibility of health services to rural areas (2) intensification of the control and eradication of communicable diseases, especially smallpox, malaria, leprosy etc., (3) Qualitative improvement in education and training of health personnel and (4) attempts to develop referral services by providing special attention to common diseases in rural areas. Under the Minimum Needs Programme it is proposed to extend the physical infrastructure in the rural areas through establishment of additional sub-centres so as to achieve the norm of one sub-centre for 5000 population by 1987/88. Additional multi-purpose works would be provided wherever there are shortages and norm of one male and one female multipurpose worker for 5000 population would be achieved. The allocation made for rural health programme during the plan is Rs.490 crores or nearly 1/3rd of the total as against Rs.120 crores provided in Vth Plan (1974/79). Establishment, construction and maintenance of family welfare centres and maintenance of sub-centres under the family welfare programme for which a sum of Rs.26,200 crores has been provided.

HEALTH PROGRAMMEPLAN OUT - LAY 1978 - 83

S.No.	Programmes	V Plan 1974 - 79	Suggested outlays for 1978 - 83
		(in crores)	(in crores)
1.	Rural Health Programme	120.30	490.00
2.	Control or communicable diseases	265.09	450.00
3.	Hospitals and dispensaries	132.75	150.00
4.	Medical education & research	91.91	114.00
5.	Training Programmes	19.25	25.00
6.	Indigenous system of medicine and Homeopathy	25.07	60.00
7.	Other programmes	<u>27.27</u>	<u>30.00</u>
	Total	681.64	1319.00
	Employees State Insurance Scheme		<u>11.00</u>
	Grand total	681.64	1330.00

OUT - LAY FOR NUTRITION

S.No.	Programme	V Plan 1974- 79	Suggested Out - lays for 1978-83
		(Rs. in crores)	(Rs. in crores)
1.	Nutrition Schemes of Department of Food	14.50	25.00
2.	Applied Nutrition Programme	12.99	21.60
3.	Supplementary Feeding Pro- gramme	<u>88.18</u>	<u>127.90</u>
	Total	115.67	174.50

Currently a primary health centre serves a population of one lakh and a sub-centre serves 10,000. The revised norm suggested 1 PHC for 50,000 people, and 1 Sub-centre for 5000 people. The system is expected to increase per capita availability of drugs. Drugs are supposed to be supplied free to all patients irrespective of economic status and consultation.

Prescription, home visits and referrals to higher levels of hospitals are also supposed to be free. The system must be referred to ensure that they caters mainly to the low income population. The Medical Association can play a vital role in generating greater empathy for the poor among their members.

III EXPERIMENTAL PROCEDURE

The Experimental Procedure was analysed under the following headings:

1. Selection of Area
2. Selection of Samples
3. Collection of Data
4. Construction of Questionnaire
5. Hypothesis Framed
6. Statistical Tools Applied

1. SELECTION OF AREA:

For this study the place selected in the urban area was Ranalingam Colony and the rural area was Machampalayam. The places were selected because of easy access for the Investigator.

2. SELECTION OF SAMPLES:

The number of samples in the urban area was 50 and for Rural area also it was 50. The houses were selected

with the same income level and with a sick child

3. Collection of Data:

Datas can be generally classified into either primary or secondary. The Primary data is the information which has originated directly as a result of the particular problem under investigation. Secondary data refers to the data which already existed and may be used for investigation but has not been collected for that specific purpose. Primary data was collected for this study. The people were contacted directly for collection of data.

4. CONSTRUCTION OF QUESTIONNAIRE :

A Questionnaire was constructed for collection of information from the people. The Questionnaire contains questions with a broad coverage of different aspects about pre-school child and the cost of sickness. The Questionnaire was drafted after consulting the faculty. It was pilot tested with some of the people and suitable modification effected.

5. HYPOTHESIS FRAMED:

There was no difference in the mean cost of sickness among pre-school children in Rural and Urban areas.

6. STATISTICAL TOOLS APPLIED:

The Statistical Tools Applied are correlation coefficient method, χ^2 test and standard error method.

IV RESULTS AND DISCUSSIONS

The Results and Discussions includes the details regarding the following:

- A. Background Information of the Rural and Urban Areas
- B. Background Information regarding the Sample
- C. Age Composition
- D. Sex Composition
- E. Educational Level of the Parents
- F. Occupational Pattern of the Parents
- G. Income Pattern
- H. Health Background of the Sick Child
- I. Prevalence of Diseases
- J. Immunisation
- K. Breast - feeding
- L. Feeding Practices Followed
- M. Environmental Sanitation, Household cleanliness and Personal Hygiene
- N. Percentage of Food Expenditure to Total Expenditure for the child
- O. Methods adopted to Treat the Sick child.

P. Sickness Expenditure

Q. Peoples Opinion

A. BACKGROUND INFORMATION OF THE RURAL AND URBAN AREAS

Machampalayam Village which is situated 3 miles from Coimbatore was selected as a Rural area and Ramalingam Colony which is situated near our college was selected as the Urban area to collection information regarding the cost of sickness among Pre-school children. The village, Machampalayam was selected because it is characterised as a typical village, which is backward economically and socially. Ramalingam Colony was selected because it is a nearby Urban Area where the facilities are available.

B. BACKGROUND INFORMATION REGARDING THE SAMPLE :

50 samples were selected in Machampalayam and 50 samples in Ramalingam Colony. The samples were selected in such a way that the Income of the family were below Rs.1,500/-. In each family only one sick child was taken into consideration.

Table I given below shows the family background of the sample selected in Urban and Rural Areas

T A B L E I
FAMILY BACKGROUND.

	URBAN		RURAL	
	Number	%	Number	%
Nuclear	45	90	43	86
Joint	5	10	7	14
	50	100		100

The survey includes 50 families in the Urban area and 50 families in the Rural Area. In the Urban area 90 per cent of the families were of nuclear type and 10 per cent were of joint type while in the Rural Area, 86 per cent were of nuclear type and the rest 14 per cent of joint type.

C. AGE COMPOSITION

The following Table II indicates the age composition of the sample families in the rural and urban areas.

TABLE II
AGE COMPOSITION

Age in Years	URBAN		RURAL	
	Number	%	Number	%
0 - 5	82	30.82	72	26.37
5 - 10	35	13.15	37	13.55
10 - 20	26	9.77	28	10.25
20 - 30	47	17.66	66	24.17
30 - 40	52	19.54	35	12.82
40 - 50	10	3.75	18	6.59
50 - 60	10	3.75	13	4.76
Above 60	4	1.50	4	1.46
		100.00		100.00

The age group 0 to 5 constituted the maximum in both the Urban and Rural areas.¹

D. SEX COMPOSITION:

The following table III depicts the Sex Composition of the Rural and Urban Areas.

TABLE III
SEX COMPOSITION

	Urban		Rural	
	Number	%	Number	%
Male	23	46	25	50
Female	27	54	25	50
		100		100

Regarding the Sex Composition 50 per cent were males and 50 per cent were females in the Rural Area and 46 per cent were males and 54 per cent were females in the Urban Area.

E. EDUCATIONAL LEVEL OF THE PARENTS:

The following table IV shows the Educational Level of parents in the Rural and Urban Area.

EDUCATIONAL LEVEL OF THE PARENTS

EDUCATIONAL LEVEL	URBAN %	RURAL %
Literates	64.13	61.43
Illiterates	<u>35.87</u>	<u>38.57</u>
	100.00	100.00

Illiterates formed the minority in both the rural and urban areas. It was also found that among the educated families the prevalence of disease was 30 per cent in the Urban and 45 per cent in the Rural area compared to 70 per cent in the Urban area and 55 per cent in the rural area in the non-educated families. This shows that education does exert a favourable influence on the health of the family

F. OCCUPATIONAL PATTERN OF THE PARENTS:

The following table V depicts the occupational pattern of the parents.

TABLE V
OCCUPATIONAL PATTERN

OCCUPATION	Urban		Rural	
	Number	%	Number	%
Skilled workers	12	16.66	44	67.68
Professionals	29	43.96	4	6.18
Unskilled workers	4	6.05	5	12.30
Self employed	22	33.33	9	13.84
		100.00		100.00

It was found that professionals ~~form~~^{form} the majority in the Urban area and skilled workers form the majority in the Rural area.

G. INCOME PATTERN:

Table XI shows the income pattern of the families in the Rural and Urban area.

TABLE VI
INCOME PATTERN

Income in Rupees.	Urban		Rural	
	Number	%	Number	%
0 - 200	1	2.00	-	-
200 - 400	4	8.00	6	12.00
400 - 600	13	26.00	23	46.00
600 - 800	8	16.00	12	24.00
800 - 1000	17	34.00	4	8.00
1000 - 1200	1	2.00	1	2.00
1200 - 1400	5	10.00	2	4.00
1400 - 1600	1	2.00	2	4.00
		100.00		100.00

In the Urban area, 34 per cent of the people earned income in the range of Rs.800 to 1000, while in the Rural area,

the majority earned incomes ranging from Rs.400 to 600.

While analysing the relationship between Income and cost of sickness, the co-efficient of correlation method was adopted for both Urban and Rural areas.

Result: Urban Area $r = .5000$

Rural Area $r = .5951$

(The calculations are given in the Appendix I)

In order to find out the relationship between the size of the family and cost of sickness the correlation co-efficient method was applied. The size of the family was divided into families with less than 4 members and families with more than 4 members (calculation in Appendix II).

Result:

	<u>Urban</u>	<u>Rural</u>
Size of the family with more than 4 members	$r = -.099$.5110
Size of the family with less than 4 members	$r = .4818$.3569

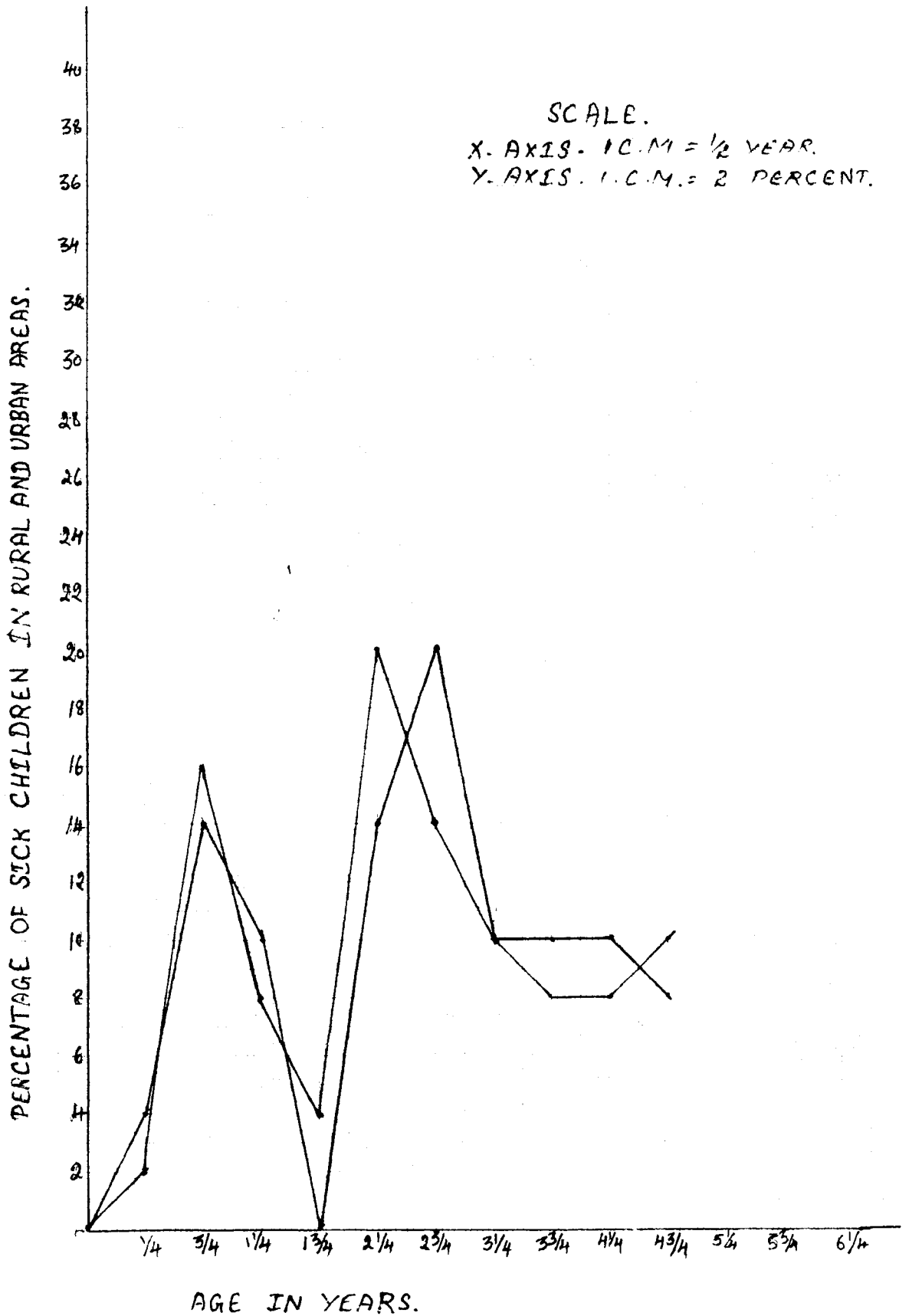
H. HEALTH BACKGROUND OF THE SICK CHILD:

The table VII indicates the Health Background of the Sick Child in Rural and Urban areas.

TABLE VII
HEALTH BACKGROUND OF THE SICK CHILD

Age in Years	Urban		Rural	
	Number	%	Number	%
0 - ½	1	2.00	2	4.00
½ - 1	8	16.00	7	14.00
1 - 1½	4	8.00	5	10.00
1½ - 2	2	4.00	-	-
2 - 2½	10	20.00	7	14.00
2½ - 3	7	14.00	10	20.00
3 - 3½	5	10.00	5	10.00
3½ - 4	4	8.00	5	10.00
4 - 4½	4	8.00	5	10.00
4½ - 5	5	<u>10.00</u>	4	<u>8.00</u>
		100.00		100.00

AGE AND SICKNESS.



While analysing the health background of the sick child, the survey showed that the age group 2 - 3 was vulnerable. The frequency of sickness at that age in both the Urban and Rural areas was high and this has been depicted graphically in figure I.

I. PREVALENCE OF DISEASES:

The following table VIII indicates the type of diseases that are prevalent in Rural and Urban Area.

TABLE VIII
PREVALENCE OF DISEASES

Name Number of the Diseases	Urban		Rural	
	Number	%	Number	%
Tonsils	2	4.00	1	2.00
Tuberculosis	7	14.00	8	16.00
Asthma	1	2.00	-	-
Akki	-	-	3	6.00
Typhoid	1	2.00	2	4.00
Polio	4	8.00	6	12.00
Whooping cough	2	4.00	10	20.00
Jaundice	2	4.00	1	2.00
Diphtheria	3	6.00	2	4.00
Fitz	5	10.00	6	12.00
Diarrhoea	23	<u>46.00</u>	10	<u>20.00</u>
		100.00		100.00

An attempt was made ^{to} analyse the types of diseases that are prevalent in the selected areas. Deficiency diseases accounted for 30 per cent of the diseases in the urban area and 25 per cent in the rural area. Infectious diseases accounted for 70 and 75 per cent in the urban and rural areas respectively. Diarrhoea was prevalent commonly in both the areas in large numbers, 46 per cent in urban area and 20 per cent in Rural area.

J. IMMUNISATION:

While taking into account the success of immunisation in controlling diseases, the survey showed that urban people immunised their children without any hesitation. The percentage of the people immunised was less in the rural area compared to urban area. To find out the effectiveness of immunisation on the prevalence of diseases the χ^2 test was used. A Null Hypothesis was framed stating that immunisation does not lead to eradication of diseases. The following table IX (a) and (B) shows the relation between immunisation and the prevalence of diseases.

TABLE IX
(a) IMMUNISATION AND DISEASES

Rural	Affected by Diseases		Not affected by diseases	
	Number	%	Number	%
Immunised	20	40	5	10
Not immunised	30	$\frac{60}{100}$	45	$\frac{90}{100}$

Result:

The calculated value of χ^2 was 12 and it is greater than the table value $\chi^2_{0.05} = 3.84$. So we reject the hypothesis. This proves that immunisation will lead to eradication of diseases.

TABLE IX
(b) IMMUNISATION AND DISEASES

Urban	Affected by diseases.		Not affected by diseases	
	Number	%	Number	%
Immunised	5	10	45	90
Not immunised	45	<u>90</u>	5	<u>10</u>
		100		100

The calculated value of χ^2 was 64 and it is greater than the table value of 3.84. So here also we reject the hypothesis and conclude that immunisation has positive effect on eradication of diseases (Calculation in Appendix III).

K. BREAST FEEDING:

Details regarding breast feeding indicated that in the urban areas, 80 per cent of the mothers breastfed their children whereas in the rural areas 90 per cent did so. For this also a Null Hypothesis was framed which states that breast feeding cannot stop the occurrence of diseases.

The following table X (a) and (b) indicates the connection between the practice of Breast feeding and the occurrence of diseases in urban and rural areas.

TABLE X
BREAST FEEDING AND DISEASES

a)

Urban	Prevalence of Diseases		Absence of Diseases	
	Number	%	Number	%
Breast Fed	10	20	42	84
Not Breast Fed	40	80	8	16
		100		100

b)

Rural	Prevalence of Diseases		Absence of Diseases	
	Number	%	Number	%
Breast fed	14	28	45	90
Not Breast fed	36	72	5	10
		100		100

Result:

	Urban	Rural
Calculated value of χ^2	= 41	39.70

Both in Urban and Rural areas the calculated value of χ^2 is greater than the table value of χ^2 . So we reject the hypothesis. Breast feeding is good for child health and it can stop the occurrence of diseases (calculation in Appendix IV).

L. FEEDING PRACTICES FOLLOWED:

The following table XI indicates the food items required for a healthy child recommended by the Nutrition Expert Group and the percentage of families which followed and not followed the recommended allowance.

TABLE XI
FEEDING PRACTICES

	% of Families followed		% of Families not followed	
	URBAN	RURAL	URBAN	RURAL
Cereals (g) 150	∅			
to 200, pulses(g)	∅			
50 to 60, green	∅			
leaf vegetables(g)	∅			
50 to 75	∅			
	∅ 40	15	60	85
Other vegetables	∅			
and roots (g)	∅			
30 to 50, fruits	∅			
(g) 50, Milk (g)	∅			
200 to 300, fats	∅			
and oils (g) 20 to	∅			
25, meat, fish or eggs	∅			
(g) 30, sugar (g) 30	∅			

Only 40 per cent of the families in the urban area and 15 per cent in the Rural area followed the standard pattern recommended by Nutrition Expert Group. This may account for the prevalence of malnutrition in both the areas due to inadequate food intake.

M. ENVIRONMENTAL SANITATION, HOUSEHOLD CLEANLINESS AND PERSONAL HYGIENE:

The following table XII shows the sanitary condition of the Rural and Urban areas which also accounts for the prevalence of diseases

TABLE XII
ENVIRONMENTAL SANITATION, HOUSEHOLD CLEANLINESS
AND PERSONAL HYGIENE

	URBAN %			RURAL %		
	Good	Fair	Poor	Good	Fair	Poor
Environmental sanitation	9	94	2	2	60	38
Household Cleanliness	8	80	12	12	78	10
Personal Hygiene	14	84	2	-	64	36

An analysis of the table shows that in the rural areas, diseases were common due to lack of sanitation. Regarding household cleanliness, the Rural households were comparatively better than urban households. But the personal hygiene of the rural children was poor (36%). This is the main cause for the prevalence of diseases.

N. PERCENTAGE OF FOOD EXPENDITURE TO TOTAL EXPENDITURE FOR THE CHILD.

The following table XIII shows the percentage of food expenditure for the child in Rural and Urban areas.

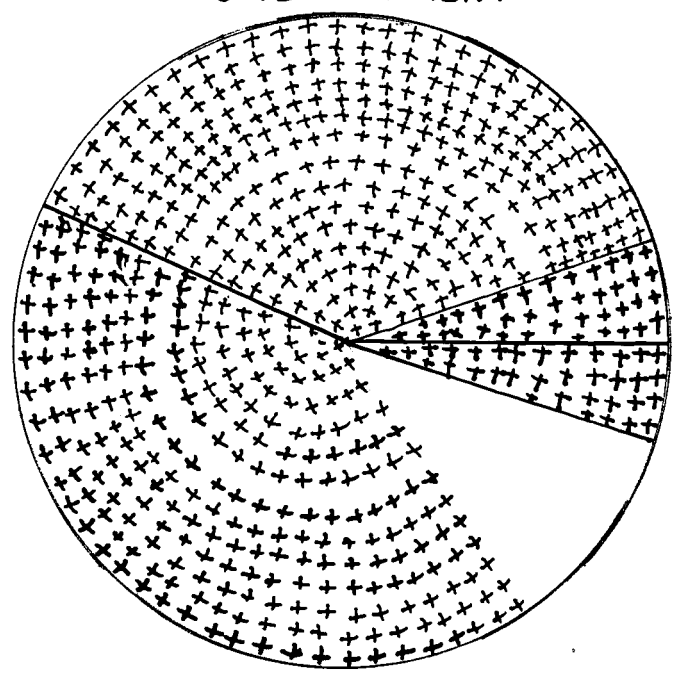
TABLE XIII

PERCENTAGE OF FOOD EXPENDITURE TO TOTAL EXPENDITURE FOR THE CHILD.

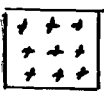
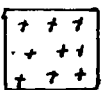


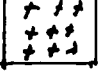
Expenditure	Urban %	Rural %
0 - 10	5	30
10 - 20	38	30
20 - 30	42	26
30 - 40	10	10
40 - 50	<u>5</u>	<u>4</u>
	100	100

FOOD EXPENDITURE IN URBAN AND RURAL AREAS FOR THE CHILD.

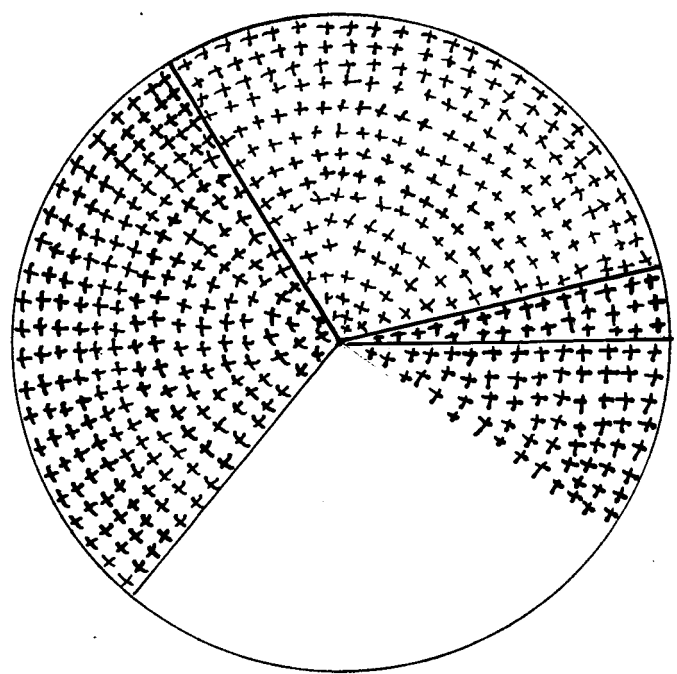
URBAN AREA.




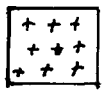


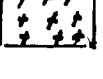
RUPEES

-  0-10
-  10-20
-  20-30
-  30-40
-  40-50

RURAL AREA.



RUPEES

-  0-10
-  10-20
-  20-30
-  30-40
-  40-50

The common trend was spending between 0 - 20 per cent for a child (60%) in the Rural area whereas in the Urban area, the trend is spending between 10 - 30 per cent for a child (80%). This has also been depicted in a pie diagram (Figure II). The table and the pie diagram shows that urban people are spending more for the child compared to the Rural people.

0. METHODS ADOPTED TO TREAT THE SICK CHILD:

The following table XIV depicts the various methods adopted such as Allopathy, Homeopathy and Ayurvedic to treat the Sick child by the Rural and Urban people.

TABLE XIV
METHODS ADOPTED TO TREAT THE SICK CHILD

Methods	Urban		Rural	
	Number	%	Number	%
Allopathy	50	100	40	80
Homeopathy	-	-	10	20
Ayurvedic	-	-	-	-
Medicine:				
1. Shop	50	100	48	96
2. Homemade			2	4
		100		100

In the Urban area, all preferred allopathy treatment and they would like to get the medicine from the shop itself. In the rural area, 80 per cent preferred allopathy treatment and 20 per cent preferred homeopathy treatment. For purchasing, 96 per cent preferred shops and 4 per cent preferred homemade medicine.

P. SICKNESS EXPENDITURE:

The sickness expenditure includes Doctors fee, cost for medicine, hospital and nurse expenditure, wages to the servants at home and transport charges. The following table XV shows the sickness expenditure for the child in both Rural and Urban areas.

TABLE XV
SICKNESS EXPENDITURE

Expenditure in Rupees.	URBAN		RURAL	
	Number	%	Number	%
0 - 200	12	24	25	50
200 - 400	16	32	9	18
400 - 600	9	18	8	16
600 - 800	2	4	5	10
800 - 1000	8	16	2	4
1000 - 1200	1	2	-	-
1200 - 1400	2	4	-	-
1400 - 1600	-	-	1	2

In the Urban area, 50 per cent were spending on an average between 200 - 600 while in the rural area 50 per cent were spending on an average below Rs.200. Sickness Expenditure appeared to be greater in the Urban area than in the Rural area.

To prove the Hypothesis which states that there is no difference between the mean cost of sickness between Rural and Urban areas, Standard Error Method was applied. From that we obtained that calculated value (2.43) is greater than the table value at 5% level (1.96). So we reject the Hypothesis (The calculations are given in the Appendix V).

Apart from this other types of cost were also incurred by the family. Table XVI shows the non-medical costs incurred by the families.

TABLE XVI

NON-MEDICAL COST

	URBAN	RURAL
Mandays lost	46	52
Income loss	48	46
Debt Incurred	64	70
Interest paid	46	52

The percentage was greater in the Rural Area compared to the Urban Area regarding Mandays lost, Debt incurred and Interest paid. But the percentage of Income loss was greater in the Urban area.

Q. PEOPLES OPINION:

The opinion of the people regarding change in food pattern, availability of medical facilities, health improvements were also found. The survey also included the questions regarding the existence of balwadis. In the rural area, 36 percent of the households wanted to change the food pattern and 4 per cent in the urban area had this opinion. Regarding the medical facilities, it was found that there was only one doctor for the whole village and no hospital in the village. Regarding the health improvements the village people wanted to improve the cleanliness of road, more ditches to be built, and also dust bins. In the Urban side there was no problem. Regarding the epidemics prevalent in the place for the past 3 years it was found that measles was common, in both Rural and Urban area. There was one Balwadi in the village which provides free mid-day meals for the pre-school children and also free medical check up every month.

V. SUMMARY AND CONCLUSIONS

The Survey made an earnest effort to analyse the prevalence of diseases among pre-school children in rural and urban areas. It also attempted to make a study on the cost of sickness among the pre-school children and compare the cost of sickness between rural and urban areas.

From the study the following conclusions are arrived at:

1. The Prevalence of diseases is greater in the rural area (75%) compared to the urban area (70%) due to infection.
2. It was found that there is positive correlation between income and cost of sickness in both the rural and urban areas.
3. There is a direct relationship between the size of the family and cost of sickness in the rural area and ^{INVERSE} ~~the~~ relationship between the size of the family and cost of sickness in the urban area.
4. Education: Diseases seems to be frequently occurring in a family when the head of the family is illiterate in the both the urban and rural areas.

5. Children are highly affected by diseases in their age group of 2 to 3 years in both the rural and urban area.
6. Immunisation: There is positive relationship between immunisation and eradication of diseases. Immunisation helps to prevent to occurrence of diseases.
7. Breast - feeding: There seems to be positive relationship between breast feeding and prevention of diseases. When a child is breast fed in its early years it seems to have more resistance against diseases.
8. 40 per-centage of families are giving food to their children following the standard pattern. Among them the prevalence of diseases seems to be minimum. The trend in rural areas is 15%. This proves that nutritional insufficiency may lead to the prevalence of malnutrition.

SUGGESTIONS:

1. The Government should provide better sanitary facilities for preventing the occurrence of diseases.
2. Special Agencies can be set up to spread the message of proper nutrition practices.
3. Smaller the family, greater will be the care given to each child. So small family norms can be stressed.
4. Proper medical facilities can be provided in the rural area which will see to that proper immunisation is given to the children.
5. Importance of breast - feeding can be spread so that children gets better resistance even in their early years.

VI BIBLIOGRAPHY

BIBLIOGRAPHY

Books

1. Achar
1957 : Child Care, Macmillan & Co., Ltd,
Madras P.10
2. Alison E.B.
Billewicz
Thomson A.N.
1968 : Diets of pre-school children -
New Castle Upon Tyne - P.P.105
to 106
3. Barry S.G.
Dr.Bronowski J.
Fisher James
1960 : The Doubleday Pictorial Library of
Health and Economics - Doubleday
Pictorial Library and Co., INC.
New York P.P. 228 to 230.
4. Chaudhury D.P.
M.A.,L.L.B.,J.D.
1970 : Child Welfare Manuel P.P. 10 to 12
5. Dabrymple W.M.D.
1959 : Foundation of Health, INC., Allyn
& Bacon. P.P. 9 to 10.
6. Devadas R.P.
1979 : Vivekanandas views on National
Development & Nutrition.- speech in
Sri Ramakrishna^{Mission} Vidyalaya.
7. Devadas R.P.
1980 : Symposium on 'The Total Development
of the young child' - Speech in
Sri Avinashilingam Home Science
Autonomous College for Women.

8. Devadas R.P.
1968 : Nutrition in Tamilnadu - Sangam Publishers, Madras P.10.
9. Fougiers.W.
Kendall.W.K.
1975 : Capitulation as a Key Ingredient to Eradication of Severe Mal-nutrition in children - October, 1975 Volume 21 No.5 p.p. 240 to 242.
10. Illingworth, M.D.
F.R.C.D.,D.P.H.
D.C.H.
1960 : Common Symptoms of Disease in Children - Brackwell Scientific Publication - Oxford & Edinburg p.p.10 to 14.
11. Mahler. H.
1969 : Health Care with Equity, World Health Organisation p.P.10 to 12.

JOURNALS : SWASTH HIND

12. Behar. M.
1979 : Man-made diseases - February 1979 Vol.7 - No.2 p.p. 33 to 34.
13. Cooper (1979)
Barber
Mitchell
Rynbergen
Green : Nutrition in Health and Disease November 1979 Vol.10 No. 2 P.8.
14. Cutting. WAM(1976)
Smith Gordonæ CE : Control of Communicable Diseases in India - June, 1976 Vol.18 No1 p.1.

15. Gopalan C. : Year of the Child - April, 1977
1977 Vol.3 - No.1 p.4
16. Gopalan, C. : Child Health Problems in Developing
1979 Countries like India - January, 1979
Vol.3, No.2, p.p. 2 to 3.
17. Gopalan C. : Combating Mal-nutrition in Rural
1977 Community - June, 1977 - Vol. 3
No.1 p.p. 288 to 290
18. Udani.P.M. : Child Health Problems - June, 1979
1979 Vol.6 No.3 p.5
Social Welfare
19. Behar. M. : Importance of Breast-feeding -
1979 April 1979 - Vol.14, No.1 p.p.33 to
36.
20. Grewal. S. : Nutrition and Immunisation February
1976 - Vol.25 No.1 p.p. 8 to 9
21. Iyer, K.S.(1979) : Agencies to promote nutrition -
May, 1979 - Vol.6, No.2 p.p.120
to 125.

The Indian Journal of Medical Research:

22. Rao, K.V. : Relative importance of Factors
Devi V.S. affecting body weight in pre-school
Reddy.P.J. children - January 1971 Vol.68.
Narayanan T.P. No.78 p.p. 10 to 12.
1971

23. Venkatachalam P.S. : Nutrition for mother and child -
Rebello L.M. No.1 p.p. 37 to 38.
1970

Archives of Child Health

24. Duffer & Serano : Nutrition and Resistance to Infec-
1976 tion January, 1976 Vol.18 - No.1
p.5
25. Dutta N.D. : Need for organising comprehensive
1976 integrated child health care -
May, 1976 Vol.18 No.8 p.p.1 to 3
26. Gopalan C. : General Objectives and Guidelines
1970 of Supplementary Feeding Programmes
for pre-school children - July 1973
Vol.15. No.11 p.p. 194 to 196
27. Gupta S. : Mortality and Morbidity in pre-
Srivatsava G school children - November 1974
1974 Vol.16, No.6. p.10.

Kurushetra:

28. Devadas R.P. : Relevance of Small Family to Health
1971 and happiness - Vol.27 No.3. p.p.15
to 16.
29. Gopalan C. : Nutritional Status of Rural Pre-school
1977 children - November, 1977 Vol.27 No.3
p.p.15 to 16.

Children in Tropics:

30. Cnandramohan, M.B.B.S. : An Urban and Integrated Health
M.D. 1960 Service Plan - International
Children Centre p.p.10 to 12.
31. Ray M. : Place of Measles and its prevention
1962 Edward Arnold Publisners Ltd.,
P.10.
32. Srikanta S.G. : Programmes for pre-school children
1950 p.10

Public Health Paper:

33. Chanda R.K. : Nutrition Immunity, and Infection
Newborne P.M. Public Health Paper 24 - World
1965 Health Organisation, Geneva P.31.
34. Davidson Z.E. : Care of children in Day CareCentres
Gornicni B. Public Health Paper 24 - World Health
1960 Organisation, Geneva p.12.

Social Pediatries:

35. Anima, Sar : The Developing Child and the Role of
1975 Pre-school experience - January 1975
Vol.20 No.5. p.p.10to 15
36. Mojumdar N.G. : Mal-nutrition - January 1977 -
1977 Fol.21 No.1 p.p.4 to 9.

37. Newmann.B.M. : Infancy and Child-hood-April 1976
NewmannP.R. Vol.10.No.9.p.p.100 to 101.
1960
CENTRES CALLING
38. Cnaudhury S.N. : Health and Nutritional Status of
1979 Children - 7th April, 1979 -
Vol.14 No.4. p.1.
39. Day. WH. : A Healthy Child, A sure future
1979 7th April, 1979 Vol.14 No.4
p.p. 9 to 10.

Nutrition Journals:

- 40.A. Bose : Mal-nutrition in children -
1976 Applied Nutrition Journal, Indian
Diets Association, June, 1976
Vol.4 No.1 p.p.7 to 10.
41. Befg R.L. : The high cost of self-deception
1976 Official Journal of the American
Health Foundation 1976 Vol.5,
No.4 p.10.
42. Datta S. : Child Health Clinic - March 1978
1978 Vol.20. No.2 P.40.
43. Josefia B.J. : Biological Research and Nutrition
M.D.MPH Phillipines Journal of Nutrition
1977 Vol.30, January, 1977 No.1 p.5.

44. Rao K.V.
1978 : Nutritional Status of pre-school children and the related factors The Indian Journal of Nutrition and Dietetics - July 1978 Vol.15 No.7.p.10.
45. Ryland E.W., Ph.D.
William F., M.D.
Yrette P.R.N.
1975 : An Evaluation of the Educational Benefits of Nutrition Rehabilitation Centre - The Journal of Tropical Pediatrics and Environmental Child Health - February 1975 Vol.21.No.1 p.p. 7 to 10.
46. Waldheim
1979 : Les Carnets de l'entance assignment children - July 1979 p.9.
47. Children of India : A Pictorial Presentation - Publications Divisions p.10.
48. India 1977 - 78 : A Reference Annual - Publications Division - Ministry of Broadcasting and Information, Government of India P.10.
49. Natarajan K.V.
Panikkar S.N.
1960 : Feeding Programmes in the Fifth V Year Plan - Planning Commission, New Delhi p.p.10 to 11.
50. Draft V Year Plan
1978 to 83. : Government of India - Planning Commission - p.114.

VII APPENDICES

Interview Schedule to elicit information regarding the cost of sickness among pre-school children in selected Rural and Urban AREAS

Date

Door No.

Name of the Village/place

I. General information

Name of the interviewee:

Name of the head of family:

Occupation and address:

Total income
per month.Type or family: Nuclear Joint II. Family Background:

S.No.	Name of the family mem- bers.	Age in years to the head of the family	Relation to the head of the family	Education	Occu- pa- ti- on.	Inco- per mon	
				Studied upto	Study- ing in	Illete- rate	

III (a) Health Background of the sick child between 0 to 5 Years

S.No.	Name of the child	Age in years	Sex	Type of disease	Period of disease
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(b) Is the child vaccinated: Yes No

If No, what are the reasons? (1)

(2)

(3)

(c) Is the child breast-fed? Yes No

(d) If yes, how long? (period in years)

If No, what are the reasons? (1)

(2)

(3)

(e) Is the child given triple antigen injection? Yes No

(f) Feeding practices followed by the family for the child: 1 to 3 years

Time	Food required	Amount required	Given or not	Amount given
On rising	Breastmilk or boiled animal milk	1 feed $\frac{1}{2}$ ^m tumbler		

Time	Food required	Amount required	Given or not	Amount given
9 to 10 A.M.	(1) Cooked - Cereal - pulses preparation or iddlies	2 spoons 1 - 1½ iddlies 1 - 1½ slices		
	(2) Soft boiled or poached egg	1 Egg		
	(3) Fruit Juice	¼ - ½ tumbler		
12 to 1PM	(1) cooked cereal or starchy vegetable or Ragi dumpling ball	1 spoon 1 small ball		
	(2) Boiled pulse, fish or minced meat	1 - 1½ spoon		
	(3) Leafy or green vegetable (cooked)	1 spoon		
3.30 to 4 P.M.	(1) Fish liver oil	1 spoon		
6 to 7PM	(2) Cooked cereal such as broken wheat porridge or ragi porridge	2 spoons		
at bed time	Breast milk or boiled animal milk	1 feed ½ tumbler		

3 to 5 years

Time	Food required	Amount required	Given or not given
8 to 9 A.M.	(1) cooked cereal pulse preparation or iddlies or Bread with butter or puffed whole ragi (to be eaten with milk)	2 - 3 spoons 1 - 2 iddlies 1 - 2 slices Small amount	
	(2) Soft boiled poached or Scrambled egg or boiled pulses	1 Egg 1 spoon	
	(3) Boiled animal milk	½ tumbler	
10.30 A.M.	Fruit juice or fresh seasonal fruit	One	
12 to 1 P.M.	(1) cooked rice or wheat or ragi chappati or boiled potato sweet potato or tapioca	2 to 4 spoons 1- 2 chappatis	
	(2) Curds or milk	¼ tumbler	
	(3) Cooked leafy or green vegetables	1 - 2 spoon	
	or raw vegetables salad to be given 3 times a week in place of above	1½ - 2 spoons	
3 to 4 P.M.	Fish liver oil	1 teaspoon	
7 to 8 P.M.	(1) cooked cereal such as broken wheat or ragi porridge	2 to 3 spoons	
	(2) Boiled pulse fish or meat preparation	2 spoon	
	(3) Boiled animal Milk	¼ tumbler	

IV(a) Personal Hygiene of the child	Good	Fair	Poor
Household cleanliness			
Environmental Cleanliness			
V(a) <u>Expenditure pattern of the Family</u>			

S-No.	Items	Amount spent per month
1.	Food	
2.	Clothing	
3.	Shelter	
4.	Education	
5.	Health	
6.	Others	

(b) Food expenditure on the child

S.NO.	Food	Quantity purchased per month	Amount spent per month
1.	Cereals		
2.	Rice		
	Wheat		
	Kambu		

S.No.	Food	Quantity purchased per month	Amount spent per month
	Cholam		
2.	Pulses		
	Greengram dhal		
	Redgram dhal		
	Blackgram dhal		
	Bengalgram dhal		
3.	Leafy vegetables		
4.	Roots		
5.	Other vegetables		
6.	Milk and Milk products		
7.	Fleshy food		

VI. Methods adopted to treat the child when sick

S.No.	Methods	Amount spent per month
1.	Doctors	
	1. Allopathy	
	2. Homeopathy	
	3. Ayurvedic	
2.	Home-made medicine	
3.	Others	

VII. Sickness expenditure

S.No.	Medical Expenses	Amount spent per month
1.	Dotors	
2.	Medicine	
	1. shop	
	2. Homemade	
3.	Hospital and Nurse	
4.	Servants at home	
5.	Transport	

VIII. Loss incurred as a result of sickness:

- 1) Mandays lost
- 2) Income Loss
- 3) Debt incurred
- 4) Interest paid
- 5) Others:

IX (a) Is there any necessity to change the food pattern?

Yes

No

If yss in what ways?

(1)

(2)

(3)

(b) Is there necessity for continuous treatment? Yes No

(c) Any other facilities to be provided for the child after sickness Yes No

X. Availability of medical facilities:

- a. Is there any doctor near-by? Yes No.
- b. If No, the distance to be travelled to reach the doctor
- c. Is there any hospital in the village? Yes No
- d. Is there any health visitor? Yes No

XI. What health improvements would you like to have in your village:

1. Protecting Well water
2. Cleanliness of Road
3. Building or Ditches
4. Dust Bins
5. Selling food items in shops
6. Others

XII. Epidemics prevalent in the place for the past 3 years:

1. Measles
2. Chicken-pox
3. Small pox
4. Malaria
5. Cholera

XIII. DETAILS ABOUT FEEDING PROGRAMME:

Is there any Balwadi in your place? Yes No

If yes, whether it gives any free food and medical facilities to the children.

APPENDIX I

(1) Co-efficient of Correlation Method:

Income and Cost of Sickness in the Urban Area:

X	f	Y	f	dx	dy	fdx	fdy	fdx ²	fdy ²
0-200	14	0-200	1	-2	-4	-28	-4	56	16
200-400	13	200-400	4	-1	-3	-13	-12	13	36
400-600	8	400-600	13	0	-2	0	-26	0	52
600-800	5	600-800	8	1	-1	5	-8	5	8
800-1000	10	800-1000	17	2	0	20	0	40	0
-	-	1000-1200	1	-	1	-	1	-	1
-	-	1200-1400	5	-	2	-	10	-	20
-	-	1400-1600	1	-	3	-	3	-	9

- X - Cost of Sickness
Y - Income of the people
f - No. of households

$$\frac{\sum f dx dy}{N} = \frac{\sum f dx \times \sum f dy}{N}$$

$$r = \frac{\frac{\sum f dx dy}{N}}{\sqrt{\frac{\sum f dx^2}{N} - \left(\frac{\sum f dx}{N}\right)^2} \times \sqrt{\frac{\sum f dy^2}{N} - \left(\frac{\sum f dy}{N}\right)^2}}$$

$$\sum f dx dy = 59$$

$$\sum f dx = -16$$

$$\sum f dx^2 = 114$$

$$\sum f dy = -36$$

$$\sum f dy^2 = 142$$

$$r = \frac{59 - \frac{-16 \times -36}{50}}{\sqrt{114 - \frac{(-16)^2}{50}} \times \sqrt{142 - \frac{(-36)^2}{50}}} = \frac{56.2}{112.4} = .5000$$

$r = .5000$ (positive correlation between income and cost of sickness).

Income and cost of sickness in Rural Areas:

X	f	y	f	dx	dy	fdx	rdy	fdx ²	fdy ²
0 - 200	24	0 - 200	0	-2	-4	-48	0	48	0
200 - 400	11	200 - 400	6	-1	-3	-11	-18	11	54
400 - 600	8	400 - 600	23	0	-2	0	-46	0	92
600 - 800	4	600 - 800	12	1	-1	4	-12	4	12
800 - 1000	3	800 - 1000	4	2	0	6	0	12	0
-		1000 - 1200	1	-	1	-	1	-	16
-		1200 - 1400	2	-	2	-	8	-	54
-		1400 - 1800	2	-	3	-	18	-	

X = Cost of Sickness

y = Income level

f = No. of households

$$r = \frac{\sum f dx dy - \frac{\sum f dx \times \sum r dy}{N}}{\sqrt{\left[\sum f dx^2 - \frac{(\sum f dx)^2}{N} \right] \times \left[\sum f dy^2 - \frac{(\sum r dy)^2}{N} \right]}}$$

$$\sum f dx dy = 86$$

$$\sum f dx = 19$$

$$\sum f dx^2 = 78$$

$$\sum f dy = 49$$

$$\sum f dy^2 = 229$$

$$86 - \frac{19 \times 49}{50}$$

$$\frac{86 - \frac{19 \times 49}{50}}{\sqrt{\left[78 - \frac{(19)^2}{50} \right] \times \left[229 - \frac{(49)^2}{50} \right]}} = \frac{67.38}{133.2} = .5951$$

r = .5951 - POSITIVE CORRELATION

APPENDIX IIIncome and Size of Family less than 4 - Urban

X	f	y	f	dx	dy	f dx	f dy	f dx ²	f dy ²	
0 -	200	4	0 - 200	0	-2	0	-8	0	16	0
200 -	400	9	200 - 400	6	-1	1	-9	-2	9	4
400 -	600	2	400 - 600	23	0	6	0	-6	0	6
600 -	800	4	600 - 800	12	1	4	4	0	4	0
800 -	1000	2	800 - 1000	4	2	6	4	6	8	6
-	-	-	1000 - 1200	1	-	2	-	4	-	8
-	-	-	1200 - 1400	2	-	0	-	0	-	0
-	-	-	1400 - 1600	2	-	2	-	8	-	32

X = Income level

y = Cost of sickness

f = No. of families with less than 4 member

$$r = \frac{\sum f dx dy}{N} = \frac{\sum f dx \times \sum f dy}{N}$$

$$\sqrt{\frac{\sum f dx^2 - \frac{(\sum f dx)^2}{N}}{N} \times \frac{\sum f dy^2 - \frac{(\sum f dy)^2}{N}}{N}}$$

$$\sum f dx dy = 18$$

$$\sum f dx = -9$$

$$\sum f dy = 10$$

$$\sum f dx^2 = 37$$

$$\sum f dy^2 = 56$$

$$R = \frac{18 - \frac{9 \times 10}{21}}{21} = .4818$$

$$r = \sqrt{\frac{37 - \frac{(-9)^2}{21} \times 56 - \frac{(10)^2}{21}}{21}}$$

r = .4818 - Positive correlation

2. Income and Size of the Family - More than 4 - Urban

X	f	dx	dx ²	fdx	fdx ²	y	dy	dy ²	fdy	fdy ²		
0 -	200	9	-2	4	-18	36	0 - 200	0	-3	9	0	0
200 -	400	8	-1	1	-8	8	200 - 400	4	-2	4	-8	16
400 -	600	5	0	0	0	0	400 - 600	3	-1	1	-3	3
600 -	800	6	1	1	6	6	600 - 800	3	0	0	0	0
800 -	1000	1	2	4	2	4	800 - 1000	16	1	1	16	16
-	-	-	-	-	-	-	1000 - 1200	0	2	4	0	0
-	-	-	-	-	-	-	1200 - 1400	0	3	9	0	0
-	-	-	-	-	-	-	1400 - 1600	3	4	16	12	48

X = Cost of sickness.

y = Income level

f = Number of families with more than 4 member

$$r = \frac{\sum f dx dy}{N}$$

$$r = \frac{\sum f dx dy}{\sqrt{\left(\sum f dx^2 - \frac{(\sum f dx)^2}{N}\right) \times \left(\sum f dy^2 - \frac{(\sum f dy)^2}{N}\right)}}$$

$$\sum f dx dy = 5$$

$$\sum f dx = 18$$

$$\sum f dx^2 = 54$$

$$\sum f dy = 17$$

$$\sum f dy^2 = 83$$

$$r = \frac{5 - \frac{18 \times 17}{29}}{\sqrt{\left(54 - \frac{(18)^2}{29}\right) \times \left(83 - \frac{(17)^2}{29}\right)}} = .099$$

r = -.099 - Negative correlation.

Income and Size of the Family - More than 4 - Rural

X	f	dx	dx ²	fdx	fdx ²	y	f	dy	dy ²	fdy	fdy ²
0 - 200	15	-2	4	-30	60	0- 200	0	-3	9	0	0
200 - 400	10	-1	1	-10	10	200- 400	4	-2	4	-8	16
400 - 600	9	0	0	0	0	400- 600	17	-1	1	-17	17
600 - 800	2	1	1	2	2	600- 800	7	0	0	0	0
800 - 1000	1	2	4	2	4	800-1000	4	1	1	4	4
-	-	-	-	-	-	1000-1200	2	2	4	4	8
-	-	-	-	-	-	1200-1400	1	3	9	3	9
-	-	-	-	-	-	1400-1600	2	4	16	8	32

X = Cost of sickness

y = Income level

f = No. of families with more than 4 members

$$r = \frac{\sum f dx dy - \frac{\sum f dx \times \sum f dy}{N}}{N}$$

$$r = \frac{\sqrt{\sum f dx^2 - \frac{(\sum f dx)^2}{N}} \times \sqrt{\sum f dy^2 - \frac{(\sum f dy)^2}{N}}}{N}$$

$$\begin{aligned} \sum f dx dy &= 36 \\ \sum f dx &= 36 \\ \sum f dx^2 &= 76 \\ \sum f dy &= -6 \\ \sum f dy^2 &= 86 \end{aligned}$$

$$r = \frac{36 - \frac{-36 \times -6}{37}}{76 - \frac{(36)^2}{37} \times 86 - \frac{(-6)^2}{37}} = .5110$$

r = .5110 - Positive correlation.

Income and Size of the family - less than 4 - Rural

X	f	dx	dx ²	f dx	f dx ²	y	f	dy	dy ²	f dy	f dy ²
0 - 200	8	-1	1	-8	8	0 - 200	2	-1	1	-2	-2
200 - 400	1	0	0	0	0	200 - 400	1	0	0	0	0
400 - 600	4	1	1	4	4	400 - 600	6	1	1	6	6
-	-	-	-	-	-	600 - 800	4	2	4	8	16

X = Cost of Sickness

y = Income of level

f = No. of houses with less than 4 member

$$r = \frac{\sum f dx dy - \frac{\sum f dx \times \sum f dy}{N}}{N}$$

$$\sqrt{\frac{\sum f dx^2 - \frac{(\sum f dx)^2}{N}}{N} \times \frac{\sum f dy^2 - \frac{(\sum f dy)^2}{N}}{N}}$$

$$\sum f dx dy = 15$$

$$\sum f dx = -4$$

$$\sum f dx^2 = 12$$

$$\sum f dy = 12$$

$$\sum f dy^2 = 24$$

$$15 - \frac{-4 \times 12}{13} = .3569$$

$$\frac{12 - \frac{(-4)^2}{13}}{13} \times \frac{24 - \frac{(12)^2}{13}}{13}$$

r = .3569 - Positive correlation

APPENDIX IIIIMMUNISATION AND PREVALENCE OF DISEASESX² test - Urban

O	E	O - E	(O-E) ²	$\frac{(O-E)^2}{E}$
5	25	-20	400	$\frac{400}{25} = 16$
45	25	20	400	$\frac{400}{25} = 16$
45	25	20	400	$\frac{400}{25} = 16$
5	25	-20	400	$\frac{400}{25} = 16$

Calculated value = 64

Table value = 3.84

IMMUNISATION AND PREVALENCE DISEASESX² test Rural

O	E	(O - E)	(O - E) ²	$\frac{(O - E)^2}{E}$
20	12.5	7.5	50.25	$\frac{56.25}{12.5} = 4.5$
30	37.5	7.5	56.25	$\frac{56.25}{37.5} = 1.5$
5	12.5	7.5	56.25	$\frac{56.25}{12.5} = 4.5$
45	37.5	7.5	56.25	$\frac{56.25}{37.5} = 1.5$
				12.00

Calculated value = 12.00

Table value = 3.84

Calculated value > table value. So we reject the hypothesis. Therefore immunisation has not led to the prevalence of diseases in both Rural and Urban areas.

APPENDIX BBREAST - FEEDING AND PREVALENCE OF DISEASES χ^2 test - Urban

O	E	(O - E)	(O-E) ²	$\frac{(O-E)^2}{E}$
10	26	-16	256	$\frac{256}{26} = 9.84$
40	24	16	256	$\frac{256}{24} = 10.66$
42	26	16	256	$\frac{256}{26} = 9.84$
8	24	-16	256	$\frac{256}{24} = 10.66$
				<u>41.00</u>

$$\chi^2 = \frac{(O - E)^2}{E} = 41.00$$

Table value 0.05 = 3.84

Calculated Value > table value. So we reject the hypothesis.

BREAST FEEDING AND PREVALENCE OF DISEASESRURAL

O	E	(O-E)	(O-E) ²	$\frac{(O - E)^2}{E}$
4	20	-16	256	$\frac{256}{20} = 12.8$
30	14	16	256	$\frac{256}{14} = 18.28$
46	30	16	256	$\frac{256}{30} = 8.53$
5	21	-16	256	$\frac{256}{21} = 12.19$
				51.8

Calculated Value = 51.8

Table value = 3.84

Calculated value $>$ Table value. So we reject the hypothesis.

APPENDIX IV

Standard Error Method:

$$\text{S.E. } (\bar{x}_1 - \bar{x}_2) = \sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}$$

$$SI = A + \frac{z_{fd}^1}{n} \times c$$

$$\sigma = \sqrt{\frac{\sum fd^2}{N} - \frac{(\sum fd)^2}{N} \times c}$$

$$\bar{x}_1 = 456$$

$$\bar{x}_2 = 320$$

$$\sigma_1 = 1680$$

$$\sigma_2 = 2642$$

$$n_1 = 50$$

$$n_2 = 50$$

$$\text{S.E.} = \frac{\text{Difference}}{\text{S.E.}} = \frac{136}{55.76} = 2.43$$

Since the calculated value of standard error (2.43) is less than the table value (2.58) we accept the hypothesis.