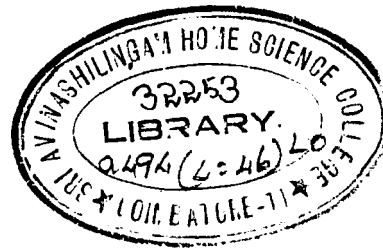


**INFLUENCE OF AN INFANT FEEDING PROGRAMME ON THE  
FOOD HABITS OF PRE-SCHOOL CHILDREN**

**By**

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## I INTRODUCTION

Food habits influence the nutritional status of individuals and populations. People everywhere develop destructive patterns of eating. The food habits of an individual reflect those of his group (Martin, 1955). In the proper utilisation of food, the individual consumer's food habits play a vital role (Devedas, 1956).

In our era of vast technological progress and scientific achievement millions of children still suffer from lack of proper nutrition. In Gandhiji's opinion, "If we are to reach real peace in this world, we shall have to begin with children". The larger number of children today will be the adults of tomorrow and in a developing country like ours, we cannot afford to neglect the nutritional needs of our future citizens. This will lead them to continue to grow as under nourished children eating the defective family diet in defective ways. As a result they may develop faulty food habits. Therefore, at this stage proper attention must be paid to the development of proper food habits in children.

Karnad (1969) is of opinion that unless proper food is given to children during the critical period of the growth, that is from one to six years, children cannot grow up into healthy individuals both physically and mentally. Children even at toddler stage should also be encouraged to develop taste for nutritious foods as life long food habits are formed during this period.

The home and school influence habit formation at this early years. Varghese (1964) emphasises that the first institution other than the family which is responsible for the care of the child, specially in the villages is the balwadi. According to Chufraan (1968) every balwadi should provide midday meals snack to the children regularly to supplement the insufficiencies of home food which are due to either poverty and ignorance of the food requirements of the child, and to encourage the development of good eating habits in the company of other children such as training in cleanliness, orderliness and so on. Balwadi also helps to overcome food prejudices. Thus the feeding programmes serve as a tool to improve the food habits of children during the early years.

With the help of Applied Nutrition Programme and Panchayats, balwadis are being run with feeding programmes in India. However their supervision is inefficient. When an effective programme is properly organised and guided along desirable directions proper eating habits and other food habits can be established in pre-school children.

This study was undertaken to know the prevailing food habits of a selected sample of pre-school children attending and not attending the balwadi and whether or not the Applied Nutrition Feeding Programme influenced the food habits of the former group.

## II. REVIEW OF LITERATURE

The available literature is reviewed under the following headings:

- A. Importance of nutrition in childhood
- B. Importance of good food habits during pre-school years
- C. Factors affecting food habits
- D. Methods of inculcating proper food habits
- and E. Feeding programmes for preschool children.

### A. Importance of Nutrition in Childhood:

According to Achar (1965) in all the regions of the world, concern of the community for the well-being of the toddlers has resulted in various concrete steps to ensure proper food and conditions for their growth and development.

In India 41 per cent of the population are under 16 years of age. Fifty per cent of them die before they reach 16 years, constituting a huge national waste. If proper nutrition and proper measure of care are offered, this tragedy could be overcome. Most rural mothers are ignorant about adequate and proper child care. They are illiterate. Therefore, most toddlers are far from healthy. A large number die before reaching school age. They need adequate nourishment, regular habits and cleanliness (Kagal).

According to Swaminathan (1966) malnutrition among preschool children is a major public health problem in developing countries. There has been growing interest all over the world in the health and

particularly in the nutritional status of the vulnerable segment of the population.

Scrimshaw (1967) warns that the high mortality rate of pre-school children in the less developed areas of the world should urge leaders to give priority for feeding programme for children as a solution to the world food problem. Such programmes should stress supply of post-weaning supplemental foods to pre-school children.

Devadas and Radharukmani (1966) stated that childhood is the period of rapid physical and mental growth and development. During that vulnerable period, good nutrition is needed, not only to assist the child to grow and increase in total mass but also for carrying out each and every function effectively.

Human beings, and particularly children, cannot thrive at their best on a diet composed largely of cereals and insufficiently supplemented by other foods - Ayrkroyd, Gopalan and Subramanian (1966).

According to Iar (1966) normal development of a child depends upon wholesome food, correct schedule and proper care.

Millions of children in India and other developing countries who are in the crucial age group one to five years are affected on account of inadequate supplies of the right type and amount of food at the appropriate time (Balasubramanian, 1966).

Chandrasekhar (1967) states that although poverty constitutes a menace to child health in many ways and particularly in the direction of malnutrition, poor nutrition may be prevalent in the homes of the wealthy as well as among the poor as a result of poor knowledge, faulty

selection of foods, over feeding etc.

Johnston (1970) opines that those who live in conditions of malnourishment in their early years are dwarfed, both mentally and physically, more or less permanently and are never able to recover to the full even when conditions of adequate nutrition are brought about.

#### B. Importance of Good Food Habits During Pre-school Years:

Antret (1952) defines food habits as the ways in which the individual or groups select, consume and utilize the available food supplies. In Roy's (1949) view, habits are an important factor in controlling the desire for food. Litman (1964) looks upon food habits as those culturally standardised sets of behaviour in regard to food which are manifested by individuals who have been reared within a given cultural tradition. Mead (1942) traces food habits in many societies (like New Guinea, the centre of Africa and the peasant communities in Europe) and concludes that food habits are the out comes of emotional association. Children associate food habits with family sentiments. They become woven into the fabric of their personalities. It is reported that food habits begin at birth. Therefore, the sooner the child is surrounded with influences which encourage good food habits, the better his chance will be to develop desirable eating patterns. Furthermore, the food habits of the individuals who compose a large measure, determine the nutritional level and health of its people (Martin, 1963)

Comstock (1930) said, "We are what our habits make us". The physical and mental make up, action, and personality of each individual is a composite of habit. The more a practice - good or bad - become a habit, the greater hold it has upon the owner.

Sebastian (1968) cautions against the vulnerability of preschool children to unfavorable conditions in their environment. Their growth and development are greatly influenced by the food intake and the care and protection given to them. Therefore, the good atmosphere given during the preschool years plays a vital role in establishing child's food habits.

Selling (1942) emphasizes that childhood training with regard to food habits is of great importance. Many children learn to decide what they eat by observing the food adults eat. They are likely to prefer food to which they were accustomed as children. A well trained child under ordinary circumstances, arrives at the meal time sufficiently hungry to eat every thing that is served to him and thus develops a tolerance towards all foods served.

Good speed, Mason and Woods (1953) are of the opinion that every child should learn to eat the right food during the first six years of life, since that is the period when foundations are laid for normal growth and health. Foster (1939) observes that most of the four year olds can be expected to take care of themselves, to eat without spilling, to pass a plate, to pour milk, to carry food to their own tables.

Guilford (1961) warns that aversions for specific foods due to disgusting odour and bitter taste, may deeply implant negative reactions in people.

Harlock (1956) states that eating disturbances, caused by emotional tensions may cause the child to lose weight or become ill.

A child's attitudes towards food are formed early in life and exert powerful influence on his later preference (Litman, 1964). Comstock (1930) holds that during the second year, the child's eating habits begin to be formed. These habits will affect his entire lifetime.

Once the faulty food habits are established, there will be endless worry for the parents (Patkar, 1963). Therefore, it is better to teach good eating habits from the start. It is desirable to introduce solid foods early so that the child gets the taste of different things. Segert (1944) looks upon cultivating the right habit of eating and proper attitude toward food, as an important part of the mother's training for her children. Goodspeed (1955) observes that it is the mother's responsibility from the day of birth to develop good attitude toward food. Training in good food habits should be effected both in the home and at school.

### C. Factors Affecting Food Habits:

Martin (1963) regards eating habits as the outcomes of influences and experiences. They are symbolic of multiple factors that operate singly or together. Friendly attitude toward food can be developed permanently, if the food is associated with comfort, satisfaction and security.

The National Research Council (1945), Devadas (1949), Martin (1965), Hendel (1965), Brown (1967) and Strang (1969) regard that food preferences are static in a person's life. The factors which determine an individual's preferences include the culture in which he lives, the prestige value of the food, religious functions, economic conditions, palatability, educational conflicts, national and religious differences, and early childhood experiences. Establishment of food habits in the child is achieved chiefly by imitation, customs, family belief, family size, or ordinal position urbanisation, education of the mother, local production, purchasing power, extent of nutrition consciousness and adult example. Thus people generally eat what they like, provided they can afford to get it. Quoting Sri John Boyd, Devadas (1949) emphasizes this point, "Rich people will eat what they like and poor people will eat what they get."

Strang (1959) opines that feeding problems are related to the culture of an individual. Many of these problems are emotional and not nutritional. Many are problems from the standpoint of the parents rather than from the standpoint of the children.

Parents who continually nag a child about eating or otherwise arouse his resistance and hostility may end up with serious feeding problems. If the child realizes that his refusal to eat is an exceedingly effective means to control his parents, he will repeat the behaviour according to his convenience. The causes for refusal

to eat must be located - whether lack of hunger, unfamiliar food or consistency of food, desire for attention, fear of authority or incipient illness. Groups of individuals, in response to social and cultural pressures, select and consume and utilize portions of available food supply.

Foster (1939) stated that lack of hunger is the result of a poorly balanced diet, irregular hours, or undesirable methods of treatment. A feeding problem may be manifestation of some personality disturbance such as jealousy, timidity, rebellion, against authority or a desire to show off. The child who dawdles over his dinner is probably slow in getting ready for bed, slow in picking up his toys and generally lacking in accepting responsibility for his own acts.

Coshle (1965) enumerates the causes for eating too little or refusal to eat as dislike for certain foods and hurry to go to school or to the play ground. Children, frequently may not take what is prepared for them but take large quantities of what they like.

Strang (1959) found that in about 35 per cent of the cases, there was resemblance between the food aversions of the parents and those of the children in the family. Good appetite and good behaviour at mealtime go together in homes where parents are relaxed, consistent, generous in their approval and set good examples.

Eating with other children in the nursery school helps a child to develop good food habits. Lewin (1943) demonstrated the influence of the group situation in a cracker eating experiment. He succeeded

in getting children eat a large number of crackers shortly after breakfast, just by pointing out to the child in an imaginary group situation, that Bobie had eaten only seven but Jackie, for example, being a little fellow, would not be able to eat so many. Having created a goal and a challenge to Jackie's maturity, Levin induced him to eat actually 12 crackers before giving up.

Patkar (1963) reports that an emotionally <sup>n</sup>unstable, tense and nervous mother causes more emotional harm to the child affecting his food habits. Late introduction of solid foods and imitation also cause difficulty.

Sharma (1967) tells that when all children in a balundi sit together and take a meal, they would develop the feeling of unity and learn to overcome the difference between the rich or poor. It is essential to lay the foundations of unity through such situations to integrate the nation and make it powerful. Martin (1954) points out that the benefits of eating together make a major contribution to social and emotional growth. The child's antipathies toward food are forgotten in a desire to do what all other children are doing.

Dudley (1960) showed that attitude towards food influences to a large extent, the food intake and nutritional status of children. Singh (1964) states that the creation of a friendly atmosphere at meal time will do much to foster good eating manners. Continual reminders, shakings of the head and dismissals from the table, add strain and emotional tension between parents and the child. Exaggerated emphasis on table manners creates additional problems.

Patkar (1963) indicates that the child's refusal to eat anything at all, eating only under certain conditions, eating certain foods and refusing others, dwelling over food, storing the food for long periods, are all faulty habits of eating. These result from the attention given in the home by constant admonitions, instructions, warnings, threats, comparisons with others, coaxing, pleading, punishing, cajoling, bribing and mechanical force. Patkar concludes that it is desirable to leave him alone without forcing. Missing one meal does not cause him any harm. Pryor (1943) states that if the atmosphere is pleasant while starting a new food, the child will learn to eat all the foods that are suitable for him.

During school years, children have definite food likes and dislikes. Taylor and Melead (1945) claim that the meals taken at nursery school afford an unusual opportunity for training children in good food habits.

#### D. Methods of Instilling Good Food Habits:

Akroyd (1962) states that at all stages of life good diet is needed for health, but it is particularly necessary during the period of growth. Martin (1963) says that it is the natural instinct of a child to like a variety of foods, even those foods that are not normally considered suitable for children. Therefore, it is pointless to force a child to eat any food he does not want. Cultivating the right habit of eating with proper attitudes toward food is an important task of a mother.

Therefore, food becomes the symbol of comfort, contentment, satisfaction, and security in childhood. Frederick (1964) and Patkar (1963) emphasize that a relaxed atmosphere during meals is needed for babies to generate a friendly attitude toward food.

The one who was fortunate enough to have this good introduction to food in childhood, has the foundation for lifetime good food habits. Early childhood experiences of rigid schedules and tensions may symbolize unhappiness, dissatisfactions and conflicts. As the child grows older, he may develop resentment toward certain foods, particularly those which had been forced on him by over solicitous adults.

Frederick (1964), Bogert (1944) and Brisbane (1965) opine that the child should not be allowed to take snacks in order to make up for a light meal. This practice will tend to unbalance a decreasing appetite. If he refuses food at one meal, he should be made to wait until the next meal. Giving ready made foods and sweets, often are harmful to the child. They will spoil his eating and other routines. Regular mealtime hours are important physically and psychologically. A small child will accept and adjust to a pattern that is dependable. Irregular meals will encourage random snacking and lead to difficulties.

Bogert (1944) fears that bad habits of eating are responsible for digestive difficulties which cause the child to be undernourished. Over fatigue and strong emotions retard digestion. Therefore, rest

periods must be provided and the child should not be scolded or punished at meal time. Introduction of some hard foods at each meal encourage chewing and exercise of teeth and gums. Water can be given moderately during meal time. Candy should not be given at each meal. The craving for sweets is a habit all too easily cultivated. They are undesirable because they:

Prevent appetite.

Spoil taste for bland foods which contain the essential nutrients for growth

Cause irritation in the digestive tract

Are deleterious to teeth and bones

and may lead to over weight which has numerous undesirable consequences.

Patkar (1965) suggests that each new food needs to be introduced at regular mealtime and then no further interest should be shown. After a reasonable time, the dishes should be removed calmly without the slightest comment.

Sometimes the situation can be handled by making use of the child's very contrariness. At the beginning, place before him very small quantity of his favourite dish and if he asks for more he is given another small portion, when he gets into the habit of asking for more, his favourite dishes are slowly replaced by other things which he has previously refused. The main purpose is to have the youngster derive as much pleasure from refusing.

Foster (1939) puts forth that children are interested in the appearance as well as in the taste and the feeling of food. Yellow

seems to be their favourite colour for food. Brightly coloured food, beets, tomatoes, carrots add to palatability. Little Seasonings are preferable. Frederick (1964) urges that meals must look good, and appeal to the eye and taste through colour, texture and flavour.

Fern (1945) reports that simple foods, simply prepared, should form the foundation of young child's diet. Meals should be so planned to suit the health and requirements of the youngsters.

Devadas, Girija Bai and Mirnala (1968) state that eating too much of sweets and spicy foods cause dental caries.

Bogert (1944) and Constock (1980) suggest that concentrated dressings and seasonings should be avoided. Too much sweets and rich condiments should be avoided. Mildly cooked vegetables should be given first. Desserts or sweets should not be given at any time as a bribe or reward or kept back as punishment, as such practice will develop craving for sweets in later years. Tea and coffee are unsuitable for children as they crowd out nutritious foods. Drinking plenty of water and milk should be encouraged.

Foster (1939) warns that unless a child learns to eat a variety of foods he is likely to be handicapped socially. Children who stay long at a meal, eat less in amount than those who finish it in a short time. Much haste leads to spilling and noisy, careless eating. Such a child is not a pleasant companion.

Children tend to dislike strongly flavoured vegetables. Uninteresting colours and texture become unpleasant to them. Variety helps them to eat more. Crisp foods are universally popular and are crunched with

great delight. Temperature is of far less concern. Patkar (1963) says that when the child begins to eat solid foods he will need less milk, so forcing him to take his usual quota of milk should be stopped. As soon as the child is ready to eat by himself encourage him to do so and applaud his clumsy efforts. Do not hamper him by insisting on adults' feeding him. Allow a brief rest between exciting and tiring play. Regularity in meals should be strictly observed and eating in between meals avoided.

Martin (1963) prescribes the following to help young children maintain a favourable attitude towards eating after infancy:

Attractive food

Small servings

Some freedom to eat in their own way

Some freedom to choose their own food

Adequate play and sleep

Relaxed parents

Some youngsters cannot eat all they need in three meals. For them Frederick (1964) suggests that snacks can be sensible and promoting good habits, if planned. Sensible snacks help allay fatigue and emotional upset in young children.

Four to five small meals a day that are eaten will be more likely to provide the essentials of good nutrition than two to three large ones that are only partially eaten. Good foods used in snacks add to the diet. Nutritious snacks include milk, nuts, ice cream, and

fruits. Soft drinks give zest and enjoyment to snack time.

Jageswar (1964) emphasizes that milk contains more building materials than any other single food and is a must for growing children. It supplies materials needed throughout life and is therefore, the best foundation from which good meals can be built. Eggs are rich in good quality protein, minerals and vitamins.

Normally one egg should be given to a child every day. Milk and eggs rank above meat, as they contain more minerals and vitamin which are necessary for growth and maintenance of health.

Adhikari (1964) discourages expressing appreciation for food through making noise. Liquids should be drunk quietly and not sucked as if going down a drain. When masticating food, the mouth should be kept closed and movements of the jaw should be quiet and silent. Never should the mouth be packed full with food. There is seldom any need to hurry the meal. Bogert (1944) advises that parents should check from the beginning that the food is well mixed with saliva in the mouth.

Fryer (1945) and Adhikari (1964) give the following reasons for the undesirability of talking with food in the mouth:

Speech becomes indistinct.

The person may spit the food which may go into the face of the neighbour.

and Food may go down in the wrong way in the throat and choke.  
When eating with hands, the left hand should be kept dry, in order to lift the cup to the mouth, to take second helping, and pass food and other articles to neighbours.

The food should not be mashed up on the plate. The bits which are not intended to be consumed should be kept apart together. Unless it is unforeseen, food should not be returned from <sup>m</sup>outh into the plate. Never should half masticated food be heaped on the plate. This slight will turn people away from food. Foods should not be dropped all round the plate. One should not smear the face and chin with food.

Devadas (1968) stresses that changes in food habits can be induced only by nutrition education, adoption of better cooking practices, greater availability of foods recommended, and of money to purchase them. Changes in food habits result only through persuasion, demonstration and example. In this process, the role of the parents is significant.

Read (1955) states that encouragement on the part of the teacher is very effective in establishing proper food habits. Kellogg (1949) puts as the first requirement of a teacher who is in charge of meals, that she be able to demonstrate that eating is something to be enjoyed by all and never to be looked upon as a duty or misery. Meals eaten under compulsion <sup>l</sup> may be of limited nutritional value to children because it is not properly absorbed. Forced feeding is thus psychologically damaging. Nothing improves a poor appetite as much as, removal of all pressure from the child.

<sup>and Ricker</sup>  
Brisbane (1965) looks upon feeding the child alone before the family eats, as important as he is inclined to dwell and be dissipated in conversation with others. Patkar (1962) emphasizes the need for variety in children's food. Variety, the spice of life, applies to children's food as well.

Kellog (1949) states that children vary in the skill with which they feed themselves. Since the variations are due to physical and psychological causes, it is best to make as few comments as possible about a child's awkwardness in spilling. If it is due to poor motor coordination, only time and effort will help. Psychologically, nagging or anxiety will only aggravate the condition.

Bogert (1944) reports that diets of the preschool child of two to five years age, should contain a quart of milk, well cooked cereals and whole grains. Ready made pre-cooked cereals can be occasionally used, orange or tomato juice daily, with some mild raw or cooked fruit in addition. An ounce of steamed or ground liver may be given occasionally in the place of egg. Potato, butter, fat in moderate amounts, and simple dessert can be introduced once a day. Meals should be planned on three meals, a day basis, at about 18 months of age. However, mid-morning feeds will be needed to avoid hunger and fatigue, at least upto 5 years. With younger children or those inclined to be undernourished, milk should be given for the lunch. Pryor (1943) looks upon milk as the most perfect food. It should form the foundation for the diet of the preschool child.

A very simple early supper is essential for a good night's rest. If it seems necessary to feed young children at the family table in order to save extra work, their meal schedule may be made to conform more nearly to that of the child.

#### E. Feeding Programmes for Preschool Children

Describing the Applied Nutrition Programme (ANP), Simpson (1963)

states that it aims at providing supplementary feeding programmes for the vulnerable groups. The ANP helps people to become healthy, active, energetic, and happy and avoid waste of human resources due to chronic ill health. Through the ANP the preschool children receive supplementary foods to develop good physique and personality.

Rai (1957) claims that even the small food supplements to a balundi programme can help much to reduce malnutrition in our country. Varghese (1964) is of opinion that foods provided in the balundi should be based on an analysis of food habits of families of children. Snacks prepared from the items, which are lacking in the home food but are essential for the growth of the children should be served.

Bonnell (1948) states that feeding programmes vary in each region according to the number, <sup>of</sup> destitutes, vulnerable groups (children, pregnant women and lactating mothers), low income groups and public welfare institutions.

The WHO, CARE, UNICEF and other welfare organisations are helping towards feeding young children in rural areas (India, 1968).

According to Devadas and Easwaran (1968) dietary habits and nutritional status of children in the rural areas should be studied to evaluate Applied Nutrition Programme.

### III. EXPERIMENTAL PROCEDURE

The experimental procedures for this study on the influence of feeding programme on the food habits of pre-school children in ANP balwadi consisted of the following steps:

1. Selection of the village
2. Selection of the sample
3. Selection of the methods
4. Provision of amenities and supervision of the feeding programme
5. Collection of data
- and 6. Analysis of the data.

#### 1. Selection of the Village:

The village, Pannasadi, in Coimbatore District where the Applied Nutrition Programme is in operation was selected for the study. The reasons for selecting this village were that the cooperation from the village authorities, school teachers and balsevika was available, it was near investigator's residence and the village had a poultry unit which could supply the eggs needed for the feeding programme.

#### 2. Selection of the Samples:

Thirty balwadi and thirty non balwadi children within the age range of 2½ to 6 years were selected as the sample. This stage was selected since the probability of revealing the feeding practices is greater in childhood than at an older age. Further more, it is at this stage, that proper habits can be inculcated in children. In order to learn the prevailing food habits of the children in their homes, their mothers were also involved in the study. Thus, the sample consisted of 60 pre-school children and their mothers.

### 3. Selection of the Methods:

The observation method was selected to study the behaviour of children during meals. This method has been used successfully as a tool for the study of behaviour by Gardner (1964), Good and Scates (1954), Best (1963) Anandan (1956) and Kasthuri (1967). An observation schedule was specially prepared as given in Appendix I. It included child's cleanliness habits, eagerness for meals, moods during meals and other miscellaneous factors.

An interview schedule as given in Appendix <sup>II</sup><sub>A</sub> was used with the mothers to understand the prevailing food habits of their children, their views about good food habits and about the ANP feeding programme. The interview has been suggested by many workers as an appropriate device to study habits. <sup>Mintern and</sup> Lambert (1964), Sears (1957) and Malina Devi (1968). Gopal (1964) states that the interview is effective with field workers, particularly, in an under developed country both because of the types of problems tackled and the environment from which data are to be collected. The interview is the only method available to collect information from illiterates.

### 4. Provision of Amenities and Supervision of the Feeding Programme:

In order to inculcate the desirable habits in children, provision of proper amenities is important. Therefore, the investigator provided facilities for toilet and washing through giving a towel for each child and enough water (Figure 1 and 2). Previously the children were not provided with plates while eating eggs although there was an adequate number of plates in the Balvadi.

The investigator organised some programmes with the help of the balsevika. She talked to the children informally about the feeding times, importance of orderliness, cleanliness and proper eating habits. She then told stories related to the same. She helped children to sit properly in lines for easy and smooth food services. The children were checked whether they had washed their hands and plates. She helped the balsevika in preparing and serving supplements. This promoted the formation of good food habits in children through effective organisation and supervision.

Parent's meetings were also organised, during which the investigator discussed the importance of developing in children proper food habits. Individual conferences were also held with the parents. Group discussions demonstrations, film shows and puppet shows were the other methods used. (Figure.3.)

The effectiveness of the above programmes was assessed by comparing the food habits of these children before and after the organisation of ANP feeding. They were evaluated also by comparing with the children who were not attending the balvadi.

### 5. Collection of Data

The initial observations on the food habits of children in the balvadi were made in July 1969. The final observations were noted after the supervised programme of six months duration in February, 1970.

In order to locate the differences between the food habits of children attending the balvadi and those not attending the investigator observed the food habits of 30 nonbalvadi and 30 balvadi children in their own homes after the organised programme. She checked their meal times before hand, went to their homes with the permission and cooperation



FIGURE 1

CHILDREN GETTING READY FOR FEEDING IN THE BALWADI

CHILDREN WHILE USING TOWEL



FIGURE 2

PARENT EDUCATION CLASS



FIGURE 3

of the parents and observed the children. For this purpose, she halted in the village for ten days which enabled her to complete her observations. Each child was observed three times.

6. Analysis of the Data:

The data were analysed statistically using 't' test (Soetharman, 1965) <sup>to find out</sup> whether or not there was significant differences in the food habits of children before and after the organised feeding programme and whether or not there was significant difference between the food habits of children attending the ANP balwadi and those not attending the balwadi.

#### IV. RESULTS AND DISCUSSION

As the objective of this investigation was to find out the influence of an Applied Nutrition Programme feeding on the food habits of preschool children, the results are discussed under the following heads:

- A. General background of the sample
- B. Food habits of preschool children as viewed by the mothers of children attending and not attending the balwadi.
- C. Comparison of the food habits of balwadi and non-balwadi children as observed in their homes after the organised feeding programme.
- D. Comparison of the food habits of balwadi children before and after the organised feeding programme in the balwadi.

##### A. General Background of the Sample:

The general background of the sample is given in Table I.

TABLE I  
GENERAL BACKGROUND OF THE SAMPLE

Particulars	Description	Balwadi children	non-balwadi children
		No: 50	No: 50
		Frequency	
Type of family	Nuclear	27	20
	Joint	3	10
Monthly income	Below Rs. 100	2	3
	Rs. 101 - 500	25	25
	Above Rs. 500	2	2
Educational status of fathers	Illiterate	27	30
	Upto elementary school	27	33
	Upto High School	60	53
	College	3	3
Educational status of mothers	Illiterate	53	50
	Upto elementary school	33	43
	Upto High School	13	7
	College	—	—

A majority of the balwadi and non-balwadi children belonged to nuclear families whose monthly income ranged between Rs. 101 - 500

It was noted that a majority of the children, 27 and 29 of the balwadi and non-balwadi respectively, were non-vegetarians.

B. Food Habits of Preschool Children as Viewed by Mothers of Children Attending and Not Attending Balwadi:

1. Foods Included and Types of Services:

There was no significant difference in the types of food items given to children between the balwadi and non-balwadi groups. For both the groups, cereals formed the major portion of the diet. Pulses occupied the next place. Milk, fruits and vegetables were used only by very few families. However, the balwadi children had egg and milk on alternate days, which the non-balwadi children did not have.

Among the balwadi children, 90 per cent ate by themselves, whereas among the non-balwadi children, only 73 per cent ate by themselves. The rest of the children wanted to be fed by others. The reasons stated by mothers were "he cannot eat by himself because he is too small"; and "refusal by the child to eat by himself". In both the groups for more than 60 per cent of children, self-feeding had been initiated between one to two years of age.

Only 15 per cent of the mothers of balwadi children and 30 percent of the mothers of children not attending balwadi avoided certain foods, such as ice-fruit, plantain, left over rice, "kali" and curds for their children as they believed them to be harmful, as "cold producing". Some avoided jack fruit, mango, egg, fish and ground-

nuts as these were considered to be gas forming and producing stomach pain. Further more, guava, jaggery and sweets were avoided due to the belief that these produced tapeworm infestation and decreased appetite. 'Cholakali' was avoided in some homes because it produced diarrhoea.

Only seven per cent of the mothers made special modifications in the children's diet by adding sprouted green gram, milk and fruits to the child's diet.

## 2. Likes and Dislikes:

The investigator noted that a majority of children in both the groups did not have any particular likes and dislikes towards foods. They ate almost all types of food offered. However, they showed a preference toward sweet preparations. "Kali" prepared out of ragi, cholan and wheat was the least liked because it was prepared everyday in many households.

## 3. Parents' Views Regarding Feeding Children:

### a. ANP Feeding Programme:

Sixty seven per cent of mothers had seen the ANP feeding programme in the balvadi. They were aware that the feeding programme helped their children in the promotion of good health and better food habits. Some mothers were thankful that the feeding programme supplemented lunch. They were appreciative of the way in which feeding programme was conducted.

Table II shows the benefits of the feeding programme on the food habits of children as claimed by the mothers.

TABLE II

## BENEFITS OF FEEDING PROGRAMME ON THE FOOD HABITS OF BALWADI CHILDREN

Benefits	Balwadi	Non-balwadi
	Percentage	Percentage
Promotes good food habits	75	63
Promotes cleanliness habits	87	—
Promotes social adjustments	10	3

A majority of the mothers of balwadi children emphasized promotion of habits of cleanliness and good eating as the benefit of the feeding programme. Among the mothers of children not in the balwadi also a majority stated likewise.

Ninety per cent of mothers were satisfied with the feeding programme for the reasons shown in Table III.

Table III

## REASONS FOR MOTHERS' SATISFACTION ABOUT THE FEEDING PROGRAMME

Reasons for satisfaction	Percentage
Administered well	17
Helps children in learning good habits	75
Provides protective foods	63

Providing protective food and learning good habits were the major reasons for the mothers' satisfactions.

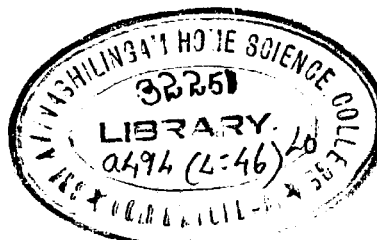
b. Meal Time:

A majority of the mothers of balwadi and non-balwadi children expressed the necessity for providing a pleasant atmosphere during meals as it promotes better digestion and creates less trouble during meal time. The methods adopted by the mothers for providing a pleasant atmosphere during eating included encouraging, bribing, conversing, patting and avoidance of threatening. A majority (57 per cent) of the mothers of the balwadi children tried not to get irritated while feeding the children. Conversation while eating was adopted by 47 per cent of mothers of the balwadi children and 40 per cent of the mothers of children not attending the balwadi.

All the mothers of balwadi and 57 percent of mothers of children not attending balwadi agreed that monotony in food should be avoided. The reasons given by mothers for avoidance of monotony in child's diet are stated in Table IV.

Table IV  
REASONS FOR AVOIDANCE OF MONOTONY IN FOOD

Reasons	Balwadi	Non-Balwadi
	Percentage	Percentage
For variety	25	25
To avoid dislike and boredom	9	5
To make eat well	67	15
To improve child's health	10	—
For economy	5	5



Mothers of balwadi children were better aware of the need to avoid monotony in foods in order to make the child eat well.

Fifty seven per cent of mothers of balwadi children and 40 per cent of the other mothers agreed that appearance of food items influenced eating habit.

A majority (83 per cent) of non-balwadi children took between meals snacks as against only 37 per cent in the case of balwadi children. A greater number of mothers of balwadi children set regular meal times, for good health, formation of good habits and for economy of time.

C. Comparison of the Food Habits of Balwadi and Non-Balwadi Children as Observed in Their Homes after the Organized Feeding Programmes

The home food habits of the children are discussed under the following heads:

1. Habits of cleanliness during meals
2. Eagerness for meals
3. Nature and moods of children during meals
4. Miscellaneous

1. Cleanliness Habits of Children during Meals:

The cleanliness habits of balwadi children in their homes as compared with those not attendant balwadi are presented in Table V

TABLE V

**CLEANLINESS HABITS OF BALWADI CHILDREN AS COMPARED WITH NON-BALWADI CHILDREN AT THEIR HOMES**

Cleanliness Habits	Always			Never		
	Bal- wadi	Non Bal- wadi	't' value	Bal- wadi	Non Bal- wadi	't' Value
	Percentage			Percentage		
1. Washes hands before meals	97	10	6.6*	3	50	
2. Washes hands after meals	97	65		-	10	
3. Washes hands only when reminded	15	30		65	15	
4. Washes with other's help	14	20		80	40	
5. Wipes after washing	65	20		7	27	
6. Wipes on towel	55	—		7	98	6.07*
7. Wipes on the dress	67	17		5	35	

\*Significant at 5% level.

The children attending the balwadi found superior to children not attending balwadi in their cleanliness habits during meals. A majority of balwadi children washed and wiped their hands before and after their meals. Many did so without being reminded and helped by others. However many of the balwadi children wiped their hands on their dress. As the mothers did not provide them towels to wipe, they had to wipe on their dress.

Figure 4 illustrates the cleanliness habits of children attending balwadi and not attending balwadi.

# CLEANLINESS HABITS OF BALWADI CHILDREN AS COMPARED WITH NON-BALWADI CHILDREN

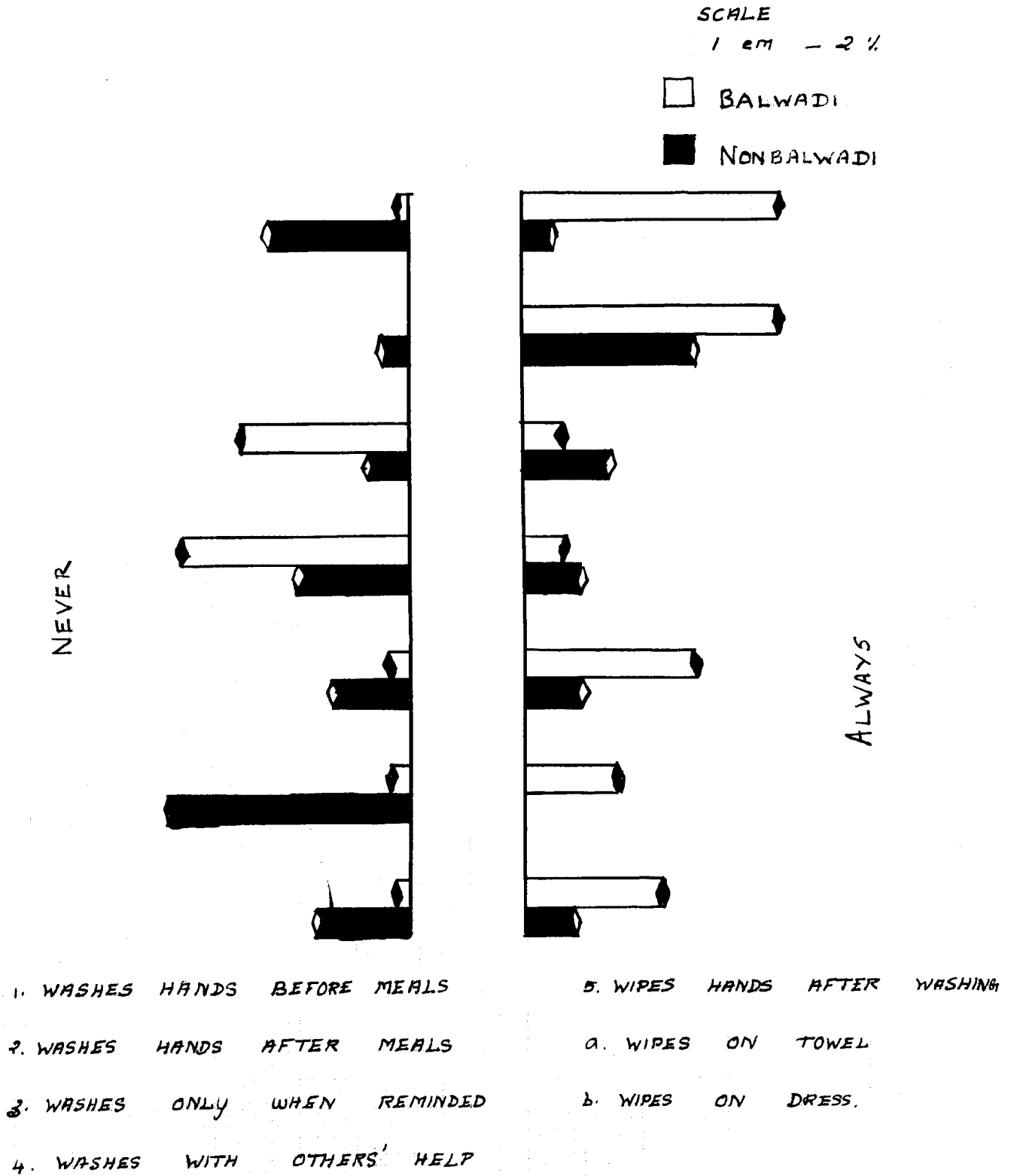


FIGURE-4

## 2. Extent of Children's Eagerness for Meals:

Children's eagerness for meals is presented in Table VI

TABLE VI  
EXTENT OF CHILDREN'S EAGERNESS FOR MEALS

Habits	Always		Never	
	Balwadi Percentage	Non Balwadi Percentage	Balwadi Percentage	Non Balwadi Percentage
1. Refuses to take meals	—	7	77	46
2. Comes willingly to take meals	80	40	—	—
3. Hurries to get the meals	—	3	93	57
4. Expects rewards	—	3	73	40
5. Needs coaxing	3	40	80	17
6. Does not finish the meals	—	20	80	23
7. Gets distracted too often in between meals	13	73	40	—
8. Eats only certain foods excessively	3	6	6	47

None of the balwadi children refused to take meals. A majority of them came willingly to eat. The problems were less in the case of balwadi children. In contrast, children not attending balwadi were found to exhibit more of the undesirable habits such as refusing to take meals, not finishing the meals, hurrying to take the meals and getting distracted.

## 3. Children's Nature and Moods during Meals:

Comparison of the nature and moods of the children during meals is presented in Table VII.

TABLE VII

## COMPARISON OF THE NATURE AND MOODS OF CHILDREN DURING MEALS

Moods	Always			Never		
	Bal-wadi	Non bal-wadi	't' value	Bal-wadi	Non bal-wadi	't' value
	Percentage			Percentage		
Happy	97	27	5.5*	—	20	
Sleepy	—	—		100	90	
Crying	—	5		97	74	
Indifferent	—	30		84	55	
Playful	6	27		57	25	
Serious	13	6		50	60	
Sulking	5	15		84	60	

\* Significant at 5 per cent level

Happiness during meals was experienced by a greater number of balwadi children <sup>as compared</sup> with their counterparts who were not attending the balwadi. There was no evidence of crying, indifference and sleepiness during meals among the balwadi children.

#### 4. Miscellaneous:

Comparison of other factors in regard to food habits are presented in Table VIII.

TABLE VIII

COMPARISON OF OTHER FACTORS IN REGARD TO FOOD HABITS OF CHILDREN DURING MEALS

Habits	Always			Never		
	Bal- wadi	Nonbal- wadi	't' value	Bal- wadi	Non bal- wadi	't' value
	Percentage			Percentage		
Likes to sit alone during meals	10	50	5.5*	57	25	
Likes to sit with family members	47	15	2.85**	16	44	
Likes to sit with the same person	7	7		60	45	
Takes other's share	--	--		85	80	
Puts his share in other's Oplate	--	--		80	85	
Licks the plate	--	27	5.04*	95	80	
Uses left hand	--	5		97	70	
Uses both hands	--	--		95	57	
Likes to be fed by others	7	20	90	90	50	

\*\* Significant at 1 per cent level

\* Significant at 5 per cent level

Sitting alone during meals was a preference among children not attending balwadi. It was striking to note that none of the balwadi children took other's share, licked the plate, used left hand and both hands during eating. Thus the balwadi children were found to be superior than those who were not in the preschool. balwadi

These findings are in agreement with that of Sharma (1967) who recorded improvement in the food habits of children after attending the balwadi.

D. Comparison of the Food Habits of Balwadi Children Before and After the Organised Feeding Programme in the Balwadi:

The observations made before and after childrens' participation in the organised ANP feeding programme in the balwadi are discussed in the following pages.

1. Cleanliness Habits of Balwadi Children during Feeding:

Comparison of the cleanliness habits of balwadi children before and after the programme is given in Table IX.

TABLE IX

CLEANLINESS HABITS OF CHILDREN BEFORE AND AFTER THE ORGANISED PROGRAMMES

Habits	Initial	Final	't' value
	Percentage		
1. Washes hands before meals	--	90	6.92*
2. Washes hands after meals	--	95	7.15*
3. Washes only when reminded	--	10	
4. Wipes hands	87	95	
5. Wipes with towel	--	90	6.92*
6. Wipes on dress	70	7	5*
7. Wipes on anything	16	5	

\*Significant at 1 per cent level

A majority of children showed improvement in cleanliness habits after participating in the ANP feeding programme.

Figure 5 illustrates the cleanliness habits of children before and after the programme.

## 2. Children's Eagerness for Meals:

The children's eagerness for meals as observed initially and finally is presented in the Table X.

TABLE X

EXTENT OF CHILDREN'S EAGERNESS FOR MEALS BEFORE AND AFTER THE ORGANISED PROGRAMME

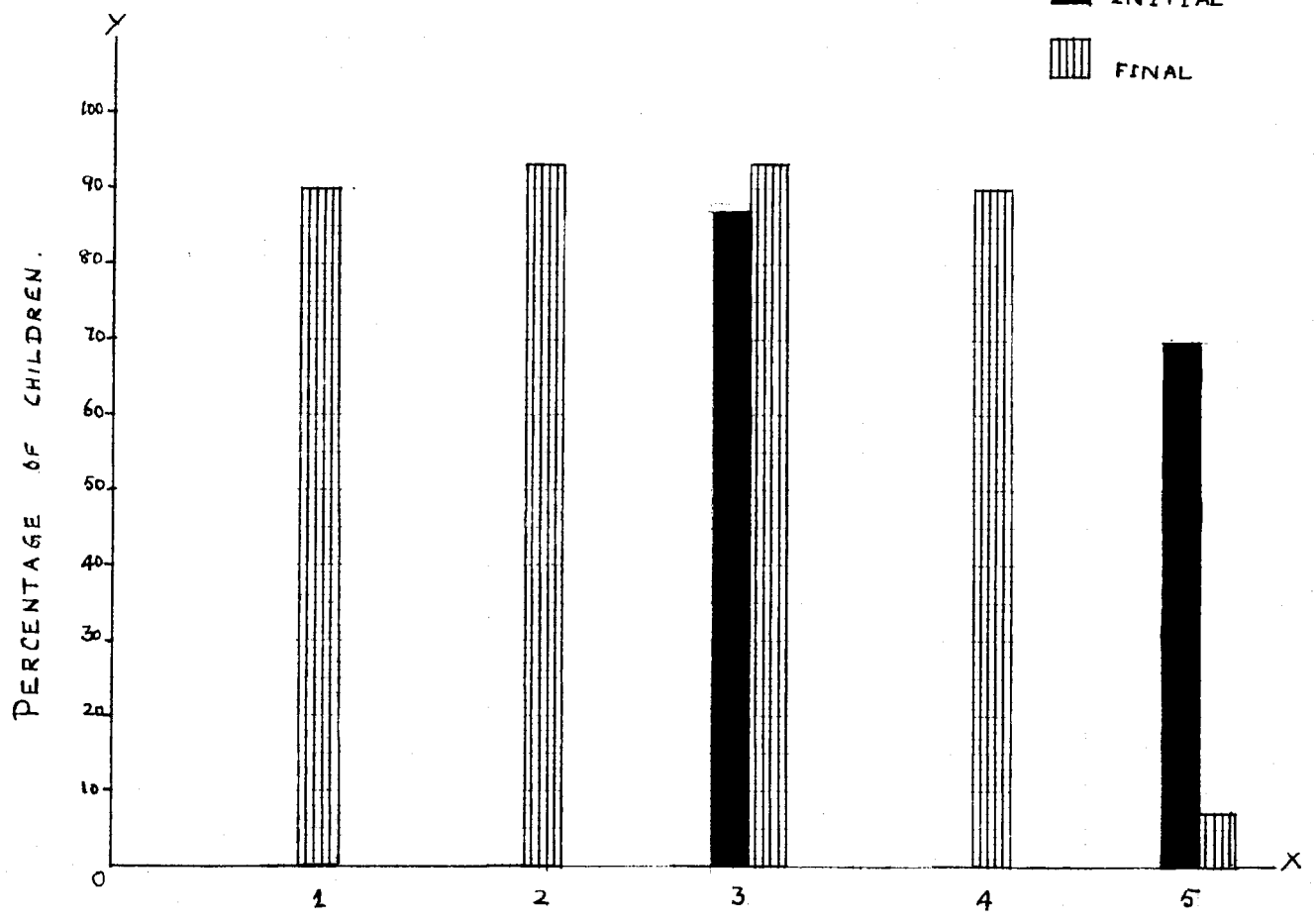
Factors	Initial	Final	't' value
	Percentage		
Refuses to take meals	20	10	
Hurries to get meals	10	5	
Does not finish the meals - Egg	10	2	2.64*
Milk	25	5	
Needs coaxing	20	10	
Gets distracted in between meals	5	--	
Takes others' share also	15	7	
Gives his share to others	7	5	
Waits quietly	87	100	

\*Significant at 5 per cent level

Most of the undesirable habits found during the initial stages had decreased in the final stage of observation. All the children had learned to be quiet while waiting for meals.

# CLEANLINESS HABITS OF CHILDREN BEFORE AND AFTER THE PROGRAMME.

SCALE  
Y axis 1cm = 10%  
■ INITIAL  
▨ FINAL



- 1. WASHES HANDS BEFORE MEALS
- 2. WASHES HANDS AFTER MEALS
- 3. WIPES HANDS
- 4. WIPES WITH TOWEL
- 5. WIPES ON DRESS

FIGURE 5

Figure 6 illustrates the extent of children's eagerness for meals before and after the programme.

### 3. Children's Nature and Moods during Meals:

A comparison of children's nature and moods during meals before and after the programme is given in Table XI.

TABLE XI  
CHILDREN'S NATURE AND MOODS OBSERVED BEFORE AND AFTER THE ORGANISED PROGRAMME

Factors	Initial	Final	't' value
	Percentage		
Happy	50	90	3.53*
Playful	35	10	2.15**
Sleepy	3	—	
Fatigue	20	3	
Active	50	90	3.53*
Serious	7	—	
Sulking	3	—	

\*Significant at 1 per cent level

\*\*Significant at 5 per cent level

The positive qualities increased and the undesirable moods such as sulking, being serious and going to sleep disappeared in the final stage. The reason may be the attention paid individually to each child. There was also orderliness and discipline during the meal time (Figure.7).

# EAGERNESS FOR MEALS BEFORE AND AFTER THE STUDY

SCALE

1 CM - 2%



INITIAL



FINAL

1. REFUSES TO TAKE MEALS
2. HURRIES TO GET THE MEALS
3. DOES NOT FINISH THE MEALS  
A. EGGS      B. MILK
4. NEEDS COOKING
5. EATS ONLY CERTAIN FOODS
6. ASKS FOR SERVING
7. TAKES OTHERS SHARE ALSO

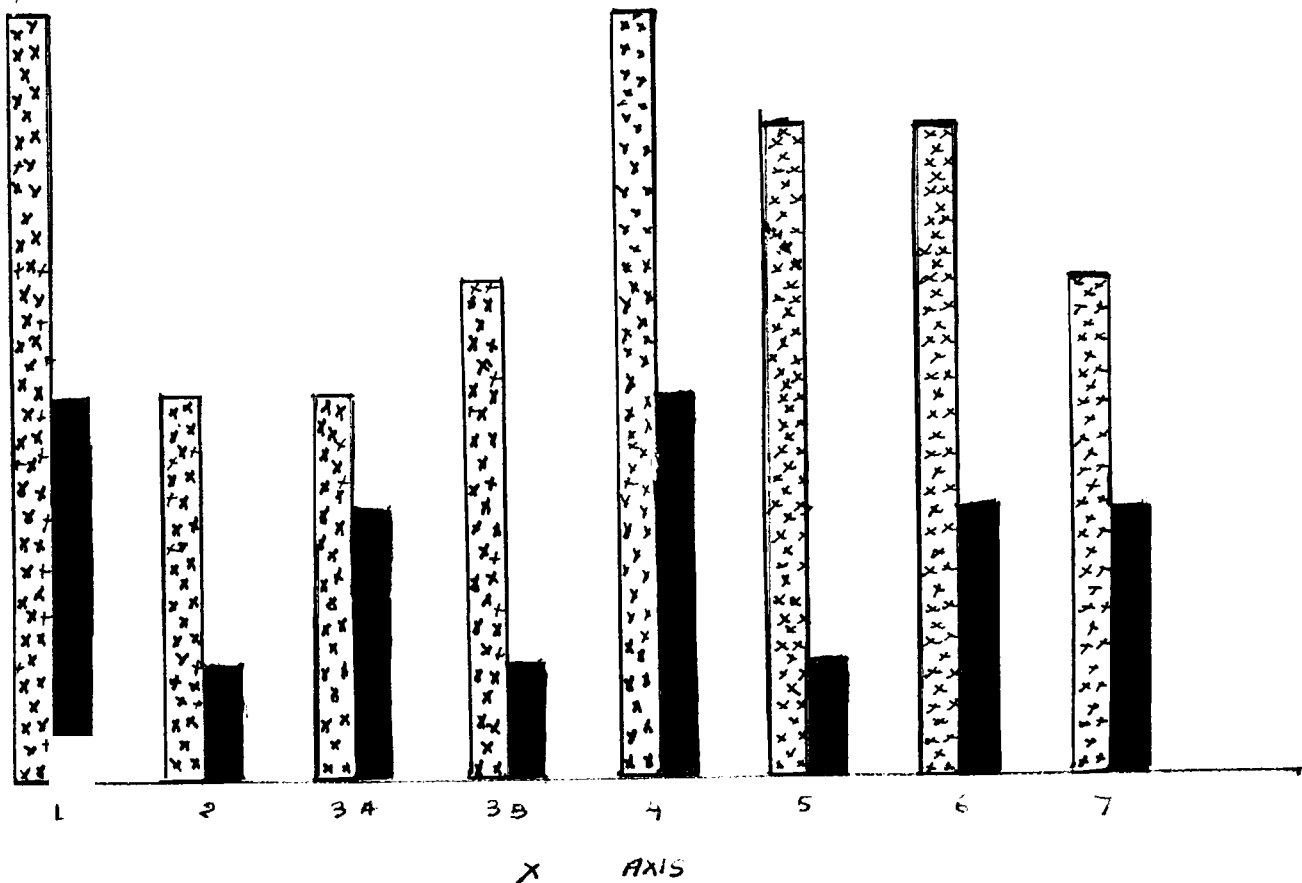




FIGURE 7

CHILDREN ATTENDING THE FEEDING PROGRAMME IN THE BALWADI

#### 4. Miscellaneous:

Comparison of other factors in regard to food habits of children as observed before and after the organised feeding programme is given, in Table XII

TABLE XII

OTHER FACTORS IN REGARD TO FOOD HABITS AS OBSERVED BEFORE AND AFTER THE ORGANISED PROGRAMME

Factors	Initial	Final	't' value
	Percentage		
1. Likes to sit alone	10	—	
2. Likes to sit with the same person during meals	57	7	2.15**
3. Washes by spilling	63	20	3.31*
4. Uses left hand	27	10	
5. Uses both hands	17	10	
6. Helps in serving	3	15	
7. Helps in cleaning plates and tumblers	3	90	6.7*

\* Significant at 1 per cent level  
 \*\* Significant at 5 per cent level

Table XII shows that none of the balwadi children sat alone for meals after participation in the programme. Initially some children sat wherever they liked. The proportion of spilling, using left hand or both hands for eating also was less. Many started to help in serving and cleaning the plates used by them.

Taylor and Meleed (1945) claimed that meals taken at nursery school afford an unusual opportunity for training children in good habits. If children are motivated and guided properly during meal time in the balwadi, they will definitely develop the desirable habits.

## V. SUMMARY AND CONCLUSION

The study was undertaken to find out the influence of an organised ANP feeding programme on the food habits of preschool children in Pannimadai village, in Coimbatore District. The sample included 50 children attending the balwadi and 50 who were not attending and all their mothers. Observation and interview were the methods adopted as tools in this study.

The important findings arising out of this study are:

1. The organised ANP feeding programme in the balwadi helped children to develop desirable food habits.
2. The mothers of the children who were participating in the feeding programme learned better methods of inculcating desirable food habits in their children.
3. The children attending the Balwadi feeding programme were found to be superior in their food habits to their counterparts who were not in the Balwadi.

This study proves conclusively the beneficial effects of an organised ANP on the food habits of preschool children.

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**APPENDICES**

APPENDIX I

OBSERVATION SCHEDULE TO ELICIT INFORMATION ON THE  
FOOD HABITS OF CHILDREN (BALWADI AND NON)  
BALWADI)

Name of the Child:

S.No.

Age of the Child:

Sex of the Child:

Address:

S.No.	Food Habits	I Time		II Time		III Time	
		Yes	No	Yes	No	Yes	No
<b>I. <u>Cleanliness Habits:</u></b>							
1.	Washes hands before meals						
2.	Washes hands after meals						
3.	Washes hands only when reminded						
4.	Washes with other's help						
5.	Wipes hands after washing						
6.	Wipes on the towel						
7.	Wipes on the Dress						
8.	Wipes on anything						
9.	Anyothers						
<b>II. <u>Eagerness for Meals:</u></b>							
1.	Refuses to take meals						
2.	Comes willingly to take meals						
3.	Hurries to get meals						
4.	Expects rewards						
5.	Needs coaxing						
6.	Does not finish the meals						
7.	Eats only certain foods excessively						

S.No.	Food Habits	I Time		II Time		III Time	
		Yes	No	Yes	No	Yes	No

**III. Child's Moods During Meals:**

1. Happy
2. Sleepy
3. Crying
4. Indifferent
5. Serious
6. Sulking
7. Any other(Specify)

**IV. Other Factors:**

1. Likes to sit alone during meals
2. Likes to sit with the same person
3. Likes to sit with the family members
4. Takes other's share
5. Licks the plate
6. Uses left hand
7. Uses both hands
8. Likes to be fed by others
9. Puts his share in other's plate
10. Any other

## APPENDIX II

**AN INTERVIEW SCHEDULE TO ELICIT INFORMATION ON THE FOOD HABITS  
OF BALWADI AND NON-BALWADI CHILDREN**

S.No. 

Name and address of the interviewee:

Name of the child:

Age of the child:

Sex of the child:

Type of family:

Joint Nuclear Vegetarian Non vegetarian 

## 1. Family background:

S.No.	Name of the members	Relationship to the head of the family	Age in years	Sex	Educational status				Occupation	Monthly income in Rs.
					Illiterate	Elementary school	High school	College		

---

Total Income

---

2. Indicate the meal pattern of the child for three days:

Name of the meals	Menu for the I day	Menu for the II day	Menu for the III day
Breakfast			
Lunch			
Tea			
Dinner			
Any other			

3. Food likes and dislikes of the preschool child

a. Food likes

S.No.	Foods liked	At what age	Reasons	In what form	Reasons

b. Food dislikes

S.No.	Foods disliked	At what age	Reasons	In what form	Reasons

4. What type of feeding do you adopt?

Type of feeding

From which year onwards	Self	Fed by others	Reasons
-------------------------	------	---------------	---------

5. Do you avoid any foods in his diet?

Yes

No

If yes,

S.No	Foods avoided	Reasons
------	---------------	---------

6. Do you make any special modifications or special foods in the diet of your preschool child?

Yes

No

If yes,

---

S.No.	Special foods included	Reasons.
-------	------------------------	----------

---

If no, reasons:

1.

2.

3.

4.

5.

7. Are you aware of the feeding programme in the taluadi?

Yes

No

8. Have you seen the feeding programme in the balwadi at least once?

Yes  No

If yes, what is your general opinion about the feeding programme in the balwadi?

- 1.
- 2.
- 3.
- 4.
- 5.

9. What are your views on the use of the following in the feeding programme?

S.No	Food stuffs	View
a.	Egg	
b.	Milk (Skim milk)	

10. Do you think that the feeding programme help in improving the food habits of the child?

Yes  No

REASON

- 1.
- 2.
- 3.
- 4.
- 5.

11. Are you satisfied with the present food habits of your child?

Yes  No

Reasons

1.

2.

3.

4.

5.

12. a. Do you agree that the meal time should be made pleasant for children?

Yes  No

Reasons

1.

2.

3.

4.

5.

b. If yes, what method do you adopt to make it pleasant?

S.No.	Method adopted	Reasons

13. Do you make the child eat with the group of family members or alone?

With members

Alone

Reasons:

- 1.
- 2.
- 3.
- 4.
- 5.

14. Do you agree that monotony in food should be avoided for children?

Yes

No

Reasons:

- 1.
- 2.
- 3.
- 4.
- 5.

15. What are the factors to be considered in preparing food items for the child?

S.No.	Factors	Yes	No	How	Reasons
1.	Colour				
2.	Texture				
3.	Taste				
4.	Shape				
5.	Size				
6.	Any other				

16. a. Do you feel that the appearance of food affects the habits of children?

Yes

No

Reasons

1.

2.

3.

4.

5.

17. Do you encourage feeding your child in between meals?

Yes  No

Reasons:

- 1.
- 2.
- 3.
- 4.
- 5.

18. Does your child eat in between the meals?

Yes  No

19. Do you set any regular meal time for your child?

Yes  No

19. Reasons:

- 1.
- 2.
- 3.
- 4.
- 5.

20. Does your child follow the regular mealtimes?

Yes  No

Reasons:

- 1.
- 2.
- 3.
- 4.
- 5.

21. Is there any change in his food habits after attending the balwadi?

Yes

No

If yes, Reasons:

1.

2.

3.

4.

5.

22. Do you make any modifications in the diet of your preschool child after he started attending the balwadi?

Yes

No

Reasons:

1.

2.

3.

4.

5.

23. Are you satisfied with the way of conducting the feeding programme?

Yes

No

Reasons

- 1.
- 2.
- 3.
- 4.
- 5.

If no, suggestions for the improvement:

- 1.
- 2.
- 3.
- 4.
- 5.

## APPENDIX - III

## MODIFIED ROUTINE OF THE BALWADI

Time	Activities
8.45 - 9.30 A.M.	Children's arrival
9.35 - 10.00 A.M.	Prayer and informal talk
10.05 - 10.30 A.M.	Outdoor free play and organised games
10.35 - 10.45 A.M.	Health check up
10.50 - 11.15 A.M.	Indoor free play
11.15 - 11.20 A.M.	Winding up
11.20 - 11.30 A.M.	Toilet and washing up
11.35 - 12.00 A.M.	Feeding programme
12.05 - 12.30 P.M.	Story and music

## APPENDIX - IV

## PROGRAMMES ORGANISED FOR CHILDREN

Aims	Topics	Methods
To educate children about health and hygiene	Importance of washing hands before after meals	Informal talk
	Need for wiping hands on towel	Informal talk
	Introduction of using motifs to recognize their towels.	
	Effects of eating the sweets sold on road side (exposed to dust and germs)	with examples
	Not to eat sweets and other foods at inappropriate times at inappropriate places.	Informal
To make them understand dangers in eating and preparing meals on the road	Story "Crow and Cake"	Story telling
To prevent nail biting	Teaching a song (Nagan Kadithan) "நகம் கடித்தேன்"	Action song
To impart knowledge on the needs for nutritious foods in the diet	"அம்மா பாலைக் கறந்திலொன்" "வாணம் கடுக்கால்" இந்தாங்க இந்தாங்க இங்கும் பாலைக் குடியுங்க" (Use of milk and milk products)	Action song    Song

Contd...

Aims	Topic	Methods
To instill proper food habits	Proper way of eating	Informal talk
Omission of undesirable way of eating	Avoidance of spitting while eating, talking with food in the mouth, spilling and using both hands and so on	Informal talk with pictures.
To avoid untimely eating	Avoidance of untimely eating (avoiding in between snacks). Illustrating the necessity to eat at regular intervals for better health	Informal talk with examples
To inculcate liking towards vegetables, milk and egg.	Importance of different vegetables, milk and egg for health and growth	Leaflet.
To develop personal hygiene	Importance of brushing teeth daily, Importance of taking bath daily Importance of cutting nails Importance of keeping hair clean	Informal talk

## APPENDIX - V

## PARENT EDUCATION

S.No.	Subjects	Method
1.	Benefits of attending Balwadi	Informal talk
2.	Children's diet	Exhibition
3.	Importance of kitchen garden	Appet show
4.	Importance of nutritious vegetables and fruits	Informal talk with the aid of leaflet
5.	Importance of proper habit formation in children	Charts
6.	Discussion with mothers on the behaviour of their children	Informal discussion with charts
7.	Importance of instilling proper eating habits in pre-school years	Home visits.
8.	Importance of cleanliness during preschool years	Home visits.
9.	Taking them to participate in women's day celebrations at Sri Avinashilingam Home Science College, Coimbatore.	Field trip
10.	How to cook locally available greens without wasting nutrients and to prepare in various recipes with it	Demonstration
11.	Preparation of low cost foods - Ragi, porridge, maize rotli	Demonstration
12.	Preparation of sweet potato puree	Demonstration
13.	Preparation of sprouted green gram pachadi	Demonstration
14.	Teaching of songs on nutritious foods and Applied Nutrition programme	Action song

## APPENDIX VI

## STATISTICAL APPRAISALS

Using 'z' test method

Formula

$$t = \frac{P_1 - P_2}{\sqrt{\frac{pq}{n_1} + \frac{pq}{n_2}}}$$

$P_1$  = proportion of balwadi children

$P_2$  = proportion of nonbalwadi children

$p = \frac{n_1 P_2 + n_2 P_1}{n_1 + n_2}$  where

$n_1$  = number of balwadi children

$n_2$  = number of nonbalwadi children

$q = 1 - p$

$$t = \frac{(P_1 - P_2)}{\sqrt{\frac{pq}{n_1} + \frac{pq}{n_2}}} = \frac{1(P_1 - P_2)}{\sqrt{2 \times \frac{pq}{n}}}$$

**CLEANLINESS HABITS OF BALWADI CHILDREN AS COMPARED WITH HONSAWADI CHILDREN  
IN THEIR HOMES**

Habits	$P_1$	$P_2$	$q_1$	$n_1$	$n_2$	$t = \frac{P_1 - P_2}{\sqrt{\frac{pq + pq}{n_1 n_2}}}$
Washes hands before meals (always)	0.97	0.10	0.53	30	30	6.6**
Wipes on the towel (Never)	0.90	0.45	0.55	30	30	6.923*

\* Significant at 1 per cent level  
 \*\* Significant at 5 per cent level  
 if  $t > 3$  significant at 5 per cent level.

Factors.	P <sub>1</sub>	P <sub>2</sub>	P	q	n <sub>1</sub>	n <sub>2</sub>	t' value
<u>Moods</u>							
Happy	0.97	0.27	0.6	0.4	30	30	5.3*
<u>Miscellaneous factors</u>							
Lacks the plate (never)	0.93	0.30	0.62	0.38	30	30	5.04*
Uses both hands	0.93	0.37	0.65	0.35	30	30	4.55*
Likes to be fed by others	0.30	0.50	0.70	0.30	30	30	3.33*
Washes hands before meals	--	0.30	0.45	0.55	30	30	6.323*

\* Significant at 1 per cent level

COMPARISON OF THE FOOD HABITS OF CHILDREN BEFORE AND  
AFTER THE ONE WISED PROGRAMME

$p_1$  = proportion of children at the initial stage in the balwadi

$p_2$  = proportion of children at the final stage in the balwadi

$$p = \frac{n_1 p_1 + n_2 p_2}{n_1 + n_2}$$

$n_1$  = number of children at the initial stage

$n_2$  = number of children at the final stage

$$q = 1 - p$$

$$t = \frac{(p_1 - p_2)}{\sqrt{\frac{pq}{n_1} + \frac{pq}{n_2}}} = \frac{1 p_1 - p_2}{\sqrt{2 \times \frac{pq}{n}}} \quad \text{where } n = 30$$

Factors	P <sub>1</sub>	P <sub>2</sub>	P	q	n <sub>1</sub>	n <sub>2</sub>	't' value
<u>Cleanliness Habits</u>							
Washes hands before meals	0	0.30	0.45	0.55	30	30	6.923*
Washes hands after meals	0	0.93	0.46	0.54	30	30	7.15*
Rinses with towel	0	0.90	0.45	0.55	30	30	6.923*
Rinses on the dress	0.70	0.07	0.39	0.61	30	30	5.000*
<u>Children's nature and mood</u>							
Happy	0.05	0.10	0.70	0.30	30	30	3.33*
Playful	0.33	0.10	0.22	0.88	30	30	2.15**
Active	0.50	0.10	0.70	0.30	30	30	3.33*

\* Significant at 1 per cent level

\*\* Significant at 5 per cent level

**CHILDREN'S EAGERNESS FOR MEALS AS OBSERVED INITIALLY  
AND FINALLY IN THE BALWADI**

$$\text{Formula } t = \frac{\bar{x}}{\sqrt{\frac{s^2}{n-1}}}$$

$x$  = Initial

$y$  = Final

$z$  =  $x - y$

S.No.	Eagerness for meals	x	y	z
1.	Refuses to take meals	6	3	3
2.	Hurries to get meals	3	1	2
3.	Does not finish egg	3	2	1
4.	Does not finish milk	4	1	3
5.	Needs coaxing	6	3	3
6.	Gets distracted inbetween meals	1	0	1
7.	Eats only certain foods excessively	5	2	3
8.	Takes other's share also	4	2	2
9.	Asks for serving	5	2	3
10.	Gives his share to others	2	1	1
11.	Waits quietly	26	30	-4
<b>Total</b>				<b>18</b>

$$s = \frac{\sum z^2}{n} = \frac{18}{11} = 1.64$$

$$s^2 = \frac{\sum z^2}{n} - (\bar{z})^2 \quad \text{with } n-1 \text{ d.f.}$$

$$t = \frac{\bar{z}}{\sqrt{\frac{s^2}{n-1}}} = \frac{1.64}{\sqrt{3.8559/10}} = \underline{\underline{2.64}}$$

Table value 5% level = 2.23  
Significant at 5% level.

**MISCELLANEOUS FOOD HABITS OF CHILDREN AS OBSERVED  
INITIALLY AND FINALLY IN THE BALWADI**

S.No.	Other factors	P <sub>1</sub>	P <sub>2</sub>	P	q	n <sub>1</sub>	n <sub>2</sub>	't' value
1.	Sits with the same person	0.37	0.07	0.22	0.78	30	30	2.15**
2.	Wastes by spilling	0.65	0.20	0.42	0.58	30	30	3.31**
3.	Helps in cleaning	0.03	0.90	0.47	0.53	30	30	6.7*

\* Significant at 1 per cent level

\*\* Significant at 5 per cent level

