EXPLORING THE POSSIBILITIES OF UTILISING THE BALWADI AS AN INSTRUMENT OF NUTRITION EDUCATION

by

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A Thesis Submitted to the University of Madras in Partial Fulfilment of the Requirements for the Degree of Master of Science,

April, 1974

A C K N O W L E D G E M E N T

The investigator is immensely grateful to Dr.(Mrs.) Rajammal P.Devadas, M.A., M.Sc., Ph.D.(Ohio State), Principal, Sri Avinashilingam Home Science College for Women, Coimbatore, for her valuable and whole hearted guidance given throughout the study. The author expresses her sincere and heartfelt thanks to Selvi K.C. Leelavathy, M.Sc., Demonstrator in Home Science Extension, Sri Avinashilingam Home Science College for Women, Coimbatore. Her sincere thanks are due to Block Development Officer of Periyanaickenpalayam Panchayat Union, Balasevikas of Veerapandi and Sundapalayam Villages, Balwadi children and their mothers for their kind cooperation in compleating this endeavour.

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I. INTRODUCTION

Life is the noblest gift of God and health is one of its greatest blessings. 'Health is Wealth'. It is a positive state of well being, in which the harmonious development of physical and mental capacities of the individual leads him to the enjoyment of a rich life, (Narain, 1967). Therefore the health of the nation's children become the foundation for the power and happiness of its people. Health reflects the energy and capacity of a people and their potentials for productive work. Health is thus an essential resource for economic development.

A healthy and strong individual is an asset, not only to his family but also to the society, (Sundaravadivelu, 1970). Just as good health is basic to physical and mental well being, nutrition is basic to health. As Devadas (1971) stresses, nutrition is one of the key factors in national development. A well nourished population provides the base for optimum national development.

According to the Census of 1971, the population of India is about 547 millions. Out of this population,

about 40 per cent, that is, approximately 227 millions are below the age of 15 years. Nearly 100 millions, that is, 20 per cent of the total population are below the age of 5 years, (Gopalan and Vijayaraghavan, 1971). Our Nation's future, its prosperity or poverty, strength or weakness, depends on the care with which we build up the character and habits of our children, (Radhakrishnan, 1962).

Preschool age is one of the most important periods in one's life. During the first six years of life, the child is most vulnerable. He needs help throughout childhood to promote his health, nutrition, education and personality development. Yet, as Gopalan (1970) deplores that the worst ravages of malnutrition occur during the preschool age. Thirty per cent of the children of preschool age, about 24 million children suffer from malnutrition, (Dhar, 1972). The future of any nation depends on how the society, the government and the parents take care of this important age group, (Narmada, 1972).

The preschool children are in a state of rapid growth. They spend a lot of energy in play and other activities. Adequate supply of energy and proteins is a 'must' during this period. Otherwise malnutrition will set in with tragic results, (National Institute of Nutrition, 1973).

Malnutrition being an economic and social problem, requires a multifaced approach with a coordinated efforts of the various departments of the government. Among the various solutions suggested to overcome the problem of malnutrition, supplementary feeding programmes appear to be the most promising and effective, (Devadas et al, 1972). The two important aspects to fight the menance of malnutrition in the vulnerable groups are, nutrition education and supplementary feeding programmes. They should go hand in hand. The education programme is a long term measure and supplementary feeding programme is the form of emergency measure to give immediate relief to overcome malnutrition.

Just as the child learns to write and speak, it should learn to eat. Unfortunately parents cannot always educate the child in nutrition because many parents are ignorant about the basic rules of a good diet and can only teach what they see, do or hear from their elders. These rules, handed down from generation to generation may or may not agree with canons of modern science of nutrition.

Nutrition education is an art and science in itself. It is the key to the solution of many problems of health and disease, (Nagaraj, 1967) and should begin soon after the

child is born. But as Pandetra, (1972) points out absence of nutrition education is one of the weakest aspects of the current feeding programme in our country.

The role of parents and teachers in helping children towards maximum development, particularly during the preschool age is great. Involvement of parents in the education of their wards is a necessity. The movement of the Parent Teacher's Association is an important step towards securing it. Coeperation of parents and teachers is needed to supplement the efforts of the others, so that the child gets the best of both. Parent Teacher Associations can also become important agencies for the education of adults in child care, (Nayar, 1973).

This study was undertaken with the objective of exploring the possibilities of using Balwadis, under the Family and Child Welfare Programmes of the State Government, as instruments of nutrition education. It is hoped that Balwadis can become sources of information for educating the parents and eventually the whole community in improving the nutritional status of the family.

II. REVIEW OF LITERATURE

The literature pertaining to this study on "Exploring the possibilities of utilising Balwadi as an instrument of Nutrition Education", is reviewed under the following headings:

A. The preschool age,

B. Feeding programmes in preschools,

and C. Role of preschools in nutrition education.

A. The Preschool age:

The various aspects discussed under this heading are:

1. The need for special attention to pre-schoolers;

2. Good nutrition during pre-school age;

3. Importance of pre-school education;

and 4. The role of Balwadis in the wholesome development of children.

1. The need for special attention to preschoolers;

'A healthy mind in a healthy body' is obvious in children, who are important resources in national development. Among the environmental factors which mould a child's personality nutrition is highly important. Good nutrition is of paramount importance for fostering maximum physical, mental,

emotional and social growth, (Devadas, 1970 and Ram Das, 1970). Mehta (1962) and Sivaramma (1973) give the following reasons for giving special consideration to the requirements of children. Children are the wealth of the nation. They need help to grow up as good and efficient citizens.

"India is a land of children". Today's children will grow into adults of tomorrow. Therefore the well-being of the country depends on the welfare and development of the child resources to the maximum advantage, (Ranjit Bhai, 1969). The health and well being of children constitute a solid foundation for the prosperity of the nation ? (Bagga, 1969 and Devadas et al, 1973). It is necessary that maximum attention is devoted to the protection, promotion and preservation of the health of children. This fact is emphasised by Sebastian (1972) in her words, "Health is the foundation of life. A nation realises its potentialities through its children who are the junior partners in the glorious adventure of building up new India. We must, therefore, protect them and prepare them for the future".

The problems of the child under-nutrition must be viewed as one of the most important problems of the nation today. Further more special attention to the pre-school

child is necessary because he is highly vulnerable. Often he is the easy victim of malnutrition and other nutritional disorders. The effects of malnutrition cause him cruel suffering. Malnourishment of the preschool children can be a hurdle to the social and economic development of the nation itself, (National Institute of Nutrition, 1973).

A large number of infants and young children need care during the time their mothers are away from home. Even when mothers are not working, poverty, ignorance, overcrowding and unhygienic surroundings and the lack of an intellectually stimulating environment conspire in creating conditions which are hardly conducive to child's development, (Phadke, 1972). Stressing the need for special attention to the preschool children, Chandramani et al (1973) say 'Protecting today's children, developing their abilities and guiding their characters are the society's most vital tasks'.

2. Nutrition during the preschool age:

The axioms "We are what we eat", "We should eat to live", apply to the principles of feeding of children aptly. Right feeding in early childhood is one of the most important factors in the well-being of individuals, (Nagal, 1965).

Verghese (1964) stresses that children of all ages require adequate quantity and quality of food for their growth and development. The nutrition of the young child is an important environmental factor affecting growth and development. Malnutrition and undernutrition are far more serious enemies of healthy growth than many people realise. They are harsher to infants and preschool children. Malnutrition in the early stages of growth can lead to irreversible physical and mental retardation.

Chandra (1968) brings out the seriousness of the problem of hunger among Indian children, as 'It is little known that more than 70 per cent of the Indian children go to bed every night without adequate satisfaction of the bare pangs of hunger'. In effect, the quality and quantity of nutrition given during the first two to four years of life may have the effect of programming the individual for the rest of his life. The quality and adequacy of the diet children receive will be reflected in the rate of their physical and mental development, (Devadas et al, 1973). Growth and development are directly related to the dietary pattern of a child. Food habits formed during the early years of life influence future health, (Seth, 1972).

Nutrition and health are now accepted as important parameters for the development of country. All efforts for economic development of the country will bear no fruit, if adequate measures are not taken to combat malnutrition, (Karnad, 1972). Recent surveys carried out in different parts of the country under the auspices of the ICMR and the State Nutrition Divisions, indicate that out of 100 million children in the age group one to six years, about half suffer from protein calorie malnutrition in one form or the other, (Pandotra, 1972).

3. Importance of preschool education:

Preschool children are those in the age group three to six years. These early years are the most important formative years of human life, because on them rests the entire span from childhood to old age, (Devadas, 1964). Chitkara (1969) considers this period of life as very important because at this time the child wants to become the master of his actions. Childhood is an impressionable time - the period of life when patterns of adult behaviour are established, (Shewak, 1967). During the pre-school age the foundation for the entire personality structure is laid. As Masuma Begum (1963) warns while it may be possible to improve the mental, physical and emotional resources in subsequent years, it will not be impossible to create new structures.

Mehta (1962) points out that if the children in rural areas are looked after well through Balwadis, then the nation will look after itself as the Balwadi is the nursery school where young saplings are provided with the optimum environment for growth and development.

The purpose of preschool education is to help the child to explore and know his world, to discover himself, and to become acquainted with many sources from which he can learn,(Devadas, 1964). Ulfat (1964) regards nursery school education as one of the modern methods by which various experiences are given to children (2-5 years).

Regarding the outcomes of preschool education, Devadas (1964) states that the nursery school makes an important contribution towards the physical development and health of the preschool child through well designed programmes and nutritionally planned meal.

The preschool plans to surround the child with opportunity and scope, with inducement to play, activity, creation, adventure, aspiration, self control and self reliance. According to Ghufran (1965), preschool education aims at good health, provision of adequate institutions, emotional and mental development and formation of sound habits and character. This can be achieved in the Balwadi whose most important function is to arrange recreational programmes.

Although development at every stage is significant, recent research evidences show that the early years of childhood are most crucial for the optimum development of the child. Environmental deprivation in childhood leads to progressive retardation in development, (Rao, 1970). In the rural areas women are busy with household and field, work. Thus the children do not get the full attention and care at right time. The Balwadis are therefore necessary to take care of the young children.

According to Dantyagi (1970), the goal of preschool education is to provide favourable conditions which foster the development of good habits including satisfactory nutritional status. Muralidharan (1970) emphasizes that preschool education is not just custodial care. It is neither just play, nor teaching the three "R"s. It aims at the total development of the child for which carefully planned programmes and well-prepared teachers are essential.

By providing the children the company of their age group peers and by furnishing them a variety of material for play and learning, which may not otherwise, be available to them in their circumstances, the preschool serves to meet the deficiencies of the home. In fact, it serves as a bridge between the intimacy and cordiality of the home atmosphere

and the formal environment of the primary school which children will attend later. (Mulkh Raj Chilana, 1969).

The child who has the potentialities for development has to be nurtured with utmost care and attention in the preschool at the most significant and impressionable period in an individuals' life. So that he will register adequate achievement in successive phases of development, (Sarojini and Sithalakshmi, 1975).

4. <u>The role of Balwadis in the wholesome development of children:</u>

The Balwadi (Preschool) has been an important and useful agency for children in the rural areas as it aims at the all round development of the pre-schoolers. It acts as a bridge between the home and the school. The main object of Balwadi is to provide the basic amenities to the children for their physical growth and mental development (Bali, 1966).

Sethuraman (1962) enumerates the following objectives for Balwadis; To

1. prepare the child for entering a new event i.e., the school
2. develop healthy habits and attitudes in children
3. Help the child in the proper development and control of his emotions;

and 4. develop sociability and cooperative spirit in children.

In the development of a child, the parents, particularly the mother and family play an important role. They provide the necessary facilities and opportunities for the growth and development of the infant.

A good Balwadi should aim to aid parents in carrying out their job of rearing children effectively (Verma, 1963). The role of the Balwadi teachers in this regard is tremendous. She is a pace setter to the parents and community in education. The Balwadi teacher could be made responsible

1) for pre-school education,
2) education of mothers on nutrition and child, and
3) nutrition feeding programme (Natarajan, 1973).

B. Feeding programmes in Preschools

The feeding programmes for the preschool children are reviewed under the following headings:

1. Importance of feeding programmes in pre-schools,
and 2. The on-going supplementary feeding programmes in the country.

1. Importance of feeding programmes in preschools:

The main objectives of providing mid-day meals in Balwadi, according to Verghese (1964) are to:

a) Supplement the deficiencies in the home diets

b) Develop good eating habits in the company of several children and under the care of an adult, children eat better than at home

and c) Provide basic nutrition education for mothers. Kagal (1965) calls for cleanliness and purity of food, regularity in feeding times, simplicity in services, sufficiency in terms of calori-requirements and correct proportions of the different essential food elements.

Chowdhury (1972) states that the aims of mid-day meals are to improve health and encourage sound dietary habits among children and to provide approximately one third of the dietary and nutritional requirements of children from locally available foods.

With regard to all the feeding programmes the major questions are two - (1) Providing the children with balanced food and (2) imparting nutrition education to children, (Avinashilingam, 1970).

The preschool feeding programme has a dual purpose introducing the young children to the school atmosphere and inculcating the school habit, and secondly providing at least one nutrition meal to those children who could not afford it, (Pandotra, 1972). According to Swaminathan (1973) the functions and goals of supplementary feeding

in a Balwadi are:

a) Motivational in ensuring regular attendance and interest on the part of parents

b) Nutritional

and c) Educational - inculcation of healthy and desirable habits, hygiene and manners relating to food, provision of tools and experiences that can further the mental, social and emotional development of children, and provision of nutrition education for mothers and families through informal, participation and formal methods.

Asari (1973) considers balwadi feeding programme as an object lesson in nutrition education to the mothers and its main purpose is to make good the deficiency the home food leaves in terms of calorie needs of a child.

A feeding programme for preschool children is not an end in itself but a means of enthusing and energising the community towards alround socio-economic development. Gopalan (1973) claims that our objective must be to design the feeding programmes in such a way that they help trigger off an ascending spiral of socio-economic development in the community.

According to Srikantia (1973) the primary objective of any supplementary feeding programme should be the bridging of the gap in nutrient intake between recommended allowances and the nutrient content of the habitual diet.

Grewal (1973) points out to the fact that a feeding programme is effective as an educational tool in four ways.

a) Improvements in anthropometric and clinical status of the beneficiary group is the most vivid and convincing form of nutrition education;

b) The channel of food distribution can be effectively used for distributing education materials as well;

c) Food acts as an incentive to draw people together and to create a "receiptive" audience to whom education can then be effectively imparted; and

d) by participating in the programme, new concepts like hygienic handling and feeding are "learnt by doing".

2. <u>The ongoing supplementary feeding programmes in the country:</u>

Some of the ongoing supplementary feeding programmes in our country are:

a) Special Nutrition Programme;

b) Applied Nutrition Programme;

c) Composite Nutrition Programme;

and d) Family and Child Welfare Programme.

a. Special nutrition programme:

The Special Nutrition Programme was initiated by the Central Social Welfare Department in July 1970. This programme of supplementary feeding covered 6.8 lakh children (0-3 years) in 1970-71. In 1971-72, this facility was extended to 20 lakh children as well as pregnant women and nursing mothers. As many as 15,000 centres are involved in this activity. At present, children in the age group 0-6 years are covered in addition to pregnant women and lactating mothers.

b. Applied Nutrition Programme (ANP):

The Applied Nutrition Programme is run with the assistance of central and state governments and the international organisations, like World Health Organisation, Food and Agriculture Organisation and United Nations Children's Fund. The department of Community Development is responsible for implementing the programme at the central and state level. The programme is mainly an educational effort with the aim of progressively developing a coordinated and comprehensive national programme of education and training in applied nutrition. Demonstration feeding is an important aspect of this project.

A study conducted on the impact of balwadi feeding on children and mothers in village under the Applied Nutrition Programme by Devadas et al (1970) revealed that the feeding programme significantly improved the nutritional status of children. Parents had gained knowledge and registered changes in meal planning, concepts of food, food production at home, food storage and preservation habits.

c. Composite Nutrition Programme:

The Community Development Department is also undertaking another project called the Composite Nutrition Programme. This programme covers the areas not included in the Applied Nutrition Programme and the Family and Child Welfare Programme in the Fourth Five Year Plan. It is expected to prepare the ground for future implementation of Applied Nutrition Programme. Nutrition education is the main aim of this effort through the activity of demonstration feeding. The programme is implemented through official and non-official agencies by the state governments. The Mahila Mandals and Balwadis play a leading role.

d. Family and Child Welfare Programme:

The Central Social Welfare Board established a network of social services for women and children in the rural areas

as part of its scheme of Welfare Extension Projects in 1954. The basic ideas underlying this scheme were (Chowdhry, 1964) to

i) provide basic minimum social services to women and children which were then of pioneering nature in the rural areas;

and ii) create an organisation known as Project Implementing Committee which could ultimately be converted into a local voluntary organisation to take over the programme of the project.

The services and activities in a Welfare Extension Project include Balwadi (continuation of creche and pre-primary school), craft activities for women, maternity services, social education for women and general medial aid.

As recommended by the Child Care committee Report appointed in 1964, the concept of Integrated Child Welfare Services was experimented both in the urban and also rural parts of India. The Evaluation Committee Report on the Rural Welfare Extension Projects Scheme ushered in the scheme of Family and Child Welfare, a programme for the total development of the child. The Family and Child welfare programme was intended to reorganise, improve and expand the welfare services for women and children which have been organised in the Welfare Extension Projects, Child Welfare Demonstration Projects and Community Development Blocks under the three plans, (Mittal, 1969).

Consequently the rural Balwadi centres got strengthened and converted into Balasevikas, Kendras where the young mother is to be trained in child care, nutrition, home management, family planning and the like so that she is enabled to bring up her children in a happy and healthy atmosphere.

Under the programme of Family and Child Welfare, the Balwadis promoted in 1952, by the Central Social Welfare Board, were expanded to cover 100 Community Development Blocks by 1967 with main emphasis on the health and nutrition care of pre-school children. By 1971, there were 461 Balwadis in operation catering to 19,280 preschool children in the age group 3-5 years, under the Social Welfare Department with the help of voluntary organizations as well as Tribal Welfare and Harijan Welfare Departments in different states.

The nutritional contents of the feeding programme are provided through preparations made from locally available foods to supply 300 calories and 15 grams of protein per day per child. At present, 1,23,165 beneficiaries are covered in 4,216 Balwadies. In Tamil Nadu, there are four Family and Child Welfare Projects, with six preschools each feeding 760 children at a cost of 20 paise per child per day (Devadas, 1972).

One such project is in operation in Periyanaickenpalayam Block of Coimbatore District. It started in Periyanaickenpalayam Block during 1969-70. It has a main centre at Periyanaickenpalayam, and five sub-centres in the villages - Veerapandi, Onnipalayam, Narasimmanaickenpalayam, Sundapalayam and Kalappanaickenpalayam.

Now there is a 'Grihasevika' in the main centre, for conducting Young Mothers Training Camp and one Balasevika for conducting the pre-school. Five Balasevikas have been posted i.e., one for each subcentre for conducting the pre-schools. For assisting the Balasevikas in giving nutritive meals to the children two helpers have been posted to the Main Centre and one helper to each to the subcentres.

Nutritive food is given to the children in all the centres on all school days at an average cost of 20 paise per child per day. Provisions for these meals are being purchased and supplied to the centres. According to the plan of operations, the children are taught regularly by the balasevikas. The Mukhyasevika who is specially posted for the scheme supervises the centres and also the Block Development Officer.

All the utensils and equipments essential have been distributed to the centres. The play materials, sewing

machines and 15 baby cycles were gifted by the UNICEF for this programme in each centre.

The results of a study of the preschool feeding programmes in operation in Coimbatore District by Sarojini and Seethalakshmi (1973) indicated that the impact of the feeding programmes on the children's health status was good. The participation of children in the feeding programmes had also motivated the mothers to make some desirable changes in their home dietary practices such as inclusion of raw vegetables and fruits and adoption of new recipes. The mothers recommended that nutrition education should become integral components of the feeding programme and parent-teacher meetings.

C. Role of pre-schools in nutrition education:

The role of preschools in nutrition education is discussed under the following aspects:

1. The indispensability of nutrition education.
2. The role of Parent Teacher Association in the Balwadis, and
3. Nutrition education of mothers and children.

1. The indispensability of nutrition education:

Balwadis have become increasingly popular because of the universal recognition that the pre-school years are the

most formative, plastic and impressionable years of an individual's life. Nigam (1964) lays particular emphasis on promotion of suitable dietary habits, popularisation of low cost balanced diets, avoidance of wastage and dissemination of scientific knowledge on the various aspects of food science, to improve the nutritional status of the people, specially of children, which is of immediate necessity. Reddy (1968) claims that the feeding programmes should provide opportunity for nutrition education of the mothers.

Nutrition education has been realised as one of the essential means of improving the nutrition of any community and so nutrition education of the people is important in putting an end to the problems of hunger and malnutrition (Usha et al, 1965).

Devadas et al (1965) concluded from a study of diet and nutrition survey of a village, that a systematic health and nutrition education programme will go a long way in improving the health and nutritional status of the people, in the rural areas.

'Education in food and nutrition, as in health, means education to adopt better practices', says Ritchie(1967).

Ahluwalia and Rangbulla (1967) consider effective nutrition education as vital to increase the production and utilisation ofprotective foods and changing the people's food habits.

One of the objectives of food and nutrition education is to help people change their habits, (Holmes, 1968). According to Giacomo (1968), education in nutrition involves two basic objectives:

1) To improve the nutritional status of a people

and 2) To maintain good nutrition among all healthy people of a country.

In view of critical food situation in the country, there is an immediate need for of changing the food habits. It is, therefore, essential to educate the public in matters of diet to get the maximum benefit out of the what is available in the country, (Baruah, 1968).

According to Devadas (1968), the chief purpose of education in nutrition are to help pupils, individuals and their families to appreciate that nutrition is essential for health, well-being, growth and vitality; understand the simple principles of good nutrition and basic food values; select the right kinds of foods and secure adequate diets within the limits of purchasing power, local production and availability in the community; and apply proper methods of cooking and hygienic practices in the handling of food.

Ferrey et al (1968) say that food practices and attitudes established during the early years are believed to affect food choice and consequently nutritional status throughout life. That is why Srikantia (1969) emphasises the role of nutrition education to correct the wrong beliefs and improve the nutritional status of the community. Nutrition education can provide the necessary motivation for healthy living, (Avinashilingam, 1970).

Subramaniam (1971) emphasises the need to take up a fairly big programme to impart nutrition education, along with the feeding programme. All feeding programmes can only be of short duration. Therefore the improvement in nutrition will have to come about by teaching the people how to improve their diets using materials that are readily available and its effectiveness will also depend upon teaching the public the importance of nutrition and thereby arousing public consciousness to the need for dealing with this problem effectively.

The core objective of nutrition and health education programmes is to improve the total well-being of the population through effecting the desirable changes in their food habits and patterns of living. Nutrition

education is the foundation for nutritional improvements. It should be aimed to promote desirable food habits and practices, to increase agricultural production and to ensure adequate food supply for the community (Devadas, 1973). Gupta (1972) gives yet another aim, that is, to alert people on dangers of malnutrition and their food habits.

If our feeding programmes have by and large failed it is mainly because of the fact that we have not so far had an organised approach to the nutrition and health education of mothers. Therefore there is an urgent necessity for organising a massive nutrition cum-health education programmes for mothers in urban and rural areas, (Sundaram, 1973).

2. Role of Parent Teacher Association in the Balwadis:

The Parent-Teacher Association is a must to help the all round development of the preschool child. The Parent Teacher Association can help to create understanding between Balasevikas and the parents in promoting healthy growth of children. Ghufran (1965) stresses that parents participation is the best method of achieving parent cooperation. Dinkmeyer (1967) says, "The purpose of Parent Teacher Association is to develop mutual under-standing about the objectives of the school and the value system of the parents".

Parental education, according to Bai (1969), takes precedence in child welfare. For, if the family is capable of fulfilling its duties and responsibilities to the child, the problems of child welfare work would be considerably reduced. The family, and mother, in particular, must be in a position to understand what is meant by "child-care and welfare", especially regarding cleanliness, feeding, nutrition, health, play and the social adjustments of the child.

In the view of Dhawan (1971), the main purpose of Parent-Teacher Association is to help the child to understand himself in relation to his home, school and society. So long as parents and teachers feel the urge of being associated in all possible ways to help the child, the Parent Teacher Association will play a vital and active part in the life of any school.

Regarding the role of parent Teacher Association in improving the school programme, Sengupta (1971) says that parents can help in the school programme along with the teachers, in all developmental aspects.

Khan (1971) stresses that there can be no better way of achieving the purpose of creating a permanent liaison between the community and the school than through a recognised institution like the Parent Teacher Association. The objective

of which is to create better homes, better schools, better community and better citizens. Natarajan (1972) states that cooperation between parents and balasevikas is very important in promoting the development of children.

The Parent-Teacher Association is necessary to bring together teachers and parents in improving balwadi and the feeding programme to provide maximum opportunities for the preschool children to grow into a healthy and clean, socially desirable frame for its own good as well as that of the community. The Parent-Teacher Association is a grass root organisation in a democracy and an essential limb of the educational structure, (Mayar, 1973).

3. Nutrition education of mothers and children:

Williams (1969) calls the wife and the mother in the home as the main gate keeper, because it is she who ultimately determines the food habits of her family. Women must be reached, with nutrition education since they are the persons who are mainly responsible for the nutrition of children, and for the development of the food habits of persons as they gorw from infancy to adulthood.

Devadas (1970) advocates efforts to combat malnutrition by the introduction of new food practices concentrated on

children, because they are in an impressionable stage and can adopt the changes without inhibition and carry them to their mothers and homes. Beghin et al (1972) point out the mother of the family as the key element for the nutrition programmes. Manocha (1972) stresses that the most important person who needs education, if any improvement in the prevalent malnutrition has to be made, is the mother whose ignorance, illiteracy, or prejudices have often contributed to faulty feeding habits, resulting in undernutrition and malnutrition among children.

The most crucial group to reach with nutrition education are today's parents, both husbands and wives. The husbands because they make all economic decisions; and they decide how much of the total family budget to spend on food and they also buy the food. The wives because they are responsible for all food preparations and for the feeding of infants and children. The most important place for nutrition education is the school (Bornstein, 1972).

Nutrition education during preschool years will be effective as the children at this stage can be moulded in any direction. That is why Devadas et al (1973) claim that children form an effective bridge between the nutrition educator and their parents to carry home nutritional knowledge and bring about nutritional improvement. Gopalan (1973)

considers feeding programme as an important means of nutrition education, and the cooperation of the mother as of pivotal importance to the success of any feeding programme.

Devadas et al (1969), studied the impact of nutrition education in a small village community in South India. They indicated that even the very poor diets of the rural families were changed and that the villagers were anxious to improve their conditions of living, health and food habits through nutrition education programmes.

The observations of Hanumantha Rao and Balasubramanian (1969) on nutrition education programme in a village revealed that the knowledge and attitude to feeding locally available food supplements to children improved among mothers after nutrition education.

Kamalanathan et al (1970) studied the effect of a blend of protein foods on the nutritional status of pre-school children in a rural Balwadi. They found that there was scope to improve the diets of the poor people using local food resources. They concluded that feeding programmes should be accompanied by nutrition education.

After an evaluation of the supplementary feeding programme for preschool children in the rural areas around Hyderabad city Swaminathan et al (1970) came to the conclusion that one of the main objects must be to educate the village community, particularly the mothers, in the proper and effective utilisation of locally available and inexpensive sources.

III. METHODOLOGY

The experimental procedure for this action-research study involved the following aspects:

A. Planning the nutrition education programme for preschool children and their mothers.

B. Conducting the nutrition education programme.

and C. Evaluating the impact of the nutrition education programme.

A. Planning the nutrition education programme:

The planning aspects included:

1. Selection of the Balwadis;
2. Selection and motivation of children and their mothers;
3. Conducting a preliminary survey;
4. Selection of the topics for nutrition education;
5. Selection of the methods;

and 6. Outlining the plan of operation.

1. Selection of the Balwadis:

Fox (1969) describes the experimental approach as seeking to establish something new and evaluate it. This study aimed at finding out the possibilities of utilising the Balwadi as an instrument of nutrition education. Therefore

two Balwadis, under the Family and Child Welfare Programme which is functioning in Periyanaickenpalayam Panchayat Union, Coimbatore, were chosen because of the following reasons:

a) Both Balwadis and the villages in which they were situated had not been influenced previously by any nutrition education programme;

b) Same conditions prevailed in both the Balwadis and had the same type of setting with regard to equipment, programme of activities and menu;

c) The college had good rapport with those Balwadis through the Applied Nutrition Programme;

and d) The villages in which these Balwadis were situated, were easily accessible to the investigator.

The Balwadi located at Veerapandi village in Periyanaickenpalayam Panchayat Union, Coimbatore District, was taken as the control, that is, without nutrition education. Only occasional visits were made by the investigator to observe changes in the activities, and to evaluate the programme.

The Balwadi at Sundapalayam village in Periyanaickenpalayam Panchayat Union, was chosen as the experimental Balwadi, where the investigator imparted nutrition education to the preschool children and their mothers, through the Balasevika. A Balasevika is not only a Balwadi teacher but also the liaison between the institution known as "Balwadi"

and the community. She is not only expected to teach and attend to the children sent to her in the centre but also convince the parents about its usefulness, (Jain, 1967). This Balwadi was visited by the investigator three times a week.

2. Selection and motivation of children and their mothers:

The samples selected consisted of the Balsevikas in charge of the selected Balwadis, the preschool children of the Balwadis and their mothers.

The number of children in the experimental Balwadi was 34. The mothers' sample consisted of 33 homemakers and one guardian. The socio-economic data of all these families were collected and nutrition education and evaluation conducted.

In control Balwadi at Veerapandi, there were 30 children and 28 mothers when the investigator initiated the project. All their families were approached, to gather the socio-economic data. When the evaluation was done after six months she could contact only 19 children and their 17 mothers, since the others had dropped out, and new children had been admitted.

The most immediate group needing nutrition education are today's parents and parents can be reached only through the organisation of Parent Teacher's Association which, as Mohisini States (1973), provides an opportunity for both parents and teachers to understand each other's role, views, problems and the needs of children.

There was no Parent Teachers' Association in Sundapalayam Balwadi. The mothersof the children attending this Balwadi, and the Balasevika were persuaded to organise the Parent Teacher Association, so that nutrition education could be imparted through the Parent Teacher Association during their meetings.

Home visits were paid prior to the study by the investigator to establish good rapport with and to motivate the mothers and to convince them about the purpose of the study. Through the home visits, the investigator was able to motivate and create an awareness in mothers of the need for improving the nutritional status of the children and was able to find out that motivated mothers showed keenness in getting educated.

3. Conducting a preliminary survey.

Rangaswamy (1969) has emphasised that interviews make possible face-to-face associations inter-stimulation between the interviewer and interviewee and thus help to

secure the data which are not obtainable by other methods Fox (1969) holds that the interview guide serves as a reminder to the interviewer of the areas which should be covered. For the comparative and evaluative, questioning type of surveys, the interview is useful for generating information on the basis of which conclusions can be made.

Two sets of interview schedules were formulated to be used in this study, one for the Balasevikas (Appendix I) and the other for the mothers (Appendix II). The investigator recorded also her own observations with regard to the various aspects of the selected Balwadis. Fox (1969) points out that observation can be done using a system to classify or measure the phenomena being observed.

Accordingly a specially prepared check list (Appendix III) was maintained to note the improvements taking place among the children who were attending the Balwadi.

The interview schedule (Appendix I) developed for testing the Balasevikas included details about the training and experience of Balasevika, general information about the Balwadi, details about the feeding programme, menu pattern, food prepearation and service, food production, problems encountered in running the feeding programme, outcomes of

Balwadi education, nutrition education if any, information about records and registers and job satisfaction and problems of the Balasevikas.

The questionnaire (Appendix II) administered to the mother enabled the investigator to find out details of their families, extent of food production, dietary practices attitudes of parents towards sending their children to the Balwadi, parent's knowledge about the Balwadi, nutrition education imparted if any, the nutritional knowledge of mothers and participation of parents in Parent Teacher Association meetings and in Balwadi Programme.

The heights and weights of the children were taken at the beginning and end of the study (Appendix IV). Using a check list the general appearance, habits, characteristics and participation of children in games and other activities of the Balwadi were noted.

The analysis of the findings of the preliminary surveys are dealt under the following headings:

a) General information about the Balwadis and the Balasevikas

b) Details regarding the family background of the parents

c) Opinions of mothers about the feeding programme and the Balwadi

and d) Participation of parents in the Balwadi.

a. General information about the Balwadis and the Balasevikas:

An analysis of the data gathered by administering the questionnaire to the two Balsevikas in the experimental and control Balwadis, revealed the following facts:

Details about the training and experience of Balasevika:

Both the Balasevikas had undergone the Balasevika training for a period of one year in Madras and Family and Child Welfare training for a period of three months at Gandhigram. The subjects studied during the training period were Preschool Education, Social Welfare, Nutrition, First Aid and Home Nursing, Community Development, Music, Games-indoor and outdoor, Drill and Needle work which enabled the Balasevikas to manage the Balwadi efficiently. The Balasevika in charge of Sundapalayam village Balwadi as well as the Balasevika inpharge of Veerapandi village had put in four years of service.

Information about the Balwadi:

Both the Balwadis were established in the year 1970 and the feeding programme was started in the same year. The allotted capacity of the Balwadi was 35. The total number of children attending the Sundapalayam village Balwadi was 34, out of which 15 were boys and 19 were girls.

Veerappandi village Balwadi had a strength of 30 children out of which 17 were boys and 13 were girls when the investigator first paid her visit to the Balwadi. At the close of her study, it was found that only 19 children out of 30 remained throughout and others had dropped out and new admissions had been made every month which had increased the strength of Veerapandi village Balwadi to 40.

Age range of children:

The age range of children in both the balwadis is depicted in Table I.

TABLE I

AGE WISE DISTRIBUTION OF BALWADI CHILDREN

S.No.	Age Range	Percentage of Children	
		Experimental	Control
1.	2 Years - 2½ Years	-	5
2.	2½ Years - 3 Years	5	11
3.	3 Years - 3½ Years	9	16
4.	3½ Years - 4 Years	56	53
5.	4 Years - 4½ Years	12	15
6.	4½ Years - 5 Years	20	--

Table I reveals that the percentage of children in the age range of 2 - 2½ years was nil in Sundapalayam Balwadi whereas in Veerapandi Balwadi, the percentage of children was nil in the age range of 4½ - 5 years. This was due to the fact that there was great rush for admission in Sundapalayam Balwadi and so the Balasevika had to fix the minimum age for admission to be 2½ years whereas in Veerapandi the Balasevika had to force the parents to admit the children and also she had to make admissions every month as the children used to drop out in between. The highest percentage of children was found in the age range of 3½ - 4 years in both the Balwadis.

The daily programme of activities:

The daily programme of the activities in both experimental and control Balwadis was the same as it was formulated by the Mukhyasevika in charge of the Family and Child Welfare Programme and is given in Table II.

TABLE II

PROGRAMME OF ACTIVITIES

Time	Activities
8.30 a.m. to 9.00 a.m.	Children's arrival
9.00 a.m. to 9.30 a.m.	Cleaning the place and checking the cleanliness of children
9.30 a.m. to 9.40 a.m.	Prayer
9.40 a.m. to 10.00 a.m.	Action songs
10.00 a.m. to 10.30 a.m.	Indoor games
10.30 a.m. to 10.45 a.m.	Interval
10.45 a.m. to 11.00 a.m.	Action songs
11.00 a.m. to 11.15 a.m.	Story telling
11.15 a.m. to 11.45 a.m.	Outdoor games
11.45 a.m. to 12.00 noon	Cleaning hands and legs
12.00 noon to 1.00 p.m.	Meals
1.00 p.m. to 2.30 p.m.	Sleep and rest
2.30 p.m. to 2.55 p.m.	Outdoor games
2.55 p.m. to 3.00 p.m.	National Anthem, distribution of sweets and departure of children

The materials and equipment present in both the Balwadis were the same and included play things like rocking horse, cycles, puppets, pictures, blocks, dolls, pulling carts, toys, aeroplanes, triangle, squares, alphabets, toy truck, post box, card board boxes and sea saw.

Details about the feeding programme:

The feeding programme in both the Balwadis was under the Family and Child Welfare Programme. The objectives of feeding programme stated by the Balasevikas interviewed, were as follows: To

i) provide nutritious food for children,
ii) develop good food habits,
iii) supplement their home diets,
and iv) help the alround development of children.

Both the Balasevikas admitted that the feeding programme influenced the Balwadi attendance as it included sweets, fruits and tasty foods.

Regarding the information about the finance for the feeding programme, it was found that to each Balwadi an amount of Rs. 80 per month, was allotted to buy vegetables, cooking oil, kerosene oil, fruits and spices, in addition to the supply of provisions such as rice, red gramdhal, bengal gram dhal, groundnuts, roasted bengal gram dhal and jaggery

by the Mukhyasevika in charge of the Family and Child Welfare Programme.

Menu pattern:

The menu pattern was the same in the selected Balwadis as it was decided by the Mukhyasevika in charge of the Family and Child Welfare Programme. The menu pattern as given by the Balasevikas is as follows:

Days	Menu
Monday	Lemon rice, tomato, Keerai Kootu, Groundnut balls.
Tuesday	Dhal rice, carrot, Keerai Poriyal, Green gram sundal.
Wednesday	Tamarind rice, Pappaya or Tomato, Keerai Kootu, Groundnuts.
Thursday	Sambar Rice, Tomato, Keerai Poriyal, Roasted Bengal gram dhal balls.
Friday	Tomato rice, Carrot, Keerai Kootu, Groundnut milk.
Saturday	Coconut Rice, Tomato, Green gram dhal Payasam.

Even though the menu pattern was fixed for both the Balwadis the Balasevikas could modify the menu according to the availability of the vegetables. Thus it was noticed that green leafy vegetables was included only once a week

as it was not available and also there was no storage facilities, in both the Balwadis, to store greens. So other vegetables like beans, brinjal and reddish were included instead of green leafy vegetables. In Sundapalayam the most common fruits included in the menu were pappaya and tomato whereas in Veerapandi village the commonly used fruit was tomato with occasional inclusion of pappaya and plantain. In both the Balwadis the ingredients for menu were measured by the Balasevikas before preparing the meals.

Food preparation and service:

In the two selected Balwadis, the time taken for cooking was two hours and they had adequate cooking and serving equipments. The Balasevikas in the selected Balwadis were responsible for purchasing the items and the cook was assigned the duty of cooking, serving, cleaning the place and cleaning the vessels.

It was shocking to find that in Veerapandi Balwadi, preparation for cooking, serving, storing and cleaning were done in one room which served as the play room of children also. On the other hand Sundapalayam village Balwadi, preparation, cooking and storing of food were done in the kitchen and the food was served in the verandah and cleaning

was done out side. Food, in both the Balwadis, was prepared according to the number of children present and was served in liberal amounts to children.

Food production:

Even though Sundapalayam Village Balwadi had space for gardening near the school, the Balasevika had not made an attempt to raise a kitchen garden. Veerapandi village Balwadi did not have any space close to it.

The Balasevikas of both the Balwadis had problems in running the feeding programmes, such as the problem of inadequate space for cooking, serving and cleaning of vessels and lack of facilities for storing vegetables and fruits. In addition, the Balasevika of Veerapandi Balwadi had the problems related to attendance and parents' cooperation.

Both the Balasevikas felt the need for additional space and to organise a Parent Teacher's Association to make the parents understand the impartance of preschool education.

Outcomes of Balwadi education:

The outcomes of Balwadi education as mentioned by the Balasevika of Sundapalayam are attendance, participation in play, sociability, improvement in the school enrollment and rapport with parents whereas according to Veerapandi village Balasevika, attendance, participation in Play, and sociability were the results of Balwadi education. It was encouraging to find that the two selected Balasevikas did not receive any complaint about feeding programme from the parents.

Both the Balasevikas insisted on the habits of wearing clean clothes, neat appearance, keeping the nails cut and clean, coming in time to the Balwadi, prayer before meals, cleaning the hands before meals, putting mats or planks, orderly sitting, avoiding spilling of food, waiting for their turn to get food, cleaning the hands and mouth before and after meals and orderly arrangement of plates and tumbler.

Nutrition education:

No nutrition education was imparted to children and no new food habits were ~~included~~ inculcated in children of both the Balwadis.

Information on parents participation:

It was disappointing to find that both the Balasevikas had not organised a Parent Teacher Association.

There was no Mahalir Manram in Veerapandi village but in Sundapalayam inspite of the existence of Mahalir Manrum, the Balwadi did not get any help from it.

As to the suggestions for the improvement of the Balwadi, both the Balasevikas did not give any suggestion except that of wanting a spacious building; but for the improvement of the feeding programme, allotment of more money to buy vegetables and fruits was mentioned.

Information about records and registers:

The registers and records maintained in the selected Balwadis were attendance register, account book, stock register for feeding programme, midday meals attendance and staff attendance registers handled daily, stock register to record once a year, health record to measure the progress once in three months, inspection register and visitor's book. All these registers and records were supervised by the Mukhyasevika in charge of Family and Child Welfare Programme once a month, and Block Development Officer and Social Welfare Officer, occasionally.

Job satisfaction and problems of Balasevikas:

Both the Balasevikas considered their choice of their vocation as wisely made as they were interested in children's welfare and their income adequate. Both of them liked to mingle with parents of children and to look after the children.

It was pleasing to note that the Balasevikas in charge of Sundapalayam as well as Veerapandi Balwadis were able to work smoothly without facing any problem.

b. Details regarding the family background of the parents:

The family background of the parents of the Balwadi children of Sundapalayam and Veerapandi villages included their age, type of family, education, family composition and income.

Age of the parents:

All the homemakers both in Veerapandi and Sundapalayam were below 40 years, and only 9 per cent of the homemakers in Sundapalayam and 6 per cent of the homemakers in Veerapandi were between 20-25 years.

Type of family:

As for the type of family, except for two parents in Sundapalayam all were part of joint families.

Family composition of the parents:

The details of family composition are shown in Table III.

TABLE III

FAMILY COMPOSITION OF THE SAMPLES

S.No.	Number of children in the family	Number of families having	
		Sundapalayam	Veerapandi
1.	One	7	2
2.	Two	9	4
3.	Three	6	6
4.	Four	5	2
5.	Five	4	2
6.	Six	3	-
7.	Seven	-	-
8.	Eight	-	1

Fifty nine per cent of the parents in Sundapalayam and 71 per cent of the parents in Veerapandi had below three children which is encouraging. On the other hand, 12 parents (41 per cent) in Sundapalayam and 5 parents (29 per cent) in Veerapandi had four to eight children which is disappointing. But the fact that even the 59 per cent in Sundapalayam and 71 per cent in Veerapandi who had less number of children were still in the reproductive age group indicates the potential for a strong family planning drive in the rural areas.

Educational status of the mothers:

Majority of the mothers of both experimental and control Belwadi children were illiterates thus pointing out the poor educational status of the rural women and great care to be taken in the selection of the methods for teaching the mothers.

Occupation of the mothers:

Only 13 out of 34, and 8 out of 17 mothers were found to be gainfully employed in Sundapalayam and Veerapandi villages respectively. Among the employed in Sundapalayam, 10 were agricultural labourers and three were working in the industries whereas in Veerapandi, six were agricultural labourers, one was agriculturist and three worked in the industry. Occupation of the parents was a factor to be considered in fixing the time for conducting classes for mothers.

6. Income level of the selected families:

Table IV shows the income range of the families in Sundapalayam and Veerapandi.

TABLE IV

INCOME RANGE OF THE FAMILIES

S.No.	Income/month in Rupees	Percentage of families	
		Sundapalayam	Veerapandi
1.	Below 100	15	23
2.	100 - 200	41	30
3.	201 - 300	29	35
4.	301 - 400	15	12

The income of all the families interviewed was found to be below Rs. 400 per month. Thus all the parents belonged to the low socio-economic group.

Details of food productions

This aspect of the study dealt with the following:

i) Possession and use of land.

and ii) Other means of food production.

Possession and use of land:

Only three families possessed cultivable land in Sundapalayam and two in Veerapandi. Out of these families two raised cereal crops and other two pulses and one family had raised vegetable and kitchen garden.

Other means of food production:

Eleven families had other means of food production through kitchen garden, cattle and goat rearing in Sundapalayam. On the other hand, only one had kitchen garden and three reared cattle in Veerapandi. Only two families in Sundapalayam used their milk for consumption and sold the rest or utilised the produce for household consumption only.

Details of Nutrition Education:

In Sundapalayam, the mothers of all the Balwadi children were aware of the existence of Mahalir Manram and only five out of 34 parents were members of Mahalir Manram whereas in Veerapandi there was no mahalir manram at all.

Daily meal pattern:

The daily meal pattern of the parents in the experimental as well as controll Balwadis is discussed in Table V.

TABLE V

DAILY MEAL PATTERN

S.No.	Meals		Food items included	Percentage of families preparing	
				Sundapalayam	Veerapandi
1.	Breakfast	i)	Iddli with Chutney or Sambar Dosai with Chutney or Sambar Uppuma	53	24
		ii)	Rice with sambar	24	41
		iii)	Poriyal	25	18
		iv)	Ragi or Maize kali	24	65
		v)	Chappathies	3	—
		vi)	Left over food	26	47
		vii)	Coffee	76	18
2.	Lunch		Rice	76	18
			Left over food	12	41
			Ragi or maize kali	24	29
			Poriyal	59	12
			Rasam	21	—
			Curds or butter milk	50	18
			Sambar	76	41
3.	Tea		Left over food from breakfast	15	18
			Sundal	18	6
			Vadai	18	6
			Coffee	68	18
4.	Dinner		Left over food from lunch	26	—
			Rice	53	53
			Maize or ragi kali	21	—
			Kolambu or Sambar	79	59
			Brinjal	35	18
			Iddli	35	18
			Dosai	3	—

The majority of the mothers followed three meal pattern in both the Balwadis. About 50 per cent of the mothers in the experimental Balwadi included snacks such as iddli, dosai and uppuma in the breakfast. A minority of mothers had ragi or maise kali or left over food for breakfast.

It is observed that a considerable number of mothers in both Balwadis prepared only sambar or colambu but not side dish.

It is clearly seen that there is lack of variety in the menu implying that the mothers need to be taught low cost nutritious diet.

Dietary practices of the families:

Table VI indicates the consumption of food stuffs by the families.

TABLE VI

CONSUMPTION OF FOOD STUFFS

S.No.	Items consumed	Frequency of consumption by the families in Percentage					
		Sundapalayam			Veerapandi		
		Daily	Weekly	Occas-ionaly	Daily	Weekly	Occas-ionaly
1.	Cereals	100	—	—	100	—	—
2.	Pulses	100	—	—	100	—	—
3.	Green leafy vegetables	9	91	—	12	88	—
4.	Other vegetables	59	41	—	47	53	—
5.	Roots and tubers	62	38	—	47	53	—
6.	Fruits	3	38	59	6	18	76
7.	Milk and milk products	56	—	—	41	—	—
8.	Oil	97	3	—	94	6	—
9.	Meat, fish etc.	—	24	67	—	12	88

Cereals, pulses, vegetables, milk and milk products and oil were consumed daily. A majority of the non-vegetarians consumed meat and eggs occasionally because they had become expensive now-a-days.

Food consumption:

The frequency of the food consumed by the families is described in Table VII.

TABLE VII

FREQUENCY OF FOOD CONSUMPTION

S.No.	Food eaten	Percentage of mothers stating the frequency of use									
		Experimental					Control				
			Weekly					Weekly			
		Daily	Once	Twice	Thrice	Occasionally	Daily	Once	Twice	Thrice	Occasionally
1.	Ragi	32	6	18	24	21	15	12	12	24	—
2.	Maize	41	—	—	9	6	41	—	—	35	—
3.	Redgram dhal	100	—	—	—	—	100	—	—	—	—
4.	Bengal gram dhal	—	15	18	6	12	—	24	6	—	6
5.	Horse gram	—	29	15	44	12	—	47	41	—	12
6.	Green gram	9	9	26	56	—	—	18	18	—	12
7.	Green leafy vegetables	—	63	26	—	—	—	12	88	—	—
8.	Fruits	3	38	—	—	59	6	—	18	—	76
9.	Milk	56	—	—	—	—	41	—	—	—	—
10.	Eggs	—	18	—	—	76	—	12	—	—	41
11.	Meat and fish	—	24	—	—	68	—	12	—	—	88
12.	Groundnuts	—	38	29	34	29	—	47	35	6	18
13.	Parboiled rice	56	15	6	24	—	29	35	12	—	24

It is evident that the use of protective foods like green leafy vegetables, fruits, milk, groundnuts and pulses except red gram dhal is less frequent in both the experimental and control Balwadis thus indicating the necessity for imparting nutrition education for mothers.

Foods given under special conditions:

The responses of the mothers about the foods for special conditions are revealed from Table VIII.

TABLE VIII

FOODS GIVEN UNDER SPECIAL CONDITIONS

S.No.	Special conditions	Food items given	Percentage of mothers	
			Experimental	Control
1.	Infancy	Breast milk	100	88
		Cows milk	59	19
		Biscuits	18	18
		Fruit juice	6	—
		Farex or Amul	12	6
		Mashed rice	41	59
		Idili	15	29
		Kanji	9	12
		Coffee with milk	3	—
2.	Toddler	Mashed rice	29	—
		Iddli	9	—
		Milk	29	—
		All the foods	62	100
3.	Pre-school years	All foods	100	100
4.	Pregnancy	All foods	44	100
		Except papaya	56	41
		Except Gingelly seed	56	41
		Except Banana	6	6
		Except Mango	6	—
5.	Lactation	All foods	15	12
		All foods except jack fruit	15	—
		All foods except Mango	21	—
		All foods except potato	35	24
		Brinjal and pumpkin	12	18
		Except Banana and Cucumber	9	6
6.	Diseases Fever	Bun	62	47
		Coffee	62	29
		Milk	15	6
		Kanji	94	82
		Barley water	12	12
7.	Diarrhoea	Butter milk	71	35
		Curds rice	32	35
		Strong tea	18	6
		Kanji	32	35
		Rasam	12	18
		Bun	6	12
		Ground poppy seeds with milk	—	12
		Bitter gourd juice	—	12
		Barley water	3	6

Breast milk and cows milk were the main food given during infancy. The mention of "Farex", "Amul" and "Biscuits" during infancy by a small percentage (3 per cent of mothers in the control Balwadi and 12 per cent in the experimental Balwadi) indicate the slowly changing trends in our rural areas. The information obtained revealed the food beliefs, as in the case of pregnancy and lactation and inadequate knowledge of the mothers about the special needs of the vulnerable groups and of the sick.

C. Opinions of the mothers about the Balwadi and the feeding programme:

Need for Balwadi education:

The reasons for sending their children to the Balwadi as felt by the mothers are presented in Table IX.

TABLE IX

REASONS FOR SENDING CHILDREN TO BALWADI AS STATED BY THE MOTHERS

S.No.	Reasons stated	Percentage of mothers stating	
		Sundapalayam	Veerapandi
1.	Get the child educated	24	6
2.	Prepare him for elementary school	65	47
3.	Develop good cleanliness habits	68	76
4.	Get nutritious diets	32	47
5.	For safety to children in the mother's absence	12	18
6.	Aid in the Child's socialisation	15	6
7.	Develop good eating habits	9	—
8.	Minimise children's mischiefs in the home	18	18

More than 50 per cent of the mothers in the experimental Balwadi could specify the reasons for sending their children to Balwadi as preparing the children for elementary school and helping them to learn good cleanliness habits. This indicates that they were more aware of the need for Balwadi education - than the mothers in the control group.

Mothers had definite purposes in sending their children to the Balwadi. Development of desirable habits was mentioned by a considerable percentage of mothers. Only 11 mothers in experimental Balwadi and 8 in control Balwadi sent their children to Balwadi exclusively to get food which may be due to their poverty.

Mothers' knowledge about the feeding programme:

Only nine out of 34 parents in the experimental Balwadi and 6 out of 17 in the control Balwadi had visited the Balwadi, thus stressing the need for parents' increased participation in the Balwadi and feeding programme.

All the mothers both in the experimental and control Balwadis were satisfied with the Balwadi and feeding programme with regard to quantity and quality and majority of them were in the habit of discussing with children about Balwadi and feeding programme daily, which was appreciable.

Seventy per cent of the mothers in the experimental Balwadi and 82 per cent of the mothers in the control Balwadi discussed with their children about the Balwadi. About the feeding programme, 82 per cent of the mothers in the experimental Balwadi and all the mothers in the control Balwadi used to discussed with their children, which clearly reveals their natural interest in knowing the food eaten by their children. But it was disappointing to find that the percentage of mothers trying to effect changes in the diet observing the menu of the Balwadi, in both the experimental and control Balwadi was less than 50 per cent. This clearly indicates ignorance about good nutrition and the need for imparting nutrition education.

Table X deals with the reasons stated by the mothers for children's liking towards the lunch provided in the Balwadis.

TABLE X

REASONS FOR CHILDREN LIKING THE LUNCH SERVED IN THE BALWADI

S.No.	Reasons	Percentage of mothers mentioning	
		Experimental	Control
1.	Company of children	55	41
2.	Taste of food	82	89
3.	Addition of sweet preparation	100	100
4.	Inclusion of fruits	68	41
5.	Desire for eating	6	12
6.	Variety of items	44	53
7.	Colourful	18	--

Mothers were very conscious of the group influence and all the qualities of food. As compared to the experimental Balwadi, the percentage of mothers in the control Balwadi mentioning the inclusion of fruits as the reason for children's liking is less thereby indicating the occasional inclusion of fruits in the control Balwadi.

d. Parents participation in the Balwadi

Nineteen out of 34 mothers in the experimental Balwadi and nine out of 17 mothers in the control Balwadi stated that there was no Parents Teacher Association. The rest had no idea of Parent Teacher Association, thus revealing the urgent need for organising the Parent Teacher Association in these Balwadis.

It was encouraging to find that 23 out of 34 in experimental Balwadi and 14 out of 17 in control Balwadi expressed their desire to have a Parent Teacher Association with the objectives to discuss children's problems and care of children, to meet other parents, to learn nutritious food and handicrafts, and to learn something useful to enrich their family living.

4. Selection of the topics for nutrition education:

The main theme of the nutrition education programme was to improve the nutritional status of the families, through imparting nutrition education to the preschool children as well as their mothers. During the home visits, the investigator's keen observations and informal discussions regarding the items the mothers were interested in, enabled her to outline the nutrition education programme based on the initial evaluation survey, for the mothers as well as children.

5. Selection of the methods:

Great care was taken to choose the appropriate methods for teaching nutrition in order to sustain the interest of the children and their mothers, the illiterates among whom constituted 76 per cent.

Effective and successful, teaching involved the use of teaching aids which are understandable. Lectures, discussions using flash cards, posters and charts, films strips and slides, demonstrations, field trips, puppet shows and exhibition were the methods selected for imparting nutrition education to the mothers in this study.

Songs, story-telling, group games, painting, puzzles, flash cards, charts, filmstrips and slides, puppet shows, field trips and exhibition were the methods chosen for imparting nutrition education to the pre-school children.

6. Outlining the plan of operations

A plan of work is the listing of activities by which the objectives already decided upon are to be achieved, (Vidyarthi, 1961). As a guide line for study a detailed plan of work was prepared indicating the topics, dates, methods and resource personnel, as presented in Table XI.

TABLE XI

THE PLAN OF WORK FOR IMPARTING NUTRITION EDUCATION TO THE MOTHERS

S.No.	Date	Topic	Methods used	Resource personnel
1.	30-7-73	Importance of food for health	Informal talk	Investigator
2.	6.8-73	Three main groups of foods - energy yielding, growth promoting and protective	Use of poster and charts	Investigator Balasevika
3.	9-8-73	Meaning of adequate diet	Use of Chart	Investigator, Balasevika
4.	13-8-73	Kitchen gardening	Lecture	Government Agricultural Woman Demonstrator.
5.	15-8-73	Distribution of seeds	Home visits	Investigator, Balasevika
6.	17-8-73	-do-	-do-	-do-
7.	7-9-73	Nutrients, their functions, sources and effect of deficiencies	Use of Charts and photographs	Investigator and Balasevika
8.	22-8-73	Meal planning	Informal talk	A Masters student majoring in Food and Nutrition
9.	27-8-73	Recommended Allowances	Use of Charts and Demonstration	Investigator and Balasevika
10.	29-8-73	Kitchen gardening	Home visits	-do-
11.	5-9-73	Desirable methods in food preparation	Use of Charts and demonstrations	-do-
12.	7-9-73	Preparation of low cost nutritious recipes	Demonstration	-do-

...contd.

S.No.	Date	Topic	Methods used	Resource personnel
13.	18-9-73	Preparation of Jowar preparations	Demonstrations	Investigator and Balasevika
14.	26-9-73	Preparation of cereal and pulse recipes	-do-	-do-
15.	29-9-73	-do-	-do-	-do-
16.	10-10-73	Preparation of weaning foods	-do-	-do-
17.	17-10-73	Preparation of pulse and greens recipes	-do-	-do-
18.	20-10-73	Preservation of foods-making Jams	-do-	-do-
19.	22-10-73	Preparation of pickles	-do-	-do-
20.	7-11-73	Groundnut preparations	-do-	-do-
21.	14-11-73	Food preservation by dehydration	-do-	-do-
22.	19-11-73	Storage of vegetables and fruits	-do-	-do-
23.	19-11-73	Care of children, their minor illnesses and treatment	Informal talk	Health visitor of the Block
24.	12-12-73	Care of Health and importance of food	Use of slides and filmstrips, field trip to Medical College Hospital	Investigator
25.	28-12-73	Malnutrition		Investigator and Balasevika
26.	9-1-74	Nutrients and deficiency diseases	Use of Slides and Filmstrips	-do-

....contd..

S.No.	Date	Topic	Methods used	Resource personnel
27.	12-1-73	The requirements of a good Balwadi, poultry raising unit, dairy keeping and kitchen garden	Field trip to Sri Avinashilingam Home Science College for Women Units	Investigator and Balasevika
28.	15-1-74	Chutney powders	Demonstration	-do-
29.	19-1-74	Ready to eat Mixes' for children	-do-	-do-
30.	23-1-74	Importance of vegetables, fruits and pulses in the diet	Puppet show	-do-
31.	28-1-74	Food for health	Exhibition	-do-
32.	6-2-74	Competitions in cooking and testing nutritional knowledge	Competitions	-do-

Another plan of work was prepared to impart nutrition education to pre-school children, as described in Table XII. This plan of work was integrated into the daily programme of the Balwadi. The Resource personnel were the Balasevika and the investigator.

TABLE XII

THE PLAN OF WORK FOR IMPARTING NUTRITION EDUCATION TO PRESCHOOL CHILDREN

S.No.	Topic	Methods used	Resource personnel
1.	Teaching the names of fruits	Actual fruits and pictures	Investigator and Balasevikas
2.	Teaching the names of vegetables	Actual vegetables. Trip to Garden	-do-
3.	Different groups of foods - vegetables fruits, milk, pulses, cereals, greens, etc.	Use of flash cards, models and actual foods	-do-
4.	-do-	-do-	-do-
5.	The importance of greens, milk and eggs	Informal talks with pictures visit to poultry house	-do-
6.	The nutrients and their functions	Action songs	-do-
7.	Effect of deficiencies of nutrients	Story telling	-do-
8.	Food for health	Action songs	-do-
9.	Which foods are good for health	Story & telling	-do-
10.	Participation of children in raising the kitchen garden	Gardening	-do-
11.	Food for strength	Drill	
12.	Good food habits	Use of charts and posters Experience in the meal programme	

...contd.

S.No.	Topic	Methods used	Resource personnel
13.	Habits of cleanliness	Song	
14.	Fruits and vegetables	Painting	
15.	Foods that should be included in the diet	Teaching with the help of the menu in the feeding programme	
16.	Good health habits	Informal talks	
17.	Importance of fruits and vegetables	Puzzles	
18.	Health care	Use of slides and filmstrip	
19.	What happens if we do not eat properly	Slides and filmstrip	
20.	-do-	-do-	
21.	Poultry unit, dairy, kitchen garden	Field trip	
22.	Importance of vegetables, fruits and pulses in the diet	Puppet show	
23.	Nutritious food for health	Exhibition	
24.	Songs, story telling, testing the nutritional knowledge of the children	Competitions	

B. Conducting the nutrition education programme:

This phase consisted of conducting nutrition education programme for the

a) Balwadi children

and b) mothers.

The nutrition education programme was implemented for a period of six months starting from 1st August 1973 to January 1974, both to the children and to the mothers.

A two pronged approach was made to impart nutrition education. As a first step towards implementation of nutrition education to the children and their mothers, the Balasevika was convinced about the importance and need for imparting nutrition education to the children and their mothers and her full co-operation in the implementation of the programme was ensured. With her assistance the Parent Teacher Association was organised, with mothers of the Balwadi children, as the members.

The time for conducting the Parent Teacher Association meetings was decided as 1-3 p.m. twice a week, after consultation with the housewives, so that those who go for work could also attend the meetings. The classes for mothers were conducted as per the schedule planned.

The programmes, activities and methods were planned and carried out with the following criteria:

1) Simplicity
2) Attractiveness
3) Suitability
4) Interesting
5) Adaptability
and 6) Applicability

The investigator helped, guided, adviced and educated the Balasevika to impart nutrition education to children and mothers throughout the course of this study.

Implementation of the programme for preschool children:

With the Balasevika's co-operation the programme was implemented along with the routine activities of the Balwadi and the menu of the feeding programme.

Songs are effective medium of communicating ideas to the audience, (Garg, 1960). Action songs on the importance of gooseberry, brinjal, tomato, ladies finger, pumpkin etc. prepared by the investigator (Appendix V) were taught to the children by the Balasevika (Figure. 1).

Holmes (1968) considers story telling as an important aid in nutrition education as it can be used effectively in nutrition education. Stories depicting the functions of nutrients specially vitamin A, vitamin C, protein and the inclusion of raw vegetables and fruits in the diet were written by the investigator and were taught to the children through Balasevika (Appendix VI).

Puzzles about vegetables and fruits (Fig.2) cutting out pictures of vegetables and fruits and pasting them in the album (Fig.3) and collecting the leaves of vegetables and fruits were included in the indoor games. In addition, the children were allowed to paint out the drawings of vegetables and fruits, pointing out the name and importance of the same (Fig.4).

The children were enlightened on nutrition through the specially prepared 'Snake and Ladder' game (Fig.5).

A kitchen garden was raised near the Balwadi and kitchen gardening was included in the outdoor games of the children (Fig.6). Children enjoyed taking part in kitchen gardening. Amaranth, tomato, brinjal, beans, raddish, bittergourd, ladies finger and pappaya were raised in this kitchen garden. It was a pleasant sight to see the yields from the kitchen garden being used in the menu of the Balwadi feeding programme.

Figure 1.

NUTRITION EDUCATION THROUGH ACTION SONGS

Figure 2.

Figure 3.

CHILDREN CUTTING AND PASTING PICTURES OF VEGETABLES

Figure 4.

NUTRITION EDUCATION THROUGH PAINTING

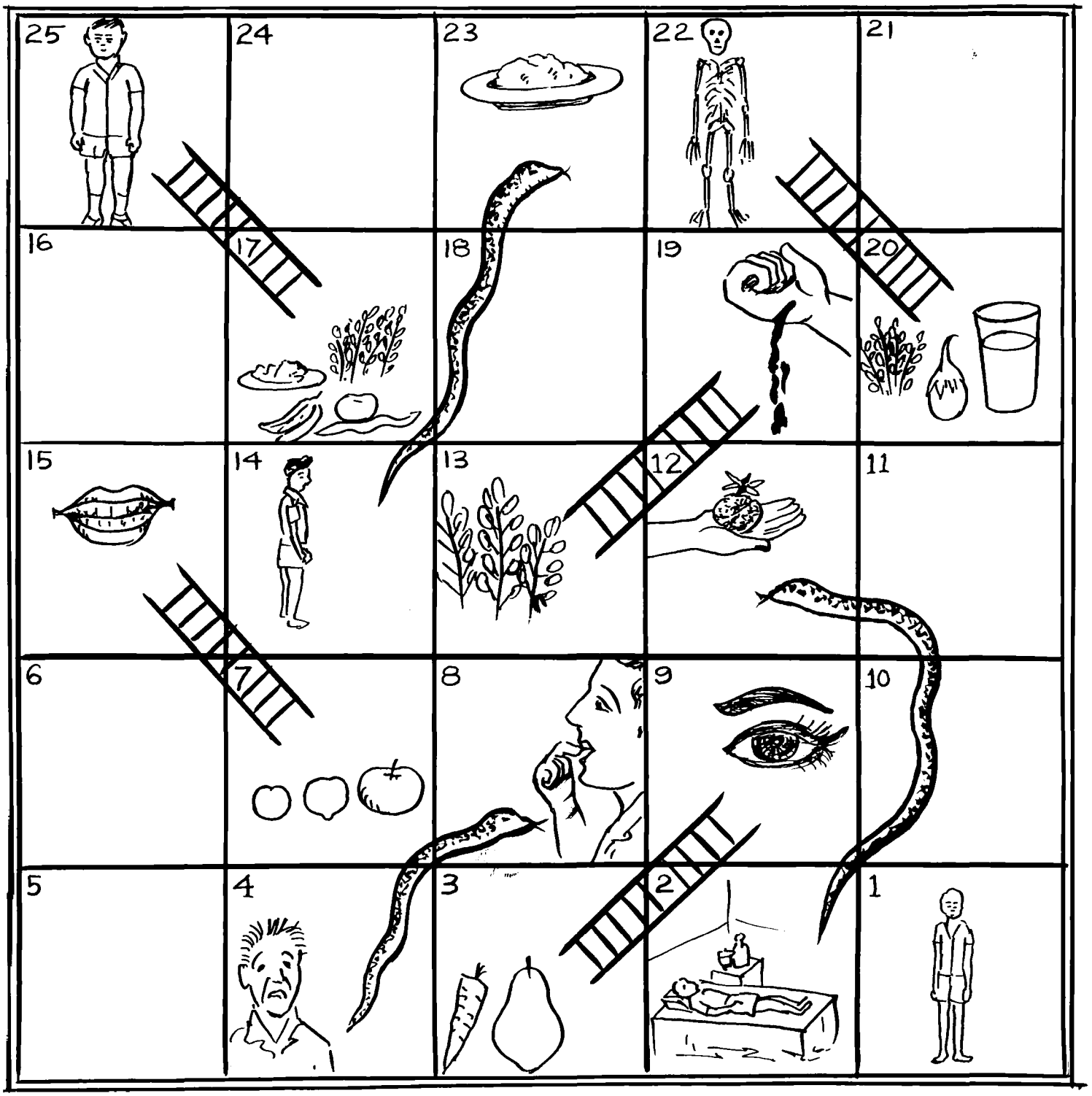


FIGURE 5.

NUTRITION EDUCATION THROUGH "SNAKE AND LADDER" GAME

Figure 6.

CHILDREN INVOLVED IN GARDENING

Figure 7.

FIELD TRIP TO MEDICAL COLLEGE HOSPITAL

Strenuous efforts were put in by the investigator to arrange for the mothers to go on field trips along with their children. A field trip not only makes possible close observation of a multitude of natural and man-made things but it also offers first-hand information and real experience in a real life situation (Haag and Packer, 1953).

Field trips to Government Medical College Hospital, Coimbatore and to Sri Avinashilingam Home Science College for Women, Coimbatore were arranged by the investigator with the help of the Balasevika, obtaining prior permissions from the Block Development Officer, Periyanaickenpalayam Panchayat Union, Coimbatore to take the preschool children along with their mothers, from Superintendent of Medical College Hospital, Coimbatore and the principal of Sri Avinashilingam Home Science College for Women to visit the hospital and the college respectively (Figs. 7, 7a). The children and mothers were depressed to see the cases of nutritional deficiency diseases in hospital and could comprehend the importance of nutritious food in the diet. They were happy to see the nursery school, poultry unit and kitchen garden of Sri Avinashilingam Home Science College for Women. The field trip had entertainment as well as educational value to the children as well as to mothers.

Figure 7a.

VISIT TO NURSERY SCHOOL, SRI AVINASHILINGAM HOME SCIENCE COLLEGE FOR WOMEN

Filmstrip has often been called as "a headful in a handful" and is the most inexpensive medium of mass communication, (Bradfield, 1966). Haas and Packer (1953) point out that the use of a single slide can vitalise an entire teaching session. These audio visual aids were used by the investigator with the assistance of the Balasevika, during the course of her visits to the Balwadi to make the preschool children and their mothers understand the difficiencies and sources of nutrients to alleviate the same(Fig.8).

It is said that lightening never strikes twice in the same place, but instructors can strike repeatedly at the understanding of students by the use of flash cards, (Haas and Packer, 1953). Flash cards had been used successfully to drive home the importance of food, in imparting nutrition education to the preschool children (Fig.9).

Puppetry is an old and popular art. It can be present ideas with extreme simplicity, without elaborate scenary or costume, yet efficiently. The puppets form an impressive tools for nutrition education, (Kulandaivel, 1961 and Goyal, 1965). Holmes (1963) speaks of it as an alternative and most successful method of presenting a play. A puppet show was arranged to make the mothers and

Figure 8.

NUTRITION EDUCATION THROUGH FILM STRIP

Figure 9.

CHILDREN LEARNING NUTRITION THROUGH FLASH CARDS.

the preschool children understand the importance of inclusion of fruits, vegetables and pulses in the diet. The puppet show was immensely enjoyed by both preschool children and their mothers (Fig.10).

One of the many ways as suggested by Holmes (1958), of bringing good nutrition ideas to the notice of the public, of stimulating discussion among them and trying to persuade people to adopt them is by the use of well-designed and well-organised exhibitions.

An exhibition was put up with 'Food for Health' as the main theme. The exhibition included suitable charts and posters showing the nutrients in various food items, food groups and indicating the principles of cooking vegetables, cut outs displayed to show the deficiencies of nutrients, display of recommended allowances of food for preschool, pregnant and lactating mothers, models of poultry unit, house, kitchen garden and dairy farm and display of janatha refrigerator (Fig.11). The children were very much impressed by the exhibition arranged in the Balwadi.

The purpose of any chart is to visualise some idea or concept which may be more difficult to understand if treated only in words. Together with posters, they create

Figure 10.

PUPPET SHOW ON NUTRITION

Figure 11.

CHILDREN SEEING EXHIBITION ON NUTRITION

a general awareness of the message in nutrition education, (Kulandaivel, 1961). Charts and posters illustrating good food habits and sources of rich foods were used in teaching children about nutrition (Fig. 12).

In coherence with the health education through exhibition, a Triple Antigen Drive was organised to alleviate the harassment happening to children through tetanus, diphtheria and whooping cough. The health visitor from Primary Health Centre volunteered to come over to Balwadi and all the children got vaccinated. It was a great dimension of work towards saving the life of children from such health hazards.

All the mothers realised the ultimate importance and indispensability of vitamin A for life and accepted to give oral doses of vitamin A to children. It was distributed through Balasevika.

The menu of the feeding programme of the experimental Balwadi was modified by the investigator, with the help of Balasevika. Table XIII shows the existing as well as the modified menu of the experimental Balwadi.

Figure 12.

NUTRITION EDUCATION USING CHARTS AND POSTERS

Figure 13.

NUTRITION EDUCATION TO MOTHERS THROUGH FLASH CARDS

TABLE XIII

MENU PATTERN OF THE EXPERIMENTAL BALWADI

S.No.	Days	Existing Menu	Modified Menu
1.	Monday	Lemon rice, Keerai poriyal Tomato, salad, groundnut balls	Lemon rice, Keerai with dhal kootu, tomato salad, groundnut balls.
2.	Tuesday	Dhal rice, vegetable poriyal, carrot salad, green gram sundal	Dhal rice, vegetable poriyal, green gram dhal puttu, carrot salad.
3.	Wednesday	Tamarind rice, Vegetable poriyal papaya, groundnut	Besi-bele bath, Keerai poriyal, papaya, groundnut, milk.
4.	Thursday	Sambar rice, vegetable poriyal, Tomato groundnut	Vengi bath, keerai poriyal, tomato, sprouted green gram salad
5.	Friday	Tomato rice, cabbage poriyal, carrot salad, roasted bengal gram dhal balls.	Tomato rice, cabbage poriyal, carrot salad, mixed dhal balls.
6.	Saturday	Coconut rice, tomato salad, green gram sundal.	Sambar rice, tomato salad, sprouted green gram sundal.

The introduction of janatha refrigerator in the experimental Balwadi made possible the serving of green leafy vegetables thrice a week and to keep the vegetables fresh.

Besi-bele bath, green gram dhal puttu, groundnut milk, steamed dhal balls, mixed dhal balls and groundnut balls were introduced as new items in the menu and the children enjoyed eating them.

At the close of the nutrition education programme, competitions were conducted for the children to test their nutritional knowledge, using story telling, songs, puzzles and picture cards.

Implementation of the programme for mothers:

Nutrition education was imparted to mothers at Parent Teacher Association meetings, using Balasevika as the tool for communication of ideas. The investigator was only a motivational factor and guided and helped the Balasevika in implementing the programmes. The nutrition education programme was started with an informal talk about the importance of food for health. This was followed by the explanation of the functions of food, food groups and balanced diet using charts, flash cards and posters (Fig. 13).

Figure 14.

CISCUSSION LI PROGRESS AT PARENT TEACHER ASSOCIATION

BALANCED MEALS LOW COST NUTRITIOUS RECIPES

Figure 15.

The Agricultural Woman Demonstrator, from Farmers' Training Centre, Coimbatore, delivered a lecture on the importance of kitchen gardening. The investigator distributed seeds of vegetables through the Balasevika and paid frequent home visits to check whether the kitchen gardens were properly raised or not.

The mothers were helped to understand the functions, deficiencies and sources of carbohydrates, fats, proteins, vitamins and minerals utilising flash cards; slides and filmstrips (Fig. 8).

Discussions were held to convince the members of Parent Teacher Association, of the importance of meal planning, recommended allowances for different age groups and of their role in improving balwadi and the feeding programme. Discussions were also supplemented by charts and demonstrations (Fig. 14).

According to Devadas and Chandrasekhar (1970) demonstration especially, the result demonstrations offer an opportunity to the nutrition educator to explain in concrete terms of ideas, she aims to transfer.

A series of demonstrations was conducted by the investigator with the help of the Balasevika, to help

Figure 16.

FIELD TRIP TO POULTRY UNIT AT SRI AVINASHILINGAM HOME SCIENCE COLLEGE FOR WOMEN

to help the mothers learn the principles of cooking, low cost nutritious recipes from ragi, jowar, combination of ragi and maize; rice, vegetables and pulses, pulses preparations, cereal and pulse preparation; cereals and greens preparation; pulses and greens preparation; different methods of cooking; preparation of jams, pickles and chutney powders; preservation of potato and ashgourd by dehydration method; weaning food; storage of vegetables and fruits using Janatha Refrigerator and groundnut preparation (Fig. 15).

The mothers were taken on field trips to Medical College Hospital, Coimbatore and Sri Avinashilingam Home Science College for Women, Coimbatore, along with their children by the investigator and Balasevika. The mothers were shocked to see the cases of nutritional deficiency diseases among children, in the hospital. The visits to hospital and the college enlightened the mothers with useful knowledge and enriched their experiences (Fig.16)

The puppet show and the exhibition arranged in the Balwadi were attended by a large number of mothers and helped to increase their knowledge (Fig. 10 and 17-20).

Visists are a most useful method for extending information so that it will be understood and used, (Warner, 1966). That is why, frequent home visists were

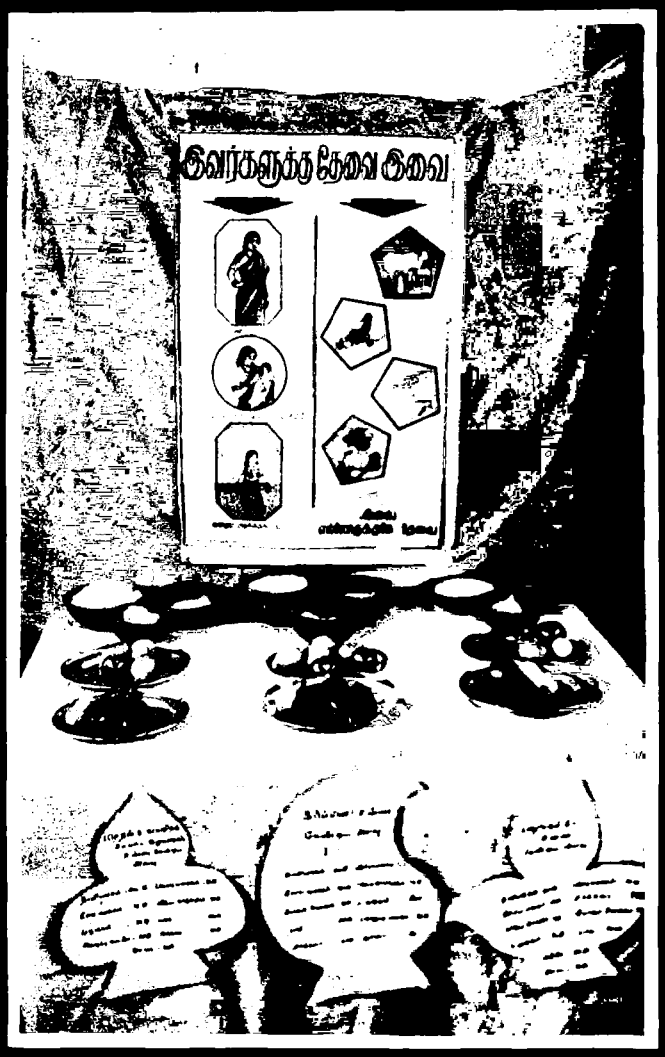


Figure 17.

A PART OF THE EXHIBITION ON NUTRITION

Figure 18.

EXPLANATION ON THE RECOMMENDED ALLOWANCES TO THE MOTHERS

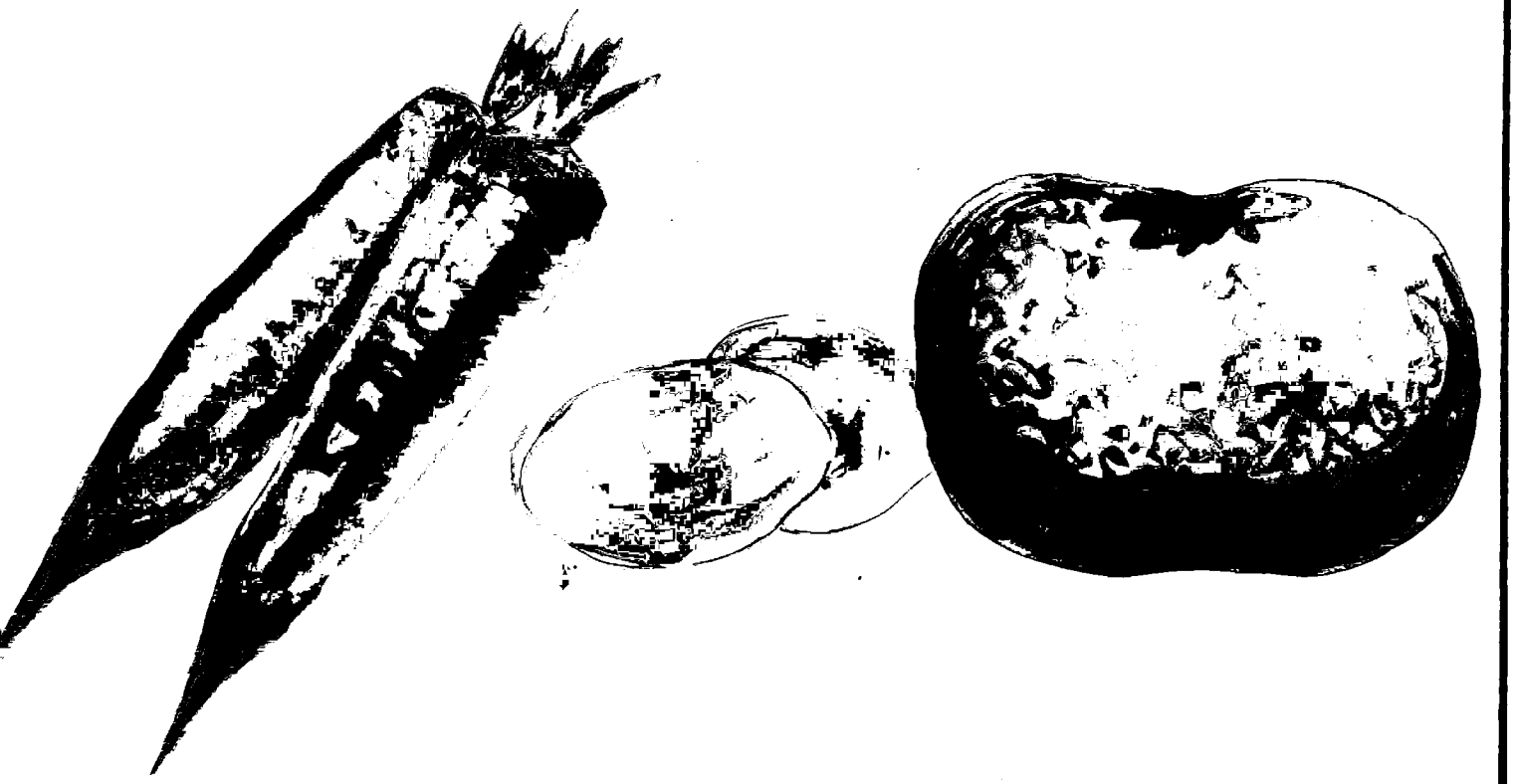
Figure 19.

MOTHERS OBSERVING EXHIBITION

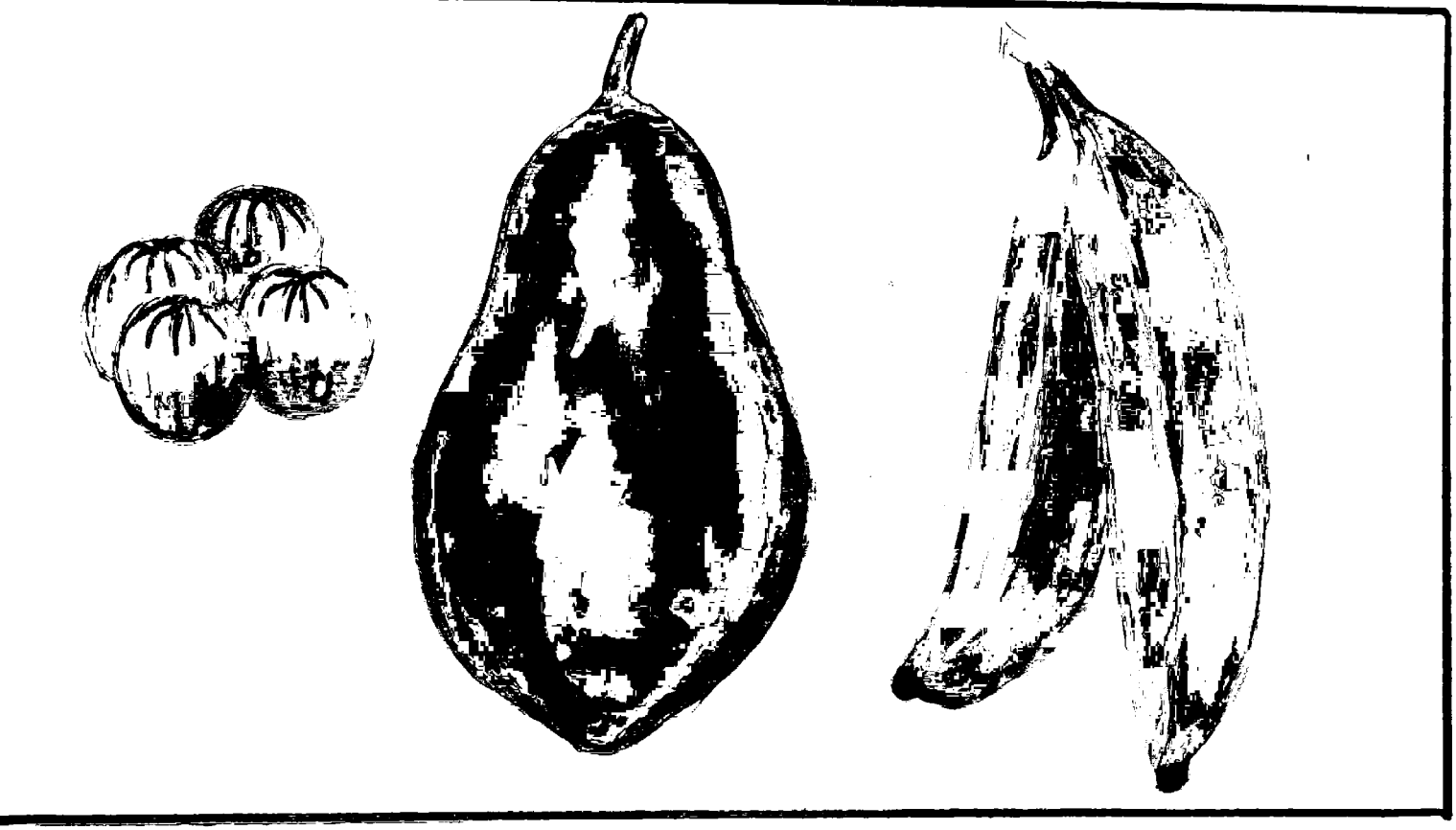
Figure 20.

DEMONSTRATION OF JANATHA REFRIGERATOR

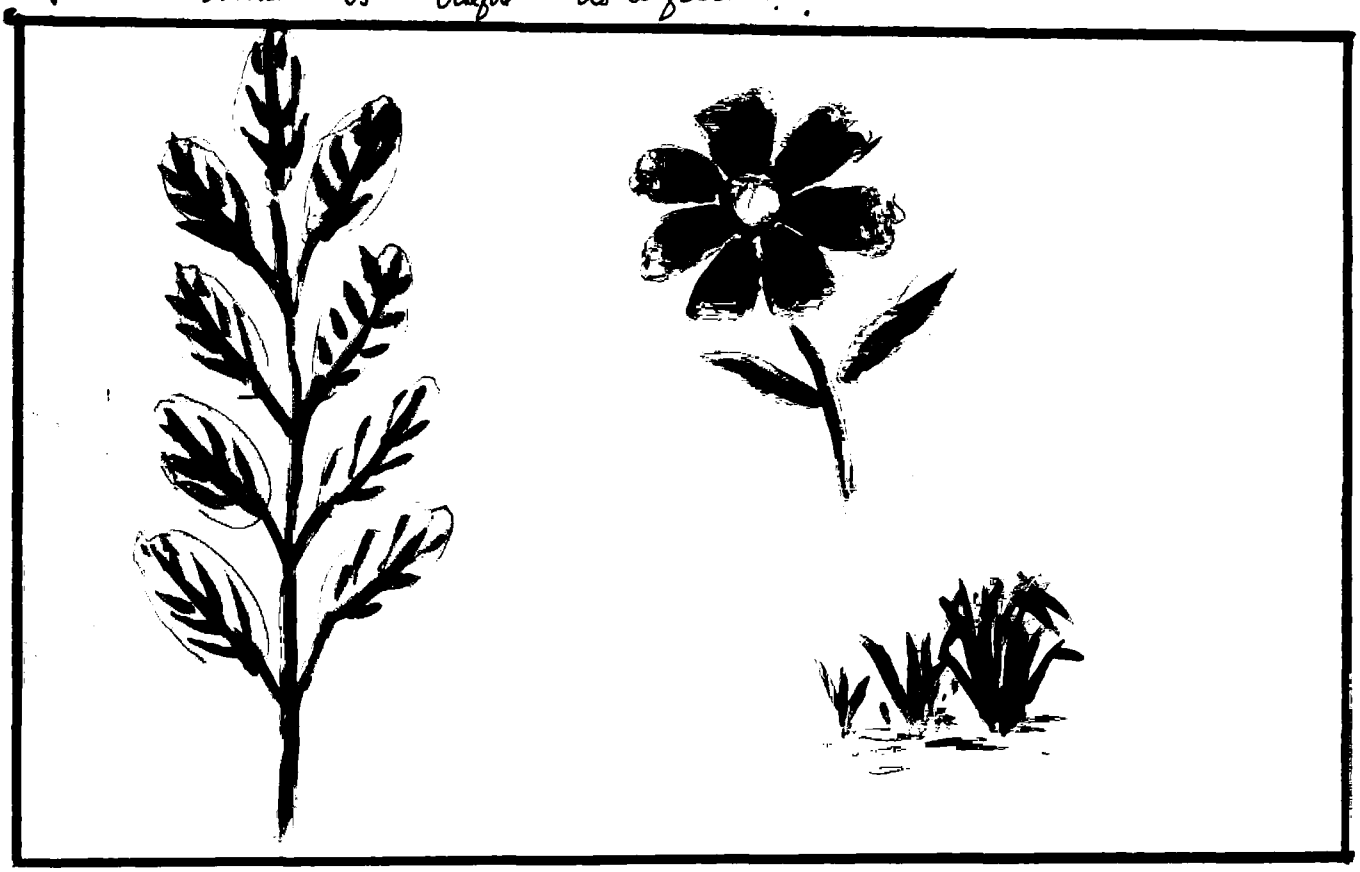
3 Which food is good for eyesight ?



4 Which good is good for gums ?



1 Which is useful as a good ?

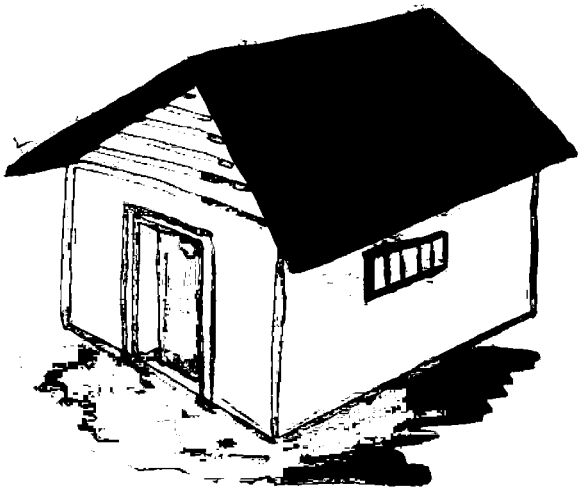


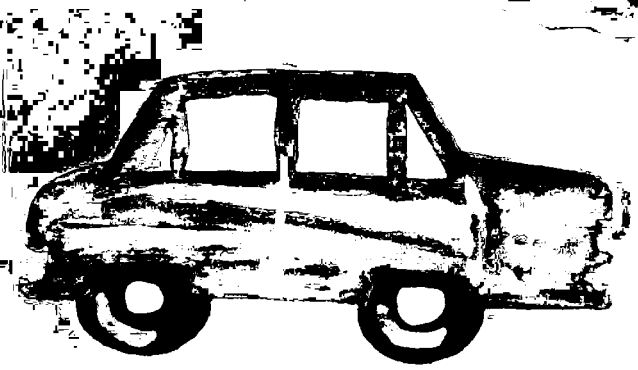
2 Which is good for growth ?

FIGURE 21. A SET OF PICTURE CARDS USED IN TESTING THE NUTRITIONAL KNOWLEDGE OF CHILDREN

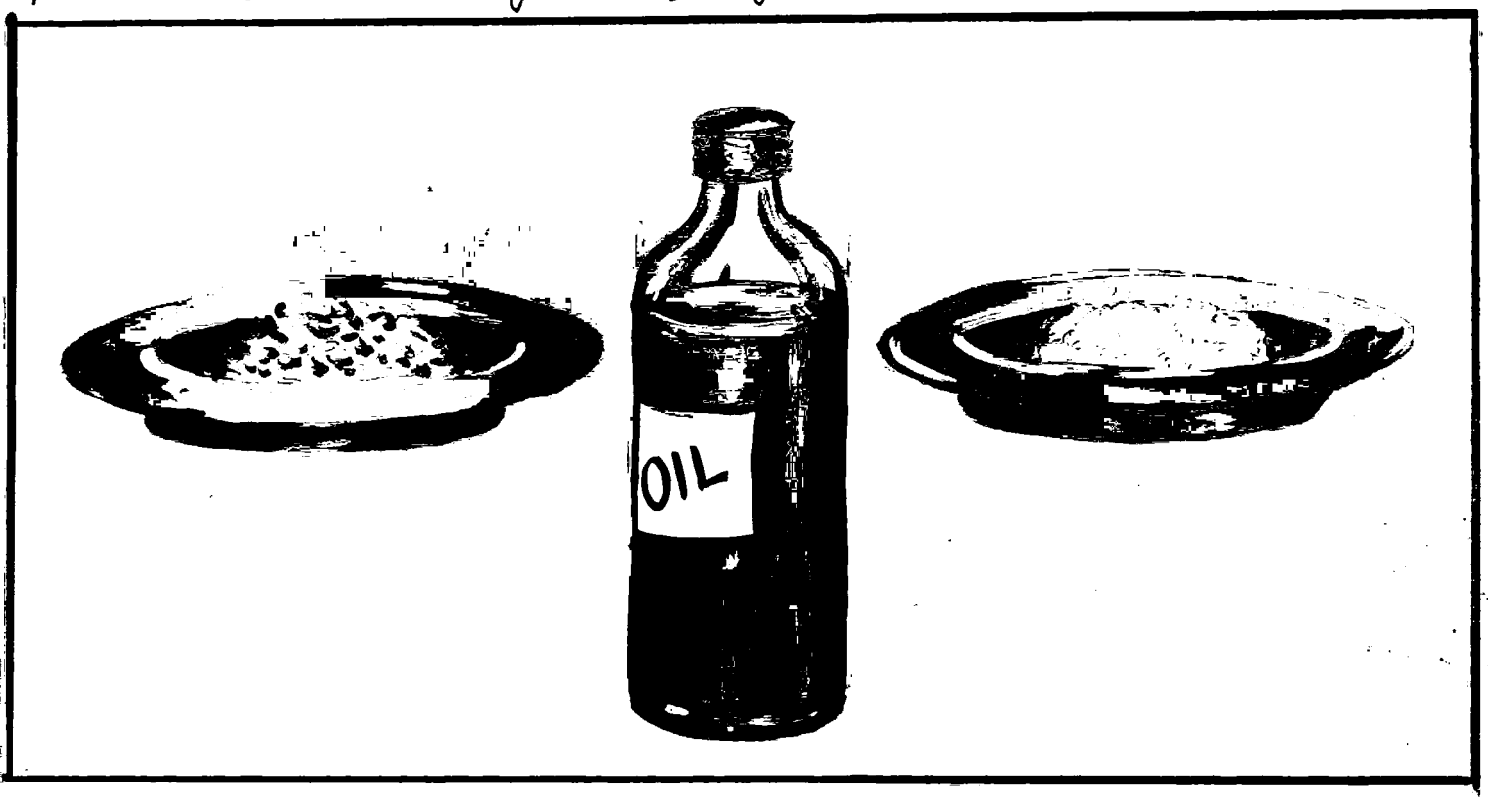
5 Which is good for blood?

6 What needs good?

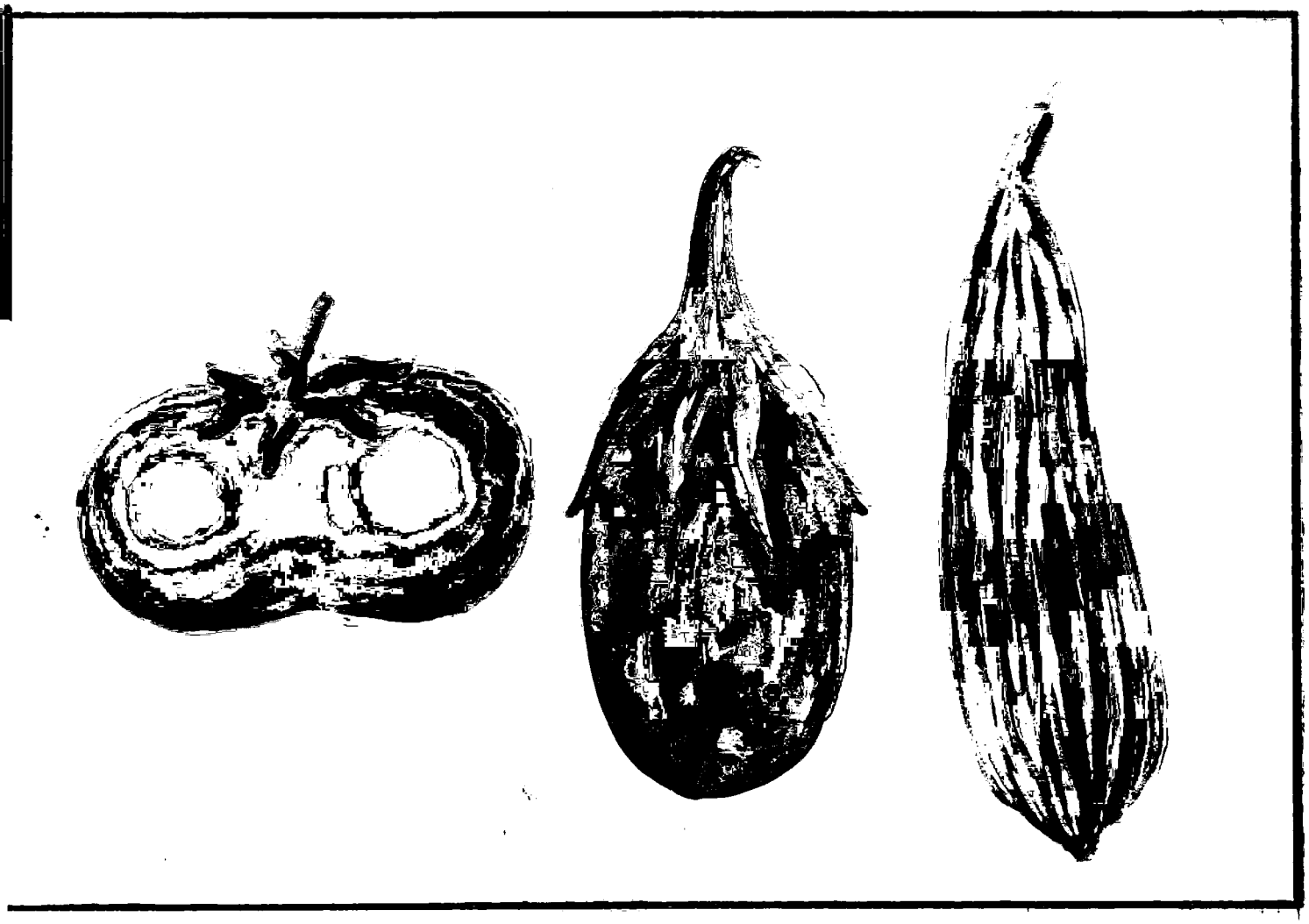




7. Which is good for growth?



Which should be eaten raw?



Which food gives energy ?

Who is well nourished ?

9. Which food gives energy ?

Who is well nourished ?

paid by the investigator along with the Balasevika to extend information to those who could not attend the Parent Teacher Meetings and also to check whether the knowledge gained and the practices demonstrated were accepted by the mothers.

At the end of the nutrition education programme, competitions were held for mothers to check the extent of the nutritional knowledge gained by them and the adoption of improved practices. The participants of cooking competitions prepared ragi recipes like ragi puttu, vadai and pakoda. A questionnaire was used to test the nutritional knowledge of the mothers in one of the competitions.

C. Evaluating the nutrition education programme:

The impact of the nutrition education programme was evaluated on the lines stated below:

1. Extent of participation of the mothers and the children in the educational programme
2. Acquisition of nutritional knowledge by the mothers and the Balwadi children.
3. Benefits derived from the nutrition education programme.

1. Extent of participation of the parents in the programme:

The regularity with which mothers and children participated in the educational programme was considered to be a mark of success. Therefore the attendance of parents for the various classes, and of the children in the Balwadi was maintained.

2. Acquisition of nutritional knowledge by the mothers and children:

Education is the production of desirable changes in human behaviour. Knowledge is a pre-requisite for adoption of and fundamental to, any behavioural change. Therefore an attempt was made to find out the change in the nutritional knowledge of the mothers as a result of the educational programme with the help of an interview schedule which was administered before and after the nutrition programme (Appendix II- Part B).

The changes in the knowledge of the children was found out by administering a set of picture cards and scoring them, before and after the nutrition education programme (Fig. 21).

3. Benefits derived from the nutrition education programme:

The benefits of the nutrition education programme

were assessed in terms of:

a) The opinions of the mothers regarding the educational programme

and b) The impact of the programme as reflected on the Balwadi children.

a) The benefits accruing to the parents from the programme were assessed through the same questionnaire which was used at the onset of the nutrition programme to facilitate the comparison of the achievements.

b) Acquisition of knowledge should ultimately result in desirable changes in the practices. The investigator observed the Balwadi children closely for their appearance, cleanliness and eating habits, behaviour and participation in games both before and after the nutrition education programme to note down the changes and improvements, using an observation checklist. The heights and weights of children were taken at the beginning and close of the nutrition education programme to find out the improvements as reflected among Balwadi Children.

IV RESULTS AND DISCUSSION

The results of this action research project are discussed under the headings given below:

A. Participation of the mothers and children in the nutrition education programme.

B. Increase in the nutritional knowledge of the mothers.

C. Changes in the dietary practices of mothers.

D. Evaluation of nutrition education imparted to children.

E. Opinions of mothers.

and F. The opinion of Balasevika regarding the nutrition education programme.

A. Participation of the mothers in the nutrition education programme

The extent of participation of the mothers in the education programme was revealed through their attendance for the various classes. Table XIV describes, the attendance of the parents for the different classes.

TABLE XIV

ATTENDANCE OF THE MOTHERS FOR THE VARIOUS CLASSES

Number in the sample: 34

Sl. No.	Class	Response of the parents in the E.B.*	
		Number	Percentage
1.	Importance of food for health	26	76
2.	Explanation of three main groups of foods	21	62
3.	Explanation of balanced diet	21	62
4.	Kitchen gardening	29	85
5.	Nutrients, their functions and deficiencies	25	74
6.	Meal planning	10	29
7.	Recommended allowances	16	47
8.	Principles of cooking	30	88
9.	Demonstration of low cost recipes (Average attendance is considered)	28	82
10.	Storage and preservation of foods	17	50
11.	Malnutrition and deficiency diseases	24	71
12.	Care of children and care of health	28	82
13.	Importance of taking raw vegetables, fruits and pulses	31	91
14.	Nutritious food for health	32	94

* EXPERIMENTAL BALWADI

More than 50 per cent of the parents had attended all the classes. They were deeply interested in the discussions and participated in the demonstrations. This is encouraging.

Attendance of Balwadi children:

The attendance of children in the experimental and control Balwadi is shown in Table XIV.

TABLE XIV

DISTRIBUTION OF ATTENDANCE OF BALWADI CHILDREN

Sl.No.	Percentage of attendance range	Number of children attending in			
		Experimental		Control	
		Number	Percentage	Number	Percentage
1.	Upto 50	2	6	2	12
2.	51 - 75	7	21	3	18
3.	76 - 100	25	73	14	82

It is remarkable to find that more than 75 per cent attendance was secured by a majority of the children in both experimental and control Balwadis. This reflects the interest and enthusiasm of children to attend the Balwadi.

B. Increase in the nutritional knowledge of the mothers:

The responses of the mothers in the experimental and control Malwadi to the knowledge tests are summarised as shown in Appendices. The scores obtained for nutritional knowledge by the mothers before and after nutrition education are given in Table XVI (Fig. 22).

TABLE XVI

SCORES OBTAINED BY THE MOTHERS IN NUTRITIONAL KNOWLEDGE

S.No.	Percentage score range	Distribution of parents obtaining			
		Experimental (No.34)		Control (No.17)	
		Before	After	Before	After
1.	0-10	7	-	-	-
2.	11-20	11	4	11	10
3.	21-30	5	2	1	2
4.	21-40	6	2	2	-
5.	41-50	2	2	1	3
6.	51-60	1	2	2	2
7.	61-70	2	7	-	-
8.	71-80	-	4	-	-
9.	81-90	-	6	-	-
10.	91-100	-	5	-	-

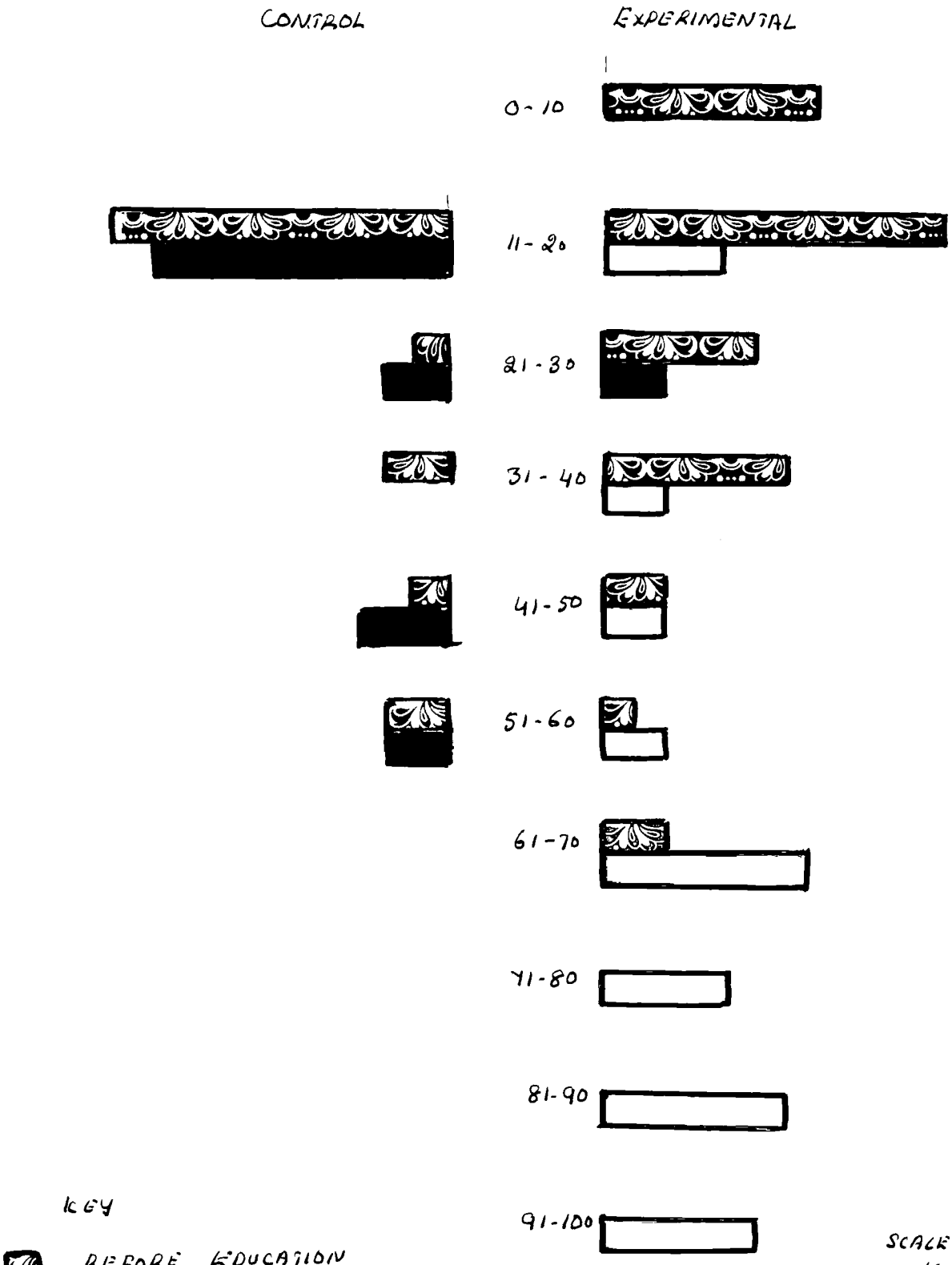


FIGURE 22. THE SCORES OBTAINED BY THE MOTHERS IN NUTRITIONAL KNOWLEDGE

In the beginning 11 out of 34 and 11 out of 17 mothers in the experimental and control Balwadis respectively, had obtained scores ranging from 11-80 per cent, the highest being 61-70 per cent scored by experimental Balwadi mothers. In contrast after nutrition education, 15 mothers had scored above 70 per cent with even 91-100 per cent in the experimental Balwadi whereas the knowledge of the mothers in the control Balwadi, had remained where it was. This clearly indicates the positive influence of nutrition education on the mothers of the experimental Balwadi in improving their nutritional knowledge and this was also statistically proved (Appendix IX). When statistically analysed, it was found that there was positive relation between the attendance of mothers in the nutrition education classes and their nutritional knowledge (Appendix X).

C. Changes in the dietary practices:

Food consumption:

The frequency of consumption of food consumed in the families of the experimental and control Balwadi children, at the close of the study, is illustrated in Table XVII.

TABLE XVII

FREQUENCY OF FOOD CONSUMPTION

Sl. No.	Food eaten	Percentage of mothers									
		Experimental					Control				
		Daily	Weekly			Occasionally	Daily	Weekly			Occasionally
			Once	Twice	Thrice			Once	Twice	Thrice	
1.	Ragi	47	12	18	24	—	24	12	12	24	—
2.	Maize	50	29	—	—	—	47	—	—	—	—
3.	Redgram dhal	100	—	—	—	—	100	—	—	—	—
4.	Bengal gram dhal	15	18	6	—	—	—	24	6	—	6
5.	Horse gram	—	35	41	18	6	—	35	65	—	—
6.	Green gram	—	47	15	—	—	—	18	18	—	12
7.	Green leafy vegetables	18	6	15	62	—	12	88	—	—	—
8.	Fruits	9	44	29	18	—	6	—	18	—	—
9.	Milk	56	—	—	—	—	41	—	—	—	—
10.	Eggs	—	26	6	—	62	—	12	—	—	41
11.	Meat and fish	—	24	—	—	68	—	12	—	—	88
12.	Groundnuts	—	53	29	15	9	—	47	35	6	88
13.	Parboiled rice	56	4	12	26	—	47	18	24	—	12

Considerable differences, between the families of the experimental and control Balwadi children, in the frequency of use of foods, specially green leafy vegetables, pulses except red gram dhal, fruits, groundnuts and ragi are evident. Mothers of children in the experimental Balwadi had better food consumption. These changes reveal the impact of nutrition education on food consumption.

Foods eaten in greater quantities than before as mentioned by the mothers is given in the Table XVIII.

TABLE XVIII

FOOD EATEN IN GREATER QUANTITIES THAN BEFORE

S.No.	Food Items	Percentage of mothers mentioning in the Experimental Balwadi	
		Before education	After education
1.	Ragi	28	82
2.	Greens	30	88
3.	Red gram dhal	17	50
4.	Green gram dhal	19	53
5.	Horse gram	18	53
6.	Bengal gram dhal	9	26
7.	Amla	23	68
8.	Variety of vegetables	29	85
9.	Tomato	27	79
10.	Carrots	27	79
11.	Seasonal fruits	25	74
12.	Groundnuts	21	62

It is encouraging to note that more than 50 per cent of the parents in the experimental Balwadi were taking foods like ragi, greens, green gram dhal, redgram dhal, amla, vegetables, tomato, carrots, groundnuts and seasonal fruits, in greater quantities than before as a result of the nutrition education given. There were no changes in the case of the control Balwadi with regard to addition of new nutritious foods.

Menus planning

The preliminary survey revealed that none of the mothers of Balwadi children in Sundapalayam as well as Veerapandi villages were in the habit of planning meals. But it was heartening to find that 26 per cent of the mothers who participated in nutrition education programme had adopted meal planning.

Daily meal pattern:

After the nutrition education programme, it was found that above 50 per cent of the mothers in the experimental Balwadi had included low cost recipes like ragi puttu, ragi rotti, bengalgram dhal omelette, maize, or ragi with green leafy vegetables or other vegetables, mixed cereal and pulse preparations in the breakfast.

Green gram puttu, maize or ragi vadai, ragi murukku, dhal balls, groundnut parothas and groundnut milk were included in tea by 9 mothers frequently and occasionally by 19 mothers. Nutrition education seems to have helped them to introduce a variety of nutritious recipes in their daily diet.

Methods of cooking:

As a result of the nutrition education imparted to the mothers of the experimental Balwadi children, remarkable changes in their methods of cooking rice and vegetables were noticed such as steaming or cooking rice by evaporation, cooking the vegetables in just enough water and not throwing away the water in which the vegetables were cooked.

Food Preservation practices:

Only 17 mothers in Sundapalayam and 3 mothers in Veerapandi preserved some foods. The most common method of food preservation adopted was pickling. The lime, amla and mango were the commong foods used for pickles. The period for which the pickles were prepared varied from one month to one year. The number of mothers who prepared

amla pickles increased from 12 to 23 after the nutrition education in the experimental Balwadi. In addition a considerable number of mothers had adopted dehydration method for preserving vegetables like ashgourd and potato.

The preservation methods and conditions remained the same in the case of the control Balwadi at Veerapandi

Foods given under special conditions:

A majority of mothers of the experimental Balwadi children had increased their knowledge of nutrition which had undergone considerable change when compared with the original findings (Table IX), regarding the foods given under special conditions. Inclusion of ragi porridge, more vegetables and fruits in the diets of infant, toddler, preschool child, pregnant women, lactating mother and the sick was appreciable. The reasons expressed for the inclusion of new foods during the special conditions were that they were good for health and nutrition.

Extent of understanding the topics covered in the nutrition education programme:

Table XIX illustrates the aspects of nutrition learnt by the mothers of the experimental Balwadi children through education programme.

TABLE XIX

ASPECTS OF NUTRITION LEARNT BY THE MOTHERS

S.No.	Aspects	Percentage of mothers stating		
		Fully understood	Partially understood	Not at all
1.	Importance of food for health	65	20	15
2.	Explanation of balanced diet	62	26	12
3.	Explanation of three groups of foods and functions of food	62	23	15
4.	Kitchen gardening - its importance	85	15	--
5.	Nutrients - their functions and deficiencies	62	20	18
6.	Meal planning	29	29	42
7.	Recommended allowances	47	15	38
8.	Care of children	78	6	16
9.	Care of health and importance of food	82	--	18
10.	Malnutrition and deficiency diseases	56	29	15
11.	Importance of taking vegetables, fruits and pulses in the diet	91	--	9
12.	Nutritious food for health	94	--	6

Above 50 per cent of the mothers who had participated in the nutrition education programme understood the topics dealt with fully. The reason for not understanding by a small percentage of mothers is their poor attendance.

Aspects of nutrition adopted:

The aspects of nutrition adopted by the mothers of the experimental Balwadi are given in Table XX.

TABLE XX

ASPECTS OF NUTRITION ADOPTED BY THE MOTHERS

S.No.	Items taught	Percentage of mothers stating in the experimental Balwadi		
		Fully	Partially	Not at all
1.	Principles of cooking	82	6	12
2.	Preparation of ragi dishes	85	—	15
3.	Preparation of maize dishes	79	21	—
4.	Combination of cereal and pulse preparations	82	—	18
5.	Combination of pulse and greens	82	—	18
6.	Using weaning food	50	—	50
7.	Preparing tomato and pappaya jam	26	—	74
8.	Preparing pickles	56	26	18
9.	Preparing groundnut preparations	82	—	18
10.	Preservation by dehydration	35	15	50
11.	Use of Janatha Refrigerator	65	—	35
12.	Preparing chutney powders	74	—	26
13.	Preparation of porridges	53	21	26

More than 50 per cent of the mothers had adopted the practices demonstrated, indicating the value of the nutrition education imparted to the mothers. The reasons for not adopting by a few mothers may be due to their poverty or poor attendance oto the nutrition education classes.

Methods liked by the mothers in imparting nutrition education:

Table XXI shows the various methods liked by the mothers of the experimental Balwadi, in nutrition education.

TABLE XXI

METHODS LIKED BY THE MOTHERS

Number in sample - 34

S.No.	Methods used	Percentage of mothers mentioning in the experimental Balwadi	
		Number	Percentage
1.	Puppet show	32	94
2.	Exhibition	34	100
3.	Demonstration	29	85
4.	Field trips	27	79
5.	Posters and charts	28	82
6.	Flash cards	28	82
7.	Group discussion	24	71
8.	Slides and films	28	82
9.	Informal talk	24	71
10.	Home visits	34	100
11.	Lecture	15	44

Puppet show, exhibition and home visits seemed to have appealed to a majority of the mothers. A considerable percentage of mothers mentioned their liking for the other methods also. The lecture method, was the least liked. Mothers could understand better what they saw and did.

D. Evaluation of the nutrition education imparted to the children of the experimental Balwadi:

1. Nutritional knowledge:

At the end of the nutrition education programme, an evaluation was conducted to assess the improvements in the nutritional knowledge of the children of the experimental Balwadi.

Puzzles about vegetables and fruits (Fig.23), songs story telling and a set of picture cards (Fig. 21) were used to test the nutritional knowledge of the children before and after the nutrition education programme.

Before the nutrition education programme the children of the experimental Balwadi did not know any story and song on nutrition. Their concepts of foods was also poor. Therefore it was impossible for them to assemble the pieces of puzzles at first. The songs sung were evaluated for clarity, subject matter, completness, audibility and action. The scores thus obtained are given in Table XXII.

Figure 23. SAMPLES OF PUZZLES

TABLE XXII

SCORES OBTAINED BY THE CHILDREN FOR SONGS

S.No.	Percentage score range	Number of children obtaining	
		Experimental	
		Before	After
1.	0 - 10	0	1
2.	11 - 20	0	-
3.	21 - 30	0	1
4.	31 - 40	0	3
5.	41 - 50	0	9
6.	51 - 60	0	10
7.	61 - 70	0	6
8.	71 - 80	0	4
9.	81 - 90	0	-
10.	91 -100	0	-

All the children in the experimental Balwadi song the songs taught during the nutrition educationprogramme. More than half of the children had scored above 50 per cent Those who obtained score from 1 - 40 per cent were the ones who were not regular in attending the Balwadi. Songs formed a valuable medium for imparting nutrition education to children.

Table XXIII indicates the time taken by the children to assemble the pieces of puzzles after nutrition education.

TABLE XXIII

TIME TAKEN BY THE CHILDREN TO COMPLETE THE PUZZLES

S.No.	Time taken in minutes	Number of children taking
		Experimental Balwadi
1.	0.5 - 1.5	1
2.	1.6 - 2.5	3
3.	2.6 - 3.5	4
4.	3.6 - 4.5	4
5.	4.6 - 5.5	2
6.	5.6 - 6.5	1
7.	6.6 - 7.5	1
8.	7.6 - 8.5	3
9.	8.6 - 9.5	5
10.	9.6 - 10.5	4
11.	Above 10.5	6

Nearly 50 per cent of the children in the experimental Balwadi could assemble the puzzles within 6½ minutes. As the assembling of puzzles requires intelligence as well as practice, it is found that only those who were above 4 years of age and had attended the Balwadi regularly could complete assembling the puzzles. In the control group children could not assemble the puzzles at all.

The scores obtained by the children in the experimental Balwadi for story telling is given in Table XXIV.

TABLE XXIV

SCORES OBTAINED BY THE CHILDREN FOR STORY TELLING

S.No.	Percentage score range	Number of children obtaining	
		Experimental Balwadi	
		Before	After
1.	0 - 10	0	-
2.	11 - 20	0	2
3.	21 - 30	0	3
4.	31 - 40	0	3
5.	41 - 50	0	6
6.	51 - 60	0	7
7.	61 - 70	0	6
8.	71 - 80	0	7
9.	81 - 90	0	-
10.	91 -100	0	-

Only 14 children out of 34 had scored from 11-50 per cent and all the rest had scored above 50 per cent leading to the inference that story telling is a good medium for imparting nutrition education.

The scores obtained by the children in nutritional knowledge test is illustrated in Table XXV (Fig.24).

TABLE XXV

SCORES OBTAINED BY CHILDREN IN NUTRITION KNOWLEDGE TEST

S.No.	Percentage score range	Experimental		Control	
		Before	After	Before	After
1.	0 - 10	5	1	9	9
2.	11 - 20	15	-	6	5
3.	21 - 30	14	1	4	5
4.	31 - 40	—	3	-	-
5.	41 - 50	—	2	-	-
6.	51 - 60	—	1	-	-
7.	61 - 70	—	9	-	-
8.	71 - 80	—	7	-	-
9. 81	81 - 90	—	4	-	-
10.	91 -100	—	6	—	—

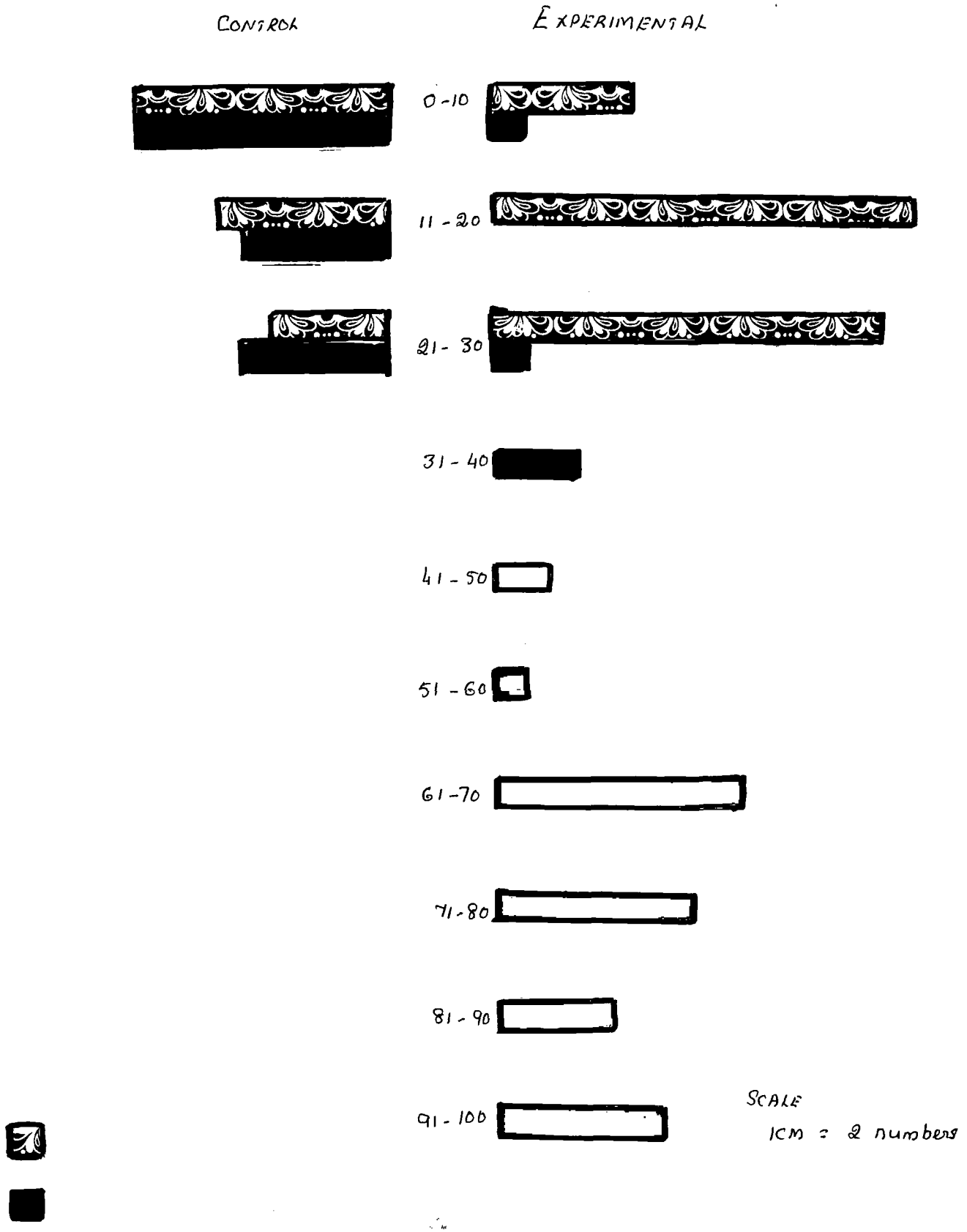


FIGURE 24. THE SCORES OBTAINED BY THE CHILDREN IN NUTRITIONAL KNOWLEDGE

Remarkable increase was shown in the scores obtained by the children after the education programme which was also statistically proved (Appendix XI). Before imparting nutrition education the scores obtained by the children in the experimental Balwadi were below 30 per cent increased above 50 per cent for 70 per cent of children. The statistical analysis proves that there is positive correlation between the attendance of the children to the Balwadi and their nutritional knowledge (Appendix XII).

2. Improvements in the heights and weights of children:

The initial and final readings of the weights and heights of children of the experimental as well as control Balwadis revealed an average increase of 0.8 kg. in the weights of control group and 0.9 kg. for the experimental group during the six months (Appendix IV). The average increase in the heights of children of experimental Balwadi was 3.8 cms. and in the heights of control balwadi children was 2.6 cms. This difference in heights and weights of children of experimental and control Balwadis can be attributed to the nutrition education imparted.

3. Other changes:

Other changes and improvements noticed among the children of the experimental and control Balwadis are presented in Table XVI.

TABLE XXVI

OTHER IMPROVEMENTS NOTICED AMONG THE BALWADI CHILDREN

Aspect	Criteria	Percentage of children			
		Experimental		Control	
		Before	After	Before	After
General Appearance					
Dress	Neat	6	56	16	53
	Fairly neat	53	41	74	37
	Dirty	41	3	10	10
Hair	Well combed	59	100	84	100
	Not combed	41	--	16	--
Eyes	Clean	79	94	89	89
	Dirty	21	6	11	11
Nose	Clean	47	94	42	68
	Dirty	53	6	58	32
Mouth	Clean	74	100	84	89
	Dirty	~~53~~ 26	~~6~~ —	~~58~~ 16	~~32~~ 11
Teeth	Clean	62	74	79	79
	Discoloured	32	20	21	21
	Caries	6	6	--	--
Skin	Normal	53	74	58	63
	Itches	21	--	21	16
	Rough	26	26	21	21
Nails	Cut and clean	26	79	37	47
	Dirty and not cut	74	21	63	53
Health	Healthy	62	94	84	84
	Sickly	38	6	16	16
Habits of children:					
Cleaning the hands before meals	Before	100	100	100	100
	After	--	--	--	--
Avoiding spilling of food	Yes	47	100	11	42
	No	53	--	89	58

contd....

Aspect	Criteria	Percentage of children			
		Experimental		Control	
		Before	After	Before	After
Wasting foods	Yes	32	--	37	11
	No	68	100	63	89
Waiting for turns	Yes	100	100	--	--
	No	--	--	100	100
Leaving the place neatly after eating	Yes	47	100	11	11
	No	53	--	89	89
Using right hand for eating	Yes	100	100	100	100
	No	--	--	--	--
Enjoy eating food	Yes	74	100	100	100
	No	26	--	--	--
<u>Behaviour characteristics of children:</u>					
Mixing freely with others	Yes	76	97	89	100
	No	24	3	11	--
Keeping a loof	Yes	12	3	11	--
	No	88	97	89	100
Indifferent	Yes	12	3	11	--
	No	88	97	89	100
Responsible	Yes	44	91	11	37
	No	56	9	89	63
Cooperative	Yes	85	97	74	100
	No	15	23	26	--
Irritable	Yes	--	--	--	--
	No	100	100	100	100
Curious	Yes	38	91	16	42
	No	62	9	84	58
Active	Yes	44	91	37	53
	No	56	9	63	47

Aspect	Criteria	Percentage of children			
		Experimental		Control	
		Before	After	Before	After
Participation in games and activities					
Singing	Yes	100	100	79	95
	Yes	--	--	21	5
Painting	Yes	100	100	74	100
	No	--	--	26	--
Interested in group games	Yes	100	100	95	100
	No	--	--	5	--
Story telling	Yes	71	94	58	84
	No	29	6	42	16
Learning numbers	Yes	62	97	47	95
	No	38	3	53	5
Learning alphabets	Yes	50	56	21	21
	No	50	44	79	79

Improvements were more marked in the case of children of the experimental Balwadi than in the control. This can be attributed to the nutrition education imparted to the children as well as to their mothers.

B. The opinions of the mothers:

The improvements suggested by the mothers for improving the Balwadi are given in Table XXVII.

TABLE XXVII

SUGGESTIONS OF THE MOTHERS FOR IMPROVING THE BALWADI

S.No.	Improvements suggested	Percentage of mothers			
		Experimental (No. 34)		Control (No.17)	
		Before	After	Before	After
1.	Repair of building	26	82	--	--
2.	Spacious and safe building	--	76	47	47
3.	Introduction of a variety of activities	--	53	--	--
4.	Balwadi surrounding should be kept clean	26	62	14	--
5.	Balwadi children should be kept clean	32	74	35	53
6.	Discipline should be maintained	18	--	12	35
7.	Children should not be beaten by the Balasevika	18	35	--	--
8.	Alphabets should be taught	50	50	35	35
9.	No suggestions	35	18	53	41

Before nutrition education the percentage of mothers in the experimental Balwadi who could suggest improvements was below 50, except for the suggestion for teaching alphabets (50 per cent). The percentage of mothers in the experimental Balwadi who gave suggestions for improvements increased after the nutrition education programme. Due to their visits to the Balwadi during the nutrition education programme, and their keen observation they gave suggestions for repair of building and provision of a spacious building.

On the other hand, the percentage of mothers who made suggestions for improvement, in the control Balwadi showed hardly any change. Visiting the Balwadi was not practiced because there was no Parent Teacher association.

Suggestions for improving the feeding programme:

The suggestions for improvements for the feeding programme given by the mothers are depicted in the Table XXVIII.

TABLE XXVIII

SUGGESTIONS FOR IMPROVING THE FEEDING PROGRAMME

S.No.	Improvements suggested	Percentage of mothers suggesting			
		Experimental (No.34)		Control (No.17)	
		Before	After	Before	After
1.	Inclusion of milk	56	35	41	41
2.	Inclusion of eggs	9	9	6	6
3.	Inclusion of ragi preparations	—	71	—	—
4.	Changes in the menu	47	65	12	12
5.	Inclusion of fruits	23	50	35	35
6.	Inclusion of vegetables	23	50	12	12
7.	Increasing the items	23	—	12	41
8.	Increase the use of green leafy vegetables	—	74	—	—
9.	No suggestions	50	18	59	51

The percentage of mothers suggesting improvements for the feeding programme had increased in the case of the experimental Balwadi due to their participation in the nutrition education programme.

The impact of the nutrition education is clearly seen in the increase in the percentage of mothers in the experimental Balwadi, suggesting inclusions of a variety of fruits, vegetables, green leafy vegetables and ragi preparations. Prior to the nutrition education programme, the percentage of mothers who made suggestion for the improvements of feeding programme was below 50 per cent except in the case of mothers suggesting inclusion of milk. After the nutrition education programme, the percentage of mothers who gave suggestions stressing the inclusion of protective foods like a variety of fruits, vegetables specially green leafy vegetables and ragi preparations in the experimental Balwadi increased above 50 per cent.

The suggestions put forth by the mothers were valuable, encouraging and reflective of their positive attitudes towards improving feeding programme.

<u>The role of mothers in improving Balwadi:</u>

The role of mothers as mentioned by the respondents in improving Balwadi is illustrated in the Table XXIX.

TABLE XXIX

THE ROLE OF MOTHERS IN IMPROVING BALWADI

S.No.	Role	Percentage of mothers			
		Experimental (No.34)		Control (No.17)	
		Before	After	Before	After
1.	Help to solve children's problems	24	50	6	6
2.	Send children regularly to school	29	79	24	41
3.	Cooperate with Balasevika	26	62	29	29
4.	Introducing improvements in the Balwadi	24	59	6	6
5.	Help the Balasevika in organising programmes	—	79	—	—
6.	Help the Balasevikas in looking after the children	9	26	—	—
7.	Donate equipment	—	15	—	—
8.	Donate money	—	15	—	—
9.	Help to construct the building	—	41	—	—
10.	No idea	71	15	71	71

The fact that the nutrition education programme has opened the eyes of mothers in the experimental Balwadi is evident from the increase in the percentage of parents who had gained an insight into their role in improving the Balwadi. Before the educational programme the mothers

considered that the Balwadi belonged to the Government and therefore did not think it was necessary for them to take any interest. But after education, the mothers of the experimental Balwadi children became fully aware of their role in improving the Balwadi and expressed valuable roles.

Contribution of mothers to the feeding programme:

Table XXX reflects the contribution of mothers to the feeding programme as stated by them.

TABLE XXX

CONTRIBUTION OF MOTHERS TO THE FEEDING PROGRAMME

S.No.	Types of contribution	Percentage of mothers			
		Experimental		Control	
		Before	After	Before	After
1.	Suggesting good recipes	24	74	9	9
2.	Offering food stuffs	6	26	12	12
3.	Monetary donations	—	59	—	—
4.	Donating equipment	—	21	—	—
5.	Help the Balasevika in establishing good eating habits in the children	—	76	12	12
6.	Help to prepare the meals	18	47	—	—
7.	No idea	59	21	32	82

The increase in the percentage of mothers of the experimental Balwadi making suggestions after the nutrition education programme, reveals the increased realisation of contributions the mothers can make towards the feeding programme. It is encouraging to note that most of the mothers were willing to contribute in cash or kind after the nutrition education programme.

F. Opinions of Balasevika regarding the nutrition education programme:

The Balasevika of the experimental Balwadi was highly impressed by the nutrition education programme. She frankly expressed that enrichment of knowledge had resulted in her and she had understood the techniques of approaching parents and solving the problems of children. She had gained ample information about the various interesting, simple and attractive methods and audiovisual aids to educate the children, and had learnt simple methods of storing vegetables through Janatha Refrigerator and new recipes with available foods. She had promised to follow up the same and excel in her dispositions and duties.

It was evident from her comments that she had established good rapport with the mothers of children which could facilitate her future programmes.

It was evinced by her statements that the children had developed good food habits, cleanliness and orderliness, acquired clear concepts of vegetables and fruits and learnt songs and stories. She also appreciated the various opportunities and play articles made available to the children to maximise their allround development. She had gathered all the songs, play articles and paintings for reference and for showing them to her authorities.

V . SUMMARY AND CONCLUSION

This action-research study aimed at improving the nutritional status of the families of children of a rural Balwadi by imparting nutrition education to the children and their mothers, utilising the Balwadi to the maximum extent. All the 34 children enrolled in the experimental Balwadi gave full attendance, while only 19 out of 30 were present in the control Balwadi at the close of the investigation. The rest had either joined the primary school or dropped. The Balasevikas of both the Balwadis were dissatisfied with the building facilities of the unhygienic surroundings and inadequate space. The major outcomes of this investigation are:

1. The dietary practices of the mothers and guardians of the experimental Balwadi children, numbering 34 who formed the Parent Teacher Association revealed the necessity for imparting nutrition education to bring about changes in their dietary practices.

2. More than 50 per cent of the mothers were aware of the foods given in the Balwadis. They discussed with their children about their Balwadi and the feeding programme to find out the activities in which the children participated and the foods eaten by them.

3. The impact of the feeding programme on the children's health status was, in general, good, as reported by the mothers.

4. The attendance of the mothers in nutrition education programme was encouraging, bringing above 50 per cent for most, of the classes, which points out the interest the mothers had in learning novel and improved practices. This facilitated the realisation of their role in the Balwadi and expression of valuable and workable suggestions to improve the standard of the Balwadi and the feeding programme.

5. The response to nutrition education was appreciable. The dietary practices, such as use of food stuffs, the frequency of use of foodstuffs, specially protective foods, cooking methods, daily meal pattern, foods given during special conditions, of the mothers of experimental Balwadi children underwent significant and positive changes as a result of the nutrition education programme. The mothers of control Balwadi children showed no changes in their nutritional knowledge and practices.

6. The members were exposed to various audio-visual aids and methods out of which the puppet show, exhibition, home visits were liked the most and the lecture method the least.

7. The increase in the nutritional knowledge of the mothers of experimental Balwadi as compared to that of control Balwadi was remarkable.

8. The changes brought about in the activities of the Balwadi had increased the interest of the children in the Balwadi. The participation of children in the feeding programme had also motivated the mothers of the experimental Balwadi children to make some desirable changes in their home dietary practices such as inclusion of raw vegetable and fruits and adoption of new recipes.

9. The increase in the heights and weightsof the children was more prominent in the case of children of experimental Balwadi than in the case of control Balwadi children.

10. All the children of experimental Balwadi registered a tremendous increase in their knowledge about nutrition as compared to that of control Balwadi children. The nutrition education programme had thus resulted in desirable changes in the experimental Balwadi children which were reflected in their general appearance, cleanliness and eating habits and participation in games and other activities of the Balwadi.

This study also pointed out the necessity for paying greater attention towards imparting nutrition education to the children and their mothers in the Balwadi: Only then Balwadis can serve as influential agents in nutritional improvement. Thus, the possibility of utilising the Balwadi as an instrument of nutrition education, for improving the

nutritional status of the community as a whole, has been proved by this study beyond doubt.

The following recommendations for practical applications are made:

1. The performance of the Balasevika should be guided and evaluated periodically. Creditable and meritorious work of the Balasevika should be recognised.

2. All the Balwadis should necessarily be provided with adequate and safe building with space for kitchen dining, and play activities.

3. Every Balwadi should have a Parent Teacher Association to fulfil the duties of the Balwadi in a village, and work in coordination with the departments of rural development and welfare.

4. The Balwadis should have provision of finance for conducting the activities of the Parent Teacher Association, as centres for rural development.

5. The Balasevikas should be oriented towards imparting nutrition education, not only in terms of subject matter but also with simple, attractive, and inexpensive audio-visual aids and good extension teaching methods, to make learning more meaningful, useful and permanent to children.

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APPENDICES

APPENDIX I

INTERVIEW SCHEDULE TO COLLECT INFORMATION FROM BALASEVIKAS ON THE BALWADI

I. Name of the village

II. Name of the Balasevika:-

III. Details about the training and experience of Balasevika.

S. No.	Training undergone	Duration of the training	Place	Benefits derived	Subjects learnt during training	Experience in years/ month

IV. General information about the Balwadi:

1. Year of establishment of the Balwadi:-
2. Year in which the feeding programme was started.
3. Allotted capacity of the Balwadi:-
4. Total number of children attending the Balwadi - Boys - Girls -
5. Age range of children

S. No.	Age Range	Number of Boys	Number of Girls
1.	1 - 1½ Years		
2.	1½ - 2 Years		
3.	2 - 2½ Years		
4.	2½ - 3 Years		
5.	3 - 3½ Years		
6.	3½ - 4 Years		
7.	4 - 4½ Years		
8.	4½ - 5 Years		
9.	5 - 5½ Years		
10.	5½ - 6 Years		

6. The daily programme of activities in the Balwadi.

~~No.~~ Time	Materials and Equipment ~~Activities~~ present	Who has decided the activities	Have you made any Changes YES - NO	If, yes, mention the changes
			Yes No	

V. Details about the feeding Programme:

(i) The title of the feeding programme

(ii) What are the objectives of feeding programme?

(iii) Does the feeding programme influence the school attendance?

Yes ☐ No ☐

If Yes, how?

(iv) Information about finance for the feeding programme.

S. No.	Source of finance	Amount allotted per year/month	Sufficiency of Money	Cost per Child
1.	Cash			
2.	Kind			

(v) Do you obtain food stuffs from any other source?

Yes ☐ No ☐

If yes,

S. No.	Items	Source	Frequency	Cost

(vi) a. Menu Pattern:-

Days	Menu

b. Who decides the menu?

c. Have you made any modification in the menu
Yes ☐ No ☐

d. If yes, Mention -

e. Do you measure the ingredients? Yes ☐ No ☐

VII. Food Preparation and Service:

a. Cooking -

Time taken for cooking-

b. Details of equipment

S. No.	Type of Equipment	Material	Number	Source	Adequacy

c. Who does the following:-

S. No.	Activities	Balasevika	Children	Cook
1.	Purchasing items			
2.	Cooking			
3.	Assisting in cooking			
4.	Serving			
5.	Cleaning the place			
6.	Cleaning the vessels			

d. Places allotted for different activities

S. No.	Activities	Place
1.	Preparation	
2.	Cooking	
3.	Serving	
4.	Storing	
5.	Cleaning	

e. Servings:-

(i) Food Prepared-

According to allotted capacity ☐

According to the number of children present ☐

(ii) The children are given food

In restricted amount ☐

In liberal amount ☐

VIII. Food Production:-

(a) Is there any place for gardening near the school?

Yes ☐ No ☐

(b) Do you have any kitchen garden? Yes ☐ No ☐

If Yes,

S. No.	AREA	Type of Produce	Amount Produced	Utilisation	Cost or Value	Problems faced

IX. Problems encountered in running the feeding Programme:-

S. No.	Problems	How do you solve it at present	Suggestions for feeding
1.	Problems related to supplies		
2.	Problems related to cooking		
3.	Problems related to service		
4.	Problems regarding cleaning of vessels		
5.	Problems related to storage		
6.	Problems related to attendance		
7.	Problems related to parents co-operation		
8.	Any other problem		

X. (a) Outcomes of Balwadi Education:

1. Attendance
2. Knowledge about nutritious food for children
3. Knowledge about nutrition food for mother
4. Participation in play
5. Sociability
6. Improvement in the school enrollment
7. Rapport with parents
8. Any other.

(b) (i) Do you receive any complaints about feeding progra. from the parents? Yes ☐ No ☐

(ii) If Yes,

S. No.	The sort of complaints	Action taken for these Complaints

(c) Which of the following habits you insist on:-

1.	Wearing clean clothes	Yes	No
2.	Bringing hand kerchieves	Yes	No
3.	Wearing under wears	Yes	No
4.	Neat appearance	Yes	No
5.	Keeping the nails cut and clean	Yes	No
6.	Coming in time to the Balwadi	Yes	No
7.	Prayer before meals	Yes	No
8.	Cleaning the hands before meals	Yes	No
9.	Putting mats or blanks	Yes	No
10.	Orderly sitting	Yes	No
11.	Avoiding wastage	Yes	No
12.	Avoiding spilling of food	Yes	No
13.	Waiting for their turns to get food	Yes	No
14.	Leaving the place neat and clean	Yes	No
15.	Cleaning the hands and mouth after meals	Yes	No
16.	Orderly arrangement of plates and tumbler	Yes	No
17.	Playing in groups	Yes	No

XI. Nutrition Education:

(i) Is nutrition education imparted to children Yes ☐ No ☐

If Yes, how?

S. No.	Topics	Methods used

(ii) What new food habits have you inculcated in children?

XII. Information on parents' participation:-

(a). Is there any parent teacher's association?

Yes ☐ No ☐

If Yes, give the following:-

S. No.	Who conducts Classes	No. of members	Frequency of meeting	Topics Discussed	Action Adopted	Problems met

(ii) What are the parent's opinions about the following:-

S. No.	Aspects	Opinions
1.	Balwadi	
2.	Feeding programme	

(b) Are you getting any help fr - Mahalir Mandrum?

Yes ☐ No ☐

If yes, the type of help

(c) Give suggestions for the improvement of

i) The Balwadi in general

ii) The feeding programme specifically

XIII Information about records and registers:

S.No.	Registers and Records	Person Recording	Frequency Recording	Person Supervising	Frequency of supervision
1.					
2.					
3.					
4.					
5.					

XIV Job satisfaction and problems of Balasevikas:

1. Do you think you have made a wise choice of your vocation?

Yes ☐ No ☐

a) If yes, reasons:

b) If no, why do you continue to be in the same job?

2. Is your pay - Just adequate ☐

Adequate ☐

Not enough ☐

3. If it is not enough, how much should a balasevika be paid per month?

4. What particularly, if any, do you like in your job?

5. What particularly, if any do you dislike in your work?

6. Do you face any problems in working as Balasevika?

Yes ☐ No ☐

If Yes, mention the problems faced:

S.No.	Problem Areas	Specific problems	Reported to					Not reported	Solutions obtained	Your suggestions for
			BDO	MS	Chairman	local leaders	Others			
1.	Administrative									
2.	Personal									
3.	In approaching villagers									
4.	In working with cook									
5.	In looking after the children									
6.	Feeding Programme									
7.	In conducting Parent Teacher Association									
8.	Any other									

APPENDIX II

SRI AVINASHILINGAM HOME SCIENCE COLLEGE FOR WOMEN
COIMBATORE 641011

Interview Schedule to Elicit Information on the Dietary Practices and Nutritional Knowledge of the Mothers of Experimental and Control Balwadi Children

Date:

Place:

1. Name of the Investigator:

2. Name of the Interviewee:

3. Type of Family: Joint ☐ Nuclear ☐

Part - A

I. **Family Details:**

S.No.	Name	Relation to head of the family	Age	Sex	Education	Occupation		Income per month
						Main	Subsidiary	

II. Food Production:

a) Do you own land?

b) If yes, mention the items that are cultivated in your land:

S.No.	Cereals	Pulses	Vegetables	Fruits	Others

c) Means of food production:

S.No.	Means	Yes	No
1.	Kitchen garden		
2.	Poultry unit		
3.	Cattle rearing		
4.	Buffalo rearing		
5.	Sheep or goat rearing		
6.	Bee keeping		

If yes,

S.No.	Type of produce	Monetary value	Use of food stuffs		
			Daily	Weekly	Occasionally

III. Dietary Practices:

1. Food Consumption:

a) Use of food stuffs:

S.No.	Foodstuffs	Frequency of use		
		Daily	Weekly	Occasionally
1.	Cereals			
2.	Pulses			
3.	Vegetables			
	i) Green vegetables			
	ii) Roots and Tubers			
	iii) Other vegetables			
4.	Fruits			
5.	Milk and milk products			
6.	Oils			
7	Meat, fish etc.			

ii) Use of Particular foods

S.No.	Do you eat?	Yes	No	Frequency of use				
				Daily	Weekly			Occasionally
					Once	Twice	Thrice	
1.	Ragi							
2.	Maize							
3.	Red gram dhal							
4.	Bengal gram dhal							
5.	Horse gram dhal							
6.	Green gram dhal							
7.	Green leafy vegetables							
8.	Fruits							
9.	Milk							
10.	Eggs							
11.	Meat and fish							
12.	Groundnuts							
13.	Parboiled rice							

iii. Methods of cooking food stuffs:

S.No.	Food stuffs	Boiling	Stewing	Frying	Steaming	Other
1.	Cereals					
2.	Pulses					
3.	Vegetables					
	i) Green vegetables					
	ii) Roots and Tubers					
	iii) Other vegetables					
4.	Fleshy foods					
5.	Eggs					

iv. Methods of Preserving Food Stuffs:

S.No.	Foods preserved	Methods of preservation	Period over which preserved	Problems encountered

v. Daily meal pattern:

S.No.	Meals	Time

vi. Foods given under special conditions:

S.No.	Special conditions	Type of foods given	Reasons	Foods acided	Reasons
1.	Infancy				
2.	Toddler				
3.	Pre-school child				
4.	Pregnant women				
5.	Lactating mothers				
6.	Diseases				
	i) Fever				
	ii) Diarrhoea				
	iii) Others				

vii. State the foods which you eat in greater quantities than before.

viii. Menu Planning:

a) Is planning done in advance? Yes ☐ No ☐

If yes, or no, reasons;

ix) Are you satisfied with the way you feed your family?

If yes, reasons

If no, reasons

IV. Attitude of parents towards sending their children to Balwadi:

1. i) What are the reasons for sending your child to the the Balwadi ?

ii) Does the child attend the Balwadi regularly?

Yes ☐ No ☐

If no, reasons:

iii) Do you force the child to go to Balwadi?

Yes ☐ No ☐

If yes, why?

2. i) How many children of yours have attended Balwadi?

Children	How long

ii) What changes do you find in your children because of attending the Balwadi?

iii) Have they been fed in the Balwadi?

Yes ☐ No ☐

iv) What benefits have been derived from the feeding programme?

V. Details about parent's knowledge about Balwadi:

1. Have you visited the Balwadi?

Yes ☐ No ☐

If no, reasons:

2. a) Do you discuss with your children about

i) Balwadi Yes ☐ No ☐

ii) Feeding programme Yes ☐ No ☐

If yes, reasons

If no, reasons

b) If yes,

	Quantity	Quality	Variety
i) Daily			
ii) Occasionally			

3. i) What do your children say about

a) Balwadi

b) Feeding programme

ii) Does your child like the lunch served in the Balwadi?

Yes ☐ No ☐

If yes, reasons:

If no, reasons

4. Do you try to effect changes in the dietary practices at home by adopting the menu in the Anwadi?

Yes ☐ No ☐

If no, reasons

If yes, reasons

VI. Details of Nutrition Education

a) i) Is there a Mahalir Manram in your village?

Yes ☐ No ☐

ii) If yes, are you a member of the Mahalir Manram?

Yes ☐ No ☐

b) Mention the matter and items you learned about nutrition through the Mahalir Manram?

c) Who taught?

d) Which were the methods adopted to impart nutrition education?

VII. Participation of Parents in Balwadi:

1. Is there any Parent Teacher's Association in the Balwadi?

Yes ☐ No idea ☐ No ☐

a) If yes,

Ar you a member?

Yes ☐ No ☐

If no, reasons

b) Do you attend Parent Teachers Association Meetings?

Yes ☐ No ☐

If yes,

i) Often

ii) Regularly

iii) Occasionally

c) What are the activities going on in the Parent Teacher's Association?

If no,

a) Would you like to have one such association?

Yes ☐ No ☐

Reasons:

b) What are the items that can be discussed in that association?

2. What improvements do you suggest for

a) Balwadi

b) Feeding programme

3. What should be the role of parents in improving?

a) Balwadi

b) Feeding programme

Part - B

Knowledge Test in Nutrition

Scores: 15

Part I

1. When should we cut the vegetables -
   a) Before washing
   b) After washing
2. How should we cut the vegetables-
   a) Into big pieces
   b) Into small pieces
3. Do you put the vegetables to be cooked-
   a) In cold water and then bringing to boiling point
   b) In boiling water
4. Do you cook the vegetables-
   a) Without removing the skin
   b) Without the skin
5. Do you use baking soda for cooking vegetables, pulses, and rice?
   a) Yes
   b) No
6. Do you wash the rice before cooking-
   a) Only once
   b) Many times
7. We should take
   a) Parboiled rice
   b) Raw rice
8. The best method for cooking rice is
   a) Evaporating or steaming
   b) Boiling and straining the water
9. If the rice is cooked in large quantities what do you do with the strained water?
   a) Throw away the strained water
   b) Use it in sambar or drink

10. The diet should include-
    a) More of cereals
    b) More of raw vegetables and fruits
11. Nutritious food among the following is
    a) Jowar rotti
    b) Ragi kanji
12. Roots and tubers mainly
    a) promote health
    b) give energy
13. Green leafy vegetables should be included in the diet-
    a) Daily
    b) Rarely

Part 2 Score:12

Complete the following sentences:

1. Carrots are good for-
2. Papaya is essential for -
3. Pulses are necessary for-
4. Ragi is essential for-
5. Groundnuts are good for-
6. Amla is good for-
7. Green leafy vegetables are necessary for-
8. Tomato is good for-
9. Milk is essential for-
10. Unpolished and parboiled rice is good because-
11. Lack of amla, oranges and limes in the diet results in-
12. Lack of papaya and carrots, leads to-

Part C

Details of Methods Used in Imparting Nutrition Education to Mothers of the Experimental Kalwadi Children

a) Which of the following methods did you like?

S.No.	Methods used	Did you like? Yes	No
1.	Informal talk		
2.	Lecture		
3.	Posters		
4.	Charts		
5.	Flash cards		
6.	Group discussion		
7.	Slides and films		
8.	Field trip		
9.	Puppet show		
10.	Demonstration		
11.	Exhibition		
12.	Home visits		

b) Details of classes conducted during nutrition education programme

Sl.No.	Topics dealt with	Methods of Aids used	Understood			Adopted			Problems	Suggestions
			Fully	Partially	Not at all	Fully	Partially	Not at all		
1	2	3	4	5	6	7	8	9	10	11
1.	Importance of Food for health	Informal talk								
2.	Explanation of three groups of foods energy yielding, growth promoting and protective foods and functions of food	Poster								
3.	Meaning and explanation of balanced diet	Chart								
3.	The need for raising kitchen garden and suggestions for raising kitchen garden	Lecture								
5.	Distribution of seeds to raise kitchen garden	Home visists								
6.	Nutrients-their functions and deficiencies	Chart and photographs								

contd....

1	2	3	4	5	6	7	8	9	10	11
7.	Meal planning-reasons for meal planning and steps in meal planning	Informal talk								
8.	Recommended allowances of food for different age groups and for pregnant and lactating mothers	Charts and Demonstration								
9.	Principles of cooking - cutting and cooking of vegetables, fruits and other foods	-do-								
10.	Preparation of low cost nutritious recipes	-do-								
	i) Ragi preparation: Potato, rotti mixed with greens, uppuma	-do-								
	ii) Preparation of cholam recipes-stuffed cholam parathas, cholam vadai with greens	-do-								
	iii) Preparation of cereal and pulse recipes	-do-								
	iv) Preparation of pulse and greens recipes	-do.								
	v) Preparation of weaning foods	-do-								
	vi) Preservation of certain commonly available foods-tomato and Papaya Jam	-do-								

contd...

S.No.	2	3	4	5	6	7	8	9	10	11
	vii) Pickles - amla, mixed vegetables	Demonstration								
	viii) Groundnut preparations- groundnut milk, parathas and groundnut chutney, groundnut curds	-do-								
	ix) Preparation of foods by dehydration method - potato slices and asagourd	-do-								
	x) Storing vegetables, eggs, fruits and other foods	Demonstration of Janatha Refrigerator								
	xi) Chutney powders	Demonstration								
11.	Care of children-their minor illness and treatment	Informal talk								
12.	Care of health and importance of food	Slides and film strip								
13.	Malnutrition and deficiency diseases	Field trip to Hospital								
14.	Nutrition and deficiency diseases	Slides								
15.	The requirements of good Nursery school, poultry unit, dairy keeping	Field trip to Home Science College								
16.	Importance of taking vegetables, fruits, and pulses in the diet	Puppet show								
17.	Nutritious food for health	Exhibition								

APPENDIX XII

CHECK LIST USED TO EVALUATE THE BALWADI CHILDREN

Name of the Child: Date:

Age:

Height of the Child: (cm)

Weight of the Child: (kg)

I. Appearance

1. Dress	- Neat,	Fairly neat	Dirty
2. Hair	- Well combed		Not combed
3. Eyes	- Clean		Dirty
4. Nose	- Clean		Dirty
5. Mouth	- Clean		Dirty
6. Teeth	- Clean	Discoloured	Caries
7. Skin	- Rough	Itches	Normal
8. Nails	- Dirty and not cut		Cut and clean
9. General health	- Sickly		Healthy

II. Habits of Children:

i)	Cleaning the hands before and after meals	Yes ☐	No ☐
ii)	Avoiding spilling of food	Yes ☐	No ☐
iii)	Wasting food	Yes ☐	No ☐
iv)	Waiting for their turns	Yes ☐	No ☐
v)	Leaving the place neat and clean	Yes ☐	No ☐
vi)	Using right hand for eating	Yes ☐	No ☐
vii)	Enjoy eating the food	Yes ☐	No ☐

III. Characteristics of children:

1. Mixing freely with children	Yes ☐	No ☐
2. Keeping aloof	Yes ☐	No ☐
3. Indifferent	Yes ☐	No ☐
4. Takes responsibility	Yes ☐	No ☐
5. Cooperative	Yes ☐	No ☐
6. Irritable	Yes ☐	No ☐
7. Curious	Yes ☐	No ☐
8. Active	Yes ☐	No ☐

Iv. Participation in games and activities of Balwadi

i.	Interested in singing	Yes ☐ No ☐
ii.	Interested in painting	Yes ☐ No ☐
iii.	Interested in group games	Yes ☐ No ☐
iv.	Interested in story telling	Yes ☐ No ☐
v.	Interested in learning numbers	Yes ☐ No ☐
vi.	Interested in learning alphabets	Yes ☐ No ☐

APPENDIX IV

HEIGHTS AND WEIGHTS OF THE BALWADI CHILDREN

Experimental					Control				
S. No.	Height in cms		Weight in kgms		S. No.	Height in cms		Weight in kgms	
	Initial	Final	Initial	Final		Initial	Final	Initial	Final
1.	92	97	12	13	1	95	99	14	15
2.	92	98	12.5	14	2	81	84.5	9.5	10
3.	94	98	12	12.5	3	85.5	88	11.5	12
4.	98	100	12	13	4	92	93.5	10.5	11
5.	94	97	11	13	5	91.5	92.5	12.5	14
6.	88	90	12	12.5	6	85	86	13	13
7.	97	101	13	13.5	7	88	99	11.5	11.5
8.	98	101	12	13.5	8	92	95	13	14
9.	93	97	10	12	9	84	86	9.5	10
10.	89	92	11	12	10	89.5	92.5	12.5	13
11.	98	102.5	13	14	11	99	102	13	15
12.	89	93	11.5	12.5	12	77	83	10.5	12
13.	90	96	12	12	13	92	94	13.5	13.5
14.	86	90	11	11.5	14	91.5	93.5	12	13
15.	92	97	12.5	13	15	96	101	16	16.5
16.	87	90	10	11.5	16	88	90	10.5	10.5
17.	88	91	10.5	12.5	17	92.5	94	12.5	12.5
18.	90	95	11.5	12	18	78	82	10.5	11
19.	94	97	11.5	11.5	19	78	80	9.5	10

Experimental					Control				
S. No.	Height in cms		Weight in Kgms		S. No.	Height in cms		Weight in Kgms	
	Initial	Final	Initial	Final		Initial	Final	Initial	Final
20.	91	95	11	11					
21.	85	91	10	12					
22.	92	97	13	13					
23.	93	94	11.5	12.5					
24.	92	98	13	14					
25.	87	90.5	10	10.5					
26.	93	95.5	12.5	13					
27.	94	99	11	12.5					
28.	94	99	13	13					
29.	90	91.5	12	12					
30.	94	100	12	13.5					
31.	98	102.5	12	13.5					
32.	93	96	12	13					
33.	90	93	11	12					
34.	91	92	12	12					

[redacted] V

1. சின்ன சின்ன தங்கம்
செப்பு நிற தங்கம்
வாயிலே போட்டால் தித்திக்கும்
வெட்டவும் கொடுக்கும்
தம்பி பிறந்த நாளிலே
பங்கு போட்டுத் தின்னலாம்.

2. கொஞ்சிக் கொஞ்சிப் பேசும் குழந்தைகளே
கோழி முட்டை வெள்ளையா பிள்ளைகளே?
முட்டையில் எல்லா சத்துமே
முட்டைக் கடக்கு பிள்ளைகளே
குழைக்கொண்டு குழைபாய்ந்து தின்று
கண்ணெல்லாம் வருத்துவரப்போமே.

3. பாப்பா பாப்பா பாருடி
பாலே வீணாய் மறவாதே
பாலில் எல்லா சத்துமே பரவலாக உள்ள
பாலை விரும்பிக் குடித்தே பாரில் நலமாய் வாழ்வோமே.

4. கீரை நல்ல கீரையாம் பசுமையான கீரையாம்
முத்துப் போல பற்களுக்கும், அழகான கண்களுக்கும்
வலுவான தோலுக்கும், சுத்தமான ரத்தத்திற்கும்
கீரை நல்ல கீரையாம்.

5. குருசாமிக்கு ஒரு தோட்டம் உண்டு
அங்கே பார்த்தால் கொய்யா
இங்கே பார்த்தால் கொய்யா
எங்கும் பார்த்தால் கொய்யா
அங்கே பார்த்தால் ஆரஞ்சு
இங்கே பார்த்தால் ஆரஞ்சு
எங்கும் பார்த்தால் ஆரஞ்சு
அங்கே பார்த்தால் பப்பாளி
இங்கே பார்த்தால் பப்பாளி
எங்கும் பார்த்தால் பப்பாளி
அங்கே பார்த்தால் கீரை
இங்கே பார்த்தால் கீரை
எங்கும் பார்த்தால் கீரை
அங்கே பார்த்தால் தக்காளி
இங்கே பார்த்தால் தக்காளி
எங்கும் பார்த்தால் தக்காளி

6. எங்கள் வீட்டு தோட்டம் பார்
என்னென்ன அழகு பார்
அங்கும் இங்கும் கீரை பார்
அதற்கடுத்து முருங்கைக்காய்
பழம் பழுக்குது பப்பாளி
பழுத்துத் தொங்குது ரஸ்தாளி
கொத்துக் கொத்தாய் அவரைக்காய்
குட்டை குட்டை பாகற்காய்

நெட்டை நெட்டை புடலங்காய்
நீண்டு தொங்கும் பந்தலில் பார்
காலை மாலை யாவரும்
கறி செய்யும் வேலை பார்.

7. கொத்தவரங்காய் செடியிலே
கொத்துக் கொத்தாய் காய்த்ததாம்
பறித்து அதனை சமைத்து
பாங்காடியில் மதிய உணவு உண்போம்.

8. குட்டை குட்டை கத்தரிக்காய்
குண்டு குண்டு பூசணிக்காய்
பச்சை நிற கீரைகள்
பவளம் போன்ற தக்காளி
பச்சடிக்கேற்ற பீர்க்கங்காய்
ஆரஞ்சு நிற கேரட்
சிவப்பு நிற பீட்ரூட்
சத்தான காய்கறிகள்
சாப்பிட்டு பலம் அடைவாம்

9. மாம்பழம், மாம்பழம்,
மல்கோவா மாம்பழம்
சேலத்து மாம்பழம்
தித்திக்கும் மாம்பழம்
அல்வா போல் மாம்பழம்
அழகான மாம்பழம்

தங்க நிற மாம்பழம்
உங்களுக்கு வேணுமா
இங்கே ஓடி வாருங்கள்
பங்கு போட்டுத் தின்னலாம்.

10. நல்ல நல்ல நெல்லிக்காய்
நன்மை தரும் நெல்லிக்காய்
சி எனும் உயிர்ச்சத்துடைய நெல்லிக்காய்
வெட்டி முழுதும் சாப்பிடலாம்
உப்புப் போட்டு சாப்பிடலாம்
சீனி போட்டு சாப்பிடலாம்
சோறுடன் கலந்தும் சாப்பிடலாம்
நல்ல நல்ல நெல்லிக்காய்.

11. நகம் கடித்தேன் நகம் கடித்தேன்
நகம் கடித்தேன் அப்போது
வயிற்றுவலி வயிற்றுவலி
வயிற்றுவலி அப்போது
டாக்டர் வந்தார் டாக்டர் வந்தார்
டாக்டர் வந்தார் அப்போது
கடிக்கமாட்டேன் கடிக்கமாட்டேன்
கடிக்கமாட்டேன் எப்போதும்.

APPENDIX VI

STORIES ON NUTRITION

உணவியல் அறிவு புகட்டும் கதைகள்

STORY-1

ஒரு நல்ல பால்வாடி இருந்தது. அதில் ஒரு ராணி, ராமு என்ற இரு குழந்தைகள் நல்ல நண்பர்கள். எப்போதும் ஒற்றுமையாக இருப்பார்கள். ஆனால் ஒரு விஷயத்தில் மட்டும் மாறுபட்டனர். ராணி பச்சையாக காய்கறிகளையும், பாலையும் சாப்பிடும் வழக்கம். ராமு எப்பொழுதும் அவற்றை வெறுத்தான். சில மாதங்களில் அவனுக்கு கண்களில் ரத்தம் வடிதல், பல்வலி, வாயின் ஓரத்தில் புண் போன்ற தொந்தரவுகள் ஏற்பட்டது. அவனை அவன் தாய் அம்மா டாக்டர் வீட்டுக்கு அழைத்துச் சென்றாள். டாக்டர் ராமுவை பார்த்து, "நீ காய்கறிகள் பச்சையாக சாப்பிடுவதுண்டா பால் குடிப்பதுண்டா" என்று கேட்டார். ராமு "இல்லை, பிடிக்காது" என்று தலையசைத்தான். ஆனால் டாக்டர் அவனுக்கு அதன் பலனைக் கூறி, அதை சாப்பிடாவிட்டால் ஏற்படும் தொந்தரவுகளையும் கூறினார். ராமு அதைத் தன் மனதில் பதித்து மறுநாள் முதல் பச்சைக் காய்கறிகளையும், பாலையும் உண்ணும் பழக்கத்தை சிறிது சிறிதாய் ஏற்படுத்திக் கொண்டதால் நல்ல பலன் கண்டான். பாலர் பள்ளி ஆசிரியையும் அவனைப் பாராட்டி, எல்லோருக்கும் காய்கறி, பால் உணவின் முக்கியத்துவத்தைக் கூறினார். இப்பொழுது ராமுவும், ராணியும் ஒற்றுமையான நண்பர்கள், நல்ல பழக்கம் உள்ளவர்கள்.

STORY - 2

கீதாவும் சீதாவும் அக்கா தங்கைகள். இருவரும் ஒன்றாகப் பள்ளிக்குப் போனார்கள். சீதா பாலர் பள்ளியில் படிப்பதால் நல்ல உணவுப் பழக்கங்கள் ஏற்பட்டிருந்தன. ஆனால் கீதா பெரியவளாய் இருந்தாலும், அவள் முட்டை, காய்கறி, பப்பாளி போன்ற உணவுகளை எப்படிக் கொடுத்தாலும் விரும்புவதில்லை. இந்த நிலை நீடிக்க, ஒரு நாள் மாலை சகோதரிகள் இருவரும் சற்றே இருட்டி வீடு திரும்பிக் கொண்டிருந்தனர்.

கீதா தட்டுத் தடுமாறி நடந்தாள். சீதா அவளைப் பிடித்து அழைத்து வந்தாள். வீடு வந்ததும், கீதா தனக்கு கண்பார்வை மங்கியிருப்பதாக கூறி அழுதாள். மறுநாள் அவள் தந்தை, அவளை ஆரம்ப சுகாதார நிலையத்திற்கு அழைத்துச் சென்று மருத்துவரிடம் காட்டினார். மருத்துவர், "மாலைக் கண் நோய்" இருக்கலாம் என்றும், இப்படியே விட்டால் கண் குருடாகப் போய் விடும் என்றும் கூறினார். அவர் சில மாத்திரைகளையும் தந்து, கீரை, முட்டை, பால், பப்பாளி போன்றவற்றை அதிகம் உணவில் தவறாமல் சேர்க்குமாறு கூறினார். வீட்டிற்கு வந்த கீதா, தன் தவறை உணர்ந்தாள். ஏனெனில் அவள் தங்கை சீதா, முட்டை, தக்காளி, பால் பற்றிய கருத்துள்ள பாடல்களை பாடிக் கொண்டிருந்தாள்.

இப்பொழுது சீதாவும், கீதாவும் நல்ல உணவுப் பழக்கங்களால் மகிழ்ச்சியாக இருக்கிறார்கள்.

STORY - 3

பாலர் பள்ளியில் குழந்தைகள் விளையாட்டு நேரம். அனைவரும் குதித்து, ஓடி, உற்சாகமாக விளையாடி இருக்க, கம்பன் மட்டும், மெலிந்து, சோர்ந்து, ஒரு மூலையில் உட்கார்ந்து இருந்தான். அவன் தோற்றமே பாவமாய் இருந்தது. இதைக் கவனித்த பாலசேவிகா, அவனருகில் வந்து அவனை விளையாடும்படி தூண்டியும், எழுந்து சென்ற சிறிது நேரத்தில் திரும்பி வந்து அதே போல் அமர்ந்தான்.

அன்று முதல் பாலசேவிகா அதன் காரணத்தை ஆராயமுற்பட்டாள். அவன் உணவுப் பழக்கங்களை குறிப்பாக நோட்டமிட்டாள். கொடுத்த உணவில், காய்கறி, கீரை, பொரியல் அனைத்தையும் ஒதுக்கி, வெறும் சாப்பாட்டை மட்டும் உண்டு வந்தான். பிறவற்றை விலக்கினான். இதை அவள் குறிப்பெடுத்து, வீட்டில் உள்ள பழக்கத்தையும், அவன் தாயைக் கேட்டறிந்து, இதே போல் என அறிந்து திடுக்கிட்டாள். கம்பன் சோம்பலின் காரணம் தெளிவாகப் புரிந்தது.

மறுநாள் முதல், உணவு நேரத்தில் அவனை அருகமர்த்தி, பிற குழந்தைகள் சாப்பிடுவதையும் காட்டி அவனையும் உண்ணுமாறு கூறுவாள். இவ்வாறே வீட்டிலும் செய்தனர். சிறிது சிறிதாக ஒவ்வொன்றாக அவன் உண்ண ஆரம்பித்தான். முதலில் பழம், பின்னர் கீரை, காய்கறி உணவின் அளவும் கூடியது.

இப்பொழுது கம்பன் எல்லோரையும் போல் சிரித்த முகத்துடன், ஓடி விளையாடி மகிழ்கிறான். இந்தப் பலன் அவன் உணவுப் பழக்கத்தில் ஏற்பட்ட முன்னேற்றமே!

APPENDIX VII

PUPPET SHOW

இப்பொழுது பலவிதமான காய்கறி உண்பதால் ஏற்படும் நன்மைகளை பொம்மலாட்டத்தில் இனி காணலாம்.

பொன்னம்மா என்னும் ஒரு குடும்பத் தலைவி சாயந்திரமாக காட்டு வேலையை முடித்து விட்டு வீடு திரும்பும்போது வழியில் உள்ள முருகன் செட்டி கடையில் அரிசி மட்டும் வாங்கிச் செல்கிறாள். அப்போது

பருப்பு_வகைகள்: பொன்னம்மா எங்களை மறந்திட்டீங்க. நாங்கள் உங்கள் உடல் வளர்ச்சிக்கு வேண்டிய புரதச் சத்தை தருவோம். ஆகவே எங்களை வாங்கிட்டுப் போங்க.

பொன்னம்மா: அப்படியா? உங்களை தின்னு நல்ல உடல் வருமா?
அப்ப நான் உங்களையும் வாங்கிக் கொண்டு போறேன்.

(பொன்னம்மா அரிசியையும், பருப்பையும் வாங்கிச் செல்லும் வழியில் காய்கறி விற்கும் பாலம்மா வருகிறாள்)

பாலம்மா: (பாடிக்கொண்டு வருகிறாள்)
தானந்தனன்னே தனனே தானனன்னே
தானந்தனன்னே தனனே தானந்தனன்னே (2)
காய்கறி வாங்கலியோ உங்கள் உடம்பில் சக்தி வர
உங்கள் பிள்ளையுமே நல்லா வளர....

பொன்னம்மா: என்ன பாலம்மா! இன்னிக்கு ஒரு குஷியா இருக்கே,
என்ன விசேஷம். சரி ஒரு அரைக்கால் கிலோ
கத்தரிக்காய் கொடு.

பூரணம்மா: அதனாலே நம்ம தேகாசயங்க காலேஜ் புஸ்தகங்க
இருந்தாக்கூடாது; நல்ல உடம்புக்கு சத்து வேணும்
இந்த மாதிரி காய்கறிகள சாப்பிடணும் என்று சொல்லுங்க.
அதுமட்டுமல்ல. எப்படி சமைக்க வேண்டும் என்று சமைத்தும்
காட்டுறாங்க. அதுலேயும் நான் நிறையக் காய் புதுசுபுதுசாய்
கொண்டு வந்தேன், இங்கேயிருந்து தக்காளி, கீரை, வெண்டைக்காய்
கேரட் எல்லாம் வாங்கி வந்திருக்கேன்; அந்தத் தவிர
பப்பாளிப்பழம் வாங்கி வந்திருக்கேன். எது வேணுமோ
அதை வாங்கிட்டுப்போங்க.

பெரியம்மா: இதையெல்லாம் நான் வாங்கலையே; அதுலே என்ன
என்ன வாங்கணும் என்றே தெரியலையே.

கேரட்: நான் தான் கேரட்; அம்மா உங்களுக்கும், உங்கள் குழந்தை
குட்டிகளுக்கும் நல்லா கண்ணு தெரியணுமென்றால் நீங்கள் என்னே
வாங்கிட்டுப் போங்க. அடிக்கடி உங்க சாப்பாட்டுல என்னே
சேர்த்துகிட்டா உங்க கண் நல்லாத் தெரியறமாதிரி பண்ணுவேன்.

பப்பாளி: நான் யார் தெரியுமா; நான் தான் பப்பாளி, ஒவ்வொருவரும்
தினமும் பழம் சாப்பிட்டால் நல்லதாகும். ஆகையால் என்னே
வாங்கிட்டுப் போங்க. நான் கூட உங்க கண் பார்வைக்கு
நல்லது செய்வேன்.

தக்காளி: நான் தான் தக்காளி.
கண் மட்டும் போதுமா? பல் வேண்டாமாக்கும். என்னே
சாப்பிட்டால் போதும். பல், எலும்பு நல்லா இருக்கும். அது
நீங்க என்னே குழம்பு, ரசம் எல்லாத்திலேயும் போட்டு கொதிக்க
விடாமல் பச்சையாக சாப்பிடுங்கள்.

<u>கீரை</u>: நான் தான் கீரை. அட எங்கம்மா, உங்களுக்கு கண்ணும் பல்லும் பொலிவாக்கும். இரத்த ஓட்டம் நல்லா இருந்தால் நான் ஆரோக்கியமாக இருக்க முடியும். எந்த வியாதியும் வாங்கிட்டுப் போங்க.

பசுமை கீரையுமே என்றும் தேவையானதுவே
எந்நாளும் உடலுக்கு அவசியமே ... (ஆரோக்கியமானதுவே)

<u>கொய்யா</u>: கொய்யாவும் வந்திருக்கேன். நானும் உங்கள் உடம்பில் சத்து ஏராளமும், பலமாக இருக்கவும் வேண்டியதை செய்வேன். இரத்தம் சுத்தமாக இருக்க விட்டமின் சி யும் தருவேன்.

<u>வெண்டைக்காய்</u>: நான் தான் வெண்டைக்காய். என்னை சாப்பிட்டாலும் மிகவும் நல்லது. அப்புறம் உங்க பையன் வகுப்பில் முதல் மார்க் தான் போங்க---

<u>பேரீச்சம்பழம்</u>: அப்போ நான் உங்களையே வாங்கிட்டுப் போறேன்.

<u>பாலம்மா</u>: அப்போ! எங்கே இங்கேயே நிற்காம ஓடிப்போகாது போனதுக்கே. வந்தப்ப இருந்த சந்தோஷக் காற்றாய் பறந்து போச்சே!

<u>பொன்னம்மா</u>: கவலைப்படாதே பாலம்மா! எல்லா காயும் அவசியம் தெரியுது. அதுவே எல்லாத்தையும் வாங்கிட்டுப்போறேன்.

இப்போ இதைக்கேட்ட எல்லோரும் நாங்க சொன்னபடியே தினமும் எல்லா காய்களும் சாப்பிடுங்க. அப்போ! நாங்க வரட்டுமா!....

வணக்கம்.

APPENDIX VIII

RESPONSES GIVEN BY THE MOTHERS IN THE KNOWLEDGE TEST

Questions	Percentage of Mothers responding			
	Experimental		Control	
	Before	After	Before	After
1. Cut the vegetables				
a. before washing	76	24	18	18
b. After washing	24	76	82	82
2. Cut the vegetables into				
a. Big pieces	32	79	35	35
b. Small pieces	68	21	65	65
3. Put the vegetable to cook				
a. in cold water	29	15	29	29
b. in boiling water	71	85	71	71
4. Cook the vegetables				
a. Without removing the skin	15	55	29	29
b. Removing the skin	85	44	71	71
5. Use baking soda while cooking vegetables				
a. Yes	—	—	—	—
b. No	100	100	100	100
6. Wash rice				
a. Only once	35	85	—	—
b. Many times	65	15	100	100
7. We should take				
a. Parboiled rice	100	100	100	100
b. Raw rice	—	—	—	—

Questions	Percentage of mothers responding			
	Experimental		Control	
	Before	After	Before	After
8. Best method of cooking rice in				
a. Steaming or evaporating	9	65	12	12
b. Boiling and straining	91	35	88	88
9. If rice is cooked in large quantities				
a. Throw away the strained water	59	15	59	59
b. Use it in sambar or drink	41	85	41	41
10. The diet should include				
a. More of cereals	88	15	64	59
b. More of raw vegetables and fruits	12	85	36	41
11. Nutritions food among the following is				
a. Jowar rotti	79	18	71	71
b. Ragi Kanji	21	82	29	29
12. Roots and tubers mainly				
a. Promote health	94	21	71	59
b. Give energy	6	79	29	41
13. Greens should be included in the diet				
a. Daily	79	100	12	29
b. Weekly once	21	--	88	71

PART 2

	Questions	Percentage of mothers responding			
		Experimental		Control	
		Before	After	Before	After
1.	Carrots are good for eyes	--	76	--	--
2.	Papaya is good for eyes	--	76	--	--
3.	Pulses are necessary for growth	6	81		
4.	Ragi is essential for bones and teeth	-	71		
	[illegible] for blood formation	--	44		
5.	Groundnuts are good for growth	--	56		
6.	Amla is good for gums	--	47		
7.	Greens are good for eyes	--	76		
8.	Blood	--	62		
	Bones and teeth	--	44		
8.	Tomato is good for eyes	--	50		
	Gums	--	47		
9.	Milk is good for				
	Growth	47	59	18	21
	Bones and teeth	--	41	--	--
10.	Unpolished and parboiled rice is good because				
	It contains nutrients	53	65	38	38
	It is good for nerves	--	29	--	--
11.	Lack of Amla results in bleeding of the gums	--	38	--	--
12.	Lack of papaya, and carrot, leads to blindness	--	44	--	--

[redacted] IX

STATISTICAL ANALYSIS FOR THE DIFFERENCE BETWEEN THE SCORES OBTAINED BY THE MOTHERS OF EXPERIMENTAL AND CONTROL IN THE NUTRITIONAL KNOWLEDGE

S. No.	Experimental Balwadi					Control Balwadi				
	Initial Score	Final Score	Difference x	Deviation from the mean $(x-\bar{x})$	Square root of the deviation $(x-\bar{x})^2$	Initial Score	Final Score	Difference x	Deviation from the mean $(x-\bar{x})$	Square root of the deviation $(x-\bar{x})^2$
1.	14	25	11	1.4	1.96	11	12	1	0.5	0.25
2.	9	16	7	-2.6	6.76	3	3	0	-0.5	0.25
3.	8	17	9	-0.6	0.36	4	7	3	2.5	6.25
4.	2	3	1	-8.6	73.96	4	4	0	-0.5	0.25
5.	4	14	10	0.4	0.16	4	4	0	-0.5	0.25
6.	11	23	12	2.4	5.76	10	11	1	0.5	0.25
7.	6	22	16	6.4	40.96	4	4	0	-0.5	0.25
8.	7	21	14	4.4	19.36	13	13	0	-0.5	0.25
9.	2	3	1	-8.6	73.96	4	4	0	-0.5	0.25
10.	8	18	10	0.4	0.16	6	8	2	1.5	2.25
11.	10	25	15	5.4	29.16	3	3	0	-0.5	0.25
12.	2	12	10	0.4	0.16	13	13	0	-0.5	0.25
13.	8	17	9	-0.6	0.36	3	3	0	-0.5	0.25
14.	16	25	9	-0.6	0.36	3	3	0	-0.5	0.25
15.	16	25	9	-0.6	0.36	10	11	1	0.5	0.25
16.	6	22	16	6.4	40.96	7	4	0	-0.5	0.25
17.	4	17	13	3.4	11.56	3	3	0	-0.5	0.25
18.	4	20	16	6.4	40.96	Total		8		12.25
19.	4	16	12	2.4	5.76					
20.	3	6	3	-6.6	43.56					

S. No.	Experimental Balwadi					Control Balwadi				
	Initial score	Final score	Difference x	Deviation from the mean $(x-\bar{x})$	Square root of the deviation $(x-\bar{x})^2$	Initial score	Final score	Difference x	Deviation from the mean $(x-\bar{x})$	Square root of the deviation $(x-\bar{x})^2$
21.	5	21	16	6.4	40.96					
22.	3	17	14	4.4	19.36					
23.	2	10	8	-1.6	2.56					
24.	3	8	5	-4.6	21.16					
25.	4	21	17	7.4	54.76					
26.	4	16	12	2.4	5.76					
27.	12	12	0	-9.6	92.16					
28.	5	14	9	-0.6	0.36					
29.	10	18	8	-1.6	2.56					
30.	6	20	14	4.4	19.36					
31.	2	6	4	-5.6	31.36					
32.	2	3	1	-8.6	73.96					
33.	6	21	15	5.4	29.16					
34.	2	3	1	-8.6	73.96					
Total			326		864.04					

Formula used $$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{n_1 s_1^2 + n_1 s_2^2}{n_1 + n_2 - 2}\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

$$t = 7.1$$

significantat one percent level.

APPENDIX X

PARTICIPATION OF MOTHERS OF EXPERIMENTAL BALWADI IN NUTRITION EDUCATION PROGRAMME VS NUTRITIONAL KNOWLEDGE.

S. No.	Percentage of Attendance	Number of Mothers obtaining Scores		Total
		Below Average	Above Average	
1.	0-50	9	1	10
2.	51-100	7	17	24
		16	18	34

X^2 Value = 10.5; Significant at one percent level

Formula used $$X^2 = \frac{\left((A\ B \times \alpha\ \beta) - (A\ B \times B\ \alpha) \right)^2}{(A)\ (B)\ (\alpha)\ (\beta)} \times N$$

APPENDIX XI

STATISTICAL ANALYSIS FOR THE DIFFERENCE BETWEEN THE SCORES OBTAINED BY THE CHILDREN OF EXPERIMENTAL AND CONTROL BALWADI IN THE NUTRITIONAL KNOWLEDGE

S. No.	Experimental Balwadi					Control Balwadi				
	Initial Score	Final Score	Difference x	Deviation from the mean $(x-\bar{x})$	Square root of the deviation $(x-\bar{x})^2$	Initial Score	Final Score	Difference x	Deviation from the mean $(x-\bar{x})$	Square root of the deviation $(x-\bar{x})^2$
1.	3	8	5	0	0	2	2	0	-0.4	0.16
2.	3	9	6	1	1	2	2	0	-0.4	0.16
3.	3	8	5	0	0	2	3	1	0.6	0.36
4.	2	3	1	-4	16	2	2	0	-0.4	0.16
5.	2	7	5	0	0	2	2	0	-0.4	0.16
6.	2	4	2	-3	9	0	1	1	0.6	0.36
7.	3	10	7	2	4	2	3	0	-0.4	0.16
8.	2	7	5	0	0	3	3	0	-0.4	0.16
9.	2	8	6	1	1	0	1	1	0.6	0.36
10.	3	10	7	2	4	0	1	1	0.6	0.36
11.	2	5	3	-2	4	0	1	1	0.6	0.36
12.	2	8	6	1	1	0	1	1	0.6	0.36

S. No.	Experimental Balwadi					Control Balwadi				
	Initial Score	Final Score	Difference x	Deviation from the mean (x-$\bar{x}$)	Square root of the deviation $(x-\bar{x})^2$	Initial Score	Final Score	Difference x	Deviation from the mean (x-x)	Square root of the deviation $(x-\bar{x})^2$
13.	3	9	6	1	1	0	0	0	-0.4	0.16
14.	2	7	5	0	0	2	2	0	-0.4	0.16
15.	2	7	5	0	0	3	3	0	-0.4	0.16
16.	2	7	5	0	0	1	1	0	-0.4	0.16
17.	2	7	5	0	0	0	1	1	0.6	0.36
18.	3	8	5	0	0	3	3	0	-0.4	0.16
19.	3	8	5	0	0	0	1	1	0.6	0.36
20.	3	9	6	1	1	Total				
								8		4.64
21.	1	8	7	2	4					
22.	3	10	7	2	4					
23.	2	7	5	0	0					
24.	2	7	5	0	0					
25.	0	5	5	0	0					
26.	2	6	4	-1	1					
27.	3	10	7	2	4					
28.	3	9	6	1	1					
29.	1	4	3	-2	4					
30.	3	10	7	2	4					
31.	2	7	5	0	0					
32.	3	10	7	2	4					

S. No.	Experimental Balwadi					Control Balwadi				
	Initial Score	Final Score	Difference x	Deviation from the mean (x-$\bar{x}$)	Square root of the deviation $(x-\bar{x})^2$	Initial Score	Final Score	Difference	Deviation from the mean (x-x)	Square root of the deviation $(x-\bar{x})^2$
33.	0	4	4	-1	1					
34.	0	1	1	-4	16					
	Total		173		85					

Formula used $t = \dfrac{\overline{X_1} - \overline{X_2}}{\sqrt{\dfrac{n_1 s_1^2 + n_2 s_2^2}{n_1 + n_2 - 2}\left(\dfrac{1+1}{n_1 n_2}\right)}}$

$t = 12.4$

Significant at one per cent level

APPENDIX XII

PARTICIPATION OF EXPERIMENTAL BALWADI CHILDREN IN NUTRITION EDUCATION PROGRAMME VS NUTRITIONAL KNOWLEDGE

S. No.	Percentage of Attendance	Number of children obtaining Scores		Total
		Below Average	Above Average	
1.	0 - 50	2	-	2
2.	51 -100	5	27	32
		7	27	34

X^2 value = 6.7 Significant at one percent level.

Formula used $X^2 = \frac{\{(AB \times \alpha\beta) - (AB \times B\alpha)\}^2}{(A)\ (B)\ (\alpha)\ (\beta)} XN$