CHAPTER II

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CHAPTER II
REVIEW OF RELATED LITERATURE

2.1 Introduction
A research worker should have good knowledge about the background for his investigation before attempting a problem in any field of research. It helps him to approach and analyse the problem effectively. With the help of previous findings and recommendations, the researcher can proceed further to find new perspectives. This Chapter presents a review of past literature. The review has been divided into a few sections according to the nature of the studies:
1. Studies relating to curriculum development.
2. Studies relating to evaluation of existing school health programme.
3. Studies relating to health status among students.
4. Studies relating to students' and teachers' knowledge of health promotion.
5. Studies relating to teachers' intervention.
6. Studies relating to students' intervention.
2:2:1 Studies relating to curriculum development

Rajammal et al, (1975) conducted a study on integrating nutrition education with the primary school curriculum. In order to evaluate the impact of the integrated school curriculum with nutrition, the questionnaire method, with scoring was used, before and after nutrition education.

In order to compare the efficacy of the mode of imparting nutrition education, the scores obtained by the children in the two sets of schools, one where nutrition education was given by the Nutritionist and the other where nutrition education was imparted by the teachers were compared. In the three classes the scores obtained by the students, taught by the nutritionist ranged from 38.97 to 47.43, while 27.4 to 39.78 was the range when nutrition education was imparted by the teachers. Both these were significantly higher than the range 1.11 to 1.64 (P<0.01), secured by the classes who had no special integration of nutrition education.

Rajammal et al, (1976) studied the impact of nutrition and health education on the growth and development
of primary school children, in selected areas of Tamil Nadu, India.

A special orientation training on teaching nutrition and health education concepts through the curriculum was organised for the teachers working in the three districts, namely Kanyakumari, Nilgiris, and Coimbatore in Tamil Nadu.

The evaluation showed that there was an improvement in the knowledge of teachers from 8.9 per cent to 74.5 per cent in Coimbatore, 9.5 per cent to 72.5 per cent in Kanyakumari and from 8.1 per cent to 70.4 per cent in Nilgiris district.

The trained teachers were able to identify symptoms of some deficiency diseases among the children and give correct guidance which resulted in the disappearance of bleeding gums in 34.25 per cent and 48 per cent of scabies, 46 per cent, 100 per cent and 35 per cent angular stomatitis in 50, 42 and 62 of anaemia in 50 per cent and 30 per cent in Coimbatore, Kanyakumari and Nilgiris students respectively.

The trained teachers taught the concepts of
nutrition, health and environmental sanitation to their children according to the children's age level. The difference in the scores obtained by the children in IV standard ranged from 3.6 in control to 51.7, 52.4 and 66.3 for the children who received nutrition and health education in the experimental schools of three districts. The scores obtained by the children from all the experimental schools in all the three districts were significantly higher than the control schools where no nutrition and health education instruction was incorporated in the educational programme. 

The obtained 't' values for students awareness in nutrition and health 55.57, 35.04 and 49.98 in Coimbatore, Kanyakumari and Nilgris districts respectively were significant at 0.01 level.

Children carried home the nutrition and health messages to their parents which resulted in increasing the parents' awareness and bringing about changes in home practices with regard to food, desirable health habits and environmental sanitation practices. The percentages of changes observed in raising kitchen garden were 10, 17 and 25, in awareness about protective foods 85, 65 and 60, in improvements in foods 85,65 and 60, in improvement in cooking
methods 80, 84, 85, in inclusion of greens in the diet 75, 70 and 80 and in improvement of garbage disposal 70, 75 and 70 in Coimbatore, Kanyakumari and Nilgiris districts respectively.

Imparting nutrition and health education concepts through an integrated curriculum in the primary schools has brought about improvement in the knowledge and practices of the students, their parents and the school teachers. Nutrition and health education, therefore, can be effectively incorporated in the Primary school curriculum.

Shukala Bhattacharya (1991) conducted a project on Nutrition, Health education and Environment sanitation with the assumption that the desirable knowledge, understanding, habits, practices and attitudes with regard to nutrition, health and environmental sanitation could be developed and nurtured in primary school children with the help of a need-based curriculum and with support/reinforcement from the parents at home. The project was implemented in selected schools of three modes, namely Project Schools (experimental), Non-project schools (control) and project and community contact programme. It was found that the student of classes I - V of project schools performed better in the
total test than the pupils of classes I-V of non-project schools. The means of students at different schools in class I, were 74.55, 60.69 and 73.9, class II 64.6, 52.9 and 66.19; class III 48.75, 37.08 and 48.67, class IV 58.75, 47.79 and 58.45 and class V 48.93, 25.16 and 52.11 in project, non-project and project community contact programmes respectively.

Stuart W. Fors et al, (1987), studied a diffusion strategy for school based hypertension education among sixth grade students and their parents', in the U.S.A. Randomly 21 schools were selected for the study assigned to be in one of the three groups:

"A" students who received the 3 R's and HBP curriculum were instructed to talk with their parents and to complete the home blood pressure measurement assignment;

"B" students who received in 3 R's and HBP curriculum were instructed to talk with their parents, but did not have the home blood pressure measurement assignment; and

"C" comparison group students who received the usual cardio vascular health curriculum of the school.
Findings

Mean knowledge scores for HBP at four week post-intervention were higher for student in group "A" (7.75/12) than in "B" (7.19) or "C" (6.08). These differences were maintained (7.57, 6.98 and 6.11) at the fourth month retest. Additionally, students' intervention of "A" had a higher passing rate (70 per cent) on BP measurement skill test than those in group "B" (40 per cent). More students in group "A" communicated HBP information to their parents than in the other two groups. Group "A" students scored higher on the diffusion questions when matched with parents for "any discussion" (A 63 per cent, B 41 per cent, C 31 per cent) and when specific CVD/HBP issues were matched (A 30 per cent, B 15 per cent, c 12 per cent). Seventy six per cent of 'A' parents indicated some HBP related discussion had taken place, compared with 54 per cent of 'B' and 40 per cent of 'C'. The significant difference between intervention groups held for all combinations of intervening variables (example: Sex, income, race, education, marital status). Knowledge scores in group 'A' parents were higher than in 'B'
or `C' groups, but the differences were not significant (A.8.78/12; B 8.44, C 8.48).

2:2:2 Synthesis of studies relating to curriculum development

Rajammal et al, (1975), (1976) found that imparting nutrition and health education concepts through an integrated curriculum in primary schools has brought about improvement in the knowledge and practice of the children, their parents and the teachers. Shukala Battacharya (1987) reported that nutrition, health education and environmental sanitation curriculum for primary school children were found successful and the pupils of class I-V of project schools and community contact programme performance were better than the pupils of classes I-V of non-project schools. Stuart W. Fors et al, (1987) studied a diffusion strategy on 3 R's and HBP school curriculum among sixth grade students in the U.S.A. They found that sixth grade students were taught practical information about blood pressure and it facilitated the health education of families and peers and helped effect blood pressure control within the community.

The results of the above studies indicate that there is wide scope for incorporating nutrition education,
Beulah Raju (1970) conducted an evaluation study on the existing status of the school health programme in selected middle schools of Delhi.

**Results**

It indicated that all new entrants to Class I were not examined by the doctors. The common deviations of high priorities detected were, discharge from nose, from ear, hearing problems, sore throat, discharge from eyes, red eyes, lice, dryness of skin, gum-bleeding, bad odour and the like. Further it was stated that only 5.1 per cent of teachers working in Delhi Corporation Schools knew about health education and the syllabus developed by the Ministries of Education, Health and Family Welfare and Urban Development for schools. It was revealed that 42 out of 44 headmasters interviewed felt that health education was mainly the responsibility of teachers, but the teachers were poorly equipped for this task, as out of 826 teachers in the study, 773 were not trained in health education. It was also
reported that schools did not have sufficient audio-visual aids for health education.

This study further stated that 50 per cent of the schools were situated in crowded and noisy surroundings. They were faced with the problems of impure water supply, traffic hazards and unhygienic surroundings. It was observed that most schools had over-crowded class rooms that is 40-50 students per class room. It was found that 11 schools out of 44 had damp buildings, 3 schools had no windows for ventilation and 14 schools had no ventilators. Twenty schools had no playgrounds and the rest had insufficient area for playground. The schools on the whole presented a drab and dull appearance which were depriving the children of one of the most important educational experiences. It was observed that 5 schools had hand pumps and 16 schools used water from outside the school. It was also observed that 3 schools did not have even a single latrine. Others had very few latrines and even these were not properly cleaned.

Sapru and Pandey (1987) evaluated Government of India's intensive pilot project of School Health Services implemented in 25 PHCs of 25 districts in 20 States and Union territories in India.
Findings

The results showed that the project failed to achieve the objectives envisaged, due to inadequate training and negligible involvement of block and district level education authorities in the training, improper distribution of health education material to the teacher at the time of training and the absence of any emphasis in project monitoring on the extent and nature of health education activities being performed in the project schools.

Despite these findings, 64.7 per cent teachers stated that they noticed over the past few years a 25 - 70 per cent improvement in the personal hygiene of their pupils and majority of them attributed this to the changing socio-economic conditions in the villages and the recently adapted practice in schools of daily inspection, rather than to any health instruction in the classes. Majority 62.87 per cent of parents also mentioned getting demands from school going children for daily bathing and washing of clothes, regular nail cutting and addition of fresh vegetables and fruits in their diet. Further this study revealed that in majority of the States that the medical checkup for enrolled primary
school students ranged from 20-60 per cent. The outcome of referrals was found to be benefiting the school children to a considerable extent, only in 22 PHCs and in remaining PHCs it was obviously negligible.

The top three causes of morbidity were dental caries, malnutrition and goitre. Suspected leprosy cases were around 5 per cent and physically handicapped children were around 6 per cent. The most notable and alarming situation was the fact that approximately every third medically examined child in the hilly tribal PHCs of Andhra Pradesh, Assam, Orissa and Sikim had fairly severe signs of malnutrition and in Sikim every second medically examined child had goitre. Scabies and dental caries ranged from 9 in 1000 in Karnataka to 113.7 in Andhra Pradesh. The morbidity findings in school pupils also reflected and confirmed the presence of local health problems.

The training provided for teachers on health education was not perceived to have been adequate by 73.3 per cent and 95.5 per cent of teachers in phases I and II of the project. About 47 per cent teachers expressed that components of school health pilot project imparted during the training was partial in phase I PHC, whereas it was 95.5 per
cent in phase II PHC. On the whole they considered the training to have been theoretical and to have failed to impart any practical skills to detect and treat common diseases, render first aid and fill health cards. Notably some of the teachers also mentioned the need for more training in health instruction. About 80 per cent of the teachers said that they had received no health education material.

Safe drinking water and hand washing facilities were present in only 32.4 per cent and 25.2 per cent of schools respectively. Latrines were virtually absent and about 15 per cent schools lacked buildings and they were located in open or under trees. The school buildings wherever present were found to be mostly in a dilapidated condition in majority of the schools.

2:3:2 Synthesis of studies relating to existing status of school health programme

Beulah Raju (1970) in her evaluation study found that the existing health status of school children had unveiled a pathetic condition and teachers also were unaware of the desirable health practice in schools. Sapru and Pandey (1987) found that India's intensive pilot project of school
health services had failed to achieve the intensification of health education in primary schools due to inadequate training for teachers, negligible distribution of health education materials and absence of monitoring health education activities.

2:4:4 Studies relating to health/nutritional status among school children

Parvathi Easwaran et al, (1974) studied the growth pattern and nutritional status of selected 8-10 year old primary school students in Coimbatore.

Results

The study revealed that both boys and girls, had lower height and lower weight. The lighter ones had the tendency to be shorter too. This correlation between height and weight was statistically significant indicating that as height or weight increases, the other dependent factors too increase. In all ages, boys were slightly taller and heavier than girls. The relationship of height, weight and the weight-height ratio with age show a high positive correlation that with increase in age there is a corresponding increase in height-weight ratio and weight-height ratio.
Angular stomatitis was found to be most prevalent as a nutritional deficiency symptom in all the age groups in both sexes. Dry/rough skin was found the next most prevalent deficiency symptom, followed by xerosis of conjunctiva. There is no prevalence of angular conjunctivitis except in 8 year old boys (0.4 per cent) and bleeding gums in 9 year old boys (0.5 per cent).

Rajammal and Nirmala (1980) conducted a study on incidence of dental caries in children of age 5 to 12 years, among 1,485 students belonging to rural and urban primary schools in Coimbatore district.

Results

The percentage of dental caries incidence in urban and rural schools was found to be 46. The percentage of missing teeth in children belonging to urban and rural schools was 1.1 and 1.7 respectively. Filling of teeth was not noticed in any of the children examined. It was found that 52 per cent (highest) of children having dental caries in the income group of Rs. 801 and above per month. The incidence was noted to be 39 per cent among children of the income below 200 Rs. per month. The dental caries incidence
was comparatively higher 51 per cent and 48 per cent in the income groups of Rs.401-600, Rs.601-800 per month respectively. The incidence of dental caries was found to be higher (53 per cent) among children of 5-8 years age than in children of 9-12 years of age.

Rao et al. (1984) studied health and nutritional status of rural primary school children as part of a larger investigation project on Health Survey Techniques. A total of 36 villages with primary schools distributed in two primary health centre blocks of Wardha District formed the sampling frame from which 17 villages were randomly selected. All children attending primary schools in these villages were subjected to clinical and anthropometric examination. A total of 1,608 children between the ages of 6-14 years were examined for evidence of nutritional deficiency signs and other common infective conditions.

Results

By and large such deficiencies were found in the majority that belonged, to the poor-socio-economic groups. Only 4 per cent from salaried groups suffered from such ailments. The percentage of prevalence of the major nutritional/health problems seen in children were angular
stomatitis 17.4; Cheilosis and glossitis 9.6; Conjunctival xerosis 14.9; Bitots spots 6, paller 3.6, phrynoderma 1.4, dental caries 20, and scabies 3.2. In general, all the measurements except the skin fold at triceps consistently increased with age. From age 6 to 14 years the heights increased from 107.5 to 142.1 cms in boys and from 107.7 to 139.8 cms in girls. The weight increased from 16.2 to 29.9 kg in boys and 15.9 to 30.8 kg in girls. The values for both heights and weights of boys were higher than those of girls upto age 9 but thereafter the boys lagged behind and remained below the girls upto 13 years in case of height and 14 years in case of weight. In case of height measurement the boys seemed to overtake girls after 13 years while in the case of weight the overtaking occurred after 14 years. Mean values for mid-arm circumferences ranged from 14.2 to 18.2 cms in boys and 14.5 to 18.3 cms in girls. The skinfold measurements varied within a mean range from 4.7 to 5 mm in boys and 5.7 to 6.2 mm in girls. The measurements of girls tended to be higher than boys at all ages.

This study revealed that the children though, appeared normal in height, were definitely retarded in
weight reflecting the existence of long term malnutrition in them.

Gupta (1989) studied health status of rural school children in Bihar. A total of 1,424 school children of either sex between the ages of 5 and 17 years were studied. Children were examined for nutritional deficiency signs, common infective conditions. Their body weight and height were recorded. Visual acuity was tested using Snellen charts. History of passage of worms was enquired from children themselves.

Results

Evidences of morbidity were found in 52.8 per cent boys and 67.4 per cent girls with 11.9 per cent boys and 12.2 per cent girls having two or more conditions existing together. The percentage of morbidity among both sexes of children are as given in Table 2:1
TABLE 2: 1
PERCENTAGE OF DISTRIBUTION OF MORBIDITY / DEFICIENCY AMONG STUDENTS

<table>
<thead>
<tr>
<th>Morbidity/ Deficiency</th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Dental caries</td>
<td>19.11</td>
<td>23.51</td>
<td>20.99</td>
</tr>
<tr>
<td>2. Worm infestation</td>
<td>14.21</td>
<td>17.43</td>
<td>15.58</td>
</tr>
<tr>
<td>3. Hearing defects</td>
<td>0.36</td>
<td>0.32</td>
<td>0.35</td>
</tr>
<tr>
<td>4. Myopia</td>
<td>1.47</td>
<td>1.97</td>
<td>1.68</td>
</tr>
<tr>
<td>5. Vit. B Deficiency</td>
<td>9.19</td>
<td>8.7</td>
<td>8.98</td>
</tr>
<tr>
<td>6. Vit. A Deficiency</td>
<td>5.58</td>
<td>6.9</td>
<td>6.32</td>
</tr>
<tr>
<td>7. Anaemia</td>
<td>2.81</td>
<td>5.05</td>
<td>4.1</td>
</tr>
<tr>
<td>8. Scurvy</td>
<td>0.72</td>
<td>0</td>
<td>0.47</td>
</tr>
<tr>
<td>9. Cardiovascular</td>
<td>0.36</td>
<td>4.91</td>
<td>3.85</td>
</tr>
</tbody>
</table>

Majority of the children belonged to the lower socio economic group and those from upper middle class families were excluded from the study. Family size had a significant relationship with disease prevalence. Average number of children per family (including those examined) was 5.13. There was no illness in 4.77 children, 5.03 had one illness and 6.94 had two or more morbid conditions.

In nutritional status, only 15.4 per cent boys and 19 per cent girls had weight above 80 per cent of 50th percentiles of the Harvard standard and 76.4 per cent boys and 71.7 per cent girls had weight between 61-80 per cent. While 8.1 per cent boys and 9.1 per cent girls had weight
less than 60 per cent. Irrespective of sex the mean height was between 90-94 per cent of the Harvard Standard but 20 per cent boys and girls showed features of stunting. Mild and moderate malnutrition was of common occurrence with few children with or without stunting.


Results

Majority of the boys and girls (59.2 boys and 62 per cent) were habituated to clean their teeth once everyday with manja (locally available red and black granular powder). Tooth paste and brush were used by 10.4 per cent of children (5.7 per cent boys and 13.6 per cent girls). Twenty-four (3.1 per cent) children were not habituated to use any material to clean their teeth and were using finger and plain water to clean their teeth. Commercially available tobacco tooth power was used by 5 children. Coarse materials like ash and powdered coal were used by 164 (21.1 per cent) children. Usage of 'dantum' was common among girls.
Dental caries was found in 128 (16.5 per cent) children followed by calculus in 101 (13 per cent) children. The less pathognomonic morbid stain was present in 191 (24.5 per cent) children. Around 40 per cent of children habituated to tobacco powder and dantum were suffering from dental caries. However, the prevalence of caries among children habituated to coal, ash, manjan and paste varied between 15-18 per cent. The difference of dental caries among children using the former was significantly greater than those using the ash, coal and the like (P < 0.005). The periodontal abscess / bleeding was significantly high among children habituated to ash, coal and manjan. The overall prevalence of periodontal diseases was 17.8 per cent and it was observed mainly among children using ash, coal and manjan.

The oral health status showed that prevalence of dental caries (22.8 per cent) among urban children. Eighty five (22.6 per cent) rural children were suffering from periodontal diseases, in contrast to 13 (10.5 per cent) from urban and 41 (15 per cent) from tribal schools. These differences were statistically significant (P < 0.05). Thirty per cent of tribal children showed staining of their teeth.
The relationship between nutritional status and dental caries when analysed showed equal distribution of children having dental disease among various grades of malnutrition.


Results

Among the school children the males were higher in height than the females from 5 to 12 years, and the difference in height was statistically significant by single year age group from 6 to 8 years. Similarly, the males were higher in weight than the females from 5 to 10 years and the difference in weight was statistically significant by single year from 6 to 9 years. Among the non-enrolled school age children no definite patterns were observed either in height or weight between the males and females. In comparing the mean height or weight among the 5 to 10 year old children, the enrolled school-age children were slightly taller or heavier than the non-enrolled and the differences were not statistically significant. In comparing the prevalence of malnutrition (moderate and severe), there was a significant difference between enrolled and non-enrolled school age
children among the 5 to 10 years age group in terms of weight for height 13.9 verses 9.8 per cent (P < 0.05), but not in terms of height for age or weight for age. The non-enrolled school-age children had higher infestation rates than school children in Ascaris Lumbiscoides (66.69 per cent versus 50.1 per cent), Trichuris trichura (38.5 per cent versus 23.9 per cent) and Giardia lamblia (5.4 per cent versus 2.7 per cent).

2.4:2 Synthesis of studies relating to students' health and nutritional status

Parvathy Easwaran, et al, (1974) in their study found that the relationship of height, weight and weight-height ratio with the age showed a high positive correlation showing that with an increase in age there was a corresponding increase in height-weight and weight-height ratio. The common health problems found among primary school children were angular stomatitis, dry/rough skin, xerotic of conjunctivitis and bleeding gums. Rajammal and Nirmala (1980) stated the incidence of dental caries in urban and rural areas was found to be 46 per cent. The highest percentage of dental caries was found in the high income group of Rs.801 and above per month. The incidence of dental caries
was found to be higher (53 per cent) among children of 5 - 8 years of age than children of 9 - 12 years of age. Rao et al, (1984) found that the major prevalence of nutritional/morbid problems seen in children were those of angular stomatitis, conjunctual xerosis, bitot spots, paller, phrynodermal, dental caries and scabies. In general, all the measurements in anthropometry, except skinfold at triceps consistently increased with age. Gupta (1989) examined the health status of rural school children between the age of 5 and 17 years. Evidences of morbidity were found in 52.8 per cent boys and 67.4 per cent girls with 11.9 per cent boys and 12.2 per cent girls having two or more condition existing together. The most common problems were, dental caries, worms, hearing defects, myopia, vitamins A and B Complex deficiencies, anaemia and scurvy. Mild and moderate malnutrition was of common occurrences with a few children with or without stunting. Rao et al, (1991) found that the prevalence of dental caries (22.8 per cent) among urban children. Twenty three per cent rural children were suffering from periodental diseases, in contrast to 10.5 per cent for urban as 15 per cent for tribal school. These difference were statistically significant (P < 0.05). The relationship
between nutritional status and dental caries when analysed showed equal distribution of diseased children among various grades of malnutrition. Thein Hling et al, (1995) found that the prevalence of wasting among 5-10 years and non-enrolled school-age children was 19.18 per cent while that for school children of similar age was 13.9 per cent. In addition non-enrolled school-age children had higher infestation rates than school children.

2.5.1 Studies relating to teachers' / students' awareness regarding health

Patel and Jaya (1981) studied the knowledge of nutrition and health concepts of primary school teachers in Gujarat. They reported that the teachers knew about health and sanitation but more than 50 per cent of teachers had no knowledge of food and nutrition. It is however noteworthy that 55 per cent of teachers were classified under 'don't know' category.

Mohapatra et al, (1985) studied the knowledge and attitudes on nutrition of primary school teachers and teacher trainees.
Results

The knowledge, attitude and practice (KAP) of the subjects and approaches to health and nutrition education were assessed by the questionnaire method. The results revealed that there was no statistical difference in scores obtained by teachers or teacher trainees when their age, sex, educational qualification, urban/rural background or teaching experiences were taken into account. The mean scores for teachers in respect to basics of health and nutrition was 79.3 ± 10.3, while it was 72.9 ± 10.49 for trainees. These scores were significantly different (P < 0.001). However, in respect to the area of food beliefs, the scores obtained by teachers 42.7 ± 13.18 and trainees 40.8 ± 13.6 were similar. Statistically significant differences were found in the mean scores obtained by teachers and teacher trainees in respect of areas like Health and Nutrition practices and approaches to teaching or health and nutrition topics. In both these areas, teachers again performed better than the trainees. The total scores for the entire schedule were considered. Scores obtained by teachers were significantly higher than those obtained by the trainees (61.1 ± 20.63 as against 48.4 ±
It was found that teachers who scored more than 50 per cent totally were 30.7 per cent.

Almost all teachers and trainees indicated that there was a need for periodic health examination of school children. Role of the teachers in helping to improve the impact of school health services was very poorly recognised both by teachers and trainees. It was noticed that only 26.2 per cent of teachers recognised that nutrition education at the school would result in the dissemination of nutrition and health messages to their parents and families. Several lacunae were found in the syllabus and text-books on environmental studies. The weakest link in the teaching of health and nutrition appeared to be the utter lack of teaching aids.

Mc Guffin (1986) conducted a study on the nutritional knowledge and behaviour of 11-16 year old school pupils in Northern Ireland. The questionnaires were administered to the students to study their knowledge and behaviour in relation to nutrition.

**Result**

Pupils in primary schools appeared to have some general knowledge of nutrition and diet, but the details...
thereof left considerable opportunity for improvement, with carbohydrates and vitamins being the areas where the knowledge was less precise. The girls had a better score in nutrition than boys. There is no association between knowledge and behaviour of students regarding nutrition.

De sole and Martel (1988) conducted a programme of health education for eye infections targetted at primary schools in the rural town of Metrahara in Ethiopia. The evaluation showed improved knowledge scores on eye disease. Before programme 88 of the 239 school children examined had dirty faces, defined as presence of dirt or discharge in the area surrounding the eyes. After 6 months only 4 out of 228 children had dirty faces. The prevalence of moderate and severe trachoma decreased from 12.1 per cent to 3.3 per cent (P <0.001) in one year, and the prevalence of conjunctivitis from 7.5 per cent to 0.4 per cent (P < 0.001).

Dhanasekaran (1990) studied the awareness of primary and middle school teachers regarding health promotion among school children.
Findings

A normative survey was conducted to study the awareness of teachers regarding health promotion among school children. Totally 190 teachers working in urban and rural schools were included in the study. The awareness of health promotion among primary and middle school teachers was low and 87.4 percentage teachers scored below 40 per cent in the awareness test. The mean scores in awareness in major units, namely immunization, nutrition, environmental sanitation and mental health was also significantly low. There was greater awareness in nutrition unit (42.97), followed by environmental sanitation (27.23) and immunization (26.57). The lowest awareness was observed in the mental health unit (10.42).

The awareness about health problems were also low, only partial awareness was noticed. Only 30 per cent of teachers were able to perform very minimal health promotional activities in the schools. The awareness regarding health promotion was high among female teachers (32.5) than the male teachers (27.37), which is significant at 0.01 level (t = 4.322). The urban teachers had more awareness (34.27) than rural teachers (27.89) which is also
significant at 0.01 level ($t = 5.678$). The other variables like educational levels, age, marital status and family size of the teachers did not have any relationship with the awareness level regarding health promotion.

Fryer (1991) conducted a radio health curriculum on diarrhoea and field-tested among IV and V grade students in Bolivia. The module consisted of 10 interactive radio lessons in which the students responded orally or through drill and practice, singing songs, or writing key concepts in their note books. Following the 25 minutes' radio broadcast, the teacher conducted 20 minutes sessions that focused on application and practice of the new behaviour. The module included lessons on personal hygiene, water and oral rehydration, home sanitation and nutrition. Students responded enthusiastically and achieved significant knowledge gains as a result of the programme. Observations by parents and teachers also suggested that the programme had an impact on children's attitude and behaviour.

2:5:2 Synthesis of studies relating to teachers' and students' awareness regarding health

Patel and Jaya (1981) found that the knowledge of nutrition and health concept of Primary school
teachers was low, more than 50 per cent of them had no knowledge of food and nutrition. Mahapatra et al. (1985) reported that the knowledge of teachers and teacher trainees regarding health and nutrition. Scores obtained by the teachers were significantly higher than those obtained by the trainees (61.1 ± 20 against 48.4 ± 23.65). The role of teachers in helping to improve the impact of school health services was very poorly recognized both by teachers and teacher trainees. Dhanasekaran (1990) found that the awareness of health promotion among primary and middle school teachers was low, 87.4 per cent of teachers have scored below 40 per cent scores in the awareness test. The awareness about health problems was also low, only partial awareness was noticed. Mc Guffin (1986) reported that the primary pupils appeared to have some general knowledge of nutrition and diet, but the details thereof left considerable opportunity for improvement. There is no association between knowledge and behaviour of students regarding nutrition. De Sole and Martel (1988) in their study on health education for eye infections targeted to primary schools found the knowledge scores was improved on eye disease. Further the prevalence of moderate and severe trachoma decreased from
12.1 per cent to 3.3 per cent in one year, and the percentage of conjunctivities from 7.3 per cent to 0.4 per cent. Freyer (1991) reported that a radio health curriculum on diarrhoea disease among IV and V grade students, improved the knowledge of the students significantly.

2:6:1 Studies relating to teachers' intervention

Govindachary (1962) studied school health programme as a part of pilot health project in one community development block of Madurai District. Since the population below 15 years formed a major part of the total population, a determined effort was made to improve the level of health condition of the children and to inculcate in them the principles of healthy living.

Results

It was observed that about 30 pupils could be examined by a doctor in one afternoon and the reasonable number of pupils that could be covered by him in a year would range from 1000 to 1500 pupils by spending at least two evenings in a week specifically for this purpose. An analysis of data on school medical inspection carried out among 677 pupils by the doctor revealed only 9 per cent of the defective pupils required the attention of the doctor.

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Essentially it meant that, by training and using paramedical personnel and school teachers to carry out preliminary screening, full-scale medical supervision was possible in a school health programme even with the present shortage of Medical officers. It also revealed that among 82 primary schools in the project area only 15 had latrines and 12 had their own drinking water sources. No school had the facility of a sanitary kitchen for cooking the midday meal.

Griffith and Whicker (1975) revealed that the teachers engaged in health education had the opportunity to observe and screen students for health problems and assist students in attaining and maintaining the desired level of well-being. They conducted a research project in a public school (K-4) in a city county system in the U.S.A. to identify the needs of the children, available resources and major deterrents to the administration of an effective school health programme. The need for a more effective and comprehensive school health programme in the local schools was supported by data recorded between 1969-75.

Most schools do not see health as a priority. A summary of needs and attitudes relating to the school health programme, revealed that teachers in the project school felt
they needed assistance in learning to identify health problems (88.8 per cent), utilizing the public health nurse in health education (88.8 per cent), securing information regarding management of communicable diseases (44.4 per cent), and preventing students from violating good health practices (77.7 per cent).

To meet the expressed needs of the teaching staff, three teacher-nurse workshops were held. Appropriate screening techniques were discussed and demonstrated. Emphasis was placed on the teachers' role as observer and member of health team. Teachers became actively involved in a day-to-day health screening process. A daily check sheet was kept by the teaching staff and submitted periodically to the public health nurse for the follow-up. Initially, the public health nurse made only 20 referrals as compared to 57 after the teaching staff had become involved in the screening process. Teachers' response was positive towards health screening after this project.

Joseph (1980) carried out a four-year school health project in 30 schools in Kanghaza, in Kerala. One teacher was selected from each school to be a health education co-ordinator responsible for development of the
school health programme in their school, co-ordinating health education activities and supporting the health education activities of other teachers. The teachers were trained on simple treatment and prevention of local diseases, first-aid, and a range of health education activities including project based health education approaches. In turn the teachers set up school health committee, attended sick children, started screening activities and set up a variety of child-to-child school health education activities in the school and community. They were able to treat basic problems, refer children to the health centre and liaise with health services for screening and immunization programmes. An evaluation of the year study saw a decline among children in the project schools for the following diseases: Vitamin `A' deficiency (3 per cent to 1.2 per cent), Trachoma (9.1 per cent to 5.5 per cent) and scabies (7.6 per cent to 1.1 per cent). There was an estimated saving of several thousand school days, at a cost of less than one Indian rupee per student per year.

A four week training on health education, nutrition, personal hygiene and environmental health was organised for the selected teachers. The results of pre and post evaluation studies had shown a gain in knowledge from 57 per cent in pre to 74 per cent in post-tests.

The teachers periodically examined the children in the school and were able to detect defects, deformities and deficiencies which they referred to the health visitor or medical officer of PHC. It was found that among 26 per cent of 5 to 14 years treated cases 40 per cent were school-going children. They also looked after the improvement of school sanitation by arranging for general cleanliness in the premises. All the eighteen schools had refuse disposal pits and the students were using the pits for disposing the refuse. The teachers had the nail cutter which was used by the students. The teachers also gave regular health instruction in the class. The students had acquired a fairly good knowledge about health and personal hygiene. The findings of the final knowledge, attitude and practice survey showed that there was an increase in knowledge when compared with the results of the base line survey conducted.
in the community. The proportion of increase of knowledge was significantly high in experimental villages when compared with the control villages. The experience reveals that the teachers can perform many of the roles to support the ongoing health programmes and assist the peripheral health workers of the PHC in the implementation of the programme in the villages.

Sornmani (1988) conducted a community based programme to prevent liver fluke disease which involved treatment and health education in both the community and schools in two villages of Thailand. Following training of teachers, a 'health education' corner was set up in the schools, with displays of snails and fish collected around the villages. The parasites that had been purged from the activities included stools examination for all students and treatments for the positive. Within 1-2 years, all students were free from the liver fluke disease and the schools were finally declared to be 'liver fluke free'.

Limburg et al, (1995) in a project on control of blindness in India, found that the trained teachers were useful in screening children for refractive errors. The study revealed that the teachers were able to detect cases of poor
vision and their performance was compared to that achieved by trained staff such as paramedical ophthalmic assistants. The number of children provided with spectacles as a result of this screening had increased dramatically.

Nio (1995) reported that a dental health programme in schools in Indonesia, involving a team of dentists, dental nurses and teachers was successful. Dental health educational activities involved simple lessons, production of booklets with pupils class/house work activities. Preventive activities done in class included brushing with fluoride tooth paste in front of mirrors, use of disclosing solution and fluoride rinses. Simple treatment was linked to annual screening and children with dental health problems were treated during school time. The effectiveness of the programme had been demonstrated by significantly lower plaque sores among participating children compared with controls.

2:6:2 Synthesis of studies relating to teachers' intervention

Govindanchary (1962) noted that only 9 per cent of the defective pupils required the attention of the doctor, it means that by training and using paramedical personnel and school teachers to carry out preliminary screening of students. Griffith and Whicker (1975) in their study was able
to improve the administration for effective school health programme. The teachers engaged in health education had an opportunity to observe and screen students for health problems and assist students in attaining and maintaining the desired level of well-being. Joseph (1980) reported that the teachers were able to treat basic problems, refer children to the health centre and liaise with health services for screening and immunization programmes after training on health promotion. With the result of teacher's intervention the incidence of Vitamin 'A' deficiency, trachoma and scabies were reduced significantly. Ramachandran et al, (1981) found that the teachers performed many of the roles to support the ongoing health programmes and assisted the peripheral health workers of the primary health centre in the implementation of the programme in the village. The result of pre and post-evaluation of teachers on health education, nutrition, personal hygiene and environmental health had shown gain in knowledge from 57 per cent in pre to 74 per cent post-test after four weeks training. Sornamani (1988) found that the teachers were found effective in eradication of liver fluke infestation among children in a community and schools. Limburg et al, (1995) reported that the trained teachers were
able to detect cases of poor vision and their performance was comparable to that of achieved by trained staff. Nio (1995) reported that in dental health programme the teachers played a vital role along with dentists and dental nurses. The incidence of plaque among participating children was lower when compared with controls.

2:7:1 Studies relating to students' intervention

Marivia Bentley et al, (1975) studied the effect of a school-based dental health education programme on children's utilization of dental services in Junita County, U.S.A.

The study population included 1859 of the 2046 children enrolled in grades K through 6. The report was based upon a cohort of 1,452 of the original population but 407 were lost for one or two reasons.

Experimental procedures

Having stratified the children in each of the nine schools according to grade and level of disease, each stratum was randomly distributed across the three assigned delivery modes namely TEAM, SOLO and COMMUNITY.
For children assigned 'TEAM' - dental treatment was provided from a school-based mobile van that visited annually each of the nine schools with a dentist, a chairside assistant and two expanded function dental assistants (EFDA).

In 'Solo' mode, the staff included the same dentist and chairside assistant but no expanded function dental assistants were involved. The children were treated according to their need for treatment. Parents of TEAM and Solo children were not involved in deciding when and what kinds of dental care their children received.

For children assigned to community, a dental treatment was provided by 39 private dentists. The treatment was delivered in response to parents who demanded dental care for their children. Dental health education included two categories, Enriched dental health programme (EDAP) and Regular Health Programme (RHP). Five of the nine elementary schools in the country were randomly selected to be EDAP schools while the remaining four were RHP schools.

Findings

The study revealed that the enriched dental health education programme encouraged students to place a higher value on their oral health and/or lose their fear of dental
treatment. In addition to its direct impact upon the children, the effect that it had on the attitude and behaviour of teachers in the enriched schools probably encouraged an even higher level of compliance among their students. The knowledge gained from teaching oral health skills and integrating dental health concepts into regular classes might have influenced teachers to be more supportive of their students and attentive to the details of scheduling than their colleagues in the regular health education schools.

Teachers and parents played a key role in determining whether children made effective use of available dental care. It followed that to have an effect on children's utilisation, a programme of dental health education, should have its impact on adults who were instrumental in gaining children's compliance with either a school-based or a community based delivery mode. In the RDHP, an enriched dental programme had an impact only when treatment children were treated in a school-based programme at no cost to parents for the dental services delivered.

Children who were assigned for treatment to a school-based delivery mode were more likely to utilize dental
services in a pattern which could lead to improved oral health if they attended a school that offered a special programme of dental health education.

Saminathan et al, (1984) studied the feasibility of utilising school children to disseminate health messages in the community. Based on the pilot study he fashioned a core syllabus, teachers manuals and visual aids on health for student of classes VI, VII and VIII. To equip teachers with the necessary knowledge and skills, orientation courses were organised for 120 teachers. The programme was implemented in 11 schools during 1982-83. The first aid kits were also supplied to the schools.

The results showed that the programme was found effective in imparting a basic understanding in school children of health and practices conducive to health by inculcating healthy habits in children and developing attitudes of mind in children conducive to their ready acceptance of information on health. All the teachers interviewed accepted the value of health education, especially at the primary school level and were satisfied with the detailed subject matter and teaching methods suggested in the manuals.
Lady Irwin College (1988) conducted an evaluation study on the child-to-child programme initiated in primary schools in the Municipal Corporation of Delhi (MCD). The programme involved primary school children and teachers in class IV and V and was designed to introduce the child-to-child approach in the general teaching/learning of the school. To facilitate incorporation of child-to-child programme in the schools, the topics were selected from current health, hygiene and nutrition syllabi for classes IV and V. The topics included were: diarrhoea, the care of teeth, a balanced diet, skin diseases, the care of eyes, good food habits, cuts and wounds, the prevention of disease, anaemia, burns, environmental cleanliness, prevention of disease, anaemia, burns, environmental cleanliness, personal hygiene, the nutrients in fruits and vegetables and the care of the sick.

Implementation strategy

During the two training workshops conducted for the teachers of classes IV and V in the selected experimental schools, 14 activity sheets on various health, hygiene and nutrition topics were used. Within the school, children in
classes IV and V 'adopted' students from classes I and II. The older students supervised the personal hygiene of the younger students and maintained records. They also guided their 'adopted' children in the development of good personal and food habits.

The Municipal corporation schools (MCD) were divided into two groups: those overseen directly by MCD staff and a sub-set that was supported by NCERT.

Results

Many of the trained teachers (67 per cent) on child-to-child approach were transferred during the programme. The great majority (88 per cent) of the teachers reported using the activity sheets provided by the MCD schools as guidelines and found them adequate. A number of trained teachers were transferred from experimental schools and many new teachers were recruited. Of the 43 teachers interviewed in phase II, 14 new teachers were untrained in child-to-child approach. On an average the MCD teachers conducted 3.7 activities, whereas in NCERT-monitored schools, it was 6.3, nearly double in relation to each activity. Most of the teachers (81 per cent) were of the opinion that conducting activities was not enough for effective learning;
appropriate encouragement of the children was also very important. Of the teachers who conducted activities in their classes, only 59 per cent reported repeating them after some time. The adoption of younger students in the school by class IV and V students was only 63 per cent as reported by the teachers.

Seventy-nine per cent of the teachers reported integrating the child-to-child information with a subject such as science. Other teachers chose to adjust the daily routine to accommodate child-to-child topics, when time was available or when children become bored with the teaching of regular subjects. A small percentage (14) of the teachers allotted a separate period (from a half to an hour a week) for covering the child-to-child topics.

"Adoption" was a child-to-child activity for 72 per cent of the children in phase I and 60 per cent in phase II. The Majority of the children (92 per cent in phase I and 83 per cent in phase II) did the checking personal hygiene daily; most of the them kept a record of their activities. The older children taught good food habits to the younger children when they ate their lunch with their adopted children. Eighty one per cent of the students reported that
they were carrying out activities at home similar to those conducted at schools. The results indicated that, over the three rounds of knowledge tests, all children evidenced increased learning. A significant improvement in the knowledge of students in experimental schools also was observed.

Maharaja Sayajirao University (1989) conducted an evaluation study on the child-to-child project implemented in rural primary schools in Gujarat and Rajastan.

The teachers in classes IV, V and VI were trained to develop nutrition, health education and child development activities. The child-to-child activities were chosen on the basis of base-line data and after scrutinizing the class IV, V and VI text books. Major health problems described by the teachers as prevalent in their areas were also considered. The topics like infant feeding, a balanced diet, protein/energy malnutrition, anaemia, vitamin 'A' deficiency, worms, malaria, diarrhoea, immunization and clean water were included in the child-to-child programme.

Results

The teacher's knowledge on selected nutrition and health areas was assessed through individual interviews. The
scores of the experimental teachers on the post project test were significantly higher than those of pre project period.

A comparison of the pre and post project scores indicated that the experimental group student scored significantly in six of the eight topics while experimental students scored significantly higher than those in the control groups in all the topics (53 per cent in experimental and 16 per cent in control students). Observations revealed that children in some of the project schools had developed skills that were not there initially, nor were they seen in many of the students who came from the non-project schools.

The students in the project schools also acted as communicators of health messages to their mothers. Thirty per cent of those interviewed mentioned their children were the source of information on anaemia, vitamin 'A' deficiency and diarrhoea. Mothers were not resistant to messages brought by their children.

The Centre for Research and Development (1989) evaluated another child-to-child programme in selected schools of Bombay. The programme focussed on children in class V. The main objective was to develop the communication
skills of the children and the correct attitudes about, and
awareness of, their own health.

**Strategies**

One division of standard V (45) in boys' school, another division of standard V (45) in girls' schools were
selected and oriented about the health messages by their
respective teachers. The science and maths period were used
for teaching the health topics, with 35 minutes each in a
week. These students, in turn, were to teach the children in
other standard V sections, passing the messages to peers
rather than to younger children.

**Results**

Development of communication skills among boys and
girls was not very encouraging. Most of them felt that the
formal communication was not successful. The reason was that
the peers felt inferior and did not co-operate. Communication
in the families was also difficult. At both mid and post
project testing, children showed definite improvement in
knowledge. Children were tested on all topics taught over
the one and half-year period. None of them scored less than
50 per cent. Children had practiced using the oral
rehydration solution at home when family members had diarrhoea. Most parents also felt that the children had become independent in terms of their own hygiene. Many girls tried recipes at home which had been taught in school.

Changes in attitude were inferred from interviews of parents and teachers. Some teachers and parents observed that their children seemed more health conscious and independent and that they had acquired a sense of responsibility towards other health needs. Most of the children became active participants in the class, and more alert and confident and could talk without hesitation to others.

**Murthy et al.** (1992) made an innovative study using school children as health educators for transmitting messages on eye health care in the school environment.

**Methodology**

Eight students who consistently performed well in the middle school were identified and were given intensive eye health education by a team consisting of specialists. The ocular problems focussed upon were those relevant to school and pre-school periods, like vitamin 'A' deficiency, trachoma, ocular injuries and refractive errors. The teachers
were sensitized and literature was also distributed. Each student was given a specific topic on which to talk to the rest of the school children. To evaluate the effectiveness of this method, 50 randomly selected children from classes V to VI were administered a pre and post-educational session questionnaire.

**Findings**

The proportions of students being aware of the different vitamins, the vitamin required for eyes and different sources of vitamin 'A' increased substantially after educational sessions. The knowledge of the students increased in all aspects of vitamin 'A'. The vitamins required for eyes were correctly mentioned by 22 per cent in pre, and 94 per cent in post-evaluation. The correct answer for sources of vitamin 'A' was mentioned by 72.7 per cent in pre and 93.8 per cent in post evaluation.

Regarding knowledge of trachoma, 84 per cent children before the session contrasted with 70 per cent after the session. The common symptom of trachoma was known to 6 children at base line and to 11 children after the session. More than one correct symptom were identified by 3 children at base line and 9 at the follow-up. Only 2 at base line and
9 at the follow-up could identify the correct mode of transmission of trachoma.

A comprehensive scoring system based on 10 aspects was developed and all children were scored at baseline and at the post session evaluation. The mean scores increased by 1.8 times and an overwhelming majority (37-74 per cent) had a better score on post evaluation. On Wilcoxon rank test, it was observed that the eye health educational session significantly ($P < 0.001$) increased the awareness of the students.

2:7:2 Synthesis of studies relating to students' intervention

Marvia Bentley et al, (1975) reported the effect of a school based dental health education programme on children's utilisation of dental services. It revealed that the enriched dental health education programme encouraged students to place a higher value on their oral health and/or lose their fear of dental treatment. Saminathan et al, (1984) in their study found that the school children disseminated health messages in the community. The results showed that the programme was found effective in imparting a basic understanding in school children of health and practices
conducive to health. The evaluation of child-to-child studies conducted by Lady Irwin college (1988), M.S. University of Baroda (1989) and the Centre for Research and Development (1989) in New-Delhi, Gujarat, Rajasthan and Bombay separately stated that the children in the child-to-child project learned more about health and nutrition than their peers who were not involved in the child-to-child programme. Health, hygiene and nutrition practices in schools could lead to a considerable improvement in food related practices at home. Murthy et al, (1992) reported that the school students could act as a health educator for transmitting message on eye health care in the school environment.

2:8 Synthesis of related literature

Rajammal et al, (1975), (1976) and Shukla Bhattarcharya (1987) reported that there was a pertinent need for integrating nutrition education, health education and environmental sanitation curriculum at primary school level. Stuart W.Fors et al, (1989) found that the school based hypertension education for 6 grade students was effective in the improvement in the knowledge and practices of students regarding hypertension.
Beaulah Raju (1970) reported that the teachers were unaware of the desirable health practices of students in schools and found the deplorable health status of students. Sapru and Pandey (1987) stated that the India's intensive pilot project on school health services failed due to inadequate training for teachers, negligible distribution of health education material and absence of monitoring health education activities.

Parvathi Easwaran et al, (1984), (1991), Gupta (1989) and Thein Hailing et al, (1995) reported that the primary school children were with mild and moderate malnutritional problems. The most common morbidity problems among school children were vitamin 'A', 'B' deficiencies, dental problems, scabies, anaemia, worms and the like.

Patel and Jeya (1981) and Dhanasekaran (1990) found that the teachers' level of knowledge on the components of health was low. Mohapatra et al, (1985) stated that the teacher's role was not recognized properly by teachers and teacher trainees in school health services. Mc Guffin (1986) reported that there was no association between knowledge and behaviour of students regarding nutrition. De
Sole and Martel (1988) and Freyer (1991) found that the student knowledge level had improved after the intervention of health education programmes.

Govindachary (1962), Griffith and Whicker (1975), Joseph (1980), Ramachandran et al, (1981), Sornmani (1988), Limburg et al, (1995) and Nio (1995) in their study reports found that the teachers were actively involved and they helped the health personnel to support the on-going school health programmes.

Maria Bentley et al, (1975), Saminathan (1984) and Murthy et al, (1992) in their studies found that the school children were useful in health education programme. Further the evaluation studies on child-to-child conducted by Lady Irwin College (1988), M.S. University of Baroda (1989) and the Centre for Research and Development (1989) in New Delhi, Gujarat, Rajasthan, Bombay separately reported that health, hygiene and nutrition practices learned in schools could lead to a significant improvement in the behaviour of school children and also the students transmitted the health messages to their parents.
2.9 Conclusion


The health topics included in the curriculum by Stuart W.Fors et al, (1987) and Shukla Bhattacharya (1987) were not found suitable to the rural primary school children under study.

Beaulah Raju (1970) and Saparu and Pandey (1987) studied the existing status of school health programmes only, but did not try any interventional strategies.


From the synthesis of review of related literature, the investigator identified the research gap, in the existing school health programme and hence he chose to work on the problem,

"Effectiveness of Teacher intervention strategy in developing school health programme".