THE EFFECT OF INNOVATIVE TEACHING TECHNIQUES ON THE KNOWLEDGE ABOUT HEALTH AMONG CHILDREN IN RURAL INDIA

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The present study investigated the effects of innovative teaching techniques on the knowledge about health among children in rural India. Two hundred children randomly selected from Children's Working Groups participated. The children were given a pre- and posttest on their knowledge of health. For the treatment, the teachers of the children attended a workshop to learn various innovative teaching techniques. The data indicated a significant improvement in the children's knowledge, and showed some gender differences in health knowledge.

The economic stress faced by many developing countries makes it difficult for them to combat issues such as malnutrition, high infection rates, high infant mortality, and poor levels of infant development (Hawes, 1988). Increasing population and the lack of financial resources make it improbable for the currently available government services to address these needs for many of the children living in the developing countries. It is, therefore, important to develop alternate methods which could help educate these needy populations about health living skills that combat such issues.

Children in the community are a viable source for transmitting messages of health in rural communities. Children have the capacity to learn and disseminate quickly what they have learned to their parents, siblings, peers, and other community members. There is an abundance of literature (e.g., Haynes & Gebreyesus, 1992; Mc Callum & Bracken, 1993; Morales, 1994; Singh, 1991) which has indicated that cooperative learning (wherein children teach each other, their peers, siblings, etc.) has been used successfully in the past with children. Cooperative learning has been used to introduce new educational concepts, to reduce ethnic prejudice, and also to introduce several health related messages to the community. The first step in testing cooperative learning as an alternative method to combat health related issues in developing countries is to give children the knowledge

and skills necessary to communicate to the other members of the society about the various aspects of healthful living. The purpose of this paper is to discuss the effects of one such method (Child-to-child) upon the knowledge of health among children in rural India.

The use of primary school children as educators of knowledge about health, nutrition, environmental hygiene, first-aid, and safety to their peers, siblings, parents, and other adults in the society, is the method analyzed herein. This is called the Child-to-child approach and is an innovative approach (Aarons, Hawes, & Gaynor, 1979). The main aim of this approach is to identify ways in which children can help themselves, each other, younger children, and their own families through individual and joint action with other members of the society (Aarons et al., 1979). This program was launched in 1978, and since then the technique has spread to 60 or more countries such as India, Nigeria, Indonesia, Kenya, and Jamaica (Knight, Grantham-Mc Gregor, Ismail, & Ashley, 1991). Children who are in formal (i.e., those who attend the regular schools) and nonformal (i.e., those who dropped out of the regular schools but attend special evening classes, etc.) streams of education are the participants in this program. In this approach, children are the primary messengers of information on nutrition, safety, personal hygiene, and environmental hygiene. Typically the children are in the age range of 9 to 16 years old. They work in groups in specific localities with an adult teacher, who teaches them the various concepts of health (Somerset, 1988). These children then return this teaching to their communities. The target populations that the children, as teachers, try to reach are their peers, siblings, parents, and other people in their community (Aarons et al., 1979).

The Child-to-child approach is based on the following three assumptions. First, the primary education becomes more effective if it is closely linked to things that matter to the children, their families, and the community. For instance, teaching practical methods that encourage being healthy, keeping one's environment hygienic, and helping to keep their younger siblings clean and healthy. Second, education, both in and out of the schools, should be closely linked to each other in order to make learning a part of life. Third, children have the will, the skill, and the motivation to help educate each other and can be trusted to do so (Muralidharan, Tolani, & Jain, 1991).

The Child-to-child groups are known by various names throughout the world. The Child-to-child groups studied herein are located in Tamilnadu, a state in southern India. They are a type of nonformal educational system in India and are labeled the Children's Working Groups (CWGs). The CWG is an integral part of the Tamilnadu Integrated Nutrition Project (TINP). The TINP is an applied health education program, and is a part of the Directorate of Social Welfare, Government of Tamilnadu (Tamilnadu Integrated Nutrition Project, 1991). The TINP has evolved to link the community at one end with the health and nutrition services team of the Government of Tamilnadu at the other end.

The CWGs consisted of children in the age range from 9 to 13 years old. These children served as messengers of health education to the local population. The main messages of the CWGs include: (a) encouraging the school dropouts to rejoin the school system; (b) reminding mothers about the weight checking procedures, immunization schedule, and anti-worm treatments for their children; and (c) communicating to the villagers messages concerning environmental and personal hygiene and the need for good nutrition (Tamilnadu Integrated Nutrition Project, 1990).

The children of the CWGs work with an adult teacher. This teacher is called the Anganwadi worker. The teacher's job is to look after a noon-meal center, to provide adequate nutritional services to the mothers and infants in their community, and to teach the children in the CWGs. Through teaching the children in the CWGs, the Anganwadi worker is a vital link between the benefits offered by the TINP and the members of the community (Tamilnadu Integrated Nutrition Project, 1990). The Anganwadi teacher instructs the children of the CWGs, and these children in turn teach their peers, parents, and other members of the community.

In the present study, we assessed the first step in the cooperative learning process. From the data, we tested the effect of the intervention program on the knowledge about health education of the children in the CWGs from various rural areas in Tamilnadu. The specific objectives were: (a) to determine which dimensions of knowledge about health and cleanliness among the children of the CWGs had increased after the children had been taught by the Anganwadi teachers using the innovative teaching methods, and (b) to test for gender differences in knowledge of the children from the CWGs after intervention. It was predicted that gender differences in knowledge learning would parallel traditional gender role expectation. Research has indicated that the gender roles for children in the Indian culture reflect the stereo-

typical roles of females and males in the Indian society (e.g., Bhogle & Seethalakshmi, 1992; Ittyerah & Mahindra, 1990). Girls are expected to be the nurturant caregivers of the families and boys are expected to perform the more outgoing types of activities and take care of the family (e.g., Ittyerah & Mahindra, 1990). We also subjectively explored the overall improvement in the awareness about health among the children and members of the community taught by the CWGs.

Method

Sample

Ten centers of Children's Working Groups, out of approximately 200 centers in the rural areas around Madras city, India, were randomly selected to participate in the study. All 10 centers were structured similarly in terms of functioning. Twenty children from each of the Children Working Groups centers were randomly selected to participate in the study (N = 200 children; 96 boys, 104 girls). The children of the CWGs who participated in the present study ranged in age from 9 to 11 years old (M = 10 years old). All children of the CWGs attended the local primary school and were in the fifth or sixth grades. The curriculum in the schools did not focus on health education issues, but instead, while in school, the children of the CWGs studied history, math, geography, and science. All the children of the CWGs lived with their families of origin. The families had an income of less than Rs 6000.00 per year (Rupees; approximately less than U.S. $200.00 per year) and belonged to the lower socioeconomic status.

Materials

A questionnaire developed by the first author was used to collect information about the knowledge of health from the children of the CWGs for both the pre- and the posttest. The questionnaire was developed in the local language, Tamil, to enable the participants to understand and respond to the questions easily. The questionnaire contained 39 questions about various dimensions relating to health. Each dimension had a varying number of questions. Environmental hygiene had five questions, personal hygiene had six questions, immunization had four questions, nutrition had six questions, caring for the sick child had five questions, caring for the child with diarrhea had five questions, playing with children had two questions, and accidents and first aid had six questions. All the questions were of the multiple

choice format, wherein only one of the four choices was correct. If the respondent marked the correct answer, he/she received one point, and, if the respondent marked an inappropriate response, he/she received no points for that question. Each dimension was scored separately and summed into a total score. There was a range for the total score from 0 to 39. Also, the researchers used anecdotal observations to monitor the effectiveness of the Child-to-child approach.

Procedure

The study was divided into the three phases: (a) pretesting, (b) intervention program, and (c) posttesting. For the pretesting, all participants were tested by trained research assistants in the children's own centers, prior to the beginning of the intervention program. The children were tested individually in a separate room and filled out the questionnaires themselves. For the intervention program, a 3-day workshop was held in Madras, which is the capital of the state of Tamilnadu. At this workshop, the Anganwadi workers were educated about the various innovative methods they could use to teach the health material to their children in the CWGs. Leading professionals in the area of techniques conducted various workshops, which included a variety of teaching strategies (i.e., puppet show, the use of audio-visual aids in the classroom, use of games to introduce concepts of nutrition and personal hygiene, and the use of music to teach health concepts). All Anganwadi workers attended all sessions of the 3-day workshop. The Anganwadi workers were given a period of 3 months to apply the skills they had learned during the intervention program. We visited the 10 centers periodically to monitor the implementation of the innovative teaching techniques by the Anganwadi workers. For the posttesting, we returned to the 10 centers two months after the intervention program and retested the children of the CWGs. We used the same questionnaire and procedure that were used during the pretesting of the children.

Results

Paired *t* tests with a one-tailed significance probability at alpha .01 were used to compare pre- and posttest scores by dimensions. The tests indicated significant improvement for all dimensions (see Table 1). On the pretest, mean scores on the various dimensions of health education ranged from 0.69 to 2.32. The posttest mean scores on the dimensions ranged from 1.97 to 5.9. These scores indicated that the children of the CWGs had

increased their knowledge about health after being taught with the innovative teaching techniques.

TABLE 1

Effect of the Intervention Program on the Gain Scores of the Children in the Various Dimensions of Health Education

Dimensions[a]	Pretest		Posttest		t
	M	*SD*	*M*	*SD*	
Environmental Hygiene (5)	2.32	0.6	4.75	0.5	44.1*
Immunization (4)	2.10	0.5	3.76	0.6	30.1*
Caring for the Child with Diarrhea (5)	2.26	1.2	4.9	0.7	26.8*
Caring for the Sick Child (5)	2.32	1.6	4.85	0.8	19.8*
Playing with the Children (2)	0.69	1.4	1.97	0.21	11.8*
Nutrition (6)	2.01	1.6	4.95	2.8	12.9*
Personal Hygiene (6)	2.24	1.6	5.9	0.8	28.9*
Accidents & First Aid (6)	2.35	1.8	5.72	1.3	21.5*

*Significant at $\alpha < .01$.
[a]Number in parentheses indicates total possible score for each dimension.

The gender differences in the level of knowledge about health were tested with t tests using a two-tailed probability level at or below .01. Significant gender differences were found in four of the eight dimensions (caring for the sick child, $t = 4.32$, M boys = 2.13, M girls = 2.93; caring for the child with diarrhea, $t = 6.1$, M boys = 2.14, M girls = 3.14; personal hygiene, $t = 3.89$, M boys = 3.26, M girls = 4.06, and accidents and first aid, $t = 3.91$, M boys = 3.87, M girls = 2.87). These data indicated that the girls of the CWGs had more knowledge on all significant dimensions except on the dimension of accidents and first aid. No gender differences were found in the dimensions of environmental hygiene, immunization, playing with children, and nutrition.

Observational data was gathered to gain an initial look at the effectiveness of the Child-to-child approach for disseminating the knowledge to the community. We visited the 10 centers periodically to observe the Anganwadi workers use the innovative teaching techniques they learned at the workshop to disseminate messages about health to the children. During these observations, we talked to 60 of the children participating in the CWG program and asked them about their attitudes towards the program and their role. All of the children were very enthusiastic about these new techniques. They felt that these innovative techniques would help them carry the health messages to the community in a forceful way rather than just using verbal messages about health. Children of the CWGs particularly liked the technique of changing the lyrics of hit songs to messages of health. The children felt that people stopped to listen to what they were actually saying! Also 57 of the 60 children we talked to, were very pleased with the response they received from several community members in their effort to make the environment a hygienic place in which to live. These children identified areas in the villages where insects bred, accidents happened to young children, homes where people were sick, and water sources that were polluted. After making a map of such spots in the village, the children met with the Anganwadi worker to identify ways to clean the area. The children then used these maps and visual aids to talk to several adults in the community and to invoke their help in cleaning the village. The children felt that having visual aids like the maps and showing pictures of sick people had a great impact in getting the adults in the community involved.

The Anganwadi workers also showed us the charts that the CWGs had made to keep track of the dietary intake and health of younger children. The data on the charts indicated that the children were eating balanced meals and their nutritional status was improving.

Due to time constraint, we could only talk to 24 parents of the children participating in the CWG to get their feedback about the functions of the CWGs. These parents were very proud of the job their children were doing. One of the mothers said, "We lived in a state of ignorance about health living for many generations; now thanks to the efforts of my son, I am learning a lot about leading a healthy life and caring for my family." Another father said, "I thought that I needed to send my daughter to school, so she could get a free meal everyday at school, however, her involvement with the CWG has changed my perspective about what I had planned for her future. I am so impressed with the knowledge she has about taking care of sick people, healthy

habits, etc., I feel that she is doing a great service to the community and I have to help her pursue higher education to better serve the community."

The researchers also spoke to seven village Panchayat heads (who are equivalent to mayors) of rural areas and all of them were very pleased with the work of the CWGs. One of them said, "Some of the ideas of these children were so good, in terms of improving the health of our community and they are so simple to implement, I wonder why nobody had thought of it before. I hope this program continues." Another Panchayat head said, "I did not want to pay any attention to what these children were saying, because they were just kids, but when they kept coming back over and over again, I paid attention to what they were saying and it made sense and I am glad that I chose to work with the CWGs, for they are doing a great job of improving the health and environment of our entire community." These observational notes reported by the Anganwadi workers and us indicated an improvement in the overall awareness about health among the children and community members taught by the CWGs. The feedback from the community members indicated that they were interested in health related issues taught by the Child-to-child groups and seemed to be interested in learning more about health and related issues.

Discussion

The data indicate that the Child-to-child procedure is an effective method for teaching children about health, which is an important step in changing the lives of many in developing countries. The posttest scores show that the children of the CWGs had increased knowledge about the various aspects of health education after the intervention program. The increase in the posttest scores of the children of the CWGs underscores the argument that children are receptive to new teaching techniques and are eager to learn more about topics that are of everyday importance to them, as well as those that would help their family and community. The data indicate that the CWG children can successfully complete the first step necessary for using cooperative learning as an effective technique for combating health related issues in developing countries.

The data from the present study show significant gender differences in the children's knowledge in the dimensions of personal hygiene, caring for the child with diarrhea, caring for the sick child, and accidents and first aid. These gender differences

support the argument that the girls and boys in the traditional Indian society respond to gender appropriate roles (e.g., Bhogle & Seethalakshmi, 1992). John Dewey (1930), one of the proponents of the symbolic interaction theory, argues that how each person develops is a result of the environment and the culture into which he/she is born. A similar view is also shared by the social learning theorists (e.g., Bandura, 1986), who state that children develop attitudes and behaviors due to the influence of the environment in which they live. In accord with this theoretical construct, these gender differences could be attributed to the child-rearing practices in the traditional Indian society.

The role of the girls in the traditional Indian society remains that of future homemakers. This concept about the girls' future roles is instilled in them very early in life. As a result of these role expectations, girls tend to be more involved in the activities related to health, homemaking, and aspects of child care. These behaviors motivate the girls to learn the knowledge, and practice the various activities related to health education with greater involvement, as compared to the boys. Recall that the girls score higher than the boys on caring for the sick child, caring for the child with diarrhea, and personal hygiene.

The boys, on the other hand, are taught to be the bread-winners and supporters of the family. This gender-typed expectation motivates the boys to learn more than the girls in the areas related to tending to the activities and the physical well being of the younger ones. As such, the boys in the present study score higher than the girls on the dimension of accidents and first aid. Thus, it may be inferred from the data that gender differences in the children's acquiring knowledge of health are, at least, partially due to the socialization process of the traditional Indian society.

These data and the theoretical perspective indicate that, in order to implement the Child-to-child programs successfully in various societies, one needs to be aware of the cultural and sub-cultural norms, roles, and expectations for the children. By doing so, the Child-to-child program can be adapted to facilitate the children's learning accordingly and suit the particular society or subculture.

The use of the Child-to-child approach is faced with certain other challenges that include (a) limited financial and material resources, and (b) a lack of external incentives for the adult teachers to participate in the Child-to-child activities (Somerset, 1988). Also, there is limited data on the effectiveness of the CWG children's subsequent teaching of the knowledge and practice to the community. The observational reports by the Anaganwadi teachers and us offer subjective data in support of the successful

completion of this step. However, the present study did not test the reliability nor the validity of the measures used to address this increase in knowledge among the children and the community taught by the CWG children. In spite of these concerns, the present results offer support for continuing to use and study the use of the Child-to-child groups as a technique to improve children's and the community's knowledge about health education. Data from a study by Knight et al. (1991), which used the Child-to-child approach, further support the conclusion that the technique is effective at improving children's and parents' knowledge of health. These indicate that the Child-to-child approach is appropriate to incorporate and use in the curriculum of schools, especially in communities with a large number of families who are in the lower socioeconomic status and in underdeveloped rural communities.

In summary, we found that the Child-to-child approach is an effective approach for impacting children's knowledge concerning healthy living. Other studies indicate that benefits of this approach include (a) increased knowledge of the importance of good health among the children's parents and community, and (b) increased confidence and a feeling of self-worth among the children, as they are allowed to play a major role in this program (UNICEF, 1988). According to the technical report of the UNICEF (1988), the Child-to-child programs allow children to learn of their importance in the community as agents of change. The Child-to-child program could be adapted to explore the effectiveness of the Child-to-child groups in carrying other important messages to their peers (e.g., saying no to drugs, staying in school), as well as messages to other audiences, such as the rural American audience and other groups in more industrialized countries.

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