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An approach to hygiene education among rural Indian school going children

Authors
Dongre AR,
Deshmukh PR,
Boratne AV,
Thaware P,
Garg BS,
Dr Sushila Nayar School of Public Health, Mahatma Gandhi Institute of Medical Sciences, Sewagram – 442102, India

Address For Correspondence
Deshmukh PR
Professor,
Dr Sushila Nayar School of Public Health,
Mahatma Gandhi Institute of Medical Sciences,
Sewagram - 442102, INDIA
E-mail: prdeshmukh@gmail.com

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Abstract:

Objectives: To find out the prevalence of intestinal parasites and its epidemiological correlates among rural Indian school going (6-14 years) children and to study the effect of focused, need based child to child hygiene education on personal hygiene of school children. **Materials and Methods:** In September 2007, the present participatory action research was undertaken at a feasibly selected village Dhotra (Kasar) in Wardha district of central India. A triangulated research design of quantitative (survey) and qualitative (transect walk & pile sorting) methods was used for the needs assessment before initiating formal hygiene education. Out of enlisted 172 children, data of 118 children with complete information was used for final analysis. The quantitative and qualitative data was entered and analyzed using the Epi Info 6.04 software and Anthropac 4.98.1/X software package respectively. School based participatory life skills based child to child hygiene education was undertaken for message dissemination and behavior change. The effect of this hygiene education on identified key behaviors was assessed after one month **Results:** Out of the 118 (50 male and 68 female) subjects examined 21 (17.8%, 95%CI, 11.4 – 25.9%) had intestinal parasite infection. The prevalence of intestinal parasitic infection was significantly high among children having dirty untrimmed nails (47.4%, 95%CI, 30.9 – 64.1%) followed by those having poor hand washing practices (37.2%, 95%CI, 22.9 – 53.2%). One month after hygiene education, the proportion of children having practice of hand washing with soap after defecation significantly improved from 63.6 % to 78%. The proportion of clean and cut nails also improved from 67.8% to 80 % ($p<0.05$). **Conclusions:** The need based, focused, life skills based child to child hygiene education was effective for behavior change. An integrated approach of drug treatment and focused participatory hygiene education is required to control parasite load among rural Indian school going children.

Key Words: Intestinal parasites, School children, Participatory, Hygiene education, Personal hygiene

Introduction:

The intestinal parasites are among the most common infections of school age children in developing countries. As a result of this morbidity, they are at risk of detrimental effects like poor cognitive performance and physical growth.[1] Although studies have been conducted on prevalence of intestinal parasites among school children in India,[2,3] there are still several localities for which epidemiological information is not available. De-worming school children by anti-helminthic drug treatment is a short term curative approach. However, effective hygiene education along with de-worming needs to be ensured to prevent re-infection. In year 2004, the government of India has started a Total Sanitation Campaign (TSC) to ensure School Sanitation and Hygiene Education (SSHE) which emphasizes skill based child to child hygiene education for behavior change among school going children.[4] In rural settings of developing countries, it is crucial to ensure drug treatment and focused need based hygiene education by skilled health care providers. Hence, the present participatory action research was undertaken to find out the prevalence of intestinal parasites and its epidemiological correlates among rural Indian school going (6-14 years) children and to study the effect of need based child to child hygiene education on personal hygiene of school children.

Materials and Methods:

The present study was undertaken during September 2007 at a feasibly selected village Dhotra (Kasar) in Wardha district of central India. The study subjects were school going children (6-14 years). The total population of the village was 1,119 with 18 percent population in 6-14 years of age group. The average annual rainfall in the district is 1090.3 mm, out of which 87 percent is received during June to September. The climate is hot in summers and dry throughout the year except during the south-west monsoon when humidity reaches 60 percent.[5] The study was undertaken in two phases. The first comprised the needs assessment for hygiene education by quantitative (survey) and qualitative (transect walk[6] & pile sorting[7]) methods. The second involved disseminating health messages and assessing the effect on key hygiene behaviors of school children.

Phase I: Needs assessment for hygiene education

A triangulated research design of quantitative (survey) and qualitative (transect walk & pile sorting) methods was used for the needs assessment be-

fore initiating formal hygiene education program. A detailed house listing exercise and identification of households with children (6-14 years) was carried out in the village. A trained medical personnel paid house to house visits and after obtaining informed consent, interviewed parents and examined target children by using pre-designed and pre-tested questionnaire. Thereafter, wide mouthed sterile glass bulbs with tight fitting lid were given to the children for collection of their next day morning stool samples of about 10 grams (thumb size) with the aid of their parents. Out of enlisted 172 children, parents of 143 (83%) children could ensure stool sample for examination. A team of microbiologists analyzed these properly collected and labeled fresh morning stool samples within two hours of collection by doing Iodine staining of wet mount examination in the village itself. 118 records of children with complete information were used in final analysis. The data was entered and analyzed using the Epi Info 6.04 software package.

Later, in order to get quick cross sectional overview, a team of trained social worker, medical doctor and a school teacher carried out a morning transect walk in the village. Based on a predetermined checklist, observations and discussions were undertaken on the practices related to sanitary toilets, open defecation, use of *chapples* (footwear), hand washing with soap, washing vegetables, drinking water supply, storage of drinking water and waste disposal in the village. About 17 pictorial cards on above observations were prepared. In order to understand children's perceptions on these identified sanitation and hygiene practices, a pile sorting exercise was undertaken with seven purposively selected children (10-14 years) who were willing to participate in discussion and able to talk freely. The participants were asked to put these 17 cards in groups which they felt went together and explain the reasons for grouping. A note taker carefully recorded the discussion. A two dimensional scaling and hierarchical cluster analysis was completed with pile sort data to get collective picture of perceived rationale behind practiced behaviors. The analysis of pile sort data was undertaken using Anthropac 4.98.1/X software.[8]

The objectives of study were explained to the school principal and teachers and consent was also obtained from village *Gram-panchayat* (local self government). The World Health Organization (WHO) recommended chemotherapy was ensured for all stool positive children.[9] However, protozoan infections were not treated since our diagnosis was only based on detection of cysts.

Phase II: Dissemination of health messages and assessing the effect on personal hygiene of school children

A triangulation of quantitative data and qualitative information identified key hygiene behaviors to be targeted like hand washing with soap and nail trimming practices to break out routes of worm transmission among children. A team of a social worker, medical doctor, school teacher and four students developed simple and clear messages in local language *Marathi* on hand washing and nail trimming practices with short term benefits of action. As the entire village children (6-14 years) were school going, school based life skills based child to child hygiene education was undertaken for message dissemination and behavior change. Four willing students (10 -14 years) who were participant in audience research were trained in message dissemination and demonstration skills of hand washing with soap & water and nail trimming. Under supervision of school teachers and social worker, these trained students disseminated messages and demonstrated hand washing and nail cutting in each class of target children. The effect of this hygiene education on identified key behaviors was assessed after one month by interviewing and observing the same students using same pre-designed and pre-tested questionnaire.

Results

Out of the 118 (50 male and 68 female) subjects examined 21 (17.8%, 95%CI, 11.4 – 25.9%) had intestinal parasite infection. Children aged 6-8 years had the highest prevalence of intestinal parasite infection (20.7%, 95%CI, 7.9 – 39.7%); followed by those in 12 – 14 years (19.5%, 95%CI, 8.8 – 34.8 %); the lowest prevalence was recorded among those aged 9-11 years (14.6%, 95%CI, 6.1 – 27.7%). The prevalence of intestinal parasitic infection was significantly high among children having dirty untrimmed nails (OR=23.1; 95%CI: 5.6-110.4) followed by those having poor hand washing practices (OR=8.3; 95%CI: 2.5 -29.1). There was no significant disparity between the infected and unin-

fected children with respect to sex, socio-economic status, source of drinking water and use of sanitary latrine and *chappal* (footwear) (Table 1). About 113 (96%) families of school children used filtration with cloth as household water purification method. Six intestinal parasites were identified which were *Giardia lamblia* (7.6%), *Entamoeba histolytica* (4.2%), *Hymenolepis nana* (2.5%), *Ascaris lumbricoides* (1.7%), *Ancyclostoma duodenale* (0.8%), and *Taenia* (0.8%).

Table 1: Distribution of socio-economic and personal hygiene variables of school children (6-14 years)

Variables	Total N = 118	Positive stool	X^2; p-value	Odds ratio (95%CI)
Age groups				
6-8 years	29 (24.6)	6 (20.7)	0.59; 0.745	1
9-11 years	48 (40.7)	7 (14.6)		1.5 (0.4-5.9)
12- 14 years	41 (34.7)	8 (19.5)		1.1 (0.3-4.1)
Sex				
Male	50 (42.4)	9 (18.0)	0.04; 0.846	1
Female	68 (57.6)	12 (17.6)		1.1 (0.4-2.9)
Socio-economic status				
Below poverty	41 (34.7)	9 (22.0)	0.37; 0.543	1
Others	77 (65.3)	12 (15.6)		1.5 (0.5-4.4)
Source of drinking water				
Hand pump	6 (5.1)	2 (16.7)	0.310*	1
Public tap	112 (94.9)	20 (17.9)		2.3 (0.3-16.2)
Sanitary latrine				
Yes	30 (25.4)	6 (20.0)	0.00; 0.974	1
No	88 (74.6)	15 (17.0)		0.9 (0.3-2.6)
Hand washing after defecation				
Soap and water	75 (63.6)	5 (6.7)	15.4; 0.000	1
Mud/ash/water	43 (36.4)	16 (37.2)		8.3 (2.5 -29.1)
Clean and cut nails				
Yes	80 (67.8)	3 (3.8)	30.6; 0.000	1
No	38 (32.2)	18 (47.4)		23.1 (5.6-110.4)
Use of *chapples*				
Yes	88 (74.6)	16 (18.2)	0.01; 0.929	1
No	30 (25.4)	5 (16.7)		1.1 (0.3-3.9)
Total	**118 (100)**	**21 (17.8)**	-	-

Figures in parenthesis are percentages. * p-value by two-tailed Fisher-Exact test

As reflected in pile sort exercise, the students formed groups of open defecation and sanitary latrine, compost pit and waste disposal, soap and bath taking, drinking water and hand pump and washing vegetables with water. However, they could not strongly relate hand washing and nail trimming practices with any of the above groups. As observed in transect walk, the village had public taps for distribution of drinking water supply. It was found during discussion that among those who had sanitary latrine in their houses used it during rainy season only. Also use of footwear by children was not a common practice. Parents avoided giving footwear to younger children as they frequently forgot and lost it.

One month after hygiene education, there was significant improvement in the key personal hygiene behavior ($p<0.05$). The proportion of children having practice of hand washing with soap after defecation significantly improved from 75 (63.6 %) to 92 (78%). The proportion of clean and cut nails also improved from 80 (67.8%) to 95 (80 %).

Discussion:

In the present study, the prevalence of intestinal parasites among children (6-14 years) was found to be 17.8%. Studies carried out in various parts of India have reported a prevalence of intestinal parasites from 30 to 50 % among school going children.[4, 5] In Nepal, the prevalence of intestinal parasite infection was found to be 21.3%.[10] Studies from other countries namely Philippines, Cambodia and Turkey have reported higher prevalence of intestinal parasites among school children.[11,12,13] The variations in prevalence of infection in different studies could be attributed to the time of study and geographical differences in the area. Also, direct microscopic examination method used for detection of parasites has lower sensitivity.[10] It was the only feasible method to examine the stool samples in present community based study.

The information obtained in the present study was applied to control intestinal parasites load among school children by drug treatment and hygiene education. The poor hand washing and nail trimming practices were the two responsible factors. The skill based effective child to child hygiene education could bring significant change in behaviors of children, which was crucial to prevent re-infection after selective drug treatment. World Health Organization (WHO) has set a target of covering at least 75% school children with regular drug treatment to control prevalence of intestinal parasites by 2010. In short period of five years, Cambodia achieved this target in year 2004.[14] In rural Bangladesh, a health intervention study found combination of periodic anti-helminthic treatment and hygiene education as a cost effective method to control intestinal parasite infections among children (2-8 years).[15] In rural India, where due to poor hygiene practices, intestinal parasite load is high; an integrated approach of drug treatment and focused hygiene education is required. Once anti-parasite treatment is administered, infected children show a dramatic increase in their short-and long-term memory, as well as their reasoning capacity and reading comprehension. School absenteeism drops by as much as 25%.[14]

The simple and clear messages of hygiene education should be based on local target audience research, few in number, objectively verifiable and should be of proven benefits to the community.[16] In rural India, the involvement of teachers and school children in message dissemination has shown significant effect on improvement in personal hygiene and related morbidities among school children.[17] The limitations of the present study should be kept in mind. It was a small participatory action research in one village. The effect of hygiene education on intestinal parasite load among children could not be studied.

To summarize, the need based, focused; skills based child to child hygiene education was effective for behavior change. An integrated approach of drug treatment and focused participatory hygiene education is required to control parasite load among rural Indian school going children.

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