

Effectiveness of a family-based educational programme on knowledge and attitude regarding *Enterobius vermicularis* among caregivers of pre-school children in selected areas of Delhi NCR

Ms. Pooja¹, Dr. Kulpooja^{2*}, Ms. Harjinder³, Ms. Riya Joon⁴, Ms. Kritika⁵

¹PG Tutor, Child Health Nursing Department, Faculty of Nursing, SGT University, Gurugram, Haryana-122505, INDIA.

²Associate Professor, Child Health Nursing Department, Faculty of Nursing, SGT University, Gurugram, Haryana-122505, INDIA.

³PG Tutor, Child Health Nursing Department, Faculty of Nursing, SGT University, Gurugram, Haryana-122505, INDIA.

⁴PG Tutor, Child Health Nursing Department, Faculty of Nursing, SGT University, Gurugram, Haryana-122505, INDIA.

⁵PG Tutor, Mental Health Nursing Department, Faculty of Nursing, SGT University, Gurugram, Haryana-122505, INDIA.

* Corresponding Author- Dr. Kulpooja

ABSTRACT

Enterobius vermicularis, commonly known as pinworm, is one of the most common intestinal parasitic infections affecting children worldwide, particularly those aged 2–10 years. The infection spreads rapidly through the faecal–oral route, contaminated hands, clothing, bedding, toys, and other household surfaces, making pre-school children highly susceptible due to their close interpersonal contact and inadequate hygiene practices. Recent evidence indicates that approximately **200 million people worldwide** are infected with *Enterobius vermicularis*, with **more than 30% of cases occurring among children aged 5–10 years**. A recent systematic review and meta-analysis reported a **global pooled prevalence of 12.9% among children**, while the **World Health Organization estimates that the prevalence in children ranges from 4% to 28%**, depending on geographical location and socioeconomic conditions. Caregivers play a crucial role in preventing transmission by promoting personal hygiene, recognizing early symptoms, ensuring timely treatment, and preventing reinfection within families. Therefore, improving caregivers' knowledge and attitude through family-based educational programmes is an effective strategy for reducing the burden of *Enterobius vermicularis* infection among pre-school children.

Aim: To evaluate the effectiveness of a family-based educational programme on the knowledge and attitude regarding *Enterobius vermicularis* among caregivers of pre-school children in selected areas of Delhi NCR.

Methods: A quasi-experimental study was conducted among 60 caregivers of pre-school children, who were assigned to an experimental group (n = 30) and a control group (n = 30). The experimental group received a structured family-based educational programme covering the transmission, symptoms, prevention, treatment, and control of *Enterobius vermicularis*. Data were collected using a structured knowledge questionnaire and a 5-point Likert attitude scale. Demographic variables and selected factors, including food habits, number of children, and defecation practices, were also recorded. Pre-test and post-test assessments were compared using descriptive and inferential statistics.

Results: The educational programme produced a statistically significant improvement in both knowledge and attitude among caregivers in the experimental group. The mean knowledge score increased from 8.67 ± 1.58 in the pre-test to 19.03 ± 1.48 in the post-test, while the mean attitude score improved from 27.40 ± 3.04 to 37.77 ± 4.91 ($p < 0.01$). In contrast, only minimal changes were observed in the control group. Significant associations were found between knowledge scores and food habits ($p = 0.022$) as well as the number of children in the family ($p = 0.013$). No significant association was observed between attitude scores and the selected demographic variables. The findings indicate that the family-based educational programme was feasible, acceptable, and effective in improving caregivers' awareness and attitudes toward the prevention and management of *Enterobius vermicularis* infection.

Conclusion: The study concludes that a family-based educational programme is an effective strategy for improving caregivers' knowledge and attitude regarding *Enterobius vermicularis* infection. Incorporating such educational interventions into community and primary healthcare programmes can promote healthy hygiene practices, facilitate early identification and treatment, and reduce the burden of parasitic infections among pre-school children.

Keywords: *Enterobius vermicularis*, family-based educational programme, caregiver knowledge, caregiver attitude, pre-school children, pinworm infection.

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INTRODUCTION

"To ensure the well-being of children, we must invest in their health and education."

— Nelson Mandela's emphasis

Intestinal parasitic diseases, also known as Soil transmitted Helminths infection, is any macro parasitic disease in which a part of the body is infected with parasitic worms, known as helminths. They often live in the gastrointestinal tract of their hosts, but they may also burrow into other organs, where they induce physiological and functional damage. Helminthiasis has been found to result in poor birth outcome, poor cognitive development, poor school and work performance, poor socioeconomic development, and poverty. There are numerous species of these parasites, which are broadly classified into tapeworms, pinworm, and roundworms.¹

STHs are usually referred to as intestine parasitic helminths, and mature larvae can be seen with the naked eye, whereas STH eggs must be examined under a microscope. Adult female helminths can live in the host's intestines, where their eggs are given out in stools, contaminating the soil and water supplies in the affected area. STH eggs mature outside the body for 2 to 3 weeks before infecting the human gut. STH eggs ingested by susceptible hosts (including mammals and humans) through contaminated food and water sources will hatch in the small intestines, releasing STH larvae that can hook on to the intestinal walls and feed on the host.² Young children, particularly those of preschool age, are more susceptible to intestinal parasitic infections (IPIs) compared to other age groups in similar demographics. Their natural curiosity often leads them to explore their environment barefoot and without supervision, increasing the risk of soil-transmitted helminth (STH) infections through direct skin contact with contaminated soil. Additionally, limited awareness of zoonotic and veterinary health contributes to exposure to domestic animals that are not dewormed. These animals often roam freely and defecate in open spaces, further contaminating the environment. Such conditions heighten the risk of IPIs, which over time can lead to complications like anemia, malnutrition, giardiasis, amoebiasis, and cryptosporidiosis. Recent studies suggest that even moderate intensity of infection may have adverse effects on growth, iron deficiency anemia and cognitive function, practically for children of pre-school age.^{3,4}

Like other developing countries, intestinal parasite infections are major health problems in India.

Epidemiological surveys on the intestinal parasite infections are important in this country because they reflect sanitary conditions of the community and produce basic data for the control of parasitosis in the future. The **World Health Organization (WHO)** has designated STH-causing IPIs as one of the neglected tropical diseases (NTDs) since they are widespread and exist solely in many global communities. NTDs are a group of infectious disorders caused by parasite infections that occur largely in areas of poverty and malnutrition. Globally, there are an estimated 895 million persons infected with STH.^{5,6}

Infections are widely distributed in tropical and subtropical areas, with the greatest numbers occurring in sub-Saharan Africa, the Americas, China and East Asia. **In India, prevalence of intestinal parasites ranges from 5.56% to 90 % as reported by different studies.** Intestinal parasites rarely caused death but have serious hazards on health and nutritional status of the patients, along with serious impact over physical, mental & finally socioeconomic development of children. Helminths such as *Ascaris lumbricoides*, hookworm, *Enterobius vermicularis* and protozoa like *Entamoeba histolytica* and *Giardia lamblia* are some of the common intestinal parasites responsible for considerable morbidity in young and adult population.⁷

A study from India revealed a high prevalence of intestinal parasitic infections (29.2). However, all the studies were performed in the general population. There are various studies on interactions between infection and socio-demographic, environmental factors, and behavioural habits from different countries and other parts of the country, to our knowledge, there is lack of adequate information, India. In this study we will be discussing about *E. vermicularis* is one of the most common helminth infections in the world, with up to 200 million infections estimated worldwide.^{8,9}

NEED FOR STUDY

The importance of performing this study is highlighted by the important need to treat the rising frequency of parasitic illnesses, notably *Enterobius vermicularis* (pinworm), among preschool children. Although, sufficient information are available for intestinal parasitic infection, information regarding enterobiasis is still not sufficient. **For these reason, *E. vermicularis* and other intestinal parasites research has become important to decrease the parasitic infection. In addition to it, people's ignorance, illiteracy, poor sanitary conditions, hygiene and food habit of children are directly**

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related to the parasitic infections among the children. So that present study was carried to determine the status of *E. vermicularis* and to assess the knowledge and attitude and practices in relation to *E. vermicularis*.

A systematic review and meta-analysis investigated that the global prevalence of *Enterobius vermicularis* among the children studied was 12.9%. The highest prevalence rate of *E. vermicularis* infection (34.7%) was observed in the primary school group.¹⁰

According to WHO It is estimated that as much as 60% of the world's population is infected with gut parasites, which may play a role in morbidity due to intestinal infections. As per Indian study 3.5 billion people are infected by intestinal parasites and around 450 million children are ill due to these infections and out of those, at least 50% are school-age children.¹¹

Parasitic infestation is more common in 5-14 years of age as they constitute 12% of total disease burden in children. IPIs can affect the child development, educational achievement, reproductive health, and social and economic development.

STH infection is widely prevalent amongst preschool-and school-aged children in India. The high prevalence of STH infections in India may be ascribed to the significant poverty levels in various regions of the country which leads to poor personal and environmental hygiene.

In South India hookworm is more prevalent among children. In India intestinal parasitism is the priority health problem because of unhygienic practices, poor awareness, illiteracy, myths, poverty and variety of allied factors. The quality of one's life is greatly influenced by the home environment which in turn influenced by the women.¹²

In regions like Delhi NCR, where urbanization and dense population contribute to increased transmission risks, caregivers often lack adequate knowledge and appropriate attitudes towards preventing and managing such infections. Family-based educational interventions have proven to be effective in addressing public health issues by involving caregivers directly in the education process, thereby fostering sustainable behavioral changes.

This study aims to evaluate the effectiveness of a family-based educational program in enhancing caregivers' knowledge and attitudes regarding *Enterobius vermicularis*. **Such an intervention is critical to reducing the burden of pinworm infection among preschool children and promoting a healthier environment within families.** The findings of this study can guide public health strategies and community-level interventions to combat parasitic infections in similar settings.

Therefore, the investigator felt that there is a strong need to educate caregivers at minimal cost, within a

short time frame, and with maximum effectiveness regarding *Enterobius vermicularis* and its prevention.

STATEMENT OF THE PROBLEM

“A quasi- experimental study to assess the effectiveness of Family-based educational programme on knowledge and attitude regarding *Enterobius Vermicularis* among caregivers of pre-school children in selected areas of Delhi NCR”

OBJECTIVES OF THE STUDY:

1. To assess the level of knowledge and attitude regarding *Enterobius vermicularis* among caregivers of pre-school children before and after the family-based educational programme.
2. To evaluate the effectiveness of the family-based educational programme on knowledge and attitude regarding *Enterobius vermicularis* among caregivers of pre-school children.
3. To find out the association between post-test knowledge and attitude scores regarding *Enterobius vermicularis* among caregivers of pre-school children with their selected demographic variables.

HYPOTHESIS

H1: There will be a significant difference in knowledge and attitude regarding *Enterobius vermicularis* before and after the family-based educational programme among caregivers of preschool children at the 0.05 level of significance.

H2: There will be a significant association between the post-test knowledge and attitude scores regarding *Enterobius vermicularis* and the selected demographic variables of caregivers of preschool children at the 0.05 level of significance.

MATERIALS AND METHODS

Study Design and Setting

A quantitative research approach with a **quasi-experimental non-equivalent control group pre-test-post-test design** was adopted to evaluate the effectiveness of a family-based educational programme on caregivers' knowledge and attitude regarding *Enterobius vermicularis*. The study was conducted in **Chhawla Village, Delhi NCR**, a rural community selected based on the availability of pre-school children and the feasibility of implementing a community-based intervention.

Study Population and Sample

The target population comprised caregivers of pre-school children residing in selected areas of Delhi NCR. The accessible population included caregivers of children aged **2–6 years** living in Chhawla Village. A total of **60 caregivers** who fulfilled the eligibility criteria and provided informed consent participated in the study. Participants were equally allocated into an

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experimental group (n = 30) and a control group (n = 30).

Inclusion Criteria:

- Caregivers of pre-school children aged 2–6 years.
- Caregivers who were willing to participate and available during data collection.
- Caregivers who could understand Hindi or English.

Exclusion Criteria:

- Caregivers who were healthcare professionals.
- Caregivers who had previously attended any structured educational programme on *Enterobius vermicularis*.
- Caregivers who were unavailable during either pre-test or post-test data collection.

Sampling Technique

A **convenience sampling technique** was used to recruit participants. To minimize contamination between groups, the experimental and control groups were selected from geographically separate areas and assigned using a non-random allocation method, consistent with the quasi-experimental study design.

Intervention

The experimental group received a **family-based educational programme** on *Enterobius vermicularis*, which included information on the causative organism, mode of transmission, clinical manifestations, diagnosis, treatment, prevention, personal hygiene, and environmental sanitation. Educational sessions were conducted using lectures, discussions, and audiovisual aids. The control group received no educational intervention during the study period.

Data Collection Tool

Data were collected using a structured interview schedule developed by the investigator after an extensive literature review and expert consultation. The instrument comprised three sections:

- **Section A:** Sociodemographic characteristics of caregivers, including age, gender, relationship to the child, educational status, occupation, type of family, monthly household income, number of children, food habits, toilet facilities, and source of information.
- **Section B:** A **21-item structured knowledge questionnaire** assessing knowledge regarding *Enterobius vermicularis*, including its transmission, clinical manifestations, diagnosis, treatment, and preventive measures. Each correct response was awarded one mark. Knowledge scores were categorized as **adequate (16–21)**, **moderate (11–15)**, and **inadequate (0–10)**.

- **Section C:** A **10-item five-point Likert attitude scale** evaluating caregivers' attitudes towards the prevention and management of *Enterobius vermicularis*. Positive and negative statements were scored according to standard Likert scale procedures, with higher scores indicating a more favourable attitude.

Validity and Reliability

The study instrument was validated by experts in Child Health Nursing, Community Health Nursing, and related specialties to ensure content validity. Reliability testing demonstrated acceptable internal consistency, confirming that the questionnaire was suitable for data collection.

Data Collection Procedure

Following approval from the Institutional Ethics Committee and permission from the concerned community authorities, eligible caregivers were recruited after obtaining written informed consent. Baseline (pre-test) data on knowledge and attitude were collected from both groups using the structured interview schedule. The family-based educational programme was then administered to the experimental group, while the control group received no intervention. Post-test assessment was conducted using the same instrument after the predetermined interval to evaluate changes in knowledge and attitude.

Statistical Analysis

Data were entered and analysed using **IBM SPSS Statistics**. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarize demographic characteristics and study variables. Inferential statistics, including **paired t-test**, **independent t-test**, and **Chi-square test**, were applied to compare pre-test and post-test scores between groups and to determine the association between knowledge, attitude, and selected demographic variables. A **p-value <0.05** was considered statistically significant.

Ethical Considerations

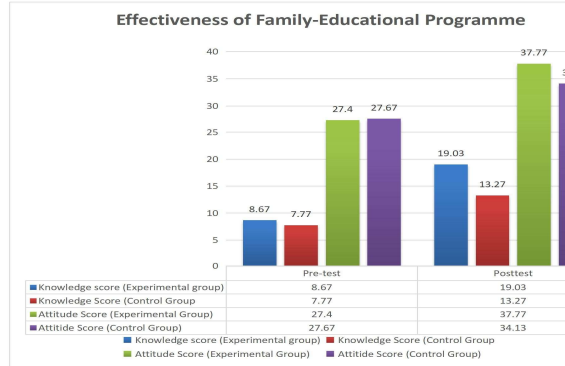
Ethical approval for the study was obtained from the **Institutional Ethics Committee of SGT University, Gurugram**. Written informed consent was obtained from all participants before data collection. Confidentiality and anonymity were maintained throughout the study, and participation was voluntary. Participants were informed of their right to withdraw from the study at any stage without any consequences.

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RESULTS

Objective 1: To assess the effectiveness of a family-based educational programme on knowledge regarding *Enterobius vermicularis* among caregivers of pre-school children.

Table 1: Comparison of Pre-test and Post-test Knowledge Scores in Experimental and Control Groups (N = 60)



Group	Test	Mean ± SD	t-value	p-value
Experimental (n=30)	Pre-test	8.67 ± 1.58	7.137	<0.01*
	Post-test	19.03 ± 1.48		
Control (n=30)	Pre-test	7.77 ± 1.54	8.678	<0.001*
	Post-test	13.27 ± 3.40		

Interpretation: The data presented in Table 1 revealed that the mean knowledge score of the experimental group increased significantly from 8.67 ± 1.58 in the pre-test to 19.03 ± 1.48 in the post-test ($p < 0.01$). Although the control group also showed improvement (7.77 ± 1.54 to 13.27 ± 3.40), the increase was comparatively lower than that of the experimental group, indicating the effectiveness of the family-based educational programme.

Objective 2: To assess the effectiveness of a family-based educational programme on attitude regarding *Enterobius vermicularis* among caregivers of pre-school children.

Table 2: Comparison of Pre-test and Post-test Attitude Scores in Experimental and Control Groups (N = 60)

Group	Test	Mean ± SD	t-value	p-value
Experimental (n=30)	Pre-test	27.40 ± 3.04	9.579	<0.01*
	Post-test	37.77 ± 4.91		
Control (n=30)	Pre-test	27.67 ± 4.58	8.227	<0.001*
	Post-test	34.13 ± 4.89		

Interpretation: The data presented in Table 2 showed that the mean attitude score in the experimental group increased significantly from 27.40 ± 3.04 to 37.77 ± 4.91 following the educational intervention ($p < 0.01$). Although the control group also demonstrated improvement, the magnitude of change was lower compared with the experimental group.

Objective 3: To assess the level of knowledge regarding *Enterobius vermicularis* among caregivers before and after the intervention.

Table 3: Frequency and Percentage Distribution of Caregivers According to Level of Knowledge (N = 60)

Knowledge Level	Experimental pre-test (%)	Experimental post-test (%)	Control pre-test (%)	Control post-test (%)
Inadequate	6 (20.0)	0 (0.0)	13 (43.3)	0 (0.0)
Moderately Adequate	24 (80.0)	0 (0.0)	17 (56.7)	27 (90.0)
Adequate	0 (0.0)	30 (100.0)	0 (0.0)	3 (10.0)

Interpretation: The data presented in Table 3 showed that before the intervention, **80.0%** of caregivers in the experimental group had moderately adequate knowledge and **20.0%** had inadequate knowledge. Following the intervention, **100%** of caregivers demonstrated adequate knowledge. In the control group, only **10.0%** achieved adequate knowledge during the post-test, while **90.0%** remained in the moderately adequate category.

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Objective 4: To assess the level of attitude regarding *Enterobius vermicularis* among caregivers before and after the intervention.

Table 4: Frequency and Percentage Distribution of Caregivers According to Level of Attitude (N = 60)

Attitude Level	Experimental pre-test (%)	Experimental post-test (%)	Control pre-test	Control post-test (%)
Negative	0 (0.0)	0 (0.0)	1 (3.3)	0 (0.0)
Neutral	25 (83.4)	2 (6.6)	24 (80.1)	10 (33.3)
Positive	5 (16.6)	28 (93.4)	5 (16.6)	20 (66.7)

Interpretation: The data presented in Table 4 revealed that **83.4%** of caregivers in the experimental group had a neutral attitude before the intervention, whereas **93.4%** demonstrated a positive attitude after the educational programme. In the control group, positive attitude increased from **16.6%** to **66.7%**, but the improvement was comparatively lower than that observed in the experimental group.

Objective 5: To determine the association between post-test knowledge scores and selected demographic variables among caregivers.

Table 5: Association Between Post-test Knowledge Scores and Selected Demographic Variables (N = 60)

Demographic Variable	χ^2 Value	p-value
Age	8.324	0.502
Gender	4.393	0.222
Relationship with Child	1.301	0.729
Educational Status	10.260	0.923
Occupation	5.982	0.425
Type of Family	5.195	0.519
Monthly Income	14.640	0.101
Number of Children	43.790	0.013*
Food Habit	9.602	0.022*
Defecation Practice	1.301	0.729
Source of Information	5.357	0.802

*Level of significance = 0.05

Food habit was significant in the **experimental group**, whereas number of children was significant in the **control group**.

Interpretation: The data presented in Table 5 revealed that **food habit (p = 0.022)** and **number of children (p = 0.013)** were significantly associated with post-test knowledge scores. No statistically significant association was observed between knowledge scores and age, gender, relationship with the child, educational status, occupation, family type, monthly income, defecation practices, or source of information.

Objective 6: To determine the association between post-test attitude scores and selected demographic variables among caregivers.

Table 6: Association Between Post-test Attitude Scores and Selected Demographic Variables (N = 60)

Demographic Variable	p-value
Age	0.059
Gender	0.462
Relationship with Child	0.113
Educational Status	0.669
Occupation	0.852
Type of Family	0.732
Monthly Income	0.168
Number of Children	0.928
Food Habit	0.611
Defecation Practice	0.577
Source of Information	0.948

Interpretation: The data presented in Table 6 showed that none of the selected demographic variables were significantly associated with post-test attitude scores (**p > 0.05**). Although age approached statistical significance (**p = 0.059**), it did not meet the predetermined level of significance.

Summary of Findings

The present quasi-experimental study evaluated the effectiveness of a family-based educational programme on caregivers' knowledge and attitude regarding *Enterobius vermicularis* among pre-school children in selected areas of Delhi NCR. Sixty caregivers participated, with 30 assigned to the experimental group and 30 to the control group. Following the intervention, the experimental group demonstrated a statistically significant improvement in knowledge and attitude compared with the control group. The mean knowledge score increased from **8.67 ± 1.58** to **19.03 ± 1.48**, while the mean attitude score improved from **27.40 ± 3.04** to **37.77 ± 4.91 (p < 0.01)**. All caregivers (100%) in the experimental group achieved an adequate level of knowledge after the intervention, whereas only 10% of the control group attained adequate knowledge. Positive attitude increased from **16.6% to 93.4%** in the experimental group. Food habits (p

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= 0.022) and the number of children ($p = 0.013$) showed significant associations with knowledge scores, whereas no significant association was observed between attitude scores and demographic variables. These findings demonstrate that the family-based educational programme effectively enhanced caregivers' awareness and attitudes towards the prevention and management of *Enterobius vermicularis* infection.

DISCUSSION

The present study demonstrated that the family-based educational programme significantly improved caregivers' knowledge and attitude regarding *Enterobius vermicularis* infection among pre-school children. The marked increase in post-test knowledge and attitude scores among the experimental group confirms that structured educational interventions are effective in promoting awareness and encouraging preventive practices against pinworm infection.

The findings are consistent with those of **Kuriakose et al. (2022)**¹³, who reported that a structured teaching programme significantly improved mothers' knowledge regarding helminthic infestations among under-five children. Similarly, **Amin and Mushtaq (2024)** observed a significant improvement in caregivers' knowledge following an educational intervention on worm infestations, emphasizing the effectiveness of targeted health education in improving awareness and preventive behaviours. The present study also supports the findings of **Kumar and Prakasam (2024)** and **Lashaki et al. (2024)**, who highlighted that caregiver education and hygiene promotion are essential strategies for reducing the transmission of *Enterobius vermicularis* and other intestinal parasitic infections.

In the present study, the mean knowledge score increased significantly from 8.67 ± 1.58 to 19.03 ± 1.48 , while the mean attitude score improved from 27.40 ± 3.04 to 37.77 ± 4.91 following the intervention. Furthermore, all caregivers in the experimental group achieved adequate knowledge after the educational programme, and the proportion demonstrating a positive attitude increased from 16.6% to 93.4%. These findings indicate that improving caregivers' knowledge positively influences their attitudes and willingness to adopt preventive hygiene practices.

A significant association was observed between post-test knowledge scores and food habits as well as the number of children, whereas no significant association was found between attitude scores and demographic variables. These findings are in agreement with **Al Shatari and Mahmood (2023)**, who reported that lifestyle-related factors influenced knowledge levels, while most demographic characteristics showed no significant

relationship with caregivers' attitudes towards pinworm infection.

Overall, the findings suggest that family-based educational programmes are practical, feasible, and effective community health nursing interventions. Integrating such programmes into routine maternal and child health services, school health programmes, and community outreach activities can improve caregiver awareness, promote healthy hygiene practices, facilitate early diagnosis and treatment, and reduce the burden of *Enterobius vermicularis* infection among pre-school children.

CONCLUSION

The present study concluded that the family-based educational programme was effective in significantly improving caregivers' knowledge and attitudes regarding *Enterobius vermicularis* infection among pre-school children. The statistically significant increase in post-test knowledge and attitude scores among caregivers in the experimental group confirms that structured educational interventions are an effective approach for enhancing awareness, promoting healthy hygiene practices, and encouraging the adoption of preventive measures against pinworm infection.

The findings support the research hypothesis that family-based education can positively influence caregivers' knowledge and attitudes. Although most demographic variables were not significantly associated with the study outcomes, food habits and the number of children showed significant associations with knowledge scores, suggesting that caregiving experience and lifestyle factors may influence awareness regarding parasitic infections. The study highlights the important role of community health nurses in delivering family-centred health education to reduce the transmission of *Enterobius vermicularis*. Incorporating such educational programmes into routine community health services, maternal and child health programmes, Anganwadi centres, and school health initiatives can contribute to improved hygiene behaviour, early recognition of infection, timely treatment, and prevention of reinfection. Future research should include larger multicentric samples, longer follow-up periods, and technology-assisted educational interventions to evaluate long-term knowledge retention, behavioural changes, and their effectiveness in reducing the prevalence of *Enterobius vermicularis* infection among children.

Conflict of Interest: The authors certify that they have no involvement in any organization or entity with any financial or non-financial interest in the subject matter or materials discussed in this paper.

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REFERENCES

1. Kumari SC, Kesavelu D. Worms and parasites in children in India: A review. *Int J Pharm Res Appl*. 2021;6(1):671-674. Available from: <https://www.ijprajournal.com>
2. Wong LW, Ong KS, Khoo JR, Goh CBS, Hor JW, Lee SM. Human intestinal parasitic infection: A narrative review on global prevalence and epidemiological insights on preventive, therapeutic and diagnostic strategies for future perspectives. *Expert Rev Gastroenterol Hepatol*. 2020;14(11):1093-1118. DOI: <https://doi.org/10.1080/17474124.2020.1806711>
3. Forson AO, Arthur I, Olu-Taiwo M, Glover KK, Ayeh-Kumi PF. Intestinal parasitic infections and risk factors: A cross-sectional survey of some school children in a suburb in Accra, Ghana. *BMC Res Notes*. 2017;10(1):485. DOI: <https://doi.org/10.1186/s13104-017-2802-7>
4. Okyay P, Ertuğ S, Gültekin B, Önen O, Beşer E. Intestinal parasites prevalence and related factors in school children: A western city sample, Turkey. *BMC Public Health*. 2004;4:64. DOI: <https://doi.org/10.1186/1471-2458-4-64>
5. Curtale F, Pezzotti P, El Sharbini A, Al Maadat H, Ingrosso P, Saad YS, et al. Knowledge, perceptions and behaviour of mothers toward intestinal helminths in Upper Egypt: Implications for control. *Health Policy Plan*. 1998;13(4):423-432. DOI: <https://doi.org/10.1093/heapol/13.4.423>
6. Dudlová A, Juriš P, Jurišová S, et al. Epidemiology and geographical distribution of gastrointestinal parasitic infection in humans in Slovakia. *Helminthologia*. 2016. Available from: <https://intapi.sciendo.com/pdf/10.1515/helmin-2016-0035>
7. Singh R, Aggarwal RK, Koul N. Prevalence of intestinal parasites at a tertiary care centre at Dehradun, Uttarakhand, India. *Int J Curr Microbiol Appl Sci*. 2019;8(6):932-937. DOI: <https://doi.org/10.20546/ijcmas.2019.806.112>
8. Ashok R, Suguneswari G, Satish K, Kesavaram V. Prevalence of intestinal parasitic infection in school-going children in Amalapuram, Andhra Pradesh, India. *Shiraz E Med J*. 2013;14(4). DOI: <https://doi.org/10.17795/semj16652>
9. Ummarino A, Caputo M, Tucci FA, Pezzicoli G, Piepoli A, Gentile A, et al. A PCR-based method for the diagnosis of *Enterobius vermicularis* in stool samples specifically designed for clinical application. *Front Microbiol*. 2022;13:1028988. DOI: <https://doi.org/10.3389/fmicb.2022.1028988>
10. Lashaki EK, Mizani A, Hosseini SA, Habibi B, Taherkhani K, Javadi A, et al. Global prevalence of enterobiasis in young children over the past 20 years: a systematic review and meta-analysis. *Osong Public Health Res Perspect*. 2023. Available from: <https://doi.org/10.24171/j.phrp.2023.0204>
11. Devi, M., et al. (2021). Epidemiological determinants of parasitic infestation among 612 years old children in peri-urban area of Rohtak, Haryana, India. *International Journal of Community Medicine and Public Health*, 8(2), 597–601. <https://doi.org/10.18203/23946040.ijcmp.h20210039>
12. Muoghalu, C., & Lebu, S. (2025). Soil-transmitted helminth infections among preschool- and school-aged children in India: A systematic review and meta-analysis of prevalence, risk factors, and intervention strategies. *Hygiene and Environmental Health Advances*, 13, 100118. <https://doi.org/10.1016/j.heha.2025.100118>
13. Kuriakose J, James A, Thomas B, George J, Raphael M, Joy N, et al. Effectiveness of structured teaching programme on knowledge regarding helminthic infestations among mothers of under-five children. *Int J Nurs Educ Res*. 2022. Available from: <https://doi.org/10.52711/2454-2660.2022.00008>