Effectiveness of a health education program on mothers' knowledge and practice regarding amebiasis

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Abstract. This study was conducted to assess the effectiveness of a health education program on mothers' knowledge and practices related to amebiasis. Pre- and post-I and II-tests were used, along with a two-group quasi-experimental design. The study included a convenience sample of 120 mothers, including 60 from the study and 60 from the control group. Out of the entire number of PHCs in Wasit Governorate, seven were used for the study. A three-part structured questionnaire tests mothers' knowledge of the illness and attitudes about it. The results of this study indicated that there is statistically significant difference between the study and control groups during the post-test I and post-test II periods (t=14.968, P=.000 and t=13.731, P=.000, respectively). Data from the study group during the pre-test period of 31.17(9.14) revealed that (70%) of mothers had bad practices connected to Entameba Histolytica among children. According to the post-test I results, 47.4 (9.48) respondents, or 70%, identified good practices. The main finding showed that, after the educational program was implemented, mothers' knowledge and practice of amebiasis dramatically increased, with pre-post implementation differences that are statistically significant.

Introduction

Amebiasis is brought on by the pseudopod-forming, non-flagellated protozoan parasite *Entamoeba histolytica* (1). With 11,300 fatalities in 2013, it was the fourth most frequent parasite infection-related cause of death worldwide and a significant cause of dysentery and protozoal diarrhoea (2). The primary symptoms of amoebiasis include abdominal ache, bloody diarrhoea, nausea, vomiting, and flatulence. It is most common in tropical and subtropical areas, and children are more prone to contract this virus than adults (3). A range of diseases, including asymptomatic colonization, amebic colitis, and even liver abscesses, can be brought on by *E. histolytica* infection (4). The occurrence and spread of intestinal parasite infections are known to be influenced by environmental, social, demographic, and hygiene-related behaviors (5).

Diarrhoea is not generally treated as a sickness like other illnesses and, in most instances, is not treated at all or managed at home with conventional treatments. Children under the age of five received no care for nearly half of them, and around one-third did not receive any therapy (6). It is emphasized that when mothers lead, carry out, and instill proper hygiene practices in the home, many processes of morbidity and dysfunction are prevented. According to studies, mothers often decide how to cure a child's diarrhea (7). They assumed full accountability for judging the child's diet and the care of the sickness. Therefore, mothers' attitudes and understanding of the causes of diarrhoea are essential for taking the appropriate actions at the proper time (8). Several factors, including mothers' educational background, experience treating the ailment, and ethnicity, can impact how well mothers understand how to treat childhood diarrhoea (9). Mothers' attitudes and behaviors, as well as other elements like their profession, their husbands' employment position, the size of the family, and the family's finances, all influence how well they comprehend diarrhoea and how to treat it (10). Mothers' knowledge of diarrhea has been reviewed in a number of studies around the world, but amebiasis and its prevention in Iraq have not been the subject of any prior studies. In order to assess mothers' knowledge of amebiasis, associated behaviors, and the effectiveness of amebiasis health education activities, this study was carried out in Kut City, Middle of Iraq.

Materials and methods

Hypothesis. The current educational program will improve mothers' knowledge of and practices related to amebiasis.

Study design. To achieve the objectives of the current investigation, the quasi-experimental design with pre- and post I and II-tests in two groups was adopted.

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Setting. The study was conducted at seven primary health centres (PHCs) out of the total number of PHCs in Wasit Governorate, Kut City-middle Iraq, which includes 29 PHCs, according to the Wasit health office. PHCs were chosen by the systemic random sample method.

Sample and sampling technique. The convenience sample consisted of 120 (60 studies & 60 control) mothers who agreed to contribute to the current research, and they fit the inclusion criteria.

Inclusion criteria. Mother residing in Kut City for at least six months with her children, ages six to fourteen. Those with various educational backgrounds. And mothers who consented to take part in the research.

Exclusion criteria. Any mother who had seriously ill children. Those who participated in the pilot study. And mothers who scored more than 85⁄100 in the pre-test.

Data collection tools. Before implementing the educational program, data were collected using two specially created questionnaires given to the mothers to assess their knowledge about amebiasis.

Tool I includes a questionnaire for collecting demographic information about the mothers and their infected children.

Tool II is a designed questionnaire to evaluate mothers' knowledge and practices about the disease.

Scoring. Scoring for Knowledge and Practice questions, the correct answer was achieved (2) and the incorrect (1). For each area, the scores of the questions were summed up then the total was divided into three levels, giving the mean score for the part [Low=50-66.66, Fair=66.67-83.33, High=83.34-100] for knowledge and [Poor=20-33.33, Moderate=33.34-46.66, Good=46.67-60] for practices.

The educational program's content was divided into two sections:

Section I: theoretical section that covers the information required to give mothers of children with amebiasis an overview of amebiasis, which includes (Introduction about the disease, amebiasis definition, causes of amebiasis, pathogenesis, sign & symptoms and complications, mode of transmission, incubation period, methods of treatment and prevention).

Section II: the practical section of the program teaches mothers the skills they need to maintain proper personal hygiene and ensure the safety of their food and water.

Various training techniques were used to ensure that all mothers received the same learning experience, including role-playing, demonstration and re-demonstration using simulated scenarios and real-life situations, and the distribution of booklets on the amebiasis disease and some of the brochures about topics covered in lectures. To illustrate the course concepts, use posters, pictures, and videos besides using a whiteboard.

Evaluation phase: to gauge the effect of the program of health education on the mothers, four tests were used to gauge their knowledge: a pre-test before the program was implemented, a post-test right away, a post-test I, and a post-test II one month later. The same data collection tools were used for this.

Methods

Formal letters of consent were taken from the Faculty of Medicine Dean, Sousse University, to the directors of EC at Sousse University and to the Iraqi Ministry of Health/Wasit health office to explain the purpose and importance of the study.

The study tool was created after thoroughly examining the literature, and seventeen academic experts in community medicine and microbiology evaluated it for content validity.

The mothers were informed about the study's aims, and then they gave their verbal agreement. To determine the amount of time required to complete the questions, their viability, and their clarity, a pilot study was conducted for the questionnaires. 15% of the individuals were excluded from the main study. The tools remained constant without any change in response to the pilot study's findings.

Period of study. The study lasted 9 months, from June 2022 to the end of February 2023.

Ethical considerations. Every mother who participated in the study sample received an assurance from the researchers that their involvement was voluntary and that they were free to leave the study at any moment without providing a cause. The researcher clarified that the data would only be utilized for actual scientific purposes and to the mothers' advantage.

Statistical design. Frequency, percentile, mean, standard deviation, independent t-tests, and ANOVA tests were used in the statistically present and analysis of the study's data by Statistical Package for the Social Science(SPSS) version 20.0.

Results

Results showed that the study and control groups had a significant percentage of mothers who fell into the 20- to 29-year-old age category. Most women in the study group (41.7%) have completed middle school, whereas the mothers in the control group (41.7%) have finished college. The study's findings show that most mothers in both groups have a governmental occupation, according to occupation. According to the current results, 75 and 71.7% of participants have a moderate socio-economic status. Regarding where they live, most members of the research and control groups live in Kut City's urban region. The majority of study participants have five family members, according to family size (Table I).

Findings from the study group revealed that 66.7% of mothers had little to no information on the prevalence of *Entameba histolytica* in children during the pre-test period, which was 61.3 (11.23). Yet, results from the post-test showed that (86.7%) displayed a high level of knowledge, scoring 87.63 (6.31). Mothers provided identical replies to post-test I after a month had passed, with a mean of 86.45 (7.65). Findings from the control group revealed that (65%) of mothers had little information on *Entameba histolytica* infection in children during the pre-test period of 61.64 (11.71). Also, results from the post-test showed that (65%) displayed a low level of knowledge, 61.58 (11.90). Mothers' responses to post-test II were identical to those from the

Table I. Distribution of study sample by their socio-demographic variables (SDVs).

SDVs	Classification	Study group		Control group		Sig.
		No.	%	No.	%	
Age/years	<20 years old	5	8.3	5	8.3	.450
	20-29 years old	47	78.3	41	68.3	
	30-39 years old	3	5.0	9	15.0	
	40 and older	5	8.3	5	8.3	
	M ± SD	24.1±6.01		25.56±6.83		
Education level	Read and write	0	0.0	5	8.3	.079
	Elementary school	4	6.7	3	5.0	
	Middle school	25	41.7	20	33.3	
	preparatory	7	11.7	7	11.7	
	College	24	40.0	25	41.7	
Occupation	Government employ	23	38.3	24	40.0	.247
	Private employ	14	23.3	12	20.0	
	Students	6	10.0	4	6.7	
	Housewife	17	28.3	20	33.3	
Economic status	Poor	8	13.3	12	20.0	.415
	Moderate	45	75.0	43	71.7	
	High	7	11.7	5	8.3	
Residents	Urban	42	70.0	39	65.0	.793
	Rural	18	30.0	21	35.0	
Family size	<5	42	70.0	37	61.7	.830
	≥5	18	30.0	23	38.3	

No., number; %, percentage.

Table II. Mothers' knowledge responses regarding incidence of *Entameba histolytica* among children in study and control groups.

Knowledge	Study group				Control group			
	Low N (%)	Fair N (%)	High N (%)	M ± SD	Low N (%)	Fair N (%)	High N (%)	M ± SD
Pre-test	40 (66.7)	17 (28.3)	3 (5.0)	61.3±11.23	39 (65.0)	17 (28.3)	4 (6.7)	61.64±11.71
Post-test I	1 (1.7)	7 (11.7)	52 (86.7)	87.63±6.31	39 (65.0)	17 (28.3)	4 (6.7)	61.58±11.90
Post test II	2 (3.3)	9 (15.0)	49 (81.7)	86.45±7.65	38 (63.3)	19 (31.7)	3 (5.0)	61.63±11.72

Level of assessment [Low=50-66.66, Fair=66.67-83.33, High=83.34-100].

pre-test after a month had passed, with a mean of 61.63 (11.72) (Table II).

Table III demonstrates at pre-test interval that there wasn't statistically significant difference between the study & control groups (t=.207; P=.837). While the post-test (t=14.968; P=.000) and post-test II (t=13.731; P=.000) periods showed a statistically significant difference between the study and control groups.

Participants in the study group's the pre-test knowledge statistically differs from that knowledge in the post-tests I and II (P=.000). When compared to post-test II, this knowledge did not statistically differ from post-test I (P=.000), but it did statistically differ from post-test II in post-test I (P=.455). At the same time, post-test I shows no differences (P=.455). Pre-test knowledge and post-test knowledge for the control group do not differ statistically significantly (P=.957 and P=.938). There was no statistically significant difference in this knowledge between post-test I and post-test II (P=.981) or pre-test time (P=.957) (Table IV).

Table V from the study group revealed that (70%) of mothers had poor practices concerning *Entameba histolytica* in children during the pre-test period of 31.17 (9.14). While the

Table III. Independent sample t-test between the study and control groups' responses at pre-post I and II tests.

Periods	Weighted	M	SD	Std. Error	t-value	d.f	Sig.
Pre-test	Study	1.22	.224	.02901	.207	118	.837
	Control	1.22	.234	.03026			
Post-test I	Study	1.75	.126	.01631	14.968	118	.000
	Control	1.23	.238	.03075			
Post-test II	Study	1.72	.153	.01976	13.731	118	.000
	Control	1.23	.234	.03027			

M, Mean; SD, standard deviation; t, t-test; d.f, degree of freedom; p, probability value.

Table IV. Multiple comparisons of the mother's knowledge regarding incidence of *Entameba histolytica* among children in study and control groups.

Groups	Period (I)	Period (J)	Mean differences (I-J)	Std. Error	Sig.
Study group	Pre-test	Post-test I	-.53200-[a]	.03160	.000
		Post-test II	-.50833-[a]	.03160	.000
	Post-test I	Pre-test	.53200[a]	.03160	.000
		Post-test II	.02367	.03160	.455
	Post-test II	Pre-test	.50833[a]	.03160	.000
		Post-test I	-.02367-	.03160	.455
Control group	Pre-test	Post-test I	-.00233-	.04303	.957
		Post-test II	-.00333-	.04303	.938
	Post-test I	Pre-test	.00233	.04303	.957
		Post-test II	-.00100-	.04303	.981
	Post-test II	Pre-test	.00333	.04303	.938
		Post-test I	.00100	.04303	.981

[a]The mean difference is significant at the 0.05 level.

results from the post-test I showed that 47.4 (9.48) of respondents (70%) stated good practices. Mothers provided the same replies to the post-test after a month had passed, with a mean of 47.68 (9.71). Results from the control group revealed that 75% of mothers had poor practices regarding the disease in children at the pre-test period of 30.2 (9.50). Also, results from the post-test showed that (70%) expressed inadequate practices 31.2 (8.42). Mothers' replies to the pre-test and post-test I were identical after a month, with a mean of 31.48 (9.86).

There was no statistically significant difference in the pre-test practices between the study and control groups, as shown in Table VI (t=.568; P=.571). At post-test I (t=9.380; P=.000) and post-test II (t=9.062; P=.000), there are statistically significant differences between the practices of the study & control groups. The study's results demonstrate that, in comparison to the control group, the study group's mothers' practices had improved during the post-test after the implementation of the educational program, according to the statistical mean.

Pre-test participant practices regarding the illness among study group children significantly differ from participant practices in post-test I (P=.000) and post-test II (P=.000). Such practices differ significantly between post-test I and post-test II, but not between post-test I and post-test II (P=.870).

Children's amebiasis habits prior to testing for the control group did not change statistically from those at the first post-test (P=.569) or the second posttest (P=.465). These habits in Post-Test I (P=.569) and Post-Test II (P=.872) are not significantly different from those at the time preceding the test. In the end, there is no statistically significant difference between this practice in the post-test II and that in the pre-test time (P=.465) and post-test I (P=.872) (Table VII).

Discussion

By using accepted practices and the most recent information on the disease, this training program aims to give mothers enough crucial knowledge and practice. The study's findings are presented in tables that refer to the following objectives:

Discussion of the socio-demographic characteristics of mothers. Regarding their age group, table (1) results revealed that the study and control groups had a high proportion of mothers in the 20 to 29-year-old age group. This finding is consistent with that of (Nusibah Elamin, 2018), who discovered

Table V. Mothers' practices responses regarding incidence of *Entameba histolytica* among children in study and control groups.

Practices	Study group				Control group			
	Poor N (%)	Moderate N (%)	Good N (%)	M ± SD	Poor N (%)	Moderate N (%)	Good N (%)	M ± SD
Pre-test	42 (70.0)	14 (23.3)	4 (6.7)	31.17±9.14	45 (75.0)	11 (18.3)	4 (6.7)	30.2±9.50
Post-test I	6 (10.0)	12 (20.0)	42 (70.0)	47.4±9.48	42 (70.0)	14 (23.3)	4 (6.7)	31.2±8.42
Post-test II	6 (10.0)	12 (20.0)	42 (70.0)	47.68±9.71	42 (70.0)	13 (21.7)	5 (8.3)	31.48±9.86

Level of assessment [Poor=20-33.33, Moderate=33.34-46.66, Good=46.67-60].

Table VI. Independent sample t-test between the study and control groups' responses at pre-post I and II tests.

Periods	Weighted	M	SD	Std. Error	t-value	d.f	Sig.
Pre-test	Study	1.55	.457	.05904	.568	118	.571
	Control	1.51	.475	.06135			
Post-test I	Study	2.37	.474	.06125	9.380	118	.000
	Control	1.56	.471	.06086			
Post-test II	Study	2.38	.485	.06271	9.062	118	.000
	Control	1.57	.493	.06370			

M, mean; SD, standard deviation; t, t-test; d.f, degree of freedom; p, probability value.

Table VII. Multiple comparisons of the mother's practices concerning incidence of *Entameba histolytica* among children in study and control groups.

Groups	Period (I)	Period (J)	Mean differences (I-J)	Std. Error	Sig.
Study Group	Pre-test	Post-test I	-.81167-[a]	.08630	.000
		Post-test II	-.82583-[a]	.08630	.000
	Post-test I	Pre-test	.81167[a]	.08630	.000
		Post-test II	-.01417-	.08630	.870
	Post-test II	Pre-test	.82583[a]	.08630	.000
		Post-test I	.01417	.08630	.870
Control Group	Pre-test	Post-test I	-.05000-	.08766	.569
		Post-test II	-.06417-	.08766	.465
	Post-test I	Pre-test	.05000	.08766	.569
		Post-test II	-.01417-	.08766	.872
	Post-test II	Pre-test	.06417	.08766	.465
		Post-test I	.01417	.08766	.872

[a]The mean difference is significant at the 0.05 level.

that the majority of his study participants were young mothers between the ages of 21 and 30 (11).

Regarding education, mothers in the control group (41.7%) have a college degree, compared to the study group (41.7%), with a middle school education. These results align with those of (Alaa *et al* 2014), who investigate the relationship between maternal education and family income and diarrhoea (12). The current study's findings on mother occupation show that the majority of mothers in both categories work in government, in contrast to the study of Sitotaw *et al* (2019), which found that 52.2% of moms were housewives (13).

The socio-economic position of both study groups was moderate, according to the study's findings. These findings conflict with those of (Kinuthia *et al* 2012), who discovered that 80% of respondents fell into the poor economic status

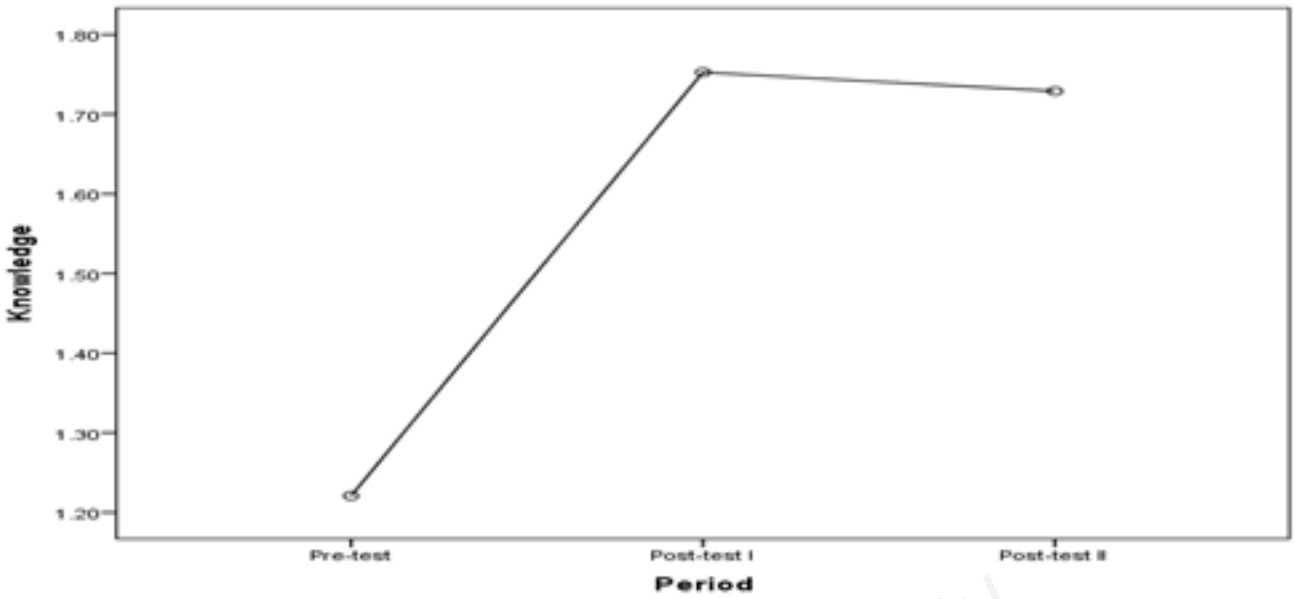

Figure 1. Distribution of knowledge between periods of measurement in excremental group.

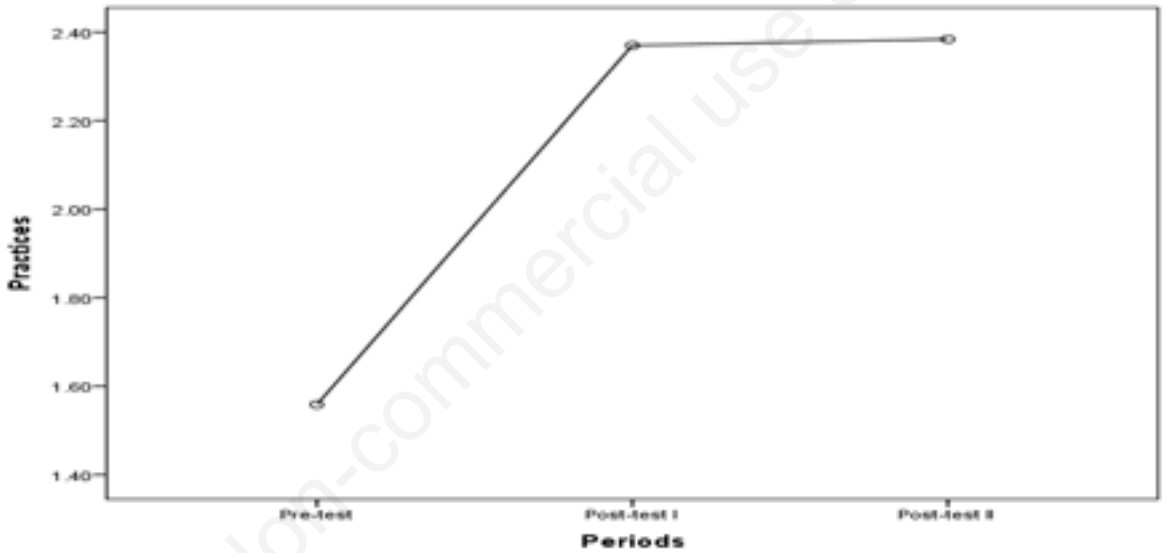

Figure 2. Distribution of practices between periods of measurement in excremental group.

category. This discrepancy is due to the study location because the authors conducted their research in a rural area. In contrast, the current study was conducted in urban and rural areas (14).

Concerning residence, the majority of study and control groups reside in the urban area of Kut city. This result was compatible with (Al-Kubaisy *et al* 2015) (15). Finally, according to family size, a high percentage of study participants have <5 family members, and these outcomes matched with those (Al-Yousof *et al* 2022) and don't match with the outcomes of (Anuar *et al* 2012) (16,17).

Comparison of mothers' knowledge of entameba histolytica over the three periods (pre, post I, and post II tests). According to research group findings, 66.7% of mothers had little knowledge about *Entameba histolytica* infection in children during the pre-test period. While the post-test I findings revealed that (86.7%) demonstrated a high level of knowledge. After a month had passed, mothers responded to Post-Test I in the same ways, which is consistent with (Praful 2017) (18).

According to the control group's findings, only (65%) of mothers knew how common *Entameba Histolytica* was in kids during the pre-test period. Additionally, the post-test findings revealed that (65%) of the participants had a low level of understanding. After a month, mothers' responses from the pre-test and post-test I were the same. Additionally, (t=.207; P=.837) shows that there was no pre-test statistically significant difference between the study and control groups. However, in both the post-test I and II periods, there is a statistically significant distinction between the study and control groups. These results were corroborated by (Jennifer *et al* 2011), (Sathish Kumar & Brogen Singh Akoijam, 2015) (19,20).

Numerous comparisons of the mother's knowledge were made between the samples taken before and after the educational program was put into place. It turned out that the mother education program had a noticeably higher relevance value. These findings are consistent with those from Bodzewan, 2014. Additionally, the current results are consistent with those of (Sarada & Subhavelvizhi, 2019), who found that 30% of mothers had adequate knowledge before the test, 56.66% had moderate knowledge, and 13.33% had inadequate knowledge, while 0% of mothers had insufficient knowledge after the test and 16% had intermediate knowledge and 83% had adequate knowledge. Other study findings done by Dipak *et al* 2016 support the current study's findings. This study also agreed with Haroun *et al* 2010 who found that mothers' knowledge of the three home management rules significantly improved after the intervention (21-24). But the knowledge among the control group in the pre-test time does not statistically differ from such knowledge in post-test I and II. This result agreed with the study results done by Bui Viet Hung, 2006 (25).

The lack of disease knowledge among mothers may be due to several factors, such as their failure to continuously update their knowledge by visiting primary healthcare facilities. Insufficient community-based training programs for the condition are another issue.

Comparison of mother's practice toward Entameba Histolytica over the three periods (pre, post I, and post II tests). In the study group, pre-test results revealed that (70%) of the mothers had poor practices with *Entamoeba histolytica*, whereas post-test data showed that (70%) had positive practices. According to the control group's findings, 75% of moms engaged in harmful habits before the test. Additionally, the post-test I result revealed that (70%) of respondents had poor practices. Mothers responded identically to the pre-test and post-test after a month had passed. Brown *et al* (2017) and Hayam Mohammed Abd Elrazak *et al* (2018) concur with the current finding (26,27). However, these findings did not agree with those reported by (Kassaw *et al* 2020) (28).

Table VII demonstrates that there is no statistically significant difference between the pre-test techniques used by the study and control groups (t=.568; P=.571). It demonstrates the shortcomings of mothers' pre-testing practices. The study's findings (Rumaolat *et al* 2019), which indicate that 84.8% of respondents had bad practices, are consistent with this conclusion (29).

The study's results show that the study group's mothers' practices at the post-test after applying for the education program have improved in comparison to those of the control group, highlighting the need for health education to change the mothers' unfavorable practices regarding the disease and how to prevent it. This outcome is in line with that of (Kuberan *et al* 2015), who found that education is required to teach people about proper hand-washing habits, sanitation procedures, and water purification techniques (30).

The current results were also consistent with those of the study by Workie *et al* (2018), which showed that mothers' attitudes and behaviors for the home-based care of diarrheal illnesses in children under the age of five were lacking. Community discourse, information sharing, and health education should be planned for and implemented to encourage a good mindset and practices for better preventing and controlling diarrheal illnesses in children (31).

A limitation of this study was the difficulty getting more mothers due to lack of time.

Conclusions

Mothers' knowledge and practice of amebiasis dramatically increased after the implementation of the educational program. As with parenting their amebic children, mothers' knowledge levels must rise to impact their practice.

Recommendations. Develop a health education program to update mothers' knowledge of amebiasis in developing child health care technology. Mass media, posters, brochures, MCH centres, or one-on-one counselling may distribute this instructional campaign.

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Contribution of authors

RKA, collected data, analyzed data, wrote the manuscript; SR, KYZ, BM, PhD supervisors (suggested title and followed student work).

Availability of data and materials

Data and materials are available from the corresponding author upon request.

Conflict of interest

The authors declare no potential conflict of interest.

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