



“A Study to Evaluate the Effectiveness of Demonstration-Based Teaching on Knowledge and Practice Regarding Oral Rehydration Therapy among Mothers of Under-Five Children in Selected Rural Areas of Nagpur, Maharashtra.”

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Abstract

Background

Diarrhoeal diseases are a major cause of morbidity among under-five children, particularly in rural communities. Oral Rehydration Therapy (ORT) is an effective and simple intervention for preventing and managing dehydration. However, inadequate maternal knowledge and inappropriate practices regarding ORT may reduce its effectiveness. Demonstration-based teaching can provide mothers with practical skills for correct preparation and administration of ORS.

Objectives

1. To assess the pre-test level of knowledge regarding Oral Rehydration Therapy among mothers of under-five children.
2. To assess the pre-test level of practice regarding Oral Rehydration Therapy among mothers of under-five children.
3. To evaluate the effectiveness of Demonstration-Based Teaching on knowledge regarding Oral Rehydration Therapy.
4. To evaluate the effectiveness of Demonstration-Based Teaching on practice regarding Oral Rehydration Therapy.
5. To determine the association between post-test knowledge and selected demographic variables.

Methodology

A **quantitative pre-experimental one-group pre-test–post-test research design** was adopted. The study was conducted among **100 mothers of under-five children** residing in selected rural areas of Nagpur, Maharashtra. Participants were selected using a **non-probability purposive sampling technique**. Data were collected using a **30-item structured knowledge questionnaire** and a **20-item practice checklist** regarding Oral Rehydration Therapy. Demonstration-Based Teaching was provided through lecture, practical demonstration, pictorial charts, and educational materials. A post-test was conducted after **14 days**. Descriptive and inferential statistics, including paired *t*-test and Chi-square test, were used for analysis.

Results

The mean knowledge score increased from **12.18 ± 3.46** in the pre-test to **22.04 ± 3.02** in the post-test, with a mean difference of **9.86** and a statistically significant paired *t*-value of **25.31 (p<0.001)**. Similarly, the mean practice score improved from **9.64 ± 2.87** to **17.28 ± 1.94**, with a mean difference of **7.64** and a paired *t*-value of **22.46 (p<0.001)**. A significant association was observed between post-test knowledge and selected demographic variables such as **educational status, previous information regarding ORS, and previous experience of childhood diarrhoea (p<0.05)**.

Conclusion

The study concluded that **Demonstration-Based Teaching was highly effective in improving both knowledge and practice regarding Oral Rehydration Therapy among mothers of under-five children**. Regular demonstration-based community health education should be incorporated into maternal and child health services to promote correct ORT practices and contribute to the prevention of dehydration and complications associated with childhood diarrhoea.

Keywords: Oral Rehydration Therapy, ORS, Demonstration-Based Teaching, Knowledge, Practice, Mothers, Under-Five Children, Diarrhoea, Dehydration, Community Health Nursing.

Introduction

Diarrhoeal disease is an important public health problem among **under-five children**, particularly in rural communities, and may lead to excessive loss of fluids and electrolytes, dehydration, nutritional problems, and serious complications if not managed promptly. **Oral Rehydration Therapy (ORT)** is a simple, safe, inexpensive, and effective method for preventing and managing dehydration associated with diarrhoea. However, its effectiveness depends on the mother's knowledge and ability to correctly prepare and administer Oral Rehydration Solution (ORS). Mothers may have inadequate knowledge regarding the correct quantity of water, preparation procedure, administration, storage, and recognition of dehydration and danger signs. Since mothers are usually the primary caregivers and often initiate home-based management, improving their knowledge and practical skills is essential. **Demonstration-based teaching** combines theoretical information with practical demonstration, enabling mothers to observe and practice the correct ORT procedure, which may improve both knowledge and performance. Community health nurses play an important role in providing such health education and promoting appropriate home-based management of childhood diarrhoea. Therefore, the present study was undertaken to evaluate the effectiveness of **Demonstration-Based Teaching on knowledge and**

practice regarding Oral Rehydration Therapy among mothers of under-five children in selected rural areas of Nagpur, Maharashtra.

Need for the Study

Diarrhoeal disease continues to be an important health problem among **under-five children**, particularly in rural communities, where inadequate knowledge and delayed management can increase the risk of dehydration and other complications. **Oral Rehydration Therapy (ORT)** is a simple, safe, inexpensive, and effective method for preventing and managing dehydration, but its success largely depends on the caregiver's ability to prepare and administer ORS correctly. Mothers may have inadequate knowledge regarding the correct preparation, quantity of water, administration, storage, and recognition of dehydration and danger signs. Since mothers are usually the primary caregivers, their knowledge and practical skills are essential for appropriate home-based management of diarrhoea. **Demonstration-based teaching** provides an opportunity for mothers to observe, understand, and practice the correct ORT procedure rather than relying only on verbal information. Community health nurses can play an important role in providing practical health education to mothers through community-based maternal and child health services. Therefore, there is a need to evaluate whether demonstration-based teaching can effectively improve both **knowledge and practical skills regarding ORT** among mothers of under-five children. Hence, the present study was undertaken among **100 mothers in selected rural areas of Nagpur, Maharashtra**, with the aim of improving appropriate ORT practices and contributing to the prevention of dehydration and complications associated with childhood diarrhoea.

Objectives

1. To assess the **pre-test level of knowledge** regarding Oral Rehydration Therapy (ORT) among mothers of under-five children.
2. To assess the **pre-test level of practice** regarding Oral Rehydration Therapy among mothers of under-five children.
3. To evaluate the **effectiveness of Demonstration-Based Teaching on knowledge** regarding Oral Rehydration Therapy among mothers of under-five children.
4. To evaluate the **effectiveness of Demonstration-Based Teaching on practice** regarding Oral Rehydration Therapy among mothers of under-five children.
5. To assess the **post-test level of knowledge** regarding Oral Rehydration Therapy among mothers of under-five children after Demonstration-Based Teaching.
6. To assess the **post-test level of practice** regarding Oral Rehydration Therapy among mothers of under-five children after Demonstration-Based Teaching.
7. To determine the **association between post-test knowledge scores and selected demographic variables** among mothers of under-five children.
8. To determine the **association between post-test practice scores and selected demographic variables** among mothers of under-five children.

Hypotheses

H₁: There will be a significant difference between the **pre-test and post-test knowledge scores** regarding ORT after Demonstration-Based Teaching ($p < 0.05$).

H₂: There will be a significant difference between the **pre-test and post-test practice scores** regarding ORT after Demonstration-Based Teaching ($p < 0.05$).

H₃: There will be a significant association between **post-test knowledge and selected demographic variables** ($p < 0.05$).

H₄: There will be a significant association between **post-test practice and selected demographic variables** ($p < 0.05$).

Materials and Methods

Research Design

The study employed a **pre-experimental one-group pre-test and post-test research design** to evaluate the effectiveness of Demonstration-Based Teaching on the knowledge and practice regarding Oral Rehydration Therapy (ORT) among mothers of under-five children. This design enabled comparison of participants' knowledge and practice before and after the educational intervention.

Research Approach

A **quantitative evaluative research approach** was adopted to objectively assess the effectiveness of Demonstration-Based Teaching in improving knowledge and practice regarding ORT.

Study Setting

The study was conducted in **selected rural areas of Nagpur, Maharashtra**, where mothers of under-five children were identified through community health workers, Anganwadi centres, and local healthcare services.

Study Population

The target population comprised **mothers of under-five children** residing in the selected rural areas of Nagpur, Maharashtra.

Sample Size

A total of **100 mothers of under-five children** participated in the study.

Sampling Technique

Participants were selected using a **non-probability purposive sampling technique** based on the eligibility criteria and their willingness to participate in the study.

Inclusion Criteria

Participants who fulfilled the following criteria were included:

- Mothers having at least one **child below five years of age**.
- Mothers residing in the selected rural areas of Nagpur, Maharashtra.
- Mothers able to understand and communicate in **Hindi or Marathi**.
- Mothers available during the period of data collection.
- Mothers willing to provide **written informed consent** and participate in the study.

Exclusion Criteria

Participants with the following conditions were excluded:

- Mothers who had previously attended a structured ORT/ORS training programme within the previous six months.
- Mothers who were unavailable for the post-test assessment.
- Mothers unable to understand the language used for data collection.
- Mothers who were unwilling to participate or withdrew from the study.

Research Instruments

Section A: Demographic Profile

A structured questionnaire was used to collect demographic information, including **age, educational status, occupation, type of family, monthly family income, number of under-five children, previous experience of childhood diarrhoea, previous information regarding ORS/ORT, and source of information**.

Section B: Structured Knowledge Questionnaire

Knowledge regarding Oral Rehydration Therapy was assessed using a **30-item structured knowledge questionnaire** covering:

- Meaning and importance of ORT
- Causes and complications of childhood diarrhoea
- Importance of preventing dehydration
- Indications for ORS administration
- Correct quantity of water for ORS preparation
- Step-by-step ORS preparation
- Correct method of ORS administration
- Frequency and quantity of ORS administration
- Management of vomiting
- Storage and duration of prepared ORS
- Continued breastfeeding and feeding
- Signs and symptoms of dehydration
- Danger signs requiring referral
- Prevention of diarrhoea and dehydration

Each correct response was awarded **one mark**, while an incorrect or unanswered response received **zero marks**. The maximum attainable score was **30**.

Knowledge Score Interpretation

- **Inadequate Knowledge:** 0–10
- **Moderately Adequate Knowledge:** 11–20
- **Adequate Knowledge:** 21–30

Section C: ORT Practice Checklist

Practice regarding Oral Rehydration Therapy was assessed using a **20-item structured practice checklist**. The checklist evaluated practical aspects such as:

- Correct preparation of ORS
- Use of the appropriate quantity of water
- Hand hygiene before preparation
- Use of clean utensils
- Proper mixing of ORS
- Appropriate administration of ORS
- Giving ORS after each loose stool
- Management of vomiting
- Continued breastfeeding
- Continued feeding during diarrhoea
- Proper storage of prepared ORS
- Safe disposal of unused ORS
- Recognition of dehydration
- Seeking healthcare when danger signs occur

Each appropriate practice was awarded **one mark**, while inappropriate practice received **zero marks**. The maximum possible score was **20**.

Practice Score Interpretation

- **Poor Practice:** 0–7
- **Moderate Practice:** 8–14
- **Good Practice:** 15–20

Validity and Reliability

The research instruments were reviewed by experts in **Community Health Nursing, Child Health Nursing, Medical-Surgical Nursing, and Biostatistics** to establish content validity. The reliability of the knowledge questionnaire and practice checklist was assessed using an appropriate reliability method. The obtained reliability coefficients were **greater than 0.80**, indicating good reliability and internal consistency of the instruments.

Data Collection Procedure

Prior permission was obtained from the concerned authorities before commencement of the study. Eligible mothers were informed about the **purpose, objectives, procedures, benefits, and voluntary nature of participation**. Written informed consent was obtained from each participant. A pre-test was conducted using the demographic questionnaire, knowledge questionnaire, and practice checklist. Following the pre-test, the participants received **Demonstration-Based Teaching on Oral Rehydration Therapy**.

Intervention

The **Demonstration-Based Teaching programme** lasted approximately **30–45 minutes** and included brief lecture, practical demonstration, return demonstration, pictorial charts, pamphlets, and audiovisual teaching aids.

The educational content covered:

- Importance of Oral Rehydration Therapy
- Meaning and purpose of ORS
- Materials required for ORS preparation
- Correct quantity of water required
- Step-by-step preparation of ORS
- Correct method of administering ORS to children
- Appropriate quantity and frequency of ORS administration
- Management of vomiting during ORS administration
- Proper storage and duration of prepared ORS
- Continued breastfeeding and feeding
- Recognition of signs of dehydration
- Danger signs requiring immediate medical attention
- Prevention of diarrhoea and dehydration
- Importance of timely referral to healthcare facilities

During the demonstration, the researcher showed the correct procedure for preparing and administering ORS. Participants were encouraged to **perform a return demonstration** to assess their practical understanding and correct any errors.

Post-Test Evaluation

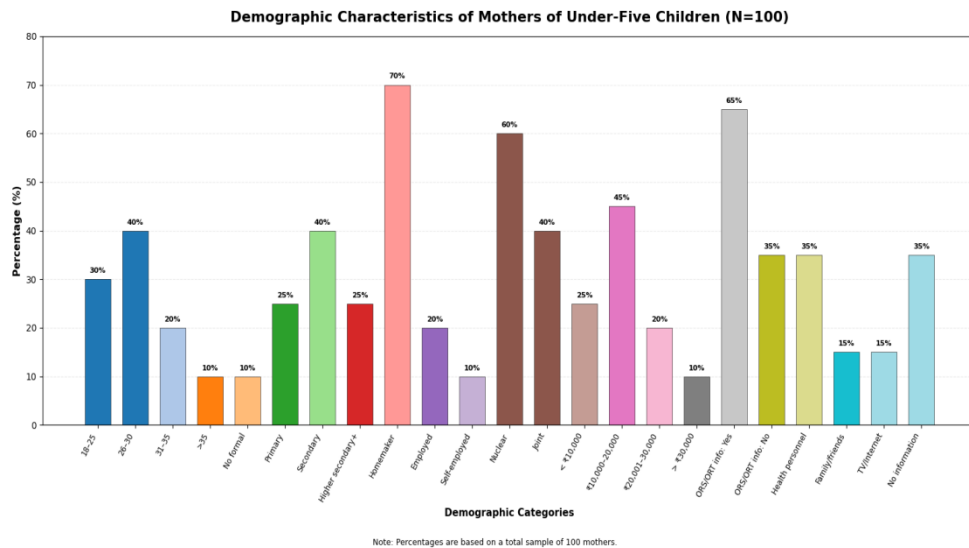
A **post-test was conducted 14 days after the Demonstration-Based Teaching programme** using the same structured knowledge questionnaire and practice checklist. The pre-test and post-test scores were compared to determine the effectiveness of Demonstration-Based Teaching in improving mothers' **knowledge and practice regarding Oral Rehydration Therapy**.

Results

The findings of the study are presented in the following tables.

Table 1: Frequency and Percentage Distribution of Mothers According to Selected Demographic Variables (N=100)

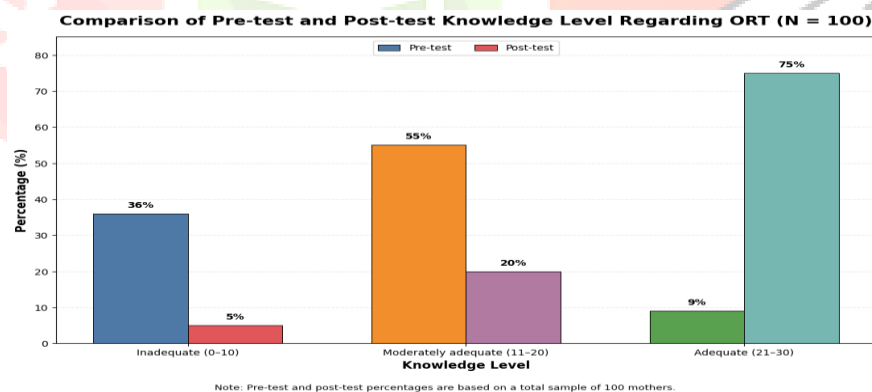
Demographic Variable	Category	Frequency (f)	Percentage (%)
Age (years)	18–25	30	30
	26–30	40	40
	31–35	20	20
	>35	10	10
Educational status	No formal education	10	10
	Primary	25	25
	Secondary	40	40
	Higher secondary and above	25	25
Occupation	Homemaker	70	70
	Employed	20	20
	Self-employed	10	10
Type of family	Nuclear	60	60
	Joint	40	40
Monthly family income	< ₹10,000	25	25
	₹10,000–20,000	45	45
	₹20,001–30,000	20	20
	> ₹30,000	10	10
Previous information regarding ORS/ORT	Yes	65	65
	No	35	35
Source of information	Health personnel	35	35
	Family/friends	15	15
	Television/Internet	15	15
	No previous information	35	35



Interpretation: The majority of mothers (40%) were aged 26–30 years, 40% had secondary education, 70% were homemakers, and 60% belonged to nuclear families. About 65% had previously received information regarding ORS/ORT.

Table 2: Distribution of Mothers According to Pre-Test and Post-Test Knowledge Level Regarding ORT (N=100)

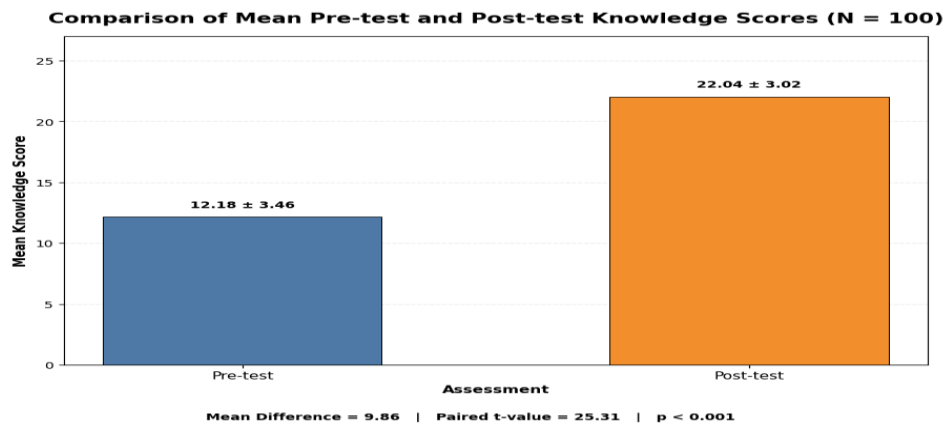
Knowledge Level	Pre-test f (%)	Post-test f (%)
Inadequate (0–10)	36 (36%)	5 (5%)
Moderately adequate (11–20)	55 (55%)	20 (20%)
Adequate (21–30)	9 (9%)	75 (75%)
Total	100 (100%)	100 (100%)



Interpretation: In the pre-test, 36% of mothers had inadequate knowledge, 55% had moderately adequate knowledge, and only 9% had adequate knowledge. After Demonstration-Based Teaching, 75% achieved adequate knowledge, while only 5% remained in the inadequate category.

Table 3: Comparison of Mean Pre-Test and Post-Test Knowledge Scores Regarding ORT (N=100)

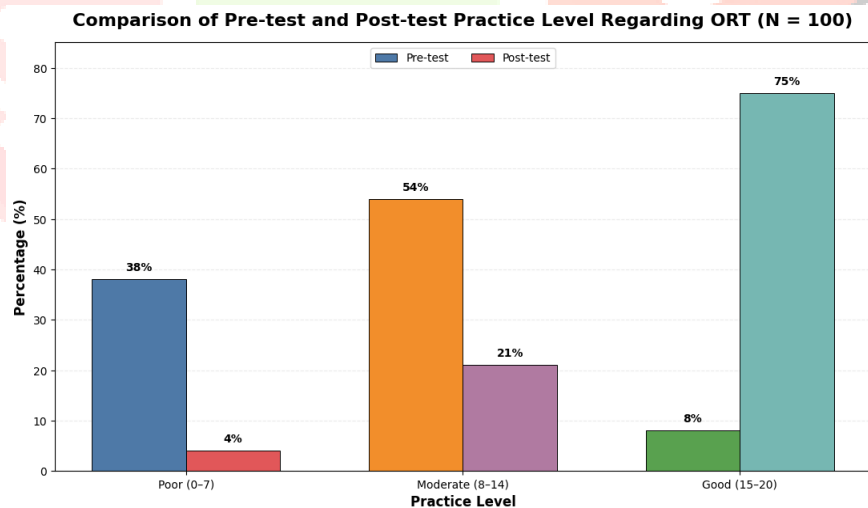
Assessment	Mean Score	SD	Mean Difference	Paired t-value	p-value
Pre-test	12.18	3.46			
Post-test	22.04	3.02	9.86	25.31	<0.001



Interpretation: The mean knowledge score increased from 12.18 ± 3.46 in the pre-test to 22.04 ± 3.02 in the post-test. The mean improvement was **9.86 points**, and the paired t -value of **25.31** was statistically significant ($p < 0.001$), indicating that Demonstration-Based Teaching was effective in improving knowledge regarding ORT.

Table 4: Distribution of Mothers According to Pre-Test and Post-Test Practice Level Regarding ORT (N=100)

Practice Level	Pre-test f (%)	Post-test f (%)
Poor (0–7)	38 (38%)	4 (4%)
Moderate (8–14)	54 (54%)	21 (21%)
Good (15–20)	8 (8%)	75 (75%)
Total	100 (100%)	100 (100%)

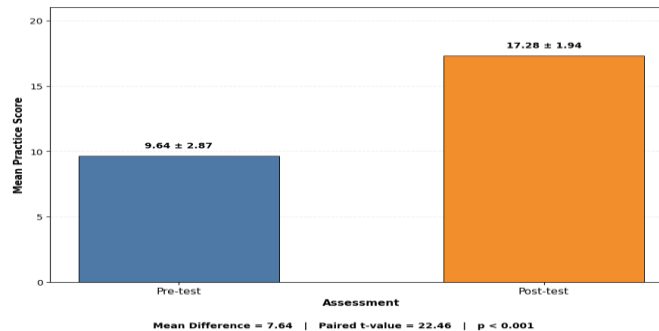


Note: Pre-test and post-test percentages are based on a total sample of 100 mothers.

Interpretation: In the pre-test, the majority of mothers (54%) had moderate practice and 38% had poor practice. Following the intervention, 75% demonstrated good ORT practice, while only 4% remained in the poor practice category.

Table 5: Comparison of Mean Pre-Test and Post-Test Practice Scores Regarding ORT (N=100)

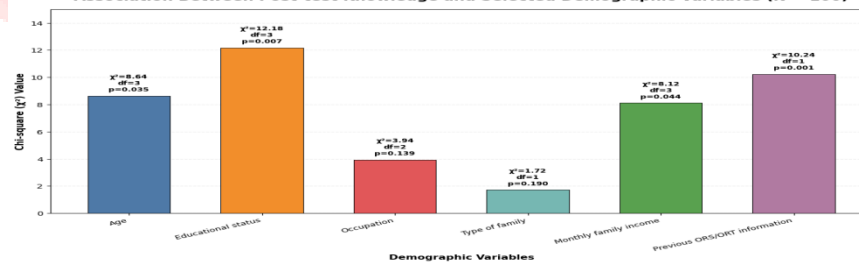
Assessment	Mean Score	SD	Mean Difference	Paired t-value	p-value
Pre-test	9.64	2.87			
Post-test	17.28	1.94	7.64	22.46	<0.001

Comparison of Mean Pre-test and Post-test Practice Scores Regarding ORT (N = 100)

Interpretation: The mean practice score increased from 9.64 ± 2.87 before the intervention to 17.28 ± 1.94 after the intervention. The mean difference was 7.64, with a paired t-value of 22.46 ($p < 0.001$), demonstrating a statistically significant improvement in ORT practice.

Table 6: Association Between Post-Test Knowledge and Selected Demographic Variables (N=100)

Demographic Variable	χ^2 Value	df	p-value	Association
Age	8.64	3	0.035	Significant
Educational status	12.18	3	0.007	Significant
Occupation	3.94	2	0.139	Not significant
Type of family	1.72	1	0.190	Not significant
Monthly family income	8.12	3	0.044	Significant
Previous ORS/ORT information	10.24	1	0.001	Significant

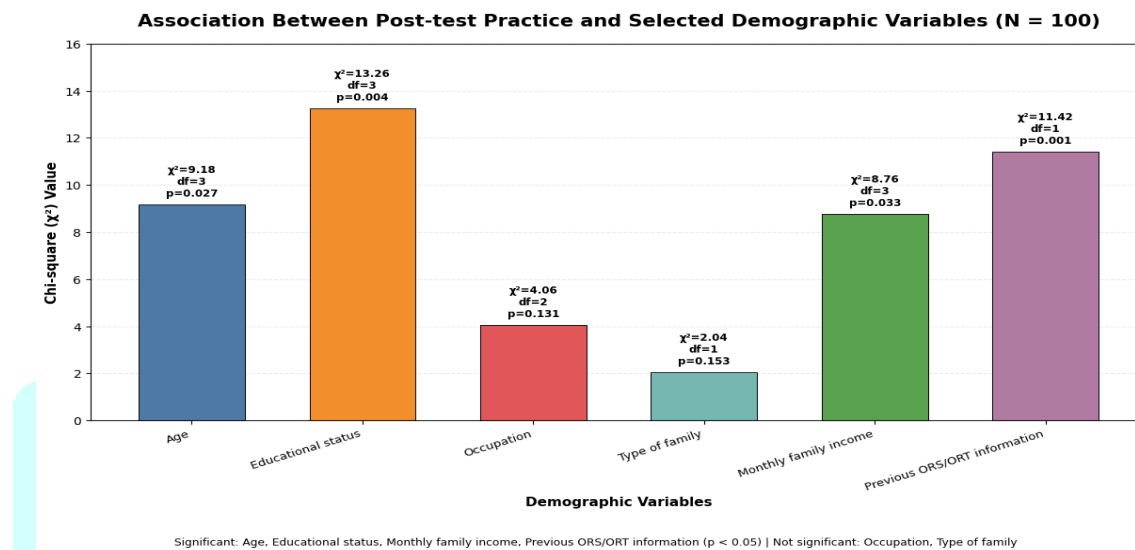
Association Between Post-test Knowledge and Selected Demographic Variables (N = 100)

Significant: Age, Educational status, Monthly family income, Previous ORS/ORT information ($p < 0.05$) | Not significant: Occupation, Type of family

Interpretation: A significant association was found between post-test knowledge and **age, educational status, monthly family income, and previous ORS/ORT information** ($p < 0.05$). Occupation and type of family were not significantly associated with post-test knowledge.

Table 7: Association Between Post-Test Practice and Selected Demographic Variables (N=100)

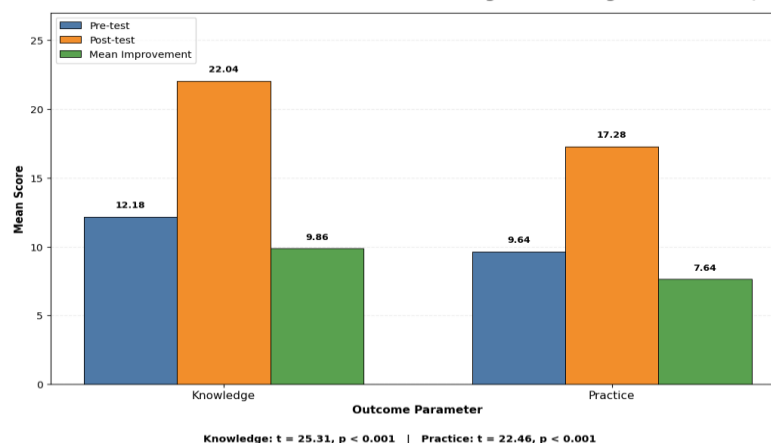
Demographic Variable	χ^2 Value	df	p-value	Association
Age	9.18	3	0.027	Significant
Educational status	13.26	3	0.004	Significant
Occupation	4.06	2	0.131	Not significant
Type of family	2.04	1	0.153	Not significant
Monthly family income	8.76	3	0.033	Significant
Previous ORS/ORT information	11.42	1	0.001	Significant



Interpretation: Post-test practice was significantly associated with **age, educational status, monthly family income, and previous ORS/ORT information** ($p < 0.05$), whereas occupation and type of family showed no significant association.

Table 8: Overall Effectiveness of Demonstration-Based Teaching (N=100)

Parameter	Pre-Test	Post-Test	Mean Improvement	Paired t-value	p-value
Knowledge	12.18 ± 3.46	22.04 ± 3.02	9.86	25.31	<0.001
Practice	9.64 ± 2.87	17.28 ± 1.94	7.64	22.46	<0.001

Overall Effectiveness of Demonstration-Based Teaching on Knowledge and Practice (N = 100)

Overall Finding

The findings demonstrate a **statistically significant improvement in both knowledge and practice regarding Oral Rehydration Therapy following Demonstration-Based Teaching**. The significant paired *t*-test results ($p < 0.001$) support the effectiveness of the intervention. Therefore, the study findings support **H₁ and H₂** and indicate that demonstration-based community health education can substantially improve mothers' knowledge and practical skills related to ORT.

Discussion

The present study evaluated the effectiveness of **Demonstration-Based Teaching on knowledge and practice regarding Oral Rehydration Therapy (ORT) among 100 mothers of under-five children** in selected rural areas of Nagpur, Maharashtra. The findings demonstrated a marked improvement in both knowledge and practice following the intervention. The mean knowledge score increased from **12.18 ± 3.46** in the pre-test to **22.04 ± 3.02** in the post-test, with a mean improvement of **9.86** and a statistically significant paired *t*-value of **25.31 (p < 0.001)**. Similarly, the mean practice score increased from **9.64 ± 2.87** to **17.28 ± 1.94**, showing a mean improvement of **7.64** with a paired *t*-value of **22.46 (p < 0.001)**. These findings indicate that demonstration-based teaching was highly effective in improving mothers' knowledge and practical skills regarding ORT. The improvement in practice is particularly important because correct preparation and administration of ORS are essential for preventing dehydration and complications associated with childhood diarrhoea. The significant association of post-test knowledge and practice with **age, educational status, monthly family income, and previous information regarding ORS/ORT** suggests that mothers' background characteristics may influence their ability to acquire and apply health information. However, occupation and type of family were not significantly associated with post-test outcomes. Overall, the findings support the use of **practical, demonstration-based community health education** by nurses and other healthcare professionals to strengthen mothers' capacity for appropriate home-based management of diarrhoea among under-five children.

Conclusion

The present study concluded that **Demonstration-Based Teaching was highly effective in improving knowledge and practice regarding Oral Rehydration Therapy among mothers of under-five children**. The mean knowledge score increased from **12.18 ± 3.46** in the pre-test to **22.04 ± 3.02** in the post-test, while the mean practice score increased from **9.64 ± 2.87** to **17.28 ± 1.94**. The improvements were statistically significant for both knowledge and practice ($p < 0.001$). The findings indicate that practical demonstration is an effective method of community health education and can enhance mothers' ability to correctly prepare and administer ORS, recognize dehydration, and provide appropriate home-based care during childhood diarrhoea. Therefore, regular **demonstration-based ORT education should be incorporated into community maternal and child health services**, particularly in rural areas.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. **Regular ORT education** should be provided to mothers of under-five children through community health programmes.
2. **Demonstration-based teaching** should be incorporated into routine maternal and child health services to improve practical ORS preparation and administration skills.
3. **Community health nurses and ASHA workers** should conduct periodic demonstrations and return-demonstration sessions for mothers in rural areas.
4. **Pictorial teaching materials, videos, and pamphlets** should be used to reinforce important ORT practices among mothers with different educational levels.
5. Mothers should be educated about the **early signs of dehydration and danger signs** requiring immediate medical attention.
6. ORT education should be integrated with **Anganwadi centres, immunization sessions, Village Health and Nutrition Days, and other community health activities**.
7. **Refresher education programmes** should be conducted periodically to reinforce correct ORS preparation, administration, and storage practices.
8. Further studies with **larger sample sizes and different geographical settings** should be conducted to validate the findings.
9. Future researchers may conduct **comparative or randomized controlled studies** to compare demonstration-based teaching with video-assisted or other educational methods.
10. Similar studies may be conducted to assess the **long-term retention of knowledge and practice** regarding ORT among mothers.

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