



Effectiveness of a guideline for ARI (Acute Respiratory Infections) on mother's knowledge and knowledge of practice in a selected hospital of district Burdwan, West Bengal.

Purnima Chaktrabarty

Background:

Pneumonia is the leading cause of death for children under the age of five, account for 14% death worldwide, more than AIDS, malaria and measles combined. 95% present of all pneumonia infections in children under the age of five occur in developing countries. In India out of 1.83 million child deaths 20.3% caused by pneumonia. In West-Bengal suffering from ARI in the year 2009 to 2010 were 1816948 and deaths were 605. Though serious, ARI is preventable and manageable with timely intervention and awareness.

Methods:

A pre-experimental study design using purposive sampling was conducted with 30 mothers of under-five children admitted in the Pediatric Ward of Burdwan Medical College, West Bengal. A validated structured interview schedule assessed mother's knowledge and practices regarding ARI. An educational guideline was introduced through lectures, discussions, and a booklet was distributed. Post-test data was collected after 7 days of introduction guideline using the same tools, along with an opinionnaire. Data were analyzed using descriptive and inferential statistics, including t-tests, odds ratio, and chi-square.

Findings:

16.67% mothers were below 19 years. 63% of children experienced ARI four or more times annually. Most mothers recognized at least three danger signs of ARI, though only 13% sought help when the child refused food. A significant increase in knowledge (pre-test mean 8.1, post-test 13.4; $t(29)=7.57$, $p<0.05$) and practice (pre-test 6.6, post-test 11.35; $t(29)=9.33$, $p<0.05$) was observed. A high correlation ($r=0.7$) was noted between knowledge and practice which was proved by t test. 93.4% of mothers felt the guideline made them more aware about ARI of children.

Conclusion:

The study supports the use of educational guidelines on a larger scale to reduce ARI in under-five children.(274 words)

Keywords: Acute Respiratory Infections, Mother'Knowledge, Knowledge of Practice, Guideline

Introduction

Acute Respiratory Infections (ARI)—especially pneumonia—remain a leading cause of child mortality worldwide. As part of the Sustainable Development Goals (Goal 3), there is a global commitment to ending preventable deaths of newborns and children under the age of five by 2030. Pneumonia alone is estimated to cause approximately 4.8 million deaths annually among children under five, equating to around 13,100 deaths each day. According to UNICEF, infectious diseases such as pneumonia, diarrhoea, and malaria continue to be among the top causes of death in this age group.

The highest mortality rates are observed in South Asia and sub-Saharan Africa. In India, an estimated 400,000 children under five die each year from ARI-related illnesses, accounting for 13–16% of all child deaths among pediatric hospital admissions. India alone contributes to nearly a quarter of the global under-five deaths due to ARI, highlighting the severity of the issue.

Despite its impact, pneumonia is both preventable and treatable. With simple, cost-effective interventions and access to basic healthcare, many of these deaths can be avoided (WHO).

UNICEF reported that case management of ARI at the community level can be effective means to achieve reduction in ARI mortality. An analysis of five community intervention studies using concurrent control communities showed that pneumonia specific childhood mortality could be reduced 33% (L.Muhe/WHO/CAH) less than 50% children seek help from an appropriate health care provider.

Despite being preventable and treatable, lack of awareness among caregivers—particularly mothers—often leads to delayed diagnosis and inadequate management of the illness. Empowering mothers with proper knowledge and practices is critical in the early identification and prevention of complications associated with ARI.

Health education through structured guidelines can play a vital role in enhancing mothers' understanding of ARI, including recognizing danger signs, seeking timely medical help, and adopting preventive measures. This study aims to evaluate the effectiveness of a structured educational guideline on ARI in improving mothers' knowledge and knowledge of practice related to the care of children suffering from ARI.

By focusing on mothers the study seeks to assess changes in their knowledge and practices before and after the introduction of a comprehensive guideline. The findings are expected to contribute to community health strategies by supporting the integration of educational interventions at healthcare settings to reduce the burden of ARI among children under five.

Methods of the study:

Study Design

A **pre-experimental one-group pre-test post-test design** of quantitative approach was used to evaluate the effectiveness of the guideline. Mother's demographic data, knowledge and knowledge practice was assessed by structure interview schedule then An educational guideline regarding ARI was introduced through reading, and a booklet was distributed. Post test was administered after seven days of introduction of guideline. The design of study is as follows.

One group Pre- test Post- test design.

K_1P_1 X K_2P_2

K_1 — Pre-test Knowledge of mothers regarding ARI of under five children.

P_1 —Post-test Knowledge of practice of mothers regarding ARI of under five children.

X- Introduction of guideline regarding ARI.

K_2 –Post Test Knowledge of mothers regarding ARI of under five children

Setting

Setting of the study :

Sick Neonatal Medicine (SNM) Ward of Burdwan Medical College and Hospital of West Bengal was selected for the final study. Paediatric Medicine Ward of Durgapur Bidhannagar Subdivision Hospital, West Bengal selected for the pilot study.

Population: In present study the study population consisted of all mothers who had 0-5 years old children with ARI of West Bengal.

Sample :

A total 30 mothers were selected for the study who have fulfilled the inclusion criteria. Ten mothers were selected for pilot study.

Inclusion criteria.

- Mothers, who have children of 0-5 yrs old and admitted in ward with ARI.
- Newly admitted mothers
- Mothers, who are available during study period and stay in the ward at least for eight days.
- Who can read and understand Bengali / English.
- Who at least class five passed.

Exclusion Criteria

- Mothers who were not physically or mentally fit.
- Who are not willing to participate

Sampling Size and Sampling technique: Non probability purposive sampling technique was used to select the hospital of Burdwan Medical College. There is one paediatric (SNM Ward) ward in Burdwan Medical College. Thirty five mothers were selected by purposive sampling techniques among newly admitted children with ARI who (mothers) met inclusion criteria. Five mothers were discharged after pre- test. Finally sample group consisted of thirty mothers.

Data collection tools and techniques: Based on objectives following data collection tools were used.

Table 1: Data collection tools and techniques for the study.

SL. NO	TOOLS	VARIABLES	TECHNIQUES
1.	Structured Interview schedule	• Demographic Data	Interviewing
2.	Structured Interview schedule	• Knowledge of mother regarding ARI.	Interviewing
3.	Structured Interview schedule	• Knowledge of practice of mother regarding ARI.	Interviewing
4.	Opinionnaire	• Opinion of mother regarding guideline for ARI	Questioning (self report)

The tool was developed after establishing content validity with input from seven experts—five nursing experts and two paediatric doctors. The Content Validity Index (CVI) ranges from as 0.9-0.92 Tool was pretested and try out with 20 mothers in another Medical College for obtaining reliability understanding of language, feasibility of administering of tool. Reliability was assessed using the split-half technique on 20 mothers. The reliability coefficient was calculated using the Pearson Product-Moment Correlation and adjusted using the Spearman-Brown formula. The correlation coefficient was found to be 0.8 for Tool 2 and 0.9 for Tool 3. The Content of Guideline on ARI validated by seven experts and translated from English to Bengali and validated by language experts.

Item analysis also done to identify Discrimination index and difficulty index of each items were computed. Discriminating index range from 0-0.8. Difficulty index within 0.3 to 0.7 of all question.

Ethical Clearance: Ethical clearance was taken from the chairperson of the Institutional Ethics Committee of Burdwan Medical College, Burdwan. Participant informed written consent was taken before collecting data. Confidentiality was ensured and anonymity was maintained for each of the participant.

Methods of Data Collection: Newly admitted mothers who met inclusion criteria were enrolled for the study. Data were collected in two phases. Self-introduction was given and purpose, nature of study was explained to all participants. Rapport was established and maintained. Informed consent was taken from each participant. After data from interview schedule coded into Microsoft Excel 2010 spreadsheet. All entries were checked for any error. The coded Excel sheet was analyzed using descriptive and inferential statistics. The level of significance was set up as $p < 0.5$ level.

Table :2 ; Schematic diagram of data collection

Group	Day 1 Pre Test	Day 1 Treatment	Day 8 Post Test
Newly admitted Mothers with their child (0 to 5 years) with ARI who met inclusion and exclusion criteria	Assessment of demographic variables and assessment of knowledge and knowledge of practice by structured interview schedule.	Read out guideline regarding ARI and distributed.	Assessment of knowledge and knowledge of practice by same interview schedule after seven days. Assessment of opinion of mother regarding guideline.

Results :Table : 3 Distribution of sample by their age, religion family type, number of children
n=30

Sl no	Demographic variables	Frequencies	Percentage
1	Age of mothers		
	Below 19 years	5	16.67
	19 to 25 years.	23	76.66
	26 to 45 years	2	6.67
	Above 45 years.	Nil	0
2.	Religion		
	Hindu	18	60
	Muslim	12	40
	Christen	Nil	0
	Others	Nil	0
3.	Family type		
	Nuclear /family member upto 6 person	20	66.67
	Joint/Family member more than 6 person	10	33.33
4.	Number of children		
	One	17	56.67
	Two	10	33.33
	Three	3	10
	Four or more	Nil	0

Table :4 Distribution of children by their birth weight, cried after birth, attend ICDS

Sl no	Demographic variables	Frequencies	Percentage
1	Birth weight of child		
	1 to 1.49kg.	01	3.33
	1.5kg to 1.99kg.	01	3.33
	2kg to 2.5kg	12	40
	More than 2.5kg	15	50
	Don't know .	01	3.33
2.	Cried after birth		
	Yes	25	83.33
	No	05	16.67
3.	Attend ICDS		
	Yes	27	90
	No	03	1

n=30

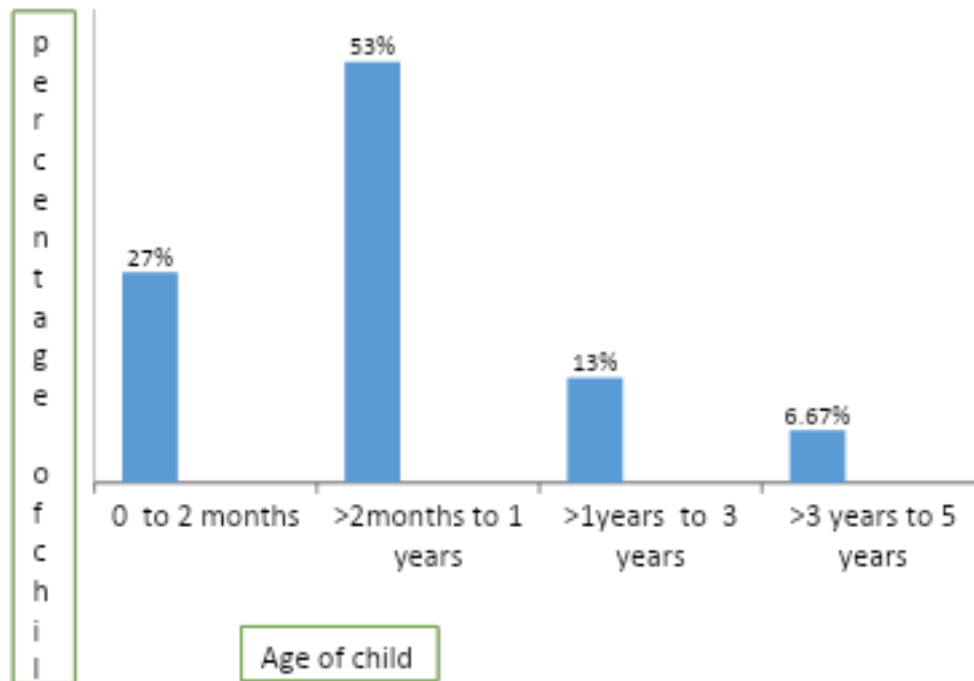


Figure1: Bar diagram showing age of the children

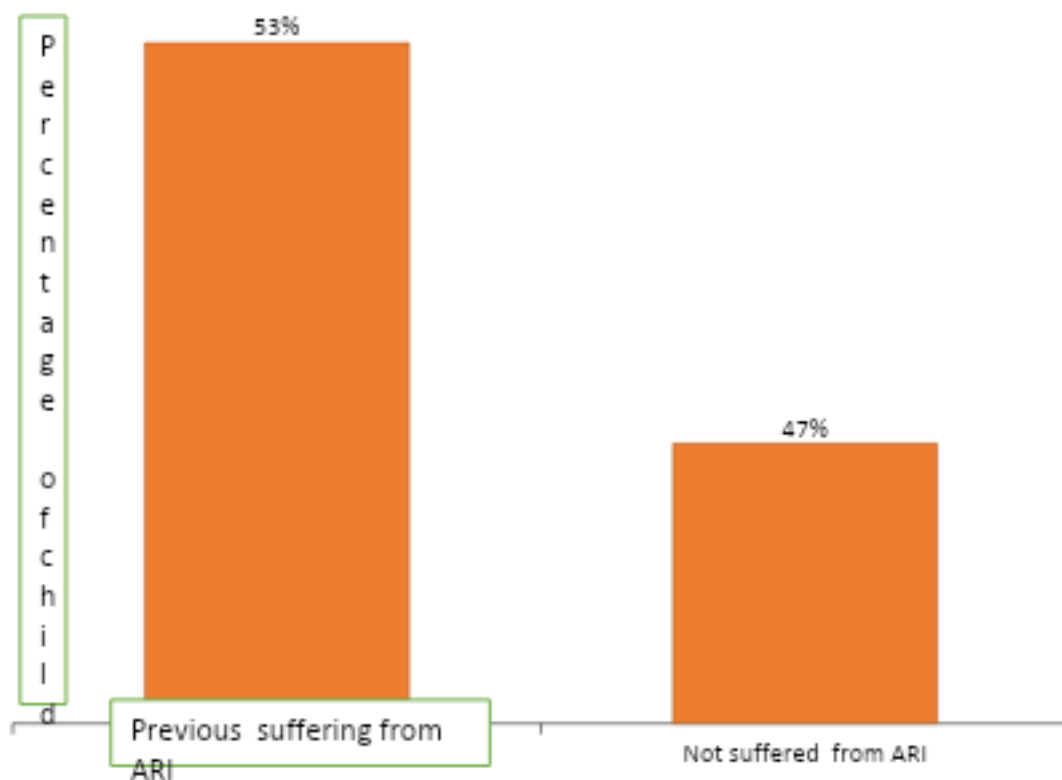


Figure 2: showing previous suffering of ARI

Table 5. : Mean, Median , Standard Deviation(SD) of pre- test and post - test knowledge scores of mothers regarding Acute respiratory infections. n=30

Sl no	Knowledge score	Range	Mean	Median	SD
1	Pre - test	2-13	8.1	8.1	2.28
2	Post- test	8-18	13.4	13.5	3.30

The data presented in table 5. showed that the mean post- test knowledge score of mothers (13.4) was apparently higher than the mean pre -test knowledge score (8.1) with maximum possible scores 18 . The data further depict that median of post- test knowledge score (13.5) is seemed to be higher than pre- test knowledge median score (8.1). Pre-test data on knowledge scores lie between 2-13 and post-test scores lie within 8 -18. Further the standard deviation of pre-test scores (2.28) seemed to be less dispersed than the post-test scores (3.30).

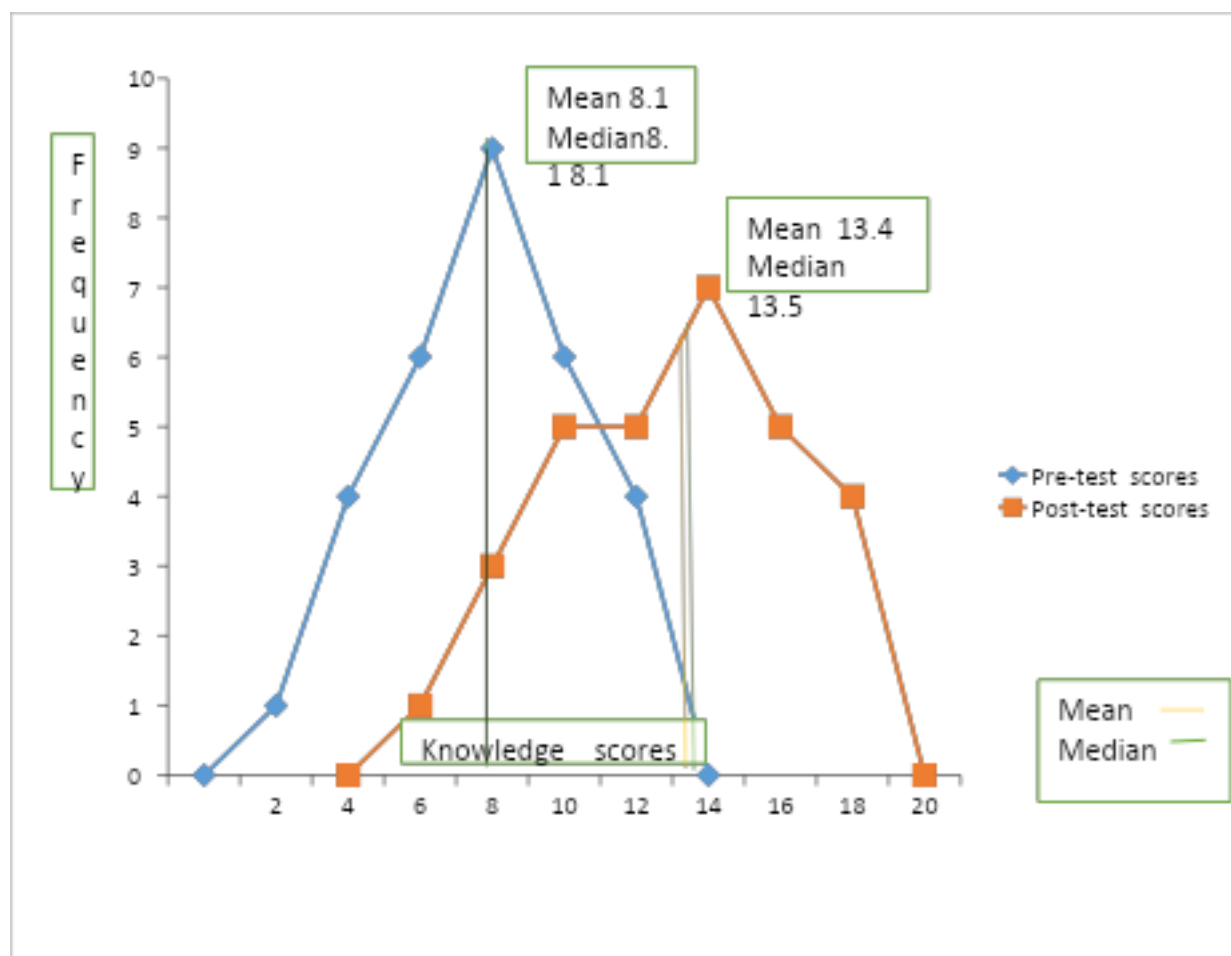


Figure :3. The distribution of Pre- test and Post–test Knowledge scores regarding ARI of mothers by smoothed frequency polygons.

The Frequency Polygons in figure 3 depicted the distribution of pre-test and post-test knowledge scores with depiction of mean and median. In pre-test, the mean is 8.1 and median 8.1, mean lies over median, skewness is zero, indicating the scores are normally distributed, whereas at post-test the mean is 13.4 and median 13.5; the mean lies to the left of the median so distribution is negatively skewed and skewness is negligible -0.096 indicating the scores are near normally distributed. The figures also showed that maximum post-test knowledge scores lie in the right side of the pre-test knowledge scores indicating that the post-test scores of mothers is increased.

Table 6 Area wise distribution of maximum possible scores on ARI on knowledge in terms of pre-test and post-test mean, mean percentage score, actual and modified gain of mothers. n=30

Sl no	Knowledg	Max.	Mean percentage		Actual gain	Modified
gain	Area	possible	Pre- test	Post- test		percentage
percentage		scores				
1	Meaning of ARI	1	83	86	3	0.17
2.	Causes	1	63	100	37	1
3.	Risk factors	2	48	86	38	0.73
4.	Mode of transmissions	1	20	56	36	0.5
5.	Signs and symptoms	9	47	72	25	0.47
6.	Danger Signals	2	46	71	25	0.46
7.	Complications	2	15	63	48	0.56

Maximum score = 18

The data presented in table 6. showed that the mean post-test knowledge score in all areas of knowledge interview schedule is higher than the mean pre-test score. Data also present that mean percentage of pre-test and post-test knowledge score. And at pre-test knowledge is highest in the area of meaning of ARI (83%) and is lowest in the area complication of ARI (15%). And other areas are causes (63%), risk factors (48%), signs and symptoms (47%), danger signals (46%), mode of transmissions (20%) respectively. The table also shows that maximum modified mean gain (1) in the area of "cause", followed by the area of "risk factors of ARI" (0.73), "complications" (0.56), "mode of transmission" (0.5), "signs and symptoms" (0.47), "danger signals" (0.46) and minimum modified mean gain in the area of "meaning of ARI" (0.17).

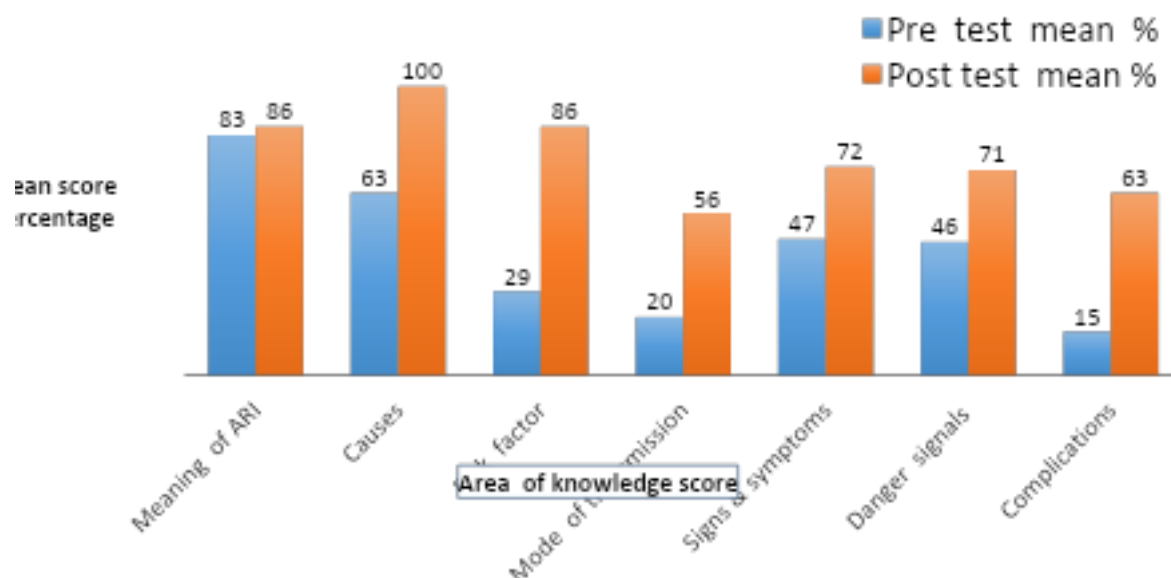


Fig. : 4. Distribution of area wise mean percentage of pre-test and post-test knowledge score.

Table :6 Mean , Mean difference ,Standard Deviation(SD) , Standard Error (SE) of mean difference and paired 't' value of pre-test and post -test knowledge score of mothers regarding on ARI. n=30.

Knowledge score	Mean	Mean difference	SD	SE	't' value
Pre- test	8.1		2.28		
		5.3		0.7	7.57 **
Post-test	13.4		3.10		

** $t_{(29)} = 2.045, p < 0.05^*$, $2.76, p < 0.01$

*means significant

The data presented in table 6 indicated that the mean post- test knowledge score (13.4) of mothers are apparently higher than the mean pre-test score (8.1) after exposure to the guideline with mean difference 5.3 as evident from structured interview schedule . The obtained difference between the post test and pre-test mean knowledge score of mothers are found statistically significant as evident from 't' value of 7.57 for df 29 at 0.01 level .So it is also significant at 0.05 level. Therefore the obtained mean difference between pre- test and post-test knowledge score is a true difference and not by chance.

Table 7: Mean, Median, Standard Deviation (SD) of Pre-test and Post-test knowledge of practice scores of mothers regarding acute respiratory infections.

n=30

Sl no	Knowledge of Practice score	Range	Mean	Median	SD
1	Pre test	2-11	6.6	6.6	2.02
2	Post test	7-12	10.8	11.35	1.6

The data presented in table 7 shows that the mean post-test knowledge of practice score of mothers (10.8) was apparently higher than the mean pre-test knowledge of practice score (6.6) with maximum possible score 12. The data further indicate that median of post-test knowledge of practice scores (11.35) is seemed to be higher than pre-test knowledge of practice scores (6.6). Pre-test knowledge of practice scores also lie in between 2-11 and post-test scores lie within 7-12. Further the standard deviation of post-test knowledge of practice scores (1.6) seemed to be less dispersed than the pre-test knowledge of practice scores (2.02). And pre-test mean equals with pre-test median denote normal distribution of group.

For further elucidating of the findings the pre-test and post-test scores of mothers are plotted in the ogive.

n=30

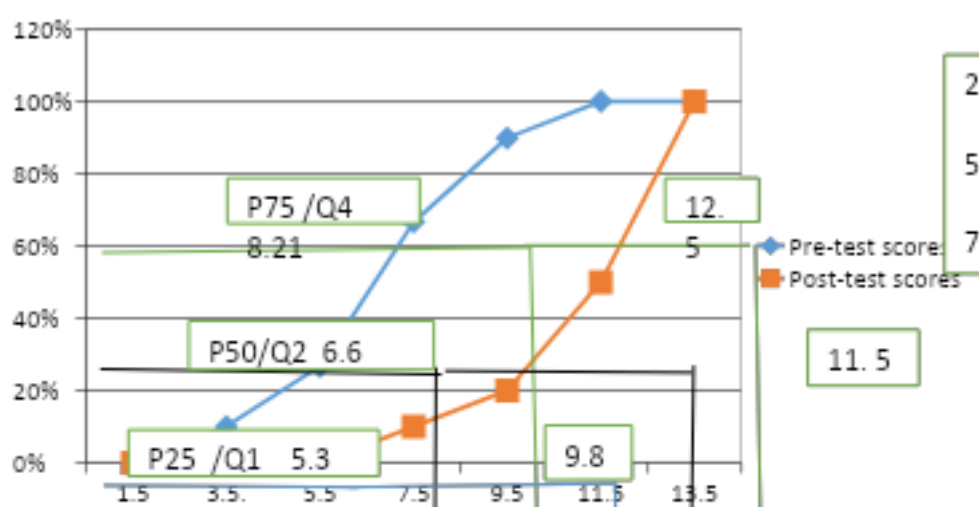


Figure:5; Ogive representing scores of Pre-test and Post-test Knowledge of practice scores of mothers regarding ARI.

The ogive in figure 5 showed that post test practice score lies to the right of the pretest practice score over the entire range, showing that the post test score consistently higher than the pre-test. Differences in achievement as between the two scores were showed by the distances separating the two curves at various levels. It was clear that differences at the extremities between the very high post-test and pre-test scoring were not so great as differences over middle range. This is brought out in a comparison of certain points in the distributions. The 25 percentile (9.83), 50th percentile (11.35), 75th percentile (12.5) of the post-test was apparently higher than pre-test practice scores at 25th percentile (5.3), 50th percentile (6.6), 75th percentile (8.21), it is clear more at 50th percentile than 25th percentile. Thus it can be concluded that post test practice scores are apparently higher than the pre-test practice scores. A closure look at the post test practice scores revealed that within the 25th percentile the scores was gradually ascending but ascending was slower than 50th to 75th percentile.

Table 8 . Area wise distribution maximum possible scores on knowledge of practice of ARI in terms of pre- test and post- test mean, mean percent score, actual and modified mean gain of mothers.

Sl n o	Knowledg e area	Max. Possibl e score	Mean percentage Score		Actual gain score percentag e	Modified gain score
			Pre test	Post test		
1	Meaning of ARI	1	66	96	30	0.88
2.	What to do in different stages	7	54	89	35	0.76
3.	Home remedy	1	63	100	37	1
4	Prevention	3	4	86	41	0.74

n=30

Maximum score = 12

The data presented in table 8. show that the mean post- test knowledge of practice scores in all areas of knowledge of practice scores are higher than the mean pre- test knowledge of practice scores.

Table 9::Mean ,Mean difference ,Standard Deviation (SD), Standard Error(SE) of mean difference and paired 't' value of pre-test and post –test knowledge of practice scores of mothers regarding ARI.

n=30

Knowledge of practice	Mean	Mean difference score	SD	SE	't' value
Pre test	6.6		2.02		
		4.2		0.45	9.33 **
Post	10.8		1.6		

**t₍₂₉₎ = 2.045, p<0.05*, 2.76, p<0.01, * means significance.

The data presented in table 9. indicated that the mean post- test knowledge of practice score (10.8) of mothers was apparently higher than the mean pre-test score (6.6) after exposure to the guideline with mean difference 4.2 as evident from structured interview schedule . The obtained difference between the post test and pre- test mean knowledge of practice scores (4.2) of mothers was found statistically significant as evident from 't' value of 9.33 for df 29 at 0.01 level . So it is significant at 0.05 level. Therefore the obtained mean difference between pre- test and post-test knowledge of practice scores are a true difference and not by chance. So it can be said that guideline for ARI is effective in enhancing knowledge of practice of the mother.

Determine opinion of mothers on guideline regarding ARI

Mother's opinion about guideline regarding child care ARI by self reporting on structured opinionnaire
Table 10 : Frequency percentage distribution of opinion on mothers on guideline regarding ARI.
n=30

Sl no	Statement I feel that	Fully agree	Partially	Not
Agree			Agree	Not
(%)		(%)		(%)
1	Guideline write in a organized way	93.4	6.6	
2.	Content area well covered .	90.1	9.9	
3.	Guideline is appropriate for Care of a child with ARI.	93.4	6.6	
4.	Its language is simple & understanding	93.4	6.6	
5	Guideline helps me to make conscious about ARI	93.4	6.6	
6	I get confidence regarding care of a child with ARI	96.7	3.3	
7.	Any other			

Table No: 11. Odd ratio (OR) value of Birth weight, Cried after birth, Attend ICDS,

Family type, Residence with Previous occurrence of ARI in a child.

n=30

Sl. No	Variables	Previous Suffering from ARI (OR)	Previous not suffering from ARI	Odd Ratio
1. Birth Weight				
	<2kg	13	13	2*
	≥2kg	2	1	
2 . Cried after birth				
	Cried after birth	12	13	0.23
	Not cried after birth	4	1	
Attend ICDS				
	Attending ICDS	14	13	0.53
	Not attending ICDS	2	1	
4 Family type				
	Lived in Joint family/family member upto six person	5	5	0.81
	Not lived in joint family/family member less than six person	11	9	
5. Residence				
	Live in Rural area	14	13	0.53
	Not live in rural area	2	1	
Significance * OR>1				

Above table depicted that Children with birth weight <2 kg had lower odds of previous ARI compared to those with ≥ 2 kg (OR = 0.50; 95% CI: 0.04–6.22; $p = 1.00$). However, this association was not statistically significant.

Children who cried after birth had lower odds of ARI compared to those who did not (OR = 0.23; 95% CI: 0.02–2.37; $p = 0.34$), though the result was not statistically significant. Children attending ICDS had lower odds of ARI (OR = 0.54; 95% CI: 0.04–6.67; $p = 1.00$), but this was also not statistically significant. Family Type: Children living in joint families or families with up to six members had slightly lower odds of ARI (OR = 0.82; 95% CI: 0.18–3.74; $p = 1.00$), with no significant association. Children living in rural areas showed lower odds of ARI than those in non-rural areas (OR = 0.54; 95% CI: 0.04–6.67; $p = 1.00$), which was also not statistically significant.

Table :11. Association between mothers knowledge level and demographic variables. n=30

Demographic Variables	Knowledge level		X^2
	Median <8	$\geq$ Median ≥ 8	
Age			
≤ 20 years	8	6	1.12
> 20 years	5	11	
Educations			
$< VIII$	8	4	0.061
$\geq VIII$	8	10	
Per capita income			
$\leq$ Rs 1000/ month	11	6	1.642
$> Rs$ 1000/month		5 8	

$X^2_{(1)} 3.84^*$, $p < 0.05$; * means significance.

Table :18. Association between mothers knowledge of practice level with**demographic variables****n=30**

Demographic Variables	Knowledge level		X^2
	<Median	≥Median	
	< 6.6	≥6.6	
Age of mothers			
≤20 years	6	10	0.47
>20 years	7	7	
Age of children			
Below 1years	11	13	0.008
Above 1 years	2	4	
Educations			
<VIII	6	6	0.36
≥VIII	7	11	
Religion			
Hindu	8	10	0.05
Muslim	5	7	

Per capita income

≤ Rs 1000/ month	7	10	0.074
>Rs 1000/month	6	7	

$$X^2_{(1)} = 3.84^*, p < 0.05$$

Discussion

Present study revealed occurrence of ARI more common within 0 to 1 years of age (81%). A cross-sectional study involving 509 under-five children in urban and rural areas of Puducherry found that the prevalence of ARI was highest in the 0–12 months age group, accounting for 63.2% of cases.² This indicates a significant vulnerability of infants to ARI in this region.

In present study showed 63% mothers recognized three danger signs stridor, chest indrawing & fast breathing, 23% recognized stridor, 10% recognized fast breathing 6.6% chest indrawing as a meaning of ARI. Data from 33 MICS, 1999-2001 analysed by UNICEF on The Pneumonia a forgotten killer 21% recognize difficult breathing, 17% recognize fast breathing. So recognition is better in current study.

A study conducted in Mehsana District, Gujarat, evaluated the effectiveness of an educational program aimed at increasing mothers' knowledge about acute respiratory infections (ARI) in children under five. The study involved 60 mothers and utilized a pre-test/post-test design. The findings indicated a significant improvement in knowledge scores, with the mean pre-test score at 8.51 and the post-test score rising to 19.31. This substantial increase underscores the effectiveness of structured educational interventions in enhancing maternal awareness of ARI.

These results align with your current study, where mothers' knowledge significantly increased following the administration of the guideline, as indicated by a notable rise in mean scores from pre-test ($M = 8.1$) to post-test ($M = 13.4$), $t(29) = 7.57$, $p < 0.01$. Both studies highlight the critical role of educational programs in improving mothers' understanding of ARI, which is essential for early detection and management, ultimately reducing child morbidity and mortality associated with respiratory infections.

In the current study, it was revealed that mothers' knowledge significantly increased following the administration of the guideline, as indicated by a notable rise in mean scores from pre-test ($M = 8.1$) to post-test ($M = 13.4$), $t(29) = 7.57$, $p < 0.01$. This finding is consistent with a similar study conducted in Kalaburagi, Karnataka, where an educational intervention program among 50 mothers of under-five children led to a significant increase in knowledge scores from a pre-test mean of 10.64 to a post-test mean of 14.86. The study reported a paired t -test value of 17.37, confirming a statistically significant improvement in maternal knowledge at the 5% level.³ These results reinforce the effectiveness of structured teaching programs in improving mothers' awareness and understanding of acute respiratory infections (ARI) in children. The similarity in outcomes across different regions highlights the broader applicability and impact.

In the current study, it was revealed that mothers' knowledge significantly increased following the administration of the guideline, as indicated by a notable rise in mean scores from pre-test ($M = 8.1$) to post-test ($M = 13.4$), $t(29) = 7.57$, $p < 0.01$.

In present study pre-test mean the present study, the pre-test mean practice score among mothers regarding acute respiratory infections (ARI) in under-five children was 6.6, which increased to 11.35 in the post-test, with a statistically significant **t-value of 9.33 (df = 29, $p < 0.01$)**. This demonstrates the effectiveness of the health education intervention in improving maternal practices. Similar findings were reported in a study conducted in Andhra Pradesh by Muthukumaran A (2022) where the mean practice score increased from 6.8 to 12.1 following a structured teaching program,⁴

In present study showed after exposure of guideline ARI for correlation coefficient between post-test knowledge and knowledge of practice was 0.7 at 0.01 level. So high degree correlation present between knowledge and knowledge of practice score of mothers.

Study result also support with the study of Sherene G Edwin. Who proved that significant positive correlation present between knowledge, attitude and knowledge on practice during the pre-test and post-test (0.05 level).

Limitation of the study: Mothers were busy and not allowed sufficient time.

Implication : Study emphasis prevention of ARI by increasing knowledge of mother. So this study can be applied at community level ICDS centre to provide knowledge of the mother, at hospital in the ward, in the OPD to create awareness of the mothers

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1. Hasan MM, Saha KK, Yunus RM, Alam K. Prevalence of acute respiratory infections among children in India: Regional inequalities and risk factors. *Matern Child Health J.* [Internet] 2022 [cited 2025 May 6]; Apr 18;26(7):1594–1602. Available from <https://pmc.ncbi.nlm.nih.gov/articles/PMC9174316/>

2. Kumar SG, Majumdar A, Kumar V, Naik BN, Selvaraj K, Balajee K. Prevalence of acute respiratory infection among under-five children in urban and rural areas of Puducherry, India. *J Nat Sci Biol Med.* [Internet]. 2015 [cited 2025 May 7]; Jan-Jun;6(1):3-6. Available from <https://pubmed.ncbi.nlm.nih.gov/25810626/>

3. Mahalakshmi B, Patel NB, Sivasubramanian N, Ramalakshmi G, Krishnan A, Patel DN. Awareness among mothers on acute respiratory tract infections in under five children at north Gujarat, India. *Bioinformation.* [internet] 2023 [cited 2025 May 7] Jun 30;19(6):713–5. Available from doi:10.6026/97320630019713.

4. Muthukumaran A. A study to assess the effectiveness of structured teaching program on knowledge and practice regarding prevention of acute upper respiratory tract infection among mothers of under five children in selected hospital, Lucknow. *J Educ Technol Health Sci.* [internet] 2022 [cited on 2024, April 5];9(2):37–43. Available from: <https://www.jeths.org/article-details/17288>

5. Edwin SG. Effect of planned teaching programme on knowledge, attitude, and practice regarding acute respiratory infections among mothers. *J Health Educ [internet].* 2023 [cited 2025, April 5];15(2):123-130. Available from https://www.tnaijournal-nji.com/admin/assets/article/pdf/10004_pdf