



# Practices And Perceptions Of Anganwadi Teachers On Teaching Science To Young Children In Telangana State

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## Abstract

There is an increasing emphasis on incorporating science education into early childhood development classrooms globally. This has prompted many countries to formulate and enforce policies that promote the teaching of science process skills. The attitudes and beliefs of teachers play a vital role in integrating new changes into the classroom effectively. The present research paper aims to investigate the practices and perceptions of Anganwadi teachers on teaching science during early childhood period. The study involved a total of 60 Anganwadi teachers (30 in the experimental group and 30 in the control group) from both urban and rural areas of Telangana State, India. Data was collected through an interview schedule, with Anganwadi teachers serving as the primary respondents. "A questionnaire to assess preschool teachers' practices, perceptions and knowledge on Science" was used to study the knowledge and practices of Anganwadi teachers. Pre and post test was conducted for both experimental and control groups and the data was subsequently analysed. The majority of Anganwadi teachers mentioned that science activities are included in their curriculum, yet they reported not being provided with any teaching resources for science. A significant difference was observed between the post-test scores of the experimental and control groups, with the experimental group showing higher scores at a 0.05 level. Participants in the experimental group demonstrated increased interest and confidence in teaching science compared to those in the control group. It was also found that the post-test scores of the experimental group are higher than the pre-test scores, while both pre and post-test scores of the control group are nearly the same on the perceptions about teaching science to young children.

**Key words:** Science; Anganwadi teachers; practice; perceptions; attitude; early childhood education; pre and post test

## 1. Introduction

The teaching methodologies of science process skills has generated extensive research, with some researchers contending that science education is crucial for young children as it aids in helps comprehension of the world around them (Abungu et al, 2014).

In a recent study, Agnes et al, (2022) reported that the instruction of science process skills to young children is essential for cultivating and mastering the pertinent concepts and critical thinking skills required in the twenty-first century. While numerous studies have delved into the importance of teaching science process skills to young learners, considerable uncertainty remains regarding teachers' understanding of the fundamental science process skills that should be imparted in early childhood development classrooms.

Imparting science process skills to young children is vital for fostering the acquisition and mastery of pertinent concepts and critical thinking skills essential in the twenty-first century. Despite numerous studies delving into the importance of instructing science process skills to young learners, substantial uncertainty persists regarding teachers' awareness of the fundamental science process skills that should be taught in early childhood development. This shows the necessity for teachers to broaden their understanding of science process skills and recognize the importance of imparting science as a subject in accordance with the demands of the twenty-first century.

Schools have a profound impact on the development and well-being of children. Teachers in schools are seen as role models who impart life values and play a crucial role in instilling healthy learning habits from an early age. These habits endure throughout life and contribute to the formation of behaviours, beliefs, and attitudes (Kwan et al., 2005).

The influence of early education teachers is believed crucial in the development and learning of children. Their academic qualifications, understanding of educational subjects, competencies, and skills are essential components of the educational process and overall quality (Rehman et al., 2011).

Hyseni et al (2022) suggested in her research study that establishing systems to evaluate the needs of teachers and assess the quality and effectiveness of professional development can assist educational institutions in providing appropriate support for teachers, fostering their engagement, and sustaining a positive impact on all stakeholders involved in early education institutions.

While numerous studies explore teachers' practices and attitudes towards pedagogy in general, limited data is available on their practices and perceptions specific to science during early childhood. In this study, an attempt is made to understand Anganwadi teachers' perceptions of teaching science during the early childhood period.

## 1.2 Aim of the study

1. To understand existing practices of Anganwadi teachers on how they are teaching Science in Anganwadi schools.
2. To evaluate the perceptions of Anganwadi teachers towards teaching science during the early childhood period.

## 1.3 Research questions

1. What are the current practices of Anganwadi teachers in teaching Science within Anganwadi schools?
2. What are the perceptions of Anganwadi teachers regarding the teaching of science during the early childhood period?

## 2. Methodology

### 2.1 Research design

The current study employed an experimental research design, incorporating both experimental and control groups.

### 2.2 Sample

The sample comprises 60 Anganwadi teachers, with an equal distribution of 30 from rural and 30 from urban areas in Telangana state. Subsequently, the sample was segregated into experimental and control group.

### 2.3 Tool

The study utilized a questionnaire titled "A questionnaire to assess preschool teachers' practices, perceptions and knowledge on Science" to evaluate the knowledge and practices of Anganwadi teachers. This tool encompassed demographic information along with questions designed to comprehend the practices and perceptions of Anganwadi teachers concerning the teaching of science during the early childhood period. The Cronbach's Alpha value of the tool is 0.76 which indicates that the inter item consistency of the tool is adequately high and the obtained Spearman-Brown co-efficient reliability is 0.83.

## 2.4 Data collection

Official authorization was secured through a permission letter from the Commissionerate, Department of Women Development and Child Welfare (WDCD), Government of Telangana, to conduct the research in both urban and rural Anganwadi centers. The questionnaire for pre and post-testing was conducted on both the experimental and control groups prior to and following the training program. Subsequently, the gathered data was processed for statistical analysis.

## 3. Results and Discussion

**Table 1. Demographical Data of the Participants as per their Age, Education and Experience (N=60)**

Item	Number	%
<b>Age (years)</b>		
< 40	29	48
> 40	31	52
<b>Education</b>		
< Graduation	26	43
> Graduation	34	57
<b>Experience (years)</b>		
< 10	8	13
> 10	52	87

Table 1 presents an overview of Anganwadi teachers' demographics. Notably, nearly half (48%) fall within the age group below 40 years, with the remaining 52% belonging to the above 40 years age group. A majority of teachers hold graduate degrees (57%), while 43% have education levels below graduate. Regarding experience, 87% of teachers have accumulated over 10 years of experience, and 13% have less than 10 years of experience. Thus, the study sample includes a majority of graduates, above 40 years of age with more than a decade of experience.

**Table 2. Understanding the current programme and availability of resources for Anganwadi teachers (N=60)**

S.No.	Question	No.	%
1	<i>Are science activities part of your curriculum?</i>		
	Yes	60	100
	No	0	0
2	<i>How many minutes per week do you teach science to children?</i>		
	< 1 hour	52	87
	>1 hour	8	13
3	<i>Are you provided with any specific material for teaching science concepts?</i>		
	Yes	4	7
	No	56	93
4	<i>How do you introduce science concepts to children?</i>		
	Oral explanation	28	53
	Showing material	32	47

It is important to understand the existing curriculum and availability of resources in the Telangana state in order to implement the science activities in Anganwadi centres. This will help identify any gaps and plan training programs and provide resources to Anganwadi teachers. Table 2 demonstrates the existing program of Anganwadi centers in Telangana state. All the participants (100%) mentioned that science activities are part of their curriculum. Eighty seven percent stated that they are teaching science for less than one hour per week to Anganwadi children, and thirteen percent of them said that they are teaching science for more than an hour in a week.

A majority (93%) of Anganwadi teachers revealed that they are not provided with any resources for teaching science, whereas 7% stated that they are supported with the material. Science concepts are introduced through oral explanation by 53% of Anganwadi teachers, while 47% of the teachers use materials and teaching aids to introduce science concepts to Anganwadi children.

**Table 3. Means, SDs and 't' values of experimental and control group Anganwadi teachers' confidence level on teaching science to young children (N=60)**

	Experimental Group (N=30)		Control Group (N=30)		't' value
	Mean	SD	Mean	SD	
<b>Pre-test</b>	0.83	0.70	0.83	0.65	0.00@
<b>Post-test</b>	1.97	0.18	0.87	0.68	8.57*

@ Not significant

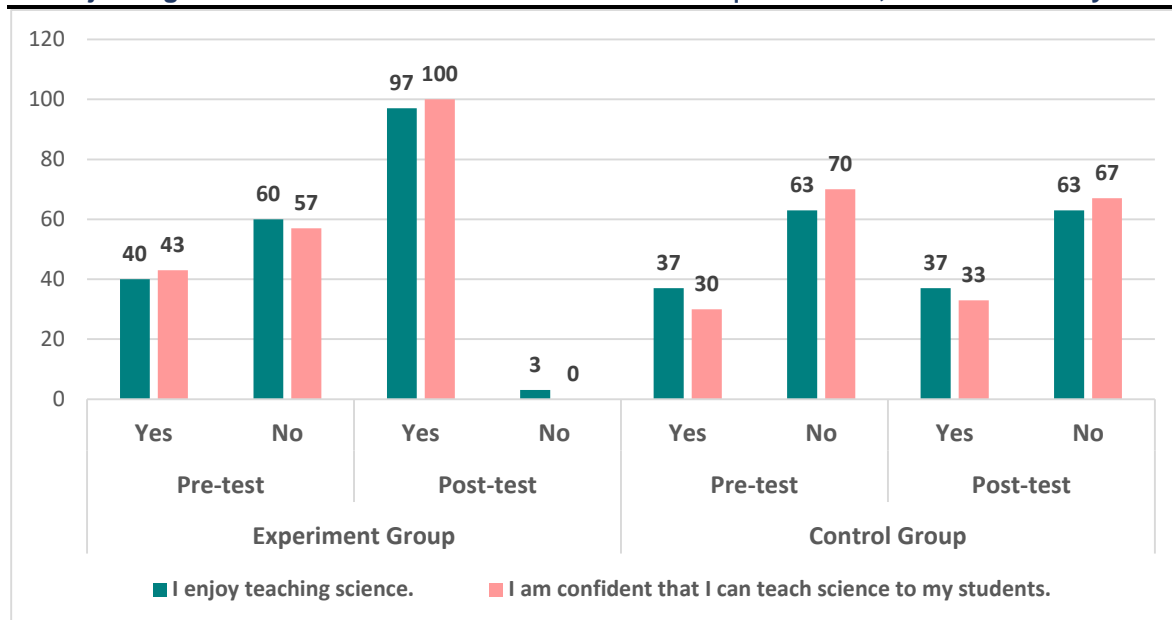
\* Significant at 0.05 level

The results as appearing in table 3 show that post-test of experimental and control groups differed significantly at 0.05 level. Two questions were designed to gauge the interest and confidence level of Anganwadi teachers in teaching science. (i) I enjoy teaching science (ii) I am confident that I can teach science to my students. A significant difference was observed in the post-test between experimental and control groups for these two questions. On the other hand, the pre-test scores of experimental and control groups are not significant.

In a similar study, Hill (1992) found that the pretest did not lead to a measurable improvement in learning among teachers. However, the study showed that the teaching method was effective because post-instructional knowledge increased by almost fifty percent compared to pretest levels. Furthermore, in a study conducted by Behairy and Al-Batanony (2015), it was revealed that teachers exhibited limited knowledge and incorrect situational practices during the pretest, and there was a statistically significant enhancement in both knowledge and practice during the post-test and follow-up assessments.

**Table 4. Anganwadi teachers' interest and confidence in teaching science to young children (N=60)**

Question	Pre-test N (%)	Post-test N (%)
<b>Experiment Group (N=30)</b>		
<i>I enjoy teaching science.</i>		
Yes	12 (40)	29 (97)
No	18 (60)	1 (3)
<i>I am confident that I can teach science to my students.</i>		
Yes	13 (43)	30 (100)
No	17 (57)	0 (0)
<b>Control Group (N=30)</b>		
<i>I enjoy teaching science.</i>		
Yes	11 (37)	11 (37)
No	19 (63)	19 (63)
<i>I am confident that I can teach science to my students.</i>		
Yes	9 (30)	10 (33)
No	21 (70)	20 (67)



**Figure 1. Pre and post test scores of Anganwadi teachers' confidence level on teaching science to young children (N=60)**

Table 3 and figure 1 depicts the pre and post test scores of Anganwadi teachers regarding their interest and confidence in teaching science to young children. The results are evident that the post-test scores of the experimental group are higher than the pre-test scores, while both pre and post-test scores of the control group are nearly the same. Therefore, it can be concluded that participants in the experimental group showed increased interest and confidence in teaching science compared to those in the control group.

In a recent study, Upendra et al., (2022) found that there was an increase in post-training knowledge scores among the teachers compared with their pre-training scores. Researcher reported that the enhancement in knowledge scores resulting from the training program may not directly translate into behavioral changes. However, it underscores the significance of targeting school teachers for their effectiveness in teaching skills. School teachers have historically played a multifaceted role in fostering various developmental changes among school children and within school environments.

**Table 5. Means, SDs and 't' values of experimental and control group Anganwadi teachers' perceptions about teaching science to young children (N=60)**

	Experimental Group (N=30)		Control Group (N=30)		't' value
	Mean	SD	Mean	SD	
<b>Pre-test</b>	13.00	2.85	13.17	3.47	0.21@
<b>Post-test</b>	8.23	0.50	13.17	3.47	7.72*

@ Not significant

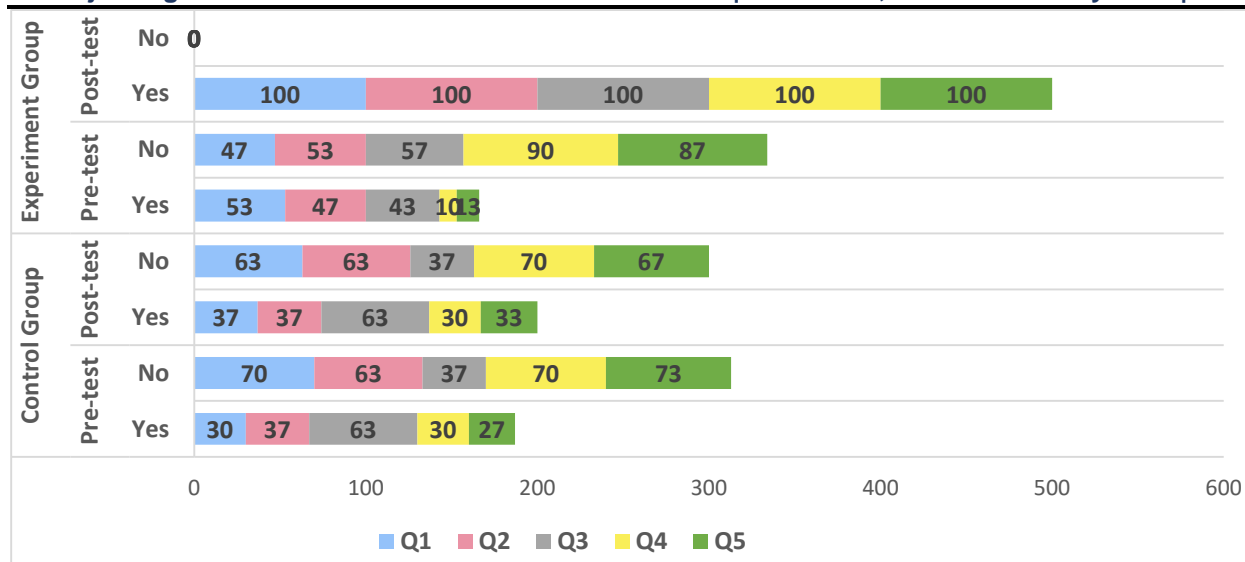
\* Significant at 0.05 level

There were seven questions on perceptions for which the findings presented in table 5 indicate a significant difference between the post-test scores of the experimental and control groups at the 0.05 level. In contrast, the pre-test scores of both the experimental and control groups did not show significance on Anganwadi teachers' perceptions on teaching science to young children. This indicates that teachers' perceptions and attitudes towards teaching science to young children became more positive over the course of the study. These results are incongruence with a study conducted by Akçoltekin (2016), found notable changes in teachers' attitudes towards scientific research, with post-test scores showing a significant improvement compared to pre-test scores ( $p < .05$ ).

**Table 6. Perceptions of Anganwadi teachers' on teaching Science to young children (N=60)**

Question	Pre-test		Post-test	
	Yes N (%)	No N (%)	Yes N (%)	No N (%)
<b>Experiment Group (N=30)</b>				
Q1	16 (53)	14 (47)	30 (100)	0 (0)
Q2	14 (47)	16 (53)	30 (100)	0 (0)
Q3	13 (43)	17 (57)	30 (100)	0 (0)
Q4	3 (10)	27 (90)	30 (100)	0 (0)
Q5	4 (13)	26 (87)	30 (100)	0 (0)
Q6	Oral explanation / textbooks N (%)	Demonstrating experiments N (%)	Oral explanation / textbooks N (%)	Demonstrating experiments N (%)
	21 (70)	9 (30)	1 (3)	29 (97)
Q7	Preschool age N (%)	Primary school age N (%)	Preschool age N (%)	Primary school age N (%)
	28 (93)	2 (7)	30 (100)	0 (0)
<b>Control Group (N=30)</b>				
	Yes N (%)	No N (%)	Yes N (%)	No N (%)
Q1	9 (30)	21 (70)	11 (37)	19 (63)
Q2	11 (37)	19 (63)	11 (37)	19 (63)
Q3	19 (63)	11 (37)	19 (63)	11 (37)
Q4	9 (30)	21 (70)	9 (30)	21 (70)
Q5	8 (27)	22 (73)	10 (33)	20 (67)
Q6	Oral explanation / textbooks N (%)	Demonstrating experiments N (%)	Oral explanation / textbooks N (%)	Demonstrating experiments N (%)
	17 (57)	13 (43)	16 (53)	14 (47)
Q7	Preschool age N (%)	Primary school age N (%)	Preschool age N (%)	Primary school age N (%)
	26 (87)	4 (13)	26 (87)	4 (13)

Q1: Is it essential to introduce basic science activities for preschool children? Q2: Do you think preschool children enjoy and understand simple science experiments? Q3: Introducing science during early years will help students to develop interest on science in the later years. Q4: When we show concrete material, children can learn and understand the concepts better. Q5: Children can learn best by doing than by memorizing the science concepts. Q6: What is the best way to teach basic science concepts to preschool children? Q7: In your opinion, what is the appropriate age for introducing science to children?



**Figure 2. Pre and post test scores of Anganwadi teachers' perceptions about teaching science to young children (N=60)**

There were seven questions to understand the perceptions of Anganwadi teachers on teaching science to young children. The data revealed that (Table 6 and figure 2) there was a difference between the pre and post-test scores of the experimental group. Whereas, no difference was found in the pre and post-scores of the control group. In the pre-test, 53% of the respondents in the experimental group perceived it as “essential to introduce science for preschool children” and in the post-test, all respondents (100%) agreed to the same statement. Forty seven percent of Anganwadi teachers opined that “preschool children enjoy and understand simple science experiments” in the pre-test, while 100% of them agreed to that in the post-test among experimental group.

In the same way, 43% participants agreed to the statement that “introducing science during early years will help students to develop interest on science in the later years” in the pre-test and all (100%) the experimental group participants agreed to the statement in the post-test results. Only 10% of teachers perceived that “when we show concrete material, children can learn and understand the concepts better” in the pre-test whereas, 100% of them accepted the statement in the post-test of the experimental group. Among the experimental group respondents, very less number (13%) expressed that “children can learn best by doing than by memorizing the science concepts” in the pre-test, but 100% of them agreed to the statement in the post-test.

Nearly one third (30%) of Anganwadi teachers opined that “the best way to teach basic science concepts to preschool children is through conducting science experiments” and remaining 70% stated that “the best way is through oral explanation”. In contrast, 97% the participants changed their opinion in the post-test, stating that “the best way to introduce science concepts is through demonstration and experiments”. In both pre (93%) and post (100%) test among experimental group, teachers expressed that “the preschool is the appropriate age for introducing science to children”.

In all these seven questions about perceptions of teachers about teaching science to young children, there is not much difference found between control group pre and post tests. Thus it can be concluded that the participants in the experimental group changed their opinions and developed positive attitudes towards teaching science to preschool age group children.

#### 4. Conclusion

The purpose of this current study is to explore the perceptions of Anganwadi teachers regarding the teaching of science in early childhood. Key findings include:

- Significantly higher post-test scores were observed in the experimental group compared to the control group, with a notable distinction in the interest and confidence levels of Anganwadi teachers regarding teaching science to young children.
- Participants in the experimental group exhibited high interest and confidence relative to those in the control group.
- Furthermore, teachers' perceptions and attitudes became more positive towards teaching science to preschool age group children.

## 4.2 Recommendations

1. Moving forward, there is a need for additional research on science education during early childhood.
2. Ongoing educational and training initiatives should be introduced for early childhood educators, specifically in the realm of early childhood science education.
3. It is essential to foster a positive attitude among early childhood teachers regarding the integration of science into early childhood classrooms.

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## Conflict of interest disclosure

The authors declare that there is no conflict of interest.

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