



Effectiveness of Structured Teaching Program on Knowledge Regarding Assessment and Treatment of Young Infants Based on IMNCI Guidelines Among Nursing Students

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<https://doi.org/10.53926/YNJR/0018>

<https://ynjr.in/>

Abstract

Introduction: Reducing neonatal and infant mortality remains a major public health priority, particularly in developing countries like India. The Integrated Management of Neonatal and Childhood Illness (IMNCI) strategy, developed by WHO and UNICEF, provides evidence-based protocols for early detection and management of childhood illnesses. Despite its importance, gaps in nursing students' knowledge regarding IMNCI guidelines persist, mainly due to limited structured educational exposure. Recognizing this need, the present study aimed to assess the effectiveness of a structured teaching program on the knowledge of nursing students regarding the IMNCI guidelines in a selected nursing college in Lucknow. Enhancing knowledge during the formative academic phase can significantly contribute to building skilled future healthcare providers, ultimately improving child health indicators. **Methods:** A quantitative pre-experimental study design with a one-group pre-test post-test approach was adopted for this research. A total of 80 nursing students were selected using non-probability purposive sampling. The inclusion criteria consisted of students who were available during the study and willing to participate. A structured questionnaire consisting of multiple-choice questions based on IMNCI guidelines was developed and validated for data collection. The participants first underwent a pre-test to assess their baseline knowledge, followed by the administration of a structured teaching program covering all essential aspects of IMNCI. After a gap of one week, a post-test was conducted using the same questionnaire to evaluate knowledge improvement. Statistical analysis was performed using SPSS software. Descriptive statistics like mean and standard deviation were used for summarizing data, while inferential statistics like the paired t-test and chi-square test were applied to test the hypotheses. **Results:** The analysis revealed a significant enhancement in the knowledge levels of nursing students after the structured teaching intervention. The mean pre-test knowledge score was 24.11 with a standard deviation of 5.39, which increased to a mean post-test score of 26.34 with a standard deviation of 4.99. The paired t-test showed a t-value of 2.6510 with 79 degrees of freedom, and the p-value was 0.010, which is less than the 0.05 level of significance, indicating a statistically significant difference between pre-test and post-test scores. Thus, the structured teaching program was effective in improving students' knowledge regarding IMNCI guidelines. Furthermore, the chi-square test was applied to assess the association between pre-test knowledge scores and selected socio-demographic variables. No significant association was found between pre-test knowledge scores and age or. However, a significant association was found between the course of study, prior academic exposure to IMNCI, and attendance at IMNCI workshops or training. Students who had prior exposure and training in IMNCI scored significantly better, suggesting that curriculum integration and workshop participation positively impact knowledge acquisition. **Conclusion:** The study suggests that effective implementation of IMNCI teaching into the regular nursing curriculum, organizing frequent workshops and seminars, and providing clinical exposure to IMNCI protocols could be effective strategies to prepare nursing students for real-world pediatric healthcare challenges. Given the critical role that nurses play in child health care services, equipping them with evidence-based knowledge and skills during their training years is essential for achieving better health outcomes for infants and children.

Keywords: Structured Teaching Program; IMNCI Guideline; Nursing Students; Knowledge Improvement; Infant Care; Pediatric Nursing Education; Child Health.

INTRODUCTION

Integrated Management of Childhood Illness (IMCI) is a comprehensive strategy developed by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) to address the leading causes of morbidity and mortality among children under five years of age, particularly in low and middle-income countries [1]. The strategy adopts an integrated approach to child healthcare by simultaneously addressing multiple conditions rather than focusing on single-disease management, thereby improving overall clinical outcomes and survival [1,2]. Recognizing the heightened vulnerability during the neonatal period, the strategy was later adapted in several countries, including India, as Integrated

Management of Neonatal and Childhood Illness (IMNCI), incorporating essential newborn care into the framework [2,3].

Since its global introduction in the mid-1990s, IMCI has been widely implemented as a key child survival intervention targeting major contributors to child mortality, including pneumonia, diarrhea, malaria, measles, and malnutrition [4]. In the Indian context, IMNCI represents a contextualized adaptation that integrates newborn care with community-based child health services, including early identification of illness, home visits, and timely referral [3,5]. This approach is particularly relevant in settings where healthcare access is limited and delays in care-seeking significantly contribute to adverse outcomes [6].

The implementation of IMNCI in India commenced in 2003 and has since expanded across multiple districts with large-scale training of frontline healthcare providers [5]. Despite these efforts, evidence indicates persistent gaps in the assessment and management of childhood illnesses at the primary care level, often due to inadequate training, poor supervision, and resource constraints [7,8]. Furthermore, neonatal mortality continues to account for a substantial proportion of under-five deaths, with the highest risk concentrated in the first week of life, underscoring the need for timely and integrated interventions [9]. The complexity of overlapping symptoms in early childhood illnesses further highlights the limitations of single-disease approaches and reinforces the importance of integrated case management strategies such as IMNCI [4].

Child health remains a major global public health priority, particularly in developing countries where children are frequently exposed to multiple coexisting morbidities. Conditions such as acute respiratory infections, diarrheal diseases, and malnutrition continue to contribute significantly to the burden of disease [10]. Global estimates indicate that a large proportion of child deaths are attributable to preventable causes that can be effectively managed through evidence-based interventions such as IMNCI [11,12]. In India, neonatal mortality constitutes a major share of infant deaths, with early neonatal deaths contributing the highest proportion, emphasizing the need for targeted interventions during the first two months of life [9,13].

Socioeconomic inequalities, disparities in healthcare access, and variations in health system performance further influence child health outcomes [14]. Addressing these challenges requires strengthening health systems, improving caregiver awareness, and enhancing the competencies of healthcare providers. The IMNCI strategy offers standardized, evidence-based guidelines for the identification, classification, and management of childhood illnesses, thereby improving the quality and consistency of care across different healthcare settings [1,3,15].

The effectiveness of IMNCI is largely dependent on the knowledge and clinical competence of healthcare providers. Evidence from multiple studies indicates that structured training programs significantly improve adherence to IMNCI protocols and enhance clinical decision-making and patient outcomes [16–18]. However, several challenges—including insufficient training opportunities, limited clinical exposure, inadequate supervision, and lack of essential supplies—continue to hinder optimal implementation, particularly in resource-constrained settings [7,8,19]. In India, community-based healthcare providers such as Accredited Social Health Activists (ASHAs) and Anganwadi workers play a pivotal role in delivering IMNCI services, particularly through home-based newborn care and early detection of illness [5,13].

IMNCI emphasizes a continuum of care that includes home-based management, promotion of appropriate care-seeking behavior, and timely referral of severely ill children. It also focuses on caregiver education, enabling families to recognize danger signs and provide appropriate home care [1,15]. Strengthening these components is essential for improving child survival outcomes and achieving national and global health targets, including the Sustainable Development Goals (SDGs) [12,20].

Given the existing gaps in knowledge and implementation, strengthening IMNCI training among nursing students is of critical importance. As future healthcare providers, nursing students play a vital role in the early identification and management of childhood illnesses. Enhancing their knowledge and competencies through structured educational interventions can significantly improve clinical practice and patient outcomes [16,21]. Previous research has consistently demonstrated that well-designed teaching programs contribute to improved knowledge retention, clinical reasoning, and adherence to standardized guidelines [17,18].

In this context, the present study aims to evaluate the effectiveness of a structured teaching program based on IMNCI guidelines in improving the knowledge regarding assessment and management of young infants among nursing students. Strengthening such educational interventions is essential to ensure that future healthcare professionals are adequately prepared to deliver high-quality care and contribute to the reduction of child morbidity and mortality in India [20, 21, 22].

MATERIALS & METHODS

A quantitative pre-experimental one-group pre-test and post-test design was used to assess the effectiveness of a structured teaching program on IMNCI knowledge among nursing students. Baseline knowledge was assessed using a structured questionnaire, followed by a video-assisted teaching intervention and a post-test using the same tool.

The study was conducted at St. Mary's College of Nursing, Lucknow, among 80 nursing students selected through purposive sampling. Students who were available and willing to participate were included, while those with recent IMNCI training were excluded. Data were collected using a validated structured tool comprising demographic variables and a 40-item multiple-choice questionnaire covering IMNCI concepts and management. Each correct response was scored one mark (maximum score: 40), categorized as poor (0–20), average (21–30), and good (31–40). The tool demonstrated good reliability (Cronbach's alpha = 0.85). Ethical approval and informed consent were obtained prior to data collection. Data were collected through pre-test, intervention, and post-test, each lasting 20–30 minutes. Data were analyzed using SPSS with descriptive statistics and paired t-test. A p-value < 0.05 was considered statistically significant.

RESULTS

Findings on demographic Variables

The study included nursing students from diverse socio-demographic backgrounds. The majority of the students (78.75%) were aged between 21–23 years, while 15% were in the 18–20 years age group, and only 6.25% were between 24–26 years. No participants were above 26 years of age. In terms of gender, most participants were female (88.75%), with a small proportion of males (11.25%). The students were enrolled in various nursing programs: 27.5% were from the ANM (Auxiliary Nurse Midwife) course, 27.5% from the GNM (General Nursing and Midwifery) course, 25% from BSc Nursing, and 20% from Post Basic BSc Nursing.

Regarding exposure to IMNCI (Integrated Management of Neonatal and Childhood Illness), a large majority of students (83.75%) reported having studied IMNCI as part of their curriculum, while 16.25% had not. With respect to participation in workshops or training programs related to

IMNCI guidelines, 30% of the students had attended some form of training, whereas 70% had not. Among those who had received training, 32.5% attended seminars, 6.25% participated in workshops, and 61.25% reported attending other types of training programs.

TABLE - 1: Frequency and Percentage of nursing students by socio – demographic variables

(n=80)

Variables	Categories	Frequency (f)	Percentages (%)
Ages	18-20yrs	12	15%
	21-23yrs	63	78.75%
	24-26yrs	5	6.25%
Gender	Male	9	11.25%
	Female	71	88.75%
Course of Study	ANM	22	27.5 %
	GNM	22	27.5%
	PBBSC	16	20%
	BSc Nursing	20	25%
Have you previously studied IMNCI part of your curriculum	Yes	67	83.75%
	No	13	16.25%
Have you attended any workshop or training on IMNCI guideline	Yes	24	30%
	No	56	80%
If yes specify the types of training	Seminar	26	32.5%
	Workshop	05	6.25%
	Others	49	61.25%

Findings on Pretest knowledge score of nursing students regarding IMNCI guideline

Before any intervention or training, the knowledge levels of nursing students about the IMNCI (Integrated Management of Neonatal and Childhood Illness) guidelines were assessed. The results showed that most students (57.5%) had **average**

knowledge, scoring between 21 and 30 on the test. A smaller group (37.5%) demonstrated **adequate knowledge**, with scores ranging from 31 to 40. Only a few students (5%) had **poor knowledge**, scoring between 0 and 20. This indicates that while over half of the students had a fair understanding of IMNCI, there is still room for improvement, especially in raising more students to the adequate knowledge level.

Table-2: Pretest knowledge score of nursing students regarding IMNCI guideline

(n=80)

Knowledge score range	Frequency (f)	Percentages (%)
Poor knowledge (0-20)	04	5%
Average knowledge (21 -30)	46	57.5%
Adequate knowledge (31 - 40)	30	37.5%

Findings on Posttest knowledge score of nursing students regarding IMNCI guideline

Table - 3 reveals that after the intervention or training, the knowledge levels of the nursing students about IMNCI guidelines showed noticeable improvement. Half of the students (50%) scored in the **adequate knowledge** range (31–

40), indicating a strong understanding of the content. Nearly half (48.75%) had **moderate knowledge**, scoring between 21 and 30. Only one student (1.25%) fell into the **poor knowledge** category, scoring between 0 and 20. Compared to the pre-test results, these findings suggest that the training or educational session was effective in increasing the students' knowledge about IMNCI

Table -3: Posttest knowledge score of nursing students regarding IMNCI guideline

(n=80)

Knowledge score range	Frequency (f)	Percentages (%)
Poor knowledge (0-20)	01	1.25%
Average knowledge (21 -30)	39	48.75%
Adequate knowledge (31 - 40)	40	50%

Comparison of pretest and posttest means knowledge scores

To assess the effectiveness of the training program, the mean knowledge scores of nursing students were compared between the pre-test and post-test. The mean pre-test score was 24.11 with a standard deviation (SD) of 5.39, while the mean post-test score increased to 26.34 with an SD of 4.99. The

calculated paired t-value was 2.6510 with 79 degrees of freedom. The corresponding p-value was 0.010, which is less than the conventional significance level of 0.05. Therefore, the difference in mean knowledge scores between pre-test and post-test was found to be statistically significant. This indicates that the training program had a positive effect on improving the students' knowledge regarding IMNCI. The total sample size for the study was 80 students.

Table – 4: Comparison of pretest and posttest mean knowledge scores

(n=80)

Test type	Mean score	SD	t- value	df	p- value (< 0.05)	Interpretation
Pre test	24.11	5.39	2.6510	79	0.010	Statistically Significant
Post test	26.34	4.99				

Findings on Association between pretest knowledge score and selected demographic variable

In this study, a statistically significant association was found between knowledge scores and the variables course of the

study, previous exposure to IMNCI in the curriculum, attendance at IMNCI training/workshops, and the type of training attended. However, age and gender were not significantly associated with the pretest knowledge scores.

Table – 5: Association between pretest knowledge score and selected demographic variable

(n=80)

Variables / categories	Categories	Level of knowledge			Chi-square	df	p-value (< 0.05)	Interpretation
		Adequate (f)	Average (f)	Inadequate (f)				
Age	18-20 yrs	1	09	02	6.141	4	0.188	Not Significant
	21-23yrs	27	32	04				
	24 – 26 Yrs	02	03	0				
Gender	Male	03	06	0	0.876	2	0.645	Not Significant
	Female	27	39	05				
Course of the Study	ANM	8	13	01	15.541	6	0.0164	Significant
	GNM	02	17	03				
	PBBSC	09	07	0				
	BSC Nursing	11	09	0				
Have you previously studied IMNCI part of your curriculum	Yes	30	36	02	14.008	2	0.000907	Significant
	No	0	10	03				
Have you attended any workshop or	Yes	16	22	9	24.93	2	0.00000	Significant
	No	0	10	23				

*training on
IMNCI
guideline*

<i>If yes specify the types of training</i>	<i>Seminar</i>	<i>11</i>	<i>14</i>	<i>01</i>	<i>12.453</i>	<i>4</i>	<i>0.01427</i>	<i>Significant</i>
	<i>Workshop</i>	<i>0</i>	<i>05</i>	<i>0</i>	<i>5</i>			
	<i>Others</i>	<i>10</i>	<i>3</i>	<i>3</i>				

DISCUSSION

The present study evaluated the baseline knowledge and the impact of a structured teaching program on knowledge regarding Integrated Management of Neonatal and Childhood Illness (IMNCI) among nursing students. The baseline findings indicated that most participants demonstrated moderate levels of knowledge, with fewer students achieving adequate scores and a small proportion exhibiting poor knowledge. This suggests that although IMNCI is included in the nursing curriculum, the depth of understanding among students may not be sufficient for confident clinical application. Similar observations have been reported in earlier studies, where nursing students and healthcare workers showed gaps in IMNCI-related knowledge despite prior exposure during training [23,17].

Following the educational intervention, a clear improvement in knowledge levels was observed, with an increase in the proportion of students achieving adequate scores and a reduction in those with poor knowledge. This finding reflects the effectiveness of structured teaching programs in enhancing cognitive understanding. Comparable improvements have been documented in previous research, which demonstrated that targeted IMNCI training significantly enhances knowledge and clinical decision-making skills among healthcare providers [24,25]. The improvement may be attributed to the organized content, focused learning objectives, and use of structured and interactive teaching strategies.

The statistical analysis further supported these findings, as a significant difference was observed between pre-test and post-test scores. This confirms that the intervention had a measurable impact on students’ knowledge. Similar results have been reported in interventional studies, where structured educational programs led to statistically significant improvements in knowledge and competency among nursing students and primary healthcare workers [26]. These findings reinforce the importance of incorporating structured and evidence-based teaching methods in nursing education.

The association analysis revealed that academic-related variables, such as course of study, prior exposure to IMNCI content, and participation in training programs, had a significant influence on baseline knowledge levels. Students who had previously studied IMNCI or attended workshops demonstrated higher knowledge scores, highlighting the role of repeated exposure and practical training. These findings are consistent with previous literature, which emphasizes that continuous education and hands-on training significantly improve knowledge retention and clinical competence [27,19]. In contrast, demographic variables such as age and gender did not show a significant association with knowledge levels, indicating that educational exposure plays a more critical role than inherent characteristics.

Overall, the findings highlight the effectiveness of structured teaching programs in improving knowledge regarding IMNCI among nursing students. The results underscore the need for strengthening IMNCI training within the nursing curriculum through regular workshops, skill-based sessions, and continuous educational interventions. Enhancing knowledge in this area is essential for improving the quality of neonatal and child healthcare services and for reducing morbidity and mortality in vulnerable populations.

LIMITATIONS

The present study has certain limitations that should be considered while interpreting the findings. The study was conducted in a single nursing college in Lucknow, which may limit the generalizability of the results to other settings. Additionally, the sample size was restricted to 80 students, which may not adequately represent the broader population of nursing students. The assessment of knowledge was performed immediately after the intervention; therefore, long-term retention of knowledge could not be evaluated. Data collection relied on self-administered questionnaires, which may have introduced response bias. Furthermore, the study employed a one-group design without a control group, limiting the ability to attribute changes solely to the intervention. The study focused only on knowledge assessment and did not evaluate practical skills or attitudes related to IMNCI. Lastly, there is a possibility that participants may have accessed additional learning resources between the pre-test and post-test, which could have influenced their scores.

IMPLICATIONS

This study highlights important implications across multiple domains. In clinical practice, integrating structured teaching on IMNCI can enhance early identification and management of neonatal and infant conditions. In nursing education, strict implementation of IMNCI guidelines into the curriculum along with regular workshops can strengthen students’ competency and bridge the gap between theory and practice. From an administrative perspective, making IMNCI training mandatory and promoting continuous in-service education can improve the quality of pediatric care. In nursing research, further studies are recommended to assess long-term knowledge retention, practical application, and effectiveness across larger and diverse populations.

CONCLUSION

The overall findings of the study suggest that structured teaching programs are highly effective in improving the knowledge of nursing students regarding the assessment and management of young infants based on IMNCI guidelines. The intervention successfully enhanced students' knowledge levels, and significant associations were observed between

knowledge and factors related to educational exposure and training. Therefore, it is recommended that structured teaching programs and regular IMNCI workshops should be integrated into the nursing curriculum to strengthen students' clinical competencies in child healthcare services.

SOURCE OF FUNDING

The authors declare that no funding was received for this study.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ACKNOWLEDGEMENT

The authors declare that there are no acknowledgements for this study.

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