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Original Article

Nursing Section

Efficacy of a Nurse-led Clinical Care Pathway in Improving the Quality of Nursing Care and Parent Satisfaction among Under-five Children with Lower Respiratory Tract Infections: A Prospective Interventional Study

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ABSTRACT

Introduction: Lower Respiratory Tract Infections (LRTIs) are frequent among children of early young age due to polluted air, overcrowding, poor sanitation etc., that increase their susceptibility to infection. Limited healthcare resources in many rural districts postpone the treatment thereby, leading to severe illness.

Aim: To study the impact of Nurse-Led Clinical Care Pathway (NLCCP) for children under five with LRTI on nursing quality, hospital stay and parent satisfaction.

Materials and Methods: A prospective interventional study was conducted in Maharashtra, India from January to March 2024 among children diagnosed with LRTIs. A total of 60 children were enrolled in the study and divided equally into control and experimental groups. Paediatric nurses (n=30) provided the NLCCP to the experimental group, while the control group received routine care, including assessment, examination, symptom management, laboratory tests, antibiotics, discharge planning, etc. The experimental group also received play activities, psychological, sociocultural, and spiritual support. Data were collected using the 37-item Quality of Nursing Care Scale for Hospitalised Acute Respiratory Infection Children (QNCS-HARIC) checklist and analysed with Statistical Package for Social Sciences (SPSS) using descriptive statistics.

Results: Post-test findings from the QNCS-HARIC tool showed major differences between the groups. The control group recorded a mean score of 82.97 (SD 3.12), while the experimental group reached 138.47 (SD 10.74). The t-test value (27.169, $p<0.01$) showed that the pathway improved nursing care scores. Parent satisfaction followed a similar pattern. The t-test (-7.28, $p<0.01$) confirmed that parents in the experimental group reported much higher satisfaction at discharge.

Conclusion: The NLCCP supports healthcare workers (staff nurses) in enhancing their knowledge, skills, and the overall quality of nursing care. It also contributes to reducing hospital stays of children with LRTIs, while demonstrating significantly higher parent satisfaction compared to the control group.

Keywords: Healthcare services, Hospital stay and parental satisfaction, Quality of nursing care

INTRODUCTION

The LRTIs are common in children and regulates high morbidity, mortality, and socioeconomic stress. These infections often lead to bronchitis, bronchiolitis, and pneumonia that are triggered by allergens, medications, respiratory viruses, and bacterial organisms [1]. Early-life LRTIs, like pneumonia and bronchiolitis, are related to airway obstruction, bronchial hyper-reactivity, and later asthma. Respiratory Syncytial Virus (RSV), rhinovirus, and human metapneumovirus are major viral causes [2]. The association between infection severity, viral type, and asthma onset in infants remains uncertain, and debate continues regarding the strength of this association. Viral LRTIs and their long-term effects remain major contributors to childhood illness and place a constant burden on the healthcare systems [3]. Viral infections in early childhood can damage the developing airway epithelium and dysregulate the immune response, thereby predisposing children to wheezing illnesses and the consequent development of asthma [4].

LRTIs occurs in Indian children with population and crowding in urban areas, limited healthcare in rural areas, poor air quality, inadequate sanitation, and incomplete vaccination increase the risk of the disease. World Health Organisation (WHO) reports that Acute Respiratory Infections (ARI) lead to approximately 20% deaths in children under five years globally, with pneumonia being the leading cause [5,6]. India accounts for 19% of the world's child population, and ARIs have caused approximately a quarter of under-five deaths in 2010 [7,8]. Recurrent Respiratory Tract Infections (RRTIs) in children arise from multiple factors, with immature immunity and nutritional deficiencies playing key roles. Frequent infections can weaken immune function further, creating a cycle of poor nutrition, reduced resistance, and repeated illness. During RRTIs, increased metabolic demands, reduced appetite, limited outdoor activity, and poor sleep can hinder recovery and growth. Comprehensive, refined nursing care combining clinical expertise, holistic support, and effective fever management helps break this cycle by improving symptoms, supporting nutrition, accelerating recovery, and enhancing overall nursing satisfaction for children with RRTIs [9].

The NLCCP was created to organise the nursing care for children with LRTIs. This includes assessment and monitoring, physical examination, symptoms evaluation, diagnostic test, oxygen therapy, antibiotics, hydration and nutrition, supportive care, hospitalisation, discharge care and health education, play and recreation, psychosocial care and spiritual care. Thus, the present study was undertaken with the aim to develop and validate the NLCCP for children under five with LRTI and assess its impact on nursing quality, hospital stay and parent satisfaction.

MATERIALS AND METHODS

This prospective interventional study was conducted at Acharya Vinoba Bhave Rural Hospital (AVBRH), Sawangi Meghe, Wardha,

and Shalinitai Meghe Research Hospital, Hingana, Maharashtra, India from 1 January to 30 March 2024. Ethical approval {Ref no. DMIMS(DU)/IEC/2022/322} and written consent were obtained from all participants.

Inclusion and Exclusion criteria: Nurses who were posted in paediatric wards and willing to participate were included. Parents who were able to provide consent and the children who got admitted with LRTI were included in the study. Nurses on leave or recently trained in LRTI care, children needing intensive care, and parents unwilling to participate were excluded from the study.

A convenience sample of 180 participants (equally divided into nurses, parents, and children, 60 each) were enrolled. Within each category, participants were randomly assigned by computer generated random number method to either the control group or the experimental group, with 30 participants from each category were taken as the control group who received routine care and 30 to the experimental group receiving the NLCCP.

Study Procedure

The NLCCP was created through a focused review of paediatric respiratory care literature [9] and input from paediatricians, respiratory therapists, and senior nurses and the draft was validated by subject experts. The LRTI care pathway included assessment, diagnosis, symptom monitoring, treatment, and supportive measures. Nurses assigned to the experimental arm completed a structured seven-day training program on the NLCCP for LRTI care. The program covered assessment, examinations, symptom tracking, coordination of investigations, antibiotic and oxygen use, fluid support, routine clinical measures, discharge steps, psychosocial care, sociocultural and spiritual support, and play-based activities.

Nursing care quality was evaluated before training and again on day seven through direct observation using QNCS-HARIC. Parent satisfaction was recorded within 24 hours after admission and at the time of discharge with Parent Satisfaction Score-Malay version (PSS-M).

The QNCS-HARIC scale assessed nursing care across physical, psychological, sociocultural, and spiritual areas on a five-point Likert format [10]. It is a validated 37-item instrument assessing physical, psychological, sociocultural, and spiritual domains on a five-point Likert scale, that was used to evaluate nursing care [10]. The total score range is from a minimum of 37 to a maximum of 185.

Parent satisfaction was measured with the PSS. It is a five-item questionnaire where responses are averaged to yield a single satisfaction score ranging from 1 to 5 [11]. Hospital stay was taken from patient records.

STATISTICAL ANALYSIS

Data were analysed using IBM SPSS version 25. A p-value of less than 0.05 was considered significant. Chi-square test and t-test were used for data analysis.

RESULTS

[Table/Fig-1] shows the Content Validity Index (CVI) which was 0.85, with strong agreement among experts for assessing NLCCP in LRTI.

Statistical test	Purpose	Metric	Result	Interpretation
Content Validity Index (CVI)	Assess content relevance and clarity based on expert feedback	CVI score per item	0.85	High content validity (values ≥0.80 are good)

[Table/Fig-1]: Validation results for content validity and reliability.

For nurses, there was no significant difference between the two groups for age (p=0.71) and gender (p=1) confirming that both groups were comparable before the intervention [Table/Fig-2,3]. [Table/Fig-4] outlines the distribution of nurses as per professional qualifications. Most participants had a General Nursing and Midwifery (GNM) qualification, with 22 in the control group and 18 in the experimental group. Although the proportions vary, the Chi-square value of 3.0067 and p-value of 0.3815 indicated no significant difference between the groups. [Table/Fig-5] presents the distribution of years of experience of nurses across both groups. There were 4 and 2 nurses with 1-5 years of experience, 13 and 12 with 6-10 years experience and 11 and 14 with 11-15 years experience in control and experimental group, respectively (p=0.785). In paediatric wards, 26 participants belonged to the control group and 22 to the experimental group. In PICU, the control group had four participants while the experimental group had 8 (p=0.1967) [Table/Fig-6].

Age group	Group		Total n (%)	Chi-sq	p-value
	Control n (%)	Experimental n (%)			
20-29 years	7 (23.3)	4 (13.3)	11 (18.3)	7.027	0.71
30-39 years	23 (76.7)	20 (66.7)	43 (71.7)		
40-49 years	0	4 (13.3)	4 (6.7)		
49 above	0	2 (6.7)	2 (3.3)		
Total	30 (100)	30 (100)	60 (100)		

[Table/Fig-2]: Distribution of nurses according to age group in control and experimental group.

Gender	Group		Total n (%)	Chi-sq	p-value
	Control n (%)	Experimental n (%)			
Female	26 (86.7)	26 (86.7)	52 (86.7)	0	1
Male	4 (13.3)	4 (13.3)	8 (13.3)		
Total	30 (100)	30 (100)	60 (100)		

[Table/Fig-3]: Distribution of nurses according to gender in control and experimental group.

Professional Qualification	Group		Total n (%)	Chi-sq	p-value
	Control n (%)	Experimental n (%)			
B.Sc. (Nsg)	6 (20)	6 (20)	12 (20)	3.0067	0.3815
GNM	22 (73.3)	18 (60)	40 (66.7)		
PBBSc.(N)	2 (6.7)	4 (13.3)	6 (10)		
Paediatric diploma	0	2 (6.7)	2 (3.3)		
Total	30 (100)	30 (100)	60 (100)		

[Table/Fig-4]: Distribution of professional qualification of nurses in control and experimental group.

Years of experience	Group		Total n (%)	Chi-sq	p-value
	Control n (%)	Experimental n (%)			
1-5	4 (13.3)	2 (6.7)	6 (10)	1.067	0.785
6-10	13 (43.3)	12 (40)	25 (41.7)		
11-15	11 (36.7)	14 (46.7)	25 (41.7)		
15 and above	2 (6.7)	2 (6.7)	4 (6.7)		
Total	30 (100)	30 (100)	60 (100)		

[Table/Fig-5]: Distribution of years of experience control against experimental. Chi-square test, p≤0.05 significant

Area of experience	Group		Total n (%)	Chi-sq	p-value
	Control n (%)	Experimental n (%)			
Paediatric ward	26 (86.7)	22 (73.3)	48 (80.0)	1.667	0.1967
PICU	4 (13.3)	8 (26.7)	12 (20)		
Total	30 (100)	30 (100)	60 (100)		

[Table/Fig-6]: Distribution of area of experience control against experimental. Chi-square test, p</=0.05 significant

Both groups began with similar nursing care scores. The control group started with a mean of 81.87 (44.24%) and an SD of 2.39, while the experimental group had a mean of 82.40 (44.54%) and an SD of 2.87. No significant difference was observed between the groups at baseline (p=0.44). After the intervention, the control group recorded a mean of 82.97 (44.85%) with an SD of 3.12. The experimental group demonstrated an increase to 138.47 (74.85%) with an SD of 10.74. The t-value of 27.17 and p<0.01 confirmed a statistical significant difference after implementing the pathway [Table/Fig-7].

Phase	Group	N	Mean	Mean %	SD	t-test	p-value
Pre	Control (QNCS-HARIC 37-item scale)	30	81.87	44.24	2.39	-0.78	0.44
Pre	Experimental (QNCS-HARIC 37-item scale)	30	82.40	44.54	2.87		
Post	Control (QNCS-HARIC 37-item scale)	30	82.97	44.85	3.12	27.17	<0.01
Post	Experimental (QNCS-HARIC 37-item scale)	30	138.47	74.85	10.74		

[Table/Fig-7]: Comparative assessment of quality of life scores between the control and experimental groups (pre- and post-intervention).
p≤0.05 significant

For patient satisfaction, the control group showed a mean of 33.0 (60%) with an SD of 7.94, while the experimental group measured 34.5 (62.7%) with an SD of 6.81. Scores increased at discharge, with the control group reaching 36.0 (65.5%) and the experimental group rising to 47.3 (86%). Both groups showed similar variation (SD 7.30 and 7.94). The t-value of -6.95 and p<0.01 showed that parents in the experimental group reported much higher satisfaction after receiving the pathway-based care [Table/Fig-8].

Parent satisfaction scale	N	Mean (11-55 scale)	Mean %	Std. Deviation	t-test	p-value
Control (Pre)	30	33.0	60.0	7.94	-0.85	0.40
Experimental (Pre)	30	34.5	62.7	6.81		
Control (Post)	30	36.0	65.5	7.30	-6.95	<0.01
Experimental (Post)	30	47.3	86	7.94		

[Table/Fig-8]: Comparative assessment of parent satisfaction section at pre and post-assessment of control against experimental group.
p≤0.05 significant

[Table/Fig-9] shows that the control group had a mean hospital stay of 10.60 days (SD 2.01). The experimental group showed a shorter stay of 8.51 days (SD 1.92). The p<0.01 confirmed that the reduction in stay was statistically significant. These findings show that children who received the pathway had shorter admissions, higher parental satisfaction, and improved nursing care scores.

Group	Mean (Hospital Stay)	Std. Deviation	z-test	p-value
Control	10.6046	2.01	7.02	<0.01
Experimental	8.5122	1.92		

[Table/Fig-9]: Comparative assessment of hospital stays at pre- and post-assessment of control against experimental group.

DISCUSSION

The study shows that the NLCCP had a positive influence on the quality of nursing care, parental satisfaction, and recovery outcomes in children with LRTIs. Nurses who received training under this pathway scored much higher on the QNCS-HARIC scale after the intervention. The mean score reached 138.47 (74.85%), whereas the control group reached 82.97 (44.85%). The values in both the groups showed major differences (t=27.169, p<0.01), with improved nursing care after the pathway. A positive response to structured nursing input has been observed in a previous study in children with respiratory failure, wherein coordinated care produced better clinical results [12]. Similarly, in a study by Abuozeid AS et al., the nursing program proved highly effective, yielding significant improvements in all assessed practice domains. Nurses showed notable post-program gains in oxygen therapy, physiotherapy, intravenous therapy, vital signs monitoring, suctioning, hand washing, and nasogastric tube insertion, with all values reaching statistical significance (p<0.001). Overall practice scores rose substantially from 135.30±25.71 to 179.85±34.17, confirming the program's strong positive impact on nursing care quality for children with pneumonia [13]. Turyasiima M et al., reported increased rates of respiratory infections in children below five years and emphasised the necessity for accurate diagnostic and management strategies [14].

This study showed that children in the experimental group had shorter admissions, averaging 8.51 days compared with 10.60 days in the control group (p<0.01). Studies using nurse-directed plans for conditions like bronchiolitis and asthma have also reported such reduced admission time [15,16]. The shorter stay in this study can be attributed to the rapid identification of symptoms, timely nursing actions, better guidance for parents with clear discharge steps. This is significant as respiratory infections have increased globally. Recent RSV outbreaks have highlighted the constant nature of these diseases and the requirement for well-organised inpatient care [17]. In India, even a two-day reduction would ease both the emotional and financial strain on families. National reports have shown that respiratory illnesses demand heavy caregiving workload on the households with young children, who form a large and vulnerable segment of the country's population [18,19].

In this study, the parents in the experimental group reported much higher satisfaction level with the care provided. Their post-intervention score reached 47.3 (86%), compared to 36.0 (65.5%) in the control group (p<0.01). Coyne I et al., reported that parental satisfaction influences how well the families follow treatment plans in paediatric cases [20]. In this study, the NLCCP showed similar findings by strengthening the communication thus, offering emotional reassurance, involving caregivers in daily decisions, respecting cultural and spiritual needs. These features are also covered in the PSS-M as was validated by Nik Adib NA et al., [11]. Hu Y et al., also reported that a structured and coordinated approach to nursing and medical care improved caregiver satisfaction in children with lobar pneumonia [21]. Nurses can support parents by providing clear guidance on preventive measures, including immunisation, which is essential in reducing the burden of LRTIs [22].

Standardised nurse-led protocols are increasingly supported in clinical practice, and several reviews describe how structured pathways reduce variation in care and improve adherence to recommended steps [23]. Global initiatives, including World Pneumonia Day, continue to highlight the need for organised approaches to manage pneumonia in children [24]. Evidence from paediatric studies, including those applying ventilator care bundles led by trained nurses, shows better outcomes and fewer complications when clear procedures are followed [25]. In this study, the NLCCP worked as a practical guide and a teaching aid, helping nurses deliver timely and steady care. It drew on established paediatric and nursing references, including the Nursing Interventions Classification (NIC) system, to lay out the steps of care in a clear sequence. Nurse-directed pathways demonstrate how structured assessment improves inpatient management for children [26,27]. The results show that a clear nursing pathway can raise the standard of care for children with LRTIs. These outcomes

are consistent with earlier work in paediatric settings and indicate that this model can be used in similar healthcare environments.

Limitation(s)

Differences in nurses' training, experience, and motivation can affect how consistently the clinical care pathway is followed, leading to variable patient outcomes and impacting the study's reliability. Focusing only on LRTIs means the findings may not apply to other common childhood illnesses. This study was conducted for under five children only and the findings cannot be generalised to other age groups of children.

CONCLUSION(S)

This study shows that the NLCCP improved the management of paediatric LRTIs and increased the quality of nursing care, reduced hospital stay, and improved parental satisfaction. Nurses were able to apply structured, patient-centered care that supported physical, emotional, social, and spiritual needs. These findings support the need for a larger, multicentre study to confirm effectiveness and explore long-term impact and costs. The integration of NLCCP principles into nursing education and introducing the pathway in paediatric units may help in the standardised care.

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