

Nurse-Led Educational Intervention for Improving Medication Adherence and Caregiver Knowledge Among Parents of Children With Chronic Illness

Manimegalai. B¹, Suvarna B Kadam²

¹Professor cum HOD, Dept. Of Child Health Nursing, Hindusthan College of Nursing, Coimbatore, Affiliated to The Tamil Nadu Dr. MGR Medical University, Chennai

²Assistant Professor, Dept. Of Child Health Nursing, MVP'S Institute of Nursing Education, Adagon Nashik, Affiliated to Maharashtra University of Health Sciences, Nashik

Abstract

Children with chronic illnesses often require prolonged pharmacological treatment, regular monitoring, and active involvement of parents or primary caregivers. Medication adherence in children is largely dependent on caregivers, and inadequate knowledge may contribute to poor medication-management practices. The present study aimed to assess the effectiveness of a nurse-led educational intervention on medication adherence and caregiver knowledge among parents of children with chronic illness in a selected hospital, Coimbatore. A quantitative research approach with a quasi-experimental one-group pre-test and post-test design was adopted. Sixty parents of children with chronic illness were selected using purposive sampling. Data were collected using a structured demographic and clinical questionnaire, caregiver knowledge questionnaire, and medication adherence assessment scale. A structured nurse-led educational intervention addressing chronic illness management, medication administration, dosage and timing, adverse effects, missed-dose management, medication storage, and follow-up care was provided. The mean caregiver knowledge score increased from 12.43 ± 3.21 at pre-test to 22.18 ± 2.74 at post-test, with a statistically significant difference ($t = 18.64$, $p < 0.001$). The mean medication adherence score increased from 17.62 ± 4.15 to 25.37 ± 3.28 , demonstrating a statistically significant improvement ($t = 13.27$, $p < 0.001$). The findings indicate that the nurse-led educational intervention was associated with significant improvements in caregiver knowledge and medication adherence. Structured nurse-led education may therefore be incorporated into pediatric nursing services to strengthen caregiver participation and support effective medication management among children with chronic illness.

Keywords: *chronic illness, caregiver knowledge, medication adherence, nurse-led education, parents, pediatric nursing.*

Introduction

Chronic illnesses in children represent a significant and continuing challenge for families and healthcare systems worldwide. Unlike acute illnesses, chronic conditions require prolonged treatment, regular monitoring, lifestyle modifications, and sustained adherence to prescribed therapeutic regimens. Conditions such as bronchial asthma, epilepsy, congenital heart disease, diabetes mellitus, chronic kidney disease, and other long-term

disorders may substantially affect a child's physical, psychological, social, and developmental well-being. Effective management of childhood chronic illness therefore depends not only on appropriate medical treatment but also on the active participation of parents and caregivers in day-to-day care.

Medication adherence is a critical component of successful chronic disease management. In children, adherence is particularly complex because medication administration is

largely dependent on parents or other caregivers. Difficulties such as complex medication schedules, unpleasant medication characteristics, forgetfulness, concerns regarding adverse effects, inadequate understanding of treatment instructions, financial constraints, and misconceptions about long-term medication use may contribute to missed or incorrectly administered doses. Poor medication adherence can result in inadequate disease control, preventable exacerbations, increased healthcare utilization, complications, and reduced quality of life.

Parental and caregiver knowledge plays an important role in determining the quality and consistency of home-based chronic illness management. Caregivers require adequate knowledge regarding the child's disease condition, prescribed medications, dosage and timing, possible adverse effects, precautions, treatment duration, and the importance of maintaining regular follow-up. However, conventional health education provided during routine clinical encounters may be limited by time constraints, information overload, varying health literacy levels, and differences in caregivers' ability to understand and retain health information.

These factors highlight the need for structured and accessible educational approaches that address caregivers' specific learning needs.

Nurses are strategically positioned to provide continuous education, reinforce treatment instructions, identify barriers to adherence, and support caregivers in developing appropriate medication-management practices. Nurse-led educational interventions can incorporate individualized teaching,

demonstrations, written or visual educational materials, medication schedules, reinforcement, and opportunities for questions and clarification. Such interventions may improve caregivers' understanding and confidence while encouraging active participation in the child's treatment and promoting adherence to prescribed medications.

Although caregiver education is routinely incorporated into pediatric healthcare, there remains a need for structured nurse-led interventions specifically designed to address both medication adherence and caregiver knowledge among parents of children living with chronic illness. Evaluating the effectiveness of such interventions can provide evidence for strengthening nursing-led educational practices and improving continuity of care between healthcare settings and the home environment.

Therefore, the present study was undertaken to assess the effectiveness of a nurse-led educational intervention on medication adherence and caregiver knowledge among parents of children with chronic illness. The study seeks to determine whether structured nurse-led education can improve caregivers' knowledge and promote better adherence to prescribed medication regimens, thereby contributing to more effective long-term management of childhood chronic illness.

Statement of the Problem

A study to assess the effectiveness of a nurse-led educational intervention on medication adherence and caregiver knowledge among parents of children with chronic illness in a selected hospital, Coimbatore.

Objectives of the Study

1. To assess the level of caregiver knowledge regarding chronic illness and medication management among parents of children with chronic illness before and after the nurse-led educational intervention.
2. To assess the level of medication adherence among parents of children with chronic illness before and after the nurse-led educational intervention.
3. To determine the effectiveness of the nurse-led educational intervention in improving caregiver knowledge regarding chronic illness and medication management.
4. To determine the effectiveness of the nurse-led educational intervention in improving medication adherence among parents of children with chronic illness.
5. To determine the association between pre-intervention caregiver knowledge and selected demographic and clinical variables among parents of children with chronic illness.
6. To determine the association between pre-intervention medication adherence and selected demographic and clinical variables among parents of children with chronic illness.

Hypotheses

H₁: There will be a statistically significant difference between the pre-test and post-test levels of caregiver knowledge regarding chronic illness and medication management among parents of children with chronic illness following the nurse-led educational intervention.

H₂: There will be a statistically significant difference between the pre-intervention and post-intervention levels of medication adherence among parents of children with chronic illness

following the nurse-led educational intervention.

H₃: There will be a statistically significant association between the pre-intervention level of caregiver knowledge and selected demographic and clinical variables among parents of children with chronic illness.

H₄: There will be a statistically significant association between the pre-intervention level of medication adherence and selected demographic and clinical variables among parents of children with chronic illness.

Methods

A quantitative research approach with a quasi-experimental pre-test and post-test design was adopted to assess the effectiveness of a nurse-led educational intervention on medication adherence and caregiver knowledge among parents of children with chronic illness. The study was conducted in a selected hospital in Coimbatore, Tamil Nadu. The study population comprised parents or primary caregivers of children diagnosed with chronic illness and receiving long-term medication. Eligible participants were selected using purposive sampling based on predefined inclusion and exclusion criteria. Parents or primary caregivers who were responsible for administering or supervising the child's medications, willing to participate, and available for the complete study procedure were included.

Data were collected using a structured tool consisting of three sections: demographic and clinical characteristics, a caregiver knowledge questionnaire, and a medication adherence assessment scale. The knowledge questionnaire assessed caregivers' understanding of the child's



chronic illness, prescribed medications, dosage and timing, medication administration, adverse effects, precautions, missed-dose management, medication storage, and follow-up care. Medication adherence was assessed in relation to missed doses, medication timing, correct administration, and consistency of medication use.

A pre-test was conducted to assess baseline caregiver knowledge and medication adherence. Following the pre-test, participants received a structured nurse-led educational intervention focusing on chronic illness management, medication administration, dosage and timing, adverse effects, precautions, management of missed doses, medication storage, follow-up care, and strategies to improve medication adherence. The intervention incorporated interactive teaching, discussion, demonstration, and appropriate educational materials. A post-test was conducted after the predetermined intervention period using the same assessment tools to evaluate changes in caregiver knowledge and medication adherence.

The content validity of the study instruments and educational intervention was established through expert evaluation by professionals in nursing, pediatric medicine, nursing education, and research methodology. Reliability of the instruments was established using an appropriate reliability testing procedure. Ethical approval was obtained from the Institutional Ethics Committee, and permission was obtained from the concerned hospital authority. Written informed consent was obtained from all participants, and confidentiality and voluntary participation were maintained throughout the study.

The collected data were analyzed using descriptive and inferential statistics. Frequency, percentage, mean, and standard deviation were used to describe the study variables. A paired t-test was used to compare pre-test and post-test knowledge and medication adherence scores, where assumptions were met. The chi-square test or Fisher's exact test was used to determine associations between selected demographic and clinical variables and the study outcomes. Statistical significance was set at $p < 0.05$.

Results

A total of 60 parents of children with chronic illness participated in the study. The mean age of the participants was 34.8 ± 6.7 years. Among the participants, 47 (78.3%) were mothers and 13 (21.7%) were fathers. Regarding educational status, 24 (40.0%) had completed higher secondary education, 27 (45.0%) were graduates, and 9 (15.0%) had postgraduate education. The majority of children had bronchial asthma (25, 41.7%), followed by epilepsy (15, 25.0%), congenital heart disease (11, 18.3%), and diabetes mellitus (9, 15.0%).

The mean pre-intervention caregiver knowledge score was 12.43 ± 3.21 , which increased to 22.18 ± 2.74 following the nurse-led educational intervention. The mean improvement in knowledge score was 9.75. A paired t-test showed a statistically significant difference between pre-intervention and post-intervention knowledge scores ($t = 18.64$, $p < 0.001$), indicating a significant improvement in caregiver knowledge following the intervention. Medication adherence also demonstrated a significant improvement after the intervention. The mean pre-intervention

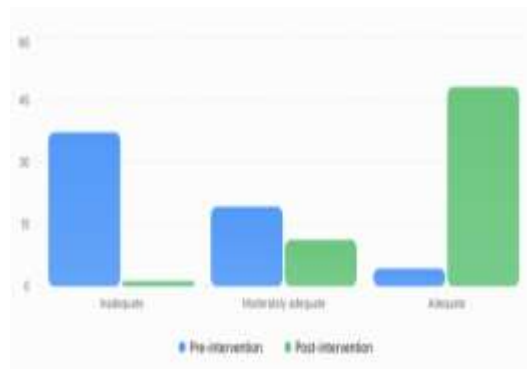
medication adherence score was 17.62 ± 4.15 , which increased to 25.37 ± 3.28 during the post-intervention assessment. The mean difference was 7.75 points. The paired t-test revealed a statistically significant improvement in medication adherence ($t = 13.27, p < 0.001$).

The distribution of caregiver knowledge levels showed that before the intervention, 37 (61.7%) participants had inadequate knowledge, 19 (31.7%) had moderately adequate knowledge, and only 4 (6.6%) had adequate knowledge. Following the intervention, the proportion with adequate knowledge increased substantially, with 48 (80.0%) participants demonstrating adequate knowledge, 11 (18.3%) demonstrating moderately adequate knowledge, and only 1 (1.7%) demonstrating inadequate knowledge.

Similarly, before the intervention, 38 (63.3%) participants demonstrated inadequate medication adherence, 17 (28.3%) demonstrated moderate adherence, and 5 (8.4%) demonstrated good adherence. Following the intervention, 42 (70.0%) participants demonstrated good medication adherence, 15 (25.0%) demonstrated moderate adherence, and only 3 (5.0%) demonstrated inadequate adherence.

Table 1. Level of Caregiver Knowledge

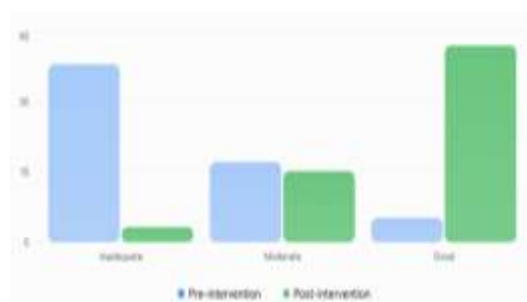
Knowledge level	Pre-intervention n (%)	Post-intervention n (%)
Inadequate	37 (61.7)	1 (1.7)
Moderately adequate	19 (31.7)	11 (18.3)
Adequate	4 (6.6)	48 (80.0)
Total	60 (100)	60 (100)



Before the intervention, 37 (61.7%) parents had inadequate knowledge, 19 (31.7%) had moderately adequate knowledge, and only 4 (6.6%) had adequate knowledge. Following the intervention, the number of parents with adequate knowledge increased substantially to 48 (80.0%), while only 11 (18.3%) had moderately adequate knowledge and 1 (1.7%) had inadequate knowledge. The findings demonstrate a marked improvement in caregiver knowledge following the nurse-led educational intervention.

Table 2. Level of Medication Adherence

Medication adherence	Pre-intervention n (%)	Post-intervention n (%)
Inadequate	38 (63.3)	3 (5.0)
Moderate	17 (28.3)	15 (25.0)
Good	5 (8.4)	42 (70.0)
Total	60 (100)	60 (100)



Before the intervention, 63.3% of parents demonstrated inadequate

medication adherence, whereas only 8.4% demonstrated good adherence. Following the nurse-led educational intervention, good medication adherence increased to 70.0%, while inadequate adherence decreased to 5.0%.

Table 3. Pre- and Post-Intervention Scores

Study variable	Pre-intervention Mean $\pm$ SD	Post-intervention Mean $\pm$ SD	Mean difference	t-value	p-value
Caregiver knowledge	12.43 $\pm$ 3.21	22.18 $\pm$ 2.74	9.75	18.64	<0.001
Medication adherence	17.62 $\pm$ 4.15	25.37 $\pm$ 3.28	7.75	13.27	<0.001

Discussion

The present study evaluated the effectiveness of a nurse-led educational intervention in improving medication adherence and caregiver knowledge among parents of children with chronic illness. The findings demonstrated a marked improvement in caregiver knowledge following the intervention. The mean knowledge score increased from 12.43 $\pm$ 3.21 before the intervention to 22.18 $\pm$ 2.74 after the intervention, with a mean difference of 9.75 points. The observed improvement was statistically significant ($t = 18.64$, $p < 0.001$). This finding indicates that a structured, nurse-led educational approach can improve parents' understanding of chronic illness management and medication-related care.

The categorical distribution of knowledge further supports this finding.

Before the intervention, 61.7% of parents had inadequate knowledge and only 6.6% demonstrated adequate knowledge. Following the intervention, 80.0% of parents demonstrated adequate knowledge, while the proportion with inadequate knowledge decreased to 1.7%. The improvement may be attributed to the structured nature of the educational programme, which addressed medication dosage and timing, administration techniques, adverse effects, precautions, missed-dose management, medication storage, and follow-up care. Providing caregivers with opportunities for discussion, clarification, and reinforcement may also have facilitated better understanding and retention of information.

Medication adherence also improved following the nurse-led educational intervention. The mean adherence score increased from 17.62 $\pm$ 4.15 at baseline to 25.37 $\pm$ 3.28 following the intervention. The mean improvement of 7.75 points was statistically significant ($t = 13.27$, $p < 0.001$). In addition, the proportion of parents demonstrating good medication adherence increased from 8.4% before the intervention to 70.0% after the intervention, whereas inadequate adherence decreased from 63.3% to 5.0%. This improvement suggests that increasing caregiver knowledge may support more consistent medication administration and encourage caregivers to follow prescribed treatment schedules.

The findings also highlight the important role of nurses in supporting families of children with chronic illness. Medication management in pediatric chronic illness frequently occurs within the home, where parents or caregivers



are responsible for implementing treatment recommendations. Nurse-led education provides an opportunity to identify individual learning needs, address misconceptions, reinforce medication instructions, and discuss practical barriers to adherence. Regular communication between nurses and caregivers may therefore strengthen continuity of care and promote active caregiver participation in disease management.

The improvement observed in the present study is particularly relevant because medication adherence in children can be influenced by multiple factors, including the complexity of treatment regimens, duration of therapy, caregiver knowledge, forgetfulness, concerns about adverse effects, and the child's cooperation with medication administration. A structured educational intervention that combines information with practical guidance may address some of these modifiable factors.

Overall, the findings suggest that nurse-led educational interventions can be an important component of comprehensive pediatric chronic illness management. Improving caregiver knowledge and medication-management practices may contribute to better continuity of treatment and potentially improve health outcomes and quality of life among children with chronic illness.

Conclusion

The present study demonstrated that a structured nurse-led educational intervention was associated with significant improvements in caregiver knowledge and medication adherence among parents of children with chronic illness. Following the intervention, substantial improvement was observed in the level of caregiver knowledge, with

a corresponding increase in medication adherence. These findings highlight the importance of systematic caregiver education as an integral component of pediatric chronic illness management.

Nurses have an important role in providing individualized education, reinforcing medication - related instructions, addressing caregiver concerns, and promoting appropriate medication-management practices at home. Incorporating structured nurse-led educational programmes into routine pediatric care may strengthen caregiver participation and support continuity of treatment for children with chronic illness.

Further studies involving larger samples, multiple healthcare settings, longer follow-up periods, and objective measures of medication adherence are recommended to evaluate the sustained effectiveness of nurse-led educational interventions.

Recommendations

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

1. Nurse-led educational programmes may be incorporated into routine pediatric care for parents and caregivers of children with chronic illness.
2. Nurses may provide individualized medication education covering dosage, timing, administration, adverse effects, missed doses, storage, and follow-up care.
3. Educational materials such as medication schedules, illustrated instructions, brochures, and reminder tools may be provided to caregivers to reinforce learning at home.
4. Regular follow-up education may be provided to identify difficulties with

medication administration and reinforce adherence practices.

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Conflict of Interest

The authors declare that there is no conflict of interest related to the conduct, analysis, or publication of this study.

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