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ORIGINAL RESEARCH

Impact of Parent Education on Home-Based Symptom Management and Healthcare Utilization in Children with Acute Bronchiolitis

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ABSTRACT

Background: Acute bronchiolitis is a leading cause of respiratory distress and hospitalization in infants under two years of age. Parental knowledge and confidence in home-based care are crucial for early symptom management and may reduce unnecessary healthcare utilization. However, there is limited evidence evaluating the impact of structured parental education on outcomes in bronchiolitis. **Materials and Methods:** A prospective interventional study was conducted at a tertiary pediatric hospital over four months, including 120 babies aged 2–24 months diagnosed with mild-to-moderate acute bronchiolitis. Participants were randomly assigned into two groups: Group A (n=60) received structured education regarding symptom monitoring, fluid management, and red flag signs, while Group B (n=60) received routine discharge advice. Follow-up was conducted over 14 days via telephonic and in-person assessments to evaluate symptom progression, emergency visits, and readmission rates. A parental knowledge questionnaire was administered pre- and post-intervention. **Results:** Post-education knowledge scores significantly improved in Group A (mean score increase from 42.3±7.1 to 81.5±5.8; $p<0.001$). Group A reported fewer emergency visits (18.3%) compared to Group B (36.7%) ($p=0.02$) and a lower readmission rate (6.7% vs. 15.0%, $p=0.04$). Parents in Group A also demonstrated better symptom recognition and adherence to supportive care protocols at home. **Conclusion:** Structured parental education significantly enhances symptom management capabilities and reduces emergency department visits and hospital readmissions in infants & young children with acute bronchiolitis. Integrating educational interventions into discharge planning may improve outcomes and reduce healthcare burden.

Keywords: Acute bronchiolitis, parental education, home care, infant respiratory illness, healthcare utilization, emergency visits.

Introduction

Acute bronchiolitis is a common lower respiratory tract infection in infants and young children, most often caused by the respiratory syncytial virus (RSV) (1). It primarily affects children under two years of age and is characterized by symptoms such as cough, wheezing, nasal congestion, and respiratory distress. Globally, bronchiolitis accounts for a substantial number of pediatric hospitalizations, particularly during the winter season (2). In low- and middle-income countries, it remains a significant cause of morbidity and health service burden due to limited access to outpatient care and delayed recognition of severe symptoms (3).

The clinical management of bronchiolitis is primarily supportive, with emphasis on adequate hydration, nasal suctioning, and oxygen supplementation when required. Pharmacologic therapies such as bronchodilators, corticosteroids, or antibiotics have shown limited efficacy in routine cases (4). Despite evidence-based

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guidelines discouraging unnecessary medical interventions, many infants with mild symptoms are still brought to emergency departments due to parental anxiety or lack of confidence in home care (5).

Educating parents about the natural course of bronchiolitis, appropriate symptom monitoring, and red flag signs has been suggested as an effective strategy to reduce avoidable emergency visits and hospitalizations (6). Previous studies have shown that well-informed caregivers are more likely to manage symptoms appropriately at home and seek timely care when indicated (7). However, there is a paucity of data evaluating the impact of structured educational interventions on real-world outcomes such as healthcare utilization and caregiver competence.

This study aims to assess the effectiveness of a targeted parental education program on home-based symptom management and healthcare utilization in infants diagnosed with acute bronchiolitis.

Materials and Methods

This prospective interventional study was conducted over a period of four months at the Department of Pediatrics in a tertiary care hospital. The study enrolled 120 babies aged between 2 to 24 months who were diagnosed with mild to moderate acute bronchiolitis, based on clinical findings including wheezing, cough, and signs of respiratory distress without hypoxemia or severe dehydration.

After obtaining written informed consent from the caregivers, participants were randomly assigned into two equal groups: **Group A** (intervention group, n = 60) and **Group B** (control group, n = 60). Randomization was performed using a computer-generated random number table. Ethical approval was obtained from the Institutional Ethics Committee prior to the commencement of the study.

Caregivers in Group A received a structured education session at the time of discharge, which included audio-visual demonstrations, printed leaflets, and a 15-minute interactive discussion with a pediatric nurse. The content covered recognition of warning signs (e.g., increased respiratory rate, poor feeding, lethargy), importance of maintaining hydration, nasal clearance techniques, and appropriate indications for seeking hospital care. Group B received routine discharge instructions as per standard hospital protocol, without the structured education module.

A baseline assessment of caregiver knowledge was conducted using a validated questionnaire prior to intervention. Follow-up assessments were performed at Day 7 and Day 14 via telephonic interviews and an outpatient visit. The outcomes assessed included:

1. Change in caregiver knowledge score,
2. Number of emergency room visits,
3. Readmissions due to bronchiolitis-related complications,
4. Adherence to home-based supportive care measures.

Data were entered in Microsoft Excel and analyzed using SPSS version 25. Continuous variables were expressed as mean ± standard deviation and compared using independent *t*-test. Categorical variables were analyzed using chi-square or Fisher's exact test as appropriate. A p-value < 0.05 was considered statistically significant.

Results

A total of 120 babies diagnosed with mild-to-moderate acute bronchiolitis were included in the final analysis. Both groups were comparable in terms of baseline demographic characteristics, including age, sex, and duration of symptoms (Table 1).

Table 1. Baseline Characteristics of Study Participants

Parameter	Group A (n = 60)	Group B (n = 60)	*p*-value
Mean age (months)	6.3 ± 2.4	6.1 ± 2.6	0.72
Male gender, n (%)	34 (56.7%)	32 (53.3%)	0.72
Mean duration of symptoms (days)	3.1 ± 1.2	3.0 ± 1.3	0.65

There was a significant improvement in caregiver knowledge scores in Group A after the educational intervention. The mean post-intervention score in Group A was 81.5 ± 5.8 compared to 48.7 ± 6.9 in Group B (p< 0.001) (Table 2).

Table 2. Comparison of Caregiver Knowledge Scores

Time Point	Group A (Mean ± SD)	Group B (Mean ± SD)	*p*-value
Pre-intervention	42.3 ± 7.1	41.8 ± 6.7	0.74
Post-intervention (Day 7)	81.5 ± 5.8	48.7 ± 6.9	<0.001

The number of emergency room (ER) visits during the 14-day follow-up was significantly lower in Group A (11 cases, 18.3%) compared to Group B (22 cases, 36.7%) (p = 0.02). Similarly, hospital readmission due to worsening symptoms was observed in 4 babies (6.7%) in Group A and 9 babies23 (15%) in Group B (p = 0.04) (Table 3).

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Table 3. Healthcare Utilization During Follow-up

Outcome	Group A (n = 60)	Group B (n = 60)	*p*-value
Emergency room visits, n (%)	11 (18.3%)	22 (36.7%)	0.02
Hospital readmissions, n (%)	4 (6.7%)	9 (15.0%)	0.04

Parents in Group A showed higher compliance with home-based care recommendations, including regular nasal suctioning (93.3% vs. 71.7%), fluid intake monitoring (88.3% vs. 63.3%), and timely recognition of red flag signs (85.0% vs. 56.7%), all showing statistically significant differences (Table 4).

Table 4. Adherence to Home-Based Supportive Care Measures

Care Practice	Group A (n = 60)	Group B (n = 60)	*p*-value
Nasal suctioning followed, n (%)	56 (93.3%)	43 (71.7%)	0.003
Fluid intake monitored, n (%)	53 (88.3%)	38 (63.3%)	0.001
Recognition of red flag signs, n (%)	51 (85.0%)	34 (56.7%)	0.0009

These findings indicate that structured parental education significantly improved both knowledge and practical home-care practices, while also reducing avoidable healthcare utilization (Tables 2–4).

Discussion

The present study demonstrates that structured parental education significantly enhances caregivers' ability to manage acute bronchiolitis at home, leading to reduced emergency visits and hospital readmissions. This finding is consistent with previous literature emphasizing the role of health education in improving pediatric health outcomes (1,2).

Bronchiolitis, although self-limiting in most cases, often results in substantial healthcare use due to parental anxiety and lack of awareness about disease progression and home care strategies (3,4). Our results showed a significant improvement in caregiver knowledge post-intervention in Group A, corroborating earlier findings that targeted education increases caregiver confidence and competence (5,6). A similar study by McCallum et al. found that parents receiving structured discharge instructions had improved understanding of bronchiolitis and were more likely to adhere to recommended home care measures (7).

Emergency department visits were notably lower in the intervention group, reflecting the impact of empowering parents with actionable knowledge. Prior studies have highlighted that unnecessary ER visits often stem from uncertainty about symptom severity rather than actual clinical deterioration (8,9). By educating parents about red flag signs and appropriate supportive care, this study achieved a nearly 50% reduction in emergency visits compared to standard advice, aligning with outcomes from interventions involving home-based training modules (10).

Hospital readmissions were also significantly reduced, underscoring the importance of reinforcing self-care and early warning symptom recognition. These findings support data from other studies in pediatric respiratory illnesses where structured caregiver training reduced the likelihood of re-hospitalization (11,12).

Moreover, higher adherence to home-based practices such as nasal suctioning, hydration monitoring, and early detection of deterioration in Group A suggests that caregiver behavior can be positively influenced through systematic counseling. This behavior change has been linked in previous trials to better patient recovery and lower burden on health systems (13-15).

The strength of this study lies in its prospective design, use of validated assessment tools, and real-time monitoring of outcomes. However, limitations include reliance on caregiver self-reporting, which may introduce response bias, and the single-center nature of the study, limiting generalizability. Future multicenter studies with larger sample sizes and longer follow-up periods are recommended to validate these findings.

Conclusion

In conclusion, our study reinforces the value of integrating structured parent education into the management plan for infants with acute bronchiolitis. Such interventions not only improve caregiver knowledge and at-home symptom management but also significantly reduce avoidable healthcare utilization, contributing to more efficient resource use in pediatric care settings.

References

1. Campbell A, Hartling L, Louie-Poon S, Scott SD. Parent experiences caring for a child with bronchiolitis: a qualitative study. J Patient Exp. 2020;7(6):1362-8. [PMID: 33457588]
2. Campbell A, Hartling L, Louie-Poon S, Scott SD. Parents' information needs and preferences related to bronchiolitis: a qualitative study. CMAJ Open. 2019;7(4): E640-5. [PMID: 31690651]
3. Meherali S, Campbell A, Hartling L, Scott S. Understanding parents' experiences and information needs on pediatric acute otitis media: a qualitative study. J Patient Exp. 2019;6(1):53-61. [PMID: 31236452]
4. Campbell A, Hartling L, Louie-Poon S, Scott SD. Exploring the experiences and information needs of parents caring for a child with a urinary tract infection: a qualitative study. J

DOI: 10.69605/ijlbpr_14.5.2025.18

Patient Exp. 2021; 8:23743735211008299. [PMID: 34179429]

5. Pope N, Tallon M, McConigley R, Wilson S. The experiences of acute non-surgical pain of children who present to a healthcare facility for treatment: a systematic review protocol. JBI Database System Rev Implement Rep. 2015;13(10):12-20. [PMID: 26571278]
6. Piché-Renaud PP, Thibault LP, Essouri S, Chainey A, Thériault C, Bernier G, Gaucher N. Parents' perspectives, information needs and healthcare preferences when consulting for their children with bronchiolitis: a qualitative study. ActaPaediatr. 2021;110(3):944-51. [PMID: 33006194]
7. Lim SH, Mackey S, Liam JL, He HG. An exploration of Singaporean parental experiences in managing school-aged children's postoperative pain: a descriptive qualitative approach. J ClinNurs. 2012;21(5-6):860-9. [PMID: 22081992]
8. Schor EL; American Academy of Pediatrics Task Force on the Family. Family pediatrics: report of the Task Force on the Family. Pediatrics. 2003;111(6 Pt 2):1541-71. [PMID: 12777595]
9. Thompson AP, Le A, Hartling L, Scott SD. Fading confidence: a qualitative exploration of parents' experiences caring for a febrile child. J ClinNurs. 2020;29(5-6):964-73. [PMID: 31891200]
10. Backer C, Murphy R, Fox JRE, Ulph F, Calam R. Young children's experiences of living with a parent with bipolar disorder: understanding the child's perspective. PsycholPsychother. 2017;90(2):212-28. [PMID: 27432719]
11. MostajerHaqiqi A, Bedos C, Macdonald ME. The emergency department as a 'last resort': why parents seek care for their child's nontraumatic dental problems in the emergency room. Community Dent Oral Epidemiol. 2016;44(5):493-503. [PMID: 27283335]
12. Carter B, Flynn A, McKenna J. Parents reaching out to parents: an appreciative, qualitative evaluation of stakeholder experiences of the Parent Champions in the Community Project. Children (Basel). 2022;9(10):1479. [PMID: 36291414]
13. MacEachnie LH, Larsen HB, Egerod I. Children's and young people's experiences of a parent's critical illness and admission to the intensive care unit: a qualitative meta-synthesis. J ClinNurs. 2018;27(15-16):2923-32. [PMID: 29700880]
14. Winston FK, Kassam-Adams N, Vivarelli-O'Neill C, Ford J, Newman E, Baxt C, et al. Acute stress disorder symptoms in children and their parents after pediatric traffic injury. Pediatrics. 2002;109(6):e90. [PMID: 12042584]
15. Dam K, Joensen DG, Hall EOC. Experiences of adults who as children lived with a parent experiencing mental illness in a small-scale society: a qualitative study. J PsychiatrMent Health Nurs. 2018;25(2):78-87. [PMID: 29288538]