



Longitudinal study on peak expiratory flow monitoring and its impact on quality of life in childhood asthma

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ABSTRACT

Objective: To evaluate the impact of peak expiratory flow (PEF) monitoring using a smart peak flow (SPF) device on the quality of life (QoL) and satisfaction among children with asthma.

Methods: This 3-month prospective cohort study enrolled 71 children aged 7 to 17 years with physician-diagnosed asthma. Participants used the SPF device twice daily, with measurements recorded automatically. Quality of life was assessed using the Pediatric Asthma Quality of Life Questionnaire (PAQLQ), and asthma control was assessed using the Asthma Control Test (ACT) or Childhood Asthma Control Test (C-ACT). Adherence to PEF measurements and satisfaction with the device were evaluated.

Results: Seventy-one children (mean age 11.4 years) completed the study. Adherence to twice-daily PEF measurements decreased significantly over three months (from 50.0% at 1 month to 39.9% at 3 months, $p < 0.001$). Children with good adherence (38.0%) showed significant improvements in PAQLQ scores, while those with poor adherence (62.0%) did not. COVID-19 infection resulted in a significant decrease in %PEF rate and increased peak flow variability. Despite device-related issues, overall satisfaction was high (85.19% for good adherence users vs. 88.64% for poor adherence users, $p = 0.671$).

Conclusion: Regular PEF monitoring improves QoL in children with asthma by enabling early detection of symptom changes and better management. However, maintaining adherence to regular PEF monitoring is challenging. Further research with control groups is needed to validate these findings.

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Introduction

Asthma is a common chronic illness in childhood and adolescence, with increased prevalence worldwide. According to the World Health Organization, approximately 262 million people worldwide had asthma in 2019, with 461,000 deaths, doubling over the past 15 years (1). Furthermore, between 1996 and 2017, the prevalence of physician-diagnosed asthma in Swedish children almost doubled (2). A global multicenter study has identified high rates of poorly controlled asthma across various age groups, including children, adolescents, and adults, with the highest prevalence observed in children (3). This increased prevalence necessitates the use of more effective tools in asthma management, such as peak expiratory flow

rate monitoring. In addition, the Global Initiative for Asthma (GINA) underscores that effective asthma management focus on the prevention of acute exacerbations disease monitoring, along with the early identification of exacerbations and timely intervention, is crucial in mitigating the overall disease burden (4).

Monitoring peak expiratory flow (PEF) rate at home is advisable for asthma management, as it plays a crucial role in ongoing symptom monitoring. It is easy to use, and a decrease in PEF by 80% of the predicted value is a reliable indicator of an impending asthmatic attack (5). Utilizing a peak flow meter, a simple yet potent device, facilitates early detection of airway obstruction, often preceding the onset of clinical symptoms. This monitoring tool mainly benefits children, allowing for easy and portable PEF

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