User-Centric Barriers to Epinephrine Self-Injection: Informing Future Device Innovation for Anaphylaxis Management

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Abstract

Epinephrine injection remains the standard treatment for anaphylaxis, with self-injectable devices commonly prescribed for emergency use during acute allergic reactions. Despite the rising global incidence of anaphylaxis, previous research indicates that the actual utilization rates of epinephrine self-injectors remain significantly lower than optimal. This study aimed to investigate user experiences and practical challenges associated with epinephrine self-injection. A qualitative methodology was employed, featuring in-depth interviews with five individuals seeking pharmacy consultations regarding self-injection products. Data collection occurred from December 2025 to January 2026, and the findings were synthesized using thematic content analysis. The research identified critical user-level barriers, specifically needle-associated pain, potential for injury, operational complexity, needle phobia, and portability constraints. These limitations significantly contribute to treatment non-adherence and cause critical delays in life-saving interventions during acute anaphylactic episodes. Furthermore, users articulated a clear demand for innovative, user-friendly, and cost-effective alternatives. These insights highlight substantial gaps in current device designs and establish a strategic foundation for future studies. The findings emphasize the need to explore factors influencing technology adoption and to drive the development of next-generation devices aimed at enhancing emergency anaphylaxis management.

Keywords: *Anaphylaxis management, Device innovation, Medication adherence, Qualitative research, Self-injectable devices, Epinephrine self-injection, User-centric barriers.*