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Review article

Use of urine alarms in toilet training children with intellectual and developmental disabilities: A review

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ABSTRACT

The purpose of this review is to describe and evaluate the existing research on the use of urine alarms in the daytime toilet training of children with intellectual and developmental disabilities (IDD). A systematic literature search yielded 12 studies, many of which were published over a decade ago. The findings suggest that interventions that incorporate the use of urine alarms are promising in the treatment of daytime enuresis for children with IDD; however, more carefully controlled research is needed to confirm these findings and elucidate the precise role urine alarms may play in toileting interventions. Methodological strengths and limitations of the body of research are discussed.

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What this paper adds?

- Many behaviors commonly associated with intellectual and developmental disabilities (e.g., behavioral rigidity, sensory irregularities, cognitive deficits, communication difficulties) can interfere with a natural progression of toilet training skills.
- Urine alarms, only one aspect of typical multi-component toilet training protocols, have the potential to improve the efficiency and effectiveness of behavioral interventions for toilet training.
- We identified 12 studies examining the effectiveness of toilet training interventions that incorporate the use of urine alarms. These studies employed a variety of methodologies including both experimental and quasi-experimental research designs.
- The results of the review indicated that urine alarms represent technology that could potentially streamline highly intensive and burdensome interventions; however, due to lack of research standards and lack of replications in the identified studies, it is difficult to draw any definitive conclusions.

1. Introduction

1.1. Importance of and barriers to independent toilet training

Achieving independence in toileting is a critical developmental milestone for any child. Not only is independent toileting often a requirement for school entry and involvement in therapeutic and extracurricular activities, it is a key developmental step and crucial daily living skill. Unfortunately, children with intellectual and developmental disabilities (IDD) are often delayed in acquiring toileting skills (Ando, 1977). Many behaviors commonly associated with this population (e.g., behavioral rigidity, sensory irregularities, cognitive deficits, communication difficulties) can interfere with a natural progression of toilet training skills. In one IDD population (autism spectrum disorder; ASD), it was found that more than a year of toilet training was required to achieve continence (Dalrymple & Ruble, 1992). One study found that among 183 children with ASD ages 2–17 years enrolled in an Autism Treatment Network site in the northeastern United States, approximately 35% had not established daytime urinary continence by 72 months of age, based on parent report (Stanberry-Beal et al., 2014). Given these challenges, families may struggle to continue to devote the time and financial resources it takes to teach toileting skills. Incontinence not only can be a burden to families, but can lead a child to experience a lack of independence and self-confidence, limit socialization opportunities, and disrupt typical daily activities (Kroeger & Sorensen-Burnworth, 2009).

1.2. Interventions used to toilet train children with IDD

A review on toilet training strategies for individuals with IDD by Kroeger and Sorensen-Burnworth (2009) identified 28 peer-reviewed studies. Most studies employed intensive interventions (e.g., requiring one-to-one supervision by an adult for several days). These interventions incorporated nine primarily behavioral strategies used in various combinations across studies: graduated guidance, reinforcement-based training, scheduled sittings, elimination schedules, punishment procedures, hydration, manipulation of stimulus control, nighttime training for diurnal continence, priming, and video modeling. In most cases, data indicated that the interventions were successful in toilet training individuals with IDD.

Many of the studies followed a recommendation by Azrin and Foxx (1971) to use an enuresis alarm in conjunction with other behavioral procedures, notably positive reinforcement, peer modeling, punishment following an accident (e.g., verbal reprimands, tepid shower, forced cleaning of soiled surfaces), and time out. The alarm serves two potential purposes. It may elicit a startle response that interrupts the urine stream, thus increasing the likelihood of being able to void the remaining urine in the toilet (Hanney, Jostad, LeBlanc, Carr, & Castile, 2012). Additionally, the alarm signals when an accident occurs, thereby allowing trainers to deliver immediate consequences to the participant. Azrin and Foxx reported the successful use of "wet alarm pants," along with behavioral procedures, for toilet training institutionalized adults with IDD. The use of mechanical apparatuses to treat enuresis dates back to the 1930s (Mowrer & Mowrer, 1938). These devices initially emerged