

Evaluation of Early Childhood Home Visiting to Prevent Medically Attended Unintentional Injury



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Study objective: We evaluated the influence of home visiting on the risk for medically attended unintentional injury during home visiting (0 to 3 years) and subsequent to home visiting (3 to 5 years).

Methods: A retrospective, quasi-experimental study was conducted in a cohort of mother-child pairs in Hamilton County, OH. The birth cohort (2006 to 2012) was linked to administrative home visiting records and data from a population-based injury surveillance system containing records of emergency department (ED) visits and hospitalizations. Cox proportional-hazard regression was used to compare medically attended unintentional injury risk (0 to 2, 0 to 3, and 3 to 5 years) in a home-visited group versus a propensity score-matched comparison group. The study population was composed of 2,729 mother-child pairs who received home visiting and 2,729 matched mother-child pairs in a comparison group.

Results: From birth to 2 years, 17.2% of the study population had at least one medically attended unintentional injury. The risk for medically attended unintentional injury from aged 0 to 2 and 0 to 3 years was significantly higher in the home-visited group relative to the comparison group (hazard ratio 1.17, 95% confidence interval 1.01 to 1.35; hazard ratio 1.15, 95% confidence interval 1.00 to 1.31, respectively). Additional injuries in the home-visited group were superficial, and the increased risk for medically attended unintentional injury was observed for ED visits and not hospitalizations.

Conclusion: Home-visited children were more likely to have a medically attended unintentional injury from birth to aged 3 years. This finding may be partially attributed to home visitor surveillance of injuries or greater health care-seeking behavior. Implications and alternative explanations are discussed. [Ann Emerg Med. 2017;70:302-310.]

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INTRODUCTION

Emergency department (ED) visits caused by unintentional injury occur at an annual rate of 11% to 12% among children aged 0 to 5 years.¹ Unintentional injuries are preventable events that cause substantial morbidity and mortality in the pediatric population. The rate of fatal unintentional injury among young persons has decreased in the past century, but has not followed the same precipitous decline of morbidities such as infectious disease.² Interventions for the prevention of pediatric unintentional injury often target the home environment, which is the most common location of unintentional injury in this population.^{3,4} Early childhood home visiting is an intervention delivered in the home environment and may prevent unintentional injury among high-risk children, including those who live in poverty, who live in single parent households, or who have young mothers.⁵⁻⁷

Home visiting programs can influence child health by establishing positive parenting behaviors and attitudes among new parents.⁸ Maternal behaviors and perceptions related to injury are known modifiable predictors of injury risk.⁷ These programs also provide home safety education and routine hazard assessments during a window of significant injury risk: aged 0 to 3 years. Parent education during home visiting is also designed to provide anticipatory guidance for use after discharge from service. The synergy of positive parenting behaviors, hazard mitigation, and home safety education may have a substantive preventive effect. Although moderate evidence exists to support home visiting as a strategy to prevent unintentional injury during early childhood,^{9,10} there is a lack of evidence from established home visiting programs fully implemented in a community.

An estimated 400,000 to 500,000 families were served annually in home visiting before 2010.^{11,12} A subsequent

Editor's Capsule Summary

What is already known on this topic

Pre- and postnatal home visiting programs target high-risk families for parenting education. Their efficacy for preventing injuries is not well studied.

What question this study addressed

This retrospective, quasi-experimental study compared emergency department (ED) visits and hospitalizations for unintentional injury in a group receiving home visiting services to a matched comparison group.

What this study adds to our knowledge

Comparison of 2,729 matched mother-child pairs in each group showed higher rates of ED visits but not hospitalizations for unintentional injury in the home-visited group at aged 0 to 2 and 0 to 3 years, but not aged 3 to 5 years. Findings may be due to selection bias or to increased health-seeking behavior in the home-visited group.

How this is relevant to clinical practice

Home visiting programs may benefit new parents, but are not likely to reduce ED visits.

federal investment of \$1.5 billion expanded this reach.¹³ In 2013, Ohio home visiting programs served 8,211 families; however, these programs have not been rigorously evaluated in the context of unintentional injury prevention. In an evaluation context, programs must also elucidate the service characteristics that influence positive outcomes. For example, the level of engagement in home visiting has been associated with positive parenting behavior and may also affect injury prevention.¹⁴

The study objectives were to determine whether participation in home visiting reduced the risk for medically attended unintentional injury during typical home visiting (ie, 0 to 3 years) and afterward (ie, 3 to 5 years). Home visiting was hypothesized to reduce the risk for early childhood medically attended unintentional injury.

MATERIALS AND METHODS

A retrospective, quasi-experimental study was conducted to evaluate the effect of home visiting on medically attended unintentional injury during early childhood. The home visiting group was composed of mother-child pairs who participated in the home visiting program Every Child Succeeds in greater Cincinnati, OH. Families who received

a minimum of one postnatal home visit were included in the home visiting group. The comparison group was composed of mother-child pairs who were eligible for home visiting services, but who did not participate in the intervention. Reasons for nonparticipation included lack of referral or refusal to participate after referral; 31% of eligible mothers in the study region were referred to home visiting. Comparison families were matched to home visiting families by year of birth and propensity scores. Families who were referred to and refused participation in home visiting were excluded from the pool of comparison families because of their limited motivation to participate, which may have been due to perceived need or value of service. This exclusion was performed to ensure a more homogeneous matched study population related to motivation, a construct that if unaddressed may contribute to selection bias.¹⁵ The study groups were compared by the risk for medically attended unintentional injury at birth to 2 years, birth to 3 years, and aged 3 to 5 years. We assessed a dose-response effect by examining the number of postnatal home visits as a continuous predictor of medically attended unintentional injury in the home visiting group.

In a secondary unmatched analysis, we compared the incidence of medically attended unintentional injury in the home visiting group to the incidence in the group that was referred to home visiting but refused participation and was excluded from the primary analysis. The study was approved by the institutional review boards at Cincinnati Children's Hospital Medical Center and the Ohio Department of Health.

Selection of Participants

Mother-child pairs (N=16,557) who were eligible for home visiting according to sociodemographic characteristics were selected from the 2006 to 2012 birth cohort in Hamilton County, OH. The eligible criteria included primiparous women with any of the following characteristics: younger than 18 years, late entry into prenatal care (third trimester), unmarried, or documented low income (Medicaid or Women, Infants, and Children [WIC] program recipient). There were 2,873 mother-child pairs who participated in home visiting, 11,385 mother-child pairs available for matching in the comparison cohort, and 2,229 mother-child pairs who were referred to but refused home visiting services and were removed from the comparison pool.

Children who were born before 25 weeks' gestation (N=141) were considered medically high risk and excluded from both study groups. There were 38 participants who received home visiting but were excluded because of no postnatal home visits, the service window theorized to

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