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Motor affordance at home for infants living in poverty: A feasibility study

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ABSTRACT

Purpose: To determine the feasibility of completing a randomized clinical trial of *motor affordance program* at home for infants living in poverty.
Methods: Fourteen infants living in poverty were randomized assigned to groups: intervention at 1st month (G-1), and at 2nd month (G-2). They were assessed into 3 visits: Visit 1 (baseline), Visit 2 (after 4 weeks), and Visit 3 (after 8 weeks). The *motor affordance program* was provided at home by parents/caregivers. To determine feasibility of the program, descriptive data was used. Effect sizes and non-parametric analysis were performed for motor and affordances at home.
Results: The *motor affordance program* was considered feasible and showed improvement on affordances at home and motor performance only for G-2.
Conclusion: Amplifying motor affordance at home may be considered appropriate for future clinical trials. It may be an efficient/low-cost early intervention strategy for infants at environmental risk.

1. Introduction

Poverty represents a lack of necessary goods and services and in poor families, the resources are not sufficient to meet their needs (Short, 2016). These families living in poverty or with low-socioeconomic status (SES) may have a home environment, which does not provide opportunities for infants to develop properly, and poor quality of child-parent relationships (Bradley, Corwyn, McAdoo, & Coll, 2001; Connor, Son, Hindman, & Morrison, 2005; Guo & Harris, 2000; Hess & Mcdevitt, 1984; National Scientific Council on the Developing Child, 2007; Rose & Fischer, 1998; Santos et al., 2009). There is evidence that infants at 6–12 months from low- SES families may present deficits in cognition, attention problems and less strategies of manual exploration compared to high-SES infants (Clearfield & Niman, 2012; Clearfield & Jedd, 2013; Clearfield et al., 2014; Tacke et al., 2015).

These differences are described as possibly related to the affordances of the physical environment (Adolph et al., 2012), in other words, lack of possibilities in the environment promoting cycles of perception-action to guide the selection of efficient motor actions (Gibson, 1979; Gibson, 1982). As expressed by Haywood et al. (2012), affordance can be defined as the individual perception of the functional significance of objects, events, or places and it is specific to the perceiver. In this perspective, stimuli are defined by information for action, and the information that individual needs is available in the stimulus and can be directly perceived.

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Considering the impact of lack of affordances on the home environment, low-SES infants are negatively impacted by shorter stimulation, less opportunities to explore objects and lack of space to explore and move on the floor (Clearfield, Bailey, Jenne, Stanger, & Tacke, 2014; Tacke, Bailey, & Clearfield, 2015). These factors may be examples of environmental risks which may impact adversely the motor development and learning in the first year of life leading to long-term consequences (Bradley, Burchinal, & Casey, 2001).

To provide affordances for motor development at the home environment, such as age-appropriate toys, may increase the frequency of exploratory behaviors (Correr, Ouro, Caçola, Almeida, & Santos, 2004) and positively influence gross and fine motor skills in infants (Caçola, Gabbard, Santos, & Batistela, 2011; Miquelote, Santos, Caçola, Montebelo, & Gabbard, 2012). Moreover, programs focused on environmental enrichment, parent-guided interaction, and infant development supervised by a physical therapist has been shown positive impact on cognition, motor development and social-emotional behaviors in infants at risk for motor delays (Dusing et al., 2015; Sgandurra et al., 2016; Sgandurra et al., 2017; Ustad, Evensen, Campbell, Girolami, & Helbostad, 2016). These programs were provided by therapists at home for infants at biological risk (i.e. prematurity), involving for example a smart baby gym system (Sgandurra et al., 2016; Sgandurra et al., 2017), helping parents to establish a routine for developmentally appropriate play and encourage them to provide more opportunities for infant's movements (Dusing, Brown, van Drew, Thacker, & Hendricks-Muñoz, 2015), or by demonstrating motor activities and providing a booklet with photos and instructions (Ustad et al., 2016). However, how families living in poverty may promote affordances in the home environment for infants to fulfill their developmental potential still need to be clarified.

For this study, we developed a short-term intervention for infants at environmental risk (i.e., poverty, lack of space/toys and lower level of parents' education). A pediatric physical therapist encouraged parents living in poverty how to interact daily with their infants at 6–9 months. At this age, infants are better able to coordinate their existing exploratory behaviors and explore the environment more independently (Adolph & Franchak, 2017; Lobo & Galloway, 2013). Moreover, they were taught how increasing the opportunities for motor action in the home environment by providing an illustrated booklet and set of as age-appropriate toys to improve their motor development and affordances at home. The *motor affordance program* was based on the perception-action framework (Gibson, 1979; Gibson, 1982), and to develop strategies to promote greater variability of motor, cognitive and exploratory behaviors for infants living in poverty. This theoretical framework called "therapeutic affordance" has been applied to intervention, where the therapist during treatment allows the patient to perceive affordances and use them to guide action through the use of information in the environment (Fetters & Ellis, 2006). In this context, by applying the affordances for a person or child in an environment, the environment is also manipulated to promote more opportunities for individual's development (Fetters & Ellis, 2006).

Although we believe that proving affordances for motor development at the home environment may positively impacts infant's development, there is evidence of challenges of engaging parents in interventions, especially in stressful conditions (Phillips-Pula, Pickler, McGrath, Brown, & Dusing, 2013) or with lower education and resources (Freitas et al., 2013). Then, to incorporate the *motor affordance program* in the daily routine might be challenging for low-SES families. Thereby, the purpose of this study was to verify the feasibility of conducting a randomized controlled trial to evaluate the efficacy of the *motor affordance program* in infants living in poverty. We aimed to: 1) verify if the parents completed daily a booklet when they carried out the activities and receive a feedback about the intervention; 2) assess the motor performance and affordances at home of infants living in poverty; 3) assess and describe the *motor affordance program* in 14 randomized infants. Our first hypothesis is that parents would be engaged and complete more than 80% of the program. We also hypothesized infants living in poverty will be at risk for delays, and the *motor affordance program* will promote positive impact on infants' motor development and affordances at home. This study becomes extremely relevant to provide guidance to parents/caregivers and strategies for pediatric therapists of how to prevent and/or minimize delays on development and optimizing their environment.

2. Method

2.1. Design overview

The study was approved by the Ethics Committee of the University (protocol no. CAAE 69888317.4.0000.5507) and registered in the Brazilian Clinical Trials Registry (protocol no. U1111-1179-8038) as a randomized controlled clinical trial, single blind, parallel group design.

2.2. Setting and participants

Fourteen infants participated in the study at 7.3 ± 1.1 months of age at the first visit. The infants were randomly assigned to one of two groups: group 1 (G-1), which received one-month intervention after the first visit; and group 2 (G-2), which received the same one-month intervention after the second visit. In other words, the G-2 had the same opportunity to receive the intervention after second visit considering ethical requirements. The same procedure was done by Sgandurra et al. (2014). The infants' parents signed an informed legal consent.

All infants were enrolled in a program called "Pastoral da Criança", which is a non-governmental and social organization focused on children's integral development through basic actions of health and nutrition in poverty communities in Brazil. The demographic and health-related information about the participants are provided in Table 1. There were no differences between the two groups in any of these characteristics.