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Spanish Validation of the Premie-Neuro Scale in Premature Infants[1,2]

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This study was an observational cross-validation of a Spanish version of the Premie-Neuro, a neurological examination for preterm infants. A cross-cultural translation was used to generate a Spanish version of the scale. The results showed an internal consistency of 0.72 according to Cronbach's alpha coefficient. The intra-class coefficient of correlation for the overall scores was 0.78. Factor analysis provided evidence of construct validity. The Spanish version of the Premie-Neuro was found to be a reliable and valid instrument for evaluating neurological and physical statements for premature infants admitted to a neonatal intensive care unit.

THE NUMBER OF pre-term infants with medical problems, cognitive delays, neuro-developmental and behavioral problems, and other difficulties has been growing (Chang et al., 2013; Melnyk et al., 2002), as survival rates have increased, thanks to rapid advances in medical technologies. In 2010, there were an estimated 15 million pre-term births worldwide, these being understood as cases in which 37 weeks of gestation had not been completed (Blencowe et al., 2012). In Spain, an annual total of approximately 29,870 children are born with low birth weights, representing 6.7% of all births, which is higher than the figure of 4.9% recorded in 1998, according the National Survey (INE, 2012).

There is also a growing body of evidence for long-term adverse outcomes reaching into school age, adolescence, and even adult years (Adams-Chapman, 2009; Stephens & Vohr, 2009). This makes pre-term birth a major public health issue (Mathur & Inder, 2009).

To prevent and control these problems, the importance of optimum diagnosis, treatment and developmentally supportive nursing care of pre-term infants has been emphasized. Assessments that are suitable for use on fragile and unstable infants in a neonatal intensive care unit (NICU) setting are highly relevant both to clinicians and to researchers, making clinical utility a major factor in deciding which tool to use (Noble & Boyd, 2012; Snider, Majnemer, Mazer, Campbell, & Bos, 2008). In general, pre-term infants are admitted to a neonatal intensive care unit (NICU) at birth because of incomplete physical and neurological development (Im, Kim, & Cain, 2009; WHO, 2012).

Neuro-behavioral and neuro-motor examinations are administered for a variety of purposes. These include examination of the relationship between motor, neurological and behavioral functioning, detection of early central nervous system dysfunction, prediction of future outcomes, evaluation of longitudinal development, and determination of the impact of interventions (Spittle, Doyle, & Boyd,

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2008). Accurately picking out atypical development is essential for targeting early interventions on those most at risk and for preventing unnecessary interventions on those who are unlikely to have any neuro-developmental impairments (Mwaniki, Atieno, Lawn, & Newton, 2012; Noble & Boyd, 2012). Adequate assessment of an infant's motor development depends on the use of reliable, valid instruments (Campos, Santos, Goncalves, et al., 2006; Santos, Araujo, & Porto, 2008).

Neonatal care is one specialty in nursing where the acquisition of a broad range of skills and knowledge is essential for safe and effective care of neonates and support for their families (Hancock, 2003; Petty, 2014). The overall aim is for a neonatal nurse to demonstrate competency for all premature dependency levels (Department of Health, 2009; British Association of Perinatal Medicine (BAPM), 2010) in order to be deemed a specialist in knowledge, skills and attitudes. In fact, a proper neurological assessment performed by nurses could contribute to providing a basis for positive neonatal and maternal outcomes. The Premie-Neuro is a reliable and valid clinical neurological test for preterm infants in the NICU (Gagnon, 2009), and that performance on the Premie-Neuro can be utilized with preterm infants to monitor neurologic development during NICU care (Daily & Ellison, 2005).

Purpose

The purpose of the present study was to translate and validate a version of the Premie-Neuro for use with Spanish premature infants.

Methods

This study was an observational cross-validation of a Spanish version of the Premie-Neuro, a neurological examination for pre-term infants. Twenty-seven pre-term infants were selected from a Spanish Neonatal Unit in a University Hospital during the period from February to September 2013. The criteria for Inclusion were: gestational age between 28 and 37 weeks inclusive, birth weight below 2500 g and a stay of at least 24 hours in the neonatal intensive care unit. Any babies that had mechanical ventilation, congenital anomalies, inotropic support, septic shock, persistent tachycardia or bradycardia, or central nervous system dysfunction were excluded from the study, as were those whose families declined to participate in the study. The sample size was selected using the expected figures for 95% confidence intervals of the intra-class correlation coefficients (ICCs) for inter-rater and test–retest reliability (Giraudeau & Mary, 2001). It was hypothesized that the ICCs for inter-rater and 1-day test–retest reliability could reach 0.90 and 0.73, respectively, which would imply a high level of reliability, comparable with what has been reported in the literature for other assessments of newborn babies (Campbell, 1999; Korner, Constantinou, Dimiceli, & Brown, 1991; Sheridan-Pereira, Ellison, & Helgeson, 1991).

The Tool

The Premie-Neuro is a neurological examination for pre-term infants born after a period of between 23 and 37 weeks of gestation, or since cessation of menstruation. It consists of twenty-four items divided into three factors, neurological, movement and responsiveness, each with eight items. Each of the items is assigned a score of 1, 3 or 5. The scores for items are added up to yield a total raw score, with the possible figures for this ranging from 24 to 120. Assessments are classified as neurologically normal, questionable, or abnormal on the basis of raw score cut-off points recommended by creators of the Premie-Neuro (Daily & Ellison, 2005).

Forward and Backward Translation

For the purposes of the study, the scale was translated into Spanish, then back-translated by other translators, in order to ensure the accuracy of translation. Evidence of validity for the translation of the Premie-Neuro hence was provided through the following steps (Thomas & Nelson, 2003): (a) forward translation of the Premie-Neuro into Spanish by a group of two specialist nurses and physiotherapists and two holders of doctorates from universities using English as the primary language; (b) back-translation of the resulting Spanish version of the Premie-Neuro into English by a second group of two specialist nurses and physiotherapists and two holders of doctorates from universities abroad; (c) finally, five neonatal nurses and five physiotherapists were asked to complete the Spanish Premie-Neuro and identify items requiring modification.

After a pilot test to evaluate problems in respect of semantic, idiomatic and cognitive issues by using a hypothetical scenario for carrying out a Premie-Neuro, which involved physicians, neonatal nurses and physiotherapists, a perfected Spanish version of the Premie-Neuro Scale was developed.

Data Collection

Permission to use the Premie-Neuro for the purposes of the present study was obtained from Dr. Donna Kathryn Daily, principal author of the scale (Daily & Ellison, 2005).

A data collection booklet was drawn up, in which the main variables under study were brought together in a definitive Spanish version of the Premie-Neuro Scale with three forms for each premature infant. The neonatal nurses who participated in the study were trained in performing the Premie-Neuro Scale in accordance with a version of the Instruction Manual for the examination provided by its authors. This training consisted of three 2-hour sessions, involving both theory and practice with a baby simulator. Before any assessments were undertaken, parents signed an institutionally approved consent form, having been informed about the study that would be undertaken. Each premature infant meeting the inclusion criteria was assessed by two neonatal nurses. The first nurse assessed the premature infant