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Use of the Pediatric Infant Parent Exam: Screening maternal-infant interactional synchrony during well infant visits

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Objectives

1. Delineate the relevance for early identification of patterns of interactional synchrony for optimal mother-infant relationships.

2. Describe the interrater-reliability, scoring of typicality of interaction, and time required for use of the Pediatric Infant Parent Exam in an outpatient well infant exam.

3. Evaluate the desirable characteristics of an instrument to measure maternal-infant interactional synchrony in the first year of life.

Disclosure

I have no conflict of interest to declare, I am a faculty member of the Texas Tech University Health Sciences Center, School of Nursing and I have received no financial support nor sponsorship for the research study.

Relevance of the Research

- Synchronous communication that is reciprocal, nurturing, and mutual is the foundation of healthy emotional, social, and cognitive development..

- To intervene early there must be reliable instruments to guide practice.

- In general, high-quality interactions during the first year of life tend to be positively linked to the child's subsequent cognitive and linguistic competence and to more secure attachments to major caregivers.

(Leclere et al., 2014)

Desired Attributes of the Study Screening Instrument

- Few instruments were noted for screening the quality of mother infant interactional synchrony in a clinic setting
- There was a match with the conceptual definition of the variable the researcher wishes to measure.
- The instrument was appropriate for use with the intended sample population.
- Reported psychometric properties (i.e., validity and reliability) of the PIPE were noted.
- Minimum of training and equipment
- Applicable to non-laboratory setting
- Relative brief time requisite for assessment
- Pose minimum risk or burden to participant
- Easy to use and score
- Cost-effective

Purpose

The purpose of this mixed methodological study was to determine the interrater reliability and feasibility of the pediatric infant parent exam (PIPE) as used by nurses during a well baby visit in a pediatric clinic.

Specific Aims

Determined:

1. Interrater reliability of the Pediatric Infant Parent Exam (PIPE).

2. Time required for the screening of the maternal-infant dyad using the PIPE during a well-baby visit.

3. Relationship between maternal-infant synchrony and three nurses' rating of typicality or usual traits of the interaction score.

4. Nurses' rating of ease of use of the PIPE during a well-baby visit.

Theoretical Underpinning

- The etiology of mother-infant communication is complex and may be attributed to characteristics of the caregiver (s), infant, or environment.
- The quality of the interaction between mothers and infants is an important indicator of the mother infant relationship.
- Maternal sensitivity and responsiveness are two major antecedents to attachment.

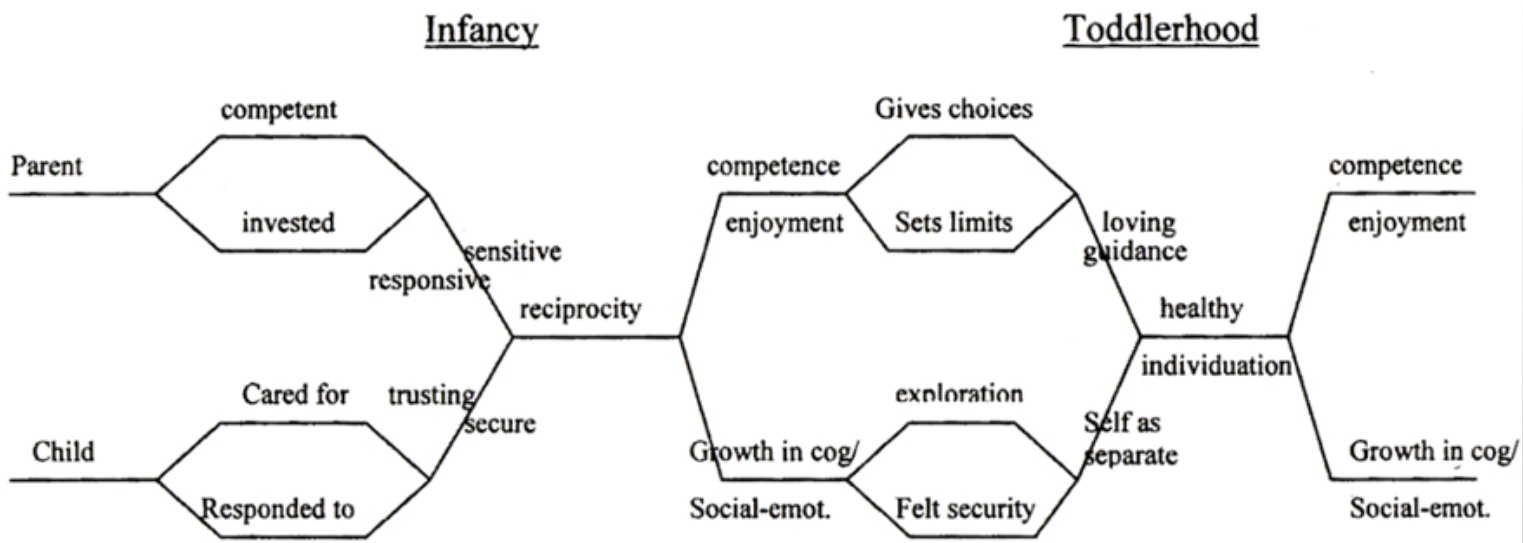
Barnard's Model

- Interactional synchrony was defined as the *mutual contingent* attendance to one another in engagement with back and forth *sharing of affect between parent and infant* that evolves over time (Barnard, 1989).

- Ability of the caregiver to interpret infant behavior and respond contingently as well as the infant's ability to give clear behavioral cues in a contingent manner are major components of the model(Kelly and Barnard, 1999).

- The interaction reveals caregiver and infant capacities for participation in the relationship (Feldman, 2007).

Conceptual Model



From Kelly, J.F. & Barnard, K.E. (1999). Parent education within a relationship-focused model. *Topics in Early Childhood Special Education, 19*(3), 151-157.

Research Design

A non-experimental mixed methodological research design was used for this study; as increased psychometric knowledge and support for use of the Pediatric Infant Parent Exam instrument in screening of interactional synchrony of maternal-infant dyads was sought.

Research Questions

1. What was the interrater reliability between the principal investigator (PI) and three pediatric clinical nurses using the Pediatric Infant Parent Exam (PIPE) in a busy pediatric clinic as a component of the well baby visit?

2. What was the amount of time required for the principal investigator (PI) and the three pediatric clinical nurses to administer and score the PIPE in a busy pediatric clinic as a component of the well baby visit?

3. What was the difference between the PIPE scores and the usual traits/typicality of interaction score?

4. How did the three pediatric clinical nurses rate the feasibility of use of the PIPE in a busy pediatric clinic as a component of the well-baby visit?

Sample

- The primary investigator and three pediatric clinical nurses used the PIPE to screen a convenience sample of 50 English-speaking mothers and their six to nine month old infants.
- Exclusion criteria were infants diagnosed with congenital anomalies, fever, or illness, as such factors may have interfered with usual maternal-infant interaction.
- A sample size of 50 was sufficient to achieve acceptable levels (power of 0.80 and alpha of 0.05) of interrater reliability (Streiner and Norman, 1995).
- Recruitment was carried out by the nursing research assistant and the appropriate pediatric clinical nurse as eligible dyads arrived for scheduled well baby visits.

The PIPE Instrument

- Was designed as an observational measure that focuses on the ***interactional synchrony*** between parents and their 6 to 9 month old infants to focus on how mother and infant related to one another in a clinic setting (Fiese et al., 2001).

- ***Interrater reliability*** of .92 was found for agreement within one point across all segments of the observed interactions.

Protection of Human Subjects

- All research nursing assistants and the primary investigator completed Institutional Review Board training per TWU and TTUHSC per NIH guidelines
- Approval from the IRB of TTUHSC and administrative staff of the university clinic and Texas Woman's University was re-confirmed prior to the study
- ***Informed consent*** was obtained by the certified nursing research assistant on mother participants 18 years and older
  *Adolescent participants less than 18 years completed ***assent*** and the parent or guardian granted permission as well.
- Participants who were younger than 18 years of age and ***married***, in the ***military***, or ***legally emancipated*** completed informed consent
- Emphasis was on providing information and answering questions, assurance that participation was voluntary, privacy during the screening, confidential treatment of data in a locked file in the PI's office (accessed only by the PI and major professor and statistician) and availability of counseling.

Data Collection

- Once consent was obtained the ***screening*** was completed in the same private exam room with the PI and the pediatric clinical nurse.
- At the beginning of the exam, the PI asked the mother to play a brief game of "peek-a-boo" with her infant as the PI and pediatric clinical nurse ***observed and independently scored*** the dyadic interaction using the PIPE.
- The PI monitored time from game onset (signaled by the PI reading instructions to the mother) to completion (signaled by the pediatric clinical nurse stating "the game is over now") to the nearest second using a stopwatch.
- The PI completed her exam scoring as the pediatric clinical nurse independently also completed exam scoring.
- After this the PI and pediatric clinical nurse averaged results and informed the mother of results.

Referral

- If there had been maladaptive results, further screening would have been recommended as would the option for referral for counseling.
- There were a variety of parenting and child developmental specialists available during the study of nine weeks including Dr. Paul Douthit.
- Each of the 50 participating dyads received a book suitable for the infant to compensate for the time and effort involved in the study.

Data Analysis

- Interrater reliability was assessed using Cohen's Kappa (***k***) and descriptive statistics were done on the variables of time.
- Correlation of the scores for the PIPE and the scores for "overall impression of interaction", and the scores for "judgment of typicality" of the exam were to be correlated.
- A statistician assisted in data analysis using SAS version 9.3.

Results

Question 1: sought the interrater reliability between the PI and three PCNs using the PIPE in a busy pediatric clinic as a component of the well-baby visit.

Beginning the Game	Continuing the Game	Ending the Game
k=0.679, 95%CI: (0.486, 0.873)	*k*=0.748, 95% CI: (0.566, 0.930)	*k*=0.887, 95% CI: (0.766-1.0)
KW=0.665, 95% CI: (0.459-0.870)	*KW*=0.768, 95% CI (O.601, 0.934)	*KW*=0.907, 95% CI: (0.808-1.0)

Nurse 1 (N=42)	Nurse 2 (N=54)	Nurse 3 (N=36)
Agreement=85.71% Disagreement =14.29%	Agreement=88.89% Disagreement =11.11%	Agreement=86.11% Disagreement =13.89%
K=0.726, 95% CI: (0.521, 0.930)	*K*=0.783, 95% CI: (0.625, 0.941)	*K*=0.751, 95% CI: (0.556, 0.947)
KW=0.765, 95% CI: (o.579, 0.952)	*KW*=0.798, 95% CI: (0.654, 0.942)	*KW*=0.750, 95% CI: (0.542, 0.957)

Question 2: sought to determine the amount of time required for the PI and three PCNs to administer and score the PIPE in a busy clinic as a component of the well-baby visit

- The time required ranged from **35 seconds** to **202 seconds**, with a **mean of 90.57 seconds**. The median was 67.5 seconds, and the standard deviation was 44.13 seconds.

Results (Cont.)

Question 3: sought to determine the difference between the PIPE scale "overall impression" interactional scores and the "usual/typicality" traits of interactional synchrony scores.

	Other Rater 1	Summary
Rater 1	Category	*K* *KW*
	Overall	0.18 0.40
	Usual Traits	0.19 0.41
Total		N=44

Question 4: sought to determine how the three PCNs rated the feasibility for use of the PIPE.

Rater 1	Rater 2	Rater 3
Somewhat Easy	Somewhat Easy	Easy

Implications of Findings

- The scores of the “overall” and “judgment of usual or typical” scales items did not meet the test of symmetry. This suggested the need for better differentiation for these components of the PIPE and was also identified by the developers.

- The fact that the PCNs rated the PIPE as “somewhat easy” or “easy” to use provides support for feasibility.

- Standardization for use of the PIPE with a larger sample would increase likelihood for future use.

Findings Linked to Relevant Research

- In recent years researchers and clinicians have identified the need for simple and brief screening tools for use with young infants and children during the most opportune time for intervention.
- Increased incidence of maternal-infant attachment disorders and altered mental health signaled the need for early identification of at-risk dyads with a focus on dealing with parents to deal with stress.
- Early relationship of mother and infant has been shown to influence the physical architecture of the brain, literally shaping the neural connections of the developing brain.
- The caregiving relationship has been identified as the major influence on the learning and growth of early years.
- Appropriate attention to maternal-infant interactional synchrony offers an answer to many threats of attachment and altered mental health in the first years of life.

Recommendations for Future Research

Future research will further determine the PIPE's clinical utility with the goal of developing an instrument to enhance early identification of maternal-infant dyads at risk for interactional problems and evaluation of prevention and early intervention services.

*This need was shared as a Grand Rounds Presentation in the Pediatric Department at TTUHSC which supported the need for an enhanced program of early intervention.

Consideration should be given for modification for scale items of "overall interactional synchrony" (1=7 ratings) and "judgment of typicality" (very typical, somewhat typical, and atypical).

Summary

- As more infants survive, the need for more reliable screening instruments for early detection of problematic dyadic interactions is required.

- The newly identified realm of infant mental health will provide a timely impetus for bringing joy to the first relationship for mothers, fathers and babies, thereby facilitating the actualization of potential for all.

Major References

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