



Effects of parenting role and parent–child interaction on infant motor development in Taiwan Birth Cohort Study



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ABSTRACT

Background: Previous studies have rarely focused on healthy infants' motor development, and nationwide birth cohort studies in Taiwan are limited. It has been shown that parent–child interactions significantly influence infant motor development and the effect of mother–infant attachment on infant development is stronger than father–infant attachment. However, it is not well understood that whether the mother–infant or father–infant interaction has the confounding effect on infant motor development.

Aims: To understand healthy infant motor development in Taiwan; and to investigate the effects of parenting roles and parent–child interactions on infant motor development.

Methods: Data were derived from the 1st through the 2nd waves of the Taiwan Birth Cohort Study-Pilot Database. Infants were classified into two categories (complete or incomplete development) according to their developmental milestones. Generalized estimating equations (GEE) and random effects models were used to clarify the possible long-term effects.

Results: The rate of infants who completed development in 6 months was 30.50%; however the rate was increased in 18 month-old children (80.01%). A mother's perceived infant care competence was the most important factor for infant motor development. "Whether or not the infant was the only baby in the family" and "parent–child interaction" had slightly significant effect on infant motor development.

Conclusions: In conclusion, the mother's perceived competence must be strengthened and parent–infant interactions should be emphasized on a daily basis.

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1. Introduction

Previous studies have shown that the tendency for infants to reach and grasp exposes them to dangerous situations. However, the impact of organism and environmental interactions on reaching and grasping behaviors of infants needs to be further examined and understood [1]. Because previous infant motor development studies have been cross-sectional and birth cohort studies are especially limited in number, the long-term effects of infant motor development are unclear. Moreover, previous studies have focused primarily on children with developmental disabilities or disorders rather than healthy infants. Accordingly, the responsible factors related to whole infant motor development need to be further explored [2–4]. In Taiwan, infant development related data

and resources are more limited than in other countries and reliable infant normative studies are especially lacking [5]. As a result, this issue needs further investigation. The Taiwan Birth Cohort Study was the first national longitudinal follow-up cohort study conducted in Taiwan. These data could help us to better understand the progress, risk factors and protective factors regarding infant motor development.

Parenting behaviors may be affected by the parent's own perspective of the role of being a parent. Sulová and Fait [6] noticed that unwanted children were significantly discriminated against by their parents, and they had more frequent illnesses, poorer school performance despite an identical intelligence quotient, a higher frequency of nervous and psychosomatic disorders, and reduced social adaptability compared to those children who were wanted by their parents. Thus, as one's attitudes and actual behaviors become aligned with a particular role, a "role identity" is created [7]. That is to say, parenting behaviors may be influenced by role identity, which may further affect their infant's development. However, whether unexpected pregnancies have a similar effect on infant motor development needs to be tested.

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In addition, it was found that fathers tend to teach fishing skills to their sons more than daughters. Also, male students mostly gained better fishing skills from their fathers than other people [8]. Overall, parents tend to adopt different parenting styles according to the infant's sex. As mentioned by Robbins and Judge [7], role expectations are defined as the way others and the individual believe a parent should act in a given situation. Perhaps, roles are induced through the sharing of expectations for role behavior and our behaviors are also controlled through these experiences [9]. However, whether the matching of infant gender with their parents' expectation has an impact on parenting style is not clear. Biddle [9] further indicated that people may be motivated to continue to modify their role functions because they desire to practice the roles they should and could play. However, the effects of a mother's and/or father's perceived competence on infant motor development needs to be elaborated upon. Sometimes, the person is subjected to confront an incompatible "role conflict," whereby he/she is futilely required to play two or more roles [9]. For example, if a career woman cannot fulfill both her job role and her family role, she would experience psychological conflict [10]. Previous studies have also suggested that socially and economically vulnerable families seem to run the greatest risk of having children with psychosomatic complaints and long-term illnesses [11]. Therefore, if parents experience severe economic pressure in terms of child care, this may also delay the infant's motor development. The explanation for this effect may be related to the nature of the context in which the role is performed and if resources for child care were depleted [9].

It is well known that an infant's development may be affected by parent–child interactions. Parents' understanding of attachment needs and behaviors of their autistic children in the early stages of the disorder may lead to more secure attachment relationships and improved social development [12]. When parents generally provide a sense of predictable contingency, the child feels understood, joined, and a sense of communion between parents and child is established [13]. Moreover, the infant–mother attachment has more impact on infant motor development than the infant–father attachment [14,15]. However, previous studies focusing on the effect of infant–father interactions on infant motor development have been lacking. Moreover, it is not known what factors affect the quality of parent–child interactions. During face-to-face interactions, non-adolescent mothers showed more positive affect toward infants than adolescent mothers because non-adolescent mothers perceived themselves as having more infant care competence than adolescent mothers [16]. Overall, associations between mother–/father–infant interactions with infant motor development are unclear; therefore, this topic will be discussed in this study. The purposes of this study were the following: (1) to understand healthy infant motor development in Taiwan; and (2) to investigate the effects of parenting roles and parent–child interactions on infant motor development.

2. Methods

2.1. Subjects

Data were derived from the 1st through the 2nd waves from the Taiwan Birth Cohort Study-Pilot Database (TBCS-Pilot), which was approved by the Institutional Review Board of Population and Health Research Center of the Bureau of Health Promotion, Department of Health in Taiwan (No. BHP-IRB-0960800522). We used a multistage stratified systematic sampling design to obtain representative samples and ranked a total of 369 towns in Taiwan into 12 strata according to their administrative divisions (4 strata) and the total fertility rate (3 strata). We used the 1st wave of data between November and December 2003 as the primary population, and we sampled 2048 infants in the TBCS-Pilot. A total of 1783 infants completed the interview that was follow-up in the 2nd waves of the TBCS-Pilot. Infants with congenital defects or a Catastrophic Illness Card were excluded. Our final samples from the 1st through the 2nd waves of the TBCS-

Pilot were 1718 and 1600 infants, respectively. There are 99.13% of the responses' providers at the interview who were infants' mothers. If infants' mothers went abroad or met physical and mental problems during the interview, then "substitute respondents (0.29%)" or "infants' mothers together with substitute respondents (0.58%)" were the responses' providers at the interview.

Infants were followed from 6 and 18 months of age between 2004 and 2005. Well-trained interviewers from the Surveillance and Research Division of the Health Promotion Administration, Ministry of Health and Welfare in Taiwan collected data through structured questionnaires and in-depth interviews at the subjects' homes.

2.2. Research framework

Our research framework (Fig. 1) was based on previous concepts of role theory and attachment theory. Because we sought to understand the differential impact of mothering and fathering on infant motor development, some variables were just used as single-part factors (we used "/" as a symbol in Fig. 1) in multivariate analysis.

2.3. Measures

2.3.1. Infant motor development

To better understand healthy infant motor development in the TBCS-Pilot, parents were asked "whether your baby can do the following behaviors." In wave 1, five items were used for a 6-month-old infant motor development evaluation. The infant behaviors included laughing, generating a smile when seeing the main caregiver, moving objects to another hand, turning the body over by themselves and crawling on the floor. In wave 2, four items were used for a 18-month-old infant motor development evaluation. They were asked for infant behaviors regarding walking steadily, drawing arbitrarily, calling parent meaningfully and drinking with both hands by holding a cup. The above-mentioned scale items were stratified into the two following groups: 0 = no or unknown; 1 = yes. If the parents answered that their infants performed all behaviors listed in items used for a 6-month-old or 18-month-old infant motor development evaluation, then we classified it as complete development. Otherwise, infants were classified as incomplete development. In other words, if less than five items in 6-month-old or less than four items in 18-month-old have been performed, then the infants were categorized into the incomplete development group.

2.3.2. Role identity

While infants were 6 months old, this study asked the mothers' and fathers' planned pregnancy. If the answer was "planned pregnancy," it belonged to category 0. If the answer was "let nature take its course," it belonged to category 1. If the answer was "unplanned pregnancy" or "unknown," it belonged to category 2.

2.3.3. Role position

While infants were 6 months old, this study asked the mothers' and fathers' expected infants' sex. If the infants' sex was the same as their expected sex, it belonged to category 0. If the answer was "no expected sex" or "unknown," it belonged to category 1. If the expected infants' sex was not the same as infant's sex, it belonged to category 2.

2.3.4. Mother's/father's perceived competence

While infants were 18 months old, this study questioned the mothers' and fathers' perceived infant care competence. If the answer in wave 2 was "have much assurance" or "have some assurance," it belonged to category 0 = have much or some assurance. If the answer was "have little assurance" or "have no assurance," it belonged to category 1 = continually have little or no assurance.

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