Original Article

Validity and Reliability of Peabody Developmental Motor Scales (PDMS) in Infants of Tehran

Amir Rahmani Rasa*, Vahid Rashedi
Hamadan University of Medical Sciences & Health Services, Hamedan, Iran

Seyed Ali Hosseini, Ali Hossein Sazmand
Pediatric Rehabilitation ResearchCenter, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran

Objectives: Movement is a continuous aspect of life and an important factor to achieve the goals and meet the needs. Regarding the importance of infantś motor assessment and the large number of children with motor disorders, a valid and reliable test is required to help evaluation of motor development and provide appropriate interventions by therapists and educators. This study was implemented in order to investigate the validity and reliability of PDMS in 0–24 months infants in Tehran.

Method: This cross-sectional study was conducted through descriptive-analytic procedures, 110 infants were selected using randomized cluster sampling regarding the inclusion criteria.

Results: There was no significant difference between the male and female on mean motor age and motor development quotient (P>0/05). However, significant correlation between total mean motor age and motor developmental quotient was observed (P<0/05).

Conclusion: Results of the study indicated that PDMS is a valid and reliable tool to enhance quality of assessment, diagnose and proper intervention for movement disorders in early childhood.

Key Words: Peabody Developmental Motor Scales (PDMS), Motor development, Motor Development Quotient (MDQ)

Introduction

The most important and significant aspect of children development during the first two years of life is mastery of sensorimotor control over their environment (1). Motor development is defined as a process in which a child primarily controls his/her body hence he/she is able to interact with the surroundings (2). Most of children's motor activities are emerged in the form of play in this period (3). Motor development does not occur in isolation (4). Children coordinate their psychomotor, cognitive and emotional aspects through purposeful activities (5). Lack of motor efficiency might lead to avoid avoidance of experiencing of exploration, play and learning in early childhood (6).

Infantś movement and play during the first year is often exploratory, social and bonding with parents and caregivers (4, 5). From gross motor perspective, an infant moves his/her head from side to side in prone position at about two months old, while a four-month-old one elevates the head to see the environment in the same position (7). At six months old he/she takes on prone on elbow position and starts to roll over (6). Rolling is the primitive actual movement to explore the environment (5, 7).

Most infants sit on their own and then crawl at seven and eight months old respectively (2, 6). During the next three months, the infant attempts to stand via gripping the objects, steps awkwardly at twelve months old and increase his/her ability to run and climb up/down afterwards (7). Fine motor skills develop more delicately in infancy (6). Eye contact is rather than touch during the first three months of life. A 3-5-month-old infant grasps the objects with the whole hand and more skillfully till 6 months old, this trend proceeds by the late 24 months old (3,4).

According to the importance of evaluating the infant's motor issues, the large number of young children with movement disorders and the necessity of early intervention in order to prevent and treat possible developmental problems, a valid and reliable test should be available as well as providing efficient therapeutic interventions by therapists and educations.

*In Correspondence to: E-mail: jyounesi@uswr.ac.ir

Materials and Methods

In this cross- sectional and descriptive- analytic study, 110 infants (0-24 months old) were selected by cluster sampling. A health center was selected randomly from each of the five districts of Tehran thereafter 22 infants were enlisted similarly. Inclusion criteria were having no sign of metabolic, neurological, visual and auditory impairment authenticated by related specialist. After explaining the examination and having parents' consent, the infants were tested on the items of 0- 24 months old in Peabody Developmental Motor Scales (PDMS). PDMS consists of two subscales; gross and fine, applied in the range of 0- 83 months old. Gross motor subscale, which contains 170 items in 17 age levels, assesses gross motor skills including reflex, balance, non-locomotion, locomotion and receipt and propulsion of objects. Fine motor subscale is composed of 112 items in 16 age levels concerning grasp, eye-hand coordination, hand use and hand dexterity as fine motor skills (8).

The test time for each subject was 30 minutes and the scoring method was as follows; 0: no performance, 1: partial or similar performance and 2: perfect performance.

Results

Descriptive findings of tested infants are presented in tables 1 (male) and 2 (female).

Table 1

Variables	N=55			
	Max	Min	M	SD
Gross motor age	24	0.5	11.88	7.32
Fine motor age	24	0.4	11.58	7.23
GMDQ	179	79	102.33	21.23
FMDQ	151	72	98.13	18.33
TMA	24	0.5	11.71	7.28

Table 2

Variables	N=55			
	Max	Min	M	SD
Gross motor age	24	0.5	11.33	7.03
Fine motor age	24	0.5	11.08	6.97
GMDQ	118	78	99.43	10.57
FMDQ	114	72	95.9	10.47
TMA	24	0.5	11.2	7

The findings of Pearson correlation show that there is significant correlation between Total Motor Age (TMA) with Gross Motor Development Quotient (GMDQ) and also Fine Motor Development Quotient (FMDQ) as noted in table 3.

Table 3

Variables	N=110			
	GMDQ		FMDQ	
	P	r	P	r
TMA	0.03*	0.35	0.03*	0.31

No significant difference was observed between the male and female for Mean Motor Age (MMA) and Motor Development Quotient (MDQ) using Independent T test (table 4).

Table 4

Variables	Male		Female		t	P
	M	SD	M	SD		
Gross motor age	11.88	7.32	11.33	7.03	0.29	0.76
Fine motor age	11.58	7.23	11.08	6.97	0.27	0.78
GMDQ	102.33	21.23	99.43	10.57	0.67	0.5
FMDQ	98.13	18.33	95.9	10.47	0.57	0.56
TMA	11.71	7.28	11.2	7	0.28	0.78

GMDQ: Gross Motor Development Quotient
FMDQ: Fine Motor Development Quotient
TMA: Total Motor Age

Discussion

The formerly-presented coefficients of correlation, indicate the validity and reliability of PDMS in 0-2 years old infants in an acceptable level. According to the above mentioned findings, there was no significant difference in variables between two groups reflecting the irrelevance of gender with motor development quotient, which has also been expressed by PDMS initiators. Efficiency of PDMS in measuring the rate of infants' motor change has been shown through early intervention programs (9). Considering the concurrent validity of PDMS and Baley Infant Development Scale (BIDS) indicate their correlation (10). Case-Smith studied the construct and concurrent validity of the infants' posture and fine motor skills using PDMS and noted that it can be applied as a clinical and research instrument (11). In another research study on concurrent validity of PDMS and BIDS, the high correlation between gross motor subscales of PDMS with BIDS has been documented (12). Hosseini Jam investigated the validity and reliability of PDMS in his study on 3-6 months old infants and indicated the high correlation between the age and total score for each subscale (13). Moreover PDMS is based on motor development, which occurs in a regular continuum (6). It should be noted that difficulty in contacting with the infant and multiple test items resulted in boredom of the infants and parent(s) at

the end of testing, of course it is somewhat modulated in revised PDMS (14) that was unfortunately unavailable in our country during implementation.

In is concluded that PDMS is of high acuity and sensitivity to infantile motor development, so it can help with the diagnostic and therapeutic procedures.

Acknowledgement

We are indebted to the parents of the infants for their patience and cooperation in this study and also the managers and staff of health centers for all the support. Sincere gratefulness to Dr. Habib Allah Jadidi for his invaluable guidance should be also offered.

References

1. Corbin C. A text book of motor development. 4th ed. New York: C. Brown. 2007, pp: 37-8.
2. Arnheim D, Auxter D, and Crow W. Principles and methods of adapted physical education. 2nd ed. New York: Mosby. 2005. p: 45.
3. Parsa M. [Psychology of child development (Persian)]. 3rd ed. Tehran: Besat. 2007. pp: 21-3.
4. Rakhshan F. [Learning disabilities (Persian)]. Tehran: Mitra. 2006. pp: 78-9.
5. Case-smith J. Occupational therapy for children. 6th ed. New York: Mosby. 2010. pp: 45-8.
6. Gesell A. Child development. 3rd ed. New York: Harper and Row. 1995. pp: 21-2.
7. Piper M, and Darrah J. Motor assessment of the developing infant. 3rd ed. New York: W.B.Sannders. 2000. pp: 84-5.
8. Rahmani Rasa A. [Peabody developmental motor scales (Persian)]. Thesis for BS.c in occupational therapy. Tehran. University of social welfare & rehabilitation sciences. Tehran. 2004, pp: 20-85.
9. Palisano R J. Validity of the peabody developmental gross motor scales as an evaluative measure of infants receiving physical therapy. Journal of the American Physical Therapy Association. 1995; 3(10): 490-4.
10. Provost B. Concurrent validity of the peabody developmental motor scales and Baley infant development scale in two-year-old children. American Journal of Occupational Therapy. 2000; 6(12): 514-8.
11. Case-Smith J. Validity study of the posture & fine motor assessment of infants. American Journal of Occupational Therapy. 1992; 2(46): 380-5.
12. Palisano R J, Concurrent validity of the peabody developmental motor scales and bayley infant development scale. Journal of the American Physical Therapy Association. 1986; 2(66): 370-6.
13. Hosseini Jam SM. [Comparison of 3-6 months old high-risk infants? motor skills with healthy ones in Tehran according to Peabody developmental motor scales (Persian)]. Thesis for MS.c in occupational therapy. Tehran University of medical sciences. Tehran. 2006. pp: 81-2.
14. Folio M, and Fewell RF. Peabody developmental motor scales. 2nd ed. New York: Austin:pro-ed. 2000. p: 14.