Original Research Article

Establish normative value of Alberta infant motor scale in Pune population

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Received: 09 March 2021
Revised: 08 April 2021
Accepted: 12 April 2021

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ABSTRACT

Background: The Alberta infant motor scale (AIMS) is a norm-reference test that assessed the spontaneous motor performance of infant 0-18 month. AIMS is development, motor assessment tools in the evaluation of motor risk in infants, but this scale was formulated by using western samples. In every country various differences are observed in the culture and ethnicity. Therefore, there is a need to establish normative value of AIMS in Pune population. Aim of the study was to establish normative value of AIMS in Pune population.
Methods: A descriptive one time study of 420 healthy infants aged between 0 to 18 months was included in the study. Infants were observed in prone, supine, sitting, and standing positions. Infants were measured using the AIMS test and represent normative value in Pune population.
Results: Medcalc software was used for the statistical analysis. For each month we calculated the mean AIMS score, and standard deviation, as well as percentiles. Results showed increases in raw scores across age groups from 0 to 15 months of age. The stability of raw scores was observed after 16 months of age. Pune infants demonstrated lower scores in specific ages compared to the Canadian sample.
Conclusions: Although the AIMS is used in both research and clinical practice, it has certain limitations in terms of behavioral differentiation before 2 months and after 15 months. This reduced sensitivity at the extremes of the age range may be related to the number of motor items assessed at these ages' months.

Keywords: Infant motor test, Motor development, Full-term infants, Normative value

INTRODUCTION

Infants born prematurely have a higher risk for delayed maturity in first year life than full term infants.[1] In any case, premature newborn children are increasingly likely to have remaining motor development during the early. Stages demonstrate at any time incompletely the dependability and functioning of the central nervous system.[2] Usually, a physical therapist in paediatrics has depended on norm-referenced assessment of motor development scales in the estimation of motor chance in newborn children. Even if such scales survey the achievement of milestone motor development, they neglect to make accessing data on subjective quality of

infant development designs that are significant essentials in early investigation and early therapeutic preparing activities. A baby may appear at a development, motor achievement 'on time' yet development; design used to accomplish the achievement might be atypical.[3]

Given these requirements, a hypothetically sound, performance-based, standard referenced test that is solid and justifiable to estimate motor advancement of newborn children from term or 40 weeks present beginning at the time of independent strolling was combined. The Alberta infant motor scale (AIMS) is a noticing of child motor development, including the hypothetical concepts of motor maturity most frequently identified by therapists in the

assessment and administration of infants with motor delays.[2]

The AIMS is a steady and simple to-utilize scientific assessment tools for the assessment of newborn child gross motor development.[3] The AIMS follows the guideline of dynamical frameworks since motor abilities are tried by watching newborn children as they do developments in and out of 4 positions: prone, supine, sitting, and standing.[4] An all-out number of 58 things in 4 positions can be scored. Everything conveys three integrants of development: weight-bearing, postural arrangement and antigravity movement.[3] The points are a standard reference test that surveys, by means of perception, the impulsive motor introduction of infants from birth however free walking (0-18 months).[5] Although there is no minimum or maximum number of trials for a child to execute the skill, the chance should be given for the child to express the complete movement inventory. The AIMS unrefined score is implied an age-based percentile rank. The administration of the AIMS may prove useful in providing developmental information and feedback to caregivers about the motor performance of their infants over the 18 months of live.[2] The hypothetical premise, clinical practice, and as we would see it, some reasonable psychometric test highlights of the AIMS have made it a valuable scale for the assessment of high-risk babies in Canada. Already the AIMS can be applied all the more mostly; still, we consider a cross ethnical judgment is merited. How much social difference may influence the association of the AIMS has not been explored.[6,7] Inherited variables, extremely large atmospheres or potential culturally diverse decent variety across nationalities may have affected the child's advancement of motor milestone. It was before revealed that basic children getting a handle on practice in regular consideration (for example holding, dressing, and bathing) may impact the start of children motor skills and their way and outcome of developmental.[8]

AIMS is an excellent motor development scale. The main aim of AIMS is to suggestion gross motor developmental delays and to recognize children that power advantage since untimely assessment. Genetic elements, extreme atmospheres, or planned, diverse varieties across nationalities may have affected the child's motor advancement. There is a need to find out whether AIMS is applicable for infants with different societal and ethnic background. This study, therefore aims to establish normative values of the AIMS in infants belonging to Pune and compare mean AIMS scores of the infants belonging to the Pune region and the Canadian population.

METHODS

A descriptive one time study was performed at Dr. D. Y. Patil Hospital at paediatric OPD, Varadan Paediatric Hospital, Renuka Shishu Gruha situated in Pimpri, Chinchwad, Pune. After ethical approval were screened clinically and history by the inclusion and exclusion criteria. Demographic data along with the registered

apprised assent was derived through parents and caretaker of 420 children between 0-18 months with normal full-term infants who full fill the inclusion criteria. The study of motive was demonstrated to all the parents and caregiver of children participated in the study. The infants were selected for the collection of data from interviews with parents or caretakers, birth date, gender or any other complication. The study was approved by the Institutional Research Ethical Committee. Study was done in March 2019 to March 2020.

Inclusion criteria

Infant age from 0 to 18 months. Infant born after 37 weeks of gestation. Birth weight in excess of 2500 gm.

Exclusion criteria

Infant with any genetic or congenital disorders. Infant with abnormal movement patterns/milestone infant with extended hospitalization (more 25% of their lives). Use baby walkers for infants.

Process of execution

Gender, age, race and clinical history of the children were recorded. Parents were asked whether their children took part in any intercession program. Motor execution was estimated utilizing the AIMS test. Test necessitates that the motor behaviour of the child was seen in prone, supine, sitting and standing. Children were unclothed and watched separately on calm live with a lovely temperature for 20-30 min relying upon the age of the children. The parent and caregiver were present during the assessment. Child must be wakeful, dynamic and substance during the appraisal. Minimum handing of the child was done. Use of visual and auditory prompts are utilised by the examiner and parents. In order to encourage or motivate the child various toys were employed to move and explore the environment newborn child was tried uniquely on those things in the range generally fitting for the baby developmental level.

Assessment tool

The points comprise of 58 things which are partitioning into 4 sub scales: prone (21 items), supine (9 items), sitting (12 items) and standing (16 items). Each thing was tried on base of 3 components of developments: weight bearing, stance, and repulsive force developments. The score sheet consists of a line drawing for each items with key descriptors of postures or components of movements that were noticed in sequence as the child to receive points for the things. Dichotomous scoring system done as "observed" and "not observed". Watched things were evaluated as one point and not watched things no point. For every one of the position, the least develop and most develop things saw during the appraisal were distinguished and score watched. The things between the least and most develop watched things in each position speak to the child's conceivable motor collection in that position, their

"window" of current abilities. Each thing inside this window were scored either "observed" or "not observed", all things inside the window were scored along these lines. Each observed thing in the children motor window credited 1 point. The entirety of the credited focuses was the positional score. The all our raw score was gotten by the extra of the positional score for every one of the four positions. The entire ties of all things were observed gives the all our raw score, running from 0 to 85. The absolute raw score likewise was changed over into a percentile rank.

Statistical analysis

The Madcalc statistical package was used to analyze the data. The entire study population was divided into 18 parts (18 month of life) based on the age of the infants on the date of assessment. For each month we calculated the mean AIMS score, and standard deviation (SD), as well as percentiles (5th, 10th, 25th, 50th, 75th and 90th). The D'Agostino-Pearson test was used in order to evaluate whether the AIMS-score followed a normal distribution, and it was found that they did. For AIMS 4 subscale of prone, supine, sitting, standing calculated the mean in each month group 0-18 month of full term 420 Pune infants.

RESULTS

In this study 420 full term infants age of 0-18 month were taken and analyzed with AIMS. All the infants assessed one time observation study.

Figure 1 interprets that there were high number of infants in 0-1 month and less number of infants in 14-17 months of infants. Figure 2 shows the mean AIMS-score curves of our investigation population (Pune babies) versus the first Canadian population (Canadian babies).

Figure 3 and 4 shows little varieties of percentiles were watched for babies and following a year old enough, showing the thankful capacity of the AIMS to separate motor improvement in these particular ages. The absence of sensitivity of AIMS began following a year old enough.

Figure 5 shows that infants with overlapping of the 25p, 50p, 75p, 90p after 14 month of age of in infants belonging to the age group of 13-18 months. There was a plateau achieved in scores of AIMS.

Figure 6 shows the developmental curve for Pune Full term infants and depicts 25p, 50p, 75p, 90p ranks in these infants in the age group of 0-18 months. The baby's individual raw score once put on the developmental diagram permits visual portrayal of the children execution, as per the age.

The outcomes recommended that in notwithstanding of the percentile, the scores increment in all age groups from the 0 to 15 months of life. It is significance to see that following a year old enough a covering of the 75p, 90p developmental curve percentiles was watched. Moreover, at 16 months old enough a level in developmental is seen in all percentile-group.
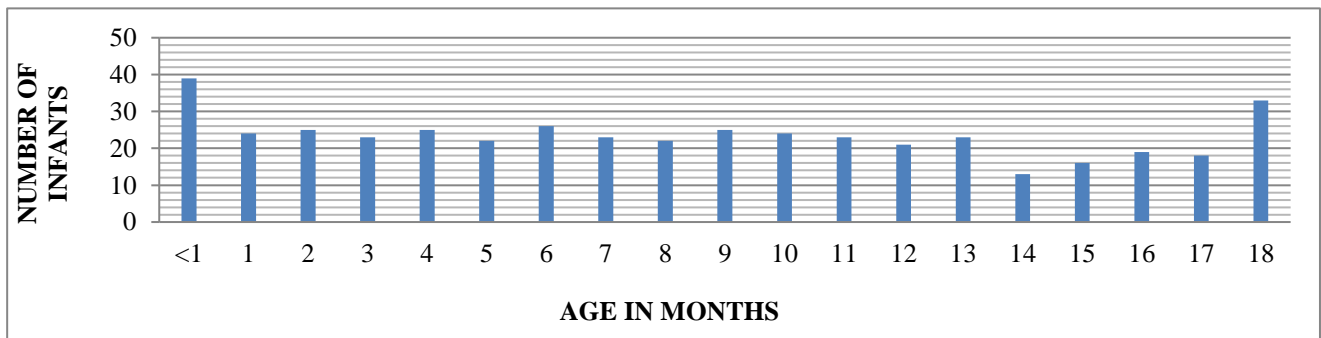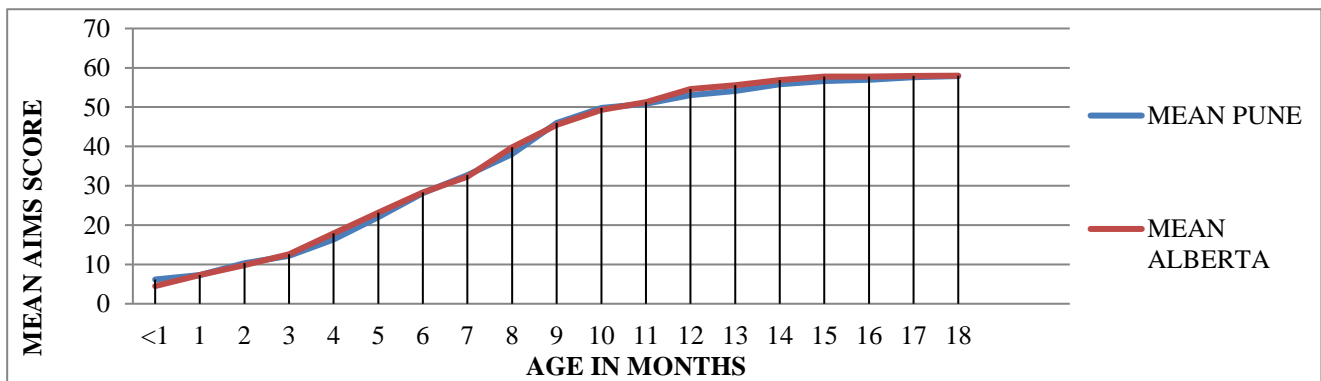

Figure 1: Demographic representation of age.

Figure 2: Demographic presentation of mean AIMS-score.
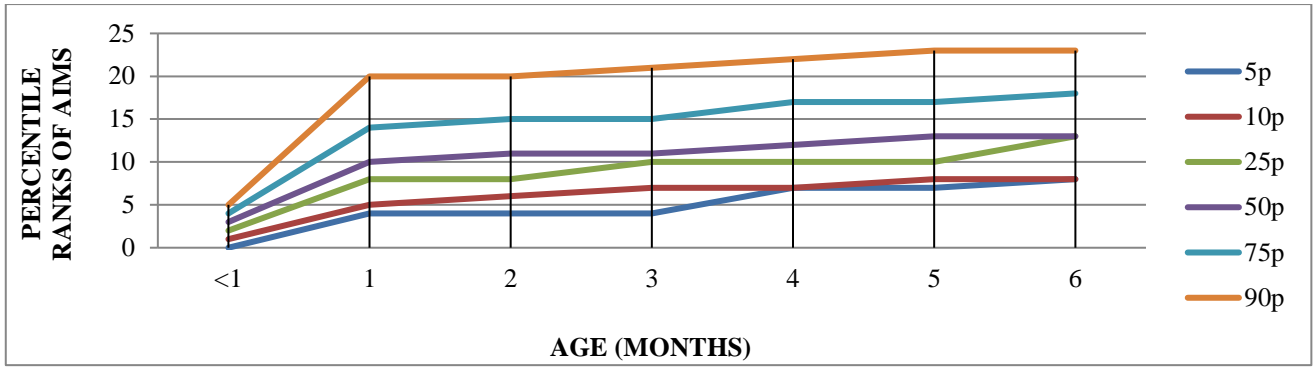
Figure 3: Demographic representation of percentile ranks of AIMS-scores 0-6 month.
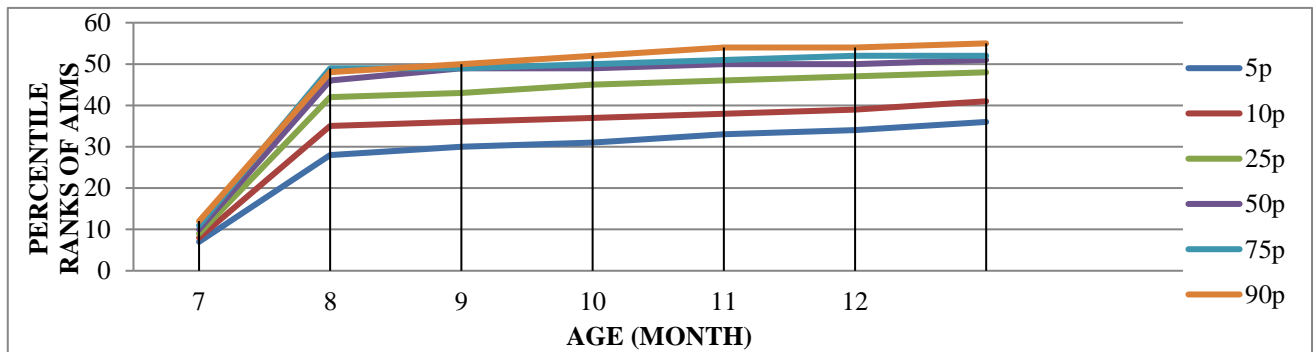

Figure 4: Demographic representation of 7 to 12 month percentile ranks.
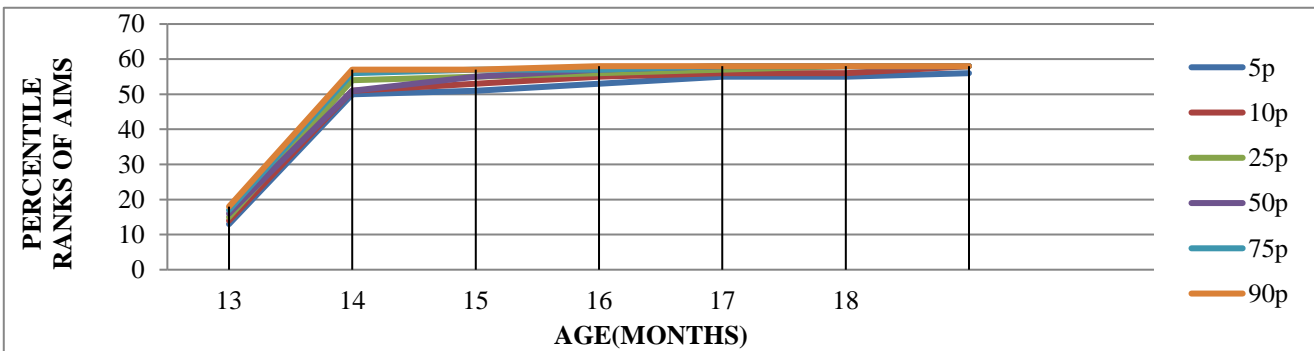

Figure 5: Demographic representation of percentile ranks 13-18 month in full-term Pune infants.
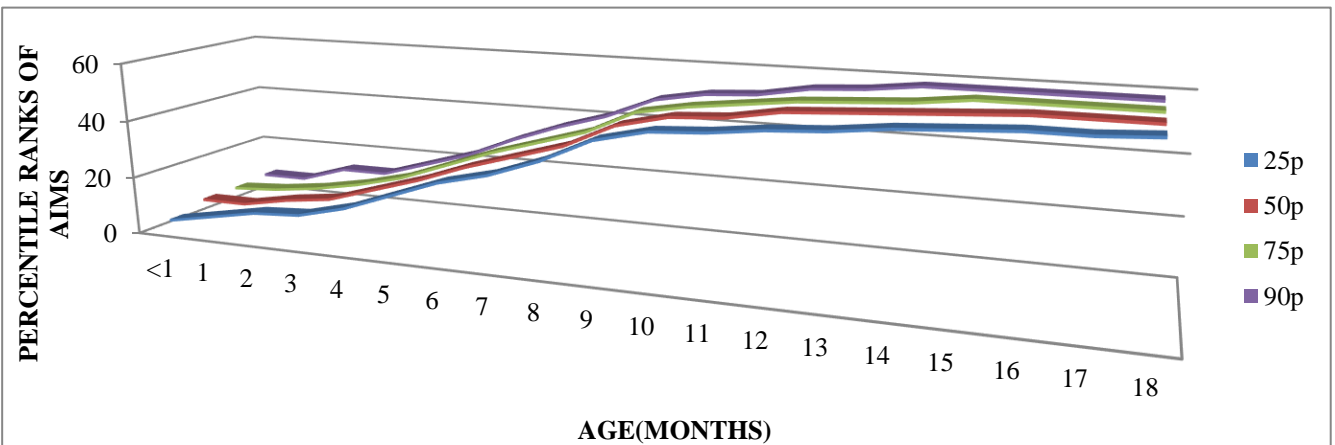

Figure 6: Demographic representation of percentiles ranks of AIMS-scores in 420 full-term Pune infants.

DISCUSSION

This study shows that Pune infants in the age of 0-18 months score essentially lower on the AIMS test than the Canadian reference group of 1990-1992. The results of the present study showed that Pune infants in the age of 0-18 months the motor development scores of Pune and Canadian infants were different, establishing the need of norms for the use of AIMS in Pune. In general, across several age groups Pune infant's performance was lower compared to the Canadian sample.

Previous studies also reported lower scores for Indian infants compared to infants of other cultures due probably to more frequent exposure of infants to biological and environmental risks factors that negatively impact the acquisition of motor milestones during childhood.[9-11] Lower motor scores, similar to the ones observed in the present study, are usually associated with biological risks such as low birth weight, prematurely and malnutrition.[11,12] Furthermore, recently, environmental factors such as low income, social vulnerability, reduced family education, and lack of family organization clearly negatively affects motor development.[11]

Yet, maternal care (e.g. infant sleep and play positions; opportunities to explore the environment, to play with toys another infants; maternal habits carried onto the infant) also play an important role in fostering or restraining development.[13,14] One must consider that specifically in the working and lower classes (approximately 65% of the present sample) the majority of the mothers work all day long and often infants are taken care during the day by other adults related to the families or siblings. Considering the cross-cultural and socioeconomic differences between countries in the present study, the quality of stimulation in the home environment could be a determinant factor to motor skill acquisition and progress, similar to observed in a previous study.[13] The families difficulties to provide infants optimized care, combined with the low income, compared to developed countries, harmfully raises the risks for infant development and may also be responsible for the differences in scores observed in the present study.[11] Future research may focus on the multi-factorial nature of risks and affordances for infant development to further understand infants' different motor developmental scores across cultures.[11,15]

In the present study was experiential for newborn and older infants. The Pune developmental curve appeared, as standard that children become older the methods increment. Despite the fact that the AIMS is considered for the period from birth to independent walking and covers the age from 0-18 months, the test is generally sensitive in the first year of life. Be that as it may, by sixteenth month of adjustment in AIMS score were experiential in Pune sample. The adjustment of the raw scores is a clear suggestion of the ceiling-effect of the AIMS to evaluate child motor maturity in the Pune population. These outcomes give further sign to the lack of sensitivity of AIMS to investigate child motor maturity within the month of life and after the child accomplish independent movement.[10] For example, the thing 'standing alone' is extended out by half of the Pune infants at 13 months. As per the Canadian norms standards this thing have to be come to at a mean age of year. This study is the beginning study showed up the normative values of Alberta infant motor scale in Pune population. it might because of clarification is that those things may have low recognize power, since babies with very extraordinary motor skill in other undertaking just executed those exact things. Subsequently, the consequences of the present investigation allow us to suggest concern in the utilization of the scale for those age groups.[16] Anticipation to misdiagnose children could be accomplished by joining AIMS with other motor evaluations, for example, the Bayley scales of baby maturity and the test of infant motor performance in the ages that the AIMS is less sensitive.[17]

Along these lines, the present study highlights the hugeness to set up standard referenced scores for the AIMS in different societies if the direction of babies growth is not normal for the ones gave by Canadian standards. Children development of motor scores from differing nations changes comprehensively, reliant upon the ethnicity, parental consideration and environmental affordances (Saccani and Valentine, and Syrengelas et al). Norm-referenced scores suggest real value to numbers sets (Piper and Darrah). Raw scores are just significant whenever differentiated to standards of an exact related ethnicity, empowering an appraisal of the child developmental curve in his/her own experience.

The examination of child individual and group scores to a comparative national example gives a standard to evaluate the quality and constraint of a baby's presentation, giving significant data to the make of careful tasks for interference programs.

The results of this study underscore the adequacy of AIMS for assessing the motor performance of babies aged 2 to 15 months. However, it was observed that the instrument has limited capacity for differentiating motor behaviours at the extremes of the age range, up to 2 months of age and after 15 months, since the percentiles at several cut-off points varied little or even remained equal. This reduced differentiation can also be seen in the Canadian reference values, since plateaus have been reported in the development curves after 15 months of age and few motor acquisitions are seen during the first 2 months, which is similar to the results reported here.[18]

Limitations

The study has small sample size. Further study must be conducted that included all regions, with a stratified sample of the whole country, with a larger sample size of Pune infants. Future study can be conducted on premature infants.

CONCLUSION

The present study performed in healthy full-term Pune infants, aged 0-18 months, and suggested the normative values of AIMS in these infants. Canadian and Pune infants showed differences in motor performance scores on the AIMS across age and norms were established for Pune infants.

Although the AIMS is used in both research and clinical practice, it has certain limitations in terms of behavioural differentiation before 2 months and after 15 months. This reduced sensitivity at the extremes of the age range may be related to the number of motor items assessed at these ages' months.

ACKNOWLEDGEMENTS

Authors are thankful to the infants and their parents who participated in this study. Special thanks to doctors and staff for their guidance, support and help for this study.

REFERENCES

1. Ungerer JA, Sigman M. Developmental lags in preterm infants from one to three years of age. Child Dev. 1983;54(5):1217-28.
2. Fleuren KMW, Smit LS, Stijnen T, Hartman A. New reference values for the Alberta Infant Motor Scale need to be established. Acta Pædiatrica. 2007;96:424-7.
3. Harris SR, Heriza CB. Measuring Infant Movement clinical and Technological Assessment Techniques. Phy Ther. 1987;67(12).
4. Piper MC, Darrah J. Alberta Infant Motor Scale: Construction of A motor Assessment tool for the Developing Infant. Motor assessment of the developing infant, 1st edition. Alberta, Canada: Saunders. 1994;25-35.
5. Jeng SF, Yau KI, Chen LC, Hsiao SF. Alberta infant motor scale: reliability and validity when used on preterm infants in Taiwan. Phys Ther. 2000;80(2):168-78.
6. Syrengelas D, Siahanidou T, Kourlaba G, Kleisiouni P, Bakoula C, Chrousos GP. Standardization of the Alberta infant motor scale in full-term Greek infants: Preliminary results. Early Hum Dev. 2010;86(4):245-9.
7. Coster W. Critique of the Alberta Infant Motor Scale (AIMS). Phys Occup Ther Pediatr. 1996;15(3):53-64.
8. Case-Smith J. Analysis of Current Motor Development Theory and Recently Published Infant Motor Assessments. Infants Young Childr. 1996;9:29-41.
9. Syrengelas D, Kalampoki V, Kleisiouni P, Manta V, Mellos S, Pons R, et al. Alberta Infant Motor Scale (AIMS) Performance of Greek Preterm Infants: Comparisons With Full-Term Infants of the Same Nationality and Impact of Prematurity-Related Morbidity Factors. Phys Ther. 2016;96(7):1102-8.
10. Bartlett, Doreen J, Fanning JEK. Relationships of equipment use and play positions to motor development at eight months corrected age of infants born preterm. Pediatr Phys Ther. 2003;15(1):8-15.
11. Saccani R, Valentini NC. Reference curves for the Brazilian Alberta Infant Motor Scale: percentiles for clinical description and follow-up over time. J Pediatr. 2012;88(1):40-7.
12. Walker SP, Wachs TD, Gardner JM, Lozoff B, Wasserman GA, Pollitt E, Carter JA; International Child Development Steering Group. Child development: risk factors for adverse outcomes in developing countries. Lancet. 2007;369(9556):145-57.
13. Van Haastert IC, de Vries LS, Helders PJ, Jongmans MJ. Early gross motor development of preterm infants according to the Alberta Infant Motor Scale. J Pediatr. 2006;149(5):617-22.
14. Hamadani JD, Tofail F, Hilaly A, Huda SN, Engle P, Grantham-McGregor SM. Use of family care indicators and their relationship with child development in Bangladesh. J Health Popul Nutr. 2010;28(1):23-33.
15. Lopes VB, de Lima CD, Tudella E. Motor acquisition rate in Brazilian infants. Inf Child Develop. 2009;18:122-32.
16. Clark JE, Metcalf JS. The mountain of motor development: A metaphor. Motor development: Res Rev. 2002;2:163-90.
17. Kayenne Martins Roberto Formiga C, Linhares MB. Motor development curve from 0 to 12 months in infants born preterm. Acta Paediatr. 2011;100(3):379-84.
18. Spittle AJ, Doyle LW, Boyd RN. A systematic review of the clinimetric properties of neuromotor assessments for preterm infants during the first year of life. Dev Med Child Neurol. 2008;50(4):254-66.