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USE OF BSID III IN DEVELOPMENTAL ASSESSMENT OF CHILDREN FROM CENTRAL INDIA

Paediatrics

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ABSTRACT

Background: The BSID – III (Bayley Scale of Infant & toddler Development) was developed in 2006 to assess the developmental functioning of infants and young children 1-42 months of age. It is normed for children of the US population, however used worldwide. The present study was undertaken to determine difficulties encountered in developmental assessment of Indian children using BSID III.

Methods: This cross-sectional study was conducted in outpatient department of Lata Mangeshkar Hospital, Nagpur from September 2016 through February 2017. Children from nearby urban slum belonging to low socioeconomic strata were assessed using BSID-III.

Results: Twenty five normal children of age group ≤ 24 months were assessed. There were 14 children (56%) who required time more than 90 minutes for assessment. Maximum duration was 180 min and minimum was 60 min and 9 out of 25 children (36%) required frequent breaks (>3 breaks /session). Difficulty in transitioning was seen in 12 out of 25 (46%) children. Difficulty in understanding certain tasks related to picture book, puzzles, stimulus book and connecting block was seen in 11 children (44%).

Conclusion: Problems were encountered while using BSID-III. Majority of difficulties were attributed to unfamiliarity with test items due to lack of exposure in children belonging to low SES. There should be an Indian standardization of BSID-III for valid interpretation of scores.

KEYWORDS

Bayley Scale of Infant & toddler Development- (BSID – III), Low socioeconomic status, Indian children.

INTRODUCTION

The BSID– III (Bayley Scale of Infant & toddler Development) was developed in 2006 to assess the developmental functioning of infants and young children 1-42 months of age.1It is normed for children of the US population, however used worldwide. It has been reported that the children from low socioeconomic status (SES) are exposed to an average of one-third the number of words that children from a professional working background are exposed to and this may affect their performance on BSID-III.2For example, in the expressive communication subtest, describing picture series may favor students who have prior exposure to stories and is biased against children from low SES who have less familiarity with stories.2In the absence of a Indian normed BSID III there is a need to assess the performance of this tool on Indian children especially in the background of the differences in cultural habits , socioeconomic and environmental characteristics and their influence on development in Indian children.3 The present study was undertaken to determine difficulties encountered in developmental assessment of Indian children using BSID III.

METHODS

This cross-sectional study was conducted in outpatient department of Lata Mangeshkar Hospital, Nagpur from September 2016 through February 2017 after obtaining approval from the Institutional Ethics Committee. Written informed consent was obtained from parents prior to enrollment of the children. An urban slum area located near hospital was identified and children between one and 2 years of age,belonging to socioeconomic status stage 3 or 4 of modified Kuppuswami scale. Only children who were developmentally normal according to parental history were selected randomly and called for developmental assessment in our development clinic. Children suffering from acute illness or chronic systemic illness and developmentally delayed according to parental history were excluded from the study.

The parameters recorded while using BSID III were:

1. Duration of assessment
2. Number of sessions required
3. Transitioning
4. Need for adaptation
5. Number of breaks during assessment.

Duration was defined as time taken from the time child entered the assessment room till the last task is performed or till the child stops cooperating. Transitioning was defined as a process of shifting from current task to next task. Adaptation was defined as need for modification of test item or task. Frequent breakers were those children requiring more than 3 breaks in study duration (Table 1).

TABLE 1: OPERATIONAL TERMINOLOGIES

Sr no	Parameters	Criteria
1	Need for adaptation	Task modification required for child to understand the task.
2	Prolonged duration	Requiring more than 90 minutes for assessment from start to end of all tasks.
3	Multiple sessions	More than one session required for an assessment.
4	Frequent breaks	More than 3 breaks required.
5	Difficulty in transition	More attachment to previous or a particular toy/task in comparison to current one

STATISTICALANALYSIS

The obtain data were statistically analyzed by applying descriptive percentage differences in term of various variable. Entered all data and further Statistical Analysis was done with the help of IBM- SPSS-25 software.

RESULTS

There were 25 normal children of age group ≤ 24 months who were assessed during the study period. Out of these, 12 (48%) were males and 13 (52%) females. Minimum age was 11 months and maximum was 25 months with average of 16.9 months. Majority of children (56%) required more than 90 minutes for completion of test set (table 2).Maximum duration was 180 min and minimum 60 min. Average duration per child was 108.6 minutes. Difficulty in transitioning was due to excessive attachment to certain objects or tools from the study kit like glitter bracelet, squeeze toy and red blocks. Need for adaption was recognized when 11 children (44%) experienced difficulty in understanding certain tasks related to picture book, puzzles, stimulus book and connecting block.

TABLE 2: FREQUENCY DISTRIBUTION OF DIFFICULTIES IN USE OF BSID III

Sr No	Difficulty	No. of children
1	Need for adaptation	11 (44%)
2	Prolonged Duration	14 (56%)
3	Multiple sessions required	1 (4%)
4	Frequent breaks required	9 (36%)
5	Difficulty in transition	12 (46%)

DISCUSSION

BSID-III is shown to have excellent sensitivity & specificity when compared with all other screening tests. Although BSID-III has been used to assess child development in many countries, several recent studies have shown that it tends to estimate differently, children with typical development and those at risk for developmental delay, depending on geographic location. Consequently, the use of the original American Bayley scale without adaptations is not recommended, because economic, ethnic and cultural factors have affected the reliability and validity of the test.

It has been found that a child's vocabulary correlates with his/her family's socio-economic status; parents with low SES (working class, welfare) used fewer words per hour when speaking to their children than parents with professional skills and higher SES. Thus, children from families with a higher SES will likely have larger vocabularies and thus will likely show a higher performance.2According to one study, children from culturally and linguistically diverse backgrounds do not perform as well on assessments that contain tasks such as labeling and known information questions, as they are not exposed to these tasks in their culture. There are a number of items on the Cognitive and Language Scales that assess whether a child can answer questions logically and explain how an object is used. Some infants are not exposed to books, print, take-apart toys, or puzzles. On the BSID-III the child is required to attend to pictures in the stimulus book in order to complete items in the Cognitive and Language Scales. Many items on the cognitive scale require the child to attend to and manipulate puzzles and books, as well. For example, item 32 on the Cognitive Scale requires the child to look at pictures from a small picture book. A series of items require the child to manipulate pegs in a pegboard or put puzzle pieces together. Lack of experience or exposure to these kinds of objects and books may negatively affect a child's performance.4 Our study reflected similar problems in all the subtests especially those in the cognitive and language scales.

Many studies have reported problems in the trans-cultural efficacy of BSID III. A cohort study from Australia found that healthy term Australian children had a significantly higher mean score on the BSID-III compared with the standardized means in four of the subtests, with the greatest difference in receptive language.5 One study reported that the reliance on US norm-based standardized scores resulted in misclassification of the neurological development of Malawian children, with the greatest potential for bias in the measurement of cognitive and language skills.6 A study from Italy assessed neurodevelopment of preterm and full-term infants, using BSID-III US norms in comparison with Italian (IT) norms and found that BSID-III US norms overestimated development compared to IT norms7 whereas studies from Persia assessed the reliability and validity of the Bayley scales of infant and toddler developmental screening test in Persian-speaking children, reporting a high level of reliability in Persian population.8 Another study from Australia reported that the Australian infants scored higher on cognitive and receptive language ($p < .01$) and lower on expressive language and gross motor ($ps < .01$) subscales& suggested that the test should be re-normed on Australian children for valid interpretation.9 A study was done on Dutch children to assess their performance on the BSID-III by comparing US norms and Dutch norms and found that the Dutch norms differ from the US norms for all subtests and these differences are clinically relevant.10 Population specific norms are needed to identify children with low scores for referral and intervention, and to facilitate international comparisons of population data.

A major criticism of physician directed developmental assessment has been the fact that, children are expected to interact with strangers. In middle class mainstream American culture, young children are expected to converse with unfamiliar adults as well as ask questions. In other cultures, however, it may be customary for a child to not speak until spoken to. When a child does speak, the child often will speak as little as possible or only to do what he is told. If a child does not respond to the clinician's questions because of cultural traditions, they may be falsely identified as having a language disorder.4The format of much of the BSID-III requires the child to respond to verbal prompts provided by the examiner. We found that the children from low socioeconomic status from central India are not much used to the tasks in BSID-III, which is reflected in prolonged duration and need for adaptation in test items in our study.

BSID-III administration time is approximately 50 minutes for children younger than 12 months, and approximately 90 minutes for children older than 13 months.1The Administration manual encourages testers to adapt their testing techniques to the child's needs, temperament and disposition. All subtests must be administered in one session, but if the child becomes very fatigued or restless the examiner can “allow the child to take a 5-minute break or have a snack if needed.11”This is helpful, but not a significant amount of time to really help the child if he/she is exhausted from the testing. We found that more than half (56%) the study children required more than standard time for assessment, significant breaks lasting longer than 5 minutes were required in some children, with one child who had to be sent home midway.

CONCLUSION: Difficulties were encountered while using BSID-III. Majority of difficulties were attributed to unfamiliarity with test items due to lack of exposure in children belonging to low SES. There should be an Indian standardization of BSID-III for valid interpretation of scores.

LIMITATIONS OF THIS STUDY: A comparative cross sectional study comparing Indian children from high and low SES will be required to generalize the results, and a larger sample size to corroborate our findings.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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