RESEARCH ARTICLE

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Marathi Language Version of Knowledge of Infant Development Inventory (KIDI-M)

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Abstract

Background: KIDI is an established instrument to measure a person's knowledge of developmental processes and infant norms. It requires to be adapted appropriately during cross-cultural studies as the original is in English language and accordingly culture specific. Geographically and culturally Marathi is the primary language used in Maharashtra state of India. It is the first language for 83 million people and second language for 12 million, thus ranking 3rd in India and 11th in the world. This study proposes to create a version of KIDI instrument suitable for Marathi speaking cultural domain (KIDI-M). **Method:** The cultural adaptation process entails not only translating, but also adapting the instrument for use in a cultural setting different from the one where the original study was conducted. This study uses back-translation technique to design and develop the proposed instrument. The developed instrument is then tested for content validity and reliability through an expert panel of ten pediatric neuro physiotherapists having minimum of five years of experience in pediatric neuro physiotherapy. **Result:** Acceptable level of content equivalence for KIDI-M is achieved after three iterations of back-translation process. Content validity and reliability of the instrument is tested using CVR, I-CVI, S-CVI/UA and S-CVI/Ave analysis. High values along with coherence between S-CVI/Ave (0.97) and S-CVI/UA (0.73) values suggested content validity of the proposed instrument. Intra-expert reliability (Cronbach's alpha: $\alpha = 0.792$) and inter-expert reliability Cohen's kappa: $k = 0.201$ to 0.658) of the instrument also found to be acceptable. **Conclusion:** Three iterations of back-translation technique ensured acceptable content equivalence level of KIDI-M with original KIDI instrument. It also found to be valid and reliable within acceptable limits. Thus it is feasible to be used as an instrument for relevant studies involving Marathi speaking population.

Major Findings: The article has proposed a Marathi language translation of Knowledge of Infant Development Inventory (KIDI-M). By adapting the questionnaire in Marathi language and establishing its reliability and validity, the outcome measure can be administered in Marathi speaking parents.

Keywords: Back Translation, KIDI, Knowledge of Infant Development Inventory, Marathi Language, KIDI-M

1. Introduction

The environment around a child influences its physical, mental and social development and it is essential that the early experiences a child receives are healthy and productive. The experiences of children that happen in the 1st 5years of life are significant for child's physical, mental and social development[1]. Their sensory as well as motor development affects their interaction, social bonding and engagement with family and friends. Research has shown that parents' knowledge about children's development has a major influence on children's interaction and development, and it is associated with increased efficiency of positive parenting[2-4]. A child's developmental

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milestones like neck holding, rolling over, crawling, sitting, standing, walking, and running are crucial in his or her neurological development. Parents awareness of possible signs of delay is vital in ensuring proper child development[5,6]. It can be assessed through Knowledge of Infant Development Inventory (KIDI) instrument to measure person's knowledge of developmental processes and infant norms. KIDI was developed for research on contributors to child-rearing practices, as a covariate of parent-completed surveys about child behavior, and for evaluating parent education programs[7]. Though KIDI is an established instrument in this domain, it requires to be adapted appropriately during cross-cultural studies as the original is in English language and accordingly culture specific. The cultural adaptation process entails not only translating, but also adapting the instrument for use in a cultural setting different from the one where the original study was conducted.

Geographically and culturally Marathi is the primary language used in Maharashtra state of India. It has already crossed its original geographical scope and has spread across the world with 1st language for 83 million people and 2nd language for 12 million, thus ranking 3rd in India and 11th in the world[8]. Earlier, KIDI has been translated into Portuguese language and has been validated[9]. Hence, this study proposes to create a version of KIDI instrument suitable for Marathi speaking cultural domain.

2. Research Problem

Knowledge of Infant Development Inventory (KIDI) is a multidimensional instrument to assess participant's knowledge about developmental processes and infant norms. Though KIDI is an established instrument in this domain, it requires to be adapted appropriately during cross-cultural studies as the original is in English language and accordingly culture specific. This study proposes to design an instrument by creating a Marathi language and culture specific version of original KIDI instrument.

3. Research Objectives

This study addresses the stated research problem through following research objectives:

- Design an instrument representing Marathi language version of original KIDI.
- Perform validation analysis of proposed instrument.
- Perform reliability analysis of the proposed instrument.
- Provide discussion on the administration of the proposed instrument.

4. Research Methodology

This research uses back-translation technique following the Brislin's translation model to design and develop the proposed instrument[10]. The developed instrument will then be tested for content validity and reliability using CVR, I-CVI, S-CVI/UA and S-CVI/Ave analysis.

4.1 Back-translation

This study used a modified version of back-tracking technique to translate original KIDI instrument from English language to its Marathi version. Automated digital translation services were used to create the first draft of Marathi instrument. This was then back-translated into English using the same automated digital translation service. It was then followed by manual verification of content equivalence was performed by the researchers. The Marathi version was then manually tuned to improve upon the content equivalence. Acceptable level of content equivalence was achieved after three iterations of this procedure.

4.1.1 Content Validation Form

A content validation form was designed with an objective to assess the validity and reliability of proposed instrument (Marathi version of KIDI instrument). It consisted of information about study objectives, rating scale and items involved. Domain-wise seggregation of items were excluded to avoid any bias and to increase the sensitivity to catch any content equivalence deviations caused during the adopted translation procedure[11].

4.1.2 Selection of a Panel of Experts

This study involved an expert panel of ten pediatric Neuro physiotherapists mainly working inpediatric neuro physiotherapy. These physiotherapists had completed Masters in pediatric neuro physiotherapy, had experience of minimum 5 years of working in hospital set up and handled cases of sensory processing disorders as well as developmental delays in children. These therapists were certified in Neuro Developmental Treatment technique (N.D.T) and Sensory Integration (S.I).

4.1.3 Administration of Content Validation Form

Researchers adopted self-administration approach to administer the content validation form with the experts using offline as well as online modes. Experts were asked to provide relevancy ratings to items with an objective to assess content equivalence of the proposed instrument with the original one. Experts were also encouraged to provide written suggestions to improve relevancy and content equivalence of the items. The data corresponding to relevancy ratings provided by ten experts for 58 items was then stored in a spreadsheet to enable its data analysis.

4.1.4 Data Pre-processing

Content validation form asked the experts to provide relevance rating for 58 items on a scale of 1-4 to allow for grey area coverage between dichotomous relevant and not-relevant extremes. This data needed to be transformed to dichotomous relevant or not-relevant for content validity analysis, necessitating the need for pre-processing of relevance ratings[12]. This was done by transforming 1 and 2 to relevance rating of 0 (not-relevant) and 3 and 4 to relevance rating of 1 (relevant).

4.2 Preliminary Content Validation Analysis

The transformed data was then analyzed for content validation with an objective to get acquainted with the collected data. It provided an average proportion relevance rating of 0.84 (±0.09) with Standard Deviation (SD) of 0.27 at 95% confidence level. The minimum and maximum values were 0.22 and 1.00 respectively with a range of 0.77. Researchers thought the higher values for SD and range to be of some concern. The calculated S-CVI/Ave based on I-CVIs found to be at acceptable level with 0.84 whereas S-CVI/UA value was extremely poor at 0.15. This was an anomaly and researchers verified the same by calculating S-CVI/Ave based on proportional relevance with the same results. Researchers decided to further study this anomaly through Content Validity Ratio (CVR) analysis.

4.3 Preliminary Content Validity Ratio (CVR) Analysis

This study considered a panel of ten experts to assess the content validity of designed instrument, resulting into a critical value of 0.62 to compare CVR for individual items. CVR score for 35 items found to be less than expected critical value. This suggested those 35 items to be invalid with respect to the geographical and cultural scope of the study. Researchers found this finding a suspicious one as 35 items out of total 58 were identified as invalid for selected cross-cultural reference. Even considering the cross-cultural nature of this study, the observation stating 60.34% items as invalid appeared to be out of place. Therefore researchers decided to further explore the data collected from the experts for existence of any outliers.

4.4 Outlier Analysis

Researchers decided to perform the outlier analysis with respect to proportion relevance ratings of individual experts[13]. Initial analysis identified responses from two experts (Expert-5 and Expert-7) to be suspicious ones (Figure 1).

Quartile analysis of proportion relevance ratings

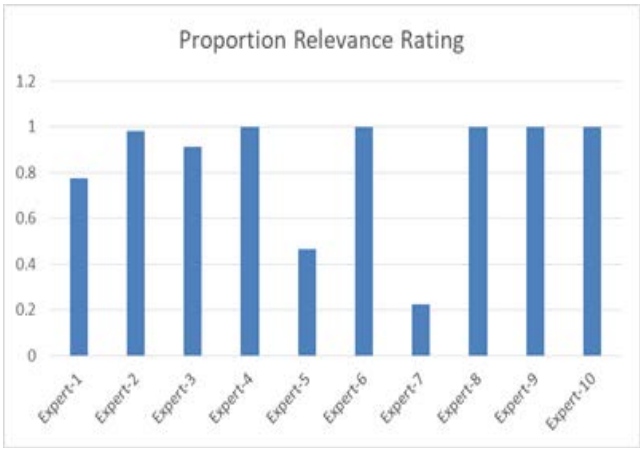


Figure 1. Proportion relevance ratings of individual experts.

of individual experts resulted into Q1 and Q3 values as 0.81 and 1.00 respectively resulting into 0.52 and 1.28 as upper and lower limits. This verified the suspicion about responses from Expert-5 and Expert-7 as their values found to be less that lower limit. This confirmed them as outliers. As a result of this analysis, researchers decided to drop responses from Expert-5 and Expert-7 in its entirety from further analysis to avoid any further bias and anomalies.

4.5 Content Validity Ratio (CVR) Analysis

Responses from remaining eight experts were then considered for CVR actual analysis. Critical value of 0.75 was selected to compare individual item CVR values as

data from eight experts was available to assess the content validity of designed instrument. CVR score for only two items (in contrast with earlier 35) now found to be less than expected critical value namely item-10 and item-42. CVR scores for item-10 and item-42 are 0.5, which are less than the critical value. Therefore it was decided to drop those two items from the instrument. Remaining 56 items were considered for inclusion in the instrument as their respective CVR's found to be greater than the critical value. The final validity analysis was then performed on the resultant data.

4.6 Validity Analysis

The resultant data consisted of relevancy ratings from eight experts over 56 items. It provided an average proportion relevance rating of 0.97 (±0.02) with SD of 0.07 at 95% confidence level. The minimum and maximum values were 0.80 and 1.00 respectively with a range of 0.20. The resultant values of Standard Error (SE), Standard Deviation (SD) and range found to be acceptable for predictable results.

4.6.1 Content Validity

Content validity analysis provided calculated S-CVI/Ave (based on I-CVIs) and S-CVI/UA as 0.97 and 0.73 respectively.

4.6.2 Face Validity

It was confirmed by the experts through their comments while providing data for content validation form. This study did not consider criteria validity of the instrument as it is not relevant and feasible for the current scenario.

4.7 Reliability Analysis

4.7.1 Intra-rater Reliability

Intra-rater or Intra-expert reliability of expert responses was assessed using Cronbach's Alpha statistic[14]. It provided a value of 0.792.

4.7 2 Inter-rater Reliability

Inter-rater or Inter-expert reliability of the instrument was calculated using Cohen's Kappa statistic[15]. Relevance ratings of Expert-2 selected randomly as a baseline to compare those from other experts namely Expert-1, Expert-3, Expert-4. Expert-6, Expert-8, Expert-9 and Expert-10. This resulted into their pairwise Kappa statistic with Expert-2 as 0.201, 0.208, 0.659, 0.659, 0.659, 0.659 and 0.659 respectively.

4.7.3 Temporal Reliability

Temporal reliability of the instrument is assumed to be acceptable based upon that of the original instrument[9].

5. Analysis of Expert Suggestions

This study invited suggestions along with relevance ratings for individual items from the experts. Received suggestions were classified under two categories as (i) rephrasing of items, and (ii) increase objectivity of the instrument by avoiding synonyms[16,17]. We received no suggestions from Expert-5 and Expert-7 to justify their outlier responses. This further justified their exclusion from content validity analysis. Suggestions with respect to item-10 and item-42 were also not considered as those items were dropped in entirety from the instrument following CVR analysis. Following the remaining suggestions, items 12, 20, 24, 36, 38 and 48 were rephrased accordingly, and synonyms were avoided for **बाळ** and **लहानमूल** along with their respective gramatical variations and contexual usage. Suggesstions towards domain-wise seggregation were redundant in nature as such seggregation is already available inproposed instrument. It was excluded from content validation form to avoid any bias and increase the sensitivity to catch any content equivalence deviations caused during the adopted translation procedure[18].

6. Result

Content validity analysis resulted into calculated S-CVI/Ave (based on I-CVIs) which found to be at highly acceptable level with 0.97 whereas S-CVI/UA value at acceptable level at 0.73. High values along with coherence between S-CVI/Ave and S-CVI/UA values suggested content validity of the proposed instrument[19]. The instrument also received affirmation about its face validity from the experts. These results validated the proposed instrument. Criteria validity of the instrument decided to be not relevant and feasible for the current scenario[20]. Intra-rater or intra-expert reliability of the instrument assessed through Cronbach's Alpha and found to be acceptable ($\alpha = 0.792$). Agreement between

Expert-2 with remaining experts also found to be good (k = 0.659). Cumulatively these results indicate acceptable level of inter-rater reliability of the instrument. Temporal reliability of the instrument is assumed to be acceptable based upon that of the original instrument.

7. Discussion

CVR analysis suggested to drop item-10 and item-42 from the instrument. Accordingly, this study dropped them entirely from the instrument. But researchers recommend context and culture specific decision before administering this step.

8. Conclusion

This cross-cultural study translated original KIDI instrument from English to Marathi language. Three iterations of back-translation technique ensured acceptable content equivalence level of KIDI-M with original KIDI instrument. Thus, the proposed instrument (KIDI-M: Marathi version of KIDI) is feasible to be used as an instrument for relevant studies involving Marathi speaking population.

9. Acknowledgement

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