Validation of yoga module for children with intellectual disabilities

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Background: Children with developmental disabilities generally experience more pain than the normal children due to chronic systemic conditions associated with their disability. Description of pain is generally difficult in children and more so in children with intellectual disabilities (IDs). Yoga has been regarded as a kind of physical activity as well as a pain management strategy. Previous studies have reported the beneficial role of yoga in enhancing physical and psychomotor abilities of IDs; however, a validated yoga module (YM) for IDs is unavailable. The present study is aimed at developing a validated YM for children with IDs. Materials and Methods: The content validity of YM for children with IDs was assessed by a panel of 22 experienced yoga experts. The YM for children with IDs was developed in the form of tailor-made yoga practices that were supported by classical texts and research evidence. A total of 32 practices were included in the YM, and each practice was discussed and rated as (i) not essential, (ii) useful but not essential, and (iii) essential. The content validity ratio was calculated using Lawshe’s formula. Results: Data analysis showed that out of 32 YM practices, 31 indicated significant content validity (cutoff value: 0.42, as calculated by applying Lawshe’s formula for the CVR). Conclusions: The present study suggests that the YM for children with IDs is valid with good content validity. However, future randomized controlled trials must determine the feasibility and efficacy of the developed YM for children with IDs.

Keywords: Children, intellectual disability, validation, yoga module

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YM for children with IDs was developed in the form of tailor-made yoga practices that were supported by classical texts and research evidence. A total of 32 practices were included in the YM, and each practice was discussed and rated as (i) not essential, (ii) useful but not essential, and (iii) essential. The content validity ratio (CVR) was calculated using Lawshe’s formula. The steps followed to execute the above-mentioned methods are as follows:

- Step 1 (compilation of literary research on ID): An exhaustive literary search from the Vedas, textbooks, and research papers/theses available in yoga was done for IDs and it was combined with modern scientific view on IDs.
- Step 2 (sorting of literary research on ID): The compiled literature has been put together in a tabular form to get the common and unique features described in each text. Then, studies done on different practices and published in journals as a scientific background were extracted. This gave a scientific backup to the literary search.
- Step 3 (preparing treatment protocol based on literary research on ID): A minute-wise treatment protocol is developed in the form of tailor-made practice which is supported by classical texts and research evidence.
- Step 4 (validation by experts): This complete module was presented for validation in front of yoga experts with clinical experience (≥5 years). These experts were requested to participate for evaluating the content validity for the proposed instrument on a 3-point scale rated as follows: (i) not essential, (ii) useful but not essential, and (iii) essential.

An expert panel including 22 health educationists, mental health specialists, and physical educationalists with ≥5 years of yoga therapy experience examined the content validity. In this study, experts with yoga therapy and clinical experience (≥5 years) were considered as yoga experts. The experts selected for the present study (both males and females) were all Indians, with age ranging from 36 to 63 years and following different yoga traditions such as Kaivalyadhama Yoga, Sivananda Yoga, Satyananda Yoga, and Vivekananda Yoga including physical educational institutes and universities. The expert panel was asked to comment on the necessity and relevance of the items in order to calculate the CVR and the content validity index (CVI), respectively. The necessity of an item was assessed using a 3-point rating scale: (i) not essential, (ii) useful but not essential, and (iii) essential. In this way, ratings were made blind. Following the experts’ assessments, the CVR for total scale was computed. According to Lawshe’s formula, if more than half of the panelists indicate that an item is essential, then that item has the least content validity. Here, the CVR for the scale ≥0.42 was considered satisfactory. The CVI was estimated by experts’ ratings of items’ relevancy, simplicity, and clarity on a 4-point Likert scale.

**Pilot study**

To find the feasibility of the YM, 13 intellectually disabled children (6 males and 7 females) aged 12.53 ± 1.45 years were enrolled for this study. The participants were classified as mild-to-moderate ID on the basis of IQ score. However, the selected participants’ IQ range was between 50 and 70, i.e., with mild ID. All the children were from School for Intellectually Disabled Individuals situated in Pune, Maharashtra. The inclusion criteria were as follows: (a) mild-to-moderate ID, (b) age between 11 and 15 years, and (c) normal health status. Exclusion criteria were as follows: (a) Major mental or physical disability, (b) severe ID, (c) children who are unable to do yoga practice, and (d) a history of psychiatric episodes. The study was approved by the Institutional Review Board and the Ethical Committee of the S-VYASA University. Signed informed consent was obtained from the parents. Further, permission from school authorities was also obtained to conduct this study. The objective of this study was to observe the effect of YM on health-related physical fitness in intellectually disabled children. The participants were intervened with the validated YM [Tables 1 and 2] for 6 weeks (1 h/day, 5 days a week) at the hall present in the school campus. Further, none of the selected participants had a history of yoga practice as yoga training was not part of the school curriculum. The selected participants were not having background yoga practices. All the participants

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**Table 1: Selected yoga module practices (postures) by yoga experts with their content validity ratio**

| Number | Name of the YM practices | CVR |
|--------|--------------------------|-----|
| 1      | Ardhakati Chakrasana     | 0.55 |
| 2      | Ardha Chakrasana         | 0.82 |
| 3      | Padahastasana            | 0.91 |
| 4      | Trikonasana              | 0.82 |
| 5      | Tadasan                  | 0.91 |
| 6      | Adhomukha Svanasana      | 0.55 |
| 7      | Vajrasana                | 0.64 |
| 8      | Janu Shirasana           | 0.55 |
| 9      | Ustrasana                | 0.73 |
| 10     | Vakrasana                | 0.73 |
| 11     | Viparita Karani          | 0.45 |
| 12     | Halasana                 | 0.45 |
| 13     | Pawannukasana            | 0.73 |
| 14     | Setu Bandhasana          | 0.91 |
| 15     | Savasana                 | 0.91 |
| 16     | Bhujangasana             | 0.82 |
| 17     | Shalabhasana             | 0.64 |
| 18     | Dhanurasana              | 0.73 |
| 19     | Makarasana               | 0.73 |

YM = Yoga module; CVR = Content validity ratio
were assessed for flexibility (sit and reach test), abdominal muscle strength (sit-ups), and balance (standing stork test) at the baseline and after completion of 6 weeks of yoga training. All the 13 participants completed the intervention. No adverse effects were observed during the study period.

Statistical analysis
The cutoff value of 0.42 was calculated by applying Lawshe’s formula for CVR. According to Lawshe’s formula, we have $CVR = (Ne-N/2)/N/2$, where $CVR$ = content validity ratio, $Ne$ = total number of essentials for each practice, and $N$ = total number of panelists. The Microsoft Office 2010 software was used for further analysis.

### RESULTS

The CVR was calculated for all the 32 practices of designed YM for children with IDs. Among them, 31 practices with CVR $\geq 0.42$ were included in the validated YM. The practice with CVR $<0.42$, i.e., Ardha Halasana was excluded as it was either a complementary pose for an important posture to align the body and mind level or just it was an extra practice as Halasana already exists in the selection module. Due to these reasons, the experts have not considered this as essential for children with IDs. Apart from this one practice, all the other 31 practices were considered to be essential for children with IDs; this made the final CVR ratio satisfy the minimum value as per Lawshe’s CVR ratio. Thus, the data analysis showed that out of 32 YM practices, 31 indicated significant content validity [Tables 1-3]. This result was based on the frequency, length, intensity of the program, teacher qualification, and setting which were rated and made blinded for their validity.

#### Results on pilot study

Thirteen intellectually disabled children were intervened with a validated YM, which consisted of 31 practices with CVR $\geq 0.42$. Assessments were done at baseline and after 1 month of intervention. All the participants completed the intervention; no adverse effects were noticed during the study. Data were analyzed using paired sample $t$-test, which showed significant change in flexibility ($t = 6.35, df = 12, P < 0.001$); strength of abdominal muscles ($t = 6.49, df = 12, P < 0.001$); and static balance ($t = 3.35, df = 12, P < 0.05$) after yoga training intervention. The results are presented in Table 4.

### DISCUSSION

In the present study, an attempt has been made to develop an YM for children with IDs by choosing specific yoga practices from the traditional literature and scientific studies on yoga to target specific symptoms of children with IDs. This YM was validated by experts in yoga and was modified according to their suggestions. Similarly, an effort was made to retain only those practices which were rated by all experts as useful. The yoga practices were ordered as suggested by the experts. All the experts opined that these practices should be easy for children with IDs. It was also decided to include some loosening exercises as majority suggested so. The matching of yoga practices with symptoms of children with IDs was performed after reviewing traditional literature. The present study was closely associated with previous studies on validation of YMs.

Further, to find the efficacy of the developed YM, 13 intellectually disabled children were intervened by a validated YM (31 practices) and they were assessed pre-and post-intervention for flexibility, strength of abdominal muscles, and static balance. All the three outcome measures showed statistically significant ($P < 0.001$) positive impact of the validated YM on intellectually disabled children. All the 13 children completed the intervention; no adverse effects were noticed during the study. In fact, the validated YM can be used in intellectually disabled children for improvement in health-related physical fitness and motor function. However, randomized controlled trials with larger samples are needed to validate its efficacy as a primary intervention.

In summary, an YM for children with IDs was designed based on traditional texts and was validated with the help...
of experts. The module remains to be tested in formal clinical trials.

**CONCLUSIONS**

Based on the findings from the present study, the YM for IDs suggests good content validity for IDs. The pilot study showed that the validated YM was found to be beneficial for improvement in flexibility, strength of abdominal muscles, and static balance in children with IDs.

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**Conflicts of interest**
There are no conflicts of interest.

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