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Original Research Article

Translation, cross-cultural adaptation and validation of the dysphagia handicap index in Odia language

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ABSTRACT

Background: Dysphagia adversely affects nutritional status, physical health, emotional well-being, and quality of life. The Dysphagia Handicap Index (DHI) assesses the physical, functional, and emotional impact of dysphagia. This study aimed to translate, culturally adapt, and validate the DHI in Odia (DHI-OD).
Methods: The study was conducted in two phases. Phase I involved forward translation, synthesis, back-translation, expert committee review, content validation, pre-testing, and finalization of the Odia version. Phase II used a cross-sectional observational design involving 78 native Odia-speaking participants, including 31 individuals with clinically diagnosed dysphagia and 47 healthy controls. Internal consistency was assessed using Cronbach's alpha. Group differences were analysed using the Mann–Whitney U test in SPSS version 30.0, with statistical significance set at $p<0.05$.
Results: The DHI-OD demonstrated excellent internal consistency (Cronbach's alpha=0.969; standardized alpha=0.970). Cronbach's alpha values for the Physical, Functional, and Emotional subscales were 0.943, 0.895, and 0.942, respectively. Significant differences between the dysphagia and control groups were observed across all three domains ($p<0.05$), supporting the instrument's ability to distinguish between the groups.
Conclusions: The DHI-OD demonstrated excellent internal consistency and preliminary evidence of validity. It provides a culturally adapted instrument for assessing the physical, functional, and emotional impact of dysphagia among Odia-speaking individuals.

Keywords: Dysphagia, Dysphagia handicap index, DHI-OD, Translation, Validation, Odia language, Reliability, Quality of life, Speech-language pathology

INTRODUCTION

Swallowing, medically termed deglutition, is a complex neuromuscular process involving four coordinated stages: oral preparatory, oral transit, pharyngeal and esophageal, regulated by cranial nerves and brainstem centres.[1] Dysphagia refers to impaired swallowing and is generally a symptom of underlying neurological, structural or muscular dysfunction.[2,3] Clinically, dysphagia is classified into oropharyngeal and esophageal types. Oropharyngeal dysphagia is commonly associated with neurological conditions such as stroke, Parkinson's

disease, amyotrophic lateral sclerosis, dementia and traumatic brain injury.[4,5] Esophageal dysphagia generally results from motility disorders or structural abnormalities, including strictures, achalasia, gastroesophageal reflux disease and neoplasms.[6] Identifying the underlying etiology is essential for appropriate clinical management and rehabilitation planning.[7] Dysphagia is particularly prevalent among older adults and individuals with neurological disorders. Studies report that 37–78% of acute stroke survivors experience dysphagia, while its prevalence in Parkinson's disease varies according to disease stage and assessment methods.[8,9] Patients with head and neck cancer may also develop swallowing difficulties following surgery or chemoradiotherapy.[10] Dysphagia may lead to malnutrition, dehydration, weight loss and aspiration pneumonia, along with prolonged mealtimes, dietary restrictions, anxiety, embarrassment and social withdrawal, adversely affecting quality of life.[11,12] Accurate assessment is essential for effective dysphagia management. Bedside screening tools, such as the Bedside Swallow Assessment and Gugging Swallowing Screen, provide clinical evaluation, while instrumental assessments, including Video-Fluoroscopic Swallow Study (VFSS) and Fiberoptic Endoscopic Evaluation of Swallowing (FEES), provide detailed information about swallowing physiology.[13-16] Additional investigations, such as barium swallow and high-resolution manometry, help evaluate esophageal disorders.[17]

Although clinical assessments provide physiological information, they may not fully capture patients' subjective experiences and psychosocial difficulties. Patient-reported outcome measures (PROMs), including the eating assessment tool (EAT-10), Sydney swallow questionnaire, swallowing quality of life questionnaire (SWAL-QOL), MD anderson dysphagia inventory (MDADI) and functional oral intake scale (FOIS), are useful in evaluating swallowing-related difficulties and functional intake.[18-23] Among these, the DHI is 25 items self-administered questionnaire assessing the Physical, Functional and Emotional impact of dysphagia.[23]

India is a linguistically diverse country, where language barriers may affect communication between patients and healthcare professionals.[24] Therefore, culturally and linguistically appropriate assessment tools are essential. However, the validated Odia version of the DHI remains unavailable. The present study aimed to translate, culturally adapt and validate the DHI into Odia (DHI-OD) for assessing the impact of dysphagia among Odia-speaking individuals.

METHODS

Aim

The aim of the study is to translate and validate the DHI for use among Odia-speaking individuals, ensuring linguistic and cultural appropriateness and to assess the impact of dysphagia on their daily lives and quality of life.

Objectives

The objectives of the study were to translate and develop a self-administered, symptom-specific Dysphagia Handicap Index in the Odia language. To assess the reliability and effectiveness of the translated tool in measuring dysphagia severity and its impact on quality of life. To provide a valid and culturally appropriate instrument for clinical use among the Odia-speaking population. The study was conducted in two phases. Phase I–material development, while Phase II involved the administration of the translated DHI in Odia.

Phase I: material development

The translation process of DHI-E index into Odia language

The 25 item English DHI was translated into Odia (DHI-OD), maintaining linguistic, conceptual and cultural equivalence. It comprises three subscales: Physical (9 items), Functional (9 items) and Emotional (7 items).[23] The translation was reviewed by a panel of one linguist, two Odia professors and two senior SLPs.

The DHI-OD was developed through a systematic cross-cultural adaptation process, involving initial translation, synthesis, back-translation, expert committee review, pre-testing, finalization and documentation.[25] Two native Odia-speaking SLPs and one linguist independently translated the questionnaire, followed by synthesis into a single version. Two bilingual SLPs, blinded to the original questionnaire, performed independent back-translations. The expert committee evaluated semantic, idiomatic, experiential and conceptual equivalence. Necessary modifications were incorporated to ensure linguistic accuracy and cultural appropriateness.

Content validation, pre-testing and finalization

Content validation was performed by five native Odia-speaking SLPs, who evaluated each item for relevance, clarity and appropriateness using a five-point Likert scale (1=very poor; 5=excellent).[26] The pre-final DHI-OD was tested on 10 eligible participants using cognitive interviewing and debriefing to assess item comprehension and cultural acceptability. Based on expert and participant feedback, necessary modifications were made and the final version was approved for the main study.

Phase II: administration of DHI-OD

Study design and setting

A cross-sectional observational study was conducted across healthcare facilities in Odisha to evaluate the DHI-OD in clinical and non-clinical populations.

Participants

A total of 78 Odia speakers participated. They were divided into 2 groups: Group A comprised 31 individuals with clinically diagnosed dysphagia (20 males and 11 females), while Group B included 47 healthy controls (36 males and 11 females).

Inclusion criteria

20- 70 years (Adults aged 20 years and above to ensure reliable self-reporting). Oropharyngeal dysphagia or esophageal dysphagia. Reported swallowing difficulty. Neurological conditions (stroke, TBI or spinal cord injuries, multiple sclerosis (MS), amyotrophic lateral sclerosis (ALS)). Muscle-related disorders (achalasia, myasthenia gravis). Gastroesophageal and digestive disorders (gastroesophageal reflux disease (GERD), eosinophilic esophagitis). Individuals who use Odia as their primary language for communication. Participants with clinically diagnosed swallowing difficulties.

Exclusion criteria

Less than 20 years and more than 70 years. Severe hearing or speech disorders. History of neurologic disease. paediatric population, cognitive impairments. severe psychiatric disorders (individuals with mental health conditions that could interfere with their ability to provide accurate responses). Chemo radiotherapy (CRT) or surgery, oropharyngeal apparatus or cerebrovascular accident. Non-native Odia speakers.

Ethical clearance and informed consent

Ethical approval was obtained from the Institutional Ethics Committee, Naseema Institute of Speech and Hearing, on 30 April 2025. Written informed consent was obtained from all participants before data collection. Confidentiality and the right to withdraw were ensured.

Materials and procedure

The DHI-OD comprised 25 items across three subscales: Physical (9), Functional (9) and Emotional (7). Demographic and clinical data were collected using a structured case history proforma and the questionnaire was administered offline with assistance when required. Responses were scored as Never (0), Sometimes (2) and Always (4), yielding a total score of 0–100. Scores were classified as no (0–24), mild (25–49), moderate (50–74) or severe (75–100) handicap.[23]

The DHI-OD comprised 25 items across three subscales: physical (9), functional (9), and emotional (7). demographic and clinical data were collected using a structured case history proforma, and the questionnaire was administered offline with assistance when required. Responses were scored as never (0), sometimes (2), and always (4), yielding a total score of 0–100. Scores were classified as no (0–24), mild (25–49), moderate (50–74), or severe (75–100) handicap.23 The complete Dysphagia Handicap Index in Odia language (DHI-OD) questionnaire is presented in Appendix-I.

Statistical analysis

Data were analysed using SPSS version 30.0. Descriptive statistics summarized participant characteristics and questionnaire scores. Internal consistency was assessed using Cronbach's alpha, Kolmogorov–Smirnov, Shapiro–Wilk, Friedman test and between-group differences were evaluated using the Mann–Whitney U test. Statistical significance was set at $p<0.05$.

RESULTS

Part A presents the internal consistency of overall Cronbach's Alpha Value (DHI-OD)

The DHI-OD demonstrated excellent internal consistency, with an overall Cronbach's alpha of 0.969 (standardized alpha =0.970), indicating high reliability of the 25-item questionnaire. The overall reliability statistics are presented in Table 1.

Subscale reliability internal consistency (Cronbach's alpha) of the DHI-Odia

All three subscales demonstrated high internal consistency, with Cronbach's alpha values of 0.943-physical, 0.895-functional, and 0.942-emotional domains, indicating good to excellent reliability of the DHI-OD subscales. The reliability statistics for all three subscales are presented in Table 2.

Part B presents the findings of descriptive and inferential statistics

The present study included 31 Participants, out of which 20 (64.52%) were male and 11 (35.48%) were female. The mean age of the participants was 51.10±14.74 years, with an age range of 22–70 years (n=31).

Calculation details

Mean=1584/31=51.10, SD=14.74 (Sample SD), minimum age=22 years, maximum age=70 years

Medical history

Out of 31 participants, 23 participants had stroke (left or right hemisphere), and 8 participants had Parkinson's disease.

5 participants reported weight loss, ranging from 3–16 kg over the past 8–12 months.

8 participants had associated medical conditions like diabetes, high blood sugar, or gastrointestinal issues.

25 participants were receiving swallowing therapy, while 6 participants were not undergoing any therapy. The demographic and clinical characteristics of the participants are presented in Table 3.

Work and environmental factors of the participants

Among the 31 participants, housewives were the most common occupational group (n=6), followed by farmers, clerks and retired individuals (n=4 each), labourers and shopkeepers (n=3 each), tailors (n=2) and teachers, drivers, sweepers, businessmen and watchmen (n=1 each). Regarding daily voice use, 14 (45.16%) participants reported moderate voice use, 11 (35.48%) reported low voice use and 6 (19.35%) reported high voice use. In terms of meal assistance, 25 (80.65%) participants did not require assistance, whereas 6 (19.35%) required assistance. Meal endurance was good in 8 (25.81%) participants, fair in 11 (35.48%) and poor in 12 (38.71%). Regarding hearing status, 25 (80.65%) participants had normal hearing, while 6 (19.35%) exhibited mild hearing loss. All 31 (100%) participants had normal vision, with no reported visual impairments.

Dysphagia related complaints

As presented in Table 4, the most frequently reported symptom was the sensation of food getting stuck in the throat or chest (food sticking was reported by 16 participants). Other symptoms included difficulty drinking through a straw (n=06), dry mouth (n=09), difficulty initiating swallowing (n=18), and pain during swallowing (n=24). Coughing during or after swallowing was reported by 9 participants. Additionally, approximately 10–12 participants experienced morning voice changes, including hoarseness, breathiness, or weak vocal quality.

Impact of dysphagia on daily life

The psychosocial and functional impact of dysphagia was assessed in 31 participants. Public eating avoidance was reported by 10 (32.3%) and social withdrawal by 7 (22.6%). Mealtime duration was rated as fair in 11 (35.5%), good in 11 (35.5%), poor in 7 (22.6%) and normal in 2 (6.5%) participants. Communication difficulties and drooling were reported in 5 (16.1%) and 11 (35.5%) participants, respectively. Swallowing-related concern was mild in 15 (48.4%), moderate in 14 (45.2%) and severe in 2 (6.5%) participants.

Copying strategies and treatment

The most commonly used swallowing strategy was chin tuck (n=13), followed by head turn (n=6) and bolus control (n=2), while 10 participants used no compensatory strategy. Swallowing therapy was received by 25 participants, whereas 6 did not receive therapy. Regarding diet consistency, 11 participants followed a soft/thick diet, 8 a soft/thin diet, 7 a pureed/honey-thick diet, 3 a regular/honey-thick diet, and 2 a regular/thin diet. Tube feeding was reported in 16 participants, while 15 did not require tube feeding. Instrumental assessments were recorded in 20 participants, whereas 11 had no recorded assessment. Regarding referrals, 11 participants were referred to both Neurology and ENT, while 20 were referred to Neurology.

Case history of control group

The control group included 47 healthy individuals (36 males and 11 females) without dysphagia symptoms, serving as a reference group for comparison with the clinical group.

Descriptive Statistics

The physical subscale showed the highest mean score (31.91±15.23) physical, followed by Functional (31.42±15.03) and emotional (23.39±14.86), indicating greater physical and functional difficulties among participants with dysphagia as presented in Table 5.

The control group (n=47) showed mean scores of 9.02±0.15 (physical), 9.04±0.20 (functional), and 7.04±0.20 (emotional), indicating minimal variation and no substantial dysphagia-related difficulties as presented in Table 6.

Test of normality for the control group

Normality was assessed using the Kolmogorov–Smirnov and Shapiro–Wilk tests. Both tests showed significant deviations from normality across the Physical, Functional and Emotional subscales ($p<0.001$). Therefore, non-parametric statistical tests were considered appropriate for further analysis.

Inferential statistics

As presented in Table 7, the Friedman test revealed a statistically significant difference in mean ranks among the physical, functional, and emotional subscales in the control group ($\chi^2=92.056$, DF=2, $p<0.001$), indicating sensitivity of the DHI-OD in detecting variations across domains.

Comparison between clinical and control groups-Mann-Whitney U test

The Mann–Whitney U test revealed significant differences ($p<0.05$) between the clinical and control groups across all three DHI-OD subscales, indicating preliminary discriminative validity (Table 8).

Table 1: Internal consistency of the overall DHI-OD.

Reliability statistics		
Cronbach's alpha	**Cronbach's alpha based on standardized items**	**No of items**
0.969	0.97	25

Table 2: Internal consistency of the DHI-OD subscales.

Item statistics			
Item	**Cronbach alpha**	**Cronbach's alpha based on standardized items**	**No of items**
PQ (Physical)	0.943	0.944	9
FQ (Functional)	0.895	0.899	9
EQ (Emotional)	0.942	0.943	7

Table 3: Demographic and clinical characteristics of the participants.

Sl. no.	Code	Age (in years)	Weight loss	Medical history	Other conditions	Swallowing therapy
1	D1	23	10 kg/12	Stroke (LH)	No	Yes
2	D2	24	16	Stroke (LH)	No	Yes
3	D3	50	No	Stroke (LH)	Blood sugar	Yes
4	D4	50	No	Stroke (RH)	No	No
5	D5	58	5 kg/8	Stroke (LH)	Diabetes	Yes
6	D6	55	3 kg/8	Stroke (LH)	Sugar	Yes
7	D7	60	5 kg/8	Stroke (RH)	No	Yes
8	D8	60	No	Stroke (RH)	No	Yes
9	D9	50	No	Stroke (LH)	No	Yes
10	D10	50	No	Stroke (LH)	No	Yes
11	D11	60	No	Stroke (RH)	No	Yes
12	D12	35	No	Stroke	No	Yes
13	D13	60	No	Stroke (RH)	No	Yes
14	D14	67	No	Parkinson	No	Yes
15	D15	64	No	Parkinson	Sugar/GI	No
16	D16	70	No	Stroke (LH)	Sugar	Yes
17	D17	38	No	Stroke (LH)	No	Yes
18	D18	25	No	Stroke (LH)	No	Yes
19	D19	48	No	Parkinson	No	No
20	D20	58	No	Parkinson	No	Yes
21	D21	22	No	Stroke	No	Yes
22	D22	24	No	Stroke	No	Yes
23	D23	58	No	Parkinson	No	No
24	D24	55	No	Stroke	Sugar	Yes
25	D25	58	No	Parkinson	No	No
26	D26	48	No	Parkinson	No	No
27	D27	70	No	Stroke (RH)	Sugar	Yes
28	D28	60	No	Stroke	Sugar	Yes
29	D29	64	No	Parkinson	No	Yes
30	D30	70	No	Stroke (LH)	No	Yes
31	D31	50	No	Stroke (LH)	No	Yes

Table 4: The dysphagia related complaints of the participants.

Code	Food stuck	Coughing	Pain in s	Difficulty straw	Dry mouth	Difficulty I. S	M.V. P
D1	No	Yes	Yes	Yes	No	Yes	No
D2	No	No	Yes	Yes	No	Yes	No
D3	Yes	No	Yes	No	Yes	No	No

Continued.

Code	Food stuck	Coughing	Pain in s	Difficulty straw	Dry mouth	Difficulty I. S	M.V. P
D4	No	No	No	Yes	Yes	No	Harsh
D5	Yes	No	Yes	No	No	Yes	Yes
D6	Yes	No	Yes	No	Yes	No	No
D7	No	No	No	Yes	No	Yes	Breathy
D8	Yes	No	Yes	Yes	No	Yes	No
D9	No	Yes	Yes	No	No	Yes	No
D10	No	No	Yes	No	No	Yes	No
D11	Yes	No	Yes	Yes	No	Yes	Poor
D12	Yes	Yes	Yes	No	No	No	Poor
D13	Yes	Yes	Yes	No	No	No	Poor
D14	Yes	No	No	No	No	Yes	No
D15	Yes	No	No	No	No	No	Poor
D16	No	No	No	No	No	Yes	Yes
D17	Yes	No	No	No	No	Yes	Yes
D18	No	Yes	No	No	Yes	Yes	No
D19	No	No	Yes	No	Yes	Yes	No
D20	Yes	No	Yes	No	Yes	No	No
D21	Yes	Yes	Yes	No	No	No	Yes
D22	No	Yes	Yes	No	No	No	Yes
D23	No	No	Yes	No	No	Yes	No
D24	Yes	No	Yes	No	No	No	No
D25	No	No	Yes	No	No	Yes	Yes
D26	Yes	Yes	Yes	No	Yes	No	Yes
D27	No	No	Yes	No	No	Yes	No
D28	Yes	No	Yes	No	No	No	No
D29	No	No	Yes	No	Yes	Yes	No
D30	Yes	Yes	Yes	No	No	No	Yes
D31	No	No	Yes	No	Yes	Yes	No

Table 5: Descriptive statistics (mean, median, St. deviation, minimum and maximum scores) for three subscales in the clinical group.

Item statistics						
Item	**Mean**	**Median**	**Std. deviation**	**Minimum**	**Maximum**	**No. of subjects**
PQ (Physical)	31.9032	28	15.22795	9	63	31
FQ (Functional)	31.4194	29	15.02614	9	63	31
EQ (Emotional)	23.3871	22	14.85862	7	49	31

Table 6: Mean, median, St. deviation, minimum and maximum scores for three subscales in the control group.

Item statistics						
Item	**Mean**	**Median**	**Std. deviation**	**Minimum**	**Maximum**	**No. of subjects**
PQ (Physical)	9.02	9.00	0.15	9	10	47
FQ (Functional)	9.04	9.00	0.20	9	10	47
EQ (Emotional)	7.04	7.00	0.20	7	8	47

Table 7: Comparison across the domains within control group: Friedman's test.

Test statistics	
N	47
Chi-square	92.056
Df	2
Asymp. Sig.	0.000
Friedman test	
Ranks	

Continued.

Test statistics	
Mean rank	
Physical	2.49
Functional	2.51
Emotional	1.00

Table 8: Comparison between clinical and control groups- Mann-Whitney U Test.

Subscale	Clinical mean rank	Control mean rank	P value (Significance)
Physical	62.23	24.51	<0.05 (Significant)
Functional	59.84	26.09	<0.05 (Significant)
Emotional	59.84	26.09	<0.05 (Significant)

DISCUSSION

The present study aimed to translate, culturally adapt, and validate the Dysphagia Handicap Index into Odia (DHI-OD) for native Odia-speaking individuals. The findings demonstrated excellent internal consistency, with an overall Cronbach's alpha of 0.969 and standardized alpha of 0.970. The Physical, Functional, and Emotional subscales also showed high internal consistency, with alpha values of 0.94, 0.89, and 0.94, respectively. These results indicate strong consistency among the questionnaire items.

Descriptive findings revealed higher mean scores in the clinical group than in the control group across all three subscales. The Mann–Whitney U test further demonstrated statistically significant differences between the groups in the Physical, Functional, and Emotional domains ($p<0.05$). These findings provide preliminary evidence of the known-groups validity of the DHI-OD, demonstrating its ability to distinguish individuals with dysphagia from healthy controls.

The Friedman test also identified significant differences among the three subscales within the control group ($\chi^2=92.056$, DF=2, $p<0.001$). Overall, the findings support the excellent internal consistency and preliminary validity of the DHI-OD. The translated instrument successfully retains the three-domain structure of the original questionnaire and provides a culturally adapted measure for evaluating the perceived physical, functional, and emotional impact of dysphagia in Odia-speaking individuals.

CONCLUSION

The present study successfully translated and culturally adapted the Dysphagia Handicap Index into Odia (DHI-OD) for native Odia-speaking individuals. The instrument demonstrated excellent overall internal consistency (Cronbach's alpha =0.969), with good to excellent reliability across the physical (0.943), functional (0.895), and emotional (0.942) subscales. Significant differences between the clinical and control groups across all three subscales provide preliminary evidence of known-groups validity. These findings suggest that the DHI-OD can effectively assess the perceived physical, functional, and emotional impact of dysphagia. Overall, it appears to be a reliable and culturally appropriate tool for clinical and research use among Odia-speaking individuals.

Future directions

Future studies can include a larger and more diverse sample size for better generalization. Since the DHI-OD has shown strong reliability, similar translations can be developed for other regional languages to increase clinical accessibility across India. Further research can explore the use of DHI-Odia in different age groups, severity levels and aetiologies of dysphagia for deeper insights.

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