

Adapting the International Dysphagia Diet Standardisation Initiative in East Asia

Feasibility study

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Abstract

In dysphagia, food or water cannot be delivered safely through the oral cavity to the stomach; both are treated using texture-modified food and thickened fluid. Before, each country had its own diet modifications and texture measurement standards. In 2012, the International Dysphagia Diet Standardisation Initiative (IDDSI) was developed by several countries. Owing to cultural differences, it was necessary to determine whether the IDDSI could well be applied to clinicians and patients without difficulties in East Asia countries. To evaluate the IDDSI scale to find out the difficulties applying this scale in East Asia countries to educate the clinicians and patients. In May 2021, we enrolled physicians, nurses, nutritionists, and swallowing therapists involved in dysphagia treatment at a single center in Seoul. To evaluate the degree of understanding and difficulties of adapting IDDSI to clinicians in East Asia countries, we used the 17-item questionnaire with IDDSI sample foods and foods in Asian countries. In first 7 items, we compared IDDSI with the previously used scale based on the National Dysphagia Diet (NDD). In the next 10 questions, only the IDDSI levels were answered, and the absolute values of the answer–response differences were calculated. The IDDSI showed a significantly high intraclass correlation with the previously used NDD-based scale; the coefficient was higher for the nutritionists (0.988) and swallowing therapists (0.991). When evaluating whether the IDDSI could applied well in East Asia countries, the absolute values of the answer–response differences were lower than 0.5 in majority of levels, except for Level 4. Because the IDDSI framework might successfully be applied universally regardless of food culture, a worldwide standard for food rheology in dysphagia treatment might be possible.

Abbreviations: ICC = intraclass correlation coefficient, IDDSI = International Dysphagia Diet Standardisation Initiative, NDD = National Dysphagia Diet.

Keywords: Asia, culture, dysphagia, international dysphagia diet standardisation initiative, national dysphagia diet

1. Introduction

In dysphagia, food or water cannot be delivered safely to the stomach from the oral cavity.^[1] More than 8% of the world's population experiences dysphagia, which can cause symptoms such as malnutrition or dehydration and even death from aspiration pneumonia.^[2,3] Various methods exist for treatment, and these mainly involve exercises, compensation techniques, and diet modifications.^[4,5]

Texture-modified foods and fluid thickened to adjust viscosity are used to reduce aspiration risk and to promote safe intake.^[5,6] Health care professionals choose which foods to provide by determining a patient's status using videofluoroscopic swallowing studies or bedside evaluations.^[7]

However, it is often difficult to apply a modified diet intuitively because countries apply their own standards.^[8] As a result, various problems have occurred: patient safety is affected, standardization is difficult, and accurate dysphagia research is impaired.^[1,2] Therefore, to resolve these issues, several countries developed the International Dysphagia Diet Standardisation Initiative (IDDSI) in 2012.^[3]

The IDDSI, formed from a multi-professional international group founded in 2012 to develop globally consistent definitions and terms for texture-modified foods and liquids, is divided into 8 levels and includes both solid foods and liquids, which are expressed with numbers and colors for easy application in clinical practice.^[3] Liquids are evaluated with the gravity flow test using a 10-mL syringe, and foods are evaluated by particle size

Informed consent was acquired from all participate.

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The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

We obtained approval for this study from the Asan Medical Center's Institutional Review Board (No. 2021-1407).

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and shape using the fork or other tools. Standardized foods are also included.

Because the IDDSI development survey could not include every country, the standard foods and steps may not be applied easily in countries with different cultural backgrounds.^[3] Even though the IDDSI has worked well in Western countries, given the differences in cultures and foods of various countries, it is still questionable whether this framework could well be applied without difficulties in other regions.^[9]

Therefore, in this study we conducted the survey targeting the physicians, nurses, nutritionists, and swallowing therapists responsible for managing patients with dysphagia to evaluate the degree of understanding IDDSI in East Asia countries by comparing it with the previously used scale based on the National Dysphagia Diet (NDD). We also determined whether the IDDSI could well be applied without difficulties to educate clinicians and patients in East Asia.

2. Methods

2.1. Questionnaire & scales

Prior approval was obtained from the institutional review board (No. 2021-1407). We collected years of service and occupational group of the study participants. We prepared a 17-item questionnaire about the foods and the IDDSI in consultation with the nutritionist and the center's Department of Medical Statistics. (Supplemental Digital Content, <http://links.lww.com/MD/H612>.) For comparing NDD-based scale with IDDSI levels, we designated nectar thick, honey thick, and pudding-like with IDDSI levels 2, 3, 4 respectively. Also, dysphagia-pureed, dysphagia-mechanical altered, dysphagia-advanced were matched with IDDSI levels 4, 5, 6 respectively.^[10] This was the same as mentioned in the NDD to IDDSI implementation announced by United States & Territories IDDSI Reference Group (USTIRG). IDDSI level 1, which was not suggested by NDD, could not be matched to NDD.

In the first seven items, foods from the IDDSI guidelines were presented from all levels except for level 1 for the reason above. Items were banana, bread, water, pudding, honey, vegetable juice, and minced meat, which were the foods presented in the IDDSI guideline, and through this, we tried to evaluate the understanding of the IDDSI first. Both the NDD-based scale and the IDDSI levels for each food were answered. We then evaluated the concordance between the two scales, confirming the degree of understanding the IDDSI of participants with different cultural backgrounds, and whether the IDDSI could replace the existing protocol.

In the next 10 questions, except for levels 1 to 3 which were mainly liquids and did not differ significantly by culture, we selected 2 representative foods of far East Asia for each level through consultation with the nutritionist. Selected foods were rice porridge, Korean style steamed eggs, kimchi, soft tofu, Sujeonggwa and rice cake, which were widely eaten in East Asia and provided for patient education. In these items, only the IDDSI levels were answered. We calculated the differences between the actual levels and the responses for each food, converting the data into an absolute value to evaluate how far it deviated from the actual food levels.

2.2. Participants

Physicians, nurses, nutritionists, and swallowing therapists (occupational therapists) involved in dysphagia treatment were enrolled in a single center in Seoul, Korea, in May 2021. The participants were those who had worked in the Department of Rehabilitation Medicine or on the Dietetics and Nutrition Services Team, were directly or indirectly involved in patients' swallowing treatment, had worked for more than a year with a good understanding of the dysphagia diet and were educated about IDDSI before the survey. To determine applicability in more realistic circumstances, we conducted the questionnaires without notice to the participants. 2 independent raters evaluated the participants.

2.3. Statistics

SPSS Statistics for Windows, version 25 (IBM Corp., Armonk, NY) was used to analyze the data. Since this was a feasibility study, the sample size was not calculated. We recorded the participants' baseline characteristics as means and standard deviations. For Items 1 to 7, we evaluated the degree of agreement between the NDD-based scale and the IDDSI by intraclass correlation coefficient (ICC). We drew Bland–Altman plots for each occupational group. For Items 8 to 17, after converting the answer–response difference for each food as an absolute value, we classified the items by IDDSI levels and verified whether any inconsistencies occurred in the answer–response differences between these levels using the Kruskal–Wallis test. We also evaluated the comparisons among the occupational groups. To confirm the differences according to years of experience, we divided the nutritionists and swallowing therapists into two groups (<10 years' experience, >10 years' experience), and we confirmed between-group differences using the Mann–Whitney *U* test.

3. Results

Table 1 showed the participants' baseline characteristics. We surveyed 45 health care professionals, excluding 5 who did not complete the questionnaire. The average years of service was 9.1 ± 7.9 years, with swallowing therapists having the longest (13.8 ± 7.8 years) and physicians the shortest (2.4 ± 1.1 years).

The concordance between the NDD-based scale and the IDDSI using Items 1 to 7 was ICC of 0.984 for all participants. The coefficient was the highest in the swallowing therapists (0.991) and the lowest in the physicians and nurses (0.978) (Table 2).

Figure 1 showed the Bland–Altman plots for Items 1 to 7 for each occupational group. For easy identification, they were sorted according to the IDDSI level regardless of the order of the items. Level 3 and 5 showed larger deviation than other levels.

In Items 8 to 17, the mean absolute answer–response difference was highest in Level 4 (0.91 ± 0.84), showing a statistical significance between the levels (Table 3). Also, when comparing among the occupational groups, we found significant disagreement in Levels 4 and 6, with the nurses showing the most and the nutritionists the least differences (Table 4). To confirm if personal experiences affected the results, when the swallowing

Table 1
Participants' baseline characteristics.

Characteristic	Physician	Nurse	Nutritionist	Swallowing therapist	Total
Participants, n	11	10	10	14	45
Response rate, %	10/11 (90.9%)	8/10 (80.0%)	10/10 (100%)	12/14 (85.7%)	40/45 (88.9%)
Years of service	2.40 ± 1.11	8.00 ± 6.14	11.10 ± 8.15	13.83 ± 7.82	9.13 ± 7.87

Table 2
ICC for NDD and IDDSI level in each occupational group.

Group	ICC	95% CI	p value
Physician	0.978	0.965–0.986	<.01*
Nurse	0.978	0.962–0.987	<.01*
Nutritionist	0.988	0.981–0.993	<.01*
Swallowing therapist	0.991	0.987–0.994	<.01*
Total	0.984	0.980–0.988	<.01*

CI = confidence interval, ICC = intraclass correlation coefficient, IDDSI = international dysphagia diet standardisation initiative, NDD = national dysphagia diet.
*P < .05, ICC.

therapists and nutritionists were divided by years of service, we found no significant differences (Table 5).

4. Discussion

The IDDSI showed a high degree of correlation with the previously used NDD-based scale, and was somewhat well applied to East Asia countries. Furthermore, the swallowing therapists and nutritionists who were directly involved in treatment showed a higher level of understanding that was not related significantly to their career of service. This study compensated for previous studies that insisted additional effort should be needed in applying the IDDSI in countries with different cultural backgrounds, including East Asia countries.^[9,11]

When evaluating the degree of understanding the IDDSI, we found a high degree of agreement between two scales. Therefore, the IDDSI framework showed high reliability despite cultural differences, which also was consistent with the similar study attempted in Germany.^[9] Moreover, it also showed a similar degree of agreement regardless of occupational group, implying that scope-of-practice characteristics were not that important in the IDDSI application.

Figure 1 showed the degree of deviation from the actual levels, with responses in Levels 3 to 5 for all occupational groups

Table 3
Absolute value of the answer–response difference estimated for participants.

IDDSI level	Absolute value of answer–response difference	p value
0	0.16 ± 0.43	<.01*
4	0.91 ± 0.84	
5	0.31 ± 0.54	
6	0.38 ± 0.64	
7	0.13 ± 0.37	

Values are presented as mean ± standard deviation.
IDDSI = international dysphagia diet standardisation initiative.
*P < .05, Kruskal–Wallis test.

deviating more than other levels. These levels were moderate thick, Pureed, and minced and moist. Previous studies had found it difficult to provide uniform and consistent concentrations for the food in these levels.^[12–14] Therefore, more attention was required to educate patients and medical professionals in

Table 4
Absolute value of the answer–response difference estimated in each occupational group.

IDDSI level	Doctor	Nurse	Nutritionist	Swallowing therapist	p value
0	0.25 ± 0.43	0.13 ± 0.48	0	0.17 ± 0.37	.099
4	1.10 ± 0.79	1.13 ± 0.89	0.35 ± 0.59	1.08 ± 0.88	<.01*
5	0.4 ± 0.58	0.44 ± 0.61	0.30 ± 0.46	0.17 ± 0.47	.282
6	0.58 ± 0.79	0.69 ± 0.68	0	0.08 ± 0.28	<.01*
7	0.05 ± 0.22	0.25 ± 0.56	0	0.21 ± 0.41	.096

Values are presented as mean ± standard deviation.
IDDSI, international dysphagia diet standardisation initiative.
*P < .05, Kruskal–Wallis test.

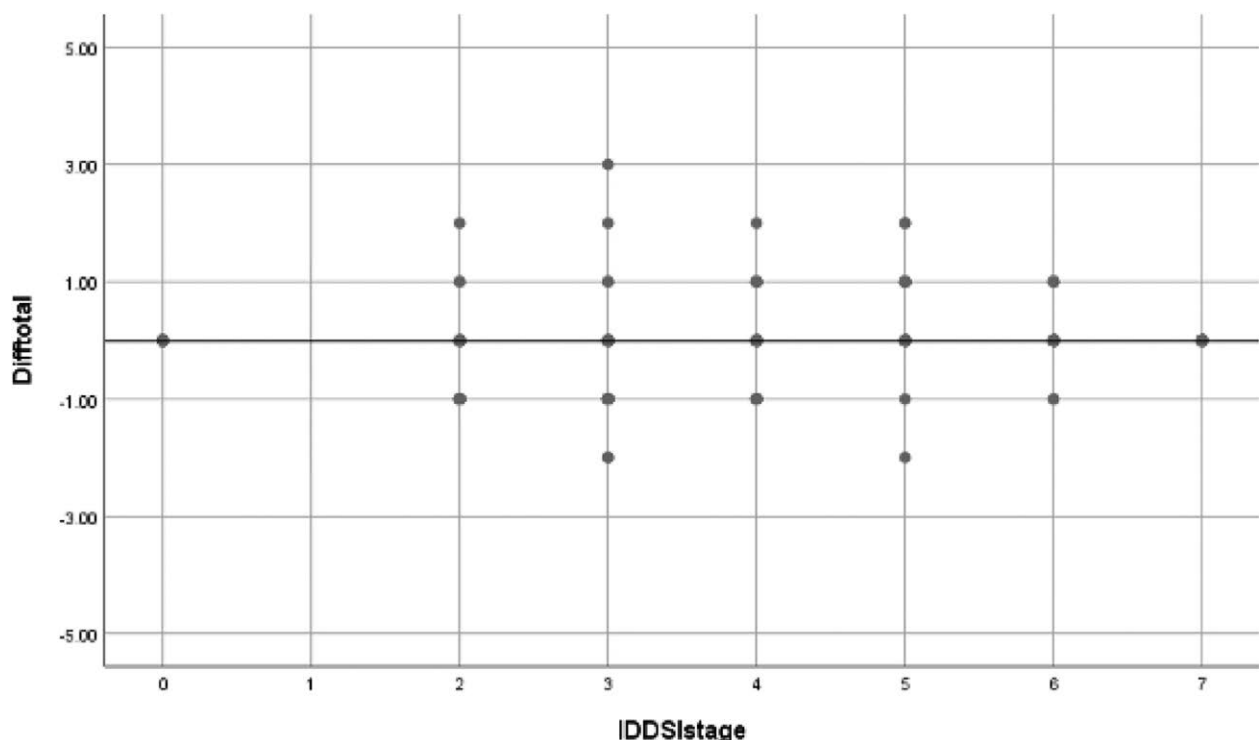


Figure 1. Bland – Altman plot for first 7 items. Difftotal = absolute value of answer–response difference in all participants, IDDSI = international dysphagia diet standardisation initiative.

Table 5**Absolute value of the answer–response difference in the nutritionists and swallowing therapists, by years of service.**

IDDSI level	<10 service yr	>10 service yr	<i>p</i> value
0	0.10 ± 0.29	0.10 ± 0.30	.502
4	0.71 ± 0.83	0.82 ± 0.84	.586
5	0.25 ± 0.47	0.18 ± 0.45	.291
6	0.05 ± 0.21	0.05 ± 0.22	.234
7	0.05 ± 0.32	0.13 ± 0.33	.318

Values are presented as mean ± standard deviation.

IDDSI = international dysphagia diet standardisation initiative.

**P* < .05, Mann–Whitney *U* test.

these levels.^[15] If it was difficult to adequately titrate viscosity in these levels in clinical settings, it might be possible to accurately educate Levels 1 and 6 and merge Levels 3 and 4 in case of patients education for easy application.^[14]

When evaluating whether the IDDSI could work well with East Asian food for each level, the absolute values of the answer–response differences were lower than 0.5 in majority of levels, but Level 4 showed a relatively high error rate. The IDDSI framework defined Level 4 as being lump-free and food that could be eaten with a spoon but could not be drunk with a cup or sucked through a straw.^[3] Level 5 was defined as allowing lumps of <4mm that could be squashed easily with the tongue. However, for foods such as tofu and steamed eggs that could either form lumps or be lump-free when fully decomposed, it could be difficult to accurately evaluate Levels 4 and 5. This problem thought not only to be restricted to “East Asia” food, but to all kinds of food.

The nutritionists’ and swallowing therapists’ comprehensive understanding was relatively high, with no differences between groups considering years of service. The entire rehabilitation team discussed the dysphagia treatment approach and goals, but the nutritionists or swallowing therapists directly managed the foods or treated the patients. Therefore, physicians and nurses who were involved indirectly had less exposure to the dysphagia diets and consequently had fewer opportunities to apply the IDDSI levels. However, as shown in Table 1, because the careers of the physicians and nurses were short, we considered that the possibility of bias due to career length could not be excluded completely. Additional research might be needed with participants with similar years of service.

Our study had several limitations. First, it could be difficult to generalize because it was conducted only in a single center in Seoul. Multicenter surveys are needed. Second, our sample size was relatively small, so studies with more participants are necessary. Third, we excluded the Levels 1 to 3 for evaluating real foods because of the difficulty in selecting suitable drinks. Finally, although the minimum number of raters evaluated the participants, inter-rater bias may be possible.

5. Conclusion

The IDDSI framework was well understood by all health care professionals, especially by the swallowing therapists and nutritionists, and might be applied universally to food regardless

of culture. Therefore, the IDDSI framework could become a worldwide standard for food rheology in dysphagia treatment.

Author contributions

S.W.C., M.J.Y. and S.H.T. performed the survey. S.K.Y. and C.K.H. supervised the project. All authors wrote the manuscript. **Conceptualization:** Woo Chul Son, Hee Tae Shin, Kyoung Hyo Choi.

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