Translation to Polish, cross-cultural adaptation, and validation of the Bristol Stool Form Scale among healthcare professionals and patients

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Abstract

Introduction: The seven-point Bristol Stool Form Scale (BSFS), which refers to seven pictures of different forms of stool, is a commonly used instrument to assess stool consistency.

Aim: To translate, cross-culturally adapt, and validate the BSFS for its use in Poland.

Material and methods: The steps included forward translation, reconciliation, backward translation, comparison of the two English versions and validation of the translation, pilot testing, proofreading, approval of the final version of the target language BSFS, and validation. The latter process involved healthcare professionals (physicians and nurses), healthy adults, and adult patients with gastrointestinal disorders, who were asked to correlate images of seven types of stools with their descriptions. All available subjects were asked to repeat the survey to assess test-retest reliability. The primary outcome measures were validity (accuracy) and reliability (repeatability).

Results: A total of 320 subjects took part in the validation study (80/group). Overall, concordance between descriptions and pictures was 78.7%, and the overall κ index was good (0.75, 95% confidence interval (CI): 0.73 to 0.77). Test-retest assessment was performed in 170 (53.1%) subjects within a mean interval of 5.9 ±2.5 days. Overall, concordance between definitions and pictures for the re-testing phase was 90.7% with a κ index of 0.89 (95% CI: 0.87 to 0.91).

Conclusions: As a result of the translation and cultural adaptation process, a final Polish version of the BSFS was created. The substantial validity and reliability of this Polish version was demonstrated.

Introduction

Good communication between patients and healthcare providers regarding stool appearance and consistency is an important part of both clinical practice and research [1]. To facilitate stool assessment, a number of standardised instruments have been developed [2–4]. The most widely used is the seven-point Bristol Stool Form Scale (BSFS) [5–9]. Currently, the BSFS consists of seven pictures of different stool forms to facilitate recording of stool consistency. Type 1 refers to stool forms as separate hard lumps, like nuts (hard to pass); type 2 – sausage-shaped, but lumpy; type 3 – like a sausage but with cracks on its surface; type 4 – like an Italian sausage or snake, smooth and soft; type 5 – soft blobs with clear cut edges (passed easily), type 6 – fluffy pieces with ragged edges, a mushy stool; and type 7 – watery, no solid pieces; entirely liquid. Types 3, 4, and 5 are considered normal stool forms. The BSFS in its original English version was validated in healthy adults and in subjects with gastrointestinal disease [10, 11]. Over the years, the BSFS has been acknowledged in the medical literature as a valuable, standardised instrument for stool assessment mainly in adults, but also in children [12–17]. So far, the scale has been translated, adapted, and validated in Spanish [18], Portuguese [19], and Romanian [20].

Aim

The aim of our study was to translate to Polish, cross-culturally adapt, and validate the BSFS for its use in Poland.

Material and methods

The translation, cultural adaptation, and validation of this scale were performed according to published

guidelines [21–23]. The steps included forward translation, reconciliation, backward translation, comparison of the two English versions and validation of the translation, pilot testing, proofreading, approval of the final version of the target language BSFS, and validation. Permission to use the BSFS for the translation to Polish, validation, and adaptation was obtained from the copyright holder, Norgine Ltd. The Ethics Committee of the Medical University of Warsaw approved the study (AKBE/22/15).

Translation (steps 1–7)

The initial translation of the BSFS into Polish was undertaken by two translators with excellent knowledge of English (however, not native speakers) and Polish. One of the translators was a physician, while the second did not have a medical background. The two translators, working separately, translated the original BSFS from English to Polish. Then (step 2), the same translators compared their translations and, by discussion, created a synthesis of these two translations. Some descriptions were modified for adaptation to the

Figure 1. Bristol Stool Form Scale adapted to Polish

Polish language and culture. Step 3 included backward translation, which was carried out separately by two different translators without any medical background. Both translators were blinded to the original version of the BSFS. In step 4, the committee, consisting of healthcare professionals and translators, reviewed all the translations and developed a pre-final Polish version of the scale. In step 5, pilot testing was performed, aimed at determining whether the Polish BSFS was appropriate and easily understandable. The adapted version was administered to 30 subjects (10 physicians, 10 nurses, and 10 healthy adults) to detect potential comprehension problems. Step 6 was proofreading of the final version. In the final stage of translation (step 7), the clinicians compared the final Polish version of the scale with all translation process documents and approved the Polish translation of the BSFS.

Validation (step 8)

The validation study aimed to determine the validity and reliability of the Polish translation of the BSFS. The study participants were asked to correlate images of seven types of stools with their descriptions. The study was conducted in two university-affiliated hospitals of the Medical University of Warsaw between March and November 2016. These hospitals included a paediatric hospital (the Department of Paediatrics) and a general hospital (the Department of Gastroenterology and Metabolic Disease). The study population included healthcare professionals (physicians and nurses) recruited from the employees of the paediatric hospital; adults aged 18 years and older with gastrointestinal disorders hospitalised at the general hospital; and healthy adults without a medical background, who were parents of children hospitalised in the paediatric hospital. Exclusion criteria included a participant's inability to understand the study procedure and/or lack of consent to participate. Additionally, all available subjects were asked to repeat the survey not earlier than 3 days and not later than 15 days after the first evaluation to assess test-retest reliability. The primary outcome measures were validity (accuracy) and reliability (repeatability).

Statistical analysis

Based on previous studies [18, 19], a sample size of 73 was calculated to estimate a 95% concordance, with 5% precision and 5% significance. Descriptive statistics were used to describe the baseline characteristics. To test validity, the percentage of concordance between the text definition of stool type and the appropriate picture was assessed. The reliability was evaluated by calculating the Fleiss' κ statistics. The same meth-

ods were also used to examine test–retest reliability. Correlations, based on the value of κ, were categorised as poor ($\kappa \leq 0.2$), fair ($0.21 \leq \kappa \leq 0.40$), moderate ($0.41 \leq \kappa \leq 0.60$), good ($0.61 \leq \kappa \leq 0.80$), or excellent ($0.81 \leq \kappa \leq 1.00$) [24]. Statistics were performed using Vassar Stats: website for statistical computation (www.vassarstats.net).

Results

Figure 1 presents the final translated Polish version of the BSFS (called *Bristolska Skala Uformowania Stolca*) used in the validation study. In the latter study, a total of 320 subjects took part. Among them, there were 160 healthcare providers (80 physicians and 80 nurses), 80 healthy adult subjects, and 80 adult patients with gastrointestinal disorders (Table I).

Table II shows the concordance results (written definitions and pictures) for the validation study in the overall series. Table III shows the concordance between definitions and pictures in relation to the type of stool and the subjects. The highest percentage concordance overall was 98.4% for stool type 4, and the lowest percentage was 62.8% for type 5. The overall κ index was 0.75 (95% CI: 0.73 to 0.77), and a summary of the concordance values for this index in each of the groups is presented in Table III.

A total of 170 subjects (45 physicians, 49 nurses, 40 healthy subjects, and 36 patients) took part in the test-retest assessment within a mean interval of 5.9 days (SD 2.5, range: 3 to 15). In the re-testing phase,

the overall percentage concordance between definitions and pictures was 90.7% with a κ index of 0.89 (95% CI: 0.87 to 0.91).

Discussion

Main findings

The objective of this study was to translate, cross-culturally adapt, and validate the BSFS, originally created in English, for its use in Poland. The steps included forward translation, reconciliation, backward translation, comparison of the two English versions and validation of the translation, pilot testing, proofreading, approval of the final version of the target language BSFS, and validation. Overall, the concordance between descriptions and pictures and the overall κ index were satisfactory. As a result of the translation and cultural adaptation process, a final Polish version of the BSFS, which is an applicable tool for assessing stool consistency, was created.

Limitations

To our knowledge, this is the only translation to Polish, cross-cultural adaptation, and associated validation of the BSFS. A rigorously planned and performed process of translation and validation, according to approved published guidelines, was adopted [22, 23]. However, we acknowledge some limitations. As described by others, the challenge is to adapt an instrument so that it retains the meaning and intent of the original instrument (the source language) and

Table I. Characteristics of the sample participating in the study

Variables	Physicians (*N* = 80)	Nurses (*N* = 80)	Healthy adults (*N* = 80)	Adult patients (*N* = 80)
Male	4 (5%)	2 (2.5%)	13 (16%)	32 (40%)
Female	76 (95%)	78 (97.5%)	67 (84%)	48 (60%)

Table II. Matching results between definitions and pictures in the overall series

Definition	Picture							
	1	2	3	4	5	6	7	Total
1	259	4	0	0	36	18	3	320
2	3	234	81	0	0	2	0	320
3	2	81	233	4	0	0	0	320
4	0	1	4	315	0	0	0	320
5	46	0	1	1	201	71	0	320
6	10	0	1	0	73	220	16	320
7	0	0	0	0	10	9	301	320
Total	320	320	320	320	320	320	320	

Table III. Concordance and κ index values by subject group and stool type

Type of stool	Physicians (N = 80)	Nurses (N = 80)	Healthy adults (N = 80)	Patients (N = 80)	Overall (N = 320)
1	100.0	85.0	82.5	57.5	80.94
2	85.0	77.5	67.5	62.5	73.13
3	85.0	77.5	68.75	60.0	72.81
4	100.0	100.0	100.0	95.0	98.44
5	81.25	73.75	62.5	40.0	62.81
6	82.5	80.0	61.25	51.24	68.75
7	100.0	100.0	97.5	80.0	94.06
Overall	90.4	84.6	76.1	63.8	78.7
κ	0.89 (0.86 to 0.92)	0.82 (0.79 to 0.86)	0.72 (0.68 to 0.76)	0.57 (0.53 to 0.62)	0.75 (0.73 to 0.77)

Data are presented as percentages.

is culturally relevant and comprehensible. Thus, as recommended, the aim was to achieve a 'cultural' rather than a 'literal' translation. The BSFS consists of several short descriptions. However, the translation provided some difficulties. Thus, after translation, all descriptions were analysed and modified to some degree to enable understanding. In cases of disagreement, translations were evaluated again to permit reaching a consensus. All discrepancies were resolved by this method. Only the consensus translation was used.

We also acknowledge some limitations of the validation study. First, there was overrepresentation (84%) of females. With regard to healthcare professionals, this reflects the feminisation of medicine in our country. With regard to healthy adults, this reflects the fact that these were parents of children hospitalised in the paediatric hospital, thus, mostly mothers. Only the population of adults with gastrointestinal disorders was more balanced. The latter group was included because the BSFS was developed and validated for use in adults. Furthermore, the study was carried out in only two academic settings; thus, the study participants might not be representative of the entire population.

In general, our findings are in line with those obtained in a similar study carried out in Spain (Spanish translation) [18]. The concordance values were 78% and 75%, respectively, and the κ index values were 0.77 and 0.7, respectively. Higher values were obtained in a study conducted in Brazil (Portuguese translation), i.e. 89.5% and 0.83, respectively [19].

Conclusions

As a result of the translation and cultural adaptation process, a final Polish version of the BSFS, which is an applicable tool for assessing stool consistency,

was created. Our study shows that the Polish version of the BSFS is suitable for use among Polish patients and healthcare professionals to assess stool consistency.

Conflict of interest

The authors declare no conflict of interest.

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