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Measuring healthcare professionals' perceptions of their ability to adopt shared decision making: Translation and psychometric evaluation of the Danish version of the IcanSDM questionnaire

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Abstract

Background Shared decision making in healthcare is a fundamental right for patients. Healthcare professionals' perception of their own abilities to enable shared decision making is crucial for implementing shared decision making within service. IcanSDM (I can shared decision making) is a brief measure to investigate healthcare professionals' perception of shared decision making approaches to their practices. It was developed in Canada with French and English versions, and recently translated into German. This study aims to adapt the IcanSDM measure for Danish-speaking healthcare professionals, and evaluate its psychometric properties.

Methods Cultural adaptation and translation based on Beaton et al.'s approach was applied. A forward translation by ten people and a backward translation by two people were performed. To assess comprehensibility, cognitive interviews were conducted with 24 healthcare professionals. Eighty healthcare professionals who were trained in shared decision making for either one hour (n = 65) or one day (n = 15) participated in the psychometric evaluation. The evaluation concerned acceptance, item characteristics, skewness, item difficulties, corrected item-total correlations, inter-item correlations, factorial structure, internal consistency, and responsiveness.

Results The forward and backward translation revealed few discrepancies, and participants understood the items well. The psychometric evaluation showed a high completion rate and acceptable item difficulties and discrimination values. Both the factor analysis and the internal consistency showed a 2-factor structure: 1) healthcare professionals' capacity to implement shared decision making; and 2) healthcare professionals' capacity to practise shared decision making. The IcanSDM_Danish obtained a Cronbach's alpha coefficient of 0.74. The evaluation of responsiveness showed improvement, but was not statistically significant.

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Conclusion The IcanSDM_Danish has good cross-cultural validity and internal consistency, and a 2-factor structure. The IcanSDM_Danish is capable of providing reliable and valid measurement when evaluating constructed knowledge about shared decision making, and may be able to support the implementation of shared decision making training and evaluation of its impact.

Keywords Implementation, Measurement, Psychometrics, Shared decision making, Translation

Strengths and limitations of this study

- This study has mainly been carried out in one professional group, but it includes data from more than six different specialisms.
- Approximately one-third of the participants in this study had prior experience with shared decision making, which may have led to a ceiling effect in some items. However, it is important to note that the IcanSDM score is unlikely to start at zero even before the teaching and implementation of shared decision making skills.
- More than 80% of the participants for the psychometric evaluation were recruited at a person-centred care conference with the risk of recruited participants having more experience of shared decision making, but that was not the case.
- A 2-factor structure has been identified of the IcanSDM_Danish, but a confirmatory factor analysis has not been conducted yet.

Introduction

Shared decision making (SDM) is defined as a process whereby patients and healthcare professionals (HCPs) collaborate to make choices about patient health [1]. A shared decision is based on: 1) an exchange of reasoning about treatment options and their consequences based on the best available clinical evidence, 2) a discussion of preferences for different options, and 3) a deliberation to plan care and find the option that best meets the patient's health and social needs [2, 3]. Supporting patients and HCPs to adopt SDM practices is seen as key to the delivery of healthcare services that are safe, evidence-based, and patient-centred [3]. There are different types of interventions to enhance SDM practices. Some target the patients and their significant others, others target the HCPs and service delivery teams, and some aim to impact the service infrastructure [2, 4, 5]. A significant focus for research and service improvement through SDM has been the delivery of training to HCPs to develop their skills, knowledge, and attitudes to provide evidence-based information and systematically elicit patient values [3, 6]. Substantial problems in HCP adoption of SDM have been identified in prior research [3, 7]. Reported barriers to successful implementation of SDM are often associated with HCPs' lack of skills and knowledge, perceived professional roles, and beliefs about capabilities [8].

Motivating HCPs to change practices is seen as a priority in SDM adoption [9], which requires well-planned and targeted training approaches to foster effective and time-efficient SDM [10]. Assessing HCPs' ability to adopt SDM is a meaningful indicator to inform projects to integrate SDM practices across services and evaluate staff training [11]. There are a few measures to assess HCPs' perceptions of their ability to adopt SDM, including the Clinical Decision Making Style – Staff Questionnaire (CDMS-S) for staff in psychiatric contexts [12], IncorpoRATE to assess physicians' willingness to incorporate SDM into practice [13], and the IcanSDM to assess HCPs' self-reporting of their ability to adopt SDM [1, 11]. In Denmark, SDM are not yet integrated systematically within clinical settings [14]. The IcanSDM is a promising measure to evaluate the impact of training HCPs in SDM and the adoption of SDM practices across specialties and healthcare contexts [15]. However, the IcanSDM is not available in Danish.

Methods

The objectives of this study were to: 1) translate and adapt the IcanSDM measure for Danish-speaking HCPs, and 2) evaluate the psychometric properties of this Danish version.

The IcanSDM_Danish was developed in three steps: 1) translation of the original IcanSDM scale, 2) assessment of comprehensibility, and 3) a psychometric evaluation. Reporting followed the international Consensus-based Standards for the Selection of Health Measurement Instruments criteria (COSMIN) [16]. The IcanSDM translation was carried out by a national-level Danish SDM research group led from Aarhus, the Central Denmark Region. The research group members (n = 13) are HCPs and researchers with different clinical backgrounds and a special interest in SDM interventions and health service innovation. The academic level of participants ranged from PhD students to professors. Eleven of the participants have Danish as first language, but in-depth knowledge of English, one participant has English as first language and one is bilingual in English and French.

Measure

The IcanSDM was developed in 2020 by a group of Canadian researchers to support and evaluate the implementation of SDM in clinical practice through an assessment of HCPs' perceptions of their capacity to implement and practise SDM [1]. By assessing HCPs' perceptions, the IcanSDM can support the evaluation of the effects of training and can also aid in customizing training and implementation initiatives to optimize their effectiveness [1]. The IcanSDM begins with a definition of SDM followed by eight questions, all to be answered on a 0–10 scale from "strongly agree" to "strongly disagree" [1]. The IcanSDM was developed and tested in French and English [1]. In 2021, the scale was translated into German [11]. The original version was psychometrically evaluated, and the analysis found a Cronbach's alpha of above 0.63 [1]. The IcanSDM was initially assumed to have a 1-factor structure, but due to a small sample size in the original study, the factorial structure was not evaluated [1]. The 1-factor hypothesis was tested in the German translation study but could not be confirmed [11]. The German study found a Cronbach's alpha of 0.65 [11]. A comparison of SDM in a Canadian and a Danish context has never been done, but based on two papers reporting implementation of SDM in each country a comparison has been made [14, 17]. See Table 1.

Translation

The translation and cultural adaptation of the IcanSDM English version into Danish followed a forward–backward translation procedure [18, 19]. Native-speaking Danish authors (NTA, SB, LEB, HSvE, AWK, KDL, TWV, GSR, PCS & SRS), all with an in-depth knowledge of English and SDM, conducted individual forward translations of the IcanSDM. All translation suggestions were entered into a table and systematically discussed at a group meeting including all members of the research group where a synthesis of the translations and thereby the first version of the IcanSDM_Danish were created. Disagreements between the group members were solved through discussions and the involvement of the original first author of the IcanSDM (AG). Native-speaking English translators performed separate backward translations. One translator had an in-depth understanding of the cultural and linguistic nuances of the English language, and the other had specific knowledge about SDM and healthcare terminology. The research group then assessed the two backward-translated versions. Questions and disagreements were discussed with the original author. The resulting adaptations led to a second version of the IcanSDM_Danish.

Assessment of comprehensibility

The assessment of content validity of the IcanSDM_Danish was guided by the COSMIN criteria, which highlight relevance, comprehensiveness, and comprehensibility as key concepts of content validity [20]. Relevance, comprehensiveness and comprehensibility were assessed based on cognitive interviews using a think-aloud approach [20, 21]. The cognitive interviews were conducted by several members in the research group (NTA, SB, LEB, HSvE, AWK, KDL, TWV, GSR, PCS & SRS), who all recruited participants in their clinical settings. Recruitment was conducted as a convenience sample. The interviews were audio recorded and the results were reported by the individual researchers who conducted the interviews. The cognitive interviews focused on the HCPs' perceptions and understanding of the wording and content of the SDM definition and the eight items. The interview participants were asked to think aloud about their perceptions of the response categories and their answers to the items [22]. For prompting the think out load process the participants were provided with the following prompts:

At the same time as you fill out the questionnaire, we would like you to 'think out loud's:

- I understand the statement as follows, that…
- I am checking this box because…
- I wonder if they mean this, or perhaps they mean this…

Table 1 A comparison of SDM in a Canadian and a Danish context

Area described	Canada	Denmark
Shared decision making included in legislation	✓	×
Patient decision aids available	✓	Some places and for some decisions
Patient decision aids included in clinical guidelines	Some examples	Some examples
Patients' experience of involvement in decision making	54%	66%
National strategy for implementing shared decision making	×	×
National education programmes including shared decision making	×	For some professional groups

They were also encouraged to express any confusion and ask clarifying questions and to provide a few demographic data. The results of the individual cognitive interviews were systematically discussed at a research group meeting, and all responses were combined to one response. The synthesis was further discussed with the original author (AG) before a third version of the IcanSDM_Danish was developed.

Psychometric evaluation

A protocol for psychometric evaluation was developed with a statistician based on the COSMIN framework [16] and the two previous IcanSDM evaluation papers [1, 11]. The protocol is to be found in online supplemental appendix 1.

Data collection for the psychometric evaluation

Data were collected in two different SDM training sessions: the first lasting one hour and the other lasting one day. We aimed for a total of 80 participants to conduct an exploratory factor analysis with the eight items of the IcanSDM [22].

The convenience sample [23] in both SDM training sessions included nurses and physicians from different healthcare settings in Denmark. In addition, other HCPs, such as pharmacists and physiotherapists, participated in the one-hour training. Before and after the training, all participants completed the IcanSDM_Danish version 3 on paper and filled out their demographic data. All HCPs were informed that participation in the study was voluntary and that they could decline to participate by not completing the questionnaires. Participant characteristics recorded included age, gender, profession, specialty, work experience in healthcare, and SDM experience.

One-hour training

The one-hour training session on SDM practices for clinical settings was held in April 2023 during a conference on person-centred care [24]. The training included, firstly, a short oral presentation led by Anne Stiggelbout, Professor in Medical Decision-Making from Leiden University Medical Centre, NL about a four-step SDM model [2] to be used within consultations. Secondly, small-group teaching was conducted, where groups of three participants were provided with three patient cases and instructions on delivering SDM using a role-play simulation training approach, swapping between the roles of HCP, patient, and observer.

One-day training

The one-day SDM training session was held in March 2023, involving nurses and physicians from four different hospitals in Denmark, all from a nephrology setting [25]. The aim of the one-day training session was to increase the HCPs' competencies around SDM in the context of end-of-life care for patients with kidney failure. The one-day training included short lectures, group discussions, and a three-participant role-play based on clinical cases brought by the participants. In the role-play simulation training, the participants alternated between the roles of patient, HCP, and observer. Additionally, the participants were introduced to a newly developed patient decision aid and watched a video of an exemplary SDM conversation. The training was provided by two researchers with clinical, academic, and educational experience in SDM.

Data analysis of the psychometric evaluation

All data were managed using the SAS® system [26] and analysed with support from a statistician and following the priori protocol, which is to be found in online supplemental appendix 1. Demographic characteristics were summarized using descriptive statistics. We calculated the completion rate and missing data frequencies per item, per case, and for the overall measure to assess acceptance of the IcanSDM_Danish. Cases with one item missing were excluded from the analyses including this item [27]. We calculated response distribution for each item and floor and ceiling effects (15%), as well as skewness and kurtosis of response distribution to assess item difficulties (cut-off values between 0.2 and 0.8) [28]. We also calculated item means and standard deviations. All of this was to assess whether the performance of the items in the translated version was equal to the performance of the items in the original version of the IcanSDM [28]. In addition, inter-item correlation (cut-off values between 0.15 and 0.5) and item discrimination (above 0.2) were calculated. To date, no study has presented a model for factor structure [1, 11], which was why an exploratory factor analysis was conducted [28, 29]. First, data were tested for sufficient covariance to conduct a factor analysis using the Kaiser–Meyer–Olkin measure. Then, the Mineigen criterion based on the average eigenvalue was used to reveal the number of factors. Null hypotheses were developed based on the Mineigen criterion and tested for rejection and acceptance. The exploratory common factor analysis was conducted using the varimax rotation method and definition of the factor loadings [28, 30]. We calculated internal consistency (cut-off values between 0.70 and 0.90) and corrected item-total correlation (cut-off values between 0.30 and 0.70) to assess the extent to which items are correlated and measure the same construct but also to investigate item redundancy [28]. Using the pre- and post-training data, the responsiveness of the IcanSDM_Danish was

assessed [28]. A signed rank test for each item score was conducted (*P*-value below 0.05 considered statistically significant).

Results

Forward and backward translation

Through forward and backward translation, the questionnaire's conceptual and linguistic correctness in the target language were ensured. The forward translation, conducted by ten people, showed minor discrepancies, mostly in sentence structure and word choice. The specific words that required more discussion are shown in online supplemental appendix 2. After the first version of the IcanSDM_Danish had been developed, two independent translators conducted a backward translation. The backward translation showed that the IcanSDM_Danish version 1 replicated the content of the original IcanSDM in the instructions, items 1–5, and the response scale. The discrepancies and how these were resolved can be found in online supplemental appendix 2.

Assessment of comprehensibility

The cognitive interviews were completed by 24 participants in total. Table 2 presents the participants' demographic characteristics. Their ages ranged from 28 to 61 years, with 42 being the average age, and nurses were the majority in terms of the professional groupings (42%). The participants' average length of employment was 16 years, with a range of 3–34 years, and 54% of the participants had prior SDM experience.

When asked about their comprehension of the IcanSDM_Danish version 2, participants generally expressed a good understanding of all items and elements included. One participant, however, had trouble comprehending the idea in item 6, and nine individuals had trouble with item 8. Table 3 shows the assessment of comprehensibility, which is to be found in online supplemental appendix 2.

Psychometric evaluation

Participant characteristics

In total, 65 participants who undertook the one-hour training completed the IcanSDM_Danish before the training and 62 afterwards. From the one-day training, 15 participants completed the IcanSDM before the training and 14 afterwards. The demographic characteristics of the participants are shown in Table 3. The mean age was 47, with a range from 28 to 78 years. Most participants were nurses, but the sample encompassed various professions. On average, the participants had 21 years of relevant work experience, with a range from 0 to 47 years. Only 30% had previous experience with SDM. Most of the participants had the one-hour training, and only 19% had the one-day training.

Table 2 Participants' characteristics

Characteristic	Assessment of comprehensibility N (%) (*n* = 24)	Psychometric evaluation N (%) (*n* = 80)[a]
Age[b]	42 [28–61]	47 [28–78]
Sex		
Female	19 (79)	75 (97)
Male	5 (21)	2 (3)
Profession		
Nurse	10 (42)	52 (69)
Health scientist		6 (8)
Physician	8 (33)	5 (7)
Pharmacist		4 (5)
Physiotherapist	5 (21)	4 (5)
Other	1 (4)	4 (5)
Work experience in years[b]	16 (3–34)	21 [0–47]
SDM experience		
Yes	13 (54)	23 (30)
No	11 (46)	53 (76)
Duration of SDM training		
One hour's SDM training	-	65 (81)
One day's SDM training	-	15 (19)

This table reflects two different samples

[a] *n* = 77 for sex, *n* = 75 for profession, *n* = 74 for work experience in years, *n* = 76 for SDM experience

[b] Mean [min–max]

Missing data and acceptance analysis

We collected data from 80 participants pre-training and from 76 post-training. The dataset from the pre-training had three missing values (two for item 5 and one for item 8), resulting in the completion rate per item ranging between 97.50% and 100% (see Table 3). The cases with missing values were excluded from further analysis that would have included the specific item, so the total sample consisted of 77 participants.

Cross-cultural validity – item analysis

On a scale from 0 to 10 (0 = high acceptance of SDM, 10 = low acceptance of SDM), means ranged between 1.89 (item 6) and 6.03 (item 3). All items showed acceptable item difficulty values except item 7, with an item difficulty of 0.97. All items showed an item discrimination higher than 0.2 and ranged from 0.27 (item 3) to 0.61 (item 5). Skewness ranged between -0.35 (item 3) and 1.98 (item 7) and showed acceptable values. Kurtosis ranged between -0.97 (item 3) and 5.09 (item 7) and showed acceptable values. Items 1 and 2 showed a normal

Table 3 Missing values, means, standard deviation, skewness, kurtosis, item difficulty, item discrimination, α if deleted

Item	Completion rate in %	Mean (SD)	Item difficulty	Item discrimination	Skewness	Kurtosis	α if deleted
1. Shared decision making results in longer clinical encounters	100	5.04 (2.47)	0.49	0.40	0.01	-0.89	0.72
2. Patients often prefer that the clinician make the decision	100	4.11 (1.79)	0.43	0.39	0.07	-0.89	0.72
3. Shared decision making does not apply to all patients, nor does it apply to all clinical situations	100	6.03 (2.78)	0.46	0.27	-0.35	-0.97	0.74
4. Communicating scientific data to patients is too complex	100	2.68 (1.90)	0.71	0.50	1.15	2.26	0.70
5. Shared decision making takes up too many resources	97.50	2.60 (1.91)	0.73	0.61	1.28	2.09	0.67
6. Shared decision making is inconsistent with clinical practice guidelines	100	1.89 (1.51)	0.79	0.42	1.19	1.78	0.71
7. Shared decision making is just a passing trend	100	1.91 (1.86)	0.97	0.40	1.98	5.09	0.72
8. During shared decision making, the patient becomes aware of the uncertainty associated with interventions and might become confused	98.75	3.60 (2.25)	0.62	0.47	0.61	-0.41	0.70

Item difficulty reflects the average score relative to the total possible score. Item discrimination reflects the correlation between the item score and the total test score excluding the item in question.'Alpha if deleted for each item' reflects a recalculation of the Cronbach's alpha after excluding this item

response distribution, while item 3 showed a uniform distribution and had a potential for both floor and ceiling effects. Items 4–8 all showed a trend towards ceiling effects. The response distributions for each item are presented in online supplemental appendix 3. The inter-item correlation matrix is shown in Table 3. No items showed an inter-item correlation above 0.5, indicating that none of the items were redundant. Several of the items showed an inter-item correlation below 0.15, indicating that the items did not measure the same construct or that the measurement consists of more factors.

Structural validity – exploratory factor analysis

Kaiser's Measure of Sampling Adequacy, at 0.76, showed the sampling of 77 participants was middlingly adequate. Items 1 and 7 showed lower specific Kaiser's Measure of Sampling Adequacy scores of 0.70 and 0.69 respectively. Two factors explained 51% of the variability, and the Mineigen criterion using the average eigenvalue, also revealed two factors. The test of significance showed a P-value < 0.0001 for the null hypothesis of no common factors and a P-value of 0.926 for the null hypothesis of two factors, which is sufficient to conclude that, based on our sample size, we could not reject this hypothesis. The factor analysis for two factors using the varimax rotation method is shown in Fig. 1. Factor 1 seemed to be defined mostly by items 1, 2, 4, 5, and 8. Factor 2 seemed to be defined mostly by items 3, 5, 6, 7, and 8. The factor loading ranged between 0.35 (item 3) and 0.84 (item 7). This same pattern is nearly reflected in the inter-item correlation matrix presented in Table 4.

Reliability – internal consistency

Due to variation in the standard deviation, we used the standardized Cronbach's alpha coefficient, which was 0.74, indicating good internal consistency. The correlation with the total score showed that no item deletion would improve the internal consistency of a single score, as shown in Table 4. The Cronbach alpha coefficient for factor 1 was 0.71 and for factor 2 was 0.67 and again the correlation with the total score for each factor showed that deleting an item would not improve the internal consistency of a single score. 'Alpha if deleted' ranged from 0.63–0.69 for factor 1 and 0.58–0.68 for factor 2.

Responsiveness

The responsiveness of the IcanSDM_Danish is shown in Table 4. After the one-hour training session, items 2 and 3 improved, but only item 3 showed a significant difference. Item 1, 4, 5 and 6 decreased, but none was statically significant. After the one-day training session, items 1, 2, 4, 6, and 8 improved, but none showed an improvement of statistical significance. Item 5 for the one-day training showed a statistically significant deterioration (Table 5).

Discussion

The IcanSDM is a brief measure to investigate HCPs' perceptions of SDM approaches to their practice. It was developed and evaluated in Canada with French and English versions [1], and recently translated into German [11]. The aim of this study was to translate and adapt the IcanSDM for Danish-speaking HCPs and evaluate its psychometric properties. Our findings indicated that the

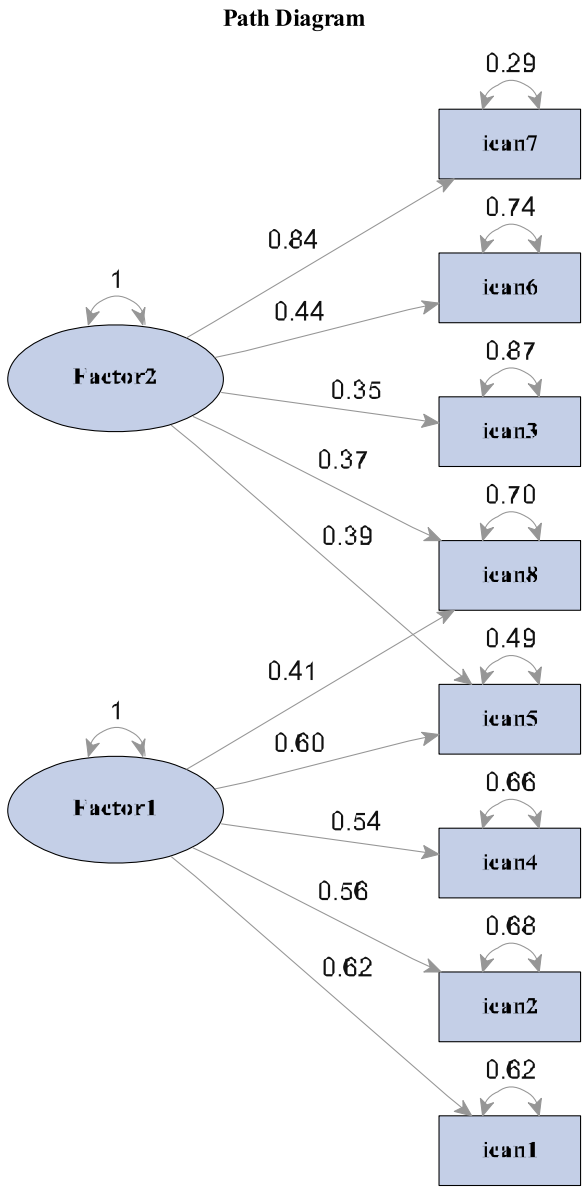

Fig. 1 Factor analysis for two factors using varimax rotation methodft. Latent factors are presented in ovals; measured items are presented in boxes. Simple arrows represent the associations between factors and items, where factor loadings are greater than 0.3, while double arrows represent variances. For identifiability purposes, variances of latent factors are set to 1

tool provides reliable and valid measurements when evaluating constructed knowledge about SDM and capacity to support the implementation and practice of SDM.

Forward and backward translation and the assessment of comprehensibility

We reached a consensus on the translation of the survey instructions, the definition of SDM, and the response scale. Consistent with the findings from the study of the translated German version, items 1–7 were well understood by the participants in the cognitive interviews, while item 8 needed further discussion [11]. In the German version, item 8 had to be reworded, and the content validity of the item remained unclear. This contrasts with the findings of our study where consensus on the translation and adaptation of item 8 was reached through a change in the sentence structure. Another contrast with the present study is that the German study found some participants, especially nurses, lacked both understanding and experience of the concept of SDM [11]. This may reflect the fact that we included the definition of SDM in the Danish version, but it might also reflect cultural differences in implementing SDM in Germany and Denmark respectively [31].

Responsiveness

The greatest and most significant responsiveness to SDM training was found after the one-day training for item 5, which concerned SDM taking up too many resources. The responses indicate the training led to increased concerns that SDM may be too burdensome to integrate within daily clinical practice. Most likely, the participants became aware of what SDM entails and that performing SDM requires changes in their daily practice not previously. These findings highlight the importance of strong leadership in the implementation of SDM in allocating resources for this change [32] but also that SDM training needs to help HCPs assimilate SDM pragmatically into their clinical practice [33]. Two-thirds of the participants in our study were new to SDM. Other researchers have found that novices to SDM approaches have longer encounters at the beginning of their SDM practice, but that this greater demand on their time may decrease later [34–36].

Psychometric evaluation

Our Cronbach's alpha test revealed good internal consistency, with no items being redundant. This finding is important to keep in mind when interpreting the 2-factor analysis: even though two factors were identified, the overall construct measures the same. This contrasts with the findings of the Canadian and German versions of the IcanSDM [1, 11], where the internal consistencies were low. This may indicate that the items may measure the same underlying construct in the IcanSDM_Danish [1, 11].

Factor analysis

As in the German study [11] and assumed in the original study [1], we could not confirm a 1-factor hypothesis. Our study found a 2-factor structure. Cronbach's alpha indicates that no items should be removed, and

Table 4 Inter-item correlation matrix for the IcanSDM_Danish ($n=77$)

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8
Item 1	1.000	.144	-.062	.212	.267	-.158	-.081	.209
Item 2	.144	1.000	.014	.159	.173	.100	-.127	.115
Item 3	-.062	.014	1.000	.096	.075	-.035	.232	.024
Item 4	.212	.159	.096	1.000	.171	.215	.004	-.019
Item 5	.267	.173	.075	.171	1.000	.105	.218	.122
Item 6	-.158	.100	-.035	.215	.105	1.000	.250	.153
Item 7	-.081	-.127	.232	.004	.218	.250	1.000	.200
Item 8	.209	.115	.024	-.019	.122	.153	.200	1.000

Table 5 Responsiveness of the IcanSDM_Danish

	One-hour training ($n=63$)		One-day training ($n=14$)	
	Median	Signed rank test	Median	Signed rank test
Item 1	0.07	.1247	-0.63	.2808
Item 2	-0.07	.9802	-0.40	.3179
Item 3	-0.15	.040	0.44	.6965
Item 4	0.07	.0070	-0.00	.5316
Item 5	0.22	.0127	1.62	.0039
Item 6	0.07	.0247	-0.15	.2477
Item 7	0.00	.2940	0.29	.1577
Item 8	0.00	.6899	-0.22	.8523

the inter-item correlation matrix confirms that no items should be deleted, nor should they be reconsidered. The two factors form an overall construct [28] measuring HCPs' perception of their ability to adopt SDM either practising or implementing. Practicing is about the interpersonal aspect, while implementing is about the structural and organisational aspect. Both are crucial for effective shared decision-making in healthcare. Looking into the content of the items in factors 1 and 2, items 1, 2, and 4 (factor 1) cover the HCPs' perceptions regarding their capacity to practise SDM and point to potential difficulties that they might experience when attempting to adopt SDM in clinical practice. Items 3, 6, and 7 (factor 2) relate to the HCPs' perception of their capacity to implement SDM and uncover scepticism about the relevance and applicability of SDM. Items 5 and 8 are represented in both factors and thus cover the HCPs' perceptions of their capacity to practise and implement SDM. Although item 5 has a stronger loading (more than 0.20) for factor 1. The cross loading for item 8 could be due to the complexity of the underlying construct. Cross-loadings is an expected part of an explorative factor analysis and hopefully a future confirmatory factor analysis will sort this out. Our inter-item correlation confirms that although two factors are identified, the questionnaire is still measuring a unified construct.

Our study used an exploratory factor analysis to examine the factor structure. It will be necessary to conduct a future confirmatory factor analysis to test whether the IcanSDM_Danish addresses the following two factors: 1) HCPs' perception of their capacity to practise SDM; and 2) HCPs' perceptions of their capacity to implement SDM. Or may be users might want to evaluate one or the other, or both factors, depending of their goal. The overall aim of the IcanSDM is to support the implementation of SDM in clinical practice by assessing HCPs' perceptions of their ability to adopt SDM. At the one-day training, the participants were all HCPs working in clinical practice, and their responses may cover SDM practice. The responsiveness findings of improvement in items 1, 2, 4, 6, and 8 after the one-day training may illustrate that four out of five items that showed improvement although not statistic significant were placed in factor 1, reflecting the fact that the participants were HCPs in clinical practice and their concerns were about their capacity to practise SDM. At the one-hour training, however, the participants represented a more diverse HCP population including HCPs from clinical practice, non-clinical practice, and different organizational levels. In this setting, the responsiveness findings of improvement were for items 2 and 3, with one item placed in each factor. This may reflect the differentiated backgrounds of the participants and their focus on the implementation of SDM as well as clinical practice incorporating SDM.

Cross-cultural validity and differences in implementing strategies in Denmark and Germany respectively

An observed ceiling effect indicated that item 6: "Shared decision making is inconsistent with clinical practice guidelines" and item 7: "Shared decision making is just a passing trend" are not perceived as barriers for SDM in the Danish healthcare system – a finding similar to the

findings in the German translation of the IcanSDM [11]. For item 7, this is also reflected in the high item discrimination, which indicates that it is easy for Danish HCPs to reply "strongly disagree" to item 7. Both in our translation process and in the German translation process, item 8 was a challenge [11]. The German authors concluded that the content validity of this item remained unclear and noted that this might be because some participants, especially nurses, were less familiar with the concept of SDM. This is notable because there has been a considerable amount of investment in SDM by the German government for many years, but despite strong national leadership, activities have not yet been well coordinated [14]. On the contrary, for item 7, we found high item difficulty, indicating that the Danish HCPs recognize SDM as a lasting trend. This may reflect the numerous and varied initiatives in the Danish national implementation strategy [31]. Among these are government funding, strong patient leadership, the establishment of implementation and research centres, and, not least, an upcoming implementation of SDM teaching in the curriculum in medical education and bachelor's degrees in nursing. Although SDM is making good progress in Denmark, there are also challenges to real-world implementation from the lack of legislation and the absence of a concise definition of the concept of SDM [31].

Practice implications

The IcanSDM_Danish is the first tool in Danish to measure HCPs' ability to adopt SDM. It takes HCPs less than five minutes to answer, which is why it is useful as a repeated measure before and after a training session to measure change in HCPs' perception of their ability to adopt SDM. If integrated within organizational structures, the IcanSDM may be a useful indicator to measure the longitudinal impact of SDM training or implementation projects such as the SHARE TO CARE programme [35] and the SDM:HOSP model [37]. Although our study has shown improvement on several items in the test for responsiveness after a one-day training, we were not able to determine responsiveness, due to too few participants. To ensure IcanSDM_Danish ability to support implementation, responsiveness has to be determined in a future study.

Limitations

One limitation of studies evaluating the IcanSDM is they tend to be carried out within one professional group. Like the German study [11], our sample was completed primarily by hospital-based nurses, whereas the original Canadian study was carried out with primary care physicians [1]. Although, the IcanSDM was developed for use by HCPs regardless of their specific profession [1], it may be that differences in psychometric testing may reflect differences in HCP types, clinical specialism or healthcare context. Approximately one-third of the participants in our study had prior experience with SDM, which may have led to a ceiling effect in some items. In Denmark, SDM is desired both at the organizational level and by patients and HCPs [14]. SDM is not a new concept in Danish healthcare, as is also the case in other countries [31]; however, it is important to note that the IcanSDM measure is unlikely to start at zero even before the teaching and implementation of SDM. Seen in this context, a trend of a ceiling effect may be considered to be positive, as it confirms a difference before and after training in SDM. Another limitation might be that some participants were recruited at a person-centred care conference. It could be expected that these participants had a greater interest in SDM compared to a population in which SDM training would normally be offered. However, the same percentage of participants recruited from a hospital environment had experience of SDM, compared to the sample recruited from the person-centred care conference. We therefore assume that our study population represent the population of Danish HCPs except that we have a lack of doctors in our sample.

Conclusion

The IcanSDM was successfully translated into Danish with minor adaptations to address linguistic and cultural understanding. The current study suggests that the IcanSDM_Danish is a reliable cross-culturally valid measure with good internal consistency and a 2-factor structure. Based on these findings, the IcanSDM_Danish represents a meaningful measure for identifying SDM barriers, monitoring the effect of SDM training, and may be able to support SDM implementation in clinical practice.

Abbreviations

SDM	Shared decision making
IcanSDM	I can shared decision making
HCP	Healthcare professionals

Supplementary Information

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Supplementary Material 1.

Supplementary Material 2.

Supplementary Material 3.

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Authors' contributions
This work has been conducted collaboratively among the whole group of authors. All authors have made substantial contributions to the conception and design of this work, including the acquisition, analysis, and interpretation of the data. All have drafted the work or substantively revised it and have read and approved the submitted version as well as the final manuscript.

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Data availability
No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate
The participants, all of whom were HCPs were informed that participation in the study was voluntary and that they could decline to participate by not completing the questionnaires. Due to Danish law, this type of study, do not need any ethical approval (https://www.retsinformation.dk/eli/lta/2023/1776). The study was conducted in accordance with the Helsinki Declaration and approved by the Danish Data Protection Agency (reference number: 1–16-02–284-23). Informed consent was obtained from all participants.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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