Linguistic Translation and Cross-Cultural Adaptation of the Questionnaire

Diabetes Treatment Satisfaction Questionnaire – In Patients (DTSQ-IP) from the Original English into a Danish context

Introduction: DTSQ-IP is a questionnaire designed to measure treatment satisfaction during hospitalization of patients with diabetes mellitus. The aim of this study was to translate, and culturally adapt the questionnaire into a Danish care context, to provide a validated tool for improvement of diabetes nursing research.

Method: The process included translation and adaption based on validated guidelines in a six-phase procedure; forward translation, reconciliation, back translation, psychologist review, cognitive debriefing and final approval.

Results: To achieve a Danish version of DTSQ-IP with a good functionality, and high reliability, adjustments had to be made concerning language, cultural matters and content within the areas: language, cultural adaption and after-cognitive review with patients.

Conclusion: The study provides a validated instrument to measure satisfaction during hospitalization of Danish patients with diabetes. Cultural adaptation had to be made to maintain a correct content. Confirmation is needed regarding psychometric properties in future studies.

Keywords: diabetes, cognitive interviews, cultural adaptation, translation procedure, questionnaire

Background

Approximately 260 000 people in Denmark are diagnosed with diabetes mellitus (DM) and the prevalence is increasing. The number of people with DM has more than doubled since 2000 and by 2030 nearly 500 000 people will be diagnosed (1).
A review on nursing studies in diabetes in the Nordic countries indicates a need for increased attention, to endorse higher quality in the care of patients with diabetes during hospitalization. Testing and evaluation of nursing interventions is essential for the advancement of clinical diabetes nursing (2).

Patients with DM are hospitalized more frequently than patients without DM, and undergo longer periods of hospitalization, on average, regardless of the cause of admission (3–6). It is estimated that approximately 10% of all inpatients have DM, and studies show a relationship between the quality of diabetes treatment, e.g. education and training of nurses, and clinical outcome. Patients with DM are often less satisfied with their treatment, compared to other patients (4,5,7). Although it is well known that factors such as loss of treatment control (e.g. nurse-administered insulin injections), insufficient blood glucose control, poor quality of nutrition during hospitalization, and lack of diabetes competencies among health professionals are decisive factors in DM treatment (7), their impact on patient satisfaction remains largely unknown.

Validated measurement tools

Patients’ own assessment of the treatment can be measured analyzing patient-reported data, known as patient-reported outcome measurement (PROM). PROMs can enable a patient to evaluate effects of a specific treatment from the patient’s own perspective. PROM data can be valuable in clinical decision-making, making scientific evidence (of the validity) of this type of data crucial (8). The use of PROM is increasing in clinical settings. Patients’ reports are essential and integral components to providing person-centered care. The use of PROM may improve communication between patients and nurses resulting in more individualized care and greater satisfaction of patients (9).

A literature search consisting of both a free text search and block search in PubMed and Cinahl found no Danish studies with PROM data regarding patient satisfaction with diabetes treatments during hospitalization. The literature search found no Danish validation measuring tools for examining patient satisfaction, specifically for hospitalized patients with DM.

Diabetes Treatment Satisfaction Questionnaire (DTSQ)

The original «Diabetes Treatment Satisfaction Questionnaire (DTSQ)» was developed in the early 1980s by Professor Clare Bradley of Health Psychology Research Unit (HPR), University of London and aimed to evaluate outpatients’ satisfaction with their diabetes treatment (10,11), whereas no questionnaire existed for an inpatient setting. The DTSQ was further developed in 1999 and is widely used in clinical trials. The DTSQ is available in more than 100 languages including a Danish version validated in 2000 (12–14). It is recommended by the World Health Organization (WHO) and the International Diabetes Federation (IDF), and is a recognized tool to clinically assess patient satisfaction with their diabetes treatment (15). The latest version of the DTSQ consists of a six-item scale.
assessing treatment satisfaction, with two additional items assessing frequency of hyperglycemia and hypoglycemia (7). However, treatment experience is different between in-patients and outpatients regarding intercurrent illness, loss of control over diet and medication, and the dependence on the nurse’s knowledge and training in diabetes care. No previous attempts have been made to psychometrically validate views of in-patients with diabetes. Quantifying the causes of in-patient dissatisfaction with diabetes treatment is necessary to improve in-patient diabetes care. Therefore the «Diabetes Treatment Satisfaction Questionnaire – In Patient (DTSQ-IP)» was developed for an inpatient setting in 2004 (7). The DTSQ-IP has high reliability (Cronbach’s α=0.92), and a high sensitivity in detecting differences in satisfaction with diabetes treatment during hospitalization (7). The DTSQ-IP is developed in English, and translated and validated into several other languages, but not Danish until now (16).

The DTSQ-IP consists of 21 questions regarding patient satisfaction with diabetes treatment during hospitalization. It can be used by patients with either Type 1 or Type 2 DM. The questions relate to treatment satisfaction (satisfaction with current treatment, flexibility in treatment, understanding of treatment, satisfaction to continue treatment, experience of hypo- or hyperglycemia, satisfaction with the supply of meals, satisfaction with treatment monitoring, satisfaction with healthcare professionals’ knowledge of diabetes treatment and possible supervision of diabetes nurses (7).

Responses to DTSQ-IP items are given on 7-point Likert scales (17). Fourteen questions have response options ranging from «very satisfied» to «very dissatisfied», three questions from «most of the time» to «none of the time», one question from «very convenient» to «very inconvenient», one question from «very flexible» to «very inflexible», one question from «yes, definitely» to «no, definitely not».

**Linguistic validation of a questionnaire**

According to Beaton and colleagues, cultural differences that may occur within a given country in which the questionnaire is translated, must be considered in the validation process (18). It is thus important to work with both the translation process, and the cultural adaptation process, to obtain equivalence between the original version and the translated version. Sole focus on the linguistic translation is not sufficient, as cultural adaptation is equally important for maintaining content validity in the questionnaire (19).

Cross-cultural adaptation occurs when the questions in the new version sufficiently reflect the questions in the original version (20). Cross-cultural validation consists of a cross-cultural translation and a cultural adaptation, in which the questionnaire’s psychometric properties are explored in the new country and its culture (8). Furthermore, it is important that the questionnaire appears logical and easy to answer, considering the respondents’ cognitive status, and ability to respond to the questionnaire. This will reduce errors, and improve the respondents’ ability to answer the questions (21,22). Ques-
tionnaire surveys and PROM data such as DTSQ-IP are dependent on respondent participation, and factors such as trust, competence and independence have been shown to be important factors in achieving this goal (23).

Aim

The aim of this study was to translate the questionnaire DTSQ-IP from the original English language into a Danish context using a formal and validated method for questionnaire translation, which includes consideration for cultural differences between diabetes patients and hospital environments in the UK and Danish health care systems.

Methods

In this study, the DTSQ-IP was linguistic validated and cross-culturally adapted to a Danish context.

Permission to translate and validate the DTSQ-IP was obtained from the original author Clare Bradley. The linguistic validation followed the guidelines of The Mapi Research Institute, which has developed a methodology intended to produce appropriate language versions since 1995. The Mapi Research Institute has validated more than 300 questionnaires and in 100 different languages (24). The duration of the validation was 10 months from April 2016 to February 2017. The validation was carried out in cooperation with Health Psychology Research (HPR), Royal Holloway, University of London, Egham, Surrey, TW20 0EX, UK.

Ethical considerations

This study was not reported to the Danish Ethics Committee, in line with national guidelines (25).

Translation

The validation process included six phases; review of concept guidelines, forward translation, reconciliation, back translation, review by a psychologist with experience of working with people with diabetes, cognitive debriefing with patients and final approval. Each phase was reviewed and discussed with HPR before commencing to the next phase. The six phases were based on validated guidelines for translation and adaptation of questionnaires dealing with PROM data (24). In this study, however, some deviations from these guidelines occur. The Mapi Research Institute describes seven steps in the standard linguistic validation process. Step 1, called conceptual definition, has as the goal to clarify the concepts by investigating each item of the original instrument to ensure they are reflected appropriately in the target languages (24). In this project we already had two clinicians in the forward translation team, so this stage did not need to take place separately. Figure 1 is inspired by Beaton et al. (18) and outlines the cross-cultural adaptation process being recommended stepwise.
Preparation
Initially, HPR was contacted, with request for collaboration and licensing. Thereafter, the intercultural translation team was established, and composed as illustrated in Figure 2.

<table>
<thead>
<tr>
<th>Team member</th>
<th>Sex/education level</th>
<th>First language</th>
<th>Profession</th>
<th>Qualifications/skills</th>
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<tr>
<td>Forward translator 1 (FT1)</td>
<td>Male Ph.d.</td>
<td>Danish</td>
<td>Clinician, vascular surgery, lecturer</td>
<td>Excellent English</td>
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<tr>
<td>Forward translator 2 (FT2)</td>
<td>Female Ph.d.</td>
<td>Danish</td>
<td>Clinician, diabetologist, lecturer</td>
<td>Excellent English</td>
</tr>
<tr>
<td>Coordinator</td>
<td>Female MscN</td>
<td>Danish</td>
<td>Assistant professor, School of Nursing</td>
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<tr>
<td>Backward translator 1 (BT1)</td>
<td>Female Ph.d.</td>
<td>English</td>
<td>Clinician, assisting professor in academic writing</td>
<td>Excellent Danish</td>
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<tr>
<td>Backward translator 2 (BT2)</td>
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<td>Translation company <a href="http://www.commsm.iulanual.com">www.commsm.iulanual.com</a></td>
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<tr>
<td>Psychologist</td>
<td>Female Cand. Psyk.</td>
<td>Danish</td>
<td>Clinical psychologist, diabetic ambulatory</td>
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Step 1: Forward Translation

The aim in this first step is to obtain a consensus target language version. The adaptation and cross-cultural validation of DTSQ-IP was translation from the original UK English language, using two bilingual translators, with Danish as their native language. According to Mapi guidelines two qualified translators, native speakers of the target language, proficient in English, living in the target country were chosen (ad). First Forward Translator (FT1) had a health background, but no specific diabetes-related knowledge. Second Forward Translator (FT2) was a clinician specializing in diabetology. Both FT1 and FT2 made an independent translation of the questionnaire. FT1 and FT2 made a written report of challenging phrases and uncertainties about specific words, including a description of how they were resolved (ad).

Step 2: Reconciliation

First author collected the two versions and marked phrases, with differences in language used in translation. The differences were presented to the translators, with the purpose of reaching consensus on a term to be used, emphasizing the importance of term agreement rather than compromise. The linguistic validation manager at HPR contributed to the discussions and approved the final reconciled FT (FT-Rec).

Step 3: Backward Translation

The aim in this phase was to obtain a translation into English of the target language version, to assess and control its quality. Therefore, based on the Danish reconciled FT (FT-Rec) following translation, the questionnaire was translated back to UK English by two individual bilingual translators, Back Translator 1 (BT1) and Back Translator 2 (BT2), with UK English as their native language, who had not seen the original version of DTSQ-IP. First author (SH) compared the Backward translations, the original English DTSQ-IP, and the reconciled FT (FT-Rec) For each item the backward translation was studied and determined whether it appropriately reflected the FT-Rec. Discrepancies between the backward translation and the original DTSQ-IP were examined (ad). This was done to ensure that the FT-REC reflected the same concepts as the original questionnaire. Translators BT1 and BT2 drew up a written report for the coordinator noting where discrepancies occurred in the back-translations, with the purpose of securing agreement concerning the concepts, in a similar fashion as described for Step 1.

Step 4: Psychological review

As part of the HPR Linguistic Validation process, a psychologist’s review was conducted in which the original DTSQ-IP, FT1, FT2, FT-Rec, BT1, BT2 and the written correspondence reports were sent to a psychologist for review. Based on psychometric parameters the psychologist was asked to evaluate whether the questionnaire was understandable and equivalent to the original DTSQ-IP and reports. In the case of remarks, the psychologist came up with alternative translation suggestions, which could be tested in the cognitive
review with a group of patients, if accepted by team members and HPR. Some suggested re-translations were rejected after discussion with HPR, and others were tested on patients in the next phase, as described below.

Step 5: Cognitive debriefing
To assess the clarity, appropriateness and cultural relevance of the target language version to the target population. The interim version of the DTSQ-IP was tested on a small group of hospitalized patients with DM for their understanding of the questionnaire. This version was tested on a total of 5 patients, and then re-tested on 3 additional patients following revisions suggested by patients to facilitate understanding. These patients were randomly selected if they met the following criteria: diagnosed with DM, age 18 years or over, reads and understands Danish, and a planned discharge within 24 hours. The cognitive debriefing was an individual in-depth, face-to-face structured interview for about 1.5 hour and the respondents representing a balanced mix in terms of age, sex, level of education to match the target population (24).

The cognitive debriefing involved each patient completing the questionnaire, and then being interviewed by the principal investigator (PI) about how they understood each question. Thus, it was both the meaning of the question itself and the response options and the chosen answer that was explored comprehensively. In this process also, alternative wording considered earlier in the linguistic validation process was tested. This procedure helped ensure content validity.

Patients were enrolled in the study during their admission at the Department of Endocrinology, Odense University Hospital, Region South, Denmark. The PI was informed by the nursing staff about patients, and their discharge plan, and they were contacted for oral and written information about the study. Information about anonymity was given and no patient data were stored. The patients were informed about their rights to withdraw from the study without further notice and time was provided for reflection before final acceptance.

Figure 3 illustrates patient characteristics of respondents participating in cognitive debriefing interviews.
Step 6: Finalization
In this final phase, all reports, including comments from the cognitive debriefing, were submitted for discussion with HPR. After discussion, the coordinator prepared a final version for proof reading to ensure that no typing, spelling or grammatical mistakes remained in the new target version (20).

Results
The results in the following sections show changes made to the original English version, with respect to both linguistic and cultural adjustments, necessary to enhance adaptation of the DTSQ-IP to a Danish hospital setting. In other words, adjustments had been made to accommodate issues of understanding, which occurred in the cognitive debriefing of patients. Additionally, the patients’ overall feedback on the questionnaire is presented.

Linguistic changes
Throughout the translation process, linguistic adjustments proved necessary. However, internationalization of both Danish language and Danish National Health Service were detected. E.g. in the translation of the concept «hospital», the first translators (FT1 & FT2) initially translated this concept as «hospital» and «Sygehus» (Danish word for hospital) respectively. The English word «hospital» is gradually gaining ground in the Danish lan-
Guage, especially in Zealand and Funen, where it is the predominantly used term. This trend is gradually spreading throughout the country, for example «Skejby Sygehus» the largest University Hospital in Jutland has become «University Hospital». In addition, no respondents in the cognitive debriefing had understanding difficulties related to «hospital», and as a result the term was kept unchanged.

Question 14: «How satisfied are you with the timing of meals in hospital?» had to be adjusted repeatedly during the process. In the initial translation from English to Danish, FT1 maintained the word «timing», while FT2 rephrased the question to «How satisfied are you with the eating hours at the hospital». «Timing» is the linguistically correct translation, and the word is recognized and used in the Danish language (Danish Dictionary, ordnet.dk 2019), especially by the younger generations. However, there was no consensus in the team, as to whether there was a misinterpretation risk for the older generation of patients regarding this question. FT1 and FT2 reached agreement to change the question to: «How satisfied are you with the eating hours in the hospital?».

Translating back, however, both BT1 and BT2 translated the question to: «How satisfied are you with the mealtimes in hospital?». During the psychological review, the team again discussed whether the Danish translation captured the original meaning of the question adequately, and in consultation with HPR, it was decided to test both «How satisfied are you with the mealtimes at the hospital?» and «How satisfied are you with timing of meals at the hospital?». All respondents preferred the term «mealtimes» («spisetiderne» in Danish):

- Mealtimes is better, timing of meals is too difficult to understand (Patient R1).
- No, I prefer mealtimes. Many people do not know the word timing, the other is easier to understand (Patient R2).
- Timing is not a good word, many older people will not understand it (Patient R3).

In addition, «mealtimes» captures the original meaning of the term as respondents unequivocally describe the meaning, in the same framework of understanding as the original word «timing»:

- That means how the coordination of meals is organized so it fits for example to my blood glucose measurement (Patient R1).
- How satisfied I am with the times the food is served (Patient 2).
- It’s easy. It is my satisfaction with dining times. Is breakfast served too early, etc.? (Patient R3).
- E.g. if your eating time is like at home (Patient R5).

Question 18: «How satisfied are you with the speed with which the hospital staff respond to your needs?». It seemed to be challenging to
achieve consensus concerning translation of the term «respond». The term can be translated directly to «respondere» in Danish, but this is rarely used in the spoken Danish language (Danish Dictionary, ordnet.dk 2019). The forward translators, FT1 and FT2, respectively used «react» (reagere in Danish) and «acceded» (imødekom in Danish). According to the Danish dictionary, «react» means acting, moving or undergoing a change due to physical or mental influence. To respond can be both positive and negative and match the Danish word «respondere». «Acceded» means fulfilling, satisfying, being willing to meet someone’s requirements and thereby explicitly acting on the need the patients’ needs, whereas «responding» is more neutral and can be a positive or negative response.

The process continued with «react» knowing that the term did not completely cover the original question. In the Back Translation, BT1 and BT2, respectively, used «act» and «react», which does not have the same meaning. Following a renewed discussion in the team, with both FT1 and FT2, the psychologist and HPR, a consensus was reached on the word «act» («handle» in Danish) as this is derived from the English verb «act», meaning handling, deciding to do something. The final question was thus: «Hvor tilfreds er du med den hastighed, hvormed hospitalspersonale handler på dine behov?» («How satisfied are you with the speed at which hospital staff are responding/acting to/on your needs?»). In the cognitive debriefing, there was consensus regarding the understanding of this question:

This means feedback, so action is taken on my needs (Patient R1).

If I call for staff, the time it takes before they respond (Patient R2).

The time it takes before the doctor or nurse responds to my needs (Patient R3).

All respondents but one was satisfied with «acting» and questioned if they thought «respond» was more correct, they all disagreed. However, a patient mentions: «I do not like the word acting, it’s better to say react» (Patient R3).

Cross-Cultural Adaptions

The front page of the questionnaire DTSQ-IP presents in short terms the purpose of the questions. It summarizes that diabetes treatment includes: «medication, blood sugar monitoring and any eating requirements». «Eating requirements» was translated by both FT1 and FT2 as «food regards» («kost henvis» in Danish), but by BT1 and BT2 as «diet considerations», which allowed the team to reflect on whether the term diet or food should be used. In a Danish context diet means a very tight diet for example to lose weight. Therefore, the wording food regards remained, however, during the psychological review it was suggested to use «possible food considerations». This was tested under the cognitive debriefing, but found no agreement between respondents.

Two respondents (patients with insulin treated DM type 1) did not weight the food re-
gards highly, and did not think it was important during hospitalization. However, one respondent was just diagnosed with DM during this admission to hospital and therefore may have had limited knowledge or understanding of the role of food in diabetes management. This respondent wanted to switch to “possible foods regards”, and the other respondent did not want the term food regards at all in the DTSQ-IP:

Medicine means insulin. And blood glucose testing tests your blood sugar. When hospitalized, the consideration of food is not a priority (Patient R1).

Among the tablet-treated DM patients, there was greater agreement that food is an important part of treatment when one was hospitalized and has diabetes. However, there was also a recognition that dietary restrictions were difficult to follow during hospitalization:

No, I prefer number 1 (food regards), because your eating is an important factor in living with diabetes (Patient R2).

Possible eating considerations, because when you are very ill you cannot always follow the recommendations (Patient R4).

Despite the different targeted feedback, the team decided to use “food regards” as this was closest to a Danish context and at the same time closest to the original English version.

Question 20: «Have you seen a diabetes specialist nurse during this hospital stay?» was not immediately possible to adapt to a Danish context. The correct linguistic translation into Danish was: «Har du set en diabetes specialist sygeplejerske under din indlæggelse?» («Have you seen a diabetes specialist nurse during this hospital stay?»). FT1 translated the question to: «Have you been in contact with a specialist diabetes nurse during your hospitalization?» While FT2 translated «Have you seen a specially educated diabetes nurse during this hospitalization?» None of the two translations makes sense in a Danish context, as a diabetes specialist nurse is not a term used in Denmark.

The most commonly used term in Denmark is «Diabetes nurse», which is also the term presented to patients in their outpatient treatment. In addition, it was problematic to translate «have you seen» as it varied between: ... supervised, ... had contact with ... seen by a ... At Step 2 after the forward translation we agreed on: «Have you been seen by a diabetes nurse during this hospital stay?», as the term «supervision» implies an explicit nursing intervention and not just a meeting.

However, this was not accepted in the back translation, as BT1 and BT2 translated «seen» as «consultation» which is a more medical expression, and in England means that the patient has actively seen the nurse in a consultation. Therefore, the question was again converted to how often a diabetes nurse had visited the patient: «Have you been in contact with a specially educated diabetes nurse during this hospital stay?»

Question 10: «How satisfied are you with the availability of snacks?» The word «snacks»
were translated into «smaller, in between meals» (mellemmåltider, in Danish) as snacks were not understood by all patients. «Snacks» is a term used in Denmark, but primarily among adolescents and the younger generation. Normally, smaller in between meals are served between the three main meals by health professionals. Thus, «snacks» is not a commonly used term as patients will be presented during hospitalization. Therefore, by a cultural adaption this question was changed to «Hvor tilfreds er du med tilgængligheden af mellemmåltider»? (How satisfied are you with the availability of smaller in between meals?).

Feed-back after Cognitive Debriefing

Question 4: «How convenient have you found your diabetes treatment while in hospital?», was a further development from the original validated Danish DTSQ. Convenient was in the DTSQ validated to «convenient/practical» (bekvem/praktisk in Danish). This did not cause any problems or disagreements in forward or backward translation. But the psychological review found this translation difficult to understand and recommended the term «pleasant».

However, this led to concern by HPR, stressing this could be associated with «enjoyable». They wanted to maintain «convenient/practical» to keep the conjugation between previously validated questionnaires, since two other questionnaires, the HIV treatment satisfaction questionnaire (HIVTSQ) and the original Diabetes Treatment satisfaction questionnaire (DTSQ) also use the term convenient/practical. The cognitive debriefing review showed that none of the five patients understood the question:

I don’t know what this means. Is it like comfortable? Like if the bed or the chair is good to sit in (Patient R1).

I don’t understand this question. I don’t understand what convenient/practical means in this setting. Practical means like practical working, how well you control your blood glucose (Patient R2).

Convenient/practical is two different words and meanings. I don’t know how to answer (Patient R4).

According to the English–Danish dictionary, convenient is translated to: «Suitable for your purposes and needs and causing the least difficulty». HPR requested a re-testing of convenient and practical separately, to investigate whether the separation of the two concepts improved the understanding. Therefore, we re-tested this question in two separate questions on three further patients.

Question 4a: «How convenient have you found your diabetes treatment while in hospital» («Hvor bekvem syntes du, din diabetesbehandling var under indlæggelsen?»).

Question 4b: «How practical have you found your diabetes treatment while in hospital» («Hvor praktisk syntes du, din diabetesbehandling var under indlæggelsen?»).
Question 4a: «How convenient have you found your diabetes treatment while in hospital».

How pleasant was my treatment, or how good was it (New patient NR1, female 29yr insulin).

How good my treatment was. It is not a word I am used to (New patient NR2, female, 45yr tablet).

How pleasant my treatment was (New patient NR3, male, 20yr insulin pump).

Question 4b: «How practical have you found your diabetes treatment while in hospital».

How easy or smooth my treatment was (NR1).

How active I am in my own treatment (NR2).

How effective my diabetes treatment is (NR3).

Patients describes practical and convenient as two completely different terms. Practical is described as «practical work», and how much the patients do on their own, which did not reflect the meaning at all. Finally, it was therefore decided to use the word «convenient» which captures the meaning of the original DTSQ-IP the most.

Discussion

With increased use of PROM data in research and clinical practice the need for international methods of measurement has grown. Most instruments, e.g. the DTSQ-IP have been developed in English. However, it is necessary that it address the same concepts in all languages, so it is possible to compare data across countries (24).

Two types of equivalence are particularly important when adapting a questionnaire from one language to another. Conceptual equivalence is achieved when answers to the same question reflect the same concept and the concept is meaningful in each of the cultures and languages concerned. Item equivalence is achieved when equivalence of meaning survives translation. Translation of a questionnaire such as DTSQ-IP requires that both content and understanding of culturally related concepts reflect the original version as closely as possible. In addition, this new version must be functional in a Danish context while maintaining its validity (19). The validation of the DTSQ-IP into Danish meant that it was necessary to adapt both linguistic and cultural content. An inadequate linguistic translation process can result in the measuring instrument not being equivalent to the original questionnaire DTSQ-IP.

PROM data are useful in clinical nursing, clinical trials and national programs to monitor the quality of health care. However, it is important that the data are collected without overburdening patients and health care professionals (26). Therefore, care must be taken
in the translation process, to ensure optimal collection and usefulness of data in future nursing strategies.

When it comes to nursing and care for patients with DM, it is crucial not only to focus on the biomedical approach, such as metabolic control. The patient’s understanding, motivation and acceptance to the prescribed treatment is crucial to obtain normal long-term blood glucose level (27).

A pilot study in four hospital wards in England indicate that self-administration of insulin in patients with DM improves patient satisfaction, optimizes nursing time and helps patients receive medication at the appropriate time (28). The DTSQ-IP is a tool for clinical nursing specialists to obtain this optimization of patient treatment.

To gain an understanding of how the individual patient experiences DM it is necessary for nurses to collect information about episodes of hypoglycemia directly from the patient. Importance of patients’ understanding of their own condition and treatment is recognized as a cornerstone in diabetes treatment. Therefore healthcare professionals must integrate individual patient preferences, needs and values, to understand how adherence to the medical treatment plan can take place in practice (27).

**Limitations and strength**

The original DTSQ for outpatients was already validated in Danish. This meant that some phrases of the questions were already validated. HPR needed a very good reason to make changes to these items which had not only been linguistically validated but also the psychometric properties had been confirmed (14). But in this linguistic validation process the psychological review and the cognitive debriefing recommended a specific change. For example, in Question 4 where the word *convenient* were translated to «convenient/practical» (bekvem/praktisk in Danish) after retesting two different opportunities.

In addition, both FT1 and FT2 were professionals in the health care system, and not as current recommendations specifying that one forward translator should not be affiliated with the healthcare.

In the present study, 5 patients were initially included, and subsequently 3 additional patients participated for further clarification, due to doubts regarding few questions. We chose a small population for more thorough interview and patients were selected according to age, gender, type and duration of DM and educational level. A larger sample might have strengthened the study, but inclusion was challenged by admission duration and patients’ willingness to participate. However, there were no major disagreements in the understanding of the DTSQ-IP among the included patients.

**Conclusion**

This article describes the linguistic translation and cultural adaptation of DTSQ-IP to a Danish context. This is the first step to create the possibility to measure Danish inpatients.
with DM and their satisfaction regarding hospitalization from a validated scientific instrument. For several questions, it was not possible to translate the question directly into Danish and maintain the correct content, therefore a cultural adaptation had to be done. Now the next step in this progress will be to confirm the psychometric properties.

Implications

A validated version of DTSQ-IP is now available in Danish enabling investigation of factors affecting satisfaction during hospitalization. Investigation of patient satisfaction with diabetes treatment is of interest in endocrinological wards where diabetes expertise is present. In addition, this enables comparison of patient satisfaction in non-endocrinological wards where diabetes expertise is not present. DTSQ-IP may help nurses to understand the complexity of daily practice, which may generate new evidence in patient-centered care and benefit inpatients with DM.

Acknowledgements

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Conflict of interest

The Authors declares that there is no conflict of interest.

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