Research letter to the editor

Danish translation and validation of the Geriatric 8 and the modified Geriatric 8 screening tools

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1. Introduction

Almost 50% of patients with cancer are diagnosed after the age of seventy, which has fueled geriatric oncology research. [1] Many investigations have underlined the importance of a comprehensive geriatric assessment (CGA) in older patients prior to oncologic treatment to improve treatment decisions and perform non-oncologic interventions. [2,3].

The Geriatric 8 (G8) and the modified G8 (mG8) are health-care personnel-administered frailty screening tools increasingly used in oncology to identify older individuals with potential frailty through a short questionnaire easily implemented in research and clinical practice. [4–6] Furthermore, they illuminate potential health concerns, which may otherwise go unidentified using the traditional Eastern Cooperative Oncology Group (ECOG) Performance Status (PS), and can affect tolerability and treatment outcomes.

The G8 consists of eight questions (scores from 0 to 17, frailty at ≤14) [4] and has demonstrated high sensitivity (85%) while maintaining good specificity (64%) in predicting CGA frailty. [7,8] The G8 has demonstrated a strong correlation between frailty and decreased survival as well as increased treatment toxicity, providing substantial clinical value. [8]

The mG8 consists of only six items (scores from 0 to 35, frailty at ≥6) [6] with an even higher sensitivity (87%) and specificity (89%) than the G8. [8]

Multiple Danish studies have used the G8, [2,9–11] whereas only a few studies have investigated the mG8. However, Danish translation and validation has not been conducted for either tool.

Herein, we report a Danish linguistic translation and validation of the G8 and the mG8.

2. Materials and Methods

The translation was conducted using the Professional Society for Health Economics and Outcomes Research (ISPOR) 10-step principles of good practice for the translation and cultural adaptation of patient-

reported outcome measures. [12] (Fig. 1.)

2.1. Preparation

The original authors of the G8 and mG8 authorized translation of each tool from the source language, English, to Danish. (Fig. 1).

As both tools contain medical terminology, medical insight was required to achieve the most accurate translation. An expert panel of four physicians (two residents in Oncology, HD and AO, and two in Geriatrics, AG and KB) fluent in both languages was assembled. Three panelists were Danish native speakers, practicing academic level English, while one was an English native speaker practicing academic level Danish. The two panelists in charge of forward translation had background knowledge of both tools.

2.2. Forward Translation and Reconciliation

HD and AG individually translated each source material and subsequently compared these in a side-by-side review. Inconsistencies were reconciled until a mutually agreed-upon target language translation was attained (G8-DK version 1.3; mG8-DK version 1.3).

2.3. Backward Translation and Review

AO and KB individually translated the reconciled Danish translations back into English (G8 version 2.1 & 2.2; mG8 version 2.1 & 2.2). Backward translation review was, thereafter, carried out by the expert panel, reviewing each screening tool individually. The backward translation of each screening tool was compared to the source material to ensure the conceptual equivalence of the translation.

2.4. Harmonization

Harmonization was omitted as Danish is the only official language in the Kingdom of Denmark and consists of a homogeneous national norm of speech. [13].

2.5. Cognitive Debriefing

Cognitive debriefing was conducted by interviewing two oncological physicians and five nurses to ensure that the Danish translation of both tools was cognitively equivalent to the source material, to identify potentially conceptually unsuitable items, to test potentially unresolved translation alternatives, and to highlight issues that cause confusion in clinical practice. All interviewees were native Danish speakers except one, and had no prior experience using either screening tool.

The translated G8-DK version 3.1 and mG8-DK version 3.1 were completed during seven individual oncologic out-patient consultations and was observed by an interviewer (HD or AK). Observations regarding questionnaire completion were noted and included in the interview, directly following the patient consultation.

Cognitive debriefing interviews utilized predefined areas of interest including comprehensibility, interpretation, concerns, structural setup, and additional comments. Questions were predominately open-ended and posed independently for each translated screening tool, with answers transcribed during the interview. (Supplementary Material).

2.6. Cognitive Debriefing Review and Finalization

Concerns mentioned by more than one interviewee, and deemed significant by unanimous vote by the expert panel, were included in the translated version prior to implementation (G8-DK version 4.1; mG8-DK version 4.1).

2.7. Proofreading and Final Report

Proofreading was carried out by AG and HD, correcting minor errors before finalization (G8-DK version 5.1; mG8-DK version 5.1, Supplementary Figs. 1 & 2). The final translational report was completed, containing the translation log, the various translation versions and
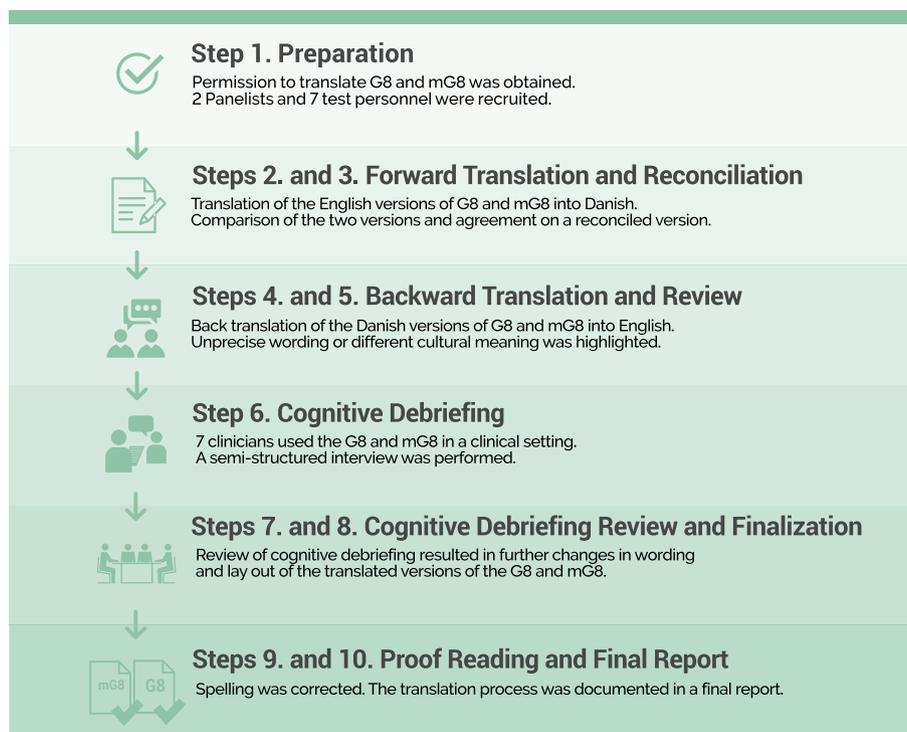

Step 1. Preparation
Permission to translate G8 and mG8 was obtained.
2 Panelists and 7 test personnel were recruited.

Steps 2. and 3. Forward Translation and Reconciliation
Translation of the English versions of G8 and mG8 into Danish.
Comparison of the two versions and agreement on a reconciled version.

Steps 4. and 5. Backward Translation and Review
Back translation of the Danish versions of G8 and mG8 into English.
Unprecise wording or different cultural meaning was highlighted.

Step 6. Cognitive Debriefing
7 clinicians used the G8 and mG8 in a clinical setting.
A semi-structured interview was performed.

Steps 7. and 8. Cognitive Debriefing Review and Finalization
Review of cognitive debriefing resulted in further changes in wording and lay out of the translated versions of the G8 and mG8.

Steps 9. and 10. Proof Reading and Final Report
Spelling was corrected. The translation process was documented in a final report.

Fig. 1. Flow Chart of the Danish Translation and Validation of the Geriatric 8 and Modified Geriatric 8.
Footnote: Geriatric 8 (G8), modified Geriatric 8 (mG8).

authors, and cognitive debriefing interviews (Supplementary Material).

3. Results

A total of fourteen items were translated (G8: eight items, mG8: six items) with two items (Item C and H) from the G8, and two items (Items 3 and 6) from the mG8 requiring specific linguistic attention.

Translational discrepancies were grouped into two categories; (1) problems related to language, vocabulary, or cultural differences and (2) a lack of matching definition. (Table 1) [14] Synonymous word choice without variation in intensity was not considered problematic.

3.1. Forward Translation and Reconciliation

Only a few minor discrepancies were identified with full agreement on the most accurate translation.

3.1.1. G8

When translating Item H, the word "medications" was translated to "*slags medicin*" i.e., "types of medications" and "*receptpligte lægemidler*" i. e., "prescription medications," highlighting the unclear understanding of the word medications and its inclusion of non-prescription medicine. It was decided that specifying this would potentially affect the comparability of the translation and therefore, the ambiguous translation "types of medications" was used.

3.1.2. mG8

Like most other items, Item 5: PS was primarily directly translated as PS has not been linguistically validated in Danish. However, the word "disabled" has no direct translation and roughly translates to the word "handicapped." As in English, "handicapped" is highly stigmatizing and includes various degrees of handicap. To solve this category 2 issue, a descriptive translation inspired by various non-validated translations of PS was chosen.

3.2. Backward Translation and Review

One backward translator used a more literal translational methodology and the other a more conceptual methodology. Through the backward translation review, it was found that a more literal translation was often more congruent with the source material.

3.2.1. G8

Backward translation review showed one category 2 issue within the translation of Item C: Mobility. The term "goes out" left much to interpretation as it can be understood as having the functional capability of going out of door or spending time outdoors e.g., shopping on a regular basis. This led to incongruent backward translations.

3.2.2. MG8

Likewise, backward translation review showed a category 2 issue in Item 6: Heart Failure. Coronary artery disease was reconciled to the Danish laymen's term "*hjertekarsygdomme,*" however, one of the backward translators had directly translated this to "cardiovascular disease," which encompasses both cardio and vascular diseases. The more accurate medical term "Coronary artery disease," i.e., "*koronararterie sygdomme*" was therefore chosen, as the screening tool will be utilized by healthcare professionals.

3.3. Cognitive Debriefing and Review

3.3.1. G8

During cognitive debriefing review, the reconciled forward translation of Item C: "Goes Out" i.e., "*kommer ud*" was further changed to "*færdes ude*" i.e., "spending time outdoors regularly," as this had been the source of much confusion during cognitive debriefing. This was universally accepted by the expert panel, as it was congruent with the validated Danish translation of the Mini Nutritional Assessment (MNA), on which the G8 is based.

3.3.2. MG8

No issues were identified.

4. Discussion

We successfully translated and validated the geriatric oncology

Table 1
Translational discrepancies for the Geriatric 8 and Modified Geriatric 8.

Main Categories	Sub Categories	Example of Issue
1. Problems related to language, vocabulary, and cultural differences	Adjectival agreement on intensity levels of the concept to be translated	G8 Item A: The words "severe decrease" were translated to "svært nedsat" and "alvorligt fald" which in Danish has varing degree of intensity as "alvorligt" would be more likely backward translated to "critical".
	Culturally specific idiomatic phrases	None
	Cultural differences of measurement	None
2. Lack of matching definitions with items across languages	Equivocal items with precise definitions	mG8 Item 6: "coronary artery disease" was translated to the danish term "hjertekar sygdomme" which includes both "coronary artery disease" and "cardiovascular dieases" thus the more precise latin term was chosen
	Equivocal items without precise definitions	G8 Item C: "goes out" can be interpreted as spending time outdoors ie. grocery shopping, or simply being able to go out in one's garden or collecting mail from the mailbox. Spending time outdoors was chosen.

Footnote: Geriatric 8 (G8), modified Geriatric 8 (mG8).

screening tools, the G8 and mG8, into Danish. Due to the limited number of items in each screening tool, unanimous agreement was easily achieved during reconciliation and review.

The ISPOR quality assurances guidelines were used to provide scientific transparency [13]. Although intended for patient-reported outcome questionnaires, these guidelines are widely used in translational studies.

The harmonization step in the ISPOR guidelines was omitted, thus, it can be argued that our translation is similar to the Functional Assessment of Chronic Illness Therapy translational methodology. [15] However, this methodology does not include cognitive debriefing, which was vital in our validation process.

Cognitive debriefing was carried out in a representative clinical setting. This face validation highlighted the practical interpretation of each tool and led to important linguistic changes to the Danish translation of the G8. Per ISPOR recommendations, interviewees were native speakers, with one exception. As this medical professional utilized Danish on a layman and academic level daily, and given the simplicity of both screening tools, this was deemed of no consequence.

Other than age, the G8 contains seven items from the MNA, while the mG8 contains three. The MNA has been linguistically validated in both Danish and French, and was consulted during the cognitive debriefing review. However, it is unclear whether the remaining items were originally developed in French or English, as printed in the source material. To our knowledge, the remaining items have not been linguistically translated into English or validated with native English speakers. Furthermore, PS has not been linguistically validated in Danish nor French.

Numerous Danish geriatric oncology studies are underway intending to use the G8 and mG8. Thus, this translational study comes at an essential point of geriatric oncology research and is expected to be much employed in future research as well as clinical practice.

Ethical Approval and Consent

Approval waived by the Danish National Committee on Health Research Ethics, as this study is purely observational, and does not fall under the Medical Research Involving Human Subjects Act.

Patient Consent for Publication

Not applicable.

Data Sharing Statement

The translational report can be found in the supplementary material. All translations have been included in the translational report, including notes from the cognitive debriefing interviews. Physician and nurse completed DK-G8 and DK-mG8 screenings conducted prior to cognitive debriefing interviews can be requested within five years of publication.

Competing Interest Statement

The authors declare that they have no competing interests.

Funding Statement

Authors' Contributions

HMD, AKWG, JR, ME, CML, PP, TLJ, and HJD were involved in the study conceptualization. ME, HJD, TLJ, JR, HMD, and AKWG conducted funding acquisition with input from CML and PP. HMD and AKWG were in charge of project administration, methodology, and investigation. HMD, AKWG, AO, and KB conducted data curation. HMD, AKWG conducted the formal analysis with supervision by TLJ. HMD and AKWG wrote the original draft with writing review and editing byTLJ, JR, ME, CML, PP, TLJ, HJD, AO, and KB.

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Appendix A. Supplementary Data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jgo.2022.07.004.

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