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Original Article

Development, face validity and acceptability of the Danish version of the Groin Hernia-Q

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ABSTRACT

INTRODUCTION. The objective of this study was to describe the development of the Danish version of the Groin Hernia-Q, a new patient-reported outcome measure for patients undergoing groin hernia repair, and to assess its face validity and acceptability.

METHODS. The Groin Hernia-Q was adapted from the Abdominal Hernia-Q through an iterative process involving an expert committee and refinement interviews with patients with groin hernia. Interviews focused on the relevance, comprehensiveness and comprehensibility of questionnaire items. Following refinement, the Groin Hernia-Q was evaluated using the QQ-10 instrument in a cross-sectional patient survey. Descriptive statistics were used to summarise participant characteristics and QQ-10 scores.

RESULTS. A total of 20 patients participated in refinement interviews, leading to the addition of new items, removal of items, clarifications of wording, improved lay understanding and structural adjustments. A total of 108 patients submitted complete survey responses. The mean QQ-10 “Value” sum score was 75.7% for the preoperative form and 80.7% for the post-operative form, both exceeding the predefined target of > 60%. “Burden” sum scores were 15.9% and 15.1%, respectively, below the maximum acceptable threshold of 40%. These results suggest that the Groin Hernia-Q has good face validity and acceptability.

CONCLUSION. The Danish version of the Groin Hernia-Q demonstrated high face validity and acceptability among patients with groin hernia.

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Groin hernia repair is a common surgical procedure, with more than 20 million repairs performed worldwide each year [1], and the global groin hernia incidence is increasing [2]. Although most patients recover fully after surgery, some experience persistent symptoms affecting quality of life [3]. Patient-reported outcome measures (PROMs) are essential tools for capturing such experiences [4], but existing PROMs lack validation and often overlook outcomes that are important to patients [5].

The Abdominal Hernia-Q (AHQ) is a condition-specific PROM developed for patients undergoing ventral hernia repair [6-8]. Although ventral hernias differ from groin hernias in anatomical location and aetiology, both can produce similar symptoms [6, 9]. The AHQ has demonstrated strong psychometric properties, including excellent content validity, and it was developed with extensive patient involvement [6]. Given the substantial overlap in patient concerns between ventral and groin hernias [6, 9], the AHQ was selected as the basis for a new PROM tailored to patients undergoing groin hernia repair, called the Groin Hernia-Q (GHQ).

This study documented the development of the Danish GHQ and provides evidence of its face validity and acceptability as a first step towards validation.

Methods

This was a methodological study intended to document the development process of the Danish version of the GHQ and provide evidence for its face validity and acceptability to patients. The GHQ was based on the AHQ questionnaire for patients undergoing ventral hernia repair [6-8], which was previously adapted and translated from English into Danish [10]. The initial draft of the GHQ was outlined by an expert committee based on the AHQ. Subsequently, the draft was revised and optimised through multiple refinement-interview cycles with patients and committee review. Finally, we conducted a patient survey using the QQ-10 [11] to provide quantitative evidence for the face validity and acceptability of the GHQ.

This study represents the first phase of GHQ validation and was conducted according to the previously published protocol [12]. This study is part of the AFTERHERNIA Project, an ongoing multimodal initiative involving nationwide surveys and registry data on all Danish patients undergoing groin or ventral hernia surgery over a ten-year period [13]. This study was reported according to the COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN) reporting guideline for studies on PROM measurement properties [14].

Participants and recruitment

Four groups of patients participated in this study:

Group 1: Preoperative patients who participated in the refinement interviews

Group 2: Post-operative patients who participated in the refinement interviews

Group 3: Preoperative patients who participated in the QQ-10 survey

Group 4: Post-operative patients who participated in the QQ-10 survey.

Patients in Group 1 were identified and recruited face-to-face in an outpatient clinic immediately after their preoperative surgical consultation. Patients in Group 2 were identified from their medical records and recruited by phone after their surgery. Patients in Group 3 were identified from their medical records and recruited via the Danish Digital Post service, an online mail service available to all Danish residents and used by approximately 95% of the population [15]. Patients in Group 4 were identified in the Danish National Patient Registry, a nationwide database that covers comprehensive administrative and clinical data on all hospital contacts in Denmark [16], and were also recruited through Digital Post. Consecutive sampling was applied in all four groups. In Groups 1 and 2, patients were recruited until data saturation (see below). In Groups 3 and 4, patients were recruited until the predetermined sample size of 50 complete survey responses had been achieved. Patients were excluded if they lacked sufficient knowledge of Danish or were unable to participate due to physical or cognitive impairment or psychiatric comorbidity. Furthermore, patients in Group 3 and 4 were excluded if they were exempt from using the Digital Post service.

Data on patients from Group 4 were merged with additional clinical and intraoperative information from the Danish Hernia Database, a nationwide, mandatory, surgeon-reported database of hernia repairs with a registration rate of > 90% [17]. Merging of data, including the use of the Digital Post service, was achieved using the unique personal identification number that is mandatory for all Danish residents [18].

Abdominal Hernia-Q, questionnaire drafting and patient interviews

The original AHQ consists of a preoperative and a post-operative form. The preoperative form contains eight items, and the post-operative form contains 16 items. All items are scored on a four-point Likert scale; for both forms, a sum score can be calculated by simple addition. Possible preoperative sum scores range from 8 to 32, and possible post-operative sum scores range from 16 to 64. Higher scores indicate lower symptom burden or a more positive outcome, whereas lower scores indicate the opposite. The Danish version of the AHQ, along with a detailed description, has been published elsewhere [10].

First, the original AHQ was thoroughly reviewed by an expert committee to determine which immediate revisions were needed to adapt it for patients undergoing groin hernia repair. The expert committee produced an initial GHQ draft, during which both the overall structure and each item of the original AHQ were assessed for relevance to patients with groin hernia. The committee comprised a senior hernia surgeon, multiple hernia researchers and a methodologist.

Subsequently, we conducted a series of refinement interviews with patients who either had a groin hernia or had already undergone groin hernia repair. The new draft of the GHQ also consisted of a preoperative and a post-operative form, and patients were interviewed only about the form relevant to them. The interviews were conducted by the authors AGH, HR and JJB, either in person or by phone, at the patient's preference. The interviews were conducted in a semi-structured manner using a concise interview guide focused on the relevance, comprehensiveness and comprehensibility of each item and the entire questionnaire. Comprehensive field notes were taken during the interviews.

The interviews were planned iteratively, with separate rounds of 5-7 interviews. Each round was then followed by a thorough review and revision by the expert committee informed by the data from the patient interviews in the previous round. This cycle was repeated until no new ideas or suggestions emerged from the interviews.

Survey

The refined GHQ draft, resulting from cycles of patient interviews and committee review, was subsequently distributed to patients in Groups 3 and 4. The GHQ draft was accompanied by the QQ-10, a tool designed to assess the face validity and acceptability of other questionnaires [11]. The QQ-10 includes ten items scored on a five-point Likert scale and three items with free-text response options. Items 1-6 of the QQ-10 are summarised into a "Value" sum score, and items 7-10 are summarised into a "Burden" sum score. The survey concluded with a comment section where participants could leave voluntary additional comments about the GHQ draft. Invitations to participate were distributed to patients through the Digital Post service [15], and the survey was completed using Research Electronic Data Capture (REDCap) [19]. Reminders were sent to non-responders after one week.

Statistical methods

Data analysis was limited to descriptive statistics. Participant characteristics and survey responses were summarised using counts and percentages for categorical variables and means with SD or medians with IQR for continuous variables, as appropriate. QQ-10 "value" and "burden" scores were calculated according to the original scoring instructions, each transformed onto a 0-100 scale [11].

Ethical considerations

The Danish Data Protection Agency approved the study (p-2023-14805). Demographic information from the Danish Hernia Database was provided by the Danish Healthcare Quality Institute (DHDB-2024-01-30). In accordance with Danish legislation, this type of study required no approval from a research ethics committee. All participants provided informed consent prior to inclusion.

Trial registration: not relevant.

Results

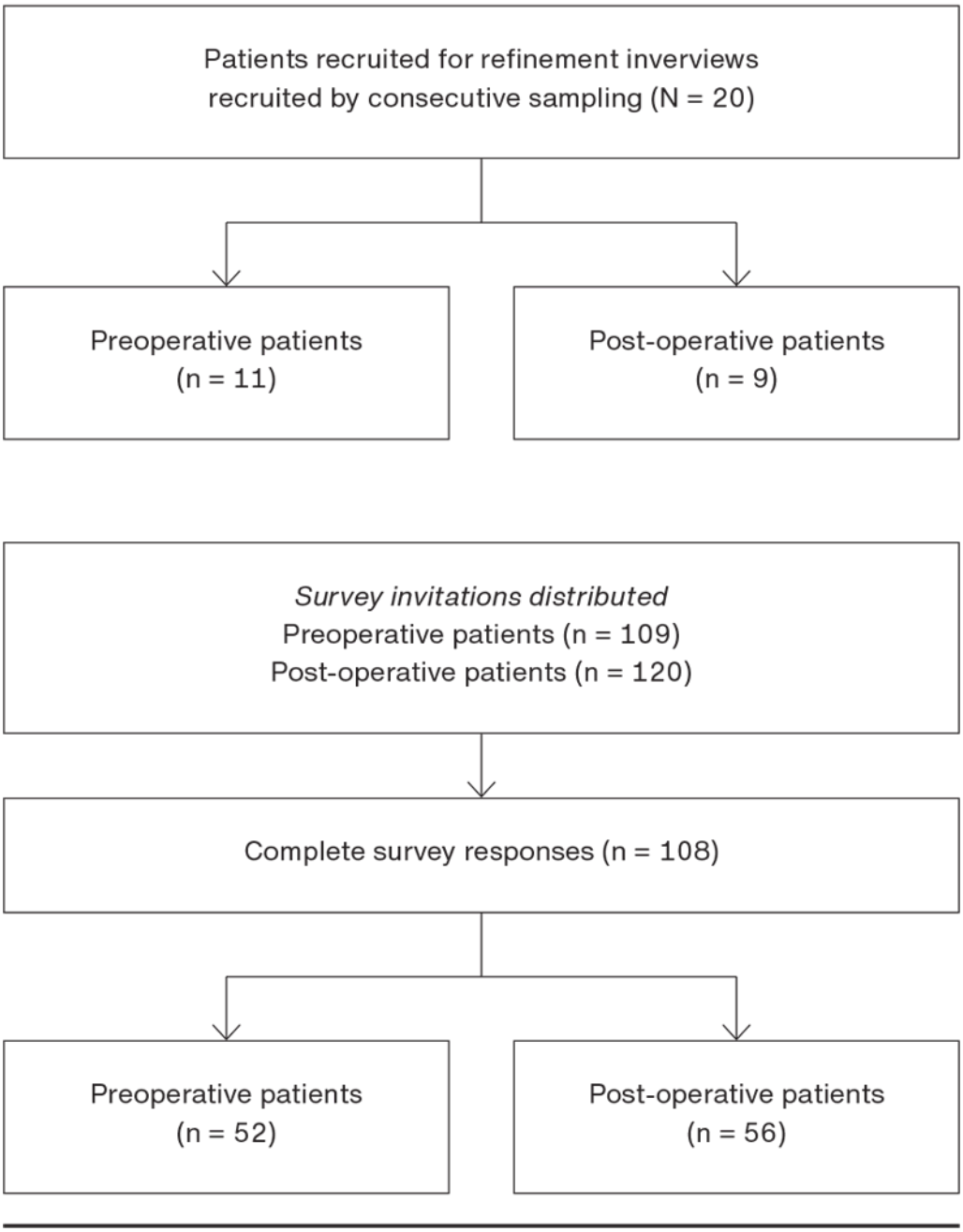
A total of 20 patients participated in the refinement interviews, of whom 11 were preoperative, and nine were post-operative. Among the 109 preoperative patients invited to the survey, 52 (48%) returned complete responses. Among 120 post-operative patients invited, 56 (47%) responded in full. See **Table 1** and **Figure 1** for details. Responses to the GHQ items are presented in Supplementary Tables 1-4.

TABLE 1 Patient characteristics.

	Interviewed patients		Surveyed patients	
	preoperative group1[a]	post-operative group 2[b]	preoperative group 3[c]	post-operative group 4[d]
N	11	9	52	56
Women, n (%)	4 (36)	2 (22)	6 (12)	13 (23)
Age, median (IQR), yrs	67 (58–75)	48 (44–70)	69 (63–78)	66 (57–73)
Hernia type, n (%)				
Indirect inguinal hernia	-	-	-	34 (61)
Direct inguinal hernia	-	-	-	20 (36)
Femoral hernia	-	-	-	1 (2)
Pantaloon hernia	-	-	-	1 (2)
Hernia orifice size, n (%)				
< 1.5 cm	-	-	-	22 (39)
1.5-3 cm	-	-	-	24 (43)
> 3 cm	-	-	-	9 (16)
Unknown	-	-	-	1 (2)
Surgical modality, n (%)				
Laparoscopic	-	-	-	44 (79)
Robot-assisted	-	-	-	2 (4)
Open	-	-	-	10 (18)
Follow-up, median (IQR), mos.	-	-	-	25 (23-28)

QQ-10 = 10-item self-completed questionnaire developed from the electronic Personal Assessment Questionnaire system ePAQ-PF.
a) Group of preoperative patients who participated in the refinement interviews.
b) Group of post-operative patients who participated in the refinement interviews.
c) Group of preoperative patients who participated in the QQ-10 survey.
d) Group of post-operative patients who participated in the QQ-10 survey.

FIGURE 1 Participant flow chart.



Questionnaire drafting, committee review and refinement interviews

In the initial committee review, all terminology referring to ventral hernias was changed to groin hernias. Next, an item concerning clothing-related issues contained in both forms was tagged for removal, and new items about sexual dysfunction were added in both the preoperative and post-operative forms in accordance with existing evidence [9, 20]. In addition, three items included only in the post-operative form were tagged for removal: one item concerning the emotional side of recovery, another about long-term changes and a third about body image. Changes made during committee review and refinement interviews are summarised in **Table 2.**

TABLE 2 Refinement interviews and questionnaire development. The presented number of items includes items in the sexual dysfunction extension.

Round	Preoperative items modified, n	Post-operative items modified, n	Total items added, n	Total items removed, n	Key feedback and changes
Initial review	8	16	4	0	Terminology was modified to target patients with groin hernia Items concerning sexual dysfunction were added
Round 1	6	6	11	8	Items concerning sexual dysfunction were moved into a separate extension Items about pain and discomfort were expanded
Round 2	8	9	0	0	Clarification of time frame Refinement of sexual dysfunction extension

The first round of refinement interviews was conducted as planned, followed by another committee review. All items tagged for removal were conclusively removed in accordance with patient feedback. Six items on both forms inquire about specific symptoms or issues that occurred in the two weeks before completing the survey. The wording of all these items was optimised to clarify the timeframe in response to patient feedback. In addition, the committee decided that the newly added item about sexual dysfunction should be removed from both forms and should instead be developed separately as an optional extension that can be administered as a supplement to the main GHQ. This decision was based on patient feedback, as well as methodological concerns from the committee, as it proved difficult to integrate into the calculation of the general sum score in a meaningful way.

In the second round of refinement interviews, patients found the questionnaire relevant and clear, and the interviews helped identify several minor issues related to wording and response options. Preoperatively, adjustments were made to improve temporal framing and to clarify selected items, whereas post-operative interviews focused on improving specificity regarding surgical type and follow-up experiences. Feedback also supported further development of the optional sexual function extension, including suggestions to better capture cosmetic concerns and reasons for sexual inactivity. This second round of refinement interviews was followed by another committee review, during which a refined draft of the GHQ was finalised.

Survey

Both preoperative and post-operative respondents rated the GHQ highly on the QQ-10 (**Table 3**). The mean "Value" sum score was 75.7 for the preoperative form and 80.7 for the post-operative form, both exceeding the predetermined 60% threshold. The "Burden" sum scores were 15.9 and 15.1, respectively, well below the 40% target maximum, indicating a low perceived burden. Across individual QQ-10 items, respondents particularly endorsed ease of completion and willingness to complete the questionnaire again. Burden items such as embarrassment, length and complexity consistently scored low.

TABLE 3 QQ-10 scores and sum scores. Higher "value" sum scores indicate greater perceived relevance and usefulness of the questionnaire, whereas lower "burden" sum scores indicate less perceived burden.

	QQ-10 scores[a]	
	preoperative form	post-operative form
Questions, %		
1. The questionnaire helped me to communicate about my condition	72.1	80.4
2. The questionnaire was relevant to my condition	71.2	74.1
3. The questionnaire was easy to complete	90.4	92.0
4. The questionnaire included all the aspects of my condition that I am concerned about	60.1	69.6
5. I enjoyed filling in the questionnaire	70.2	81.7
6. I would be happy to complete the questionnaire again in the future as part of my routine care	90.4	86.6
7. The questionnaire was too long	24.5	26.3
8. The questionnaire was too embarrassing	13.0	17.0
9. The questionnaire was too complicated	13.5	12.5
10. The questionnaire upset me	12.5	4.5
Sum scores		
Value sum score[b]	75.7	80.7
Burden sum score[c]	15.9	15.1

QQ-10 = 10-item self-completed questionnaire developed from the electronic Personal Assessment Questionnaire system ePAQ-PF.
a) The original QQ-10 scores recorded on a 5-point Likert scale (coded as 1-5) were inverted and transformed into a 1-100 scale as recommended by the original developers [11], the following formula was applied: 100 – (([SCORE] – 1)/4 × 100).
b) The value sum score was calculated as an average of scores on items 1-6, the scale ranges 1-100 with higher scores being positive, the predetermined target sum score was > 60%.
c) The burden sum score was calculated as an average of scores on items 7-10, the scale ranges 1-100 with lower scores being positive, the predetermined target sum score was < 40%.

In total, 64 respondents provided free-text comments, of which 40 contained meaningful but generally brief feedback. Many respondents described the questionnaire as clear, simple and easy to understand. A small number of respondents expressed general satisfaction and appreciation for the initiative. Among preoperative respondents, a few noted that questions about sexuality felt personal or sensitive. No problems with wording or comprehension were identified.

Discussion

The GHQ was well received, with patients rating it as clear, relevant and easy to complete. This supports its face validity and acceptability as a PROM for groin hernia surgery. The GHQ is intended for use in both clinical practice and research. Clinically, it may be applied as a routine PROM before and after groin hernia repair, while in research, it is designed for use in observational studies and registry-based initiatives such as the

AFTERHERNIA Project [13] to enable standardised, patient-reported outcome assessment.

Methodologically, pain in the GHQ is assessed as an overall symptom, whereas activity-related impact is captured through separate items addressing daily activities, social participation and sleep, reflecting the underlying structure of the AHQ. Post-operative items addressing broader domains such as activity and quality of life are not intended as causal measures but are primarily meaningful in pre-post comparisons or population-based analyses. Strengths of this study include extensive patient involvement, iterative refinement and a systematic methodology following a published protocol [12] and aligned with COSMIN guidelines [14]. A key limitation is the restriction to a Danish population, which may affect generalisability. Future work will focus on quantitative testing to provide evidence for sufficient measurement properties.

Conclusion

The GHQ demonstrated strong face validity and patient acceptability and is ready for full psychometric validation.

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