



Original Article

Development of the Korean Version of the Gastrointestinal Quality of Life Index Questionnaire

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ABSTRACT

Purpose: To establish a standardized quality of life measurement that allows global cross-study comparisons, we translated the Gastrointestinal Quality of Life Index (GIQLI) into Korean and linguistically validated the Korean version of the GIQLI (K-GIQLI) in patients who underwent colorectal surgery.

Materials and Methods: A cross-cultural adaptation of the original GIQLI was created based on the established guidelines. Based on participation in a cognitive interview, 20 patients with colorectal cancer were enrolled in the study. To ensure that the Korean version of the questionnaire was understood as intended, the time needed to complete the questionnaire was measured, and three additional items related to comprehension were added.

Results: From May to July 2021, two translators, whose native language was Korean translated the GIQLI items into Korean, and a native English editor who had no knowledge of the original questionnaire translated the items back into English. In the cognitive interview, the median age of the patients was 61.8 (range: 44~82) years, and the median time required to complete the questionnaire was 6.5 (range: 5~10) min. For the language and cultural adaptation process, the participants' comprehension of the questionnaire was measured on a scale of 1~5, with a mean score of 4 (range: 3~4).

Conclusion: The K-GIQLI was developed and did not exhibit a significant difference from the original English version in terms of social, linguistic, and cultural differences between the Western world and Republic of Korea.

Keywords: Colorectal surgery; Quality of life; Surveys and questionnaires

INTRODUCTION

Surgery has a significant impact on the quality of life (QOL) of patients, and in addition to survival outcome, postoperative complication, and recurrence rate, has become an important standard outcome measure of therapeutic effects in clinical care and research [1]. In addition, since life satisfaction has been demonstrated to have a substantial effect on

the recovery of patients after surgical operations [2], many randomized studies have evaluated QOL before and after colorectal surgery [3-6]. In assessing QOL before and after surgery, most questionnaires are disease specific. However, few questionnaires have been used to evaluate general colorectal disease. Previously, we validated the Korean version of the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire module for

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patients with colorectal cancer (EORTC QLQ-CR29); however, the second half of the survey focused on anal function with or without stoma [7]. Therefore, this questionnaire is not suitable for general application in patients with colorectal diseases other than colorectal cancer. A questionnaire about general colorectal disease is necessary to measure and compare the nutritional and metabolic aspects after colorectal surgery regardless of the specific disease.

The Gastrointestinal Quality of Life Index (GIQLI) was first developed, verified, and translated into English by Dr. Eypasch in 1995 [8]. The GIQLI comprises 36 items, wherein 19 items are related to symptoms, five to emotions, four to social functions, one to medical treatments, and seven to physical functions. The total score on the questionnaire ranges from 0 to 144, and the higher is the score, the better is the QOL. The GIQLI is used globally to evaluate patient QOL in colorectal cancer and benign diseases, such as diverticulitis and Crohn's disease [3,5,6].

The aim of this study was to develop the first Korean version of the GIQLI (K-GIQLI) to conduct a global cross-sectional study using a verified questionnaire and to measure a standardized QOL in patients who underwent colorectal surgery.

MATERIALS AND METHODS

1. Linguistic Validation Process

To perform linguistic validation, we received approval in May 2021 by Mapi Research Trust (Mapi), which has a copyright license for the GIQLI. We performed a four-step linguistic validation process according to Mapi's guidelines: Forward translation, backward translation, cognitive interviews, and proofreading (Fig. 1). The first step was a forward translation, in which the English version was translated into Korean. Two translators and coordinators fluent in both English and Korean were involved. The English version and two Korean translations were compared and discussed by the study committee, which then integrated the two translations into one. The second step was a backward translation. The Korean version was translated back into English and presented to Mapi. To avoid bias, we commissioned a third-party English editing company (Editage, www.editage.co.kr) to perform the backward translation. The third step was the cognitive interview, during which it was confirmed that the Korean version of the questionnaire was well understood by the patients. Last, we corrected the grammar and any formatting errors and received approval for the Korean version on September 6, 2021.

2. Cognitive Interview

From July 6 to 21, 2021, a cognitive interview was conducted with 20 patients with colorectal cancer undergoing colorectal surgery. The inclusion criteria were as follows: 1) Patients aged 19–80 years who were diagnosed with

colorectal cancer, and 2) those who understood the purpose of the study and volunteered. The exclusion criteria were as follows: 1) Patients who could not read or fill out the Korean questionnaire on their own, 2) patients who underwent emergency operation, 3) patients who did not complete the questionnaire, and 4) patients with rectal cancer who received chemotherapy or radiation therapy. After completing the questionnaire, four additional questions were asked to assess comprehension. The first question was, "How long did it take you to fill out the questionnaire?". The second was, "Are the meanings of the questions clear and unambiguous?". The third question enquired, "Are the questions in the questionnaire adequately described in terms of expressions used in daily life?". Finally, the fourth question asked, "if there are words or expressions that are difficult to understand, please describe them and state the question number". The second and third questions were scored on a multiple-choice scale from 1 to 5, with higher scores indicating better understanding and adequate description as relevant to everyday life.

3. Statistical Analyses and Ethics Approval

Categorical variables are presented as numbers (percentages) and continuous variables as medians (interquartile ranges). The Institutional Review Board (IRB) of our hospital approved this study before commencement of data collection and analysis (IRB no. B-2109-708-302), and the need for informed consent was waived. The trial was registered at the Clinical Research Information Service (CRIS) with the identifier number KCT0006705.

RESULTS

In principle, the K-GIQLI was developed through a scien-

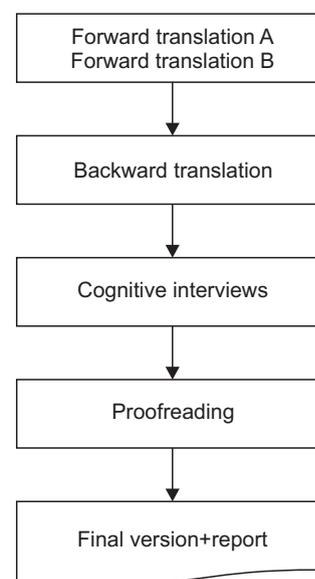


Fig. 1. Process of linguistic validation.

tifically proven linguistic validation procedure, and items for each subscale of symptoms, emotions, physical functions, social functions, and medical treatment are presented in Tables 1~4.

In the cognitive assessment, the median age of the participants was 61.8 (44~82) years, and most participants were men (80%). The total score on the questionnaire ranges from 0 to 144, and the higher is the score, the better is the QOL. The median total score of the GIQLI was 104 (range: 93.0~111.2), 63 (53.7~67.5) for symptoms, 13 (11.0~14.2) for emotions, 17 (14.5~21.5) for physical function, 9 (7.0~11.0) for social function, and 3 (2.0~4.0) for

medical treatment. The mean time required to complete the questionnaire was 6.5 (5~10) minutes. For the language and cultural adaptation process, questions 2 and 3 were related to the understanding and expression of the questions, and most patients reported that they understood the questions fairly well; no patient noted questions or descriptions that were difficult to understand (Table 5). The study committee developed the Korean version of the questionnaire through a series of forward and backward translation processes and developed the final version by reviewing, modifying, and culturally adapting the items through cognitive interviews with the participants.

Table 1. Symptom subscale of the Korean version of the Gastrointestinal Quality of Life Index

Subscales	Question number	Korean version
Symptoms (19 items)	1	지난 2주간, 복통이 얼마나 자주 있었습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	2	지난 2주간, 윗배가 가득 찬 느낌으로 얼마나 자주 불편했습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	3	지난 2주간, 배에 가스가 가득 찬 느낌이나 팽만감으로 얼마나 자주 불편함을 느꼈습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	4	지난 2주간, 방귀로 얼마나 자주 불편감을 느꼈습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	5	지난 2주간, 트림으로 얼마나 자주 불편감을 느꼈습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	6	지난 2주간, 위나 장에서 나는 이상한 소리를 얼마나 자주 느꼈습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	7	지난 2주간, 빈번한 배변(대변보기)으로 얼마나 자주 불편감을 느꼈습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	8 ^a	지난 2주간, 음식 먹는 것을 얼마나 자주 즐겼습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	9	당신의 질병 때문에 평소 좋아하는 음식을 먹지 못하고 참는 경우가 얼마나 자주 있었습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	27	지난 2주간, 음식물의 역류로 불편함을 느낀 적이 있었습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	28	지난 2주간, 느린 식사 속도로 얼마나 자주 불편감을 느꼈습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	29	지난 2주간, 음식물을 삼킬 때의 어려움으로 얼마나 자주 불편감을 느꼈습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	30	지난 2주간, 급작스러운 배변(대변보기)으로 얼마나 자주 불편감을 느꼈습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	31	지난 2주간, 설사로 얼마나 자주 불편감을 느꼈습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	32	지난 2주간, 변비로 얼마나 자주 불편감을 느꼈습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	33	지난 2주간, 구역질로 얼마나 자주 불편감을 느꼈습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	34	지난 2주간, 변에 피가 섞여 나와서 얼마나 자주 놀랐습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	35	지난 2주간, 속쓰림으로 얼마나 자주 불편감을 느꼈습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	36	지난 2주간, 의도하지 않은 배변(대변보기)으로 얼마나 자주 불편감을 느꼈습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음

Please note that the questions shown in “^a” are inverted scores and should be carefully summed.

Table 2. Emotion subscale of the Korean version of the Gastrointestinal Quality of Life Index

Subscales	Question number	Korean version
Emotions (5 items)	10	지난 2주간, 일상적인 스트레스에 어떻게 대처했습니까? ① 아주 나쁘게 ② 나쁘게 ③ 적당히 ④ 좋게 ⑤ 아주 좋게
	11	지난 2주간, 당신이 아프다는 사실 때문에 얼마나 자주 슬펐습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	12	지난 2주간, 당신의 질병으로 인해 얼마나 자주 긴장하거나 예민해졌습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	13 ^a	지난 2주간, 당신의 삶 전반에 대해 얼마나 자주 만족했습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	14	지난 2주간, 당신의 질병으로 좌절감을 얼마나 자주 느꼈습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음

Please note that the questions shown in “^a” are inverted scores and should be carefully summed.

Table 3. Physical function subscale of the Korean version of the Gastrointestinal Quality of Life Index

Subscales	Question number	Korean version
Physical function (7 items)	15	지난 2주간, 지치고 피곤함을 얼마나 자주 느꼈습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	16	지난 2주간, 몸이 불편한 것을 얼마나 자주 느꼈습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	17	지난 1주간(7일), 밤에 자면서 한번이라도 깬 경험을 한 날이 몇 일입니까? ① 매일 밤 ② 5~6일 ③ 3~4일 ④ 1~2일 ⑤ 전혀 없음
	18	당신의 질병으로 본인의 외모가 얼마나 불품 없어졌다고 생각합니까? ① 아주 많이 ② 많이 ③ 다소 ④ 약간 ⑤ 전혀 아님
	19	당신의 질병으로 본인의 체력이 얼마나 떨어졌다고 생각합니까? ① 아주 많이 ② 많이 ③ 다소 ④ 약간 ⑤ 전혀 아님
	20	당신의 질병으로 본인의 기력(스테미나)은 얼마나 감소했다고 생각하십니까? ① 아주 많이 ② 많이 ③ 다소 ④ 약간 ⑤ 전혀 아님
	21	당신의 질병으로 본인의 건강상태가 얼마나 나빠졌다고 생각하십니까? ① 아주 많이 ② 많이 ③ 다소 ④ 약간 ⑤ 전혀 아님

Table 4. Social function and medical treatment subscales of the Korean version of the Gastrointestinal Quality of Life Index

Subscales	Question number	Korean version
Social function (4 items)	22 ^a	지난 2주간, 직장, 학업, 집안일 등 정상적인 일상 활동을 유지할 수 있었습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	23 ^a	지난 2주간, 운동이나 취미생활 등 정상적인 여가 활동을 유지할 수 있었습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음
	25	당신의 질병이 가까운 사람들과의 관계를 얼마나 많이 바꿨습니까? ① 아주 많이 ② 많이 ③ 다소 ④ 약간 ⑤ 전혀 아님
	26	당신의 질병이 본인의 성생활에 얼마나 나쁜 영향을 미쳤습니까? ① 아주 많이 ② 많이 ③ 다소 ④ 약간 ⑤ 전혀 아님
Medical treatment (1 item)	24	지난 2주간, 치료로 인해 구속감을 느꼈습니까? ① 항상 ② 대부분 ③ 때때로 ④ 드물게 ⑤ 전혀 없음

Please note that the questions shown in “^a” are inverted scores and should be carefully summed.

DISCUSSION

In this study, the K-GIQLI, which evaluated patients' QOL before and after colorectal surgery and has shown comparable results worldwide, was successfully developed. The translation was not ambiguous and was adequately described in terms of its usage in daily life. In addition, there were no significant differences compared to the original English version in terms of linguistic, social, and emotional differences between Republic of Korea and the Western world.

The GIQLI was chosen over other questionnaires was because it can be used for pre- and post-surgery metabolism and nutritional assessment, and it can measure the patient QOL for generic gastrointestinal disorders, rather than being disease-specific. Currently, in Republic of Korea, the incidence of irritable bowel diseases (IBDs), such as ulcerative colitis and Crohn's disease, is increasing annually, along with the cost of treatment [9]. IBD involves a high prevalence of malnutrition due to inadequate dietary intake and malabsorption, and regular monitoring of nutritional status is recommended [10]. One of the methods for monitoring is

the GIQLI questionnaire [11]. Moreover, the GIQLI has been used for nutrition and QOL assessment in colorectal cancer [12] and functional gastrointestinal disorders [13].

No other gastrointestinal QOL questionnaire can be used to evaluate multiple gastrointestinal disorders in Republic of Korea. Generic questionnaires commonly used for general health-related QOL include the Sickness Impact Profile (SIP) and Short form-36 (SF-36) [14]. The SIP, which consists of 136 items and 12 sub-scores, is designed to measure the extent of physical and psychological functional impairment through behavioral changes; though it can detect unexpected effects, important clinical changes might be missed owing to the large number of items [15]. The SF-36, which consists of 36 items and eight domains, is also widely used in gastrointestinal disease, but a previous study comparing the GIQLI and SF-36 found that it was better to use a disease-specific questionnaire than a general questionnaire when evaluating treatment results [16]. Therefore, the SIP and SF-36 are not suitable for use in patients with multiple gastrointestinal disorders. Moreover, the GIQLI has been translated into and validated in several languages and countries, such as Hong Kong [17], Taiwan [18], Sweden [19], and the Netherlands [20], and can be used to conduct global cross-sectional and internationally comparable studies.

Our study has some limitations. First, for the K-GIQLI to be widely used as a questionnaire, further studies are warranted to establish its reliability and validation. Therefore, we plan to conduct a multicenter prospective study to show that the K-GIQLI is a valid self-rating tool. Second, cognitive interviews were not conducted with patients with benign colorectal diseases such as diverticulitis and IBD. However, this did not significantly affect the results because the interviews evaluated sentences and comprehension, rather than the results of the questionnaire.

CONCLUSION

The K-GIQLI was developed and did not differ significantly in meaning from the original English version. We plan to conduct a multicenter prospective study to show that the K-GIQLI is a valid self-rating instrument and a reliable and effective tool for measuring the QOL of patients after colorectal surgery. This study verified that the K-GIQLI is a useful tool not only for conducting global clinical research, but also for evaluating nutritional metabolism before and after surgery.

AUTHOR CONTRIBUTIONS

Conceptualization: HKO. Data curation: HP, HHS. Formal analysis: IJY. Funding acquisition: HKO. Investigation: JWS, JL, HA. Methodology: IJY, HA, HP, HHS. Project administration: HKO. Resources: JWS, JL, HA. Supervision: YBC, IKL, SR. Validation: DWK, SBK. Visualization: DWL. Writing – original draft: IJY. Writing – review and editing: IJY, HKO.

Table 5. Results of the pre-test for the cognitive interview

Variable	Total patients (n=20)
Baseline characteristics	
Age (yr)	61.8 (44~82)
Sex	
Male	16 (80)
Female	4 (20)
GIQLI	
Total score	104 (93.0~111.2)
Symptoms	63 (53.7~67.5)
Emotions	13 (11.0~14.2)
Physical function	17 (14.5~21.5)
Social function	9 (7.0~11.0)
Medical treatment	3 (2.0~4.0)
Interview	
Question 1	6.5 (5.0~10.0)
Question 2	4 (3.0~4.0)
Question 3	4 (4.0~4.0)

Values are presented as median (interquartile range) or number (%).

Question 1 = "How long did you take to complete the questionnaire?". Question 2 = "Are the meanings of the questions clear and unambiguous?". Question 3 = "Are the questions in the questionnaire adequately described in terms of expressions used in daily life?"

GIQLI = Gastrointestinal Quality of Life Index.

CONFLICTS OF INTEREST

The authors of this manuscript have no conflicts of interest to disclose.

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