

# Daily life difficulties among patients with ulcerative colitis in Japan and the United Kingdom

# A comparative study

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### Abstract

The difficulty of life scale (DLS) instrument is used to measure specific life problems in patients with ulcerative colitis (UC). Importantly, health care providers should consider the characteristics of the country in which they support patients with UC. This cross-cultural comparison study investigated DLS among patients with UC in Japan and the United Kingdom (UK). Outpatients attending one hospital in London and one in Osaka were included. We collected patient information using the DLS questionnaire, which comprises 18 items in three domains. Mean differences between Japan and the UK were compared for the total score and each domain of the DLS. Variables with P < .05 in univariate analysis were entered into a multiple regression model. We included 142 patients from Japan and 100 patients from the UK in the analysis. Univariate results showed that UK patients had more difficulties than Japanese patients in all three domains. Multivariate results showed that only "decline of vitality or vigor" showed significantly lower difficulty scores in Japanese patients. Having four or more bowel movements per day, visible bleeding, and being a homemaker or unemployed were significantly associated with greater difficulty according to the DLS total score. The level of daily life difficulties assessed using the DLS was greater among patients in the UK than among Japanese patients. This comparative study between patients with UC in Japan and the UK demonstrated certain country-related features for domain 3, "decline of vitality or vigor," of the DLS. The reasons why UK patients felt greater decline in vitality or vigor may be that these patients may have symptoms other than bowel symptoms; also, Japanese patients are more hesitant to express discomfort. The findings of this study might lead to a better understanding of culturally sensitive perceptions of daily life difficulties in UC.

**Abbreviations:** 5-ASA = 5-aminosalicylate, DLS = difficulty of life scale, IBD = inflammatory bowel disease, UC = ulcerative colitis,UK = United Kingdom.

Keywords: cultural difference, health-related quality of life, inflammatory bowel disease

## 1. Introduction

Inflammatory bowel disease (IBD) includes ulcerative colitis (UC) and Crohn disease. IBD is mainly characterized by abdominal symptoms, and patients experience these symptoms for a long period, with repeated relapses and remissions. In the past, UC was more common among people in Europe and North America. However, IBD has increased in incidence and prevalence in Asian countries since the end of the 20th century. In particular, the incidence of UC in Japan has been reported to have

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

\*Correspondence: Makoto Tanaka, Department of Critical and Invasive-Palliative Care Nursing, Graduate School of Health Care Sciences, Tokyo Medical and increased tenfold from 1991 to 2014 to 172.9 per 100,000 people.<sup>[1]</sup> Estimated UC prevalence rates of 154 to 233 per 100,000 population have been reported in the United Kingdom (UK)<sup>[2]</sup>; therefore, the prevalence of UC in both countries is similar.

The Nurses-European Crohn's & Colitis Organisation statement highlights that nurses should support patients in managing their own condition in their daily lives.<sup>[3]</sup> Previous studies have reported that patients with UC have a wide range of difficulties and stresses in living with UC and that negative emotions and worsened disease are related to each other.<sup>[4–6]</sup> To improve this,

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disease-related life difficulties experienced by patients with UC should be evaluated. The difficulty of life scale (DLS) is useful for patients and their caregivers to assess specific difficulties in their lives.<sup>[7,8]</sup> The DLS has the advantage that it is easier to identify specific difficulties in life than with other quality of life scales. Tanaka et al<sup>[9]</sup> reported that factors associated with greater perceptions of life difficulties include a serious illness course such as a history of hospitalization, the presence of disease symptoms, and poor mental condition.

Barnes et al<sup>[10]</sup> emphasized the need to consider race and ethnicity in the management of IBD. These authors noted the need to fully understand not only genetic differences but also various other aspects such as disease perception and treatment adherence. Therefore, it is important to identify differences with respect to daily life difficulties between different countries. Several previous studies have compared quality of life scores across countries and cultures.<sup>[11-13]</sup> The objective of this study was to compare DLS scores between patients with UC in Japan and in the UK. We expected differences in DLS scores between patients with UC in Japan and those in the UK because of different cultural backgrounds and illness perceptions.

#### 2. Methods

The present study was a secondary analysis using a part of the data from our previously reported studies.<sup>[7]</sup> To collect data in the UK, we conducted a cross-sectional survey using a self-administered questionnaire and review of medical records at King's College Hospital in London from April 2016 to April 2017.<sup>[7]</sup> The survey in Japan was conducted at the Kinshukai Infusion Clinic from July to September 2019.<sup>[14]</sup> Sociodemographic and clinical characteristics of participants in the UK were reported in a previous study.<sup>[7]</sup>

#### 2.1. Participants

Patients diagnosed with UC and attending a clinic at King's College Hospital in London, UK were enrolled consecutively in this study. We enrolled patients who: met the criteria for a diagnosis of UC; were over 20 years old; and were prescribed 5-aminosalicylate (5-ASA). Patients were excluded if they were intolerant of 5-ASA; had a history of surgery for UC; were unable to complete the questionnaire or understand English; had any serious complications; or were participating in other clinical studies at the time of study entry. In keeping with the UK study, among Japanese patients reported in our previous study,<sup>[14]</sup> patients attending Kinshukai Infusion Clinic who met the following eligibility criteria were included in the present study: diagnosed with UC, aged 20 years or older, prescribed 5-ASA, without a history of surgery for UC, and without serious complications. Both study facilities were equipped to provide specialized care for patients with IBD.

#### 2.2. Data collection procedure

As for the UK survey, before patients consulted with a medical doctor or nurse, nurses selected patients who met the criteria and introduced them to an investigator. Candidate participants were informed about the study by the investigator and signed an informed consent form if they agreed to participate in the study. The participants were asked to complete the questionnaire in a location where their privacy was ensured and to hand the completed questionnaire directly to the investigator. As for the Japan survey, nurses working at the clinic selected patients who met the eligibility criteria of our previous study and invited them to participate in the present study. Potential participants read the informational document about the study and checked the box on the questionnaire if they agreed to participation in the study. Completed questionnaires were deposited in a designated

area of the clinic. In both countries, data on participants' clinical features were collected from their medical records and from the questionnaire responses.

#### 2.3. Measurements

2.3.1. DLS. The DLS is a self-administered questionnaire consisting of 18 items and comprising three domains. Each item is scored on a 5-point Likert scale ranging from 1 (not troubled at all), 2 (rarely troubled), 3 (slightly troubled), 4 (very troubled), and 5 (extremely troubled). The three domains of the DLS are as follows: Domain 1 involves difficulties of life in society (nine items), Domain 2 addresses difficulties concerning bowel movements (seven items), and Domain 3 concerns a decline in vitality or vigor (two items). The total value for each domain is calculated by adding the scores of all items in the domain, and the total DLS score is calculated by summing the scores for the three domains. Higher scores indicate greater life difficulties. The DLS scale was developed by Hashimoto and Koike.<sup>[8]</sup> It is available in Japanese and English language versions and its reliability and validity have been verified among patients with UC.<sup>[7,8]</sup> The factor validity, construct validity, known-group validity, internal consistency, and test-retest reliability of the DLS have been verified in the English version. The factor validity, convergent validity, construct validity, internal consistency, and test-retest reliability of the DLS have been verified in the Japanese version.

**2.3.2. Control variables.** The following participant information was collected using the questionnaire or from the medical records: duration of UC; disease extent determined on recent colonoscopy; prescription status for corticosteroids, thiopurines, or biologics medications; abdominal symptoms in the previous week (bowel movements, and bleeding); sex; age; employment; marital status; and race/ethnicity.

#### 2.4. Data analyses

First, the distribution of all variables was determined. Next, we compared the differences between Japan and the UK for the potential explanatory variables by means of a t test or a chisquare test, as appropriate. Next, the mean differences between Japan and the UK were compared for total score and each domain of the DLS. Finally, after checking for multicollinearity between explanatory variables, variables with P < .05 in the univariate analysis were entered into a multiple regression model using the forced entry method. When the correlations between the variables was r > 0.7, the variable with the smaller P value in the univariate analysis was entered into the multiple regression model. We carried out a post-study power analysis to check the degree of power using the DLS total score. All statistical tests were two-tailed, and statistical significance was defined as P < .05. All analyses were performed with SAS version 9.4 for Windows (SAS Institute Inc., Cary, NC).

#### 2.5. Ethical considerations

The investigation conformed to the principles outlined in the Declaration of Helsinki. The Ethics Committee of King's College Hospital National Health Service Foundation Trust approved the protocol of this survey (IRAS project ID: 198963). The Ethics Review Committee of the Faculty of Medicine of Tokyo Dental and Medical University approved the study protocol (approval no. M2019-052).

#### 3. Results

In Japan, the analysis included 142 participants who met the criteria of this study. In the UK, the analysis included 100

participants, with a valid response rate of 89.2%. In the UK, 78% of respondents were White, 6% African, 5% Indian, 2% Caribbean ethnicity, and 7% other.

Table 1 shows the descriptive statistics for DLS and control variables and the results of data comparisons between Japan and the UK. There were significant differences between the two countries in disease duration, disease extent, region, bowel movements, visible bleeding, and marital status for control variables. The mean  $\pm$  standard deviation of the total DLS score in Japan was  $33.2 \pm 14.3$  and  $44.2 \pm 18.4$  in the UK, indicating that UK patients experienced significantly more difficulty. Similar results were found when comparing the results for each

domain score of the DLS. The power calculated using the mean of the DLS total score was >0.99.

Table 2 shows the results of the multivariate model including variables with P < .05 in the univariate analysis as the total DLS score and each domain as the outcome. There was no multicollinearity between variables that resulted in P < .05 in univariate analysis. Only domain 3, "decline of vitality or vigor," showed significantly lower difficulty scores in Japan than in the UK. As for the association between other adjusted variables and outcome, having four or more bowel movements per day, having visible bleeding, and being a homemaker or unemployed were significantly associated with greater difficulty in terms of DLS total score.

#### Table 1

#### Descriptive statistics for DLS and control variables and results of data comparison between Japan and the UK.

	n (%) or mean $\pm$ standard deviation [range]			
	Total (N = 242)	Japan (n = 142)	UK (n = 100) <sup>[7]</sup>	P value§
Outcome: DLS				
Total score [18–90]	37.8 ± 7.1 [18-88]	33.2 ± 14.3 [18-78]	44.2 ± 18.4 [18-88]	<.01
Domain 1: Difficulties of life in society [9-45]	17.0 ± 9.1 [9–45]	14.4 ± 7.2 [6.6-8.6]	20.7 ± 10.3 [9-45]	<.01
Domain 2: Difficulties concerning bowel movements [7–35]	15.5 ± 6.8 [7–34]	14.1 ± 13.0 [7-32]	17.3 ± 6.8 [7–34]	.03
Domain 3: Decline of vitality or vigor [2–10]	5.2 ± 2.5 [2-10]	4.6 ± 2.2 [2-10]	6.2 ± 2.6 [2-10]	<.01
Control variables				
Disease characteristics				
Duration of UC: <5 yr	60 (24.8)	21 (14.8)	39 (39.0)	<.01
Disease extent by recent colonoscopy: rectum*	36 (16.0)	16 (11.2)	20 (24.4)	.02
Currently receiving treatments other than 5ASA: presence	108 (44.6)	61 (43.0)	47 (47.0)	.55
Abdominal symptoms				
Bowel movements/d: ≤3 times	130 (53.7)	113 (79.6)	17 (17.0)	<.01
Visible bleeding: absence	182 (75.2)	115 (81.0)	67 (67.0)	.01
Sociodemographic characteristics				
Gender: male	137 (56.1)	80 (56.3)	57 (57.0)	.98
Age (yr)†	42.4 ± 13.6 [18-93]	42.6 ± 12.0 [20-68]	42.1 ± 15.7 [21-93]	.75
Employment: full time job, family operated business, part-time job, student+	197 (80.7)	120 (85.1)	74 (74.8)	.05
Marital status: married‡	127 (52.9)	89 (62.7)	38 (38.8)	<.01

5-ASA = 5-aminosalicylate, DLS = difficulty of life scale, UC = ulcerative colitis, UK = United Kingdom

\*n = 225.

†n = 241.

‡n = 240.

 $\chi^2$  test for categorical variables, t test for continuous variables.

#### Table 2

Factors related to DLS calculated using multivariate regression analysis.

	$eta^{\star}$						
	Total	Domain 1	Domain 2	Domain 3 Decline of vitality or vigor, n = 239			
	score, n = 239	Difficulties of life in society, n = 239	Difficulties concerning bowel movements, $n = 240$				
Country: Japan/UK (ref)	-0.06	-0.13	0.03	- <b>0.15</b> †			
Control variables							
Duration of UC: <5 yr/≥5 yr (ref)	0.09	0.04	<b>0.12</b> †	<b>0.13</b> †			
Bowel movements/d: ≥4 times/≤3	<b>0.25</b> †	<b>0.21</b> †	<b>0.27</b> †	0.14			
times (ref)							
Visible bleeding: presence/absence	<b>0.33</b> †	<b>0.30</b> †	<b>0.34</b> †	<b>0.26</b> †			
(ref)							
Employment: full time job, family-	- <b>0.15</b> †	- <b>0.18</b> †	- <b>0.12</b> †	-0.10			
operated business, part-time job,							
student/homemaker, unemployed (ref)							
Marital status: married/unmarried,	-0.10	-0.08	_				
divorced, widowed (ref)							

Notes: Variables with P < .05 in univariate analysis were input to the multiple regression model. In Domain 1, country, disease duration, bowel movements, visible bleeding, employment, and marital status were input to the multiple regression model. In Domain 2, country, disease duration, bowel movements, visible bleeding, and employment were input to the multiple regression model. In Domain 3, country, disease duration, bowel movements, visible bleeding, and employment were input to the multiple regression model. In Domain 3, country, disease duration, bowel movements, visible bleeding, and employment were input to the multiple regression model. The variable "disease region on recent colonoscopy" was excluded from multivariate analysis owing to a large number of missing values (n = 17).

DLS = difficulty of life scale, UC = ulcerative colitis, UK = United Kingdom.

\*Standard partial regression coefficients.

†P < .05.

#### 4. Discussion

This study demonstrates a comparison of differences between Japan and the UK in terms of daily life difficulties among patients with UC. An interesting association between certain DLS scores and the country was revealed. Japanese patients had significantly fewer difficulties than those in the UK for domain 3, "decline of vitality or vigor," even when adjusted for control variables. The scores for domains 1 and 2, "difficulties of life in society" and "difficulties concerning bowel movements," did not differ between the two groups. The reason for this is that domains 1 and 2 comprised items that are more easily influenced by abdominal symptoms than those of domain 3. Therefore, the differences between countries in domains 1 and 2 may have been obscured by abdominal symptoms. There are two possible reasons for the difference in domain 3 scores. First, fatigue is highly correlated with a decline of vitality or vigor.<sup>[14]</sup> A review by D'Silva et al<sup>[15]</sup> reported that the prevalence of fatigue in patients with UC was 36% and is considered common. Seventy-two percent of patients with active disease experience fatigue. In this study, UK patients had worse than what abdominal symptoms, such as the presence of bloody stools and more frequent bowel movements. Because worsening of UC symptoms is associated with the presence of extra-intestinal symptoms such as fever and anemia,<sup>[16]</sup> it is possible that UK patients have more than what extra-intestinal symptoms and experience more fatigue. Additionally, a previous study reported that worsening UC can result in diarrhea,<sup>[17]</sup> especially at night. Many UK patients may have had diarrhea during the night, which may have interfered with sleep, resulting in a loss of vigor and vitality. Access to hospitals may also be a factor in why patients in the UK had worse abdominal symptoms. In Japan's health system, patients are free to visit the medical facility of their choice, and patients can visit any hospital they wish at any time. Japanese patients may therefore be able to address their symptoms more quickly.

Another possibility is a difference in the expression of discomfort. A previous study reported that people in East Asia, including Japan, tend to believe that enduring pain is a virtue and tend to underreport it.<sup>[18]</sup> Hence, Japanese patients may have underreported their decline in vitality and energy. Schulman et al<sup>[19]</sup> reported that the culture to which a patient belongs influences the clinical judgment of health care providers. Betancourt<sup>[20]</sup> reported that medical professionals need "cultural competence" so as to provide culturally appropriate medical care to patients of different cultures. Cultural competence refers to the ability to be sensitive to the culture of the recipients of health care and to respond accordingly.<sup>[21]</sup> Our results suggest that health care providers need to consider cultural differences in the expression of vitality among patients with UC.

Among the control variables, having four or more bowel movements per day, having visible bleeding, and being a homemaker or unemployed were significantly associated with worse DLS total score. Among them, worse abdominal symptoms were more strongly associated with worse DLS score. Previous studies have reported an association between worse abdominal symptoms and poor quality of life, and the results of our study support this.<sup>[22,23]</sup> Among them, the presence of visible bleeding has a significant impact on the patient's daily life. Bloody stool is a more accurate predictor of UC activity than frequency of bowel movements<sup>[24]</sup> and may have a greater impact on DLS scores. Additionally, the sight of bloody stools may make patients feel negative and reluctant to go outside or do other daily activities. The association between not working and worsened health-related quality of life among patients with IBD has been reported in previous studies.<sup>[4,5]</sup> Although a causal relationship has not been clarified, it is possible that patients are unable to work owing to worsening IBD, with worsened quality of life as a result. However, this interpretation requires caution.

This study has three limitations. The first is selection bias. Participants in this study from both Japan and the UK were

recruited from a single facility that specializes in the treatment of patients with IBD. These patients may therefore have less difficulty in receiving extensive support from specialized health care providers. Second, there were many differences in control factors between the two countries. Although background factors that differed in the univariate analysis were adjusted in the multivariate model, "disease extent" had many missing values and could not be included in the multivariate model. There was also a difference in the timing of the survey. This study was conducted in 2019 in Japan and during 2016 to 2017 in the UK. The increase in treatment options for UC in recent years, such as the development of vedolizumab or tofacitinib,<sup>[25]</sup> may have affected patients' disease activity as well as their perception regarding difficulties of life. Third, the UK and Japan surveys were conducted as sub-surveys; therefore, sample sizes were not calculated in this study. The power was high in the post-hoc analysis. Future comparisons should be made based on comparable data with appropriate sample sizes to confirm differences. Finally, the country surveyed, that is, Japan or the UK, was adopted as a factor associated with the domain 3 score. However, because ethnicity in the UK is diverse, further research is needed to determine exactly what affects the differences in scores. A previous study reported that apart from disease symptoms, mental health condition and history of hospitalization were factors related to difficulty of life; however, we did not include those variables in this study. In particular, domain 3, "decline of vigor," may be highly related to mental health condition; it is necessary to examine the relationship with mental health condition in the future.

In conclusion, the level of daily life difficulties assessed using the DLS was greater among patients in the UK than among Japanese patients. This comparative study between patients with UC in Japan and the UK demonstrated certain country-related features for domain 3, "decline of vitality or vigor," of the DLS. The findings of this study might lead to a better understanding of culturally sensitive perceptions of daily life difficulties in UC. The findings of our study also suggest that it is important for health care providers to consider disease activity, such as extra-intestinal symptoms or nighttime bowel movements, when interpreting DLS scores.

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