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Health-related Quality of Life in Inflammatory Bowel Disease in a European-wide Population-based Cohort 10 Years After Diagnosis

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Background: Chronic inflammatory bowel disease (IBD) negatively affects the patient's health-related quality of life (HRQoL). Only a few population-based studies have compared the HRQoL of patients with the background population. The aim of this study was to evaluate the HRQoL in a European cohort of patients with ulcerative colitis and Crohn's disease 10 years after diagnosis (European Collaborative study group of Inflammatory Bowel Disease) compared with the national background population in each country and to assess possible country-specific differences.

Methods: Patients with IBD from 7 European countries were invited to a follow-up visit 10 years after their diagnosis of IBD. We assessed their clinical and demographic data, including the generic HRQoL questionnaire short form health survey-36. Countrywise comparison with the background population was performed with z-scores using the Cohen's effect size index.

Results: Seven hundred sixty-nine patients were eligible for the study. We registered statistically significant and clinically relevant decreases in the short form health survey-36 dimensional scores in patients with symptoms at the time of follow-up and for patients reporting sick leave during the previous year or having received disablement pension. In the Netherlands and Norway, there was a moderate difference between the patients with IBD and the background population for the general health dimension.

Conclusions: Overall, the HRQoL was not reduced in the IBD cohort compared with the background populations. However, in addition to older age and female gender, current symptoms at follow-up, disablement pension, and sick leave during the previous year were significantly associated with a reduced HRQoL in patients with IBD.

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Key Words: Crohn's disease, ulcerative colitis, health-related quality of life

INTRODUCTION

Crohn's disease (CD) and ulcerative colitis (UC) are 2 forms of chronic inflammatory bowel disease (IBD). They affect different parts of the bowel and can develop extraintestinal manifestations.[1] Recent studies on CD have identified prognostic factors present at diagnosis that may increase the likelihood for later surgery. These factors include the following: disease location in the terminal ileum, stricturing or fistulizing disease, and age below 40 years at diagnosis.[2–4] In UC, an erythrocyte sedimentation rate ≥ 30 and extensive colitis at diagnosis may increase the probability of subsequent colectomy during the first 10 years after diagnosis.[5,6] The role of patient-reported outcome measures in optimizing IBD treatment and supporting disease management decisions has become more important in the last decade.[7,8] The aim of IBD treatment is to promote disease control and to improve patients' health-related quality of life (HRQoL). The HRQoL assessment is carried out with patient-reported outcome measures, usually as a generic- or diagnose-specific questionnaire with mental, physical, social, and emotional domains.[9–11] Previous studies have shown that a reduced HRQoL in patients with IBD is associated with higher disease activity, an increased need for corticosteroid medication, an increased frequency of sick leave, and decreased work participation, smoking, rheumatic symptoms, female gender, and having CD.[12–14]

Furthermore, cross-cultural differences in Europe for disease-related issues have been reported with a possible north–south

gradient. This may impact the HRQoL in IBD by influencing the patient's coping ability.[15] There is a lack of standardized population-based studies comparing the HRQoL of patients with IBD with the background population.[16] To the best of our knowledge, no published studies have compared the HRQoL in population-based cohorts of patients with IBD from different European countries 10 years after diagnosis.

The primary aim of this study was to evaluate the HRQoL in a European population-based cohort of patients with IBD 10 years after diagnosis. The secondary aims were to assess the possible country-specific differences in the HRQoL and to identify the demographic and clinical variables associated with those differences. Finally, we compared the HRQoL scores in patients with IBD with the HRQoL scores in the background population for each participating country.

PATIENTS AND METHODS

Ethical Requirements

The ethics committees of all participating centers approved the study protocol. All subjects gave their informed consent before entering the study.

Patients

This study is a part of the European Collaborative study group of Inflammatory Bowel Disease (EC-IBD) project.[17] From October 1991 to September 1993, 2201 patients with IBD were included in a population-based prospective and uniformly diagnosed inception cohort from 20 well-defined areas in 12 European countries and Israel using the diagnostic criteria of Lennard-Jones.[1,18]

Data collection for the 10-year follow-up study was performed from August 2002 to January 2004. Thirteen centers from 9 countries contributed with data from 1580 patients with IBD. To reduce the possibility for selection bias, a minimum response rate of 60% was set as the criterion for participation for each center, which was met by 9 centers from 7 countries (Oslo, Norway; Copenhagen, Denmark; Maastricht, the Netherlands; Vigo, Spain; Cremona and Reggio Emilia, Italy; Ioannina and Heraklion, Greece; and Beer Sheva, Israel).

The Short Form Health Survey-36 (SF-36) scores from the background population in Greece, Spain, Israel, Italy, the Netherlands, and Norway are published elsewhere.[19–24] The SF-36 data from the Danish background population were provided by the Danish National Institute of Public Health. Nationwide representative samples with persons older than 18 years were used. However, the Israeli sample consisted of a Jewish population aged between 45 and 75 years, whereas the Israeli cohort in this study comprised non-Jewish persons as well. Therefore, we decided to exclude the Israeli European Collaborative study group of Inflammatory Bowel Disease cohort from the assessment when comparisons were made with the nation-specific background population.

Data Acquisition

All patients included in the study were invited to a standardized 10-year follow-up visit at their respective hospitals. At this visit, clinical and demographic data were obtained regarding their IBD. Additional investigations, such as colonoscopies, were performed if needed. All patients completed a separate patient questionnaire, including questions on their HRQoL. Patients self-reported the data through an internet-based form presented and explained at the clinic.[24]

Methods

HRQoL Questionnaire SF-36

The SF-36 is one of the most used generic HRQoL questionnaires in medical research; it assesses the functional status, well-being, and general perception of health with high validity and reliability.[25] The SF-36 consists of 1 multiitem scale of 36 questions that can be transformed into the following 8 domains: physical functioning (10 items), role limitations due to physical problems (role physical, 4 items), social functioning (2 items), bodily pain (2 items), mental health (5 items), role limitations due to emotional problems (role emotional, 3 items), vitality (4 items), general health perceptions (5 items), and 1 item about general health (transitional health) that were not used to score any of the 8 domains.[26] A physical and mental component summary score can be calculated; however, the interpretation of these scores is dependent on country-specific conversion factors.[25]

The results from the SF-36 surveys in each nation-specific background population were used in this study to calculate the z-scores as described below.

Statistical Analysis

Univariate associations between the pairs of demographic and clinical variables were assessed with Student's t test for continuous data and Pearson's chi-square test for categorical data. Most of the SF-36 dimension scores were not normally distributed. Therefore, we performed both parametric and non-parametric tests (t test and Mann–Whitney Wilcoxon tests for pairs of variables and analysis of variance and the Kruskal–Wallis test when comparing 3 or more groups). Both methods gave similar results for the statistical significance. Therefore, we chose to present the results of the standard parametric tests to compare our results with the literature.[10,12–14] We performed analysis of covariance to adjust the countrywise mean dimensional scores for age, gender, and level of education, as recommended.[10,12–14] Results are shown as the estimated marginal means with 95% confidence intervals. The variables tested were those shown in the literature to impact the SF-36 dimensional scores.[10,12–14,27] We performed univariate analysis and multiple linear regression analysis to identify variables that were statistically significantly associated with at least 2 SF-36 dimensions. Because of multiple testing, the level of statistical significance

was set to 1%. When *P* values were <0.05, associations were considered as a trend. All tests were 2-sided.

The comparison of the dimensional scores between the background population and patients with IBD in each country was performed with z-scores (z-score = the mean patient score minus the mean population score divided by the population SD). Scores higher than zero indicate higher dimensional scores and those lower than zero indicate lower dimensional scores in the patient population compared with the background population. Z-scores were evaluated with the Cohen's effect size index (<0.2 indicates no difference, 0.2–0.5 indicate a small difference, 0.5–0.8 indicate a moderate difference, >0.8 indicates a large difference).[28] With the exception of Norway, none of the dimensional scores from the background populations were adjusted for age, gender, and the level of education for any of the participating countries because of the lack of such information in the published articles. Therefore, the z-scores were calculated with unadjusted dimensional scores.

All statistical analyses were performed with SPSS version 19 (IBM SPSS Statistics, Chicago, IL) for Windows.

RESULTS

At the 10-year follow-up, 9 centers from 7 countries contributed data from 1199 patients. Four hundred twenty-two patients did not complete the questionnaires at follow-up because they were unwilling to participate, untraceable, or dead. An additional 8 patients were classified as having uncertain IBD and were withdrawn. In total, 769 patients with IBD (64.1%), two thirds with UC (n = 517) and one third with CD (n = 252), completed the HRQoL questionnaire and were eligible for analysis (Fig. 1). There were no differences in the gender, diagnosis, age, disease distribution, and disease complications (fistulizing or stricturing CD) between the responders and nonresponders at baseline.

HRQoL Scores in the Entire Cohort

Increasing age was associated with significantly lower scores for the physical functioning, role physical, bodily pain, and general health SF-36 dimensions. Female gender was associated with significantly lower scores for the physical functioning, role physical, bodily pain, vitality, and role emotional dimensions. Higher education was associated with significantly higher dimensional scores for general health, bodily pain, and physical functioning. We registered a trend for lower scores for the mental health dimension in patients with CD compared with UC (data not shown).

Table 1 shows the variables that were independently associated with reduced HRQoL scores, adjusted for age, gender, level of education, and country. "Symptoms at follow-up," "ever received disablement pension," and "sick leave during the previous year" were significantly associated with reduced SF-36 dimensional scores. An active disease course (symptoms in the majority of years or every year since diagnosis), being single/divorced or having undergone IBD-related surgery in the observation period all resulted in reduced HRQoL scores in some dimensions. Multiple regression analysis showed that the use of corticosteroids over the previous year, IBD diagnosis type, disease distribution, smoking status, rheumatic manifestations, number of flares over the year before follow-up or ever having been on social welfare did not have an independent statistically significant effect on any of the SF-36 dimensions.

Country-specific HRQoL Scores

Table 2 shows the demographic and clinical data of the responders stratified by the country at the 10-year follow-up. The mean age in the patient groups ranged from 43 years (Israel) to 50 years (Italy) (*P* < 0.05). There was, however, no statistically significant difference in the gender distribution among the countries. The proportion of patients with UC differed significantly between the national cohorts and was especially high in the Greek
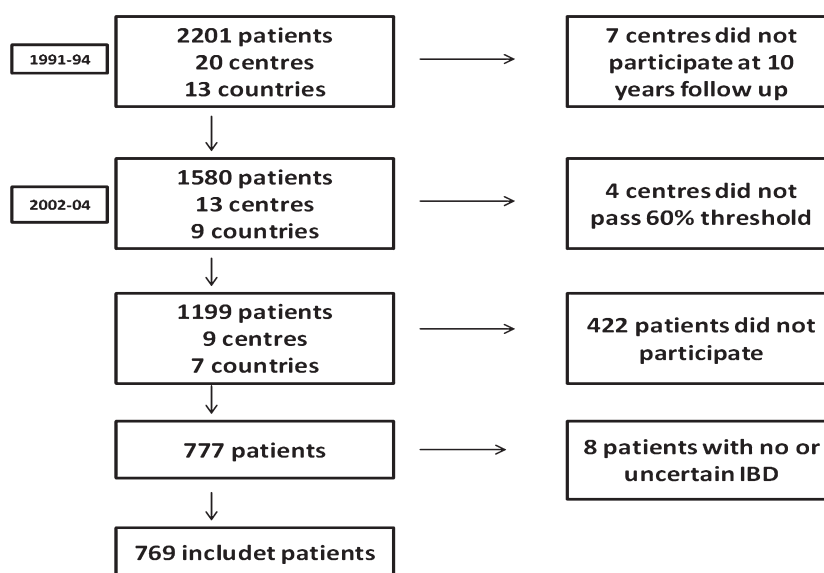

FIGURE 1. Cohort of patients with IBD at inception and at 10-year follow-up.

TABLE 1. SF-36 Dimensional Scores Adjusted for Age, Gender, Education and Country

		PF	RP	BP	GH	VT	SF	RE	MH
Symptoms at follow-up	No	91** (89–93)	86*** (83–89)	85*** (82–87)	70*** (68–72)	68*** (66–70)	91*** (89–93)	89* (86–92)	78 (76–79)
	Yes	82 (80–84)	58 (54–62)	63 (61–66)	51 (48–53)	51 (49–54)	74 (72–77)	70 (66–74)	69 (67–72)
Sick leave	Not more than once	89* (88–91)	81* (78–83)	80** (78–82)	66* (64–67)	65* (63–66)	88*** (86–90)	86*** (84–89)	77* (75–78)
Last year	More than once	77 (73–80)	43 (36–51)	53 (48–58)	43 (39–48)	44 (40–49)	65 (61–70)	54 (47–61)	62 (58–66)
Ever received disablement pension	No	89*** (88–90)	79*** (76–81)	78*** (76–80)	65*** (63–66)	63* (61–65)	87*** (85–88)	84* (81–86)	76** (74–77)
	Yes	76 (71–80)	47 (38–57)	61 (55–67)	44 (38–49)	49 (43–55)	68 (63–74)	65 (57–74)	65 (60–69)
Disease course (activity most of the year)	No	90 (88–92)	84 (81–88)	84* (82–86)	70* (68–72)	68 (66–71)	91 (88–93)	88 (85–91)	78* (77–80)
	Yes	85 (83–87)	67 (63–70)	69 (66–71)	55 (52–57)	55 (52–57)	79 (77–81)	76 (72–79)	71 (69–73
Married/Living together	Yes	86 (84–88)	75 (72–78)	76 (71–78)	62 (61–64)	62* (60–64)	85* (83–87)	83 (80–85)	75*** (74–77)
	No	82 (79–85)	70 (65–76)	74 (71–78)	59 (56–62)	58 (55–61)	78 (75–81)	77 (72–81)	66 (63–69)
No. surgeries in 10 yr	None	86* (87–90)	78* (75–81)	77 (75–79)	63 (61–65)	62 (60–64)	84 (82–86)	83 (80–86)	72 (71–74)
	One or more	83 (80–86)	65 (60–71)	74 (70–78)	58 (55–62)	58 (54–62)	81 (77–85)	77 (72–82)	73 (70–77)
Mean dimension scores whole cohort (SD)		87.8 (20)	76 (37.7)	76.9 (25.7)	62.8 (23.2)	62 (23.7)	85.2 (22.3)	82.3 (33.3)	72.6 (20.7)

Scores adjusted for age, gender, education, and land in ANCOVA analysis. Adjusted mean and 95% confidence intervals. Only variables, which reached statistical significance (***$P < 0.001$, **$P < 0.01$) or showed a trend (*$P < 0.05$) in a multiple regression analysis for at least 2 dimensions, are shown in this table.

BP, bodily pain; GH, general health; MH, mental health; PF, physical function; RE, role emotional; RP, role physical; SF, social function; VT, vitality.

TABLE 2. Demographic and Clinical Characteristics of the Study Population

	Italy	Greece	Spain	Israel	Denmark	Netherlands	Norway	Total
No. patients	96	74	73	41	103	156	226	769
Gender—male, %	54 (56.3)	41 (55.4)	42 (57.5)	20 (48.8)	39 (37.9)	85 (54.5)	108 (47.8)	389 (50.6)
Mean age at time of 10-yr follow-up, yr[a]	49.7	47.3	44	42.9	44.3	45	46.8	46.2
Number of patients with UC, %[a]	65 (67.7)	63 (85.1)	46 (63)	28 (68.3)	62 (60.2)	96 (61.5)	157 (69.5)	517 (67.2)
Marital status (married or living together, %)[b]	77.1	74.3	74	14.6	65	79.5	77	72.1
Education (university, %)[b]	40.6	24.3	21.9	34.1	34	27.6	42.9	34.1
Rheumatologic manifestation, %[a]	7.3	27	13.7	26.8	17.5	17.9	18.6	17.7
Ever received disablement pension due to IBD, %[b]	3.1	2.7	5.5	7.3	3.9	23.7	4.9	8.3
Sick leave more than once last year, %[a]	10.4	5.4	5.5	4.9	19.4	15.4	12.4	12.0
Ever been a cigarette smoker, %[b]	60.4	43.2	65.8	36.6	58.3	69.2	58.4	58.9
Symptoms at time of 10-yr follow-up, %[b]	27.1	9.5	38.4	41.5	35.9	42.3	43.8	36.4
Steroids last year, %	7.3	5.4	17.8	9.8	8.7	7.7	11.5	9.8
Flares last year, %[c]	25	5.4	21.9	14.6	25.2	11.5	23.5	19.1
High disease activity the last 10 year, %[b]	29.2	24.3	45.2	46.3	37.9	48.1	64.6	46.6
At least 1 surgery due to IBD the last 10 year[b]	16.7	5.4	17.8	7.3	44.7	25	17.7	20.9

[a]Statistical significance between countries: Pearson chi-square: $P < 0.05$.
[b]Statistical significance between countries: Pearson chi-square: $P < 0001$.
[c]Statistical significance between countries: Pearson chi-square: $P = 0.001$.

cohort. The marital status of the Israeli patients differed significantly from the rest of the cohort. The proportion of patients with symptoms at the time of follow-up varied significantly between the cohorts and was more than 4 times higher in the Israeli, Dutch, and Norwegian cohorts than in the Greek cohort. Additionally, the proportion of patients with flares in the year before the 10-year follow-up differed significantly, with a low number in the Greek group compared with the Spanish, Norwegian, and Danish groups. The proportion of patients with high disease activity in the observation period was increased in the Norwegian cohort. In the Danish cohort, there were a high proportion of patients with at least 1 surgery during the observation period.

At the 10-year follow-up, the SF-36 scores adjusted for age, gender, level of education, and stratified by country showed statistically significant differences between the countries in 7 of 8 dimensions. Patients with IBD from Israel scored the lowest in 6 of 8 dimensions (physical functioning, general health, vitality, social functioning, role emotional, and mental health) (Fig. 2A). Excluding the Israeli cohort because of its distinct differences with the rest of the European cohort, there were still statistically significant country-specific differences in the SF-36 scores. Without the Israeli cohort, the highest mean scores for the physical functioning and bodily pain dimensions were registered for the Italian cohort, and role physical was the highest for the Greek cohort. The lowest mean scores for the physical functioning, role physical, and bodily pain dimensions were registered for the Dutch and the Norwegian cohorts. The scores for the mental health dimension were the lowest in the Greek and the Italian cohorts and high in the Danish group.

In Figure 2B, we summarize the SF-36 dimensional scores from the background population for each of the participating countries. There were considerable differences in the country-specific dimensional scores, wherein the Israeli cohort scored the lowest for 5 of 8 dimensions.

Countrywise Comparison with the Background Population

The z-scores depict the country-specific differences in the mean dimensional scores in the study group compared with the background population (Fig. 3). Most of the mean z-scores in the Norwegian, Dutch, and Danish cohorts and half of the z-scores in the Spanish and Greek cohorts revealed lower HRQoL scores in the IBD cohort compared with the national background population. Only the Italian cohort showed a better HRQoL in the IBD group than in the background population. Most of the scores, however, indicated small differences, according to Cohen's effect size; therefore, we consider these findings to be of minor clinical importance. The only exceptions were the mean z-scores that were higher than −0.5 in the general health dimension in Norway and the Netherlands, which represents a moderate effect size according to Cohen's index and indicates substantially lower general health scores compared with the background population.

DISCUSSION

In this European population-based IBD cohort, symptoms at the 10-year follow-up, disablement pension due to IBD, and sick leave, as well as age and female gender, were correlated with
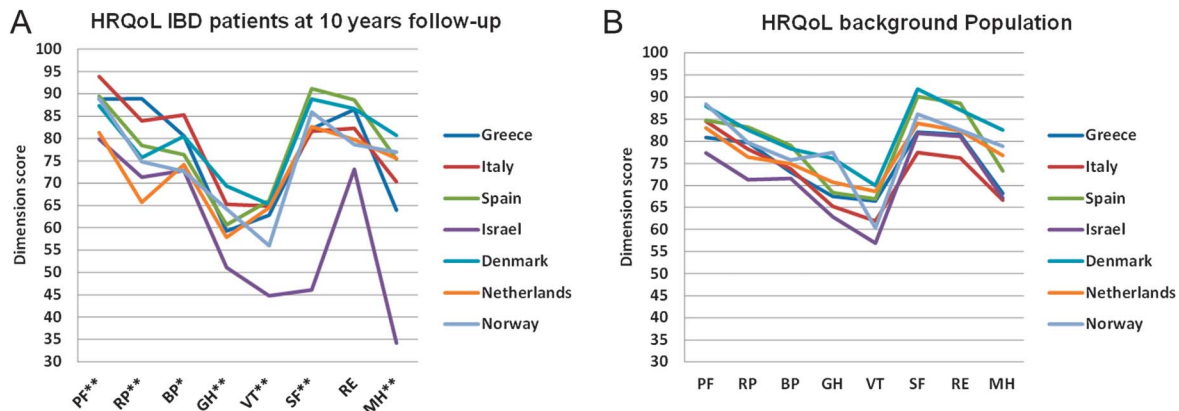
FIGURE 2. Unadjusted means of SF-36 dimension scores stratified by country in patients with IBD at 10-year follow-up (A) and in the background population (B). Countrywise differences. *P = 0.001; **P < 0.001. BP, bodily pain; GH, general health; MH, mental health; PF, physical function; RE, role emotional; RP, role physical; SF, social function; VT, vitality.

a reduction in the patient-reported HRQoL. This confirms the results of other population-based studies.[10,12–14,27,29]

In the Norwegian IBSEN cohort,[12–14] patients with CD reported significantly lower HRQoL scores compared with patients with UC. We were not able to reproduce this finding in the present European study. One possible explanation for this could have been the higher disease activity of patients with CD in the Norwegian cohort than in this study. However, this was not the case. Additionally, the mean age and the gender distribution were similar between the IBSEN cohort and the present sample. The 5- and 10-year follow-up studies from the IBSEN cohort[10,12–14,29] also revealed an association between treatment with corticosteroids or immunosuppressive drugs and reduced HRQoL scores. In this study, the use of corticosteroids and flares the previous year before follow-up were associated with disease activity at
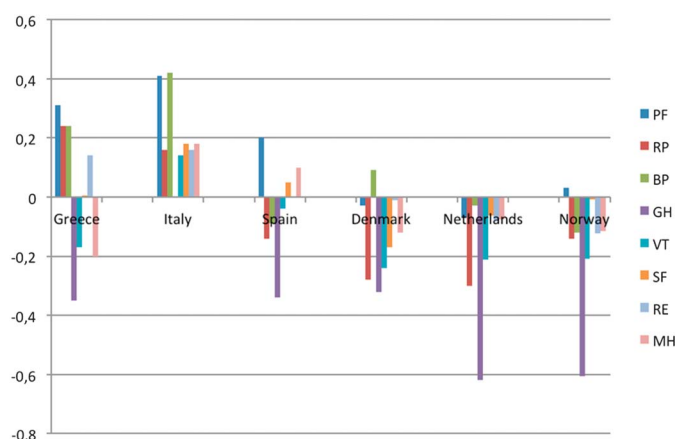

FIGURE 3. SF-36 dimensions, z-scores = the mean patient score minus the mean population score divided by the population SD. Cohen's effect size index: <0.2 no difference, 0.2 to 0.5 small difference, 0.5 to 0.8 moderate difference, >0.8 large difference. BP, bodily pain; GH, general health; MH, mental health; PF, physical function; RE, role emotional; RP, role physical; SF, social function; VT, vitality.

follow-up and could not be regarded as factors that independently influenced the HRQoL.

This study could not confirm previous findings that rheumatic symptoms were associated with a poorer HRQoL in patients with IBD.[13,30] Marital status (being married or living together) was associated with higher dimensional scores for mental health, vitality, and social functioning, which, to the best of our knowledge, has not been previously reported for patients with IBD. A Swedish study with 300 patients with UC, which also showed an association between a lower HRQoL and current disease activity, coexisting disease, and female gender did not detect an association between marital status and the HRQoL.[16]

Are the statistically significant differences presented in Table 1 clinically relevant? Coteur et al[31] defined minimal clinically important differences for physical and mental component summary scores for patients with CD, which range from 2.3 to 8.7 and 1.6 to 7.0, respectively, depending on the methods used. Minimal clinically important differences for UC have not been reported. Because the PCS and MCS scores are most likely influenced by the country-specific conversion factors, we did not calculate them in this study.

Hjermstad et al[32] defined a difference of 10% in a HRQoL scale ranging from 0 to 100 as clinically relevant. Norman et al[33] showed that a difference of half a SD is the threshold for a clinically meaningful difference. In our study, the SD for the dimensional scores varied from 20 for physical functioning to 38 for role physical (Table 1), indicating that a cutoff value of 10% is most likely not adequate. Therefore, using Norman's definition, our study shows clinically meaningful differences for the following factors: "symptoms at follow-up" (all dimensions except the physical functioning and mental health), "sick leave over the previous year" (all dimensions), "received disablement pension" (all dimensions), and "disease course (activity most of the years)" for bodily pain and general health. The statistically significant differences observed between marital status and "number of surgeries after 10 years" do not seem to be of clinical relevance.

The distinctly poor SF-36 scores of the Israeli cohort in 6 of 8 dimensions (Fig. 2A) are difficult to explain. An extremely high percentage of single persons and a relatively high percentage of persons with symptoms at follow-up might contribute to the explanation. However, we detected relatively low numbers of Israeli patients reporting sick leave more than once in the previous year and a relatively low mean age, which are negatively associated with HRQoL. Another possible explanation could be the special political situation in Israel with frequent-armed conflicts in the region. The fact that the background population scores are also the lowest in 5 of 8 dimensions, compared with the other countries, supports this assumption.

To check the robustness of our data, we excluded the Israeli data and reanalyzed the remaining country data sets. The differences between countries remained statistically significant. Moreover, they seem to be clinically relevant for the physical functioning, role physical, bodily pain, and mental health dimensions.[33] The low scores for the physical functioning, role physical, and bodily pain dimensions, which can all be characterized as expressing reduced physical functions of daily living, most likely have a multifactorial explanation. The relatively high percentage of symptoms at the time of follow-up in the Norwegian cohort combined with the increased sick leave and disablement pension in the Dutch cohort may contribute to this finding (Table 1). The low mean scores for mental health in the Greek and Italian cohorts compared with the Danish group might represent an attitude to the disease and the patients' coping abilities. Levenstein at al[15] showed that there is a higher level of concern about IBD in southern compared with northern European patients, which might explain the observed differences.

Surprisingly, most of the z-scores in the Italian and Greek cohorts and some of those in the Spanish cohorts were positive, indicating a better HRQoL in patients with IBD than in the reference populations. However, the estimated differences are small and do not indicate clinical relevance. They might indicate a trend, which is difficult to explain because there are no demographic differences in the mean age, gender, or marital status between the IBD cohorts and the national background populations. The assessments of HRQoL in the background populations were performed for most of the countries in the early 90s. During the next decade, there may have been changes in the general HRQoL in some or all of the participating countries. However, this is beyond the scope of this study and remains unknown. Hjortswang et al[16] found that Swedish patients with UC in remission had SF-36 scores similar to the background population. To the best of our knowledge, no studies have thus far shown a better HRQoL in patients with IBD compared with the background population. Although the differences are small and of no clinical relevance, we must consider the possibility of a selection bias in the Greek and Italian cohorts. The moderate reduction in the general health dimension from Norway and the Netherlands may reflect concerns about their own health, in general as well as compared with others and uncertain expectations about the future health in the patient group with unpredictable disease activity. This has been reported in other studies.[10,12,14,27] As in the discussed population-based studies, the HRQoL in our study population was generally rather good, which is not in agreement with non-population–based studies that report a higher proportion of patients with symptoms and a considerable impact on the HRQoL.[34]

This study is the first to report the HRQoL in a population-based European IBD cohort, including comparison with the HRQoL scores in the background population. The use of the SF-36, an internationally recognized and validated HRQoL instrument in all participating countries, is a major strength of the study. Furthermore, the use of standardized definitions for IBD and relapse, standardized symptom scores and a standardized set-up for the 10-year visit also adds value to the study. In addition, to avoid a selection bias, patients from centers with response rates below 60% were excluded from the study. Given the study design with independent inclusion of incident cases in each center, the exclusion of those with low response rates should not bias results from the remaining centers. However, the smaller sample sizes in the southern countries might have affected the robustness of our results and limited our statistical power. Moreover, relatively few centers from each country recruited patients, which may introduce a bias in the country-based data, which may turn out to be from the center-based data.

The fact that centers in the northern countries contributed with relatively many patients and that IBD treatment in the participating countries is standardized to specialized health care may suggest that the participating northern centers are representative for the IBD treatment in these countries. However, the numbers of patients in the southern European centers and the number of centers from each country in the entire sample are too low to be representative for the participating countries.

In conclusion, patients with IBD from 6 European countries and Israel do not, in general, have clinically relevant decreased HRQoL 10 years after diagnosis compared with the background populations. However, the HRQoL is reduced in subgroups of patients. Current symptoms, several episodes of sick leave during the year before follow-up, receiving disease-related disablement pension, being female and higher age are associated with reduced HRQoL. Country-specific differences in the HRQoL seemed to be caused by disease activity in the form of current symptoms, number of sick leaves over the previous year, and disablement pension due to IBD. The HRQoL measurements should be included in the standard follow-up routine as an objective tool for monitoring the disease course in IBD.

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