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Original research

Rome V global epidemiology and validation survey: prevalence of disorders of gut–brain interaction and comparison with the Rome IV global epidemiology study

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ABSTRACT

Background The recently published Rome V adult diagnostic criteria facilitated an updated epidemiological survey of disorders of gut–brain interaction (DGBI).

Objective We aimed to describe the global epidemiology of DGBI using the Rome V criteria and compare it with the Rome IV Rome Foundation Global Epidemiology Study.

Methods A population-based Internet survey of 28,771 adults was conducted in 15 countries using the Rome V diagnostic questionnaire. DGBI prevalence was determined and compared with the Rome IV data. Multivariable logistic regression models were used to examine associations of demographic factors to Rome V DGBI status in the global population and to assess potentially associated clinical factors.

Results The surveys yielded similar results. The prevalence of at least one DGBI using the Rome V criteria was 40.9%, compared with 40.5% for Rome IV. In both, the prevalence was higher among females and decreased with increasing age. In the Rome V sample (25 DGBI), the most prevalent oesophageal disorder was functional dysphagia at 4.1%, the most prevalent gastroduodenal disorder was functional dyspepsia at 8.1%, unclassified bowel disorder was the most prevalent bowel disorder (9.6%), followed by chronic constipation (8.9%) and IBS (8.5%) and proctalgia fugax was the most prevalent anorectal disorder (7.3%). The prevalence rates for two new DGBI were 5.1% for abdominal migraine and 1.4% for inability to belch syndrome.

Conclusion The Rome V global prevalence of DGBI is consistent with Rome IV. This bolsters confidence in the validity of prevalence rates for DGBI and reaffirms their high global burden.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ The global prevalence of disorders of gut–brain interaction (DGBI) was last assessed in the Rome Foundation Global Epidemiology Study (RFGES) conducted in 2017–2018, based on the Rome IV diagnostic criteria. The availability of the new Rome V diagnostic criteria enabled us to conduct a comparative study of the global prevalence and burden of DGBI using the results of the current Rome V survey and the previous RFGES.

WHAT THIS STUDY ADDS

⇒ The results of the two surveys were very similar, providing greater confidence in the solid, evidence-based understanding of DGBI epidemiology, as the diagnostic criteria were not only based on expert opinion but considered the epidemiological evidence gathered by the RFGES. Three additional DGBI were assessed in the Rome V survey and clinical factors such as consultation rate for DGBI and bothersomeness of and life interference by symptoms were included, providing a robust basis for the development of future clinical DGBI criteria, which will be more relevant for clinical practice than for clinical trials and epidemiological studies.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ This study is expected to serve as a reference work that enhances understanding of the prevalence and burden of DGBI. New clinical factors have been added that broaden our understanding of the personal impact of these disorders and may lead to more optimal, personalised treatment in the future.

INTRODUCTION

The adult disorders of gut–brain interaction (DGBI) comprise 34 GI disorders, including some of the

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most common digestive problems. Clinically, DGBI are defined and identified by their pattern of GI symptoms and a minimal number of diagnostic tests in the absence of alarm features.

The Rome diagnostic criteria, expert consensus criteria that have evolved with four previous iterations spanning four decades, are used to formally diagnose DGBI, based predominantly on patterns of presence, frequency and duration of self-reported GI symptoms. The criteria are updated approximately every 10 years. The previous iteration was Rome IV in 2016.[1] Studies using factor[2 3] and latent class analyses[4] have shown that the Rome classifications of symptoms into defined DGBI diagnostic syndromes are reflected in objective population symptom patterns, supporting their value in clinical research and patient care.

In 2017–2018, the Rome Foundation conducted the Rome Foundation Global Epidemiology Survey (RFGES) of more than 75 000 adults in the general population of 33 countries to assess the prevalence and burden of DGBI as defined by the Rome IV diagnostic criteria. The first study highlighted the substantial global burden of DGBI.[5]

The evolution from the Rome I to the Rome V criteria reflects an incremental progression from primarily eminence-based criteria to increasingly evidence-based criteria.[1] The RFGES, with its rigorous methodology, large dataset and numerous publications established a substantial base of evidence for future diagnostic iterations.

The Rome Foundation has finished updating the diagnostic criteria to the new Rome V version.[6] The changes from Rome IV are reflected in the updated Rome V Adult Diagnostic Questionnaire, which was used to conduct a global epidemiology study.[7] However, it was not clear whether the Rome V criteria maintain epidemiological stability while improving clinical relevance.

The first aim of the present study was to present an updated epidemiological picture of the global prevalence and burden of DGBI by Rome V criteria and compare it with the RFGES findings. For this aim, the survey enabled calculation of the prevalence rates for all DGBI assessed with the Rome V diagnostic questionnaire[7] and a direct comparison using the previous iteration, Rome IV.[6]

The second aim was to lay evidential foundations for DGBI clinical diagnostic criteria. To date, the Rome criteria have served mostly for clinical trials and epidemiological research. The Rome Foundation is developing the groundwork for clinical criteria to capture the clinical impact of the disorders, not just symptom frequency and duration.[8]

For this aim, we enhanced the survey questionnaire with items on doctor visits, bothersomeness of symptoms and life interference related to symptoms. These items were validated previously in a focus group study.[9]

The third aim was to assess the performance of the new Rome V adult diagnostic questionnaire, which had to be tested in the general population because (1) changes were made to self-report symptom frequency scales, (2) questions on symptoms were added or modified for some of the diagnoses and (3) there are two new DGBI entities, inability to belch syndrome and abdominal migraine, which necessitated novel questions not yet tested in population samples. Two new Rome V diagnoses, 'rectal hyposensitivity' and 'rectal hypersensitivity', were not included in the questionnaire or in this report because rectal sensitivity testing is required for their diagnosis. 'Narcotic bowel syndrome' (NBS) that was included in the Rome IV criteria but not in the RFGES was assessed in the present survey.

For this aim, data collection for the Rome V survey was completed in early 2025 prior to the release of the new diagnostic criteria to identify any problems with the criteria or the performance of the diagnostic questionnaire before publication and final approval.

The present paper focuses primarily on study aims #1 and #2, presenting the main findings of the study for all 25 Rome V DGBI in the same 15 countries, with detailed comparisons with the RFGES for the 22 DGBI that were assessed in both surveys and an assessment of the bothersomeness and life interference of DGBI.

METHODS

Data collection

This was a de-identified secure internet survey, closely following the data collection methodology used in the RFGES.[5]

Study recruitment and participants

Study participants were adults in the general population, 18 years of age and older (no upper age limit), who were registered in survey-taker panels by a global market survey company (Qualtrics, Provo, Utah, USA) or its subvendors. Participants earned points redeemable for gifts for completing the survey. Potential participants were invited via email by Qualtrics, based on their demographic characteristics only, until all predetermined demographic quota groups (see below) were filled.

Patient and public involvement

Neither patients nor the public were involved in the design, conduct, reporting or dissemination plans for this study.

Participating countries and pre-determined population quotas

The 15 countries surveyed in this study were Argentina, Canada, China, France, Germany, Japan, Mexico, Poland, Romania, South Korea, Spain, Sweden, Turkey, the UK and the USA, each with approximately 2000 participants surveyed. All 15 were surveyed in the RFGES also.

Predefined demographic quotas were applied to make the sample equivalent across countries and to achieve broad representation of the population. These quotas were 50%/50% sex balance, age distribution of 40% aged 18–39 years, 40% aged 40–64 years and 20% aged 65+ years, and no more than 35% with an education level equivalent to or greater than an undergraduate university degree.

Survey quality assurance methods

Quality assurance methods were identical to those in our previous multinational surveys,[10] including enforced completion of all symptom questions, repeated GI questions for identifying excessively inconsistent respondents and attention-check questions. Data from individuals identified as poor-quality participants, based on these methods, were eliminated from the study dataset and replaced by other respondents in the same demographic quota groups.

Study questionnaire

In addition to the 114-question Rome V diagnostic questionnaire,[7] the survey included questions on sociodemographic variables, history of GI diseases and surgeries, comorbid non-GI conditions, medication use, healthcare utilisation and access, dietary intake and nutrition, food avoidance/restriction, quality of life,[11] anxiety and depression,[12] postinfection DGBI (including COVID-19), menstrual status and hormone supplementation, concern about symptoms, life stress (using dedicated questions from the RFGES) and somatisation (Patient Health

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Questionnaire-12(PHQ-12)).[13] Bothersomeness and life interference were measured on the same five-option response scale; 'not at all', 'a little', 'moderately', 'a lot' and 'extremely' that was used in the focus group study for these variables.[9]

Questionnaire translation

The study questionnaire was translated by a professional translation company (TransPerfect, USA), into 11 languages with linguistic validation (cognitive debriefing). Each country's principal investigator monitored this process to ensure that the translated questionnaires were linguistically valid and culturally adapted for their country.

DGBI case definitions

Individuals with a self-reported history of physician GI diagnoses that could account for DGBI-like symptoms were excluded from assignment to the relevant Rome V DGBI diagnoses. Participants who reported a history of coeliac disease, GI cancer or IBD were excluded from all Rome V DGBI diagnoses. Those reporting peptic ulcer disease were excluded from oesophageal, gastroduodenal and biliary diagnoses, but could be assigned to bowel, centrally mediated abdominal pain or anorectal DGBI diagnoses. Those reporting diverticulitis and those with a history of bowel resection were excluded from bowel, centrally mediated abdominal pain and anorectal diagnoses, but were not excluded from oesophageal, gastroduodenal or biliary diagnoses. All participants who were excluded from a DGBI diagnosis for these reasons remained in the total population denominator.

Definition of any DGBI by anatomic GI regions

In addition to calculation of the prevalence of having any DGBI, which was defined as meeting criteria for one or more of the total DGBI assessed, the presence of DGBI was also characterised by GI anatomic region. The latter included oesophageal,[14] gastroduodenal,[15] bowel,[16] pancreas or gallbladder/biliary[17] and anorectal DGBI.[18] Centrally mediated disorders of abdominal pain,[19] which are Rome V DGBI, but not in a specific anatomical region, were included as their own category.

Statistical analyses

Comparisons between the new Rome V survey and the RFGES

Descriptive comparisons were made between the 15 countries in the Rome V survey and the same 15 countries in the internet arm of the RFGES, by tabulating prevalence rates as point prevalence estimates with 95% CIs. For these prevalence comparisons, the samples were weighted to equalise the within-study sample size per country, because both survey datasets had somewhat uneven sample sizes for the 15 countries.

A second adjustment was made because the RFGES encompassed 22 DGBI and the Rome V study 25 DGBI (the 2 new ones and NBS, which was not included in the RFGES). To enable direct comparison of the prevalence of having any DGBI between the two surveys, the Rome V DGBI count was limited to the same 22 DGBI that were surveyed in the RFGES. However, in analyses using only individual DGBI in the Rome V dataset, all 25 DGBI were included.

Mixed effects logistic regression analysis was used to assess associations between sociodemographic variables and probability of having any DGBI, which was the outcome variable and the independent variables were sex, age, education and urban versus rural living. Country was entered as random intercept effect to account for between-country variability.

Assessment of clinical impact variables

The percentage of individuals in the Rome V survey reporting moderate or greater bothersomeness and life interference of symptoms was calculated for any DGBI and each DGBI separately. A mixed effects logistic regression analysis including all people with DGBI was used to assess the relative strength of association of each variable with history of GI-related doctor visits.

Definition of painful and non-painful DGBI

The DGBI in the Rome V survey were divided into painful and non-painful DGBI (online supplemental table 1)[20] for comparison of prevalence of doctor visits, bothersomeness and life interference.

Division of the sample into age groups

The study data were collected according to predetermined quotas for three age groups. This is a pragmatic division to ensure broad representation of the adult population. However, for statistical analysis of DGBI differences across the age spectrum, a more nuanced age division is preferable. In particular, division around the age of menopause (generally around 50 years) is desirable. For this reason, our analyses of age group differences used a four-group division that has also been used in numerous papers on the results of the previous RFGES survey: that is, 18–34 years, 35–49 years, 50–64 years and 65 years and older.

RESULTS

The total study population in the Rome V survey was 28,771 participants, with almost equal sex ratio (49.9% women, 50.1% men). The mean age was 46.4 years, range 18–99. The age group distribution was 40.0% ages 18–39 years, 40.9% ages 40–64 and 19.1% 65 years and older. The urban/rural distribution was 89.8%/10.2%, and 48.9% had college degrees. None of the participants in one study participated in the other.

In the multivariable analysis on associations between sociodemographic variables and DGBI, female sex and younger age were associated with DGBI, but education level and residence type (urban/rural) were not (data not shown).

Table 1 shows the comparative rates for meeting diagnostic criteria for at least one DGBI for the same 22 DGBI in each survey. The results were very similar in all analyses, holding true for the entire study population and by sex and age. The prevalence rate for the Rome V survey was 40.9% (40.3, 41.4) compared with 40.5% (40.0, 41.0) in the RFGES. When all 25 DGBI were included for the Rome V survey alone, DGBI prevalence increased to 41.4% (40.8, 42.0). In both surveys, the rates were higher for females and the prevalence decreased with increasing age.

The number of participants who were disqualified from a DGBI diagnosis due to a self-reported physician diagnosis of an upper GI organic disease was n=1803, 6.3% (6.0%, 6.6%) and for a lower GI organic disease n = 1804, 6.3% (6.0%, 6.6%).

Table 2 presents the results for having any DGBI by country. The rates increased in 8 countries and decreased or were unchanged in 7 compared to RFGES. The highest Rome V rate was for Argentina (48.9%). Sweden, Mexico and the UK had substantial DGBI increase compared to the earlier survey, from 39.0% to 48.2%, 40.2% to 46.0%, and 36.7% to 42.5%, respectively. In contrast, the prevalence decreased substantially in France from 47.3% to 38.0% and in South Korea from 39.3% to 31.1%. The changes in the other countries were in the 0%-5% range

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Table 1 Per cent prevalence (95% CI)* and proportions (numerator/denominator) meeting criteria for any DGBI (ie, at least one of the 22 DGBI assessed in both studies) in the total samples and by sex and age subgroups. The distribution of age groups is different from the original classification (four age groups instead of the original three: 18–34, 35–64 and 65+ years)

		Sex		Age group			
	Total sample	Males	Females	18–34 years	35–49 years	50–64 years	65+ years
Rome IV (RFGES) survey N=31 888, 22 DGBI	40.5% (40.0, 41.0) 12 857/31 888	34.7% (34.0, 35.4) 5549/16 004	46.3% (45.6, 47.1) 7308/15 884	44.6% (43.6, 45.6) 4297/9654	41.9% (41.0, 42.9) 4114/9860	39.3% (38.1, 40.5) 2649/6852	32.2% (30.9, 33.4) 1797/5522
Rome V Survey N=28 771, Same 22 DGBI	40.9% (40.3, 41.4) 11 754/28 771	34.8% (34.0, 35.6) 5021/14 422	46.9% (46.1, 47.8) 6733/14 349	45.9% (44.8, 47.0) 3708/8076	42.7% (41.7, 43.8) 3705/8670	38.5% (37.3, 39.7) 2512/6528	33.3% (32.1, 34.5) 1829/5497

*RFGES data were limited to the same 15 countries as in the Rome V survey and were weighted to equalise sample size between countries to produce a closer match with the Rome V sample. Weights were applied to the prevalence estimates to equalise sample sizes between countries within each study, to produce a closer comparison. Percentages in the table represent weight-adjusted prevalence point estimates, whereas the DGBI case counts are unweighted actual numbers of individuals meeting the criteria in the datasets.
DGBI, disorders of gut–brain interaction; RFGES, Rome Foundation Global Epidemiology Study.

Prevalence rates by individual anatomic GI regions

The Rome V and the RFGES DGBI prevalence results by GI anatomical regions are presented in table 3 and figure 1, along with the rates for the 22 individual DGBI.

The prevalence for having at least one oesophageal DGBI was 7.0% (6.7, 7.2) compared to 6.1% (5.8, 6.3) for RFGES. As in the RFGES, the most prevalent disorder was functional dysphagia at 4.1% (3.9, 4.3) compared to 3.3% (3.1, 3.5) in the RFGES.

The prevalence of having at least one gastroduodenal DGBI was 11.9% (11.5, 12.3) compared to 10.4% (10.0, 10.7) in the RFGES. The most common disorder was functional dyspepsia at 8.1% (7.8, 8.4) compared to 6.9% (6.6, 7.2) in the RFGES. The prevalence of the new inability to belch syndrome diagnosis was 1.4% (1.3, 1.6). As previously observed in the RFGES study, the bowel region was the most affected by DGBI. The Rome V prevalence of having at least one bowel DGBI was 34.7% (34.2, 35.9) compared to 33.9% (33.3, 34.4) in the RFGES. Unclassified bowel disorder (UBD) was the most prevalent bowel disorder (9.6%), followed by chronic constipation (8.9%) and IBS (8.5%).

The prevalence for having at least one central pain DGBI in Rome V was 0.3% (0.2 to 0.4) versus 0.01% (0.00 to 0.03) in the RFGES. However, two additional DGBI in this class were assessed only in Rome V: abdominal migraine, which had 5.1% (4.8 to 5.3) prevalence, and narcotic bowel syndrome at 0.09% (0.05 to 0.12) prevalence. The Rome V prevalence for having at least one anorectal DGBI was 11.1% (10.7 to 11.4) compared with 7.9% (7.6 to 8.2) in the RFGES. The most prevalent DGBI was proctalgia fugax at 7.3% (7.0 to 7.6) compared to this same DGBI at 5.7% (5.5, 6.0) in the RFGES.

Figure 2 shows the percentage of individuals who reported having seen a doctor because of a GI problem and reported substantially bothersome or life interfering GI symptoms ('moderate or greater'). It shows these results by GI anatomical segments and by painful versus non-painful DGBI. The percentage with a history of GI-related doctor consultations was over 50% for most individual DGBI (range: 34.9%-88.0%), highest for narcotic bowel syndrome (88.0%), cannabinoid hyperemesis syndrome (80.6%), CAPS (75.0%), functional heartburn (74.5%) and biliary pain (71.7%) table 4.

Bothersomeness of symptoms was rated higher than life interference by participants with DGBI. Among all individuals with a DGBI, 42.6% reported having consulted a doctor for a GI problem, 39.0% reported moderate or greater bothersomeness and 28.1% moderate or greater interference with life. Table 5 shows the results of a multivariable analysis, showing that bothersomeness followed by interference with life had strong associations with doctor visits, while age and sex had very weak associations.

When the DGBI were grouped into painful and non-painful DGBI (figure 2 and table 4) the mean percentages for all three parameters were higher for painful than non-painful DGBI at 54.4% vs 43.2% for doctor visits, 56.1% vs 39.9% for bothersomeness and 42.4% vs 29.2% for life interference.

DISCUSSION

The primary aim of the present study was to gain a rigorously informed global perspective on the prevalence and burden of the DGBI, and to evaluate the stability of DGBI prevalence. The most important finding of this study is the striking consistency in global DGBI prevalence across Rome IV and the updated Rome V criteria, despite modifications in some diagnostic definitions.

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Table 2 Per cent prevalence (95% CI) and proportion (numerator/denominator) meeting Rome V and Rome IV criteria for any DGBI, by country*

Country	% meeting criteria for any DGBI Rome V survey N=28 771 All 25 DGBI	% meeting criteria for any DGBI Rome V survey N=28 771 Same 22 DGBI as in ROME IV	% meeting criteria for any DGBI Rome IV survey (REGES) N=31 888 22 DGBI
Argentina	49.2% (47.0, 51.4) 958/1948	48.9% (46.7, 51.1) 952/1948	44.0% (41.8, 46.1) 904/2057
Canada	41.6% (39.3, 43.8) 763/1836	41.3% (39.1, 43.6) 759/1836	41.3% (39.1, 43.4) 837/2029
China	30.1% (28.1, 32.2) 583/1936	29.7% (27.7, 31.7) 575/1936	34.6% (32.7, 36.1) 1002/2914
France	38.5% (36.3, 40.7) 734/1907	38.0% (35.6, 40.2) 724/1907	47.3% (45.1, 49.5) 955/2019
Germany	36.8% (34.6, 39.0) 663/1802	35.8% (33.6, 38.0) 645/1802	36.5% (34.4, 38.6) 738/2020
Japan	39.6% (37.4, 41.8) 766/1934	39.5% (37.3, 41.7) 764/1934	39.4% (37.5, 41.3) 987/2504
Korea	31.1% (29.1, 33.2) 614/1972	31.1% (29.1, 33.2) 614/1972	39.3% (37.1, 41.5) 795/2022
Mexico	46.5% (44.2, 48.8) 828/1781	46.0% (43.7, 48.3) 819/1781	40.2% (38.0, 42.3) 804/2001
Poland	45.0% (42.8, 47.2) 889/1976	44.1% (41.9, 46.3) 871/1976	46.0% (43.9, 48.2) 947/2057
Romania	42.6% (40.5, 44.8) 832/1951	41.5% (39.3, 43.7) 810/1951	40.1% (38.0, 42.2) 822/2049
Spain	45.2% (43.1, 47.4) 898/1985	44.7% (42.5, 46.9) 887/1985	43.7% (41.6, 45.9) 906/2072
Sweden	48.4% (46.1, 50.6) 921/1905	48.2% (45.9, 50.4) 918/1905	39.0% (36.9, 41.1) 812/2084
Turkey	40.4% (38.2, 42.5) 794/1968	39.2% (37.1, 42.1) 772/1968	39.7% (37.6, 41.8) 798/2010
UK	43.0% (40.9, 45.2) 860/1999	42.5% (40.4, 44.7) 850/1999	36.7% (34.6, 38.8) 743/2027
USA	42.9% (40.6, 45.1) 802/1871	42.4% (40.2, 44.7) 794/1871	39.9% (37.8, 42.0) 807/2023
Total	41.4% (40.8, 42.0) 11 905/28 771	40.9% (40.3, 41.4) 11 754/28 771	40.5% (40.0, 41.0) 12 913/31 888

*RFGES dataset limited to the same 15 countries as in the Rome V survey. Both survey samples were weighted (only for the total combined sample) to equalise sample size between countries within each study and produce a more closely matched comparison.
DGBI, disorders of gut–brain interaction; RFGES, Rome Foundation Global Epidemiology Study.

Analyses of the Rome V survey results indicate that the global DGBI prevalence using Rome V criteria is comparable to Rome IV in the RFGES. The global prevalence based on the Rome V survey was 40.9% vs 40.5% in Rome IV,based on the same 22 DGBI.The demographic patterns of having DGBI were closely comparable in both studies. The sex ratio of having any DGBI in the current survey was nearly identical to that found in the RFGES and most DGBI showed a decline in prevalence with age as in the RFGES,[21] with the most marked prevalence drop typically seen in the 65+ age group. This stability suggests that DGBI represent biologically and clinically coherent entities rather than artefacts of diagnostic criteria.

Although the majority of DGBI showed broadly similar prevalence results between the Rome V and RFGES data, there were some notable exceptions. Some of these could be anticipated due to changes in diagnostic criteria, whereas the reasons for prevalence differences between the surveys for some other DGBI are unclear.

Functional dyspepsia prevalence increased from 6.9% to 8.1% and rumination syndrome decreased from 2.8% to 1.5%. For these disorders, changes in the criteria, even if subtle, may have contributed to the mild changes in prevalence. For functional dyspepsia the Rome V consensus was changed for post-prandial distress syndrome (PDS) symptoms, where 2 days per week is now considered sufficient compared with 3 days per week in Rome IV. For rumination syndrome, the condition that 'Regurgitation is not preceded by retching or nausea' was added as a criterion in Rome V. Another possible explanation for the change in functional dyspepsia could be related to the COVID-19 pandemic.[22] Some studies have reported a greater increase in prevalence for post-COVID-19 FD than post-COVID-19 IBS.[23 24]

The prevalence of IBS was more than doubled compared with Rome IV; 8.5% vs 3.9%. This was expected from the changes in the criteria in Rome V, which included lowering of the minimum pain threshold to 3 days a month and reincorporation of discomfort alongside abdominal pain as a criterion. This also led to a prevalence shift from other bowel disorders in the Rome IV RFGES survey to IBS in the Rome V survey. The reduction in the prevalence of functional constipation (as termed in Rome IV) and chronic constipation (as termed in Rome V) from 11.8% to 8.9% likely reflects such an internal shift as more people with constipation-type bowel symptoms now met IBS criteria, thereby excluding them from a diagnosis of chronic constipation. Another possible contributor to increased IBS prevalence

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Table 3 Per cent prevalence (95% CI) and number of survey participants meeting Rome V criteria for individual DGBI by GI anatomical region without the new DGBI diagnoses, and comparison with Rome IV prevalence from the RFGES in the same 15 countries*

Disorder	Rome V survey (N=28 771) 22 DGBI common to both surveys	RFGES (N=31 888) 22 DGBI common to both surveys
A. Oesophageal disorders		
A1. Functional chest pain	1.8% (1.6, 1.9) n=506	1.3% (1.2, 1.4) n=422
A2. Functional heartburn	0.5% (0.5, 0.6) n=157	1.1% (1.0, 1.2) n=363
A3. Reflux hypersensitivity	1.3% (1.2, 1.4) n=376	0.9% (0.8, 1.0) n=283
A4. Globus	0.8% (0.7, 0.9) n=217	0.8% (0.7, 0.9) n=253
A5. Functional dysphagia	4.1% (3.9, 4.3) n=1174	3.3% (3.1, 3.5) n=1047
Any oesophageal DGBI	7.0% (6.7, 7.2) n=1996	6.1% (5.8, 6.3) n=1933
B. Gastroduodenal disorders		
B1. Functional dyspepsia	8.1% (7.8, 8.4) n=2322	6.9% (6.6, 7.2) n=2196
B1a. Postprandial distress syndrome	5.1% (4.9, 5.4) n=1478	5.7% (5.5, 6.0) n=1818
B1b. Epigastric pain syndrome	2.9% (2.7, 3.1) n=844	2.5% (2.3, 2.7) n=799
B2a. Chronic nausea vomiting syndrome (CNVS)	1.0% (1.0, 1.2) n=312	1.0% (0.9, 1.1) n=316
B2b. Cyclic vomiting syndrome (CVS)	1.0% (0.9, 1.1) n=281	1.3% (1.1, 1.4) n=403
B2c. Cannabinoid hyperemesis syndrome	0.6% (0.5, 0.7) n=180	0.08% (0.05, 0.11) n=25
B3a/b belching disorder (supragastric/gastric)	1.0% (0.9, 1.1) n=284	1.0% (0.9, 1.2) n=343
B4. Rumination syndrome	1.5% (1.4, 1.6) n=430	2.8% (2.6, 3.0) n=895
Any gastroduodenal DGBI	11.9% (11.5, 12.3) n=3415	10.4% (10.0, 10.7) n=3299
C. Bowel disorders		
C1. Irritable bowel syndrome	8.5% (8.2, 8.8) n=2449	3.9% (3.7, 4.1) n=1237
IBS-C	2.7% (2.5, 2.9) n=780	1.2% (1.1, 1.3) n=387
IBS-D	2.3% (2.1, 2.5) n=658	1.1% (1.0, 1.2) n=355
IBS-M	2.9% (2.7, 3.1) n=825	1.3% (1.2, 1.4) n=355
IBS-U	0.6% (0.6, 0.7) n=186	0.2% (0.2, 0.3) n=74
C2. Chronic constipation	8.9% (8.5, 9.2) n=2550	11.8% (11.5, 12.2) n=3769
C3. Functional diarrhoea	5.1% (4.8, 5.3) n=1464	5.1% (4.8, 5.3) n=1620
C4. Functional abdominal bloating	2.4% (2.3, 2.6) n=697	3.2% (3.0, 3.4) n=1025
C5. Unclassified bowel disorder	9.6% (9.3, 9.9) n=2768	8.9% (8.5, 9.2) n=2823
C6. Opioid-induced constipation	0.2% (0.2, 0.3) n=62	1.7% (1.5, 1.8) n=522
Any bowel DGBI	34.7% (34.2, 35.9) n=9990	33.9% (33.3, 34.4) n=10 793
D. Centrally mediated disorders of gastrointestinal pain		
Any centrally mediated disorder of GI pain	0.3% (0.2, 0.4) n=88	0.01% (0.00, 0.03) n=4
E. Biliary disorders		
Biliary pain	0.2% (0.1, 0.2) n=53	0.07% (0.04, 0.09) n=21
F. Anorectal disorders		
Faecal incontinence	4.1% (3.9, 4.3) n=1175	1.7% (1.6, 1.8) n=540
Proctalgia fugax	7.3% (7.0, 7.6) n=2098	5.7% (5.5, 6.0) n=1821
Levatorani syndrome	1.3% (1.2, 1.5) n=383	1.0% (0.9, 1.1) n=342
Any anorectal disorder	11.1% (10.7, 11.4) n=3175	7.9% (7.6, 8.2) n=2507

*RFGES data were limited to the same 15 countries as in the Rome V survey. Both survey samples were weighted to equalise sample size between countries within each study and produce a more closely matched comparison. Percentages in the table represent weight-adjusted prevalence point estimates, whereas the DGBI case counts are unweighted actual numbers of individuals meeting the criteria in the datasets.

DGBI, disorders of gut–brain interaction; RFGES, Rome Foundation Global Epidemiology Study.

in the Rome V survey is an increased rate of post-infection IBS since the RFGES was conducted before the pandemic and the Rome V study after it. There is evidence that the COVID-19 pandemic may have increased the prevalence of IBS.[22] However, the overall prevalence of bowel DGBI remained stable.

A factor that may have had a negative effect on the prevalence of IBS was the exclusion of anyone with continuous abdominal pain, who were classified as centrally-mediated abdominal pain syndrome (CAPS), which now has two types. Type A is the traditional one with no association of pain with physiological events, while Type B is a new category that allows association of pain with physiological events. The increase in CAPS can be related to this new type and many patients that would otherwise have been classified as IBS were now included as CAPS. In contrast, this change may not be fully reflected in clinical practice where most practitioners likely still diagnose most of these patients as IBS even though they have continuous abdominal pain.

UBD was the most prevalent bowel DGBI. A detailed analysis and discussion of this entity can be found in a previous RFGES paper.[25] Individuals comprising this group have reduced quality of life and general negative impact on various health outcomes measures. Changes in bowel habit were more prevalent than pain, although pain was the most bothersome symptom in this group. Hence, UBD is an important standalone group that deserves clinical and research attention. While specialists may manage these patients by treating their predominant symptoms and associated psychosocial factors, primary care providers may

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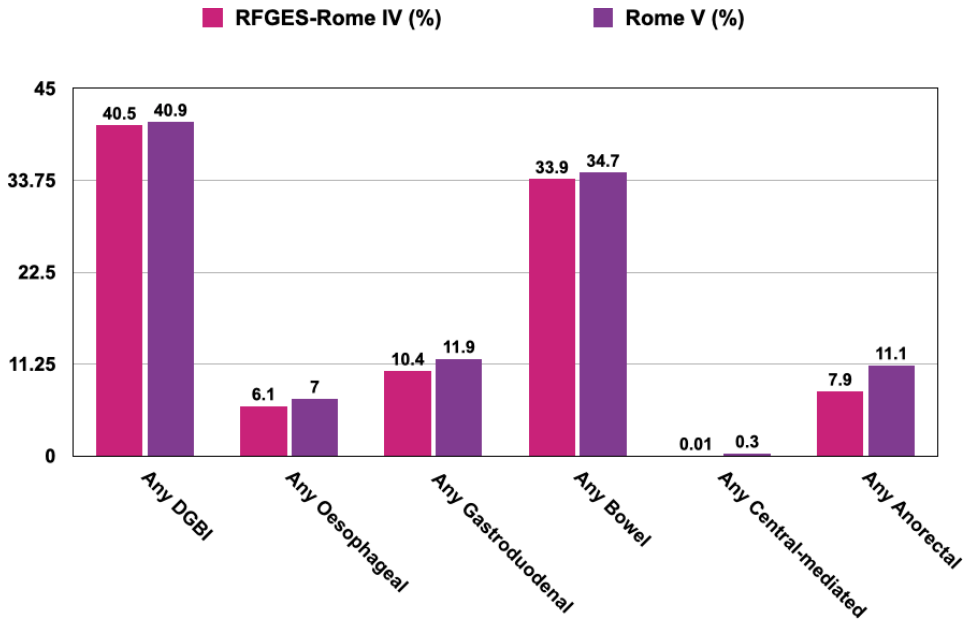

Figure 1 Comparative percentage prevalence of having a DGBI in different anatomic regions, between the RFGES and the Rome V survey. Number of DGBI=22. DGBI, disorders of gut–brain interaction; RFGES, Rome Foundation Global Epidemiology Survey (Rome IV).

simply diagnose them as IBS, although this impression is more speculative than evidence based.

Faecal incontinence prevalence was substantially higher in Rome V, with a difference of 2.4%. This was also expected, largely due to the lowering of the diagnostic frequency threshold for faecal incontinence episodes in Rome V from two to one a month.

We also do not have an explanation for the increase in Rome V proctalgia fugax by 1.6%. The prevalence in the RFGES (5.7%) was considered by many as higher than seen in clinical practice. To correct for this, the description of anorectal pain in the Rome V diagnostic questionnaire was refined, mentioning only pain rather than the overly broad Rome IV characterisation, that is, 'aching, pain or pressure'. That adjustment was expected

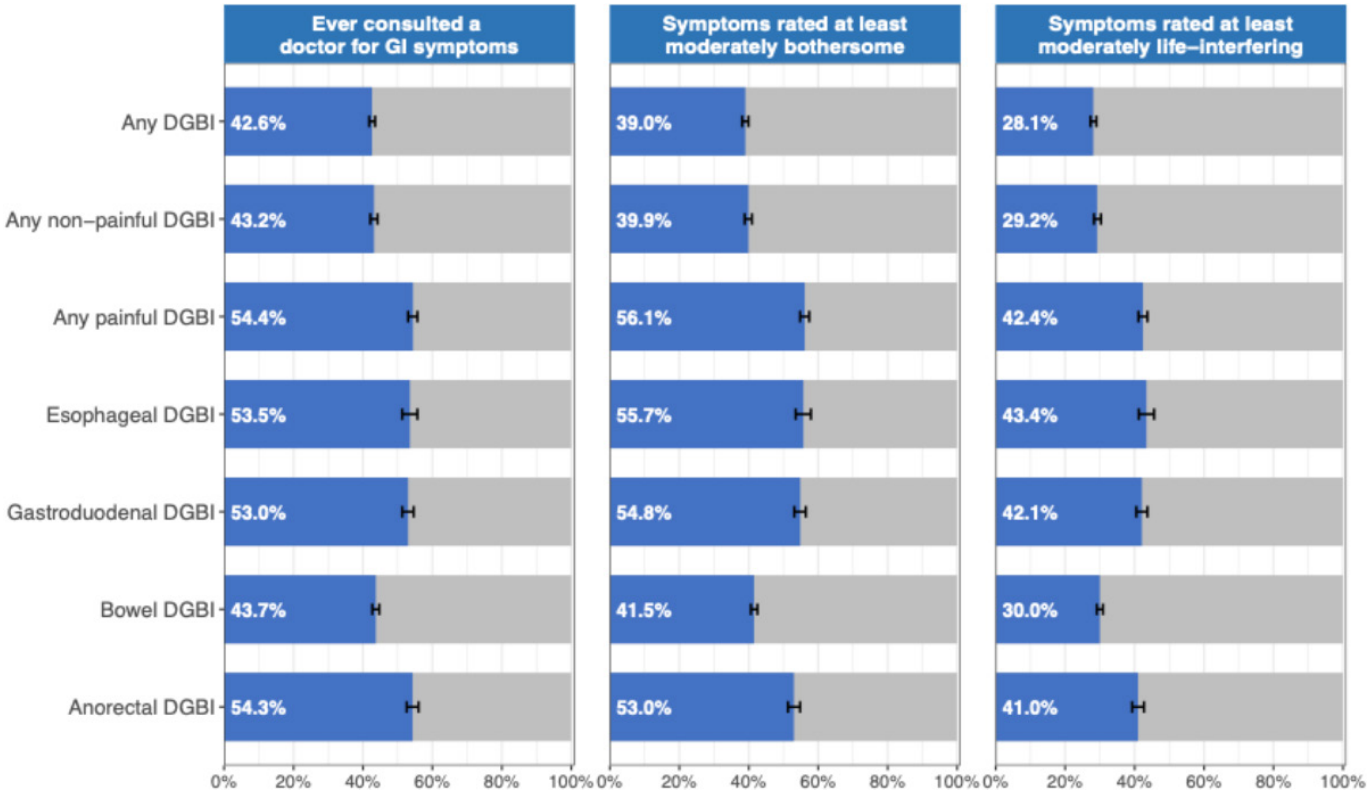

Figure 2 Percentage of individuals in the Rome V survey with DGBI reporting doctor visits for their GI problem, and moderate or more bothersomeness of symptoms and/or life interference by symptoms. DGBI, disorders of gut–brain interaction.

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Table 4 Per cent of individuals with DGBI in the Rome V survey who had ever consulted a doctor for a GI problem, and who reported at least moderate bothersomeness and/or life interference from their GI symptoms

Characteristic	Doctor visit due to GI problem Yes N=8738*	Bothersomeness Moderately or more N=6359*	Life interference Moderately or more N=4555*
Any DGBI (n=11 905)	42.6% (41.8, 43.5) n=5076	39.0% (38.1, 39.9) n=4640	28.1% (27.3, 29.0) n=3350
Oesophageal DGBI (n=1996)	53.5% (51.3, 55.7) n=1068	55.7% (53.5, 57.9) n=1112	43.4% (41.2, 45.6) n=866
Functional chest pain (n=506)	43.5% (39.2, 47.8) n=220	42.9% (38.6, 47.2) n=217	29.8% (26.0, 34.0) n=151
Functional dysphagia (n=1174)	59.0% (56.2, 61.8) n=693	62.4% (59.5, 65.1) n=732	51.1% (48.2, 54.0) n=600
Functional heartburn (n=157)	74.5% (67.2, 80.7) n=117	80.3% (73.3, 85.7) n=126	70.1% (62.5, 76.7) n=110
Globus (n=217)	42.4% (36.0, 49.0) n=92	39.6% (33.4, 46.3) n=86	27.6% (22.1, 34.0) n=60
Reflux hypersensitivity (n=376)	68.6% (63.8, 73.1) n=258	79.0% (74.6, 82.8) n=297	66.5% (61.6, 71.1) n=250
Gastroduodenal DGBI (n=3547)	53.0% (51.3, 54.6) n=1879	54.8% (53.1, 56.4) n=1942	42.1% (40.5, 43.7) n=1493
Belching disorder (n=284)	59.9% (54.1, 65.4) n=170	65.1% (59.4, 70.4) n=185	55.6% (49.8, 61.3) n=158
Cannabinoid hyperemesis syndrome (n=180)	80.6% (74.2, 85.7) n=145	83.9% (77.8, 88.5) n=151	79.4% (73.0, 84.7) n=143
Chronic nausea and vomiting syndrome (n=312)	57.7% (52.1, 63.0) n=180	73.7% (68.6, 78.3) n=230	62.2% (56.7, 67.4) n=194
Cyclic vomiting syndrome (n=281)	61.9% (56.1, 67.4) n=174	72.6% (67.1, 77.5) n=204	60.1% (54.3, 65.7) n=169
Epigastric pain syndrome (n=844)	55.3% (52.0, 58.7) n=467	58.5% (55.2, 61.8) n=494	41.5% (38.2, 44.8) n=350
Functional dyspepsia (n=2322)	51.6% (49.6, 53.7) n=1199	52.4% (50.4, 54.4) n=1217	38.3% (36.4, 40.3) n=890
Inability to belch (n=415)	57.3% (52.5, 62.0) n=238	66.7% (62.1, 71.1) n=277	55.2% (50.4, 59.9) n=229
Postprandial distress syndrome (n=1478)	49.5% (47.0, 52.1) n=732	48.9% (46.4, 51.5) n=723	36.5% (34.1, 39.0) n=540
Rumination syndrome (n=430)	50.5% (45.8, 55.2) n=217	42.1% (37.5, 46.8) n=181	26.5% (22.6, 30.9) n=114
Bowel DGBI (n=9990)	43.7% (42.7, 44.7) n=4367	41.5% (40.6, 42.5) n=4149	30.0% (29.1, 30.9) n=2998
Abdominal migraine (n=1456)	66.1% (63.7, 68.5) n=963	73.5% (71.2, 75.7) n=1070	63.0% (60.5, 65.5) n=918
Functional constipation (n=2550)	36.5% (34.6, 38.4) n=930	32.0% (30.5, 34.1) n=823	21.6% (20.1, 23.3) n=552
Functional diarrhoea (n=1464)	37.7% (35.3, 40.2) n=552	31.4% (29.0, 33.8) n=459	21.0% (19.0, 23.1) n=307
Functional abdominal bloating (n=697)	34.9% (31.4, 38.5) n=243	32.1% (28.8, 35.7) n=224	22.0% (17.4, 23.4) n=141
Opioid-induced constipation (n=62)	61.3% (48.8, 72.4) n=38	40.3% (29.0, 52.7) n=25	32.3% (22.0, 44.6) n=20
Irritable bowel syndrome (n=2449)	62.1% (60.1, 64.0) n=1520	68.9% (67.0, 70.7) n=1687	53.4% (51.4, 55.4) n=1308
Unspecified functional bowel disorder (n=2768)	39.2% (37.4, 41.0) n=1084	33.6% (31.9, 35.4) n=931	24.2% (22.6, 25.8) n=670
Anorectal DGBI (n=3175)	54.3% (52.6, 56.0) n=1724	53.0% (51.3, 54.8) n=1684	41.0% (39.3, 42.7) n=1301
Faecal incontinence (n=1175)	59.7% (56.9, 62.5) n=702	57.6% (54.8, 60.4) n=677	47.8% (45.0, 50.7) n=562
Levator ani syndrome (n=383)	60.6% (55.6, 65.3) n=232	67.4% (62.5, 71.9) n=258	54.6% (49.6, 59.5) n=209
Proctalgia fugax (n=2098)	54.8% (52.7, 56.9) n=1150	53.2% (51.1, 55.3) n=1116	41.0% (38.9, 43.1) n=860

Continued

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Table 4 Continued

Characteristic	Doctor visit due to GI problem Yes N=8738*	Bothersomeness Moderately or more N=6359*	Life interference Moderately or more N=4555*
Biliary pain (n=53)	71.7% (58.4, 82.0) n=38	67.9% (54.5, 78.9) n=36	64.2% (50.7, 75.7) n=34
Centrally-mediated abdominal pain syndroe (CAPS) (n=88)	75.0% (65.0, 82.9) n=66	89.8% (81.7, 94.5) n=79	84.1% (75.0, 90.3) n=74
Narcotic bowel syndrome (n=25)	88.0% (70.0, 95.8) n=22	88.0% (70.0, 95.8) n=22	88.0% (70.0, 95.8) n=22
Any painful DGBI (n=5482)	54.4% (53.0, 55.7) n=2980	56.1% (54.8, 57.4) n=3075	42.4% (41.1, 43.7) n=2324
Any non-painful DGBI (n=7939)	43.2% (42.1, 44.2) n=3426	39.9% (38.8, 40.9) n=3165	29.2% (28.3, 30.3) n=2322

*Values are row percentages; 95% CIs are Wilson CIs for the row percentage shown.
DGBI, disorders of gut–brain interaction.

to lower the prevalence, but the opposite occurred, raising the question whether this entity is under-reported or underdiagnosed in clinical practice or increasing in population prevalence.

The prevalence of opioid-induced constipation was reduced by 1.5% and cannabinoid hyperemesis syndrome increased from 0.08% to 0.6%. The difference in the former is likely due to the requirement for self-report of opioid-type medications rather than just prescription pain medication in the RFGES, while the latter is likely due to questionnaire changes aimed at reducing reticence for answering questions about cannabis use.

The addition of abdominal migraine may be particularly meaningful as this newly defined DGBI in adults had a prevalence of 5.1%, indicating that it is a major addition to the Rome DGBI classifications.[19] Inability to belch syndrome, which is increasingly recognised in clinical practice, was found to have a prevalence of 1.4%. NBS, while not a new diagnosis, was assessed for the first time in the Rome V survey.[5] Its prevalence in the Rome V survey was very low at 0.09% underscoring the possibility that effective identification of this disorder may be unreliable by self-report.

The inclusion of two new DGBI and the inclusion of NBS in the present study increased the total rate for any DGBI by 0.5% only (41.4% for 25 DGBI vs 40.9% for 22 DGBI). The explanation for this very small addition to the overall prevalence for any DGBI is that both abdominal migraine and inability to belch overlap almost entirely with other DGBI and the rate of NBS was extremely low. More than 90% of people with abdominal migraine and more than 95% of those with inability to belch syndrome also met criteria for another DGBI, so these entities added very little to the overall prevalence of DGBI.

Table 5 Strength of associations of clinical and demographic variables with having ever visited a doctor for a GI problem

Variable	OR (95% CI)
Bothersomeness	
Less than moderate	1.00
Moderate or more	3.53 (3.25 to 3.83)
Life interference	
Less than moderate	1.00
Moderate or more	2.25 (2.05 to 2.48)
Age (per 10 years)	1.03 (1.02 to 1.05)
Sex	
Male	1.00
Female	1.18 (1.11 to 1.24)

Bothersomeness and life interference of symptoms are associated with doctor visits when adjusting for age and sex, with country as random intercept effect.

To date the largest use of the Rome diagnostic criteria has been for clinical trials and epidemiological research. They appear to be underused in clinical practice, perhaps because they are relatively inflexible[8] and do not relate to clinical factors beyond symptom frequency and duration. To our knowledge this is the first study that has assessed and compared DGBI in terms of bothersomeness and life interference from GI symptoms, especially in a large population. Our data showed that on average, 43% of individuals with DGBI had visited doctors for GI symptoms, and bothersomeness is more strongly associated with consulting doctors than life interference. In the clinical setting, even primary care, all patients are consulters. Thus, one would expect more severe symptoms, greater symptom frequency and duration and more severe impact on the patient's quality of life. Investigators should be clear on these differences when reporting on population-based or clinic-based studies.

Although evaluating the performance of the new Rome V Adult Diagnostic Questionnaire was not a major element in this paper, we conclude that the Rome V diagnostic questionnaire is as effective at identifying DGBI as its Rome IV predecessor,[5] showing a comparable overall DGBI global rate, largely similar prevalence rates for individual DGBI where the criteria did not change much and closely comparable demographic sex and age group prevalence patterns.

The main strengths of this study are the large sample size, the rigorous methodology and the ability to make direct comparisons between the RFGES and the present study. Another is the inclusion of the clinical parameters of symptom bothersomeness and life interference. This provides hypothesis-generating data and can help develop clinical criteria for DGBI. Furthermore, the analyses of painful versus non-painful DGBI reinforce previous observations from RFGES studies that showed the centrality of pain in DGBI[26] and differences between painful and non-painful DGBI in Latin America.[20]

An inherent limitation of this study was the absence of diagnostic testing, which may have affected prevalence rates for some DGBI. However, the removal from DGBI of those who self-reported a previous physician diagnosis of an organic GI diagnosis history, while leaving them in the denominator reduced this effect or may even have led to a negative (ie, underestimation) bias. Another limitation of this study is the reduction in the number of participating countries from 26 in the RFGES to 15

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in the present study. The number of countries in the Middle East, Latin America and Eastern Europe was reduced while representation of North America, Western Europe and Asia was similar. This, taken together with the low rate of rural dwellers may reduce the generalisability of the results.

The observed country-level differences in overall DGBI prevalence should be interpreted with some caution. Although prevalence increased in some countries and decreased in others, these changes do not necessarily reflect uniform shifts across the full DGBI spectrum. Instead, they may be driven by changes in selected diagnoses within individual countries. A detailed country-level analysis of specific DGBI diagnoses is beyond the scope of the present study.

The pre-specified study parameter of no more than 35% with a college degree or above was not met (48.6%). However, our multivariable analysis showed that education level was not associated with the prevalence of DGBI. Further limitations include those inherent to survey-based research, most notably potential bias from the self-selecting nature of participants and recall bias in self-reported symptoms.

Neither patients nor the public were involved in any aspect of planning or implementation of this study, which could be considered another limitation. For example, it might be helpful to gain insight into the perception of the term 'DGBI' that has come under some criticism recently.[27] However, that would be more suitable for a focus group study and the term DGBI does not appear anywhere in the questionnaire. It only appears in study results as it is derived from the scoring algorithms for each individual.

The literature concerning the epidemiology of DGBI has been impaired historically by methodological variance and heterogeneity.[28] Thus, there was a need for a multinational global survey with uniform research methodology. The RFGES and now the new Rome V survey addressed this successfully so that we finally have a methodologically sound global picture of the overall prevalence and burden of DGBI. The results of the Rome V survey indicate that the global prevalence of DGBI in Rome V is comparable to Rome IV in the RFGES, thereby bolstering our confidence in the Rome diagnostic criteria and associated prevalence rates for all DGBI. The Rome V diagnostic questionnaire, which reflects fine tuning of the Rome IV version, is effective in assessing DGBI prevalence rates. Epidemiology studies of DGBI enhance our understanding of the wide distribution and sizeable burden of these disorders, thereby providing incentive for the development of new medications and other therapies and the allocation of healthcare resources and research funding. The finding that large proportions of individuals with DGBI report substantial bothersomeness and life interference supports the need to use these parameters in clinical criteria and further research on these and other clinical aspects.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study involved human participants. The University of North Carolina at Chapel Hill Institutional Review Board, exempted it because the participants were anonymized and unidentifiable(University of North Carolina Institutional Review Board, notice 24-1407, 4 November 4, 2024, phone: 1-919-966-3113, email: IRB_subjects@unc.edu). The protocols were then submitted to IRBs in the other participating countries. In some the survey was exempted from ethics board oversight based on the UNC-CH decision, while in others formal approval was requested and granted. All invitees who chose to participate completed online consent before proceeding to answer the survey questions.

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