

**RFGES papers update**  
**Ami Sperber, as of March 2, 2024**

**Table 1. Papers published or in print.**

#	Name	First and Last authors	Journal	Year	Short summary	doi
1	Worldwide prevalence of DGBI	Sperber, Palsson	Gastroenterology	2021	In a large-scale multi-national study, more than 40% of persons worldwide meet criteria for at least one DGBI, with a negative affect quality of life and health care use.	doi.org/10.1053/j.gastro.2020.04.014
2	Overlap of DGBI	Sperber, Bangdiwala	CGH	2022	In a population-based study with 54,127 participants in 26 countries, there was a universal association between overlapping DGBI and a negative impact on quality of life, disease severity, psycho-logical comorbidity, and health care utilization.	10.1016/j.cgh.2021.05.042
3	Rumination Syndrome	Josefsson, Tornblom	Gastroenterology	2022	The prevalence of rumination syndrome is higher than previously suggested, so it is likely underdiagnosed. Factors associated with rumination syndrome can aid clinicians in identifying rumination in patients and treating consequences of rumination syndrome.	10.1053/j.gastro.2021.11.008
4	DGBI in Israel	Sperber, Dickman	NMO	2022	The first in-depth assessment of the prevalence and burden of DGBI in Israel. The results demonstrate the high burden of DGBI in Israel	10.1111/nmo.14323
5	Meal-related abdominal pain	Colomier, Simren	BMC Medicine	2022	Reporting frequent meal-related abdominal pain is common across the globe and associated with other GI and non-GI somatic symptoms, psychological distress, healthcare utilization, and a poorer quality of life. Individuals who frequently experience meal-related abdominal pain also more frequently fulfill the diagnostic criteria for DGBI.	10.1186/s12916-022-02259-7

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6	DGBI in Romania	Dumitrascu, Sperber	J Gastrointest Liv Dis	2022	We provide the first comprehensive evaluation of the prevalence and burden of DGBI in Romania using the Rome IV criteria. The burden of DGBI in Romania is substantial, with 40.1% of the 2,049 meeting diagnostic criteria for any DGBI.	10.15403/jgld-4380
7	Worldwide prevalence and burden of gastroparesis-like symptoms	Huang, Tack	UEGJ	2022	GPLS are common worldwide and more common in diabetic patients. The symptom complex is associated with multiple aspects of illness and an increased healthcare consumption.	10.1002/ueg2.12289
8	Prescription pain medication use in DGBI	Luo, Keefer	NMO	2022	14.8% of patients globally with at least one diagnosis of DGBI were on prescription pain medications with wide geographic variation, about twice as many as their counterparts without a diagnosis of DGBI.	10.1111/nmo.14457
9	Negative Impact of DGBI on HRQOL	Knowles, Mikocka-Walus	Gastroenterology	2023	The most comprehensive study of DGBI comparing quality of life among individuals with and without them, and across different DGBI in a large representative sample of adults.	10.1053/j.gastro.2022.12.009
10	Factor analysis of the Rome IV criteria	Hreinsson, Simren	Gastroenterology	2023	The Rome IV criteria for irritable bowel syndrome, functional dyspepsia, functional constipation, globus, and biliary pain are globally valid and represent universal diagnostic entities that are similar across sex and age groups.	10.1053/j.gastro.2023.02.033
11	Concept and implementation of RFGES	Sperber	NMO Special issue	2023	This review paper introduces a special issue on the Rome Foundation Global Epidemiology study (RFGES) with a narrative description of its conception, development, and implementation, its outcomes to date, and its potential contribution to neurogastroenterology.	10.1111/nmo.14567

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12	Face-to-face interviews versus Internet surveys: Comparison of two data collection methods in the RFGES: Implications for population based research	Sperber, Palsson	NMO Special issue	2023	The findings strongly indicate that besides affecting data quality, man-power needs and data collection time and costs, the choice of survey method is a substantial determinant of symptom reporting and DGBI prevalence outcomes. This has important implications for future DGBI research and epidemiological research more broadly.	10.1111/nmo.14583
13	DGBI in Australia	Knowles, Mikocka-Walus	NMO Special issue	2023	This study provides comprehensive data on the epi-demiology of DGBI and comorbid anxiety, depression, and somatization symptoms in Australia in an age and sex representative population	10.1111/nmo.14594
14	DGBI in Belgium	Broeders, Tack	NMO Special issue	2023	The results of this first in-depth analysis of Rome IV DGBI in Belgium show a higher prevalence for some DGBI in the French-speaking cohort, and a larger associated disease burden. These differences between language/culture groups in the same country support the psychosocial pathophysiological model of DGBI.	10.1111/nmo.14588
15	DGBI in Canada	Rodrigues, Vanner	NMO Special issue	2023	A large proportion of Canadians suffer from DGBI which seriously impact their well-being. There is a need for further research and education, including understanding whether significant regional and cultural differences contribute to DGBI.	10.1111/nmo.14585
16	DGBI in India and Bangladesh	Ghoshal, Sperber	NMO Special issue	2023	The Rome IV diagnostic criteria for IBS are less sensitive than the Rome III criteria in Indian and Bangladesh communities. Application of the Rome IV criteria to people who meet the Rome III IBS criteria selects a subgroup of people with greater severity of symptoms.	10.1111/nmo.14579

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17	DGBI in Japan	Fukudo, Kanazawa	NMO Special issue	2023	The data provide support for Rome IV IBS as a typical gut– brain disorder, but compared to Rome III- IBS the Rome- IV IBS diagnostic criteria may exclude clinically important cases.	10.1111/nmo.14581
18	Comparison of the epidemiology of disorders of gut– brain interaction in four Latin American countries.	Schmulson, Sperber	NMO Special issue	2023	The burden of illness, anxiety, and depression also differ among the Latin American countries, with individuals with DGBI from Colombia and Mexico having lower scores for anxiety, while depression scores were higher among those from Brazil, who also had the lowest health- related quality- of- life (HRQOL) scores.	10.1111/nmo.14569
19	Pictograms to assess bloating and distension symptoms in the general population in Mexico	Schmulson, Sperber	NMO Special issue	2023	Pictograms are more effective than VDs for assessing the presence of bloating/distension in Spanish Mexico.	10.1111/nmo.14577
20	DGBI in Poland	Mulak, Sperber	NMO Special issue	2023	The first comprehensive report on significant sex/gender- related differences in the prevalence and burden of DGBI in Poland. The revealed differences between women and men with DGBI in the clinical profile, psychosocial variables, and healthcare utilization may have important diagnostic and therapeutic implications.	10.1111/nmo.14568
21	DGBI in Spain	Flores- Arriaga, Santos	NMO Special issue	2023	The first comprehensive data on the prevalence and burden of all DGBI in Spain using the Rome IV criteria. The enormous burden of DGBI in Spain highlights the need for specialized training and future research.	10.1111/nmo.14582

22	DGBI in Sweden	Tornkvist, Tornblom	NMO Special issue	2023	DGBI prevalence and its impact in Sweden is in line with global data, including increased healthcare utilization. GI symptoms are commonly affected by psychological factors and eating, and a high proportion of those on pre-prescription medication report sufficient GI symptom relief.	10.1111/nmo.14578
23	DGBI in UK	Jaafari, Vasant	NMO Special issue	2023	Sociodemographic factors including environmental factors, British cultural, lifestyle and dietary practices, and opioid use may contribute to some of the variance in DGBI prevalence between the UK and other countries.	10.1111/nmo.14574
24	DGBI in US	Palsson, Whitehead	NMO Special issue	2023	Approximately 4 out of every 10 US adults have a DGBI; more commonly women and people under the age of 65. DGBI adversely affect QoL and emotional well-being and increase healthcare needs.	10.1111/nmo.14564
25	Comparison of DGBI in Western Europe and Asia	Hreinsson, Simren	NMO Special issue	2023	The prevalence of DGBI is generally higher in Western Europe compared to Asia. A considerable portion of the observed difference in prevalence rates seems to be explained by more severe psychological and non-GI somatic symptoms in Western Europe.	10.1111/nmo.14566
26	Work productivity and activity impairment in DGBI	Frändemark, Simren	UEGJ	2023	In the general population, people with DGBI have substantial WPAI compared with those without DGBI. Having multiple DGBI, psychological distress, fatigue and somatic symptom severity seem to contribute to this impairment associated with DGBI.	10.1002/ueg2.12425
27	Prevalence and Associated Factors of Bloating	Ballou, Lehmann	Gastroenterology	2023	The pathophysiology of bloating is poorly understood. In the current study, we have identified demographic, dietary, and psychological factors associated with bloating.	10.1053/j.gastro.2023.05.049

28	Global Prevalence of Psychological Distress and Comorbidity With DGBI	Trindade, Simren	AJG	2023	The coexistence between psychological distress/somatic symptoms and DGBI is especially detrimental to quality of life and healthcare utilization. Individuals with psychological distress/somatic symptoms and DGBI coexistence seem to be a group vulnerable to psychosocial problems that should be studied further and would likely benefit from psychological/psychiatric interventions.	10.14309/ajg.0000000000002500
29	Editorial: The RFGES: Research opportunities national and worldwide.	Drossman, Rack	NMO	2022	The database of the study is now available through the Rome Foundation Research Institute for use by academic and industry researchers. This unique gift from the Rome Foundation to the scientific community no doubt will further enhance our understanding of disorders of gut- brain interaction.	10.1111/nmo.14431
30	Interview: Highlights of the Findings From the RFGES	Sperber	Gastroenterology & Hepatology	2023	... the most important result may be that 40.3% of the approximately 54,000 people who completed the Internet survey met the diagnostic criteria for at least one DGBI.	PMID: 37771792
31	Sub-diagnostic gastrointestinal symptoms	Palsson, Simren	APT	2024	One in four adults without organic GI disorders or DGBI nonetheless report frequent GI symptoms. This sub-diagnostic group has reduced QoL, greater psychological and non-GI bodily symptoms, impaired work productivity and life activities, and greater healthcare use compared to non-GI individuals.	<a href="https://doi.org/10.1111/apt.17894">https://doi.org/10.1111/apt.17894</a>

**Table 2. Papers under review in journals.**

#	Name	First and Last authors	Journal	Short summary
1	Dynamic system networks	Burton-Murray, Staller	In preparation for NMO	This study is the first to evaluate symptom networks in DGBI as an alternative to the current disorder-based classification model. Our findings suggest pain symptoms are central and serve as a key connection to other symptoms, crosscutting anatomic location.
2	DGBI patient clusters: A new approach to detect syndromes based on digestive symptoms and psychological factors,	Sehhati, Adibi	Revision requested by Computers in Biology and Medicine	In addition to establishing presence and validity of well-known DGBI, the proposed clustering approach revealed new clusters with meaningfully different determinants. The results of the re-clustering approach can lead to more precise and targeted patient care, including recruitment for clinical and biomedical studies.
3	Classification of community-dwelling individuals by GI and psychological symptoms	Jones	Rejected by Gastroenterology	This study, based on data collected as part of the Rome Foundation Global Epidemiology Survey (RFGES), aimed to evaluate whether individuals would classify into different clusters depending on whether only gastrointestinal symptoms were considered in the classification process or gastrointestinal symptoms were combined with measures of psychological state.
4	DGBI in pts with self-reported organic disease	Van Gils, Simren	CGH	The aim of this study was to compare the global prevalence of all symptom profiles compatible with a DGBI in adults with and without an organic GI disease or DM and to investigate the role of associated factors. Organic diseases of interest were gastroesophageal reflux disease (GERD), peptic ulcer, coeliac disease, inflammatory bowel disease (IBD, Crohn's disease and ulcerative colitis), diverticulitis, GI cancer, and DM.
5	Functional dyspepsia	Tack	Revision requested by APT	The RFGES database was used to estimate the global prevalence of dyspepsia and its subgroups according to the Rome IV definition, as well as the association with other gastrointestinal disorders and psychosocial factors, its impact on quality of life, and on healthcare utilization.
6	Environmental factors and the epidemiology of DGBI	Fairlie, Holtmann	NMO	To investigate if proxy measures of sociocultural and environmental risk factors are associated with the prevalence of various DGBI in populations across the world.
7	Confirmatory validation of the PHQ4 for DGBI	Knowles	J Psychosomatic Research	The aim of this study is to evaluate psychometrically the properties of the PHQ-4 across both gastrointestinal and non-gastrointestinal condition cohorts using the RFGES database.
8	Aging digestive tract	Sperber, Palsson, Simren	UEGJ	The aim of this study was to test our hypotheses that the 65+ age group would have lower DGBI and GI symptom prevalence and lower frequency of GI symptoms, compared to younger individuals (<65).

**Table 3. Papers in preparation.**

#	Name	PIs	Short description of study and aims
1	Diet and DGBI	Bushyhead, Quigley	1) to evaluate the association between three specific diets (vegan, vegetarian and lactose-free) and the prevalence of IBS, functional dyspepsia, functional constipation, functional diarrhea and functional bloating; to evaluate the association between diet as defined by starch predominance (rice and bread or pasta) and the prevalence of these disorders.
2	Confirmatory validation of Brief PROMIS global health scale for DGBI	Knowles	Health related quality of life (HRQOL) is an important and frequently assessed patient reported outcome related to social and work functioning in gastrointestinal condition. The 10-item PROMIS global health scale is a well-establish measure of HRQOL, however its length can result in significant costs in large studies. The aim is to evaluate the reliability and validity of a brief two-item global and physical and mental health scale and compared it to the original 10-item version.
3	Fecal incontinence	Whitehead, Palsson	To examine fecal incontinence (FI) prevalence and associated factors in 26 countries and provide important novel and unique information about demographic associations and risk factors of FI, whether they are the same in different in different parts of the world, and whether people with FI are affected in different ways by FI in different regions.
4	Dietary factors in Italy	Corazziari	To assess the association of FODMAP intake and anxiety/depression (alone and combined) with number and frequency of symptoms in subjects with any DGBI, esophageal DGBI, upper DGBI, lower DGBI, anorectal DGBI and overlapping of DGBI). To assess the association of dietary FODMAP intake and anxiety/depression (alone and combined) with IBS severity
5	Effect of religious fasting customs on GI symptoms	Dumitrascu	To assess the percentage of participants who observed religious fasting and possible associations between that fasting and digestive symptoms corresponding to disorders of gut–brain interaction (DGBI).
6	PI-DGBI	Barbara, Schmulson, Ghoshal	<b>Primary aims:</b> The global prevalence of PI-DGBIs, the prevalence of PI-DGBIs in GI anatomic regions (esophageal, gastroduodenal, bowel and anorectal disorders), the prevalence of PI-DGBI for each sub-category (i.e., EPS, PDS, IBS-C, IBS-M, IBS-D etc.) <b>Secondary aims:</b> Assessment of PI-DGBI risk factors (gender, age, psychological comorbidity, use of antibiotics, sanitation, living condition in childhood, education etc.), evaluation of health outcomes in PI-DGBI patients (health perception, QoL, use of healthcare resources)

7	CVS	Izagirre, Santos, Huang, Tack	To determine the global prevalence of CVS and prevalence of CVS in diabetes and non-diabetes, to determine its association/overlap with other DGBI, to test association between CVS and pain medication or cannabinoid intake, to explore the association between CVS and demography, somatization, and psychological distress (anxiety and depression), to evaluate impact of CVS on quality of life and healthcare use.
8	Dietary intake patterns and symptom severity	Vasant	To investigate the associations between dietary intake patterns using a clustering model and the prevalence of Rome IV IBS in the 26 internet countries that participated in the RFGES and to investigate the associations between dietary intake patterns using a clustering model and IBS symptom severity scores in those with Rome IV IBS.
9	Abdominal pain in the general population	Palsson, Simren	To gain insight into the occurrence, associated characteristics and impact of abdominal pain in the adult global population, using the unique large database from the Rome Foundation's Global Epidemiology Study.
10	Latent class analysis - bloating	Grover, Palsson	Bloating, distention, and gas-related gastrointestinal (GI) symptoms are frequently reported by patients across the spectrum of DGBI. However, whether the clinical features and specific personal characteristics vary between subgroups of people with these problems is unknown. We aimed to comprehensively characterize these using latent class modelling in a large multi-national survey.
11	Ecological factors and DGBI	Holtmann, Wong	The aim was to investigate if proxy measures of sociocultural and environmental risk factors are associated with the prevalence of various DGBI in populations across the world.
12	Functional dyspepsia and heartburn	Carbone, Tack	The primary aim was to investigate the prevalence and characteristics of EPS with overlapping heartburn globally, and regionally in Western Europe, Eastern Europe, and Asia. We also hypothesized that: 1) the presence of EPS symptoms goes along with a high regional prevalence of HP; 2) EPS symptoms associated with heartburn are more common in regions with low HP prevalence.
13	Menopause/menses and DGBI	Sarnoff, Chang	To assess differences in pre- vs. post-menopausal women with DGBI compared to similarly aged men with DGBI, and the prevalence of menses-related symptoms.

14	Nausea and vomiting disorders	Tornblom	To investigate the global prevalence of isolated/dominant chronic nausea (similar to Rome III Chronic Idiopathic Nausea) and isolated/dominant vomiting (similar to Rome III Functional vomiting) And to investigate the global prevalence of chronic nausea and vomiting syndrome, in comparison to cyclic vomiting syndrome.
15	Effects of changes in diagnostic criteria on functional bowel disorders	Tornkvist, Simren	To review the prevalence and impact of functional bowel disorders across global regions; assess factors of importance for change in IBS prevalence from Rome III to Rome IV; characterize the U-FBD group in greater detail including impact and associated factors
16	DGBI in Iran	Maleki, Adibi	DGB I in Iran
17	Sex differences in DGBI	Sarnoff, Chang	To investigate sex differences in DGBI symptoms and healthcare utilization worldwide.
18	Confirmatory validation and cluster classification of the of the IBS Severity Scale Score (IBS-SSS)	Knowles	To conduct a confirmatory factor analysis (CFA) of the IBS-SSS for individuals living with IBS and its subtypes (C, D, M U). To conduct an exploratory cluster analysis of the IBS-SSS for these individuals and to conduct an exploratory cluster analysis of the IBS-SSS for individuals living with single diagnosis of IBS versus those with overlapping DGBI diagnosis (IBS with or without overlapping DGBI diagnosis).
19	Obesity and DGBI in Europe	Melchior, Hreinnsson, Simren	To assess the prevalence of DGBI among obese subjects (BMI $\geq$ 30) in the general population in comparison with non-obese subjects, as well as exploring factors associated with DGBI in obesity in Europe.
20	Symptom burden after cholecystectomy	Konings, Tack	To compare the global prevalence of disorders of gut-brain interaction (DGBI) in subjects with vs without a history of a cholecystectomy. To determine the global prevalence of cholecystectomies in total and stratified by country. To determine the relation between cholecystectomy and gastrointestinal symptoms and their severity. To determine the relation between healthcare utilization, extra-intestinal somatic symptoms and psychological distress and the development of DGBI after cholecystectomy.
21	DGBI in South Africa	Setshedi	DGBI and South Africa.
22	Clinical phenotype of IBS	Barbara, Marasco, Hod	To compare clinical phenotype of patients with IBS-D and IBS-C and to assess factors associated with pain among IBS-D compared with FD and IBS-C compared with FC. To provide descriptive data on the prevalence of IBS-related psychiatric disorders (anxiety, depression and somatization) and non-gastrointestinal symptoms.
23	Do DGBI follow the hygiene hypothesis	Barbara, Marasco, Hod	To investigate possible associations and interactions between non-hygienic lifestyle in childhood (up to age 7) and currently. To investigate the possible association between additional environmental exposures, such as bowel infection history, antibiotics treatments, et al. and DGBI occurrence.
24	Consulter status for bowel disorders	Rangan, Ballou, Sperber	To compare clinical and demographic characteristics of the 6 population groups: 1) DGBI consulters, 2) DGFBI non-consulters, 3) symptomatic without DGBI - consulters, 4) symptomatic without DGBI – non-consulters, 5) infrequent or no symptoms – consulters, 6) infrequent or no symptoms – non-consulters, which vary on healthcare utilization and clinical symptoms. These groups will be compared in relation to sex, age, location/country, access to healthcare; western vs. traditional medicine; medications used regularly for GI symptoms, symptom severity; anxiety/depression, somatization, and QOL.
25	DGBI in Germany	Andresen	DGBI in Germany

26	Prevalence and Burden of DGBI before and after the COVID-19 pandemic	I. Aziz	To examine potential effects of the COVID-19 pandemic on Rome IV DGBI population prevalence. To examine the potential effects of COVID-19 infection and illness on Rome IV DGBI prevalence. Describe the current (2023) prevalence of the 22 DGBI in the U.S. and U.K. population.
27	Latent class analysis of IBS	Ford	We have used latent class analysis (LCA) to classify patients according to not only gastrointestinal, but also psychological, symptoms. There are clusters of people with IBS in whom gastrointestinal symptoms predominate, some in whom psychological symptoms predominate, and some for whom IBS symptoms are part of a broader picture, which included anxiety, depression, or extra-intestinal symptoms. Aims: 1. to assess if the clusters we have identified are reproducible in the RFGFES using our existing model 2. To assess whether the clusters from our existing model vary by country in the RFGFES 3. To assess the healthcare burden of IBS in each cluster using the RFGFES 4. To assess whether alternative clusters exist using latent class analysis fitted to the existing RFGFES data
28	Functional mixed bowel habits - a possible new category of DGBI	Barbara, Hod	
29	Irritable Bowel Syndrome in Malaysia and Indonesia: Similarities and Differences in Dietary Profile and Clinical Characteristics	Lee, Syam	1. Determine the differences and similarities between Malaysian and Indonesian populations in clinical characteristics, diet, healthcare-seeking behavior, and psychosocial dysfunction of patients with IBS 2. The prevalence and demographics of IBS diagnosed with Rome III only, Rome IV only, and both Rome criteria in the Malaysian and Indonesian population.
30	Malaysia country paper	Lee	1. Prevalence of DGBI in Malaysia based on the Rome IV criteria 2. Comparison of prevalences of DGBI with other face-to-face interview countries in RFGES 3. Association of DGBI (compared to non-DGBI) with somatic non-GI symptoms, psychological symptoms, and health-related QoL.
31	Indonesia country paper	Syam	1. Prevalence of DGBI in Indonesia based on the Rome IV criteria 2. Comparison of the prevalence of DGBI with other face-to-face interview countries in RFGES
32	Burden of painful versus non-painful digestive functional disorders in four Latin American countries	Lopes	1. Study the prevalence of painful functional gastrointestinal disorders (FGID) versus non-painful FGID in four Latin American countries (Argentina, Brazil, Colombia and Mexico). 2. Compare the burden of anxiety and depression, as measured by PHQ-4 score, between the individuals with painful FGID and non-painful FGID. Results will be presented as crude analyses and adjusted for age, sex, education and community size. 3. Compare the health related quality of life, as measured by PROMIS Global-10 score, between individuals with painful FGID and non painful FGID. Results will be presented as crude analyses and adjusted for age, sex, education and community size.
33	Prevalence and risk factors of epigastric pain syndrome (EPS), postprandial distress syndrome (PDS) and heartburn	Tack	To investigate the global prevalence and characteristics of FD subgroups EPS and PDS with and without heartburn. Hypothesis: exploratory analysis. We hypothesize that heartburn is more prevalent in the EPS subgroup compared to the PDS subgroup.

34	Italy country paper	Barbara, Coriazzari,	<p>To report epidemiological data of DGBIs prevalence rates in Italy, stratified by regions, age, gender and living area and to report the most common DGBIs overlaps in the Italian population in terms of anatomical regions (i.e. any esophageal, any gastroduodenal, etc)</p> <p>To compare epidemiological data regarding DGBIs in Italy with other southern European countries (as a whole category) and northern European countries (as a whole category), who were included in the internet survey.</p> <p>To compare demographical, clinical and lifestyle factors of the Italian population with other southern European countries (as a whole category) and northern European countries (as a whole category), who were included in the internet survey</p>
35	LCA for subgroups of Functional Dyspepsia	Barberio, Savarino	<p>To see whether using latent class analysis we could derive subgroups of patients with functional dyspepsia that were distinct and reproducible, based on both gastrointestinal and psychological symptoms.</p>