

The Current Prevalence of Irritable Bowel Syndrome in Asia

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Irritable bowel syndrome (IBS) has been one of the commonly presented gastrointestinal disorders. It is of interest how commonly it presents in the society. Western studies indicated that most population-based IBS prevalences range 10%-15%. It is believed that IBS is prevalent in both East and West countries without a significant prevalence difference. Most recently, the Asia IBS prevalence has a higher trend in the affluent cities compared to South Asia. Since many Asia IBS prevalence studies have been published in the recent decade, we could compare the IBS prevalence data divided by various criteria in looking whether they were also comparable to this of West community. Summarized together, most Asia community IBS prevalences based on various criteria are usually within the range 1%-10% and are apparently lower than these of selected populations. Within the same population, the prevalence orders are first higher based on Manning criteria, then followed by Rome I criteria and finally reported in Rome II criteria. Overall, the median value of Asia IBS prevalences defined by various criteria ranges 6.5%-10.1%. With regard to gender difference, female predominance is usually found but not uniquely existed. For the IBS subtypes, the proportions of diarrhea predominant-IBS distribute widely from 0.8% to 74.0%, while constipation predominant-IBS proportion ranges 12%-77%. In conclusions, current Asia IBS prevalence is at least equal to the Western countries. Female predominant prevalence in Asia is common but not uniquely existed, while the proportions of IBS subtypes are too variable to find a rule.

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Key Words

Asia; Gastrointestinal motility; Irritable bowel syndrome; Prevalence

Introduction

Upon Rome III definition, irritable bowel syndrome (IBS) has been a biopsychosocial dysfunction. It means that a biological bowel dysfunction is the final result of brain-gut linkage and modified by the social, environmental and psychological factors.^{1,2} Since a well-known functional disorder usually coexisted with other somatic complaints, IBS *per se* has an obvious im-

pact on living and quality of life of sufferers leading to the excessive social costs for medical seeking behavior and absenteeism.³⁻⁹ Today, IBS has been included as one of the commonly presented functional gastrointestinal disorders (FGIDs).¹ It is of interest how commonly it presents in the society. In addition, knowing the IBS prevalence may estimate how it would consume the limited medical resources in the society. Western studies indicated that the population-based IBS prevalence widely ranges between 3%-20%, whereas the most reported data range from

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10% to 15%.^{10,11} It draws a controversy why the IBS prevalence studies usually show an obvious discrimination. Actually, most prevalence study obtained data completely depend upon the response of distributed questionnaires to the studied subjects. Thereafter, the demographic characteristics in terms of evaluated population, willing of responsiveness, geographical location, criteria to define, etc always individually exist leading to the study heterogeneity and variation in the reported IBS prevalences.¹²⁻¹⁴ Of them, the employed IBS diagnostic criteria may obtain extremely distinct results for the same population. For example, Manning definition often yields a higher value compared to this of either Rome I or II definition with a gap of 2-5 folds or 2.5%-37.0%.^{4,14} Even confined to the Manning definition, the number of used disorders results in different values.¹⁴ In addition, large-scaled and questionnaire-based prevalence study does not exclude the alarm symptoms and the obtained results are unlikely to reflect the true IBS manifestations seen clinically.^{4,15,16} Since a characteristically biopsychosocial disorder, many social and cultural factors indeed have an apparent impact on the meaning, expression and course of FGIDs including IBS.¹⁷ Accordingly, gender,¹⁸⁻²² age,^{23,24} economic state,²⁴⁻³¹ education level,²⁴⁻²⁹ married state,^{25,28,31} food,²⁹⁻³² race,³³ stress,^{21,22,28,31,34-36} climate,^{29,31} drugs,³⁵ dysentery history^{29,35} and coexisted dyspepsia³⁷ etc all have been addressed to be the risk factors leading to IBS.

Unfortunately, it is very hard to define that all enrolled study populations throughout the world should be harmonized with a least heterogeneity. Thus obtained IBS prevalences throughout the world would be quite variable among the studies. Besides, it is unknown whether these mentioned factors are truly existed because prevalence studies do not attempt to confirm their existence. Even some studies indicate the contradictory impact on the IBS. For instance, the same questionnaire applied to different countries may obtain the very dissimilar prevalence results, such as this conducted in Thailand and Western countries,³⁸ another conducted in USA and 8 European countries^{39,40} and an early study carried out in Japan and The Netherlands,⁴¹ respectively. With regard to the IBS prevalence around the world, it has been indicated that the IBS prevalence is lower in non-western countries.¹⁷ In addition, a study based on Manning criteria indicated that the IBS prevalence of USA Asian residents was lower compared to others.⁴² However, this early statement meets challenge. Likewise, IBS prevalence is reported as higher as 26%-33% in the selected populations of the African countries.^{23,43} Similarly, the Japanese IBS prevalence was almost 3-fold of this of Dutch using the same questionnaire.⁴¹ Kang⁴⁴ compared East

IBS prevalences to those of West counterparts and provided the median values of 12% vs 17% in Manning criteria, 10.4% vs 9.2% in Rome I and 7.6% vs 6.0% in Rome II, respectively. He finally concluded no convincing prevalence difference existed in the East and West countries. In the same year, Gwee et al⁴⁵ believed that the IBS prevalence is increasing among the Asia countries with the estimated community prevalence ranging 5.7%-8.6%, whereas these of selected population reach up to 16%-45%. Most recently, he reviewed the Asia IBS studies and indicated that the Asia IBS prevalence has a trend of higher in the affluent cities compared to South Asia, eg, 8.6%-9.8% vs 4.2%.⁴⁶ Talley⁴ also pointed out that IBS is prevalent in both East and West countries without necessarily to emphasize on the prevalence difference. With regard to study IBS prevalence, employed criteria should be considered since it may produce enormously different results.^{47,48} While the proportions of IBS subtypes may not correlate well between the used criteria.^{49,50} Nevertheless, it is believed that no consistent differences in sensitivity and specificity between various criteria to diagnose IBS clinically.⁵¹ Very recently, many Asia IBS prevalence studies have been published within this decade. Now we could compare the IBS prevalence data divided by various criteria in looking whether they were also comparable to this of West community.

Community Population Based IBS Prevalences of Western Developed Countries

Hungin et al⁴⁰ had conducted a large-scaled study that evenly enrolled population sizes of UK, 5999; France, 5033; Germany, 5002; Italy, 5082; Holland, 5463; Belgium, 5229; Spain, 5097 and Switzerland, 5079, respectively. Their study indicated that the recommended Rome criteria obtained a value less than 5%, whereas the extreme variation of prevalence values among enrolled countries still existed, eg, 11.7% in Italy and only 1.7% in German. Besides, Manning criteria defined IBS prevalence was higher compared to those of 2 Rome definitions within the same population. In order to know what is the most reported population based IBS prevalence, Table 1 illustrates 25 community-based IBS prevalences of Latin America and Western developed countries ranging from Europe, North America to Australia. Overall, 5 of 11 Manning and other criteria defined prevalence data are less than 10.5%, whereas remaining 6 values are higher than this point. In addition, 14 of 21 Rome defined prevalences are within the range 2%-10%, whereas another 7

prevalence data are higher than 10% particularly a Canadian study based on small sample size.¹⁸ Secondly, Manning criteria based studies usually report a higher prevalence than this of Rome definition within the same population. Thirdly, the same country using the same criteria may obtain different values

among various enrolled community populations. Fourthly, small-scale study often results in a higher IBS prevalence even based on community population. Finally, female predominance is invariably found no matter of used IBS definitions.

Table 1. Community Population Based Prevalences of Irritable Bowel Syndrome Among the Western Developed Countries and Latin America

Author	Year of publication	Country	Sample size	Prevalence (Used criteria)	M/F ratio
Hungin ⁴⁰	2003	8 European countries	41,984	6.8% (Any) 6.5% (Manning) 4.2% (Rome I) 2.9% (Rome II)	1/1.69 (NM)
Vandvik ¹⁹	2006	Norway	4,622	8.4% (Rome II)	1/1.56
Agréus ⁵²	1995	Sweden	1,156	12.5% (NM)	ND
Hillilä ¹⁴	2004	Finland	3,650	16.2% (Manning X2) 9.7% (Manning X3) 5.6% (Rome I) 5.1% (Rome II)	1/1.47 (M X2) 1/1.35 (M X3) 1/1.10 (Rome I) 1/1.04 (Rome II)
Hillilä ⁹	2010	Finland	3,650	15.9% (Manning) 5.1% (Rome II)	1/1.50 1/1.10
Jones ⁵³	1992	UK	1,620	22.0% (Manning)	1/1.38
Kennedy ²⁰	2000	UK	3,169	17.2% (Manning)	1/2.20
Wilson ⁵⁴	2004	UK	4,807	10.5% (Rome II)	1/2.12
Bommelaer ⁵⁵	2004	France	8,221	2.5% (Manning) 2.1% (Rome I) 1.1% (Rome II)	1/1.82 (Manning) 1/2.00 (Rome I) 1/1.44 (Rome II)
Dapoigny ⁵⁶	2004	France	20,000	4.7% (Rome II)	1/1.54
Mearin ⁴⁷	2001	Spain	2,000	10.3% (Manning) 12.1% (Rome I) 3.3% (Rome II)	1/2.63 1/2.33 1/2.42
Corazziari ⁵⁷	2008	Italy	29,139	7.4% (NM)	1/1.95
Zagari ⁵⁸	2010	Italy	1,033	7.1% (Rome II)	ND
Katsinelos ⁵⁹	2009	Greece	2,397	15.7% (Rome II)	1/1.31
Andrews ²⁵	2005	USA	25,986	6.6% (Rome II)	1/1.82
Hungin ³⁹	2005	USA	5,009	10.4% (Manning) 7.9% (Rome I) 6.7% (Rome II)	1/1.44 (Manning) 1/1.38 (Rome I) 1/1.36 (Rome II)
Minocha ⁶⁰	2006	USA	1,000	9.5% (Rome II)	NS (ND)
Choung ⁶¹	2007	USA	2,298	4.4% (Rome II)	ND
Jung ⁶²	2010	USA	1,695	13.2% (Rome II)	1/1.93
Thompson ⁶³	2002	Canada	1,198	13.5% (Rome I) 12.1% (Rome II)	1/2.13 (Rome I) 1/1.74 (Rome II)
Li ¹⁸	2003	Canada	437	25.2% (Rome II)	1/1.88
Valerio-Ureña ⁶⁴	2010	Mexico	459	16.9% (Rome II)	1/1.96
Gómez Alvarez ⁶⁵	2009	Colombia	558	19.9% (Rome III)	ND
Boyce ³⁴	2000	Australia	2,910	13.6% (Manning) 4.4% (Rome I) 6.9% (Rome II)	1/1.89 (Manning) 1/3.10 (Rome I) 1/2.19 (Rome II)
Boyce ⁶⁶	2006	Australia	762	4.4% (Rome I) 8.9% (Rome II)	1/2.98 (Rome I) 1/1.37 (Rome II)

X2, 2 diagnostic statements; X3, 3 diagnostic statements; M/F, male/female; ND, no data; NM, not mentioned; NS, not significant.

IBS Prevalences of Asia Countries

Table 2 provides 11 IBS prevalence data of Asia countries. Of them, 6 were based on Manning definition, whereas 5 did not mention their employed definitions. Most reported prevalences are within the range 2.3%-11.5% but a Japanese study based on selected population obtained a higher value.⁴¹ Apart from other definitions, the median value of 6 Manning based studies is 10%. Female predominance is found but not always existed. Based on Rome I criteria definition, Table 3 depicts 8 Asia IBS prevalence data plus another Korea study from Rome α definition. Many of them were conducted in East Asia. The range of 4 community population based prevalences is within 0.82%-10.4%, whereas the data of 5 selected population studies are variable from overlapping to much higher. The median value of 8 Rome I definition

based studies is 6.5%. Female predominance remains existed. Rome II criteria based prevalence has been extensively reported in Asia, Table 4 provides 35 IBS prevalence values obtained as far as from Turkey to the most Eastern Asia countries such as Japan and Korea. Overall, 14 of 16 community population based prevalences are within 2.9% and 10.2%, whereas another 2 values are higher up to about 14.0%.^{82,86} With regard to 19 data of selected population studies, only 7 values are less than 10.0%, whereas other 12 higher values even reach up to 31.0%.⁹⁷ Overall, the median value of 35 Rome II definition based studies is 8.6%. Regarding the gender difference based on Rome II criteria, 22 of 31 studies reported a female predominance, whereas 5 reported male predominance and 4 reported almost equally distributed. Table 5 provides 9 Rome III criteria defined IBS prevalence data among the Asia countries. Two West Asia community-based studies indicate the values of 1.1% and 11.4%, respectively.^{26,101}

Table 2. Prevalences of Manning and Other Criteria Defined Irritable Bowel Syndrome in Asia Countries

Author	Year of publication	Country	Sample size	Study type	Prevalence (Used criteria)	M/F ratio
Massarrat ⁶⁷	1995	Iran	947	Selected	3.2% (NM)	NM
Shah ⁶⁸	2001	India	2,549	Community	7.5%	NM
Ghoshal ⁶⁹	2008	India	4,500	Community	4.2% (NM)	1/0.93
Danivat ³⁸	1988	Thailand	912	Selected	4.4% (NM)	NM
Ho ⁷⁰	1998	Singapore	696	Community	2.3% (Local)	M = F (ND)
Chen ⁷¹	2000	Singapore	271	Community	3.2% (NM)	1/1.13
Gwee ²⁴	2004	Singapore	2,276	Community	11.0%	1/1.33
Lau ⁷²	2002	Hong Kong	1,298	Community	10.0%	NM
Pan ²⁹	2000	China	2,486	Community	7.3%	1/1.15
Xiong ³⁵	2004	China	4,178	Community	11.5%	1/1.34
Schlemper ⁴¹	1993	Japan	231	Selected	25.0%	1/1.35

M/F, male/female; ND, no data; NM, not mentioned.

Table 3. Prevalences of Rome I and α Criteria Defined Irritable Bowel Syndrome in Asia Countries

Author	Year of publication	Country	Sample size	Study type	Prevalence	M/F ratio
Zuckerman ⁷³	2006	Vietnam	411	Selected	7.20%	1/1.92
Tan ³⁶	2003	Malaysia	533	Selected	15.80%	1/1.59
Gwee ²⁴	2004	Singapore	2,276	Community	10.40%	1/1.30
Lau ⁷²	2002	Hong Kong	1,298	Community	6.00%	NM
Cheung ⁷⁴	2007	Hong Kong	1,649	Community	4.00%	M = F (ND)
Pan ²⁹	2000	China	2,486	Community	0.82%	NM
Lu ⁷⁵	2003	Taiwan	2,018	Selected	17.50%	NM
Kim ³⁰	2005	Korea	1,717	Selected	5.70% (Rome α)	1/1.27
Kawamura ⁷⁶	2001	Japan	2,263	Selected	6.50%	NM

M/F, male/female; ND, no data; NM, not mentioned.

Table 4. Prevalences of Rome II Criteria Defined Irritable Bowel Syndrome in Asia Countries

Author	Year of publication	Country	Sample size	Study type	Prevalence	M/F ratio
Sperber ²⁶	2007	Israel	1,000	Community	2.9%	1/2.06
Celebi ²⁷	2004	Turkey	1,766	Selected	6.3%	1/1.48
Yilmaz ⁷⁷	2005	Turkey	3,000	Community	10.2%	1/1.55
Basaranoglu ⁷⁸	2008	Turkey	707	Selected	8.6%	M = F (ND)
Hoseini-Asi ⁷⁹	2003	Iran	4,726	Community	5.8%	1/1.17
Sohrabi ⁸⁰	2010	Iran	1,436	Selected	4.1%	1/2.19
Yarandi ⁸¹	2010	Iran	6,476	Selected	21.9%	1/1.58
Jafri ⁸²	2007	Pakistan	1,167	Community	14.0%	M > F (ND)
Husain ²⁸	2008	Pakistan	880	Selected	13.3%	1/1.02
Masud ⁸³	2001	Bangladesh	2,426	Community	8.5%	1/1.84
Perveen ⁸⁴	2009	Bangladesh	1,503	Community	7.7%	1/1.28
Devanarayana ⁸⁵	2010	Sri Lanka	427	Selected	2.8%	NM
Rajendra ⁸⁶	2004	Malaysia	949	Community	15.6%	1/1.40
Gwee ²⁴	2004	Singapore	2,276	Community	8.6%	1/1.21
Lau ⁷²	2002	Hong Kong	1,298	Community	3.6%	1/1.06
Kwan ⁸⁷	2002	Hong Kong	1,000	Community	6.6%	1/1.30
Lee ⁸⁸	2009	Hong Kong	2,005	Community	5.4%	1/1.35
Xiong ³⁵	2004	China	4,178	Community	5.7%	1/1.25
Dong ³¹	2005	China	5,403	Selected	13.8%	1/1.80
Wang ⁸⁹	2007	China	3,014	Selected	18.5%	M = F (ND)
Dai ⁹⁰	2008	China	1,147	Selected	4.7%	1/1.34
Shen ⁹¹	2009	China	491	Selected	15.7%	1/1.16
Zhao ⁹²	2010	China	16,091	Community	4.6%	1/1.22
Lu ⁷⁵	2003	Taiwan	2,018	Selected	22.1%	1/0.64, NS
Han ³²	2006	Korea	1,066	Community	6.6%	1/0.85
Park ²¹	2008	Korea	1,124	Selected	16.8%	1/1.36
Lee ⁹³	2009	Korea	1,443	Selected	9.6%	NM
Son ⁹⁴	2009	Korea	405	Selected	25.7%	Only enrolled girls
Park ⁹⁵	2010	Korea	1,009	Community	8.0%	1/1.50
Kumano ²²	2004	Japan	4,000	Community	6.1%	1/1.73
Shiotani ⁹⁶	2006	Japan	2,495	Selected	10.7%	1/2.04
Shinozaki ⁹⁷	2008	Japan	633	Selected	31.0%	1/1.24
Hori ⁹⁸	2009	Japan	181	Selected	22.1%	NM
Okumura ⁹⁹	2010	Japan	5,813	Selected	1.2%	1/0.92
Kaji ¹⁰⁰	2010	Japan	2,680	Selected	14.2%	NM

M/F, male/female; ND, no data; NM, not mentioned; NS, not significant.

A Korea community study provides prevalence of 9.0%,⁹⁸ whereas 6 selected population based studies are very variable ranging 7.0%-21.9%. The median value of 9 Rome III definition based studies is 10.1%. Female predominance is also found among 7 reports.

Summarized together, the reported IBS prevalences of Tables 2-5 are very variable with a range 0.82%-31.0% among the Asia countries. However, these data are likely to indicate that the most Asia community prevalences are within the range 1%-10% and lower than these of selected populations as well as previous comments.^{45,105,106} Similar to Table 1, the same country using the

same criteria usually yields dissociated results among the different study populations. On the other hand, the same population always results in different prevalences defined by various criteria. Within the same population, the prevalence orders are usually first higher based on Manning criteria, then followed by Rome I criteria and finally reported in Rome II criteria. This ranking characteristic is also to agree with Asia consensus.¹⁰⁶ Occasionally, few studies in Asia and developed countries contradictorily indicated the higher value based on Rome II than Rome I.^{34,75} With regard to Rome III criteria, it is apparently higher than Rome II reported in Israeli, Chinese and Korean studies, respectively,^{26,90,95}

Table 5. Prevalences of Rome III Defined Irritable Bowel Syndrome in Asia Countries

Author	Year of publication	Country	Sample size	Study type	Prevalence	M/F ratio
Sperber ²⁶	2007	Israel	1,000	Community	11.4%	1/1.37
Khoshkrood-Mansoori ¹⁰¹	2009	Iran	18,180	Community	1.1%	1/2.31
Yarandi ⁸¹	2010	Iran	6,476	Selected	21.9%	1/1.58
Devanarayana ⁸⁵	2010	Sri Lanka	427	Selected	7.0%	1/1.15
Dai ⁹⁰	2008	China	1,147	Selected	10.4%	1/1.85
Wang ¹⁰²	2008	China	3,014	Selected	15.9%	1/1.17
Park ⁹⁵	2010	Korea	1,009	Community	9.0%	1/1.57
Nam ¹⁰³	2010	Korea	4,296	Selected	9.1%	1/1.04
Noh ¹⁰⁴	2010	Korea	2,388	Selected	10.1%	NM

M/F, male/female; NM, not mentioned.

whereas another study carried out in a selected Chinese population showed comparable in both definitions.^{89,102} In contrast, an Iran study yields a much lower prevalence by way of Rome III criteria.¹⁰¹ Most importantly, the IBS prevalence studies conducted on multi-ethnic countries such as Malaysia and Singapore clearly pointed out no difference existed among various ethnic populations.^{24,36,70,86} Similarly, the IBS prevalence of Chinese minority was not different from this of Han ethnic.³¹ Based on these observations and comparisons, we as well as the Asia consensus¹⁰⁶ are strongly to conclude that the current Asia IBS prevalence is at least equal to the Western countries.

Gender Difference of Asia Countries

Gender factor may play an impact on the FGIDs including IBS. As previously indicated that female gender has been one of factors leading to IBS and females usually report more FGID symptoms.⁶³ Perhaps it means that the visceral perception is determined by the sex.¹⁷ Female IBS subjects also have lower authority over decisions at work.¹⁰⁷ Besides, Caucasian females easily suffer from IBS symptoms compared to males or African American females.³³ Based on the current IBS diagnostic criteria, higher positive predictive value is often obtained for females, whereas a negative predictive value exists for males.¹⁰⁸ Accordingly, it is unknown whether these gender-related specificities account for the female predominance in many IBS studies. Clinically, constipation predominant IBS (C-IBS) is commonly seen among the females, whereas males usually manifest diarrhea-predominant IBS (D-IBS).^{19,25,90,109,110} In addition, IBS is common among the Vietnamese females but no significant gender effect on some bowel symptoms in terms of stool frequency, consistency and bloating is observed.⁷³ Table 1 depicts the IBS

male/female ratio among the developed countries. Almost all except a USA study indicate the female predominance, irrespectively of used criteria.⁶⁰ Interestingly, a Finnish study showed female predominance in Manning definition and gradually became equal in Rome II definition.¹⁴ For the African IBS, female predominance is not reported yet.^{23,43} Regarding the Asian IBS gender issue, Gwee et al⁴⁵ early pointed out lack of female predominance except the existed female predominance in Japan. Recent Asia IBS consensus also concludes no obvious female predominance existed in many Asia studies.¹⁰⁶ Tables 2-5 provide the sex ratios among cited Asia studies. The ratios are widely variable ranging from equal to 2-fold of female predominance. Even the same country may not obtain the similar gender ratio among various reports, eg, Pakistan, Singapore, China and Korea, respectively. Accordingly, the female predominance looks to be commonly existed in Near East, Bangladesh, Southeast Asia, China, Japan and finally some but not all Korea studies, whereas the remaining countries just show similar or diverse ratio. With regard to the used criteria, a Korea study indicates that female subjects showed a higher prevalence than male subjects under Rome III but not under Rome II criteria.⁹⁵ Summarized together, the IBS female predominance is not uniquely existed among all Asia countries.

Subtypes of IBS in Asia

The IBS subtypes are mainly divided according to the bowel movement (BM) frequency and stool consistency of the presenting subjects. Consequently, it looks important to know what is the so-called normal bowel habit in the general population. Among the Asia countries, many studies already provide the BM parameters. For instance, subjects with non-complaint of lower abdo-

men symptoms in India usually have the BM as 1-2 times/day.⁶⁹ Over 90% people of Thailand and Singapore have the BM as 3 times/day to 3 times/wk, while nearly 60% of them pass once daily.^{38,70} Koreans also exhibit this BM pattern and 41% of them report once daily.³⁰ Meanwhile, 84% Chinese non-patient community subjects report BM once daily with a mean value 7 times/wk. Besides, 90% of them pass formed soft stool, 77% finish it in the morning and only 3.8% show constipation and 1.1% as diarrhea, respectively.¹¹¹ It can be concluded that the BM ranging 3 times/day to 3 times/wk is acceptable as normal for most Asia people.

Regarding the IBS subtypes, this subjective category remains

difficult in clinical practice. Because the restrictive character of Rome II definition and alternating-IBS (A-IBS) being really unknown as part of C- or D-IBS, most IBS are perhaps undiagnosed.^{12,39} Surprisingly, even some A-IBS subjects think that their BM is normal despite the alternating expression.²⁴ Thereafter, who such as physician or patient himself or what criteria should determine the subtype correctly? In addition, IBS subtypes are likely depending upon heterogeneity in terms of evaluated population, gender, geographical location and criteria to define.^{12,19,22,40,44,90,108,110} For example, the subtype correlation between Rome II and III has been poor because the apparently existed drawback in the categories of A-IBS, mixed-IBS and un-

Table 6. Percentile Distribution of Reported Subtypes in Subjects With Irritable Bowel Syndrome

Study	Country	Sample	Criteria size	D-IBS (%)	C-IBS (%)	A (M)-IBS (%)	U-IBS (%)
Western and Latin America countries							
Hungin ⁴⁰ 2003	8 European countries	41,984 ^a	Rome II	21.0	16.0	63.0	-
Vandvik ¹⁹ 2006	Norway	4,622 ^a	Rome II	23.0	24.0	53.0	-
Ersryd ⁴⁹ 2007	Sweden	249	Rome II	36.5	18.1	45.4	-
Hillilä ¹⁴ 2004	Finland	3,650 ^a	Rome III	39.0	31.0	63.0	23.7
			Manning X2	41.2	22.7	NM	NM
			Manning X3	47.6	18.7	NM	NM
			Rome I	53.9	21.5	NM	-
Jones ⁵³ 1992	UK	1,620 ^a	Rome II	56.5	16.3	NM	-
Wilson ⁵⁴ 2004	UK	4,807 ^a	Manning	58.0	48.0	27.0 (Both)	21.0 (Neither)
Dapoigny ⁵⁶ 2004	France	20,000 ^a	Rome II	25.4	24.1	46.7	-
Katsinelos ⁵⁹ 2009	Greece	2,397 ^a	Rome II	36.0	29.0	31.0	-
Andrews ²⁵ 2005	USA	25,986 ^a	Rome II	36.5	44.2	19.3	-
Hungin ³⁹ 2005	USA	5,009 ^a	Rome II	53.0	19.7	25.8	-
			Rome I	20.7	15.5	63.8	-
Valerio-Ureña ⁶⁴ 2010	Mexico	459 ^a	Rome II	22.6	16.1	61.3	-
			Rome II	28.2	50.0	21.8	-
Schmulson ¹¹³ 2010	Mexico	1,021	Rome II	28.5	27.8	43.7	-
Asia countries							
Sperber ²⁶ 2007	Israel	1,000 ^a	Rome II	32.1	57.1	10.7	-
			Rome III	16.1	36.6	47.3	NM
Celebi ²⁷ 2004	Turkey	1,766	Rome II	36.0	52.3	11.7	-
Yilmaz ⁷⁷ 2005	Turkey	3,000 ^a	Rome II	48.1	38.9	-	13.0
Khoshkrood-Mansoori ¹⁰¹ 2009	Iran	18,180 ^a	Rome III	18.0	52.0	8.0	NM
			Rome II	29.3	50.4	20.3	-
Husain ²⁸ 2008	Pakistan	880	Rome II	4.0	39.0	-	57.0
Ghoshal ⁶⁹ 2008	India	4,500 ^a	NM	0.8	16.0	19.2	63.9
Masud ⁸³ 2001	Bangladesh	2,426 ^a	Rome II	50.0	16.4	7.8	25.9
Perveen ⁸⁴ 2009	Bangladesh	1,503 ^a	Rome II				

^aCommunity based study.

X2, 2 diagnostic statements; X3, 3 diagnostic statements; IBS, irritable bowel syndrome; D-IBS, diarrhea predominant-IBS; C-IBS, constipation predominant-IBS; A-IBS, alternating-IBS; M-IBS, mixed-IBS; U-IBS, un-subtyped-IBS; NM, not mentioned.

Table 6. Continued

Study	Country	Sample	Criteria size	D-IBS (%)	C-IBS (%)	A (M)-IBS (%)	U-IBS (%)
Devanarayana ⁸⁵ 2010	Sri Lanka	427	Rome II	25.0	33.3	16.7	25.0
			Rome III	26.7	26.7	33.3	13.3
Tan ³⁶ 2003	Malaysia	533	Rome I	7.1	77.4	-	15.5
Rajendra ⁸⁶ 2004	Malaysia	949 ^a	Rome II	35.1	36.5	28.4	-
Gwee ²⁴ 2004	Singapore	2,276 ^a	Rome II	12.8	51.0	NM	-
Kwan ⁸⁷ 2002	Hong Kong	1,000 ^a	Rome II	27.0	17.0	-	56.0
Si ¹¹⁰ 2004	China	662	Rome II	47.7	20.0	32.3	-
Xiong ³⁵ 2004	China	4178 ^a	Rome II	74.1	15.1	10.8	-
Wang ⁸⁹ 2007	China	3,014	Rome II	38.2	33.2	28.7	-
			Rome III	32.7	27.9	6.7	32.7
Dai ⁹⁰ 2008	China	1,147	Rome III	24.3	14.7	48.0	13.0
Wang ¹⁰² 2009	China	3,014	Rome III	32.7	27.9	6.7	32.7
Zhao ⁹² 2010	China	16,091 ^a	Rome II	37.7	24.9	37.4	-
Kim ³⁰ 2005	Korea	1,717	Rome α	22.5	24.5	-	52.0
Han ³² 2006	Korea	1,066 ^a	Rome II	32.8	24.3	42.9	-
Son ⁹⁴ 2009	Korea	405	Rome II	26.9	34.5	38.8	-
Park ⁹⁵ 2010	Korea	1,009 ^a	Rome II	27.2	37.0	25.9	9.9
			Rome III	29.7	36.3	22.0	12.1
Noh ¹⁰⁴ 2010	Korea	2,388	Rome III	54.4	12.0	12.4	NM
Kumano ²² 2004	Japan	4,000 ^a	Rome II	31.1	41.0	27.9	-
Shiotani ⁹⁶ 2006	Japan	2,495	Rome II	43.7	47.8	-	8.6
Shinozaki ⁹⁷ 2008	Japan	633	Rome II	29.6	21.4	49.0	-
Hori ⁹⁸ 2009	Japan	181	Rome II	65.0	35.0	-	-

^aCommunity based study.

X2, 2 diagnostic statements; X3, 3 diagnostic statements; IBS, irritable bowel syndrome; D-IBS, diarrhea predominant-IBS; C-IBS, constipation predominant-IBS; A-IBS, alternating-IBS; M-IBS, mixed-IBS; U-IBS, un-subtyped-IBS; NM, not mentioned.

subtyped-IBS, respectively.^{49,90} Finally, a review indicates that USA population-based studies found similar distribution of C-IBS, D-IBS and A-IBS, whereas European studies showed either C-IBS or A-IBS as the most prevalent subtypes. More interestingly, primary care office-based studies showed A-IBS as the most prevalent group, while the specialist office-based studies found either C-IBS or D-IBS as the most frequently reported subtype.¹² It is likely the different attitude to acknowledge IBS between primary care and gastroenterologists. For example, not more than 50% of primary care physicians could reach the consensus, while cultural differences in the description of key symptoms is responsible for this discrimination.¹¹² Table 6 depicts the percentile distribution of IBS subtypes in 12 Western and 28 Asian countries. Among the developed countries, there is quite variable in the distribution of 3 main subtypes. Apart from Manning definition, it looks that the subtype proportions of C-IBS and D-IBS usually range 15%-55%, whereas this of A-IBS ranges higher as 20%-65%. The subtype correlation between Rome I and II is optimal but is not well existed between

Rome II and III. For the Asian countries, the proportions of D-IBS distribute widely from 0.8% to 74.1%, C-IBS proportion ranges 12.0%-77.4%, whereas A-IBS appears less common with range 6.7%-49.0%. Of 8 Rome III criteria based studies showing subtypes, 5 report untyped-IBS with proportion ranged 12.1%-32.7%. Apart a Korea study,⁹⁵ the subtype correlation between Rome II and III is poor as well as this of Western studies. Summarized together, IBS subtype proportions are very variable among the Asia studies. It is likely to mean that the clear and precise differentiation of various subtypes to fit BM stool form and occupied duration remains very subjective both for the patients and physicians themselves.

In conclusions, current Asia IBS prevalence is at least equal to the Western countries. Female predominant prevalence in Asia is common but not uniquely existed, while the proportions of IBS subtypes in Asia are too variable to find a rule.

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