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ORIGINAL ARTICLE

A global survey on the use of the international classification of diseases codes for metabolic dysfunction-associated fatty liver disease

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Abstract

Background With the implementation of the 11th edition of the International Classification of Diseases (ICD-11) and the publication of the metabolic dysfunction-associated fatty liver disease (MAFLD) nomenclature in 2020, it is important to establish consensus for the coding of MAFLD in ICD-11. This will inform subsequent revisions of ICD-11.

Methods Using the Qualtrics XM and WJX platforms, questionnaires were sent online to MAFLD-ICD-11 coding collaborators, authors of papers, and relevant association members.

Results A total of 890 international experts in various fields from 61 countries responded to the survey. We also achieved full coverage of provincial-level administrative regions in China. 77.1% of respondents agreed that MAFLD should be represented in ICD-11 by updating NAFLD, with no significant regional differences (77.3% in Asia and 76.6% in non-Asia, $p=0.819$). Over 80% of respondents agreed or somewhat agreed with the need to assign specific codes for progressive stages of MAFLD (i.e. steatohepatitis) (92.2%), MAFLD combined with comorbidities (84.1%), or MAFLD subtypes (i.e., lean, overweight/obese, and diabetic) (86.1%).

Conclusions This global survey by a collaborative panel of clinical, coding, health management and policy experts, indicates agreement that MAFLD should be coded in ICD-11. The data serves as a foundation for corresponding adjustments in the ICD-11 revision.

Keywords Global survey · MAFLD · ICD-11

Extended author information available on the last page of the article

Introduction

It has been more than 40 years (1979) since Dr. Klatskin and colleagues first used the term "non-alcoholic fatty liver disease (NAFLD)" to describe a specific type of fatty liver [1]. However, with a more in-depth understanding of the pathogenesis of this disease and its increasing prevalence worldwide, there was an urgent need to change the disease definition from one of "exclusion" to an "affirmative" standard. In 2020, a panel of international experts from 22 countries pioneered the concept of metabolic dysfunction-associated fatty liver disease (MAFLD) as a replacement and more apt terminology [2] that has subsequently been widely endorsed and adopted by a wide range of stakeholders. MAFLD describes the presence of fatty liver based on liver histology, imaging methods, or blood-based biomarkers in people who meet at least one of the following three metabolic conditions: overweight/obesity (using ethnic-specific cutoffs), type 2 diabetes mellitus, or evidence of metabolic dysregulation with at least two metabolic risk factors [2].

The International Classification of Diseases (ICD) is the most widely used disease classification system, which provides critical information on the extent, cause and consequences of human disease and death. Clinical terms encoded using ICD are the primary basis for health records and statistics on diseases in health care and for causes of death. The ICD data supports payment systems, service planning, quality and safety management, as well as health services research. Diagnostic guidelines linked to ICD codes also standardize data collection and enable large-scale clinical research. The ICD system originated in the nineteenth century with the release of ICD-1 in Paris and was taken over by the World Health Organization (WHO) in 1946 [3]. The latest version, ICD-11 [4–6] (https://icd.who.int/browse11/l-m/en), was adopted by the 72nd World Health Assembly in 2019 and came into force in 2022.

With the upcoming full implementation of ICD-11 worldwide, reaching a timely consensus on the appropriateness of MAFLD coding in ICD-11 or its revisions is necessary. Therefore, to gain a more comprehensive view, and commissioned by the Asia Pacific Association for the Study of the Liver (APASL) and its **M**etabolic f**A**tty l**I**ver **D**iseas**E** co**N**ortium (APASL-MAIDEN), we conducted the largest expert survey involving ICD-11 coding and MAFLD to date.

Methods

Between December 20, 2023, and January 31, 2024, a survey covering the appropriateness of MAFLD coding in ICD-11 was sent online to worldwide stakeholders in the field. A total of 1071 responses were collected from 61 countries (Fig. 1).

Study design

The survey started by asking whether the participants had been exposed to or were aware of ICD coding. If the answer was "No", the questionnaire was automatically terminated. The survey was split into four parts: (1) basic information on participants, including full name, email address, affiliation (for publication purposes), country of residence, sex, and age; (2) academic/clinical background, including the field in which they worked or are currently working, years of work and number of publications in the field of fatty liver disease, and professional association background; (3) core questions comprising participants' choices and attitudes about how to encode MAFLD in ICD-11; and (4) participants' attitudes towards the role of ICD-11. To ensure participants did not feel pressured to give information, some questions throughout the survey included an answer option reading "prefer not to say" or a text box to provide feedback if required. The questionnaire was designed and finalized by senior clinical and coding experts.

Due to geographical network limitations, the English version of the questionnaire was designed on the Qualtrics XM platform, and the Chinese version was developed on the WXJ platform and had the same content. Participants were identified in one of three ways: (1) by email addresses of authors (mainly corresponding authors) from papers published in PubMed on MAFLD since 2020 from across the globe; (2) members of relevant professional associations, such as APASL-MAIDEN, Chinese Portal Hypertension Alliance (CHESS), and the National Center for Quality Control of Medical Records in China, etc.; and (3) from a list of coding-related personnel collected by the Collaborating Center for the WHO Family of International Classifications in Beijing.

Statistical analysis

Only response entry data were statistically analyzed, and no interpolation was performed on missing data. Group comparisons were made primarily based on the region of respondents, and data are presented mainly as proportions. For single-choice questions, the chi-square test was used to compare the overall composition between different groups. For multiple-choice questions, the chi-square test was used to compare the composition between different groups for each option. Statistical analyses were conducted using IBM SPSS statistics (version 26.0) and software R (version 4.2.3). All reported probability values were 2-tailed, and a p-value < 0.05 was considered statistically significant.

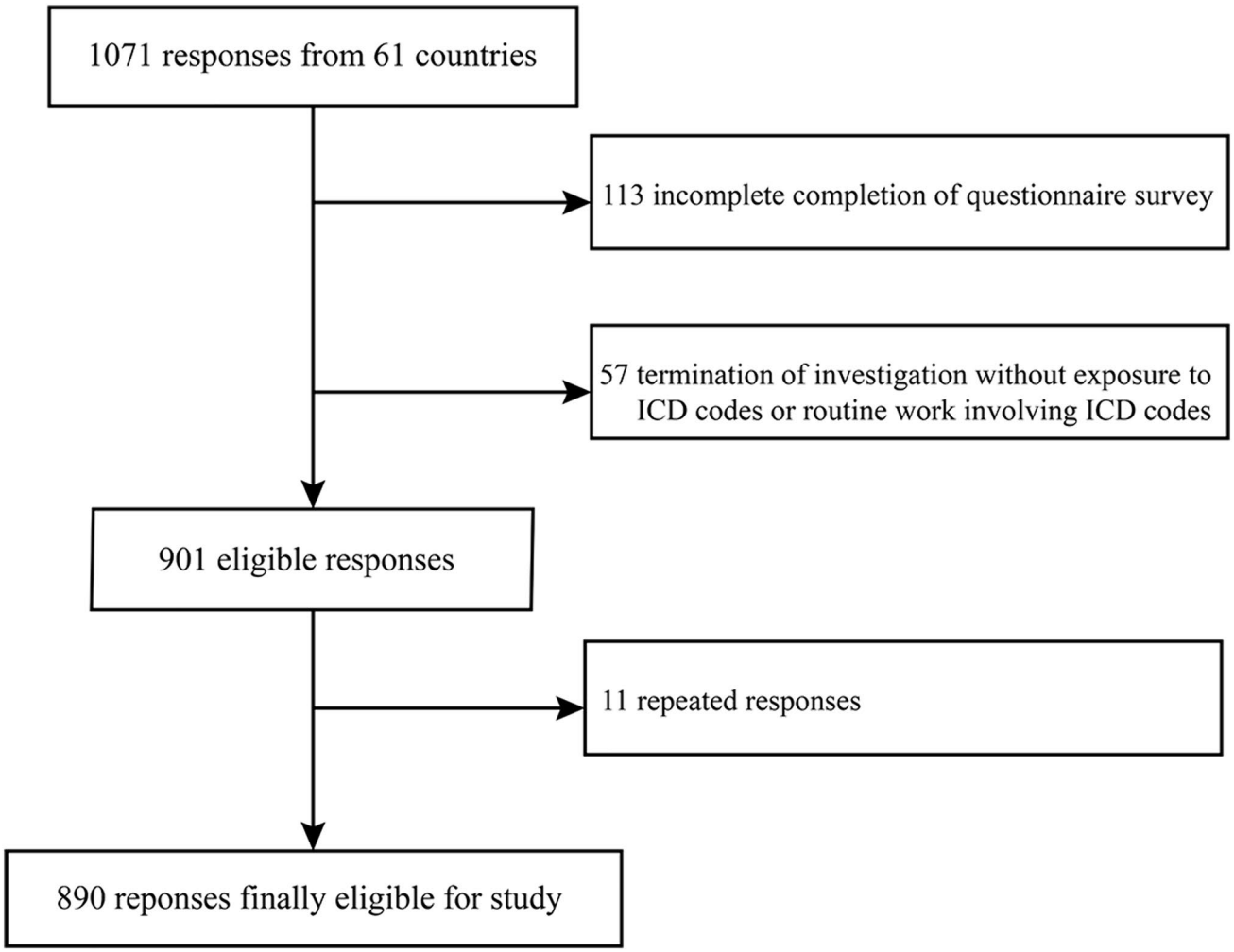


Fig. 1 Flow chart for the survey

Results

Characteristics of respondents

One thousand and seventy-one respondents from 61 countries responded to the questionnaire between December 2, 2023, and January 31, 2024; a total of 890 responses were included in the final analysis after data culling (Fig. 1). Asia (25 countries, 41.0%) and Europe (24 countries, 39.3%) were the continents with the most participants. The countries with the highest proportion of respondents were China (486, 54.6%), Italy (41, 4.6%), USA (28, 3.15%), Australia (27, 3.03%), Brazil (21, 2.36%), UK (20, 2.25%), India (19, 2.13%), and Mexico (18, 2.02%), accounting for 71.2% of the total number of respondents. The number of respondents for each of the 61 countries is presented in Table S1. The Chinese region had the most responses and included all provincial-level administrative regions (Fig. S1).

Of the respondents, 66.1% were male, and this proportion was greater among non-Asian populations (72.1%, $p = 0.005$) (Table 1). The age distribution showed that the highest number was in the 41–45 years group. In terms of academic/clinical background, the largest number of respondents were clinicians/medical staff (89.3%); others involved included personnel from healthcare administration, policy, or education, most of whom were engaged in clinical (61.1%) or non-clinical (24.8%) research. As shown in Tables 1 and S2, there was no significant difference in the number of years working in fatty liver disease care/research by respondents according to region, with the greatest number in the range of 9–19 years (39.3% Asia vs. 39.0% non-Asia; 39.6% China vs. 38.5% non-China in Asia; 41.3% America vs. 38.0% non-America in non-Asia; all $p > 0.05$ for differences). 65.2% of the population were members of pan-national (region) associations in various disciplines, such as American Association for the Study of Liver Diseases (AASLD), Asociación Española para el Estudio del

Table 1 Socio-demographic characteristics and academic/clinical backgrounds by region of respondents

	Asia, *n* (%)	Non-Asia, *n* (%)	*p*-values	Total, *n* (%)
n	621	269		890
Sex			0.005	
Male	394 (63.4%)	194 (72.1%)		588 (66.1%)
Female	226 (36.4%)	71 (26.4%)		297 (33.4%)
Prefer not to say[a]	1 (0.2%)	4 (1.5%)		5 (0.6%)
Age group			< 0.001	
18–35 years	95 (15.3%)	28 (10.4%)		123 (13.8%)
36–40 years	89 (10.7%)	7 (9.3%)		125 (14.0%)
41–45 years	135 (21.7%)	57 (21.2%)		192 (21.6%)
46–50 years	115 (18.5%)	47 (17.5%)		162 (18.2%)
51–55 years	86 (13.8%)	23 (8.6%)		109 (12.2%)
56–60 years	63 (10.1%)	33 (12.3%)		96 (10.8%)
61–85 years	38 (6.1%)	45 (16.7%)		83 (9.3%)
Field(s) of employment[b]				
Clinician/medical doctor	563 (90.7%)	232 (86.2%)	0.050	795 (89.3%)
Healthcare administration	113 (18.2%)	20 (7.4%)	< 0.001	133 (14.9%)
Clinical research	366 (58.9%)	178 (66.2%)	0.042	544 (61.1%)
Non-clinical research	150 (24.2%)	71 (26.4%)	0.478	221 (24.8%)
Policy	16 (2.6%)	14 (5.2%)	0.046	30 (3.4%)
Education	146 (23.5%)	115 (42.8%)	< 0.001	261 (29.3%)
Other[c]	19 (3.1%)	4 (1.5%)	0.175	23 (2.6%)
Number of years worked in the field of fatty liver disease			0.091	
< 9	226 (38.0%)	83 (31.1%)		309 (35.8%)
10–19	234 (39.3%)	104 (39.0%)		338 (39.2%)
20–29	102 (17.1%)	62 (23.2%)		164 (19.0%)
> 30	33 (5.5%)	18 (6.7%)		51 (5.9%)
No response[d]	26 (4.2%)	2 (0.7%)		28 (3.1%)
Membership(s) of relevant association(s) in the following fields at the level of pan-national (regional) or national[b,e]				
Hepatology	210 (33.8%)	111 (41.3%)	0.034	321 (36.1%)
Gastroenterology (not including Hepatology)	90 (14.5%)	81 (30.1%)	< 0.001	171 (19.2%)
Endocrinology	70 (11.3%)	35 (13.0%)	0.460	105 (11.8%)
Other[f]	96 (15.5%)	76 (28.3%)	< 0.001	172 (19.3%)
No membership	253 (40.7%)	57 (21.2%)	< 0.001	310 (34.8%)

p values are based on chi-square or Fisher's exact probability tests

[a]Due to the small number of people in this subgroup, only data are shown and not included in the chi-square analysis

[b]Sum may exceed the sample size due to multiple-choice questions

[c]Mainly International Classification of Diseases coders

[d]Percentages for "no response" are based on the total number of participants; all other percentages are calculated after excluding non-responsive n, unless otherwise noted

[e]Associations should be at the level of pan-national (regional) or national, not state, or provincial associations

[f]Mainly includes the fields of metabolism and bariatrics, cardiovascular, nutrition, and medical records management

Hígado (AEEH), Italian association of study liver disease (AISF), APASL, European Association for the Study of the Live (EASL), and Indian National Association for study of liver (INASL) (Fig. 2).

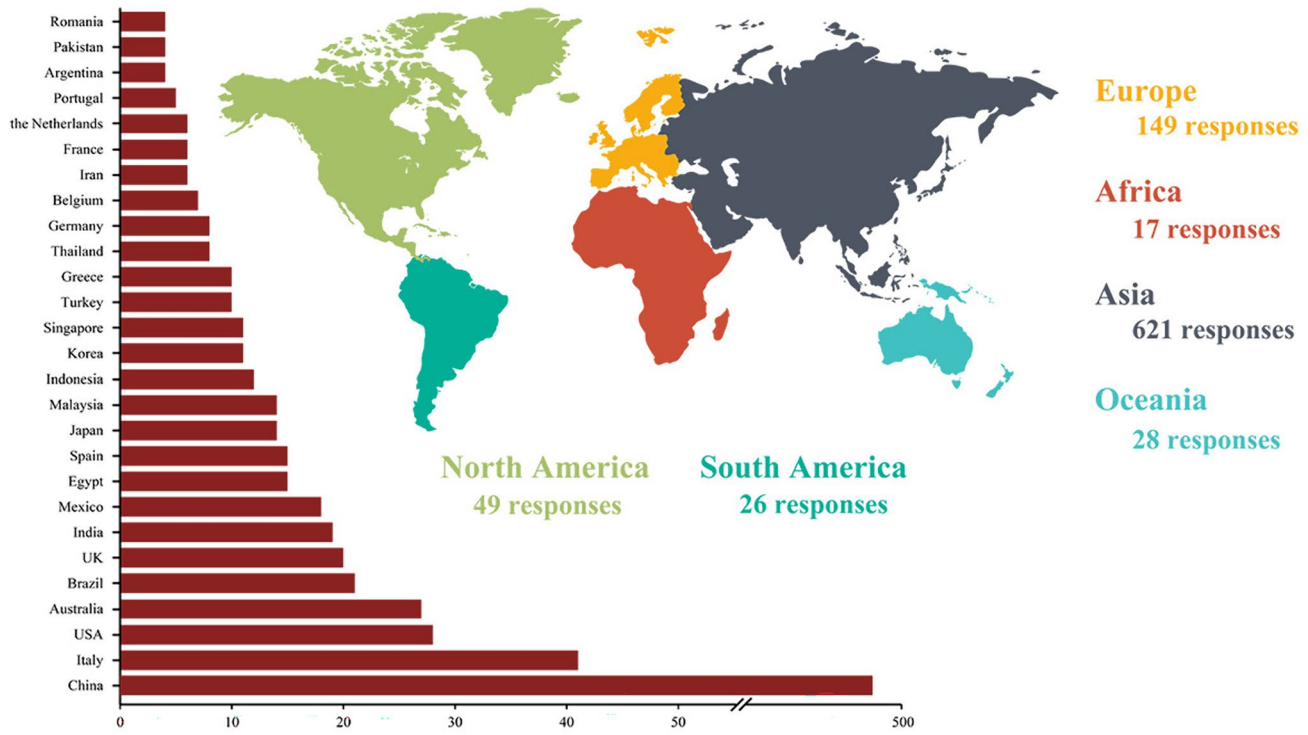


Fig. 2 Global response to the survey. The bar chart shows the respondent counts for the top 27 countries with the highest number of responses

ICD-11 codes for fatty liver disease

Before answering ICD-related questions, we asked participants to read the records of liver diseases in ICD-11 (published by WHO), especially DB90-DB9Z (https://icd.who.int/browse11/l-m/en). For participants' (experts in the relevant field) choices of the best code in ICD-11, the question-wording was: In the latest version of ICD-11, the ICD-11 code for NAFLD is DB92, do you think the best code in ICD-11 for MAFLD is to replace NAFLD directly, or to leave MAFLD as a synonym for NAFLD, or to add it using additional codes such as extension codes? The options provided were "Replace NAFLD directly", "Exist as a synonym", "Add an extension code", "Not qualified to respond", and a feedback box. Although the first two options are not the same, both resulted in using the code DB92, so the two options were combined in the subtotal when analyzing the comparison.

There were no significant differences in the choice of MAFLD in ICD-11 among geographically diverse respondents (42.7%, 34.6%, 22.7% vs. 47.9%, 28.7%, 23.4%, $p = 0.212$) (Table 2). Overall, the first two options (subtotal) accounted for 77.1%, and the proportions among various regions were all above 73% (77.3% in Asia and 76.6% in non-Asia; 78.5% in China and 73.3% in non-China; 73.2% in America and 77.9% in non-America) (Table 2, Fig. 3a, and Fig. S2A). By comparison, male respondents were more likely to choose to replace NAFLD with MAFLD directly or to exist as a synonym (80.3% vs. 71.1%, $p = 0.002$). Notably, there were no differences in the choice of coding across academic/clinical contexts, either in terms of employment, number of years worked in the field of fatty liver disease, or association background (Table S3).

More than 80% of respondents agreed or somewhat agreed with the need to assign codes in terms of the progressive stages of MAFLD (i.e. steatohepatitis) (92.2%), MAFLD combined with comorbidities (84.1%), or MAFLD subtypes (i.e., overweight/obese-MAFLD, lean-MAFLD, diabetic-MAFLD) (86.1%) (Fig. 3 and Fig. S2). Furthermore, when it came to which aspects of the phenotype needed to be represented by an additional code, the highest numbers opted for cardiovascular disease (92.4%), chronic kidney disease (77.4%), and atherosclerosis (68.4%) (Fig. 3d and Fig. S2D). Figure S3 shows the percentage of experts on each continent for each of the questions.

At the end of the questionnaire, all respondents answered questions about their attitudes toward the role of ICD coding and whether the survey improved their understanding of ICD-11 coding. 98.6% of respondents agreed (or somewhat agreed) with the positive role of ICD in the medical field and for clinical research, especially in Asia (99.4% in Asia vs. 97.0% in non-Asia, $p = 0.009$); 98% agreed (or somewhat

Table 2 Experts' choices of the best code for MAFLD in ICD-11

Question	Asia, *n* (%)	Non-Asia, *n* (%)	Total, *n* (%)
In the latest version of ICD-11, the ICD-11 code for NAFLD is DB92, do you think the best code in ICD-11 for MAFLD is to replace NAFLD directly, or to leave MAFLD as a synonym for NAFLD, or to add it using additional codes such as extension codes?			
Replace NAFLD directly (DB92 for MAFLD, and NAFLD will may no longer exist in ICD-11)	260 (42.7%)	125 (47.9%)	385 (44.3%)
Exist as a synonym (keep the term NAFLD, and MAFLD is a synonym, DB92 for both)	211 (34.6%)	75 (28.7%)	286 (32.9%)
Subtotal[a]	471 (77.3%)	200 (76.6%)	671 (77.1%)
Adding an extension code (add other code for MAFLD, but not DB92, which is still used for NAFLD)	138 (22.7%)	61 (23.4%)	199 (22.9%)
Not qualified to respond[b]	12 (1.9%)	8 (3.0%)	20 (2.2%)
p-value[c]			0.212
p-value[d]			0.819

[a]Subtotal, the sum of responses to choose option "Replace NAFLD directly" and to choose option "Exist as a synonym"

[b]Percentages for "Not qualified to respond" are based on the total number of participants; all other percentages are calculated after excluding n of not qualified to respond and are not included in the chi-square analysis unless otherwise noted

[c]*p* value is based on comparing the differences in the distribution of the three options across regions

[d]*p* value is based on comparing differences in the distribution of the two options (subtotal vs. adding an extension code) across regions

agreed) that the survey helped improve their knowledge of ICD-11 (98.9% in Asia vs. 95.9% in non-Asia, $p = 0.004$) (Table 3).

Discussion

This study, targeting fatty liver disease coding in ICD-11 involves the largest number of countries and expert participants to date. To achieve a consensus, geographic locations were used to compare the experts' choices for coding MAFLD in ICD-11. We found no significant geographic differences in the selections, that is, there was relative agreement that MAFLD can be represented in ICD-11 by updating the existing NAFLD codes. As a disease classification system used worldwide, this result is crucial for subsequent updating of ICD-11 by WHO.

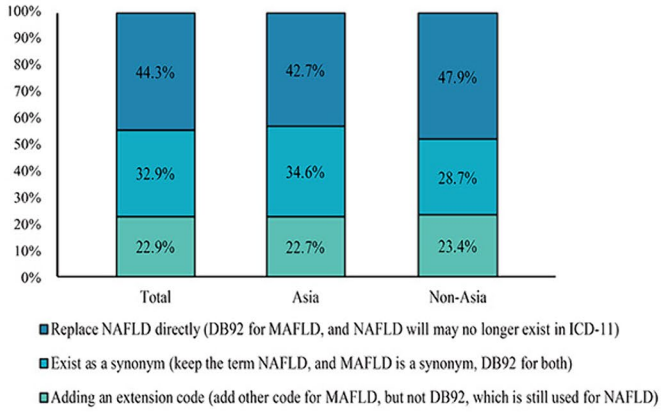
Numerous studies and clinical cases have shown that MAFLD causes long-term health, social and economic burdens [7–10] especially in the context of the high prevalence rates of MAFLD worldwide. It is worth noting that these consequences will continue to grow if there is no effective policy response [11]. The recently coined nomenclature for MAFLD in 2020 is based on decades of research and an in-depth understanding of the pathogenesis of this liver disease [2, 12] and the need to have a disease term that is both affirmative and informative for patients [1, 13]. After the new terminology was proposed, more than 1,000 stakeholders, including Hepatologists, Internists, Diabetologists, Endocrinologists, Pediatricians, Primary care providers, Nephrologists, Cardiologists, Pathologists, Patient advocates, Nurses, Nutritionists, and Pharmacologists have supported the use of the term [14]. It has also been recognized by many regional associations, including Latin America [15], the Middle East, and North Africa [16, 17], and has resulted in consensus documents or high-level articles related to MAFLD [18–22].

As stated on the WHO website, ICD-11 provides strong support for payment systems, service planning, administration of quality and safety, health care services research, standardization of data collection, and large-scale research [6, 23]. The present study entailed a global questionnaire survey on ICD-11 to support the specific coding of MAFLD in the latest version of the code book. Stakeholders included various clinical stakeholders, as well as coders and members

Fig. 3 Expert responses to five items regarding the use of ICD-11 for fatty liver disease. **a** Question-wording: "In the latest version of ICD-11, the ICD-11 code for NAFLD is DB92, do you think the best code in ICD-11 for MAFLD is to replace NAFLD directly or to leave MAFLD as a synonym for NAFLD, or to add it using additional codes such as extension codes?". **b** Question-wording: "Do you consider that there should be a code for MAFLD without steatohepatitis, a code for MAFLD with steatohepatitis (both are the different pathological stages in the progression of MAFLD)?". **c** Question-wording: "In the latest version of ICD-11, there are additional codes for clinical manifestations of the digestive system in DB92, do you consider that it would be useful to assign additional codes for MAFLD combined with comorbidities (e.g., MAFLD-CKD), to more fully characterize the clinical phenotype?". **d** Those who choose to agree/somewhat agree with question C could answer this next question. Question-wording: "What aspects of the phenotype do you recommend should be added to the additional coding? (Terminology: Post-coordination) (select all that apply)". **e** Question-wording: "As stated in the diagnostic criteria for MAFLD, do you think it would be useful to assign additional codes for MAFLD subtypes (e.g., overweight/obese-MAFLD, lean-MAFLD, diabetic-MAFLD), as they have a different baseline clinical phenotype in cross-sectional studies, different disease trajectory and different outcomes."

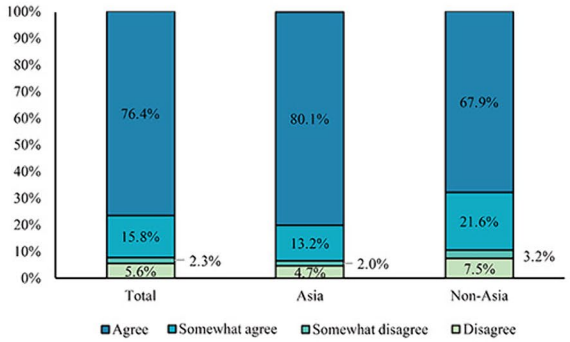
A

Experts' choices of the best code for MAFLD in ICD-11



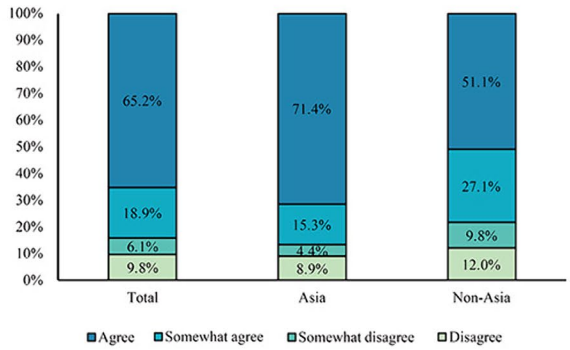
B

Expert attitudes toward the need for coding for MAFLD with/without steatohepatitis in ICD-11



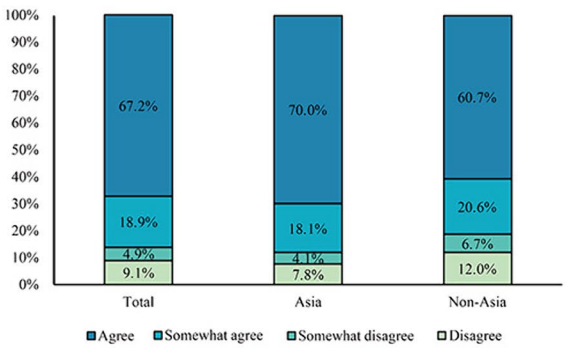
C

Expert attitudes toward the need to assign additional codes for MAFLD combined comorbidities in ICD-11



E

Expert attitudes toward the need to assign additional codes for MAFLD subtypes in ICD-11



D

Comorbidities phenotypes are considered to need to be added in additional codes

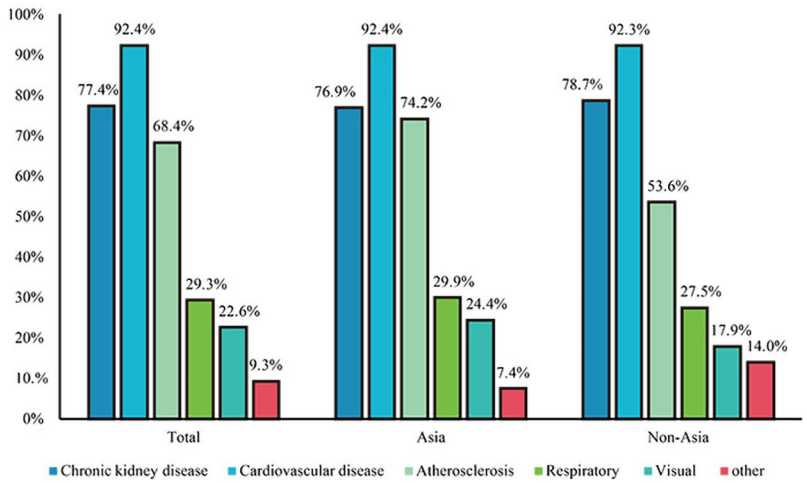


Table 3 Attitudes of experts toward the role of ICD-11

Question(s)	Total		Asia		Non-Asia		*p*-values
	Agree + Somewhat agree	Disagree + Somewhat disagree	Agree + Somewhat agree	Disagree + Somewhat disagree	Agree + Somewhat agree	Disagree + Somewhat disagree	
Do you agree standardized coding systems in ICD contribute to better communication in the medical field and for clinical research?	98.6% (85.3% + 13.3%)	1.4% (0.8% + 0.6%)	99.4% (89.7% + 9.7%)	0.6% (0.6% + 0)	97.0% (75.1% + 21.9%)	3.0% (1.1% + 1.9%)	0.009
Do you agree the survey has improved your knowledge of ICD-11 coding?	98.0% (82.1% + 15.9%)	2.0% (0.4% + 1.6%)	98.9% (87.8% + 11.1%)	1.1% (0.2% + 1.0%)	95.9% (69.0% + 26.9%)	4.1% (1.1% + 3.0%)	0.004

p values are based on comparing differences in the distribution of the two options (agree or somewhat agree vs. disagree or somewhat disagree) across regions

of the Collaboration Center for the WHO Family of International Classifications.

The questionnaire survey was sent online to as many experts as possible, including authors from PubMed online searches and lists of relevant associations. Finally, this is the only expert survey questionnaire on MAFLD concerning ICD-11 coding. Due to limitations of the geographical networks, the questionnaire was designed using two platforms (the Qualtrics XM platform and the WXJ platform) with identical content. All provincial-level administrative regions in China were covered. At a national level, responses were received from 61 countries, covering all major continents. The results show that the responding authors covered all geographic locations, both sexes, a spectrum of ages and they were from different academic/clinical backgrounds, with expertise in fatty liver disease, and/or had memberships in high-level associations (Tables 1 and S2).

This survey focused on the differences in views or attitudes across global regions. We further compared opinions or attitudes between China and non-China regions in Asia and America and non-America in non-Asia. Encouragingly, on the core issue, there were no significant geographical differences, with more than 77% of experts, both in Asia and non-Asia regions, taking a favorable view of the use of MAFLD in ICD-11 as a replacement for NAFLD (either as a direct replacement or exist as a synonym). Furthermore, even among experts in different fields or with different seniority, there was no significant difference in views on this issue. These relatively consistent results are essential for the ICD, a global disease classification system.

An item that cannot be ignored in the questionnaire process is the mention of metabolic dysfunction-associated steatotic liver disease (MASLD), a term proposed by AASLD and other scientific liver societies in 2023 [24]. 3% of respondents ($n = 24$) mentioned MASLD, especially from the West. It needs to be clear that the purpose of our study is not to compare MAFLD and MASLD definitions to determine which terminology is more appropriate. In medical cognition of diseases, academic disputes are expected as long as they are not mixed with political issues and are not boycotted for their own sake [25–27]. The only thing we would like to emphasize is that it is necessary to listen to the voice of the Asia–Pacific region [28], mainly due to its people representing about 60% of the world's population. The prevalence and total disease burden of MAFLD is highest in the Asia Pacific and will continue to further increase with rising economic prosperity [29–31]. Again, this study investigated the optimal coding of MAFLD in ICD-11 but does not seek to devalue other initiatives.

The main limitation of this study is the short duration of the survey. This does not rule out the possibility that some experts might have been unable to respond promptly for various reasons. Encouragingly, the vast majority (over 96%) of respondents expressed positive attitudes about the survey itself and specifically, regarding respondents' attitudes towards the role of ICD coding and whether the survey improved their understanding of ICD-11 coding. In addition, although this is the largest expert survey on MAFLD and ICD to date, involving all major regions and covering all provincial administrative areas in China, it did not include participants from all countries. Hence, the way forward requires the generation of more evidence to inform further efforts.

In conclusion, this large global expert survey shows that there are no significant regional differences in the appropriateness and selection of MAFLD coding in ICD-11. This survey could therefore serve as a basis for corresponding adjustments in future revisions of ICD-11.

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Data availability Interested researchers can contact the corresponding author for data access requests via email (zhengmh@wmu.edu.cn).

Declarations

Conflict of interest Gregory Y. H. Lip: Consultant and speaker for BMS/Pfizer, Boehringer Ingelheim, Daiichi-Sankyo, Anthos. No fees are received personally. He is a National Institute for Health and Care Research (NIHR) Senior Investigator and co-PI of the AFFIRMO project on multimorbidity in AF (Grant Agreement No 899871), TARGET project on digital twins for personalised management of atrial fibrillation and stroke (grant agreement No 101136244) and ARISTOTELES project on artificial intelligence for the management of chronic long term conditions (Grant Agreement No. 101080189), which are all funded by the EU's Horizon Europe Research & Innovation programme. Christopher D Byrne has received grant support from Echosens. Vincent Wai-Sun Wong: Consultancy: AbbVie, Boehringer Ingelheim, Echosens, Gilead Sciences, Intercept, Inventiva, Novo Nordisk, Pfizer, Sagimet Biosciences, TARGET PharmaSolutions, Visirna. Lectures: Abbott, AbbVie, Echosens, Gilead Sciences, Novo Nordisk, Unilab Research grants: Gilead Sciences. Stock: Co-founder of Illuminatio Medical Technology. Wai-Kay Seto received speaker's fees from AstraZeneca, is an advisory board member of Abbott, received research funding from Alexion Pharmaceuticals, Boehringer Ingelheim, Pfizer and Ribo Life Science, and is an advisory board member, received speaker's fees and researching funding from Gilead Sciences. Leon A. Adams has received speaker or advisory board fees from Novartis, Pfizer, Novonordisc, Roche Diagnostics, and Gilead Sciences. Javier Crespo reports consultant and/or speaker and/or participated in clinical trials sponsored and/or received grants and research support from Gilead Sciences, AbbVie, MSD, Shionogi, Intercept Pharmaceuticals, Janssen Pharmaceuticals Inc, Celgene, and Alexion. Stefano Romeo reports consultant for Astra Zeneca, AMGEN, Novartis, Ultragenyx, Sanofi, Ribocure Ab, and received research grants from Astra Zeneca. Nikolaos T. Pyrsopoulos received research grants from Intercept Pharmaceuticals, Ocera, Salix, Grifols, Cytosorbents, Gilead Sciences. Victor De Ledinghen: Consultancy: Echosens, Escopics. Robert G. Gish has performed as Consultant and/or Advisor to Abacus, Abbott, AbbVie, Albireo, Aligos, Altimunne, Antios, Arrowhead, AstraZeneca, Audentes Therapeutics, Corcept, Dynavax, Effectus, Eiger, Eisai, Enyo, Genentech, Genlantis, Gerson Lehrman Group, Gilead Sciences, GlaxoSmithKline, Helios, HepaTX, HepQuant, Intercept, Ipsen, Janssen, JBS Science, Kinnate Bio, Merck, Precision BioSciences, Pfizer, Seres Therapeutics, Topography Health, Tune Therapeutics, Venatorx, Virion. Scientific or Clinical Advisory Boards: AbbVie, Dynavax, Enyo, Genentech, Genlantis, Gilead, Helios, HepaTX, HepQuant, Intercept, Janssen, Merck, Pfizer, Prodigy. Lectures: AbbVie, AstraZeneca, BMS, Diasorin, Eisai, Genentech, Gilead Sciences Inc., Intercept, Ipsen Biopharmaceuticals, Madrigal, Mallinckrodt, VBI Vaccines. Ming-Hua Zheng has received honoraria for lectures from AstraZeneca, Hisky Medical Technologies and Novo Nordisk, consulting fees from Boehringer Ingelheim, serves as a consultant for Eieling Technology. Giada Sebastiani has acted as a speaker for Merck, Gilead, Abbvie, Novo Nordisk, Pfizer, served as an advisory board member for Pfizer, Merck, Novo Nordisk, Gilead, and has received unrestricted research funding from Theratecnologies Inc. Yusuf Yilmaz serves as a consultant for Zydus Therapeutics. Ming-Lung Yu received research grants from Abbvie, BMS, Gilead, Merck and Roche diagnostics, served as a consultant of Abbott, Abbvie, BMS, Gilead, Roche and Roche diagnostics, acted as a speaker for Abbvie, BMS, Eisai, Gilead, Roche and Roche diagnostics. Wah Kheong Chan served as a consultant or advisory board member for Roche, AbbVie, Boehringer Ingelheim and Novo Nordisk; and a speaker for Novo Nordisk, Abbott, Echosens, Viatris and Hisky Medical. Faming Zhang conceived the concept of GenFMTer and transendoscopic enteral tubing and the devices related to them at FMT Medical. Seung Up Kim has served as an advisory committee member Gilead Sciences, GSK, Bayer, and Eisai. He is a speaker for Gilead Sciences, GSK, Bayer, Eisai, Abbive, EchoSens, MSD, and Bristol-Myers Squibb. He has also received a research grant from Abbive, Gilead, and Bristol-Myers Squibb. Robert J Wong has received research funding (to his institution) from Gilead Sciences, Theratechnologies, Durect Corporation, and Exact Sciences. He has served as a consultant without compensation for Gilead Sciences, Mallinckrodt, and Salix. George Boon-Bee Goh has served as a consultant or advisory board member for Roche, Boehringer Ingelheim, MSD and Novo Nordisk; and a speaker for Echosens, Viatris and Abbott. Other authors have no conflicts of interest to declare.

References

1. Reuben A. Leave gourmandising. Hepatology. 2002;36:1303–1306
2. Eslam M, Newsome PN, Sarin SK, et al. A new definition for metabolic dysfunction-associated fatty liver disease: an international expert consensus statement. J Hepatol. 2020;73:202–209
3. World Health Organization. History of the development of the ICD. Volume 2024.
4. Fung KW, Xu J, Bodenreider O. The new International Classification of Diseases 11th edition: a comparative analysis with ICD-10 and ICD-10-CM. J Am Med Inform Assoc. 2020;27:738–746
5. Pocai B. The ICD-11 has been adopted by the World Health Assembly. World Psychiatry. 2019;18:371–372
6. Lancet T. ICD-11. Lancet. 2019;393:2275
7. Feng G, Valenti L, Wong VW, et al. Recompensation in cirrhosis: unravelling the evolving natural history of nonalcoholic fatty liver disease. Nat Rev Gastroenterol Hepatol. 2024;21:46–56
8. Miao L, Targher G, Byrne CD, et al. Current status and future trends of the global burden of MASLD. Trends Endocrinol Metab. 2024. https://doi.org/10.1016/j.tem.2024.02.007
9. Taylor RS, Taylor RJ, Bayliss S, et al. Association between fibrosis stage and outcomes of patients with nonalcoholic fatty liver

disease: a systematic review and meta-analysis. Gastroenterology. 2020;158:1611-1625.e12
10. Younossi Z, Aggarwal P, Shrestha I, et al. The burden of non-alcoholic steatohepatitis: a systematic review of health-related quality of life and patient-reported outcomes. JHEP Rep. 2022;4:100525
11. Le MH, Yeo YH, Zou B, et al. Forecasted 2040 global prevalence of nonalcoholic fatty liver disease using hierarchical bayesian approach. Clin Mol Hepatol. 2022;28:841–850
12. Eslam M, Sanyal AJ, George J, et al. MAFLD: a consensus-driven proposed nomenclature for metabolic associated fatty liver disease. Gastroenterology. 2020;158:1999-2014 e1
13. Ayada I, van Kleef LA, Alferink LJM, et al. Systematically comparing epidemiological and clinical features of MAFLD and NAFLD by meta-analysis: focusing on the non-overlap groups. Liver Int. 2022;42:277–287
14. Méndez-Sánchez N, Bugianesi E, Gish RG, et al. Global multi-stakeholder endorsement of the MAFLD definition. Lancet Gastroenterol Hepatol. 2022;7:388–390
15. Mendez-Sanchez N, Arrese M, Gadano A, et al. The Latin American Association for the Study of the Liver (ALEH) position statement on the redefinition of fatty liver disease. Lancet Gastroenterol Hepatol. 2021;6:65–72
16. Shiha G, Alswat K, Al Khatry M, et al. Nomenclature and definition of metabolic-associated fatty liver disease: a consensus from the Middle East and north Africa. Lancet Gastroenterol Hepatol. 2021;6:57–64
17. Fouad Y, Ghazinyan H, Alboraie M, et al. Joint position statement from the Middle East and North Africa and sub-Saharan Africa on continuing to endorse the MAFLD definition. J Hepatol. 2024. https://doi.org/10.1016/j.jhep.2024.01.033
18. Sun DQ, Targher G, Byrne CD, et al. An international Delphi consensus statement on metabolic dysfunction-associated fatty liver disease and risk of chronic kidney disease. Hepatobiliary Surg Nutr. 2023;12:386–403
19. Zhou XD, Targher G, Byrne CD, et al. An international multidisciplinary consensus statement on MAFLD and the risk of CVD. Hepatol Int. 2023;17:773–791
20. van Kleef LA, Ayada I, Alferink LJM, et al. Metabolic dysfunction-associated fatty liver disease improves detection of high liver stiffness: the Rotterdam Study. Hepatology. 2022;75:419–429
21. Yamamura S, Eslam M, Kawaguchi T, et al. MAFLD identifies patients with significant hepatic fibrosis better than NAFLD. Liver Int. 2020;40:3018–3030
22. Zhang L, El-Shabrawi M, Baur LA, et al. An international multidisciplinary consensus statement on pediatric metabolic dysfunction-associated fatty liver disease. Med. 2024. https://doi.org/10.1016/j.medj.2024.03.017
23. Harrison JE, Weber S, Jakob R, et al. ICD-11: an international classification of diseases for the twenty-first century. BMC Med Inform Decis Mak. 2021;21:206
24. Rinella ME, Lazarus JV, Ratziu V, et al. A multisociety Delphi consensus statement on new fatty liver disease nomenclature. J Hepatol. 2023;79:1542–1556
25. Emanuele E, Minoretti P. Letter to the Editor: NAFLD, MAFLD or MASLD? Cut the Gordian knot with "Ludwig disease." Hepatology. 2024;79:E4
26. Fouad Y, Alboraie M, El-Shabrawi M, et al. Letter to the Editor: How F to S turned the premature to be mature? Hepatology. 2023. https://doi.org/10.1097/hep.0000000000000745
27. Sanal MG. Is the change from NAFLD to MASLD driven by political correctness? J Hepatol. 2024;80:e74–e76
28. Lonardo A, Bril F, Caldwell SH, et al. Researchers call for more flexible editorial conduct rather than abruptly adopting only the new MASLD nomenclature. J Hepatol. 2024. https://doi.org/10.1016/j.jhep.2024.01.012
29. Le MH, Yeo YH, Li X, et al. 2019 Global NAFLD prevalence: a systematic review and meta-analysis. Clin Gastroenterol Hepatol. 2022;20:2809-2817.e28
30. Le MH, Le DM, Baez TC, et al. Global incidence of non-alcoholic fatty liver disease: a systematic review and meta-analysis of 63 studies and 1,201,807 persons. J Hepatol. 2023;79:287–295
31. Prabhakar T, Prasad M, Kumar G, et al. High prevalence of MAFLD in general population: a large cross-sectional study calls for concerted public health action. Aliment Pharmacol Ther. 2024;59:843–851

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