

Prevalence and Professional Impact of Mental Health Conditions Among Cardiologists

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ABSTRACT

BACKGROUND Mental illness among physicians is an increasingly recognized concern. Global data on mental health conditions (MHCs) among cardiologists are limited.

OBJECTIVES The purpose of this study was to investigate the global prevalence of MHCs among cardiologists and its relationships to professional life.

METHODS The American College of Cardiology conducted an online survey with 5,931 cardiologists globally in 2019. Data on demographics, practice, MHC, and association with professional activities were analyzed. The *P* values were calculated using the chi-square, Fischer exact, and Mann-Whitney *U* tests. Univariate and multivariate logistic regression analysis determined the association of characteristics with MHC.

RESULTS Globally, 1 in 4 cardiologists experience any self-reported MHC, including psychological distress, or major or other psychiatric disorder. There is significant geographic variation in MHCs, with highest and lowest prevalences in South America (39.3%) and Asia (20.1%) ($P < 0.001$). Predictors of MHCs included experiencing emotional harassment (OR: 2.81; 95% CI: 2.46-3.20), discrimination (OR: 1.85; 95% CI: 1.61-2.12), being divorced (OR: 1.85; 95% CI: 1.27-2.36), and age <55 years (OR: 1.43; 95% CI: 1.24-1.66). Women were more likely to consider suicide within the past 12 months (3.8% vs 2.3%), but were also more likely to seek help (42.3% vs 31.1%) as compared with men (all $P < 0.001$). Nearly one-half of cardiologists reporting MHCs (44%) felt dissatisfied on at least one professional metric including feeling valued, treated fairly, and adequate compensation.

CONCLUSIONS More than 1 in 4 cardiologists experience self-reported MHCs globally, and the association with adverse experiences in professional life is substantial. Dedicated efforts toward prevention and treatment are needed to maximize the contributions of affected cardiologists. (J Am Coll Cardiol 2022;■:■-■) © 2022 by the American College of Cardiology Foundation.

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**ABBREVIATIONS
AND ACRONYMS****ACC** = American College of
Cardiology**AHA** = American Heart
Association**IRB** = institutional review
board**MHC** = mental health condition

The practice of medicine comes with numerous stressors, some unique to the medical profession. Given the increasing prevalence of mental health conditions (MHCs) among physicians, and the increased focus on this topic nationally and internationally, MHCs are now recognized as an area of significant concern.¹⁻³ Clinician well-being, defined as the experience of satisfaction and engagement with one's work while having a sense of professional fulfillment and meaning in work, is an important aspect of prevention of burnout.^{3,4} Clinician well-being directly impacts patient care and productivity, and if clinician well-being is not addressed adequately, it may lead to a spectrum of negative components including burnout and other MHC.⁴ Furthermore, improving physicians' mental health and wellness is an integral part of the "Quintuple Aim": a concept of improved patient experience, better outcomes, lower costs, clinician well-being, and health equity as key to health care transformation.⁵⁻⁷

A recent survey exploring lifestyle, happiness, and burnout among cardiologists reported that 42% of cardiologists in the United States felt burned-out, with 83% of those reporting colloquial depression (feeling down/sad/blue), and 7% reporting clinical depression.⁸ Furthermore, this was noted to impact colleague and patient relationships and to decrease motivation while documenting patient notes.^{8,9} Prior studies and surveys looking at physicians in the United States have identified that mental health concerns and burnout affect 30% to 60% of physicians and residents.^{2,9,10} This has been further amplified by the toll of the ongoing COVID-19 pandemic, which has increased professional loneliness and isolation, feelings of guilt, workload, and uncertainty about the future and also negatively altered medical training and work environments.^{2,11}

There is little understanding on the prevalence of MHCs among cardiologists on a global scale, any gender differences, as well as the relationship between MHC and professional satisfaction. We sought to further explore the global prevalence and differences in MHCs among cardiologists worldwide, the predictors of MHCs, and the influence of MHCs

on professional fulfillment. There is an extensive literature on the relationship between burnout and depression and other psychiatric illnesses. This study contributes to the literature on physician mental health and does not directly address the problem of burnout, which is regarded as an experience rather than a diagnosis.

METHODS

The American College of Cardiology (ACC) conducted a 50-item online anonymous survey from September 13 to October 22, 2019, with 5,931 cardiologists in Africa, Asia, Eastern Europe, European Union, Middle East, Oceania, and South, Central, and North America, of which 5,890 answered the MHC question and are the basis for analysis in this paper.¹² The study examined the professional lives of cardiologists collecting standard demographic information and questions exploring professional role, practice environment, mental health, discrimination, and harassment. We also studied the association of MHC with professional metrics such as feeling valued, satisfaction with compensation, and fair treatment at work. Advarra Institutional Review Board Services conducted the independent review and approved the protocol used for the study. Using the Department of Health and Human Services regulations found at 45 CFR 46.104(d)(2), the Institutional Review Board (IRB) determined that the research project was exempt from IRB oversight. The IRB also completed the necessary additional limited review considerations as set forth under the Revised Common Rule, 45 CFR 46.104(d).

DEFINITION OF A MHC. MHCs included self-reported experience with alcohol/drug use disorder, suicidal tendencies, psychological distress (ie, anxiety, irritability, and anger), other psychiatric disorder (ie, panic disorder, post-traumatic stress, and eating disorders), and major psychiatric disorder (ie, major depressive disorder, bipolar disorder, or schizophrenia).

INCLUSION AND EXCLUSION CRITERIA. ACC member and nonmember cardiologists listed in the ACC database were eligible for participation. In this study, 1,468 participants were excluded from the sample for at least 1 of the following: no country was associated with their contact information, they were a medical

The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the [Author Center](#).

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student, fellow in training, cardiovascular team member or administrator, or “unsubscribe” or “do not contact” was associated with their database record.

SURVEY DEPLOYMENT. The survey was hosted on an Internet server, and questions were answered online. Invitations to participate were e-mailed to cardiologists listed in the ACC database. Up to 3 follow-up reminder invitations were sent to those who had not completed the survey. Social media was also used to promote survey responses. The survey questions were not available on social media and were only distributed via e-mail. The mechanics of the survey and some findings have been previously reported.¹²

DATA ANALYSIS. *P* values were calculated using Pearson chi-square, Fisher exact, and Mann-Whitney *U* tests. For modeling, scaled independent variables were dichotomized using the top 2 options; categorical variables were converted into binary variables. Bivariate relationships with *P* < 0.001 were included into the multivariable forward stepwise likelihood ratio logistic regression model with the explanatory variables entered simultaneously to predict mental health status (criteria for model entry was *P* < 0.05 and for staying in the model *P* < 0.10). Univariate modeling was also conducted in which the explanatory variable was entered independently. Analysis of responses was performed using IBM SPSS Statistics for Windows Version 27.0. A *P* value of <0.001 was considered significant to account for multiple comparisons. Multivariable analyses of emotional harassment and discrimination, United Nations region, gender, age, children, race/ethnicity, and career status were controlled for and used to determine the factors that independently predicted or protected from MHCs.

RESULTS

A total of 71,022 cardiologists were sent survey invitations. A total of 5,931 cardiologists responded to the survey, of whom 5,830 cardiologists answered questions on mental health: 77.4% were men and 22.6% women. The overall response rate for the study was 8%. About one-third of the respondents were aged <40 years and two-thirds were aged ≥40 years. The respondents identified as White (53.5%), Asian (16.9%), Hispanic (16.7%), non-Hispanic Black (3.4%), Native American (0.3%), and native Hawaiian (0.1%). The majority of the cardiologists were married (75.5%), had children (74.9%), and lived in a dual-income household (57.2%). The highest number of respondents were from the European Union (32.4%),

followed by South America (17.7%), Middle East (9.3%), Asia (9.1%), Eastern Europe (8.8%), Africa (8.3%), North America (6.5%), Central America (5.6%) and Oceania (2.3%). Most of the cardiologists worked full time (84.2%), and more than one-half (61.5%) reported 10 or more years of practice since training (Table 1).

DESCRIPTION OF CARDIOLOGISTS AFFECTED BY MHCs. Demographic characteristics of cardiologists with MHCs. MHC were reported in 28.0% of respondents (Table 2). The prevalence of MHCs varied by age, gender, marital status, race-ethnicity, career tenure, region, overall hostile work environment, and contributors to hostile work environment (defined as discrimination based on age/gender/race/ethnicity/religion or emotional or sexual harassment).

Younger cardiologists (aged <40 years) had a higher prevalence of self-reported MHCs as compared with those aged ≥70 years (32.2% vs 16.8%; *P* < 0.001), followed by those aged 40-54 years (29.1%) and 55-69 years (22.1%). Compared with men, women cardiologists were more likely to report any MHC (33.7% vs 26.3%; *P* < 0.001), a major psychiatric disorder (4.1% vs 2.1%), or other psychiatric disorder (10.8% vs 8.0%) (Table 1). Of those cardiologists that reported any MHC, women were less likely to have an alcohol or drug use disorder compared with men (1.8% vs 6.5%; *P* < 0.001) (Table 2).

Divorced and single cardiologists more often reported MHCs compared with married cardiologists (43.1% and 31.8% vs 26.0%, respectively; both *P* < 0.001). In terms of race and ethnicity, Hispanic cardiologists (35.3% overall; 36% of Hispanics were in South America and 35% of Hispanics in Central America) were more likely to report MHCs as compared with their White (27.8%), non-Hispanic Black (26.3%), or Asian (21.6%) counterparts (*P* < 0.001). Early career cardiologists with 5-10 years of practice post-training were most likely to have MHCs (31.9% vs 22.6%, *P* < 0.001) as compared with cardiologists with longer duration of practice (≥20 years) (Table 1, Figure 1, Supplemental Table 1).

GEOGRAPHIC VARIATION IN MHCs. There was significant regional variability in MHCs, with detailed results of region and MHC subtype in Table 1. MHCs were highest in South America (39.3% reporting any MHC, with 30.2% reporting psychological distress, 14.0% other disorder, and 3.3% major disorder) followed by Central America (32.8% reporting any MHC, with 25.9% reporting psychological distress, 11.0% other disorder, and 5.2% major disorder).

TABLE 1 Global Demographic Information on the Cardiologists and the Prevalence of MHCs

	Total	MHCs (n = 1,648)	No MHCs (n = 4,242)	P Value	Types of MHCs		
					Psychological Distress (n = 1,254)	Other Disorder (n = 505)	Major Disorder (n = 150)
All respondents	5,890	28.0	72.0		21.4	8.6	2.6
Age group				<0.001			
<40 y	1,974	32.2	67.8		25.0	10.5	3.2
40-54 y	2,294	29.1	70.9		22.2	8.9	2.4
55-69 y	1,373	22.1	77.9		17.1	5.9	2.0
≥70 y	202	16.8	83.2		9.0	6.5	3.0
Gender				<0.001			
Men	4,557	26.3	73.7		20.2	8.0	2.1
Women	1,333	33.7	66.3		25.7	10.8	4.1
Marital status				<0.001			
Married	4,446	26.0	74.0		19.6	7.1	2.1
Single	694	31.8	68.2		25.9	7.8	3.6
Living with partner	417	35.3	64.7		28.1	8.9	4.1
Divorced	195	43.1	56.9		33.0	14.4	5.2
Separated	67	34.3	65.7		20.9	11.9	6.0
Dual-income household				0.093			
Yes	3,372	28.7	71.3		21.8	8.9	2.4
No	2,448	27.2	72.8		21.0	8.4	2.8
Have children				0.0043			
Yes	4,411	26.9	73.1		20.3	8.1	2.3
No	1,431	31.4	68.6		25.2	10.0	3.6
Race/ethnicity				<0.001			
Asian	995	21.6	78.4		15.4	6.5	1.8
Non-Hispanic Black	198	26.3	73.7		21.8	4.6	2.0
Hispanic	984	35.3	64.7		28.3	11.3	4.0
Native American	16	25.0	75.0		18.8	6.3	0.0
Native Hawaiian	4	0.0	100.0		0.0	0.0	0.0
White	3,153	27.8	72.2		21.2	8.7	2.5
Other	480	30.2	69.8		22.9	9.5	2.7
Decline	129	21.7	78.3		17.2	5.5	1.6
Employment status				0.004			
Full-time	4,961	27.1	72.9		20.8	8.2	2.4
Part-time	828	32.4	67.6		24.4	11.3	3.3
Years of tenure				<0.001			
<1 y	99	27.3	72.7		22.7	9.3	5.2
1-2 y	226	32.3	67.7		22.3	13.8	3.6
2-5 y	751	30.2	69.8		24.1	9.1	3.5
5-10 y	1,123	31.9	68.1		24.8	9.3	2.8
10-20 y	1,633	30.4	69.6		23.2	9.7	2.0
>20 y	1,989	22.6	77.4		16.8	6.7	2.4
Practice setting				0.118			
Government hospital or agency	2,410	27.8	72.2		21.8	8.1	2.4
Nongovernment hospital	1,351	27.6	72.4		20.8	9.0	2.5
Medical school/university	1,262	26.1	73.9		19.7	7.6	2.1
Physician-owned practice	721	31.2	68.8		23.2	10.9	3.8
Insurance company (HMO, PPO, IPA)	13	30.8	69.2		30.8	7.7	0.0
Industry	15	53.3	46.7		40.0	13.3	20.0
Still in training	57	31.6	68.4		25.5	14.5	3.6

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The lowest regional report of MHCs was by cardiologists in Asia (20.1% reporting any MHC, with 13.4% reporting psychological distress, 7.3% reporting other disorder, and 1.5% reporting major disorder) (Table 1, Central Illustration).

COMPONENTS OF MHCs. Psychological distress.

The overall prevalence of psychological distress was high at 76.1% among the cardiologists who reported MHCs (Table 2). Psychological distress was more common among those cardiologists also reporting an

TABLE 1 Continued

	Total	Types of MHCs					
		MHCs (n = 1,648)	No MHCs (n = 4,242)	P Value	Psychological Distress (n = 1,254)	Other Disorder (n = 505)	Major Disorder (n = 150)
Region				<0.001			
Africa	489	29.9	70.1		23.0	8.6	2.5
Central America	329	32.8	67.2		25.9	11.0	5.2
South America	1,040	39.3	60.7		30.2	14.0	3.3
North America	384	26.0	74.0		19.7	8.7	3.4
Asia	536	20.1	79.9		13.4	7.3	1.5
Eastern Europe	519	26.0	74.0		21.0	8.0	1.4
EU	1,907	25.9	74.1		20.4	6.3	2.5
Middle East	550	20.4	79.6		15.2	6.0	1.1
Oceania	136	26.5	73.5		14.1	12.6	4.4
Subspecialty				<0.001			
Adult congenital	358	28.2	71.8		20.9	7.6	3.4
Clinical cardiology	3,443	28.9	71.1		22.5	8.7	2.4
CT/MRI	310	30.0	70.0		22.2	8.5	2.6
Diagnostic invasive	567	22.9	77.1		17.6	6.7	2.1
Echocardiography	1,915	28.4	71.6		22.2	8.2	2.3
Electrophysiology	563	25.2	74.8		19.4	7.1	3.6
General imaging	215	25.1	74.9		19.7	7.5	2.8
Heart failure/transplant	709	26.2	73.8		20.3	5.3	3.0
Interventional invasive	1654	24.2	75.8		18.4	7.6	1.8
Nuclear	172	29.7	70.3		22.9	8.8	2.9
Pediatric	230	32.6	67.4		24.9	8.4	4.4
Other	433	33.5	66.5		27.5	7.0	4.2
None	235	32.8	67.2		24.8	12.4	3.4
Hostile work environment				<0.001			
Yes	2,566	41.7	58.3		32.2	13.8	4.4
No	3,324	17.4	82.6		13.0	4.6	1.2
Types of hostile work environment				<0.001			
Discrimination	1,731	42.0	58.0		32.0	13.6	4.9
Sexual harassment	217	53.5	46.5		40.3	16.7	13.4
Emotional harassment	1,724	46.3	53.7		36.5	15.5	5.1

Values are % unless otherwise indicated. P values represent comparisons between subgroups of respondents.
CT = computed tomography; EU = European Union; HMO = health maintenance organization; IPA = individual practice association; MHC = mental health condition; MRI = magnetic resonance imaging; PPO = preferred provider organization.

associated major psychiatric disorder (vs those not reporting a major psychiatric disorder; OR: 2.68; 95% CI: 1.87-3.82), other psychiatric disorder (OR: 1.81; 95% CI: 1.47-2.22), experienced hostile work environment such as emotional harassment (OR: 2.59; 95% CI: 2.24-2.98), and discrimination (OR: 1.59; 95% CI: 1.37-1.83). Similar to any MHC, psychological distress was more common among those with early career status (OR: 1.42; 95% CI: 1.20-1.68) and those living in South America (OR: 2.18; 95% CI: 1.61-2.96) (Figure 2).

Other psychiatric disorders. The overall prevalence of other psychiatric disorders was 27.1%, and higher in women compared with men (31.2% vs 25.6%; $P < 0.001$) (Table 2). Major psychiatric disorder (OR: 3.27; 95% CI: 2.23-4.80), psychological distress (OR: 1.79; 95% CI: 1.46-2.20), emotional harassment

(OR: 2.51; 95% CI: 2.016-3.06), discrimination (OR: 1.54; 95% CI: 1.25-2.05), and age <55 years (OR: 1.60; 95% CI: 1.25-2.05) were associated with other psychiatric disorders (Figure 2).

Major psychiatric disorder. The overall prevalence of major psychiatric disorders such as major depressive disorder and schizophrenia was 4.7%: this was higher in females than males (6.9% vs 3.8%; $P < 0.001$) (Table 2). Other psychiatric disorder (OR: 3.61; 95% CI: 2.48-5.24) and psychological distress (OR: 2.78; 95% CI: 1.96-3.94) were associated with major psychiatric disorder (Figure 2).

OTHER MHCs-SUICIDE. Among cardiologists that reported any MHC globally, 2.7% considered suicide within the past 12 months, 2.9% considered suicide >12 months ago, and 0.4% reported an attempted suicide. There were also gender differences in

TABLE 2 Types of MHCs Experienced by Cardiologists

	Total	Men	Women	P Value
MHCs	5,890	4,557	1,333	<0.001
Yes	28.0	26.3	33.7	
No	72.0	73.7	66.3	
Type of MHCs	1,648	1,199	449	<0.001
Psychological distress (ie, anxiety, irritability, and anger)	76.1	76.2	75.7	
Other psychiatric disorder (ie, anxiety and panic disorder, post-traumatic stress, and eating disorders)	27.1	25.6	31.2	
Major psychiatric disorder (ie, major depressive disorder and schizophrenia)	4.7	3.8	6.9	
Alcohol/drug use disorder	5.2	6.5	1.8	
Considered suicide within past 12 mo	2.7	2.3	3.8	
Considered suicide >12 mo ago	2.9	2.3	4.5	
Attempted suicide	0.4	0.4	0.4	
Other	3.4	3.1	4.2	
Episodes of MHCs	1,648	1,199	449	0.015
None	0.0	0.0	0.0	
Single/1 type	82.8	84.2	79.1	
Multiple/2 or more types	17.2	15.8	20.9	
Report MHCs	1,648	1,199	449	0.007
Yes	16.9	15.1	21.6	
No	83.2	84.0	77.5	
Barriers to reporting	1,355	1,007	348	0.002
Lack of privacy	34.5	32.6	40.0	
Embarrassment	29.5	28.0	34.0	
Impact on practice	20.9	19.4	25.0	
Impact on professional advancement	28.6	26.0	36.0	
No resources	15.9	15.8	16.3	
Funding/coverage	2.9	2.9	2.7	
Lack of time	30.8	30.8	31.0	
Other	11.0	11.2	10.3	
Seek help for MHCs	1,648	1,199	449	<0.001
Yes	34.2	31.1	42.3	
No	56.8	59.2	50.3	
Not applicable	8.1	8.7	6.7	

Values are n or %.
MHC = mental health condition.

suicidal ideation. Women cardiologists were more likely to have considered suicide within the past 12 months (3.8% vs 2.3%; $P < 0.001$) and more than 12 months ago (4.5% vs 2.3%; $P < 0.001$) compared with their men colleagues. The prevalence of attempted suicide, however, did not differ between the 2 groups. Women cardiologists were more likely to seek help for any MHC compared with their men colleagues (42.3% vs 31.1%; $P < 0.001$) (Table 2).

ASPECTS OF PROFESSIONAL LIFE AND SATISFACTION.

Globally, compared with cardiologists that did not report MHCs, a higher proportion of those who did felt treated unfairly (22.5% vs 11.2%), felt undervalued (17.6% vs 7.5%), and felt dissatisfied with

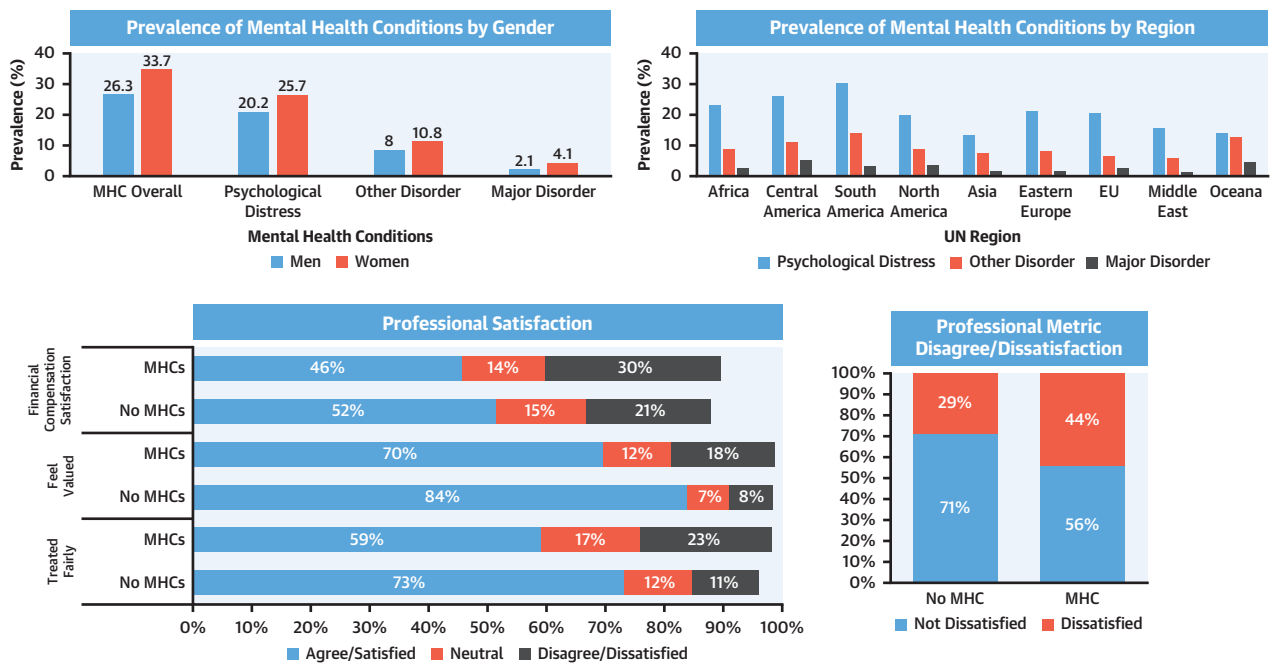
financial compensation (29.7% vs 21.0%). Of cardiologists that reported psychological distress, 23.5% felt treated unfairly, 18.1% felt undervalued, and 31.3% felt dissatisfied with financial compensation. Of cardiologists that reported other psychiatric disorders, 21.4% felt treated unfairly, 18.6% felt undervalued, and 28.9% felt dissatisfied with financial compensation. Of cardiologists who reported major psychiatric disorders, 29.3% felt treated unfairly, 24.0% felt undervalued, and 28.7% felt dissatisfied with financial compensation (Table 3, Figure 1, Central Illustration).

HOSTILE WORK ENVIRONMENTS. Overall, cardiologists who reported a hostile work environment, defined as experiencing discrimination and emotional and sexual harassment were more likely to have MHCs compared with those who did not (41.7% vs 17.4%; $P < 0.001$) (Table 1). Among those who experienced any type of discrimination based on age, gender, race/ethnicity, or sexual orientation, the prevalence of MHCs was 42.0%. Those that experienced sexual harassment were more likely to report MHCs as compared with those who did not (53.5% vs 46.5%; $P < 0.01$). Of those that experienced any emotional harassment, such as microaggression, invalidation, bullying, or intimidation, the prevalence of MHCs was 46.3%, but the prevalence of those who did not have a MHC in that group was 53.7% ($P < 0.001$).

HEALTH-SEEKING BEHAVIOR. Regarding health-seeking behavior, of the 16.9% of affected cardiologists worldwide who reported mental illness, only 34.2% sought help. Among cardiologists who reported any MHC, commonly identified barriers to reporting included lack of privacy (34.5%), lack of time (30.8%), embarrassment (29.5%), impact on professional advancement (28.6%), impact on practice (20.9%), lack of resources (15.9%), and other reasons (11%) (Table 2, Supplemental Table 2).

ASSOCIATIONS BETWEEN MHCs AND PROFESSIONAL LIFE.

To determine association with MHCs, a multivariate model was constructed including demographic (gender, age, career stage, race/ethnicity, marital status, and region) and professional work environment (discrimination, emotional harassment, and sexual harassment) variables. Positive predictors of MHC (with $P < 0.001$) included experiencing emotional harassment (OR: 2.81; 95% CI: 2.46-3.20), discrimination (OR: 1.85; 95% CI: 1.61-2.12), being in South America (OR: 2.30; 95% CI: 1.96-2.71), being divorced (OR: 1.73; 95% CI: 1.27-2.36), and age <55 years (OR: 1.43; 95% CI: 1.24-1.66); gender was not a significant predictor in the multivariable model (Figure 2).

FIGURE 1 Prevalence of MHCs and Its Influence on Professional Satisfaction

The prevalence of MHCs varied by gender and geographic region. Women cardiologists were more likely to report any mental health condition, a major psychiatric disorder, or other psychiatric disorder compared with men. The prevalence of MHCs was highest among those from South America and lowest among those from Asia. Those with MHCs were more likely to report professional dissatisfaction. MHC = mental health conditions; UN = United Nations.

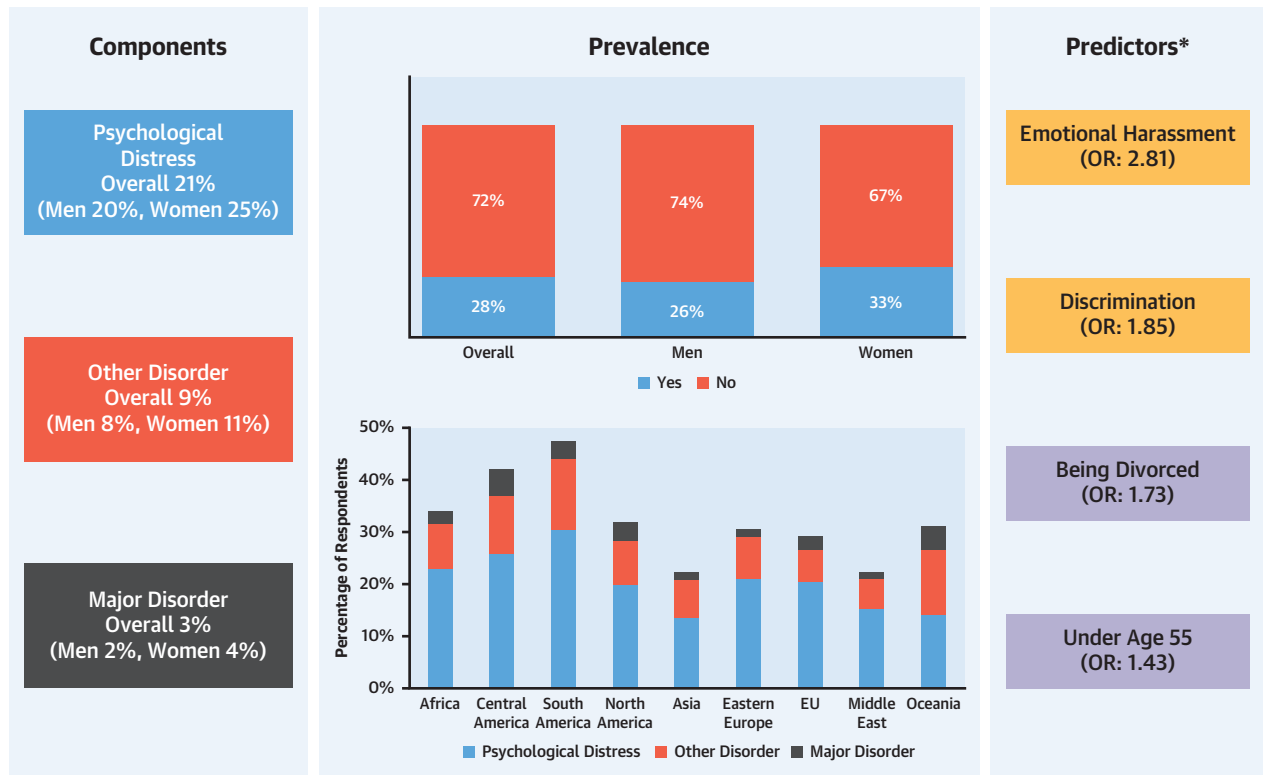
DISCUSSION

Our study showed that more than one-fourth of all cardiologists globally reported any self-reported MHC. Our study identifies significant differences in MHCs among cardiologists based on age, gender, career status, and geographic location and its association with working in a hostile work environment and with professional work life. Geographically, the highest reports of MHCs were from cardiologists in South and Central America, with lowest reports of MHCs from the Middle East and Asia.

There is a significant gender variation globally, with MHCs and other and major psychiatric disorders being more frequent in women than men cardiologists; this association did not persist in multivariable models. Women were also more likely to consider suicide within the past 12 months and more than 12 months ago; however, women were also more likely to seek help for MHCs compared with men. Cardiologists that had experienced MHCs were almost 3 times more likely to have also experienced emotional harassment and almost twice as likely to have experienced discrimination. There were notable

differences in professional satisfaction where almost one-half of the cardiologists that experienced MHCs were more likely to be dissatisfied with at least one professional metric. To our knowledge, this is the first study that examined the global prevalence and differences in MHCs among cardiologists worldwide, as well as the predictors and protectors of MHCs.

Gender difference in major depressive disorders exist and represent a health disparity, with global data showing twice as many women experience major depression compared with men.¹³ Although there is no prior direct global comparative data for mental health of cardiologists specifically, a 2015 systematic review and meta-analysis examined data from 54 studies, involving 17,500 resident physicians from 18 countries,¹⁴ and reported that the prevalence of depression or depressive symptoms among resident physicians was 28.8% (range: 20.9%-43.2% based on the instrument used), and there were no statistically significant differences in prevalence between studies within the United States vs elsewhere and studies of nonsurgical vs both nonsurgical and surgical residents.¹⁴ Prior studies examining rates of generalized anxiety disorder and post-traumatic stress disorder in

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The components, prevalence, and predictors of MHCs. Psychological distress, other psychiatric disorder, and major psychiatric disorder in cardiology and their association with emotional harassment and discrimination. *Gender was not significant in the multivariable models. EU = European Union; MHC = mental health conditions.

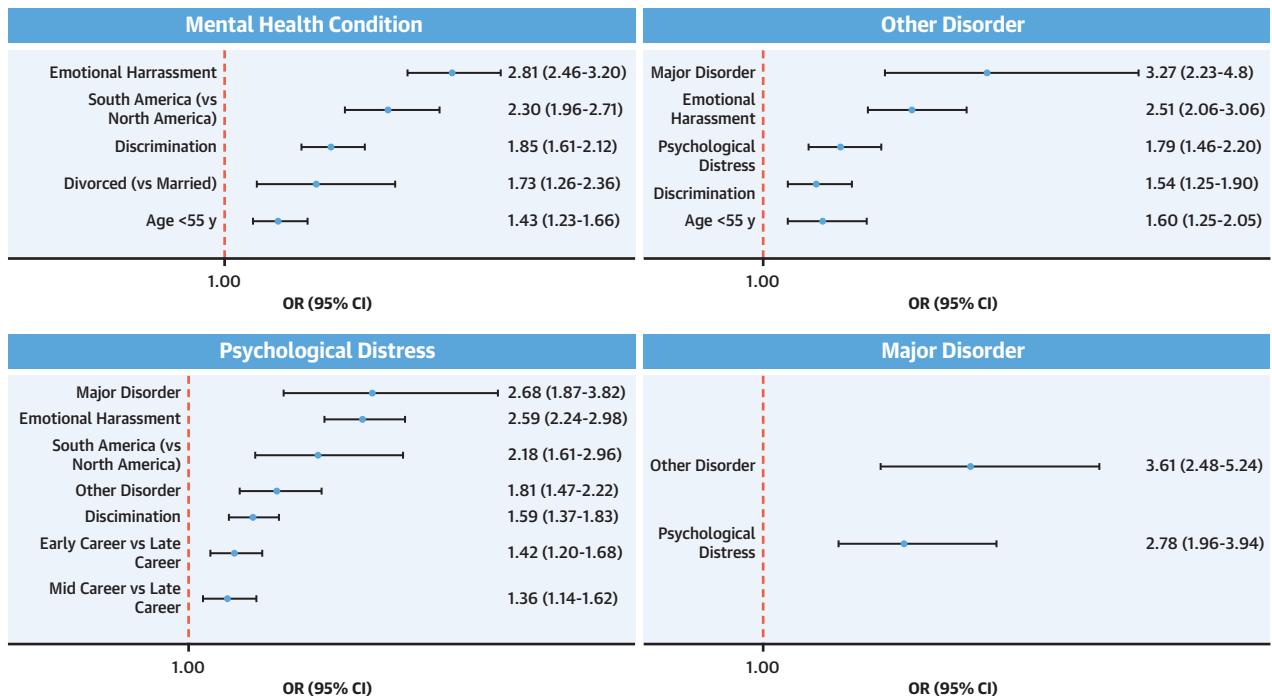
physicians have suggested rates as high as 24% and 16%, respectively.¹⁵⁻¹⁷ The overall prevalence of any MHC in our study was 27.8%, and was largely contributed by psychological distress such as anxiety and stress.

The ongoing COVID-19 pandemic has had a tremendous impact on physician well-being, in part through amplification of pre-existing problems pertaining to physician mental health.² A recent study investigating the impact of the COVID-19 pandemic on cardiologists in Japan reported worsening mental health issues and higher rates of suicide, especially among women.¹⁸ These findings are like ours in terms of women cardiologists having higher reports of any MHC, having higher other or major psychiatric disorders, and being more likely to consider suicide.

Beyond description, our data point to the predictors of MHCs and the intersectionality of hostile work environment and MHCs. Our data show that early career status, facing emotional harassment, and

discrimination were all predictors of MHCs. Our data are unique because they explore the intersectionality of mental health among those who also experienced a hostile work environment, defined as a combination of discrimination and emotional and sexual harassment.¹² We have previously reported that the presence of a hostile work environment in cardiology is high, with about 44% of cardiologists worldwide reporting some form of hostility at work.¹² We found that, of the cardiologists who experienced a hostile work environment, almost one-half also reported having some MHC. These data need to be taken into context as we assess the chronic influence of working in psychologically unsafe environments and in a culture and climate where workplace toxicity is highly prevalent. The way women experience the health care system (hostile work environment) and the higher percentage of women among younger physicians at greater stress likely contribute to the higher prevalence of MHCs in our study, however,

FIGURE 2 Factors Associated With MHCs in Cardiology



Forest plots demonstrating the characteristics independently associated with experiencing mental health conditions (MHCs), psychological distress, major psychiatric disorder, and other psychiatric disorders. This is a multivariate analysis and only results with $P < 0.001$ are shown. The model was adjusted for gender, tenure, age, children, race, and region.

gender alone was not found to be a significant contributor of MHC on multivariate analysis.

Alcoholism and drug use can lead to depression, which is a well-known risk factor for suicide, especially with physicians and physicians-in-training

experiencing exhaustion and work-related stress.¹⁹⁻²¹ Most prior studies investigating alcohol and drug use among physicians have been done through surveys, with reports of anywhere from 5% to 20% of physicians having problematic consumption of

TABLE 3 Associations of MHCs With Professional Satisfactions

	Total	MHC	No MHC	P Value	Types of Mental Illness		
					Psychological Distress	Other Disorder	Major Disorder
Treated fairly	5,890	1,648	4,242	<0.001	1,254	505	150
Agree	69.3	59.0	73.2		57.8	57.2	53.3
Neither agree/disagree	13.0	16.8	11.6		16.9	20.2	14.7
Disagree	14.4	22.5	11.2		23.5	21.4	29.3
Feel valued	5,890	1,648	4,242	<0.001	1,254	505	150
Agree	80.0	69.8	84.0		68.8	68.3	62.7
Neither agree/disagree	8.2	11.5	7.0		12.4	11.9	12.0
Disagree	10.3	17.6	7.5		18.1	18.6	24.0
Financial compensation	5,890	1,648	4,242	<0.001	1,254	505	150
Satisfied	49.9	45.6	51.5		44.7	45.7	42.0
Neither satisfied/dissatisfied	15.0	14.1	15.3		13.8	15.4	18.0
Dissatisfied	23.4	29.7	21.0		31.3	28.9	28.7

Values are n or %.
 MHC = mental health condition.

alcohol.² A study of 7,209 U.S. physicians reported 15.3% of participants having scores indicative of alcohol dependence or alcohol abuse,²² with studies among U.S. surgeons revealing similar prevalence.²³ Compared with the general population, physicians may be consuming alcohol at similar or perhaps higher rates,²² a trend that has seemingly maintained over the past 3 decades.^{2,24} Based on our data, the prevalence of alcohol and drug use among cardiologists globally was 5.2%, seemingly at the lower end of the spectrum of prior reports, although it was reported more frequently by men compared with women.

In terms of help-seeking behavior for mental illness and reporting of MHCs, our findings are important. A longitudinal study of Norwegian medical students and doctors identified neuroticism personality trait (low self-esteem, vulnerability, and self-criticism) predicts work stress, burnout, and severe depression. Furthermore, a particular trait of “reality weakness” independently predicted severe depressive symptoms, suicide ideation, need for mental health treatment, and lack of help-seeking behavior among physicians and physician trainees.²¹

Notably, suicide is a known cause-specific mortality among physicians, with an overall calculated standardized mortality rate of 1.44 for suicide among physicians.^{2,25} Moreover, women physicians appear to be at a higher risk, with a recent meta-analysis reporting a significantly higher suicide mortality rate among women physicians as compared with women in the general population (standardized mortality ratio: 1.46; 95% CI: 1.02-1.91) and, in contrast, a significantly lower suicide mortality ratio in men physicians compared with men in the general population (standardized mortality ratio: 0.67; 95% CI: 0.55-0.79).²⁶ Our data shows similar results among cardiologists, with women cardiologists more likely to have considered suicide in the past as compared with men, and overall reports of cardiologists considering suicide globally being between 2.7% and 2.9%.

Despite these findings of MHCs, alcohol and substance use, and suicidal ideation among physicians, there continues to be reluctance among physicians to seek help and treatment. This may be shaped by the stigma of mental illness in the medical community and perhaps also fears of discrimination.²⁷ Other barriers that prevent physicians from seeking help may include fears regarding confidentiality, professional consequences, as well as licensure and medical registration.^{2,28,29} Among a recent study of 2,106 women physicians representing all 50 U.S. states and

the District of Columbia, nearly one-half of respondents reported that they felt they met criteria for a psychiatric disorder, but had not sought treatment.³⁰ A number of studies have estimated the rate of “help-seeking” behaviors among physicians with MHCs to be anywhere between 13% and 36%. Our study data revealed that 34.2% of cardiologists globally sought help for mental illness. These findings are at the higher end of the spectrum of data from prior studies among physicians in general.

Additionally, our data focuses on the relationship between key professional satisfaction metrics and mental health. MHCs may occur in the presence or absence of burnout and contribute to overall physician well-being. Improving physicians’ mental health and wellness is integral for enhancing patient experience, reducing costs, improving population health, and improving the work life of health care workers.⁷

POTENTIAL SOLUTIONS. Several professional medical societies have called for increased focus on physician mental health concerns.^{2,31,32} Dedicated efforts should be aimed at reducing the causes of mental illness, including creation of a respectful and inclusive environment, reducing the fear of reporting, and creating a safe environment for those with MHCs at an organizational level.³³ As such, a 2-tiered model using individual and group-based approaches may be necessary, with the goal of improving emotion regulation, preventing distress, reducing symptoms, and providing physicians with easy access to confidential treatment for MHCs.³³

The 2020 American Heart Association (AHA) and ACC Consensus Conference on Professionalism and Ethics addressed the practical management of behavior (professional and ethical) of clinicians in cardiovascular medicine, to make specific recommendations regarding issues of professionalism and ethics.³⁴ This included health care organizations maintaining accountability and supporting the psychosocial health of the work force, as well as leading and participating in advocacy initiatives to improve clinician well-being.³⁴ Furthermore, training institutions were encouraged to make preventive and responsive mental health resources readily available to trainees, along with implementation/development of a confidential ombudsperson for confidential reporting of mistreatment.³⁴

A recently published Joint Opinion from the ACC, AHA, European Society of Cardiology, and World Heart Federation about clinician well-being suggests potential strategies to address this, including an assessment survey, improving practice efficiency,

strengthening personal resiliency, and focusing on destigmatizing MHCs.⁴ There is an emerging consensus that some aspects of physician training, working conditions, and support and overall culture and climate in cardiology are adverse for workplace synergy and belonging. Common issues, such as administrative and bureaucratic burden, job insecurity, reduced job control, and a shift in the age and priorities of medical graduates, appear across the international medical community and probably help to explain some of the growing mental health concerns among physicians.² This is especially true considering the Dr. Lorna Breen Healthcare Provider Protection Act, recently passed in the U.S. Senate, aimed at improving mental health among health care providers as well as removing barriers to accessing treatment and care.³⁵ There is urgent action required from stakeholders, institutions, graduate training programs, and the workforce at large to find a multi-pronged approach where clinician well-being is made a core priority.

STUDY LIMITATIONS. Our study is novel given its global reach and comprehensive analysis of MHCs; we surveyed a large sample of many different regions globally, and correlated the association of MHCs to workplace environment, culture, and climate. It also has some notable limitations. Our study sample was limited to cardiologists captured in the ACC database and those cardiologists with an interest in this topic, and, as such, may not be representative of the experience of the field as a whole. Another limitation is the regional variations in the cultural and social practice patterns in the countries surveyed, which may affect the interpretation of MHCs and other topics covered in the survey. Furthermore, data on individuals who did not respond to the survey is lacking. As such, we cannot exclude the possibility that the data of nonresponders may have been substantially different from those who responded.

Additionally, these data provide some key insight into possible MHCs, however, these are self-reported MHCs and not diagnosed by criteria from the Diagnostic and Statistical Manual of Mental Disorders as we chose not to use psychiatric screening scales (Patient Health Questionnaire-9 or Hamilton Depression and Anxiety Ratings). The study is limited by regional variations in terminologies and

in legal, cultural, social, and practice patterns in the countries that were surveyed. To mitigate this limitation, we used broad terms, such as clearly identified major and other mental health disorders and psychological distress in our survey engine, relying on self-diagnosis to be defined by the respondent as seen in their own culture and as experienced by them as a possible target. Key terms were presented to the respondent as: psychological distress (ie, anxiety, irritability, and anger), other psychiatric disorder (ie, anxiety and panic disorder, post-traumatic stress, and eating disorders), and major psychiatric disorder (ie, major depressive disorder and schizophrenia).

CONCLUSIONS

This study reports the global prevalence and variations in MHCs among cardiologists worldwide, the predictors and protectors of MHCs, and the influence of MHCs on professional satisfaction. We highlight the need for the culture of cardiology to be more inclusive and supportive of those affected and encourage them to report their illness and seek treatment. Given the high prevalence of mental health disorders among cardiologists globally, dedicated efforts are needed, on an individual and organizational level, to reduce the causes of mental illness and to create a safe environment for those affected by MHCs.

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PERSPECTIVES

COMPETENCY IN SYSTEMS-BASED PRACTICE: The prevalence of self-reported mental health disorders among cardiologists is high across the globe, and women cardiologists more often have mental health conditions than men do. Despite the intersection of mental health and professional satisfaction, most affected cardiologists do not report or seek help for mental illness.

TRANSLATIONAL OUTLOOK: Dedicated efforts are needed to reduce the causes of mental illness among cardiologists and create a safe environment for those affected.

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KEY WORDS burnout, cardiologist, mental health, mental health condition, mental illness, physician, well-being

APPENDIX For supplemental tables, please see the online version of this paper.