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COVID-19 and Breast Radiologist Wellness: Impact of Gender, Financial Loss, and Childcare Need

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Abstract

Purpose: The purpose of this study was to evaluate the emotional and financial impact of coronavirus disease 2019 (COVID-19) on breast radiologists to understand potential consequences on physician wellness and gender disparities in radiology.

Methods: A 41-question survey was distributed from June to September 2020 to members of the Society of Breast Imaging and the National Consortium of Breast Centers. Psychological distress and financial loss scores were calculated on the basis of survey responses and compared across gender and age subgroups. A multivariate logistic model was used to identify factors associated with psychological distress scores.

Results: A total of 628 surveys were completed (18% response rate); the mean respondent age was 52 ± 10 years, and 79% were women. Anxiety was reported by 68% of respondents, followed by sadness (41%), sleep problems (36%), anger (25%), and depression (23%). A higher psychological distress score correlated with female gender (odds ratio [OR], 1.9; $P = .001$), younger age (OR, 0.8 per SD; $P = .005$), and a higher financial loss score (OR, 1.4; $P < .0001$). Participants whose practices had not initiated wellness efforts specific to COVID-19 (54%) had higher psychological distress scores (OR, 1.4; $P = .03$). Of those with children at home, 38% reported increased childcare needs, higher in women than men (40% versus 29%, $P < .001$). Thirty-seven percent reported that childcare needs had adversely affected their jobs, which correlated with higher psychological distress scores (OR, 2.2-3.3; $P < .05$).

Conclusions: Psychological distress was highest among younger and female respondents and those with greater pandemic-specific childcare needs and financial loss. Practice-initiated COVID-19-specific wellness efforts were associated with decreased psychological distress. Policies are needed to mitigate pandemic-specific burnout and worsening gender disparities.

Key Words: Breast Radiology, COVID-19, physician wellness, gender, burnout

J Am Coll Radiol 2021;18:1017-1026. Copyright © 2021 American College of Radiology

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Dr Dontchos is a member of the advisory board for Premier-GE Healthcare. Dr Dialani is a consultant for Intrinsic Imaging and Hologic. All other authors state that they have no conflict of interest related to the material discussed in this article. Drs Milch, Grimm, Plimpton, Markovic, Dontchos, Destounis, Dialani, Dogan, Sonnenblick, Zuley, and Dodelzon are employees. Dr Tran is a partner.

INTRODUCTION

Before the coronavirus disease 2019 (COVID-19) pandemic emerged, physician burnout in the United States was recognized as a worsening epidemic that affected 60% of radiologists [1,2]. Burnout is a syndrome resulting from chronic workplace stress and encompasses three key components: emotional exhaustion, depersonalization, and low personal accomplishment. Compared with colleagues in other medical specialties, radiologists are more likely to feel unhappy and undervalued in the workplace and by leadership and are less likely to find work meaningful [3]. The surge in radiologist burnout has been attributed to multiple factors, including increasing workload, changes in practice environment, poor communication, and loss of professional autonomy [1].

The COVID-19 pandemic has exacerbated chronic pressures in an already strained health care system and led to new, more acute stressors [4-6]. In addition to coping with the monumental societal shifts and emotional stressors affecting everyone, health care professionals face moral dilemmas, increased workload, rapidly changing guidelines and work environment changes, and a greater risk of exposure [7,8]. Frontline health care workers who regularly care for patients with COVID-19 have demonstrated the most severe psychological symptoms, including high levels of depression, anxiety, and insomnia [9,10]. However, nonfrontline health care workers are also at high risk. Wu et al [11] found that nonfrontline health care workers experienced even higher levels of burnout than frontline workers in Wuhan, China. With significant changes to the workflow affecting radiologists specifically, it is not surprising that 61% of radiologists rated their levels of anxiety as 7 out of 10 or higher in a nationwide survey during the initial surge of COVID-19 in April 2020 [12,13].

Breast radiologists may be particularly at risk, given their close emotional and physical contact with patients combined with limited remote working options compared with other radiology subspecialists. Screening mammography experienced one of the greatest imaging volume declines during the initial disease surge, putting breast radiologists at greater risk for redeployment, furloughs, and job loss and potentially further contributing to stress and financial instability [14,15]. In addition, unlike radiology in general, breast imaging is a female-dominated subspecialty, and the pandemic has been shown to affect women disproportionately in terms of job loss, childcare responsibilities, and mental health [16,17].

The purpose of this study was to use survey data to gain insights into the mental health and financial impacts of COVID-19 on breast radiologists across the country and identify potential gender- and age-related disparities. The

data provide a foundation upon which to address short- and long-term consequences of COVID-19 on physician wellness.

METHODS

This study received an institutional review board waiver. A cross-sectional survey was designed to assess the emotional impact of the COVID-19 pandemic on the breast imaging community, targeting the following primary end points: mental health, childcare, finances, work safety, COVID exposure, and patient care. Results of the first three categories—mental health, childcare, and finances—are presented here.

The survey consisted of 41 multiple-choice questions with a limited number allowing multiple answers as well as free-response answer choices (Appendix 1). The survey was developed jointly by the Patient Care and Delivery Committee of the Society of Breast Imaging (SBI) and the National Consortium of Breast Centers (NCBC). The survey questions were written in collaboration with 10 fellowship-trained breast radiologists. Before implementation, the survey was piloted at 10 breast imaging practices to elicit feedback regarding question clarity and overall survey design. The pilot survey was reviewed primarily by breast radiologists at these institutions. Changes to question length, wording, and organization were incorporated on the basis of this pilot testing.

The survey was created in SurveyMonkey (SurveyMonkey, San Mateo, California) and distributed by e-mail to the 3,594 members of the SBI and NCBC. Given overlap in SBI and NCBC membership, recipients of the e-mail were asked to complete the survey only once. The survey was open from June 29 to September 18, 2020. An initial e-mail and five subsequent e-mail reminders were sent to encourage participation. Completion of the survey was optional, and participants received no compensation.

Psychological Distress Score

Participants were asked to report whether they were experiencing increases in any of the following symptoms because of COVID-19: anxiety, sadness, depression, anger, withdrawal, sleep problems, guilt, or “other” (Appendix 1). One point was assigned for each of the mental health symptoms answered affirmatively by the respondent. The total psychological distress score was computed as the sum of these points, with a higher score indicating more psychological distress (range, 0-7 points). Free-text responses for the “other” answer choice option were not included in the psychological distress score. The associations of the total psychological distress score and each variable of interest were evaluated using the Wilcoxon rank-sum test in

the case of categorical variables or Spearman correlation in the case of continuous variables.

Financial Loss Score

A financial loss score was determined on the basis of the number of personal financial loss questions answered affirmatively by the respondent (Appendix 1). One point was assigned for each “yes or no” question answered affirmatively, and 0 to 4 points were assigned for all Likert-type scale or other scaled questions (eg, “strongly disagree” = 0 points, “strongly agree” = 4 points). The total financial loss score was computed by summing the points across all the relevant questions (range, 0-16 points). The associations of the total financial loss score and each variable of interest were evaluated using the Wilcoxon rank-sum test in the case of categorical variables or Spearman correlation in the case of continuous variables.

Multivariate Analysis of Factors Associated With Psychological Distress Score

A multivariate ordinal logistic model was used to evaluate the relationship between the total psychological distress score and predictor variables: age, gender, type of practice, total years in practice, geographic region, “Has your practice put forth wellness programs specific to COVID-19 to support your emotional needs?” “Has your practice put forth additional childcare support measures?” “Do you have increased childcare needs because of COVID-19?” “Childcare needs have adversely affected my ability to do my job,” total financial loss score, “Has anyone in your practice been laid off or furloughed?” “Has anyone in your practice taken leave without pay?” and “Has your practice instituted a hiring freeze?” The final model was selected using the backward procedure for variable selection on the basis of the Akaike information criterion. The results of the final model were summarized using odds ratios (ORs) and their 95% confidence intervals (CIs).

Survey responses were also summarized descriptively using SurveyMonkey software. Comparisons were made between the demographic variables of respondents (eg, practice type and region) and the survey questions of interest using a Pearson χ^2 test.

Analysis was performed using Excel for Mac version 16.39 (Microsoft, Redmond, Washington) and SAS version 9.4 (SAS Institute, Cary, North Carolina).

RESULTS

Participant Demographics

A total of 628 surveys were completed by 513 SBI members and 115 NCBC members. The overall response rate was

18% (628 of 3,594). The response rate was 23% (513 of 2,219) among the SBI membership and 8% (115 of 1,375) among the NCBC membership, although some individuals are members of both organizations and were instructed to respond only once. Participants were 79% women, and the mean respondent age was 52 ± 10 years. The majority of participants (71%) had been practicing for >10 years, as shown in Table 1.

The vast majority of participants (97%) were from the United States, representing 48 of the 50 states as well as Puerto Rico. The highest proportions of participants were from the following states: New York (n = 56 [9%]), Florida (n = 53 [8%]), California (n = 51 [8%]), Texas (n = 34 [6%]), North Carolina (n = 24 [4%]), and Pennsylvania (n = 23 [4%]). Nine participants (1%) were from Canada, and nine (1%) were from other countries, including France, Great Britain, Greece, Belgium, Brazil, Libya, Sweden, Turkey, and Slovakia.

The majority of participants were radiologists (86%), and practice groups were primarily private practice (48%), academic (24%), or hybrid (community practice affiliated with an academic medical center; 20%).

Mental Health and Wellness

Anxiety was the most commonly reported mental health symptom from COVID-19, at 68%, followed by sadness (41%), sleep problems (36%), anger (25%), depression (23%), guilt (11%), and withdrawal (5%). Eight percent reported “other” psychiatric effects, and some of the free-response answers included alcohol consumption, fear, frustration, and boredom.

The single greatest source of reported anxiety was fear of contracting the virus (28%), the global human impact of the pandemic (27%), management of personal and family needs (22%), and the global economic impact of the pandemic (14%). The most common anxiety-alleviating measures were exercise (53%), increased connection with family or friends (40%), and a healthier diet (24%).

A higher psychological distress score was correlated with female gender (OR, 1.9; 95% CI, 0.6-0.9; $P = .001$) and younger age (OR, 0.77; 95% CI, 1.3-2.8; $P = .005$), after controlling for other wellness, childcare, and financial variables (Table 2). There was no correlation between psychological distress score and practice type or US geographic region.

Fewer than half of participants (42%) reported that their practices had put forth wellness efforts specific to COVID-19 (Table 3), and these efforts were more common at academic compared with private practices (65% versus 30%, $P < .001$). Participants who reported that their practices had not put forth additional wellness efforts were

Table 1. Demographics and mean psychological distress and financial loss scores

Demographics	Total Responses (%)	Mean Psychological Distress Score	<i>P</i>	Mean Financial Loss Score	<i>P</i>
Practice type			.88		<.01*
Private	299 (48)	2.2		6.6	
Academic	152 (24)	2.2		5.1	
Hybrid	123 (20)	2.3		6.6	
Other	54 (9)	2.3		5.9	
Age of respondent			<.01*		.74
31-40	111 (19)	2.4		6.1	
41-50	155 (26)	2.4		5.9	
51-60	204 (34)	2.4		6.1	
61-70	117 (20)	1.7		6.5	
≥71	11 (2)	1.4		6.7	
Years of practice			.37		.49
<5	66 (11)	2.3		6.0	
5-10	111 (18)	2.4		6.0	
11-20	122 (19)	2.3		5.8	
>20	329 (52)	2.1		6.3	
Gender			<.01*		.77
Male	129 (21)	1.6		6.0	
Female	494 (79)	2.4		6.2	
Region			.55		.52
Northeast	140 (22)	2.4		6.3	
South	224 (36)	2.1		5.9	
Midwest	119 (19)	2.2		6.5	
West	121 (19)	2.3		6.0	
Other	24 (4)	2.1		5.7	

*Statistically significant ($P < .05$).

significantly more likely to have higher psychological distress scores (OR, 1.4; 95% CI, 1.0-1.9; $P = .03$).

Childcare

Increased childcare needs related to COVID-19 were reported by 38% of all participants reporting children at home and were significantly higher in women compared with men (40% versus 29%, $P < .001$) and in younger respondents (62% in 31- to 40-year-olds, 54% in 41- to 50-year-olds, 13% in 51- to 60-year-olds, 10% in 61- to 70-year-olds, and 39% in ≥70-year-olds; $P < .001$). Increased childcare needs were associated with a significantly higher psychological distress score (mean, 2.7 versus 2.1; $P = .001$), but this correlation did not persist in the multivariate analysis.

Thirty-seven percent of respondents with children at home agreed or strongly agreed that childcare needs had adversely affected their ability to do their jobs, and this correlated with a higher psychological distress score (mean, 3.2 for “strongly agree,” 2.8 for “agree,” 2.6 for “neutral,”

2.4 for “disagree,” and 1.6 for “strongly disagree”; $P = .002$). This finding persisted in the multivariate analysis: respondents who strongly agreed that childcare needs had adversely affected their jobs had three times greater odds of having a higher psychological distress score compared with those who strongly disagreed (OR, 3.3; 95% CI, 1.3-7.9; $P = .009$).

About one in five respondents (19%) reported that their practices had put forth additional childcare support measures during the pandemic, and this was more common in academic than private practices (27% versus 11%, $P < .001$). Reporting additional childcare support measures in the workplace did not significantly correlate with the psychological distress score.

Finances

Forty-four percent of participants reported layoffs or furloughs within their practices, most commonly of breast technologists (32%), administrative staff members (24%),

Table 2. Multivariate ordinal logistic model of factors associated with psychological distress score

Variable	Class Value	Odds Ratio (CI 95%)	P
Age	Per SD	0.8 (0.6-0.9)	<.01*
Gender	Male	1.00	—
	Female	1.9 (1.3-2.8)	<.01*
Financial loss score	Per SD	1.4 (1.2-1.7)	<.01*
Has your practice put forth wellness efforts specific to COVID-19 in order to support your emotional needs?	Yes	1.0	—
	No	1.4 (1.0-1.9)	.03*
Childcare needs/home-schooling have adversely affected my ability to do my job.	Strongly disagree	1.0	—
	Disagree	2.0 (0.9-4.2)	.08
	Neutral	2.1 (1.0-4.5)	.06
	Agree	2.2 (1.0-4.7)	.05*
	Strongly agree	3.3 (1.3-7.9)	<.01*
Has your practice/healthcare system instituted a hiring freeze?	No	1.0	—
	Yes	1.4 (1.0-2.0)	.03*
	I don't know	0.8 (0.5-1.2)	.32

*Statistically significant ($P < .05$).

and breast radiologists (19%). Layoffs and furloughs were more commonly reported at private than academic practices (58% versus 40%, $P < .001$). Forty-three percent of participants reported that medical or personal leave had been taken by colleagues or staff members within their practices (Table 4).

Half of participants (50%) reported that they were working reduced hours or for reduced pay during the pandemic, a finding that was higher at private compared with academic practices (60% versus 45%, $P = .002$). The range of estimated personal compensation loss for 2020 was wide: 19% reported no financial loss, 16% reported a \$0 to \$25,000 loss, 23% reported a \$25,000 to \$50,000 loss, 18% reported a \$50,000 to \$100,000 loss, and 19% reported greater than \$100,000 compensation loss. Spouses or partners of 22% of participants had experienced some kind of financial loss.

Forty-one percent of participants reported more financial strain at the time of their response compared with before the pandemic, and 15% agreed or strongly agreed that they were worried about losing their jobs, a finding that was almost double in women compared with men (17% versus

9%, $P = .04$). Increased financial strain correlated with a higher psychological distress score (mean, 2.7 for “strongly agree,” 2.5 for “agree,” 2.4 for “neutral,” 2.2 for “disagree,” and 1.4 for “strongly disagree”; $P < .0001$).

The overall financial loss score, determined on the basis of the number of personal financial impact questions answered affirmatively, was positively correlated with the psychological distress score in the multivariate analysis (OR, 1.4 per SD; 95% CI, 1.2-1.7; $P < .0001$). No significant difference in financial loss score was seen among gender or age subgroups.

DISCUSSION

COVID-19 has negatively affected the emotional well-being of the majority of breast radiologists; the greatest psychological distress was associated with younger age, female gender, pandemic-specific financial loss, and childcare needs adversely affecting job ability.

Higher levels of COVID-19-related psychological distress noted by women in this survey are consistent with past literature from China and Italy [16,17]; a confounding factor may be that women are more likely to report mental health symptoms than men [18]. Childcare demands are

Table 3. Wellness and childcare questions and association with mean psychological distress and financial loss scores[‡]

Question	Response	Respondents (%)	Mean Psychological Distress Score	P	Mean Financial Loss Score	P
Wellness						
Has your practice put forth wellness efforts specific to COVID-19 in order to support your emotional needs?	Yes	265 (42)	2.3	<.01*	5.8	<.01*
	No	307 (49)	2.5		6.7	
Have you reached out or felt the need to reach out to emotional/psychiatric support services due to COVID-19?	Yes	48 (8)	3.8	<.01*	6.9	<.01*
	No	517 (82)	2.3		6.2	
	Prefer not to answer	9 (1)	2.2		7.8	
Have you taken any personal steps to alleviate anxiety/address your emotional needs due to COVID-19?	Yes	422 (67)	2.5	<.01*	6.4	<.01*
	No	206 (33)	1.6		5.5	
Childcare[†]						
Do you have increased childcare needs because of COVID-19?	Yes	146 (38)	2.7	<.01*	6.6	<.01*
	No	241 (62)	2.1		5.6	
Has your practice put forth additional childcare support measures?	Yes	58 (15)	2.3	.85	3.8	<.01*
	No	277 (72)	2.4		6.3	
	Not sure	51 (13)	2.4		6.7	
Childcare needs/home-schooling have adversely affected my ability to do my job.	Strongly agree	33 (6)	3.2	<.01*	6.6	.03*
	Agree	70 (12)	2.8		7.2	
	Neutral	74 (13)	2.6		6.1	
	Disagree	64 (11)	2.4		5.5	
	Strongly disagree	36 (6)	1.6		5.2	

COVID-19 = coronavirus disease 2019.

*Statistically significant ($P < .05$).

[†]Childcare responses were limited to participants reporting having children at home.

[‡]Missing data (skipped questions) <12% for wellness and childcare questions.

Table 4. Financial questions and mean psychological distress score[†]

Question	Response	Respondents (%)	Mean Psychological Distress Score	P
Has anyone in your practice been laid off or furloughed?	Yes	277 (44)	2.3	.04*
	No	258 (41)	2.1	
	I don't know	93 (15)	2.5	
Has anyone in your practice taken medical or personal leave without pay?	Yes	269 (43)	2.3	.07
	No	246 (39)	2.1	
	I don't know	113 (18)	2.5	
Has your practice/healthcare system instituted a hiring freeze?	Yes	262 (43)	2.6	<.01*
	No	227 (36)	2.1	
	I don't know	119 (20)	2.0	
I am worried about losing my job.	Strongly agree	26 (4)	3.1	<.01*
	Agree	64 (11)	2.6	
	Neutral	93 (15)	2.5	
	Disagree	212 (35)	2.3	
	Strongly disagree	211 (35)	2.0	
I am under more financial strain now compared to before the pandemic.	Strongly agree	80 (13)	2.7	<.01*
	Agree	170 (28)	2.5	
	Neutral	199 (33)	2.4	
	Disagree	86 (14)	2.2	
	Strongly disagree	72 (12)	1.4	
What do you estimate to be your PERSONAL compensation loss due to COVID-19 for 2020?	None	146 (24)	2.0	<.01*
	\$0-\$25,000	96 (16)	2.3	
	\$25,000-\$50,000	140 (23)	2.4	
	\$50,000-\$100,000	108 (18)	2.2	
	>\$100,000	112 (19)	2.6	
Are you working at reduced hours or for reduced pay during the pandemic?	Yes	305 (50)	2.5	<.01*
	No	274 (45)	2.1	
	Prefer not to say	26 (4)	1.8	

(continued)

Table 4. Continued

Question	Response	Respondents (%)	Mean Psychological Distress Score	P
Have you been laid off?	Yes	18 (3)	2.3	.98
	No	572 (96)	2.3	
	Prefer not to say	5 (1)	2.6	
Has your spouse/partner suffered a job loss/furlough or financial loss due to the pandemic?	Yes	134 (22)	2.6	<.01*
	No	449 (75)	2.2	
	Prefer not to say	17 (3)	3.3	
If you planned on retiring in the next year, has the pandemic postponed or pushed up your retirement?	Postponed	55 (9)	2.2	.15
	Pushed	15 (3)	1.9	
	No	174 (29)	2.1	
Have you taken medical/personal leave?	Yes	135 (22)	2.5	.29
	No	460 (76)	2.2	
	Prefer not to say	11 (2)	2.1	

COVID-19 = coronavirus disease 2019.

*Statistically significant ($P < .05$).

†Missing data (skipped questions) $\leq 5\%$ for financial questions.

also more likely to affect women. Even before the pandemic, working women carried a higher childcare burden than men, which has been greatly exacerbated during the pandemic [19]. Stay-at-home orders, school closures, and virtual schooling may make it challenging for some full-time breast radiologists to meet professional demands, especially once imaging volumes reached and possibly even exceeded prepandemic levels in the summer and fall of 2020 [20]. Having COVID-19-related childcare support measures in the workplace did not affect the psychological distress score, which may be because of the limited childcare support options available when families are encouraged to minimize contact outside of their immediate household. Furthermore, although many radiologists and other professionals may have benefited from expanded remote working options during the pandemic, breast imagers have limited remote working options given their routine patient contact and the cost of the high-resolution workstations needed to read mammograms. Even when remote work is possible, merging work and home life may make it more difficult to excel in either domain, further contributing to psychological distress.

The higher mental health and childcare burden of the pandemic on women threatens to exacerbate existing gender disparities in radiology, just as the pandemic has widened disparities in many facets of society. A diminishing trend of women in radiology is seen with advancing academic status, with women constituting only 17% of radiology chairs in 2019 [21,22]. Emerging evidence suggests that the pandemic may further curtail female radiologists' academic and leadership potential [23]. The gender gap in lead authorship in medical journals increased from 23% to 55% after the start of the pandemic [24], which is a reversal of a promising trend that had been seen over the past two decades [25]. Beyond amplifying the gender gap in radiology leadership and academic output, the pandemic may lead to a regression in the proportion of women radiologists overall, back to a historic low [26]. A recent national survey of corporate America found that one in four women are considering downshifting their careers or leaving the workforce altogether because of COVID-19 [27]. The health care industry should prepare for a similar trend. In our study, women were 1.5 times

more likely to take leave without pay during the pandemic. There may be a lag before the full effects of COVID-19 on women in radiology are realized, and radiology practices should consider proactively ramping up strategies to support, mentor, and sponsor young female faculty and staff members [28].

Although highest in women and young people, COVID-19-related psychological distress was widespread across all demographic groups, with 68% reporting increased anxiety, 43% reporting increased sadness, and 36% reporting increased sleep problems. Forty-four percent reported increased financial strain now compared with before the pandemic, and one in five respondents reported a greater than \$100,000 personal compensation loss in 2020. A high financial loss score positively correlated with higher levels of psychological distress. Burnout is associated with emotional stress and decreased job satisfaction, and therefore these findings may signal an acute worsening of the existing widespread burnout among radiologists. Respondents who reported that their practices had not initiated additional wellness efforts were more likely to have high psychological distress scores (OR = 1.4, $P = .03$), suggesting that more widespread wellness efforts at practice groups may help mitigate burnout associated with the pandemic [29].

This study had several limitations. First, volunteer selection bias may have affected the study results, as is true for any survey study; however, there was widespread participation in all practice types and US geographic regions. Women were overrepresented in the sample at 79%, in part because the majority of breast radiologists are women [30]. The response rate for SBI members was similar to that seen in other studies (23%) but low for NCBC members (8%). The low NCBC response may be due in part to overlap with the SBI membership and because the NCBC includes nonradiologist members. In addition, recipients were asked to complete the survey only once, but there was no way to identify duplicate submissions given the anonymous nature of the survey. Finally, measurement of psychological distress was based on a basic set of self-reported mental health symptoms and did not include a validated psychological assessment tool. The small number (<10%) of “other” mental health symptoms given as free-response answers were not included in the psychological distress score analysis. Similarly, the financial loss score was based on responses to personal financial questions and is not a validated tool.

TAKE-HOME POINTS

- High levels of psychological distress specific to COVID-19 were observed across all demographic groups—age, gender, practice type, and geographic

region—but were highest among young people, women, those reporting childcare negatively affecting job ability, and respondents with greater financial loss.

- COVID-19-specific wellness efforts put forth by practice groups were associated with decreased psychological distress.
- Additional practice policies are needed to address the mental health, childcare, and financial struggles of the breast imaging community and address high levels of anticipated pandemic-specific burnout.
- Wellness policies specifically targeting younger women are needed to help mitigate worsening gender disparities that may occur as a consequence of the pandemic.

ADDITIONAL RESOURCES

Additional resources can be found online at: <https://doi.org/10.1016/j.jacr.2021.02.022>.

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