Letters

Attitudes and Factors Associated With COVID-19 Vaccine Hesitancy Among Patients With Breast Cancer

The COVID-19 pandemic has had a substantial effect on cancer care.[1] The recent widespread availability of vaccines against SARS-CoV-2 is a promising strategy to prevent COVID-19–associated mortality. However, previous reports have shown a high hesitancy rate to receive a COVID-19 vaccine among oncologic patients.[2,3] Because breast cancer is the most commonly diagnosed malignant neoplasm,[4] it is imperative to evaluate the specific concerns regarding COVID-19 vaccination among patients with this disease.

Methods | From March 12 to March 26, 2021, any woman with breast cancer residing in Mexico who visited the social media channels of nongovernmental organizations dedicated to improving breast cancer care were invited to complete a web-based survey. To assess COVID-19 vaccine hesitancy rates, participants were dichotomized into a vaccine-acceptant group (ie, willing to be vaccinated immediately) and a vaccine-hesitant group (ie, prefer to wait, only if vaccine is mandatory, or refuse). Respondents who previously had been vaccinated against COVID-19 were excluded from the statistical analysis.

Data analyses were performed using SPSS, version 27 (IBM Inc). Significance was defined as 2-tailed $P < .05$. The Research Ethics Committee of the School of Medicine of the *Instituto Tecnologico y de Estudios Superiores de Monterrey* approved the study. Informed consent was waived because the research was deemed to be of minimal risk and no identifiable data were collected.

Results | In all, 619 women with breast cancer residing in Mexico who visited the social media channels dedicated to improving breast cancer care responded to the survey; of these, 79 (13%) were excluded for prior COVID-19 vaccination. The remaining 540 women (median [range], 49 [23-85] years) were included. Of these 540 participants, 357 (66%) were willing to be vaccinated immediately and 183 (34%) were hesitant to be vaccinated—142 (26%) would wait to see the vaccine's adverse effects in others, 23 (4%) would only be vaccinated if it became mandatory, and 18 (3%) would refuse to be vaccinated.

The most common reasons motivating vaccine-acceptant patients were: to prevent COVID-19 (n = 301; 84%), to take care of their relatives (n = 227; 64%), an autoperceived social responsibility (n = 227; 64%), a fear of getting seriously ill (n = 217; 61%), and/or a desire for "getting back to normal" (n = 186; 52%). The reasons motivating vaccine hesitancy and the factors that might influence hesitant patients to accept immunization are shown in the **Table**. Regarding misconceptions, participants believed that the COVID-19 vaccines may contain a virus capable of causing infection
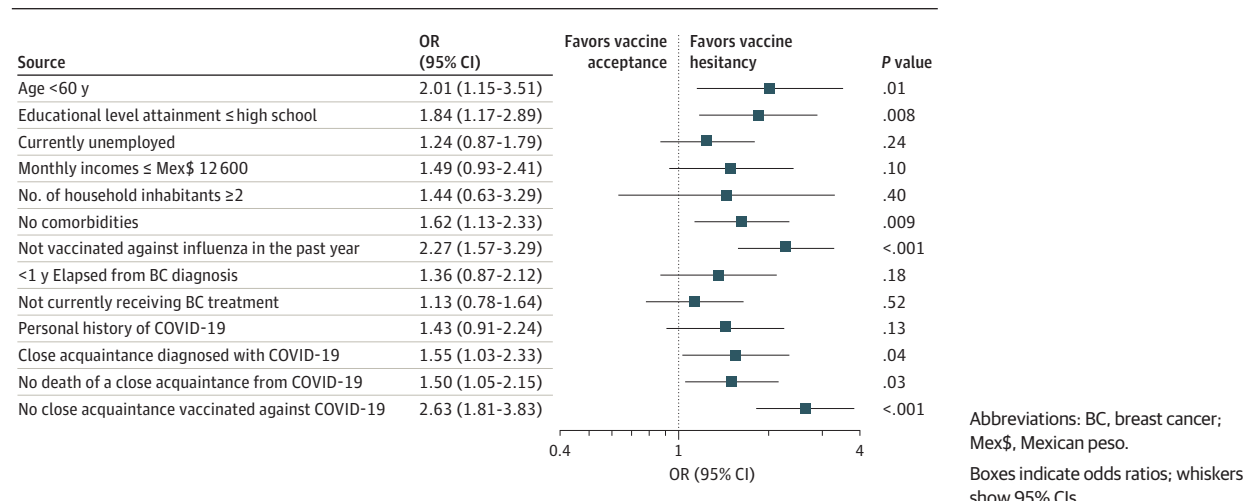
(n = 115; 21%), are contraindicated in patients with breast cancer (n = 29; 5%), are not effective (n = 19; 4%), carry a computer chip to surveil the population (n = 10; 2%), and/or could cause infertility (n = 6; 1%).

Univariate analyses showed that factors associated with vaccine hesitancy include mistrust in the health care system (odds ratio [OR], 8.79; 95% CI, 4.26-18.15), misconception that COVID-19 vaccination is contraindicated in patients with breast cancer (OR, 8.41; 95% CI, 3.36-21.05), not having a close acquaintance already vaccinated against COVID-19 (OR, 2.63; 95% CI, 1.81-3.83), noncompliance with prior influenza immunization (OR, 2.27; 95% CI, 1.57-3.29), age younger than 60 years (OR, 2.01; 95% CI, 1.15-3.51), low educational attainment (OR, 1.84; 95% CI, 1.17-2.89), and not having a close acquaintance deceased from COVID-19 (OR, 1.5; 95% CI, 1.05-2.15) (**Figure**). Significant variables were included in a multivariate model and remained independent predictors of vaccine hesitancy, except for being less than 60 years of age (OR, 1.74; 95% CI, 0.87-3.50; $P = .12$) and not having a close acquaintance who died of COVID-19 (OR, 1.42; 95% CI, 0.89-2.29; $P = .14$). In comparison with the vaccine-acceptant group, hesitant patients were more likely to state that having a close acquaintance who did not experience a vaccine-related adverse reaction (OR, 5.66; 95% CI, 3.47-9.22), having more information about vaccine effectiveness (OR, 3.82; 95% CI, 2.58-5.68) and safety (OR, 3.10; 95% CI, 2.09-4.60), mandatory vaccination (OR, 3.33; 95% CI,

Table. Concerns and Motivations Regarding COVID-19 Vaccination Among Patients With Breast Cancer

Concerns and motivations	No. (%)	
	Acceptant group (n = 357)	Hesitant group (n = 183)
What concerns make you not want to receive a COVID-19 vaccine?		
Fear of adverse reactions	39 (10.9)	100 (54.6)
Distrust of the health care system	10 (2.8)	37 (20.2)
Belief that vaccination is not indicated for patients with breast cancer	6 (1.7)	23 (12.6)
Treating physician has not recommended it	8 (2.2)	18 (9.8)
Belief that vaccination is not effective	2 (0.6)	17 (9.3)
Belief that vaccination can cause COVID-19	2 (0.6)	14 (7.7)
Belief that vaccine is not necessary because I already had COVID-19	3 (0.8)	3 (1.6)
What would motivate you to be vaccinated against COVID-19?		
Vaccination being recommended by my oncologist	127 (35.6)	118 (64.5)
More information about its effectiveness	66 (18.5)	85 (46.4)
More information about its safety	69 (19.3)	78 (42.6)
If someone close to me receives it and does not experience adverse reactions	29 (8.1)	61 (33.3)
Vaccination being recommended by my primary care physician	35 (9.8)	32 (17.5)
Vaccination becoming mandatory	10 (2.8)	16 (8.7)
Endorsement of vaccination by national authorities	17 (4.8)	6 (3.3)

Figure. Univariate Logistic Regression Analysis to Identify Factors Associated With COVID-19 Vaccine Hesitancy Among Patients With Breast Cancer

Source	OR (95% CI)	Favors vaccine acceptance	Favors vaccine hesitancy	P value
Age <60 y	2.01 (1.15-3.51)			.01
Educational level attainment ≤ high school	1.84 (1.17-2.89)			.008
Currently unemployed	1.24 (0.87-1.79)			.24
Monthly incomes ≤ Mex$ 12 600	1.49 (0.93-2.41)			.10
No. of household inhabitants ≥2	1.44 (0.63-3.29)			.40
No comorbidities	1.62 (1.13-2.33)			.009
Not vaccinated against influenza in the past year	2.27 (1.57-3.29)			<.001
<1 y Elapsed from BC diagnosis	1.36 (0.87-2.12)			.18
Not currently receiving BC treatment	1.13 (0.78-1.64)			.52
Personal history of COVID-19	1.43 (0.91-2.24)			.13
Close acquaintance diagnosed with COVID-19	1.55 (1.03-2.33)			.04
No death of a close acquaintance from COVID-19	1.50 (1.05-2.15)			.03
No close acquaintance vaccinated against COVID-19	2.63 (1.81-3.83)			<.001

OR (95% CI) — axis 0.4 / 1 / 4

Abbreviations: BC, breast cancer; Mex$, Mexican peso.

Boxes indicate odds ratios; whiskers show 95% CIs.

1.48-7.48), and being recommended by their oncologist to be vaccinated (OR, 3.29; 95% CI, 2.27-4.77) were needed to motivate them to receive a COVID-19 vaccine.

Discussion | The suboptimal acceptance of a COVID-19 vaccine is a reason for concern,[5] especially among individuals with a higher risk of severe illness. Strategies that focus on building vaccine literacy and confidence in the health care system are urgently needed to enhance vaccine acceptance. To achieve this, clear and credible communication that addresses patient misinformation and specific concerns must be encouraged.[5] Moreover, the active participation of oncologists is essential to educate cancer patients on the benefits of COVID-19 immunization and to endorse vaccination.

Some limitations of this study include its cross-sectional nature, reliance on self-reported data, limited sample size, and lack of formal survey sampling. However, this study provides much needed data to elucidate the factors associated with vaccine hesitancy in patients with breast cancer.

Immunization remains the leading strategy for reducing the COVID-19 burden. Interventions directed toward raising awareness of the benefits of vaccination, especially among the most vulnerable, are a priority for increasing the uptake of COVID-19 vaccines.

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