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# The Impact of the COVID-19 Pandemic on Self-Reported Management of Chronic Conditions

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## Abstract

Chronic conditions (CCs) management during the COVID-19 pandemic and the impact of the pandemic on patient activation (PA) and health locus of control (HLOC) remain unknown. This cross-sectional online survey study examined the role of COVID-19 pandemic-related worry or fear in PA and HLOC among patients with CCs. Individuals with CCs (n = 300) were recruited through MTurk Amazon. The questionnaire included sociodemographic questions, the Patient Activation Measure, and the Multidimensional Health Locus of Control-Form B. Out of the 300 participants, 9.7% were diagnosed with COVID-19, and 7.3% were hospitalized. Patients with cancer, chronic kidney disease, chronic obstructive pulmonary disease, drug abuse/substance abuse, and stroke reported significant difficulties in managing their CCs due to worry or fear because of COVID-19. More than half of the sample (45.7%) reported COVID-19-related worry or fear about managing their CCs, and these patients had lower PA and lower external HLOC compared to patients not affected by COVID-19-related worry or fear. Health professionals should provide more support for patients facing difficulties in managing their CCs during the COVID-19 pandemic.

## Keywords

patient activation, health locus of control, chronic conditions, COVID-19

## Introduction

The COVID-19 pandemic's impact on patients with chronic conditions (CCs) is reflected in many areas, such as different living routines and alterations in routine care with effects on mental and overall health (1–3). Additionally, patients with CCs are at increased risk of hospitalization, intubation, or death due to COVID-19 (4). These considerations suggest that the pandemic could impose additional stress and anxiety among patients with CCs, which in turn could lead to worsening CC management.

Having the confidence, ability, and skills to manage health and health care remains among the goals of the patient-centered approach (5). This concept refers to patient activation (PA), where more activated patients have better health outcomes and positive health-related behaviors compared to less activated patients (6). Health locus of control (HLOC) (7), including both internal and external health beliefs, is also associated with health behavior. Internal HLOC refers to an individual's actions leading to health-related outcomes and the individual being responsible for his/her health, whereas external HLOC refers

to individuals considering chance or powerful others, that is, doctors, to be responsible for individual health. Understanding the relationship of PA and HLOC among patients with CCs is important in implementing a patient-centered approach and guiding the development and implementation of health behavioral interventions.

Furthermore, understanding the association between the difficulties managing CCs due to COVID-19-related worry or fear with PA and HLOC would give direct insight into the role of the pandemic on PA and indirectly on health outcomes of these patients. Additionally, identifying patients with CCs who are most affected by pandemic-related fear to manage

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their condition may provide guidance to health professionals to offer tailored support for these patients. Therefore, this study aimed to examine potential differences in PA and HLOC between those with and without COVID-19-related fear and worry. Secondary aims were to determine the specific CCs for which patients are having difficulty managing, due to COVID-19-related worry or fear and to examine potential predictors of COVID-19-related worry or fear.

## Methods

### Participants and Data

We conducted a cross-sectional survey study of patients with CCs across the United States during July 2020. Participants were recruited through MTurk Amazon (8) and were given an incentive of \$1.50 for completion of the survey.

Of 300 submissions in MTurk, 32 were rejected due to nonrational responses and 32 substitutes were requested. The final sample consisted of 300 individuals who met the inclusion criteria of being 18 years or older, a resident of the United States, and having 1 or more CCs.

### Measures

The online questionnaire included sociodemographic questions, the Patient Activation Measure (PAM) (9), the Multidimensional Health Locus of Control (MHLC)–Form B (10), and 3 questions related to COVID-19. Patient Activation Measure contains 10 Likert-response questions that yield a score in a range of between 0 to 100 points, soliciting the degree to which patients are activated in managing their health and health care. Multidimensional Health Locus of Control–Form B measures 3 HLOC dimensions, Internal, Chance, and Powerful Others while including three 6-Likert-item subscales, with each subscale ranging from 6 to 36 points. The COVID-related questions asked if the participant had been diagnosed with COVID-19, if they had been hospitalized due to COVID-19, and if worry or fear about COVID-19 made it difficult for them to manage their CCs.

### Analysis

Descriptive statistics were calculated to characterize the demographic and CC status of the participants. Mean scores were calculated for the PA and HLOC measures. The data set was checked for linearity, collinearity, normality, and homoscedasticity, and the data were found to be non-normally distributed; therefore, Spearman's correlation was utilized to examine the relationship between the measures. To determine whether there were differences in PA and HLOC between patients with and without COVID-19-related fear and worry, we used an independent-samples *t* test. While, to examine the effect of PA, HLOC, sociodemographic, and clinical factors on COVID worry or fear, we conducted binary logistic regression analysis. Statistical analyses were conducted using IBM SPSS v25.

## Results

### Sample

Among the 300 participants in the sample, over half were males (66.3%), Whites (70.7%), with at least a college degree (70.6%). Age ranged from 20 to 70 years, with a mean of 36.62 (10.92). More than half of the sample had only 1 (52.7%) CC. The average time having a CC was 7.96 (8.95) years (range 1-50 years). The most prevalent CCs among the sample were depression (43.0%), asthma (23.0%), and diabetes (22.3%).

The mean PAM score was 68.8 (14.5), ranging from 31.90 to 100.00, while among the MHLC subscales, Internal MHLC had the lowest mean score ( $15.45 \pm 5.02$ ), and Chance MHLC had the highest ( $20.24 \pm 6.17$ ). Out of 300 participants, 29 (9.7%) reported they had been diagnosed with COVID-19, while 22 (7.3%) reported they had been hospitalized because of COVID-19. Nearly 46% reported that worry or fear made it difficult for them to manage their CC(s) (Table 1).

### Differences in PA and HLOC Between Those With and Without COVID-19-Related Worry or Fear

An independent-samples *t* test was conducted to compare PAM and MHLC scores for patients who reported that were affected by worry or fear over COVID-19 in managing their CC(s) and patients who reported to not have been affected by COVID-19-related worry or fear to manage the CC(s) (Table 2). The groups did not differ significantly regarding internal HLOC,  $t(298) = -0.67, P = .51$ . The mean for the worried group ( $M = 15.66, SD = 5.02$ ) was not significantly different than the not worried group ( $M = 15.28, SD = 5.03$ ). However, the groups did differ significantly regarding PAM score, Chance MHLC, and Powerful Others MHLC, with the group reporting worry or fear having significantly lower scores on the PAM ( $P = .002$ ), Chance MHLC ( $P < .001$ ), and Powerful Others MHLC ( $P = .001$ ).

### Associations Among Demographic/Clinical Factors, CCs and COVID-19-Related Worry or Fear

Correlation analyses were conducted between the COVID-19-related worry or fear and demographic/clinical factors. As the number of CCs a patient had increased, and as years for patients having CC(s) had decreased, they were more likely to report COVID-19-related worry or fear affecting their CCs' management. Additionally, a negative significant relationship between age and COVID-19-related worry or fear was observed as well.

Out of Centers for Medicare & Medicaid Services CCs list containing 21 CCs (11), 5 of them had a significant relationship with COVID fear impact in making difficult for patients to manage their CCs (Table 3).

**Table 1.** Participants' Characteristics (n = 300).

Variables	n (%)	Mean $\pm$ (SD)	Minimum-Maximum
Age		36.62 (10.92)	20-70
Gender			
Male	199 (66.3%)		
Female	99 (33.0%)		
Other/would rather not say	2 (0.7%)		
Education level			
Less than college degree	72 (24.0%)		
At least college degree or higher	228 (76.0%)		
Number of years with CC		7.96 (8.95)	1-50
Number of CC		2.02 (1.934)	1-21
Single or multiple CC			
Single CC	158 (52.7%)		
Multiple CC	142 (47.3%)		
CCs <sup>a</sup>			
Alcohol abuse	59 (19.7%)		
Alzheimer's disease and related dementia	15 (5.0%)		
Arthritis (osteoarthritis or rheumatoid)	32 (10.7%)		
Asthma	69 (23.0%)		
Atrial fibrillation	11 (3.7%)		
Autism spectrum disorders	13 (4.3%)		
Cancer (breast, colorectal, lung, or prostate)	15 (5.0%)		
Chronic kidney disease	27 (9.0%)		
Chronic obstructive pulmonary disease	27 (9.0%)		
Depression	129 (43.0%)		
Diabetes	67 (22.3%)		
Drug abuse/substance abuse	19 (6.3%)		
Heart failure	11 (3.7%)		
Hepatitis (chronic viral B or C)	9 (3.0%)		
HIV/AIDS	5 (1.7%)		
Hyperlipidemia (high cholesterol)	19 (6.3%)		
Hypertension (high blood pressure)	48 (16.0%)		
Ischemic heart disease	6 (2.0%)		
Osteoporosis	8 (2.7%)		
Schizophrenia or other psychotic disorders	8 (2.7%)		
Stroke	9 (3.0%)		
PAM score <sup>b</sup>		68.8 (14.5)	31.90-100.00
Internal MHLC <sup>c</sup>		15.45 (5.02)	6-33
Chance MHLC <sup>c</sup>		20.24 (6.17)	8-34
Powerful Others MHLC <sup>c</sup>		18.26 (5.55)	6-33
COVID variables			
COVID-19 diagnosed			
Yes	29 (9.7%)		
No	263 (87.7%)		
Uncertain	8 (2.7%)		
COVID-19 hospitalized			
Yes	22 (7.3%)		
No	7 (2.3%)		
Has worry or fear over COVID-19 made it difficult for you to manage your CC?			
Yes	137 (45.7%)		
No	163 (54.3%)		

Abbreviations: CC, chronic condition; CMS, Centers for Medicare & Medicaid Services; MHLC, Multidimensional Health Locus of Control.

<sup>a</sup>Chronic conditions list includes 21 CCs and refers to CMS CCs list.

<sup>b</sup>Patient activation was measured with PAM.

<sup>c</sup>Internal, Chance and Powerful Others dimensions were measured using MHLC-Form B.

### *The Effect of PA, HLOC, Sociodemographic and Clinical Factors on COVID-19-Related Worry or Fear*

A logistic regression was performed to examine the effects of age, number of years having CCs, PAM score, MHLC

subscales, number of CCs, education level, employment status, and annual household income on the likelihood that participants report to have been affected by worry or fear related to COVID-19 in facing difficulties to manage their CCs. The logistic regression model was statistically

**Table 2.** Differences in PAM Score, Internal MHLC, Chance MHLC, and Powerful Others MHLC Between Participants Worried or Fearful About COVID-19 Compared to Those Who Were Not Worried or Fearful.

Variables	COVID worry/fear (mean $\pm$ SD)		t	df	P value	Cohen's <i>d</i>
	Yes	No				
PAM score	66.04 $\pm$ 11.46	71.11 $\pm$ 16.31	3.06	298	.002	0.36
Internal MHLC	15.66 $\pm$ 5.02	15.28 $\pm$ 5.03	-0.67	298	.506	0.08
Chance MHLC	18.65 $\pm$ 5.89	21.58 $\pm$ 6.11	4.201	298	<.001	0.49
Powerful Others MHLC	17.08 $\pm$ 5.41	19.26 $\pm$ 5.49	3.444	298	.001	0.40

Abbreviation: MHLC, Multidimensional Health Locus of Control.

**Table 3.** COVID Fear, Demographics, and CCs Correlation Analyses.

Variables	Spearman's $\rho$	P value
COVID fear—COVID hospitalized	0.281 <sup>b</sup>	<.001
COVID fear—Not COVID diagnosed	-0.267 <sup>b</sup>	<.001
COVID fear—COVID diagnosed	0.266 <sup>b</sup>	<.001
COVID fear—Number of CCs	0.172 <sup>b</sup>	.003
COVID fear—Employment status	0.125 <sup>a</sup>	.031
COVID fear—Years with CC	-0.190 <sup>b</sup>	.001
COVID fear—Age	-0.117 <sup>a</sup>	.042
COVID fear—Alcohol abuse	0.035	.550
COVID fear—Alzheimer's disease and related dementia	0.066	.254
COVID fear—Arthritis	0.030	.604
COVID fear—Asthma	0.087	.131
COVID fear—Atrial fibrillation	0.106	.067
COVID fear—Autism spectrum disorders	0.068	.242
COVID fear—Cancer (breast, colorectal, lung, or prostate)	0.127 <sup>a</sup>	.027
COVID fear—Chronic kidney disease	0.156 <sup>b</sup>	.007
COVID fear—Chronic obstructive pulmonary disease	0.179 <sup>b</sup>	.002
COVID fear—Depression	-0.012	.832
COVID fear—Diabetes	0.071	.222
COVID fear—Drug abuse/substance abuse	0.174 <sup>b</sup>	.003
COVID fear—Heart failure	0.070	.224
COVID fear—Hepatitis (chronic viral B or C)	0.113 <sup>a</sup>	.050
COVID fear—HIV/AIDS	0.090	.121
COVID fear—Hyperlipidemia	0.009	.878
COVID fear—Hypertension	-0.53	.358
COVID fear—Ischemic heart disease	0.060	.298
COVID fear—Osteoporosis	0.056	.334
COVID fear—Schizophrenia or other psychotic disorders	0.056	.334
COVID fear—Stroke	0.153 <sup>b</sup>	.008

Abbreviation: CC, chronic conditions.

<sup>a</sup>Correlation is significant at the .05 level (2-tailed).

<sup>b</sup>Correlation is significant at the .01 level (2-tailed).

significant,  $\chi^2(10) = 52.90, P < .001$ . The model correctly classified 67.7% of cases. Increasing number of CCs and a positive status of employment were associated with an increased likelihood of reporting COVID-19-related worry or fear affecting their CCs' management. However, increasing PAM score, Powerful Others MHLC score, and annual

**Table 4.** Results of Binomial Logistic Regression for COVID Related Worry or Fear in Patients With CCs (n = 300).<sup>a</sup>

Predictors	Adjusted OR (95% CI)	P value <sup>b</sup>
Age	0.98 (0.96-1.00)	.098
Number of years with CCs	0.99 (0.96-1.03)	.747
PAM score	0.98 (0.96-1.00)	<b>.025</b>
Internal MHLC	1.02 (0.96-1.09)	.454
Chance MHLC	0.97 (0.92-1.03)	.336
Powerful Others MHLC	0.93 (0.87-0.99)	<b>.033</b>
Number of CCs	1.31 (1.07-1.60)	<b>.008</b>
Education level	1.12 (0.60-2.04)	.745
Employment status	2.94 (1.08-8.00)	<b>.035</b>
Annual household income	0.70 (0.53-0.93)	<b>.014</b>

Abbreviations: CC, chronic condition; MHLC, Multidimensional Health Locus of Control.

<sup>a</sup> $\chi^2(10) = 52.90, P < .001$ .

<sup>b</sup>Bolded means significant at  $P < .05$ .

household income were associated with a reduction in the likelihood of reporting difficulties in managing CC(s) because of COVID-19-related worry or fear (Table 4).

## Discussion

The findings of this study suggest that participants who reported to be facing difficulties in managing their CCs because of worry or fear over COVID-19, were less activated, and had lower scores on Chance and Powerful Others dimensions of the HLOC measure. These findings may be explained by a poorly established/maintained doctor-patient relationship or lack of confidence in the recommendations of scientific organizations. Having weaker beliefs in Powerful Others and potentially greater skepticism relating to their advice may then lead to increased difficulties managing CCs because of COVID-19-related worry or fear. However, the COVID-19-related worry or fear impact on CC management was not significantly associated with Internal HLOC. These findings might be explained by the robustness of internal HLOC beliefs not being affected by external factors. Therefore, COVID-19-related worry or fear is less likely to affect CC management in patients who believe themselves to be responsible for their health and having control over it.

Around 10% of this study sample were diagnosed with COVID-19, and 7.3% were hospitalized due to COVID-19.

These numbers are concerning, considering the potential complications that could arise from COVID-19 pandemic to the patients with CCs (4).

Around 46% of the sample reported that worry or fear over COVID-19 made it difficult for them to manage their CC(s). Patients with cancer, chronic kidney disease (CKD), chronic obstructive pulmonary disease (COPD), drug abuse/substance abuse, and stroke were associated significantly with difficulties in managing CC due to the COVID-19-related worry or fear. This is concerning because patients at increased risk of severe illness from COVID-19 are precisely patients with cancer, CKD, and COPD, while patients with cerebrovascular disease are in the category of potential increased risk (4). Also, the role of COVID-19-related worry or fear in making it difficult to manage drug abuse/substance abuse might be explained by additional stressful situation posed by pandemic, which could lead to amplified use of drugs or other substances, and restriction isolation policies due to the pandemic potentially leading to relapses (12).

Also, we observed a positive significant association between COVID-19-related worry or fear impact on management of CCs and the number of CCs. This finding may be explained by patients' already more complicated health condition; therefore, the potential risk they would perceive to have from COVID-19 would be higher compared to patients with lower number of CCs. However, a negative correlation between COVID-19-related worry or fear and patients not diagnosed with COVID-19 was significant, meaning that such patients are more likely not to have been affected by COVID-related worry or fear in managing their CCs. Considering the positive significant association between COVID-19-related worry or fear and COVID-19 diagnosed or hospitalized patients, as well as the continuous trend of COVID-19 cases (13), health professionals should generally be cautious about patients with CCs. Additionally, patients with multiple CCs should receive higher attention from health care professionals with respect to promoting and maintaining social support, therefore leading to better mental health and quality of life (14). Furthermore, the correlation between the impact of COVID-19-related worry or fear on CC management and age was significantly negative as well as the relationship between number of years patients had CCs and COVID-19-related worry or fear. These results suggest that over time, patients have more confidence in managing their CCs, which also indicates higher PA.

### **Strengths and Limitations**

This study is one of the first to examine the role of COVID-19-related worry and fear on the management of CCs. Additionally, the inclusion of concepts known to be associated with effective management of CCs, PA, and HLOC is a strength of this study. Furthermore, using MTurk for participant recruitment during the pandemic was a convenient and optimal data collection method. However, the MTurk sample was relatively young and more educated compared to other studies

conducted in patients with CCs (15,16), potentially limiting the generalizability of these results. Thus, further research is needed in different demographic groups. Self-reported data pose another limitation to the study. However, considering the pandemic situation, the online questionnaire was safer compared to other potential study designs that would have required any sort of contact and increase risk of contracting COVID-19.

### **Conclusions**

Patients affected by COVID-related worry or fear about managing their CCs were associated with lower activation and lower external HLOC. Health professionals should provide more support for patients with CCs during COVID-19 pandemic.

### **Authors' Note**

The University of Mississippi Institutional Review Board approved the study protocol (#20x-189).


### **Declaration of Conflicting Interests**

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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## Author Biographies

**Hyllore Imeri** is a pharmacist (Magister of Pharmacy) and currently a PhD student at The University of Mississippi in the Department of Pharmacy Administration. She is a research assistant, and her research interests include pharmacy practice, patient behaviors and eHealth.

**Erin Holmes** is a pharmacist by training and practice (PharmD) and is also PhD trained in the field of pharmacy administration. Her teaching and research interests converge on legal and regulatory issues in pharmacy practice, community pharmacy operations and finance, and organizational behavior in the pharmacy setting.

**Shane Desselle** is a professor of Social and Behavioral Pharmacy at Touro University California. He is founding editor for two peer-reviewed journals, *Research in Social and Administrative Pharmacy* (RSAP) and *Exploratory Research in Clinical and Social Pharmacy* (ERCSP). Dr Desselle shared authorship of the 2020 Wiederholt Award provided to the 'best paper' in the *Journal of the American Pharmacists Association* and in 2019 won the American Association of Colleges of Pharmacy (AACP) Sustained Contribution Award for Social and Administrative Pharmaceutical Sciences.

**Meagen Rosenthal**, PhD, her research focuses on developing systems to integrate health research evidence into practice (either in clinical settings or the daily lives of people) faster and more effectively. She does this first by partnering with people who have chronic conditions such as diabetes and obesity to understand their specific needs and help to generate research questions that are meaningful to them. Second, she works with health care providers, like community pharmacists, to transform their practices to provide patients, especially those in rural communities where resources are limited, with much-needed services focused on chronic disease management.

**Marie Barnard** is an assistant professor of Pharmacy Administration and research assistant professor in the Research Institute for Pharmaceutical Sciences. Trained as an epidemiologist, she utilizes participatory evaluation techniques in a wide range of projects in the education and health sectors. Her research includes evaluation of STEM pipeline programs, engagement of pharmacists in public health initiatives, health outcomes research, and the health care response to intimate partner violence.