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Delayed and unmet prescription drug access linked to elevated anxiety symptoms during COVID-19: Retrospective findings from the NLSY79 child and young adult cohort

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ABSTRACT

Background: The COVID-19 pandemic produced substantial challenges to pharmacy systems worldwide and provoked concerns about a wider influence on mental health. While various studies have investigated the relationship between disruptions in access to healthcare and mental health, the effects of delayed and unmet access to prescription drugs on anxiety-related outcomes have been underexamined.
Objective: This study analyzed the impact of delayed and unmet access to prescription drugs on anxiety-related outcomes, including anxiety, inability to stop or control worrying, worrying too much, trouble relaxing, trouble sitting still, being annoyed or irritable, and fear of future events, before and during the COVID-19 pandemic.
Methods: A retrospective observational study was performed using the National Longitudinal Survey of Youth 79 Child and Young Adult dataset, encompassing 2193 individuals. One-way multivariate analysis of covariance (MANCOVA) analyses were conducted to examine the relationship between access to prescription drugs and anxiety-related symptoms.
Results: The findings show that, before the pandemic, instances of delayed/unable to access prescription drugs were either not linked to anxiety symptoms or, in some cases, were linked to anxiety symptoms but no different than during the pandemic. Delayed access to prescription drugs amid the pandemic was significantly linked with increases in anxiety symptoms not found pre-pandemic, including worrying too much ($F = 18.433$, $p < .001$, $\eta_p^2 = 0.017$), trouble relaxing ($F = 11.423$, $p < .001$, $\eta_p^2 = 0.010$), and being easily annoyed or irritable ($F = 3.881$, $p = .021$, $\eta_p^2 = 0.004$). Similarly, unmet access to prescription drugs amid the pandemic was significantly linked with increases in anxiety-related symptoms not found pre-pandemic, including an inability to stop or control worrying ($F = 14.666$, $p < .001$, $\eta_p^2 = 0.013$) and worrying too much ($F = 18.433$, $p < .001$, $\eta_p^2 = 0.017$).
Conclusions: These results have implications for pharmacy administrators and policymakers seeking to understand and limit adverse mental health outcomes within pharmacy during times of crisis.

1. Introduction

The outbreak of COVID-19, resulting from the novel coronavirus SARS-CoV-2, represented a substantial danger to public health and profoundly interrupted various aspects of daily life. While government controls were advanced to protect public health, they often inadvertently limited people's access to medicines.[1–3]

Various studies have detailed the difficulties people experienced in obtaining healthcare during COVID-19,[4–6] and the association between disruptions in access to healthcare and increased mental health issues has been demonstrated.[7] However, there is a notable gap in research into the specific influence of delayed and unmet access to prescription drugs on anxiety and other quality-of-life issues.[8] This research addresses this gap by examining the association between prescription drug access and anxiety-related issues before and during the pandemic. The exceptional circumstances of COVID-19 offer a chance to evaluate this relationship in a unique framework.

Access to prescription drugs is essential to the well-being of individuals experiencing chronic health or mental health issues. However, the advent of COVID-19, its related lockdowns, overburdened

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healthcare settings, supply chain slowdowns, increased demand for pharmaceuticals, and various market considerations produced challenges in accessing drugs.[9–11] For example, in 2021, 83% of community pharmacists in the United Kingdom (UK) reported drug shortages three or more times a week; 93% stated that drug shortages were problematic, with 61% stating that COVID-19 had made matters worse.[12] Essential medication shortages during COVID-19 impacted 8.9% of people with gastrointestinal (GI) disorders in multiple countries.[13] In 2021, according to hospital pharmacy leaders in the United States (U.S.), the percentage of hospital pharmacies encountering ten or more drug shortages saw an uptick, rising from 62% to 76% year-over-year.[14] A 2023 investigation commissioned by the U.S. Senate found that from 2021 to 2022, there was close to a 30% increase in drug shortages.[15] At the end of 2022, according to this report, active drug shortages reached a record high over the previous five years, totaling 295.

Studies have shown minimal or no relationship between access to medicines and anxiety-related symptoms. Mikocka-Walus et al. studied mental health among people experiencing medication shortages during COVID-19 and found no relationship between psychological distress and medication shortages.[13] They did find a link between distress and shortages in pain medication. A mixed-methods study of the mental health effects of pre-and during clobazam shortages for patients with epilepsy found no relationship between pre-and during shortages and quality of life distress.[16] However, the qualitative responses from interviewees in this study showed a more extensive impact on psychological health from the shortages, with an emphasis on anxiety-related issues.

Medication non-adherence, though not the same as inaccessibility to medicines, represents a break or disruption in routine medicine consumption and has been linked with adverse mental health issues. Distinguishing whether non-adherence impacts mental health or if pre-existing mental health issues foster non-adherence is challenging and often unclear, but it can provide insight. In a study of prescription drug adherence and anxiety and depression among a Swedish sample, it was found that non-adherence to prescription drugs was associated with anxiety and depression.[17] These results held with both intentional and unintentional non-adherence. In a review of the relationship between medical non-adherence and anxiety and depression involving patients on medical regimens unrelated to mental health and who were not being treated for mental health issues, a limited and nonsignificant relationship was found between anxiety and medical non-adherence.[18] However, a significant relationship between depression and non-adherence was detected, wherein depressed patients were three times more likely than nondepressed patients to be non-adherent. Among patients with hypertension, there is evidence that non-adherence to antihypertensive medicines is linked with increased depression.[19] Non-adherence to antiepileptic medicines among epilepsy patients was associated with increases in both anxiety and depression.[20] A relationship between low medication adherence and moderate-to-high stress was also found among patients with chronic diseases in Mumbai.[21]

Anxiety disorders stand out as the most widespread mental health issue globally, impacting approximately 4.05% of the world's population.[22,23] By examining the interaction between disruptions in access to prescription drugs and mental health, this study will inform policy development and emergency response authorities in reducing the adverse effects of future public health crises. This research extends the literature by contributing an investigation into the relationship between prescription drug access and anxiety-related issues within the frame of a global health emergency. The application of a large and robust dataset fostered insights into various anxiety indicators influenced by disruptions in prescription drug access during COVID-19.

2. Methods

This study investigated whether delayed and unmet access to prescription drugs during COVID-19 produced different anxiety-related outcomes relative to the pre-pandemic period, seeking to engage the challenges presented to pharmacy systems by the pandemic and the possible wider bearing on psychological well-being. The research objective was to study the impact of delayed and unmet access to prescription drugs on various anxiety-related symptoms, including anxiety, inability to stop or control worrying, worrying too much, trouble relaxing, trouble sitting still, being annoyed or irritable, and fear of future events. A retrospective observational study employing secondary data was performed. To measure certain dependent variables simultaneously, one-way multivariate analysis of covariance (MANCOVA) analyses were carried out, using data from the National Longitudinal Survey of Youth 79 Child and Young Adult (NLSY79-CYA) dataset.

One NLSY79-CYA prescription drug availability variable, delayed/unable to access prescription drugs, was tested in relation to 14 NLSY79-CYA General Anxiety Disorder Scale (GAD-7) outcome variables: 1) feeling nervous, anxious, or on edge in 2018 and 2020, 2) not being able to stop or control worrying in 2018 and 2020, 3) worrying too much in 2018 and 2020, 4) having trouble relaxing in 2018 and 2020, 5) having trouble sitting still in 2018 and 2020, 6) being easily annoyed or irritable in 2018 and 2020, and 7) feeling afraid something awful might happen in 2018 and 2020. All analyses controlled for gender, ethnicity, and year of birth and were conducted with data from periods before (2018) and during (2020) the pandemic.

The NLSY79-CYA provided the data, which were collected during two periods: in 2018, representing the time before COVID-19, and during the second half of 2020, in the early to mid-stages of the pandemic. The 2020 collection wave measured the psychological health of the NLSY79-CYA cohort and the extent of prescription drug access during the COVID-19 pandemic. The sample size was 2193, which included individuals born between 1970 and 2014 in the U.S. The NLSY79-CYA is representative regarding gender (51% male, 49% female) and ethnicity (53% non-Black/non-Hispanic, 28% Black non-Hispanic, and 19% Hispanic or Latino)—evidence of equity across the demographic strata.[24] The initial survey sample size in 2020 was 4354 subjects 12 and older; missing data on any of the variables tested for this research activated listwise deletion, reducing the sample to 2193. Mothers completed specific questions for children 18 and younger, and participants 12 and older were interviewed as young adults. The survey is named NLSY79 Child and Young Adult; however, the participants during the 2018 and 2020 collection periods were not exclusively young people. Instead, participants spanned a broader age range. As of 2020, the subjects were 12 to 50 years old (the current study consisted of subjects 14 and older in meeting the requirements of specific questions). The terminology “Child and Young Adult” might seem misleading. The subjects surveyed are the biological children of the mothers participating in the original NLSY79 (1979–2020 cohort) survey. These mothers were born between 1957 and 1964. As this was a retrospective observational study employing secondary data from the National Longitudinal Surveys, which are publicly available datasets from the U.S. Bureau of Labor Statistics, obtaining ethics approval was not required for this study.

Independent variable: One delayed/unable to access prescription drugs question was provided to the NLSY79-CYA cohort in the second half of 2020 (see the Appendix for the question).

Dependent variables: Seven anxiety-related questions, representing central anxiety-related questions in the NLSY79-CYA, were used from the 2018 and 2020 datasets. These questions are part of the General Anxiety Disorder Scale (GAD-7), developed by Spitzer et al.[25] The GAD-7 is a questionnaire designed to gauge the presence of feelings associated with anxiety during assessment. The NLSY79-CYA cohort were asked to provide ratings on their feelings and experiences over the two weeks preceding the interview (see the Appendix for the questions).

The questions were administered by National Longitudinal Survey interviewers using various modes of data collection, including in-person, telephone, and computerized/online interviews (the most common method), depending upon the participants' preferences and other

considerations.

2.1. MANCOVA testing

One-way MANCOVAs were conducted to help protect against inflating the type 1 error rate in the follow-up ANOVAs and post hoc comparisons. To investigate the relationship between delayed/unable to access prescription drugs and anxiety-related issues, seven sets of MANCOVAs were performed.

Test 1) Delayed/unmet access to prescription drugs on two dependent variables 1) felt nervous, anxious, or on edge in 2018 and 2) felt nervous, anxious, or on edge in 2020.

Test 2) Delayed/unmet access to prescription drugs on two dependent variables 1) could not stop or control worrying in 2018 and 2) could not stop or control worrying in 2020.

Test 3) Delayed/unmet access to prescription drugs on two dependent variables: 1) worrying too much in 2018 and 2) worrying too much in 2020.

Test 4) Delayed/unmet access to prescription drugs on two dependent variables: 1) trouble relaxing in 2018 and 2) trouble relaxing in 2020.

Test 5) Delayed/unmet access to prescription drugs on two dependent variables: 1) trouble sitting still in 2018 and 2) trouble sitting still in 2020.

Test 6) Delayed/unmet access to prescription drugs on two dependent variables: 1) easily annoyed or irritable in 2018 and 2) easily annoyed or irritable in 2020.

Test 7) Delayed/unmet access to prescription drugs on two dependent variables: 1) felt afraid something awful might happen in 2018 and 2) felt afraid something awful might happen in 2020.

Each MANCOVA set controlled for birth year, gender, and ethnicity. No outliers were eliminated from the dataset, as there was no indication that any were in error. Missing data activated listwise deletion. Cases with missing values on any examined variables were omitted from the study.

3. Results

3.1. Test 1: Delayed/unable to access prescription drugs on feeling nervous, anxious, or on edge before (2018) and during (2020) the COVID-19 pandemic

A statistically significant multivariate test was obtained from delayed/unable to access prescription drugs on feeling nervous, anxious, or on edge, Pillai's Trace = 0.005, F (4, 4374) = 2.679, $p = .030$, $\eta_p^2 = 0.002$.

A meaningful difference between 2018 and 2020 was not detected. In both cases, univariate testing indicated a significant difference in delayed/unable to access prescription drugs on feeling nervous, anxious, or on edge (scores range from 0 to 3; higher scores signify greater incidents of feeling nervous, anxious, or on edge), 2018: F (2, 2187) = 3.033, $p = .048$, $\eta_p^2 = 0.003$; 2020: F (2, 2187) = 4.126, $p = .016$, $\eta_p^2 = 0.004$. Post hoc comparisons using Fisher's LSD test specified similar differences, wherein for both 2018 and 2020, those experiencing delayed access to prescription drugs were significantly more likely to experience feeling nervous, anxious, or on edge compared to those with no impact on prescription drugs.

Ultimately, individuals undergoing delays in accessing prescription drugs were significantly more likely to feel nervous, anxious, or on edge relative to those unimpacted by prescription drug access issues in both 2018 and 2020, indicating no difference between pre-pandemic and pandemic periods (Table 1).

3.2. Test 2: Delayed/unable to access prescription drugs on an inability to stop or control worrying before (2018) and during (2020) the COVID-19 pandemic

A statistically significant multivariate test was obtained from delayed/unable to access prescription drugs on an inability to stop or control worrying, Pillai's Trace = 0.014, F (4, 4372) = 7.871, $p < .001$, $\eta_p^2 = 0.007$ (Table 2).

Univariate testing indicated a significant difference in delayed/unable to access prescription drugs on an inability to stop or control worrying in 2018 (scores range from 0 to 3; higher scores signify greater incidents of being unable to stop or control worrying), F (2, 2186) = 4.555, $p = .011$, $\eta_p^2 = 0.004$. Post hoc comparisons using Fisher's LSD test specified significant differences, wherein delayed access to prescription drugs (M = 0.96) had a significantly higher risk of an inability to stop or control worrying compared to no impact on access to prescription drugs (M = 0.58).

Univariate testing indicated a significant difference in delayed/unable to access prescription drugs on an inability to stop or control worrying in 2020, F (2, 2186) = 14.666, $p < .001$, $\eta_p^2 = 0.013$. Post hoc comparisons using Fisher's LSD test specified significant differences, wherein delayed access to prescription drugs (M = 1.28) and unable to get access to prescription drugs (M = 1.11) had a significantly higher likelihood of being unable to stop or control worrying compared to no impact on access to prescription drugs (M = 0.63).

This indicates that in 2020, relative to 2018, an inability to stop or control worrying significantly increased among those unable to access prescription drugs compared to those with no impact on prescription drugs. Concurrently, both in 2020 and 2018, individuals experienced an increased risk of an inability to stop or control worrying when undergoing delayed access to prescription drugs; thus, as both 2018 and 2020 showed similar significant results with delayed access, there were no differences between pre-pandemic and pandemic periods in this case.

Table 1
Mean difference, std. error, sig., and 95% confidence interval (CI) for delayed/unable to access prescription drugs on feeling nervous, anxious, or on edge.

Dependent Variable	Delayed/Unable to Access	Delayed/Unable to Access	Mean Difference	Std. Error	Sig.	95% CI	
						Lower Bound	Upper Bound
Nervous, Anxious, or On Edge (2018)	No Impact	Delayed	−0.296*	0.134	0.028	−0.559	−0.032
		Unable to Get	−0.284	0.252	0.259	−0.779	0.210
	Delayed	No Impact	0.296*	0.134	0.028	0.032	0.559
		Unable to Get	0.011	0.284	0.969	−0.546	0.569
	Unable to Get	No Impact	0.284	0.252	0.259	−0.210	0.779
		Delayed	−0.011	0.284	0.969	−0.569	0.546
Nervous, Anxious, or On Edge (2020)	No Impact	Delayed	−0.351*	0.133	0.008	−0.612	−0.091
		Unable to Get	−0.289	0.250	0.248	−0.779	0.201
	Delayed	No Impact	0.351*	0.133	0.008	0.091	0.612
		Unable to Get	0.063	0.282	0.824	−0.490	0.615
	Unable to Get	No Impact	0.289	0.250	0.248	−0.201	0.779
		Delayed	−0.063	0.282	0.824	−0.615	0.490

* . The difference is significant at the 0.05 level.

Table 2
Mean difference, std. error, sig., and 95% confidence interval (CI) for delayed/unable to access prescription drugs on an inability to stop or control worrying.

Dependent Variable	Delayed/Unable to Access	Delayed/Unable to Access	Mean Difference	Std. Error	Sig.	95% CI	
						Lower Bound	Upper Bound
Uncontrolled Worrying (2018)	No Impact	Delayed	−0.379*	0.126	0.003	−0.626	−0.133
		Unable to Get	0.023	0.236	0.923	−0.441	0.486
	Delayed	No Impact	0.379*	0.126	0.003	0.133	0.626
		Unable to Get	0.402	0.267	0.131	−0.121	0.925
	Unable to Get	No Impact	−0.023	0.236	0.923	−0.486	0.441
		Delayed	−0.402	0.267	0.131	−0.925	0.121
Uncontrolled Worrying (2020)	No Impact	Delayed	−0.650*	0.128	0.000	−0.902	−0.399
		Unable to Get	−0.477*	0.241	0.048	−0.950	−0.004
	Delayed	No Impact	0.650*	0.128	0.000	0.399	0.902
		Unable to Get	0.173	0.272	0.525	−0.360	0.706
	Unable to Get	No Impact	0.477*	0.241	0.048	0.004	0.950
		Delayed	−0.173	0.272	0.525	−0.706	0.360

* . The mean difference is significant at the 0.05 level.

Ultimately, there was an increased risk of an inability to stop or control worrying among those unable to access prescription drugs during the pandemic relative to the pre-pandemic period (Fig. 1).

3.3. Test 3: Delayed/unable to access prescription drugs on worrying too much before (2018) and during (2020) the COVID-19 pandemic

A statistically significant multivariate test was obtained from delayed/unable to access prescription drugs on worrying too much, Pillai's Trace = 0.017, F (4, 4372) = 9.151, $p < .001$, $\eta_p^2 = 0.008$ (Table 3).

Univariate testing indicated no significant difference in delayed/unable to access prescription drugs on worrying too much in 2018 (scores range from 0 to 3; higher scores signify greater incidents of excessive worry), F (2, 2186) = 1.810, $p = .164$, $\eta_p^2 = 0.002$.

Univariate testing indicated a significant difference in delayed/unable to access prescription drugs on worrying too much in 2020, F (2, 2186) = 18.433, $p < .001$, $\eta_p^2 = 0.017$. Post hoc comparisons using Fisher's LSD test specified significant differences, wherein delayed access to prescription drugs (M = 1.55) and unable to get access to prescription drugs (M = 1.31) were significantly more likely to worry too much compared to those with no impact on access to prescription drugs (M = 0.81).

This shows that in 2020, relative to 2018, worrying too much significantly increased among individuals experiencing delayed access and those unable to access prescription drugs compared to those with no impact on prescription drug access (Fig. 2).

3.4. Test 4: Delayed/unable to access prescription drugs on trouble relaxing before (2018) and during (2020) the COVID-19 pandemic

A statistically significant multivariate test was obtained from delayed/unable to access prescription drugs on trouble relaxing, Pillai's Trace = 0.011, F (4, 4368) = 5.893, $p < .001$, $\eta_p^2 = 0.005$ (Table 4).

Univariate testing indicated no significant difference in delayed/unable to access prescription drugs on trouble relaxing in 2018 (scores range from 0 to 3; higher scores signify greater incidents of trouble relaxing), F (2, 2184) = 2.227, $p = .108$, $\eta_p^2 = 0.002$.

Univariate testing indicated a significant difference in delayed/unable to access prescription drugs on trouble relaxing in 2020, F (2, 2184) = 11.423, $p < .001$, $\eta_p^2 = 0.010$. Post hoc comparisons using Fisher's LSD test specified significant differences, wherein delayed access to prescription drugs (M = 1.28) was significantly more likely to have trouble relaxing compared to those with no impact on prescription drugs (M = 0.71).

This signifies that in 2020, relative to 2018, having trouble relaxing significantly increased among individuals undergoing delayed access to prescription drugs compared to those experiencing no impact on prescription drug access (Fig. 3).

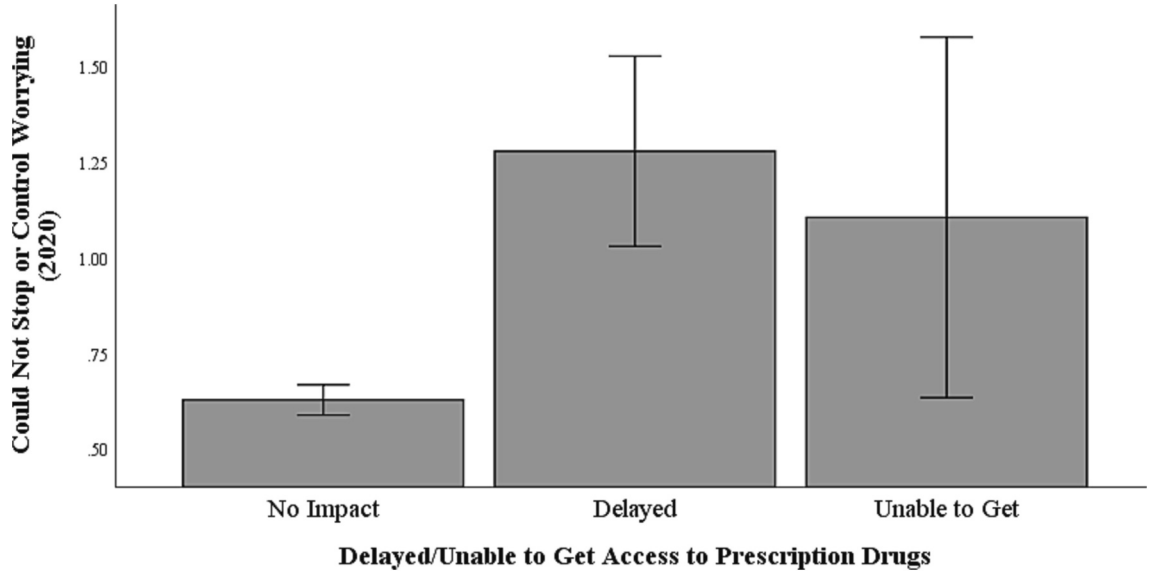

Fig. 1. The influence of delayed/unable to access prescription drugs on an inability to stop or control worrying in 2020.

Table 3
Mean difference, std. error, sig., and 95% confidence interval (CI) for delayed/unable to access prescription drugs on worrying too much.

Dependent Variable	Delayed/Unable to Access	Delayed/Unable to Access	Mean Difference	Std. Error	Sig.	95% CI	
						Lower Bound	Upper Bound
Worried Too Much (2018)	No Impact	Delayed	−0.236	0.132	0.073	−0.494	0.022
		Unable to Get	−0.163	0.248	0.510	−0.649	0.322
	Delayed	No Impact	0.236	0.132	0.073	−0.022	0.494
		Unable to Get	0.073	0.279	0.794	−0.474	0.620
	Unable to Get	No Impact	0.163	0.248	0.510	−0.322	0.649
		Delayed	−0.073	0.279	0.794	−0.620	0.474
Worried Too Much (2020)	No Impact	Delayed	−0.744*	0.130	0.000	−0.998	−0.490
		Unable to Get	−0.496*	0.243	0.042	−0.974	−0.019
	Delayed	No Impact	0.744*	0.130	0.000	0.490	0.998
		Unable to Get	0.248	0.274	0.367	−0.291	0.786
	Unable to Get	No Impact	0.496*	0.243	0.042	0.019	0.974
		Delayed	−0.248	0.274	0.367	−0.786	0.291

* . The mean difference is significant at the 0.05 level.

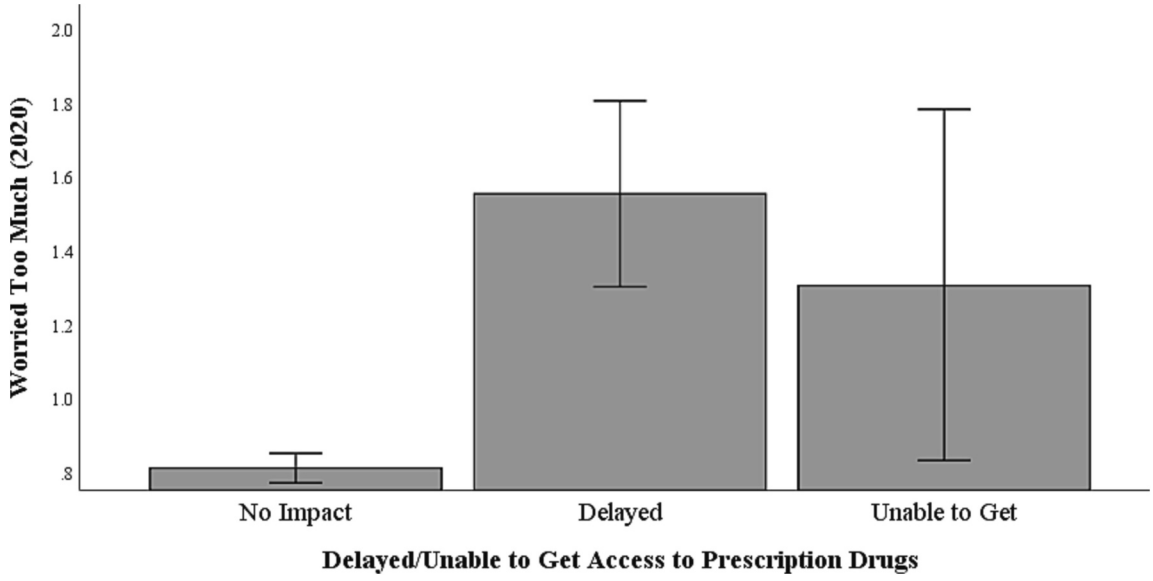

Fig. 2. The influence of delayed/unable to access prescription drugs on worrying too much in 2020.

Table 4
Mean difference, std. error, sig., and 95% confidence interval (CI) for delayed/unable to access prescription drugs on trouble relaxing.

Dependent Variable	Delayed/Unable to Access	Delayed/Unable to Access	Mean Difference	Std. Error	Sig.	95% CI	
						Lower Bound	Upper Bound
Trouble Relaxing (2018)	No Impact	Delayed	−0.274*	0.130	0.035	−0.528	−0.019
		Unable to Get	−0.043	0.242	0.861	−0.517	0.432
	Delayed	No Impact	0.274*	0.130	0.035	0.019	0.528
		Unable to Get	0.231	0.273	0.398	−0.305	0.767
	Unable to Get	No Impact	0.043	0.242	0.861	−0.432	0.517
		Delayed	−0.231	0.273	0.398	−0.767	0.305
Trouble Relaxing (2020)	No Impact	Delayed	−0.574*	0.127	0.000	−0.823	−0.325
		Unable to Get	−0.377	0.236	0.111	−0.841	0.086
	Delayed	No Impact	0.574*	0.127	0.000	0.325	0.823
		Unable to Get	0.197	0.267	0.461	−0.327	0.721
	Unable to Get	No Impact	0.377	0.236	0.111	−0.086	0.841
		Delayed	−0.197	0.267	0.461	−0.721	0.327

* . The mean difference is significant at the 0.05 level.

3.5. Test 5: Delayed/unable to access prescription drugs on having trouble sitting still before (2018) and during (2020) the COVID-19 pandemic

A statistically significant multivariate test was obtained from delayed/unable to access prescription drugs on having trouble sitting still, Pillai's Trace = 0.009, F (4, 4368) = 4.996, $p = .001$, $\eta_p^2 = 0.005$.

A meaningful difference between 2018 and 2020 was not detected. In both cases, univariate testing indicated a significant difference in delayed/unable to access prescription drugs on having trouble sitting still (scores range from 0 to 3; higher scores signify greater incidents of having trouble sitting still), 2018: F (2, 2184) = 5.694, $p = .003$, $\eta_p^2 = 0.005$; 2020: F (2, 2184) = 7.631, $p < .001$, $\eta_p^2 = 0.007$. Post hoc

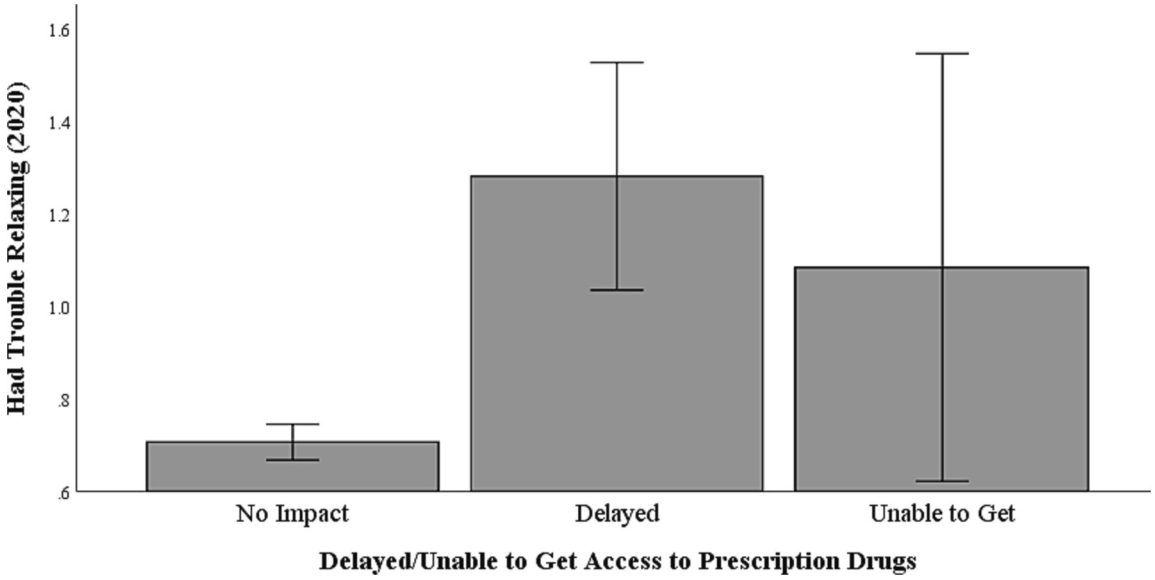

Fig. 3. The influence of delayed/unable to access prescription drugs on trouble relaxing in 2020.

comparisons using Fisher's LSD test specified similar differences, wherein for both 2018 and 2020, those experiencing delayed access to prescription drugs were significantly more likely to have trouble sitting still compared to those with no impact on prescription drugs.

In summation, individuals undergoing delays in accessing prescription drugs were significantly more likely to have trouble sitting still relative to those unimpacted by prescription drug access issues in both 2018 and 2020, indicating no difference between pre-pandemic and pandemic periods.

3.6. Test 6: Delayed/unable to access prescription drugs on being easily annoyed or irritable before (2018) and during (2020) the COVID-19 pandemic

A statistically significant multivariate test was obtained from delayed/unable to access prescription drugs on being easily annoyed or irritable, Pillai's Trace = 0.004, F (4, 4372) = 2.396, $p = .048$, $\eta_p^2 = 0.002$ (Table 5).

Univariate testing indicated no significant difference in delayed/unable to access prescription drugs on being easily annoyed or irritable in 2018 (scores range from 0 to 3; higher scores signify greater incidents of being easily annoyed or irritable), F (2, 2186) = 1.748, $p = .174$, $\eta_p^2 = 0.002$.

Univariate testing indicated a significant difference in delayed/unable to access prescription drugs on being easily annoyed or irritable in 2020, F (2, 2186) = 3.881, $p = .021$, $\eta_p^2 = 0.004$. Post hoc comparisons using Fisher's LSD test specified significant differences, wherein delayed access to prescription drugs (M = 1.00) was significantly more likely to be easily annoyed or irritable compared to those with no impact on prescription drugs (M = 0.68).

This implies that in 2020, relative to 2018, being easily annoyed or irritable significantly increased among individuals undergoing delayed access to prescription drugs compared to those experiencing no impact on prescription drug access.

3.7. Test 7: Delayed/unable to access prescription drugs on feeling afraid something awful might happen before (2018) and during (2020) the COVID-19 pandemic

A statistically significant multivariate test was obtained from delayed/unable to access prescription drugs on feeling afraid something awful might happen, Pillai's Trace = 0.011, F (4, 4372) = 6.297, $p < .001$, $\eta_p^2 = 0.006$.

A meaningful difference between 2018 and 2020 was not detected. In both cases, univariate testing indicated a significant difference in delayed/unable to access prescription drugs on feeling afraid something awful might happen (scores range from 0 to 3; higher scores signify greater incidents of feeling afraid something awful might happen), 2018: F (2, 2186) = 4.145, $p = .016$, $\eta_p^2 = 0.004$; 2020: F (2, 2186) = 11.577, $p < .001$, $\eta_p^2 = 0.010$. Post hoc comparisons using Fisher's LSD

Table 5
Mean difference, std. error, sig., and 95% confidence interval (CI) for delayed/unable to access prescription drugs on being easily annoyed or irritable.

Dependent Variable	Delayed/Unable to Access	Delayed/Unable to Access	Mean Difference	Std. Error	Sig.	95% CI	
						Lower Bound	Upper Bound
Annoyed or Irritable (2018)	No Impact	Delayed	−0.162	0.118	0.170	−0.394	0.070
		Unable to Get	0.279	0.222	0.210	−0.157	0.714
	Delayed	No Impact	0.162	0.118	0.170	−0.070	0.394
		Unable to Get	0.441	0.250	0.079	−0.050	0.932
	Unable to Get	No Impact	−0.279	0.222	0.210	−0.714	0.157
		Delayed	−0.441	0.250	0.079	−0.932	0.050
Annoyed or Irritable (2020)	No Impact	Delayed	−0.321*	0.116	0.006	−0.548	−0.094
		Unable to Get	0.056	0.218	0.796	−0.370	0.483
	Delayed	No Impact	0.321*	0.116	0.006	0.094	0.548
		Unable to Get	0.377	0.245	0.124	−0.104	0.858
	Unable to Get	No Impact	−0.056	0.218	0.796	−0.483	0.370
		Delayed	−0.377	0.245	0.124	−0.858	0.104

* . The mean difference is significant at the 0.05 level.

test specified similar differences, wherein for both 2018 and 2020, those experiencing delayed access to prescription drugs were significantly more likely to experience feeling afraid something awful might happen compared to those with no impact on prescription drugs.

Consequently, individuals undergoing delays in accessing prescription drugs were significantly more likely to feel afraid something awful might happen relative to those unimpacted by prescription drug access issues in both 2018 and 2020, indicating no difference between pre-pandemic and pandemic periods.

4. Discussion

The results show that, prior to COVID-19, delayed/unable to access prescription drugs were either not associated with anxiety-related symptoms or, in certain instances, were associated with anxiety-related symptoms but no different than during the pandemic. A shift occurred during the pandemic. Individuals experiencing delayed access to prescription drugs had an elevated risk of various anxiety-related symptoms amid the pandemic in ways not found pre-pandemic, specifically significant increases in excessive worry, trouble relaxing, and being easily annoyed or irritable. Also, individuals experiencing unmet access to prescription drugs had a heightened propensity for an inability to stop or control worrying and excessive worry amid the pandemic in ways not found pre-pandemic.

The observed association between delayed and unmet access to prescription drugs and increased anxiety-related issues corresponds with the wider interruptions in healthcare access and anxiety linked to COVID-19.[26–28] The factors responsible for the association between delayed and unmet access to prescription drugs and increased anxiety-related symptoms are likely varied. People may have faced compounded issues, particularly in managing the unpredictability of an international health emergency while grappling with disruptions in pharmacological schedules. Additionally, interrupted access to prescription drugs reduces the feelings of agency that people usually have over their well-being. Perceived diminished control has been linked with anxiety-related symptoms.[29,30]

These results provide the groundwork for developing solutions. Pharmacy strategies should be reevaluated to safeguard the mental health of those experiencing disrupted access to prescription drugs during public health crises. Foremost, telepharmacy, the application of digital communication technologies to deliver pharmacy services, that considers mental health should be forwarded.

Telepharmacy expanded substantially during COVID-19 and was instrumental in maintaining pharmacy services, patient counseling,[31] and engagement with underserved areas.[32] It has the potential to provide distance pharmaceutical consultations, mental health evaluations, psychological care, and dispensation to patients, uniting pharma and mental health. Among adult patients utilizing telepharmacy services in Spain during COVID-19, 96.7% reported being “satisfied” or “very satisfied” with their telepharmacy experiences.[33] Similarly high levels of satisfaction with telepharmacy have been found during COVID-19 among adult patients at specialized hospital clinics in Iran (77% favored telepharmacy while 23% favored in-person care),[34] and pre-COVID-19 among HIV outpatients undergoing treatment.[35] Telehealth, applying digital communications to deliver healthcare services remotely, and other virtual platforms have also demonstrated benefits for individuals with anxiety and depression.[36,37] These findings underscore the potential of telepharmacy mechanisms in managing access to prescription drugs and safeguarding mental health in one platform. Furthermore, good communication with doctors during delays in healthcare treatment has been shown to reduce the risk of general psychological distress (GPD),[28] indicating that productive communication between pharmacists and patients using telecommunications and other virtual platforms may limit mental health issues during disruptions in prescription drug access.

4.1. Limitations

The results of this study may be influenced by the temporal elements inherent in COVID-19. Changes in pharmacy policies, fluctuations in vaccine availability, and the emergence of novel variants may modify the findings. Additionally, as our understanding of the virus and its consequences progresses, this enhanced knowledge may influence mental health outcomes.

Future studies should investigate the long-term implications of disruptions in access to prescription drugs on psychological well-being post-COVID-19. A prolonged study of this relationship, especially in the aftermath of the pandemic, will provide a setting for an advanced understanding of this phenomenon.

5. Conclusion

The COVID-19 pandemic influenced the relationship between access to prescription drugs and mental health. This study evaluated the psychological effects of delayed and unmet access to prescription drugs, examining various anxiety-related issues, such as anxiety, inability to stop or control worrying, worrying too much, trouble relaxing, trouble sitting still, being annoyed or irritable, and fear of future events. Pre-pandemic, delayed and unmet access to prescription drugs were either not associated with anxiety-related issues or, in certain instances, were associated with anxiety-related issues but no different than during the pandemic. There was a significant relationship between delayed and unmet access to prescription drugs and increases in anxiety-related issues during the pandemic in ways not found pre-pandemic. This relationship underpins the importance of interventions that move beyond traditional pharmacy systems, integrating mental health diagnosis and care within pharmacy platforms.

The content of these results may inform pharmacists and policy-makers managing public health systems. Systems should be forwarded to safeguard the uninterrupted accessibility of prescription drugs, even during crises, and provide integrated mental health interventions when this is not possible. Telepharmacy services and public awareness campaigns may offer means to limit anxiety-related issues. The importance of these findings extends beyond the proximate concerns of people experiencing anxiety-related issues. It resides within the wider discussion on psychological health and the general responsibility of public health systems.

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Nicholas Lassi: Methodology, Investigation, Formal analysis, Data curation, Conceptualization, Writing – review & editing, Writing – original draft.

Declaration of Competing Interest

The author has no competing interests that could influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.rcsop.2024.100411.

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