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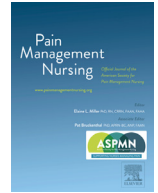
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Original Article

A Brief Survey of the COVID-19 Pandemic's Impact on the Chronic Pain Experience

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ABSTRACT

Background: The COVID-19 pandemic has forced sweeping social and behavioral changes that have adversely affected the general population. Many changes, such as business closures, working from home, increased psychological distress, and delayed access to health care, could have unique adverse effects on patients diagnosed with chronic pain (CP). The present study sought to examine perceived changes in the CP experience brought about by the COVID-19 pandemic.

Design: Participants included 487 self-reported patients with musculoskeletal, neuropathic, or postsurgical pain recruited using CloudResearch. A 53-item survey was created to assess changes in perceived pain, mood, control over pain, physical activity, employment, and medical access since the onset of the pandemic.

Results: Results suggested a worsening of the pain experience, particularly for women, with greater pain, negative affect, sedentary functioning, perceived decline in treatment quality, and increased treatment delays. Of note, pandemic-related declines in control over pain, which represents an important clinical target, are associated with other pandemic-related declines and also mediates relevant associations.

Conclusions: For frontline treatment providers, particularly primary care nurses and physicians, these findings may be relevant in order to reduce the likelihood of a worsening of symptoms, loss of self-efficacy regarding management of pain and/or potential maladaptive increase in the use of pain medications.

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The COVID-19 pandemic has forced sweeping social and behavioral changes that have adversely affected significant aspects of functioning for the general population. Many of these changes, including business closures, transition to working from home, increased rates of psychological distress (Xiong et al., 2020), and delayed access to health care (e.g., Shanthanna et al., 2020), could have unique adverse effects on patients diagnosed with chronic pain (CP).

There is robust literature on the multifaceted nature of the CP experience (International Association for the Study of Pain, 2020) and current pain management research suggests that multidisciplinary or interdisciplinary treatment approaches offer the best overall outcomes, with such treatments often targeting physical activity, coping and psychological well-being, and adequate social support within a collaborative medical environment (Gatchel et al.,

2014). However, any of these functional aspects could be negatively affected by the pandemic.

The present study sought to examine perceived changes in the overall CP experience brought about by the COVID-19 pandemic. In particular it was anticipated that physical activity would be limited as businesses closed and opportunities outside of the home, including employment, would decrease. Furthermore, it was expected that pain and well-being would be adversely impacted and that the perceived ability to cope or manage pain would be reduced, as the pandemic has been associated with an overall increase in anxiety and a decrease in well-being in the general population (Xiong et al., 2020). Given the importance of patient coping in the self-management of CP (Gatchel et al., 2014), we also anticipated that perceived declines in coping with pain would mediate many of the associations between pandemic-related pain and mood, worry, treatment delay, and physical activity. Finally, consistent with other literature (Shanthanna et al., 2020), we also expected to see perceived delays in pain treatments.

Given the important multidimensional nature of CP, this article was intended to provide both a brief overview of key factors

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associated with CP and the potential impact of the COVID-19 pandemic on the pain experience. This may be particularly salient for primary care nurses and physicians, as well as health care specialists, who are often the first point of contact for CP patients (Mills et al., 2016). Thus, they may be best situated to address pandemic-related changes in a patient's functioning.

This article has been divided into four general topic areas and an integration section, all of which cover important psychosocial elements that are key in the etiology and treatment of CP. Each individual topic area includes a summary from the present survey.

Methods

Participants

Data for the present study were collected using CloudResearch. An informed consent statement was provided prior to survey participation. Participants were targeted for the study if they had self-identified as having CP.

Initially, 1,283 participants accessed the study. However, 549 did not endorse a diagnosis of CP and thus were excluded from analysis. Additionally, 204 participants endorsed chronic headache pain, five reported cancer-related pain, and two did not respond to the question about type of pain. Given that the classifications, target outcomes, modalities, and general pain experience and its sequelae may be different for headache (e.g., frequency reduction, forms of biofeedback; Eccleston et al., 2009; Lee et al., 2019) and cancer pain (Caraceni & Shkodra, 2019) as opposed to musculoskeletal pain, headache and cancer pain were not included in the analyses to minimize potential experiential confounds. An additional 36 participants were excluded due to incomplete or potentially invalid responses. In total, 487 self-reported patients with a diagnosis of CP over the age of 18 residing in the United States were recruited for the final analyses.

Eligible participants endorsed a diagnosis of either musculoskeletal or visceral (73.1%), neuropathic (22.2%), or postsurgical (4.7%) CP. Of the 487 respondents, 66.9% identified as female, and 0.8% identified as nonbinary or other. In terms of ethnicity, 88.1% identified as White, 4.7% identified as Black or African-American, 2.9% identified as non-White Hispanic or Latino, 1.6% as Asian, 0.8% as American-Indian or Alaskan Native, 0.2% as Middle Eastern, North African or Arab, and 1.6% identified as other.

In the present sample, 11.3% reported that their employment had been impacted by pandemic-related job loss, 17.2% reported shifting to working at home, and 15.6% reported no change in status. Additionally, 50.3% reported being unemployed before and during the pandemic. No significant gender differences were found between those whose employment circumstances did or did not change.

Of the 487 respondents, 475 reported their age with a mean of 52.43 years and a standard deviation of 13.83. As only adults over the age of 18 were included, the range of age scores was 19 to 88 years. Finally, of 483 responses, 19.3% of respondents reported living alone (of that, men = 18.3%; women = 81.7%), 34.4% reported living with a spouse or partner (men = 32.5%; women = 67.5%), 29.0% reported living with a spouse or partner and children (men = 50.0%; women = 50.0%), and 8.3% reported living with children only (men = 20.0%; women = 80.0%). The remaining 9% of participants reported other living arrangements. Of 487 responses, 62.4% reported being involved in a romantic relationship.

Measures

A 53-item survey was created to tap into the multidimensional aspects of CP and the potential impact of the pandemic. In ad-

dition to general demographic items, aspects of the pain experience that were included in the survey were pain, mood, activity or functioning, coping, relationships, employment, medical care, and general functioning. Many survey items were derived from the West Haven-Yale Multidimensional Pain Inventory (WHYMPI; Kerns et al., 1985), such as "since the COVID-19 pandemic started, how much has your average pain level changed?" with potential responses ranging on a five-point scale from "notably less pain" to "notably more pain" and "since the COVID-19 pandemic started, how much change has there been in the amount of control you feel over your pain?" with potential responses ranging on a five-point scale from "notably less control" to "notably more control."

Literature Review and Findings

Pain severity/functional impact

Despite decades of work, there is still not a standard measure for pain severity (e.g. Bhardwaj & Yadav, 2015). Of the current measures, many rely on self-report of physical qualities of pain or ways in which pain has impacted patient's lives (e.g., WHYMPI). The more comprehensive measures of pain are often used more in research settings than clinical practice.

Pain severity as a construct, however measured, may be indicative of changes in pain interference or may reflect an increased risk for worsening symptoms of distress. Changes in pain severity seen in regular medical appointments during the COVID-19 pandemic could serve as a "red flag" for practitioners that an increased level of multidisciplinary care is needed.

Survey findings

Findings indicate that the pandemic has been associated with general worsening of self-reported change in average pain severity with 62.4% of patients reporting a little more or notably more pain and 5.3% reporting a little less or notably less change in average pain since the pandemic onset. Additionally, 33.3% reporting a little more or notably more pain medication use and only 6.6% reporting a little less or notably less pain medication use (9.5% reported not using pain medication). In terms of functional impact, 23.5% of patients reported that the pandemic was associated with pain significantly or moderately affecting their ability to work and 35.7% reporting that pain was slightly or somewhat affecting their ability to work (40.8% reported that pain was not affecting their ability to work since the pandemic onset). In terms of household work, 47.6% reported that since the pandemic, pain was associated with notably or a little less perceived ability to engage in household chores while 39.7% reporting no change. As would be expected, the pain and functioning variables were significantly correlated, as shown in Table 1.

Gender differences in pandemic-related changes in pain were assessed using Mann-Whitney *U* tests. Significant differences were found with women reporting a greater increase in pain $U(N_{\text{female}} = 326, N_{\text{male}} = 157) = 21144.00, z = -3.38, p < .001$ and greater increase in pain affecting the ability to do household chores $U(N_{\text{female}} = 326, N_{\text{male}} = 157) = 18314.50.00, z = -5.31, p < .001$ relative to men since the pandemic onset.

It is particularly noteworthy, especially given the present opioid crisis, that the majority of patients reported an increase in pain since the onset of the pandemic and that a significant minority are using more pain medication. From a gender perspective, it may not be surprising that since the onset of the pandemic, women report a greater increase in pain and a greater increase in pain affecting their ability to engage in household work relative to men. This may in part reflect pandemic-related workload increases such as for childcare or homeschooling which have been found to fall disproportionately on women (Savilla & Smith, 2020). Additionally, the

Table 1
Spearman Correlations (*rs*): Perceived Pandemic Related Changes in Salient Pain Variables

	Increased Use of Pain Medications	Pain Affecting Ability to Work	Pain Affecting Household Chores
Average pain increase	.48 ^a	.30 ^a	.37 ^a
Increased use of pain medication		.25 ^a	.20 ^a
Pain affecting ability to work			.33 ^a

^a <.001

pandemic has also resulted in an overall increase in the amount of housework potentially due to people spending more time at home (Hudde et al., 2021). Although improving, this may also reflect the greater burden that women generally carry in terms of household work (Altintas & Sullivan, 2016) and may suggest a unique challenge for women with CP during the pandemic.

Physical Activity/Pain Interference

The literature on physical activity or activity limitations and CP is complex. Perruchoud et al. (2014) in a review of the relevant literature concluded that the existing findings were quite variable. They further described that the overall results for patients with chronic back pain suggested a lower level of activity relative to healthy controls; however, the association was complex and somewhat inconsistent.

Despite a potential link between pain and decreased physical activity, from a treatment perspective, there is strong literature to support the potential role that increasing physical activity can play as a mechanism to reduce pain severity. For example, Geneen et al. (2017) in a review of Cochrane reviews found reductions in pain and improved physical functioning associated with exercise; however, some effect sizes were modest and overall sample sizes small. It is possible that the COVID-19 pandemic has limited the types of physical activities that patients with pain can engage in. Many exercise activities that are utilized by patients with pain involve use of water (pools), group classes, or specialized weight or stretching machines that may not be available/safe during the pandemic. Furthermore, pandemic-related closure of businesses and social distancing may further limit day to day activity.

An important variable, often used as a primary tool in the justification or rationale for insurance reimbursement or continued pain management, is pain-related interference. Pain interference has been defined as the extent to which pain negatively impacts engagement with physical, cognitive, emotional, and recreational activities, as well as sleep quality and overall life satisfaction (Miettinen et al., 2019). Pain interference is shown to be cross sectionally associated with physical activity, but pain-related interference mediates the association between pain severity and physical functioning in patients with pain (Karayannis et al., 2017). As the pandemic may limit the types of physical activities patients with pain typically engage in for pain management, there may be subsequent increases in pain-related interference in a reciprocal fashion.

Survey findings

The pandemic has the potential to significantly decrease physical activity due to business closures, a shift to working from home, and increased social distancing. Two hundred and fifty one respondents (51.5%) reported that the pandemic has created difficulties in mobility and activity. In terms of overall physical activity, 70.0% reported a little less or notably less physical activity since the onset of the pandemic with 18.9% reporting no change in physical activity. In evaluating day-to-day activity, 65.2% reported a little less or notably less activity since the pandemic onset with 21.2% reporting no change. As expected, 82.3% reported they were remaining at home more since the onset of the pandemic. In

terms of the pain experience, 46.2% reported that since the pandemic, decreased physical activity had moderately or significantly increased their pain while 49.5% reported that decreased activity had not changed their pain. Significant gender differences were found with women reporting a greater decrease in overall physical activity $U(N_{\text{female}} = 326, N_{\text{male}} = 157) = 18219.50, z = -5.41, p < .001$ and less reported day-to-day activity $U(N_{\text{female}} = 326, N_{\text{male}} = 157) = 17508.00, z = -5.91, p < .001$ relative to men since the onset of the pandemic.

Given pandemic-related shutdowns, it is not surprising that the majority of patients report decreased physical activity. As would be expected, the pandemic-related perceived decrease in overall physical activity was associated with both increased pain from lack of activity ($rs = .29, p < .001$) and with increased time at home ($rs = .28, p < .001$). Additionally, the greater decrease in physical activity reported by women may partially reflect pandemic-related changes in gender inequality in job losses (Dang & Nguyen, 2020). Similarly, increased time at home was associated with increased pain; thus, an important consideration for both patients and clinicians would be to potentially address ways to increase physical activities by providing patients with home-based activity or exercises. Moreover, providing psychoeducation on the relationship between decreased activity and pain may be clinically relevant.

Psychological Distress and Coping

There is robust literature that has established a link between CP and subsequent psychological distress including depression (IsHak et al., 2018). Moreover, there is evidence to suggest a reciprocal worsening of pain and depressive outcomes when the two conditions are comorbid for patients (IsHak et al., 2018).

A full review of the cause of psychological distress is beyond the scope of this paper; however, several factors are quite salient within the context of the pandemic (e.g., social support, pain-related cognitions). Prenevost & Reme (2017) describe the consistent relationship between couples functioning and psychological distress in pain samples. McKillop et al. (2017) found that poor social support was predictive of depressive symptoms in patients with pain at 1 year. COVID-19 may be an impetus to exacerbate an already existing discordant relationship for patients with pain who are in a dyad, thus worsening symptoms of distress, especially during stay at home orders. For those who are not cohabiting with a romantic partner, the change in supportive social interactions (either with friends/family or coworkers) brought about by the pandemic may serve to increase distress in patients with pain. Moreover, this may be exacerbated by changes in pain severity or potential decreases in physical activity and vice versa.

One's belief in and use of coping strategies plays a significant role in the pain experience. One's belief in their ability to adequately cope with their pain is an important consideration within the context of the pandemic, and adaptive strategies can have a profound effect on other aspects of pain such as pain, physical activity and functioning, depression, and anxiety (Miller-Matero et al., 2017). The pandemic may serve to prime patients with pain to feel helpless or establish a cognitive schema for loss of control over pain. In turn, this may increase psychological distress for patients with pain during this time.

Table 2
Spearman Correlations (*r*s): Perceived Pandemic Related Changes in salient Mood Variables

	Increase in Negative Mood	Increase in Worry About Pain	Increased Suffering Due to Pain
Loss of control over pain	.50 ^a	.42 ^a	.51 ^a
Increase in negative mood		.34 ^a	.32 ^a
Increase in worry about pain			.54 ^a

^a < .001.

Survey findings

Given the important component of mood in the overall CP experience, it is notable that 63.2% reported a moderate to significant increase in negative mood since the pandemic (27.3% reported no change in mood). Additionally, 51.9% reported a little more or notably more worry about their pain condition since the start of the pandemic (42.9% reported no change in worry about their pain condition).

In terms of overall life satisfaction and enjoyment, 53.9% reported that since the onset of the pandemic, their pain was associated with moderately or significantly less enjoyment with 38.3% reporting no change. Finally, in terms of overall suffering due to pain since the onset of the pandemic, 54.3% reported a little or notably more suffering with 39.3% reporting no change.

In terms of perceived coping, since the onset of the pandemic, 45.2% reported a little less or notably less perceived change in control over their pain with 43.7% reporting no change since the pandemic onset. Similarly, 52.5% reported a little less to notably less perceived change in control over their day-to-day problems with 34.6% reporting no change in perceived control. Associations between significant mood and control variables are shown in Table 2.

Significant differences were found with women reporting a greater increase in negative average mood $U(N_{\text{female}} = 326, N_{\text{male}} = 157) = 17797.50, z = -5.79, p < .001$, greater increase in suffering due to pain $U(N_{\text{female}} = 326, N_{\text{male}} = 157) = 22269.50, z = -2.44, p < .05$, and a decrease in perceived control over pain $U(N_{\text{female}} = 326, N_{\text{male}} = 157) = 19381.00, z = -4.61, p < .001$ relative to men since the pandemic onset.

Consistent with studies finding increases in depression and anxiety in the general population since the onset of the pandemic (Xiong et al., 2020), the majority of this sample reported increased negative mood, and a small majority reported increased worry about their pain condition. Furthermore, participants reported that their pain since the pandemic onset is associated with less life satisfaction and greater perceived suffering. Thus, their pain experience within the context of the pandemic may confer an additional risk factor affecting mood and anxiety beyond how the pandemic affects these variables in the general population.

In addition to an overall worsening of mood, almost half of the participants reported less control over their pain and day-to-day problems. Given the importance of health-related locus of control in pain management (Campbell et al., 2017), this is particularly relevant. Indeed, loss of control over pain associated with the pandemic accounted for 25% of the variance in the pandemic-related increase in negative mood, 18% of the variance in worry about pain, and 26% of the variance in perceived suffering due to pain. Thus, control over pain may be a particularly important clinical target during a pandemic. Once again, this may be an especially important clinical target for women given the gender differences found.

Medical Care

CP is one of the most common reasons for attending medical care in developed countries and places significant demands on the health service (Finley et al., 2018). Although the best way to main-

tain adequate management of one's pain experience involves regular follow-ups with one's health care provider, this may be increasingly difficult during the COVID-19 pandemic. At present, pain management health professionals are stuck between providing care as usual while limiting the spread of the virus through person-to-person contact (Cohen et al., 2020). It has been reported that during the time of the pandemic, patients with pain have been experiencing delays in care (Shanthanna et al., 2020) or a reluctance to seek care due to increased risk of virus exposure. This may result in worsening pain outcomes and adding to the already costly burden of the pain.

Survey findings

One hundred and sixty-seven (34.3%) respondents reported moderately or significantly delayed pain-related treatments due to the pandemic and 35.7% reporting slightly or somewhat delayed treatments due to the pandemic. In terms of perceived quality of care since the pandemic onset, 33.2% reported moderate to significantly worse perceived quality of care (59.8% reporting no change). No significant gender differences were found for either perceived delays in pain-related treatments or perceived quality of care.

Consistent with other studies, results showed a correlation of $r = .44, p < .001$ between pain-related treatment delays and perceived quality of care. Limited supply availability and difficulty in the health care system's ability to cope with COVID-19 likely contributed to these findings and highlights the need of the U.S. health care system to be more responsive to patient requirements during crises like the COVID-19 pandemic.

Integrative Considerations

As can be seen, the experience of CP is multifaceted. Indeed, the domains discussed interact as part of the comprehensive pain experience. Correlations between major aspects of each domain are presented in Table 3. Given the findings for the individual domains, it is not surprising that the associations between domains are significant and reflect an overall negative picture emerging from the pandemic. Additionally, it was anticipated that pandemic-related decreases in perceived ability to cope with pain might mediate the associations between increased pain and negative mood, worry about pain, treatment delay, and physical activity. Finally, given the significant gender differences found in pandemic-related changes in pain and negative mood, as well as the additional burden women often face in childcare and social support, gender differences in these domains were examined by living arrangements.

Control Over Pain

Given the importance of cognitive control as both a factor in pain and a target for treatment, it is notable that a pandemic-related decline in control over pain was positively associated with pandemic-related increases in average pain, negative mood, worry about pain, treatment delay, and decreased physical activity.

It was hypothesized that pandemic-related change in control over pain would mediate the relation between change in pain and mood, worry over pain, physical activity and perceived delays in treatment. Using PROCESS V3.4 model 4 (bootstrap 5000) for SPSS,

Table 3
Spearman Correlations (*r*s): Correlations Among Salient Variables Across Pain Related Domains

	Increase in Negative Mood	Increase in Worry About Pain	Loss of Control Over Pain	Delay in Pain Treatments	Decrease in Overall Physical Activity
Average pain increase	.31 ^a	.51 ^a	.44 ^a	.28 ^a	.35 ^a
Increase in negative mood		.34 ^a	.50 ^a	.28 ^a	.48 ^a
Increase in worry about pain			.42 ^a	.32 ^a	.28 ^a
Loss of control over pain				.35 ^a	.49 ^a
Delay in pain treatment					.23 ^a

^a < .001.

control over pain was found to fully mediate the association between increase in average pain and increase in negative mood (effect = 0.18; 95% confidence interval [CI], 0.12–0.25), but to only weakly mediate worry about pain (effect = 0.11; 95% CI, 0.06–0.17). Loss of control over pain partially mediated the association between increase in average pain and treatment delay (effect = 0.07; 95% CI, 0.05–0.10) and fully mediated the association between increased pain and decreased perceived quality of care (effect = 0.15; 95% CI, 0.09–0.21). Pandemic-related decline in control over pain was also found to partially mediate the association between increase in average pain and overall decline in physical activity (effect = .14; 95% CI, 0.09–0.19) and to fully mediate the association between increase in average pain and decrease in day-to-day activity (effect = 0.13; 95% CI, 0.08–0.18).

Given the gender differences in the individual domains, gender was examined as a potential moderator of the association between pandemic-related change in control over pain and change in pain. Gender differences were found to be significant in the association between perceived control over pain and average pain since the start of the pandemic with women displaying a stronger association ($r_{\text{men}} = .21$, $r_{\text{women}} = .53$, $p < .01$; $z = -3.83$, $p < .001$). A closer examination of gender and cognitive control over pain revealed significant differences between decreased cognitive control and increased worry over pain ($r_{\text{men}} = .19$, $r_{\text{women}} = .52$, $p < .05$; $z = -3.95$, $p < .001$); again, with women displaying a stronger association. No gender difference was found in the association between decreased cognitive control and increased negative mood. A small gender difference was found between cognitive control and physical activity with men showing a slightly larger association ($r_{\text{men}} = .55$, $r_{\text{women}} = .42$, $p < .001$; $z = 1.68$, $p < .05$).

Thus, the sense of pandemic-related loss of control over the pain experience may play a central role in the associations between the relevant pain-related domains. Findings suggest loss of perceived control over pain may be an important target in the cumulative experience of CP. Additionally, the more detrimental profile for women within both the individual domains and in associations across domains may be partially explained by gender differences in stress and coping. Zwicker and DeLongis (2010) provide an overview of the additional cognitive and emotional burdens for women across a variety of stressors. Thus, physicians may need to consider delivery of remote cognitive interventions to target perceived control over pain in the treatment for patients with CP during a pandemic.

Physical Activity

Undoubtedly, the COVID-19 pandemic has led to a shift to working and schooling from home for many individuals along with a general decline in activities such as shopping and social gatherings. Results from the present study show an inverse association between physical activity and negative mood, average pain, worry about pain, and perceived delay in treatment for patients with CP since the start of the pandemic. This is not surprising given that research has shown that regular physical activity improves mood

and decreases anxiety (Chan et al., 2019). The relationship between physical activity and perceived delay in pain treatments may stem from the fact that without the scheduled treatments taking place to help alleviate pain severity for patients with CP, patients may find themselves less able to engage in physical activity.

In terms of gender, a significant difference was found between the association of pandemic-related decline in physical activity and worry over pain ($r_{\text{men}} = .10$, $p > .05$, $r_{\text{women}} = .34$, $p < .001$; $z = -2.68$, $p < .005$) with women reporting a stronger association. No differences were found between decline in physical activity and increase in negative mood or delay in treatment.

Gender and Living Arrangement

With women reporting greater increases in pandemic-related pain and negative mood relative to men, we further examined these differences by living arrangement in order to better understand the role gender may play in pandemic-related changes. Included were participants reporting a living arrangements of living alone, living with a spouse or partner, living with a spouse or partner and children, and living only with children. The remaining 9% of participants who reported other living arrangements were not included in this analysis.

For each of the four living arrangements, an independent sample *t* test was conducted to assess whether pandemic-related change in pain and change in mood differed by gender. Results indicated pandemic-related changes in pain differed by gender for participants living with a spouse or partner, and participants living with a spouse or partner and children ($t[164] = -2.32$, $p < .05$; $t[138] = -2.40$, $p < .05$, respectively) with women reporting greater pain increases. For pandemic-related change in mood a similar pattern of gender differences were found. Women reported a greater increase in negative mood relative to men when living with a spouse or partner and living with a spouse or partner and children ($t[164] = -2.72$, $p < .01$; $t[138] = -4.97$, $p < .001$, respectively). No gender differences were found for pandemic-related changes in pain or mood for those living alone or with children only. Taken together, the results suggest that pandemic-related changes in the pain experience may adversely affect women relative to men if the living arrangement involves cohabitating with a spouse or partner with or without children. This may be the result of protective buffering in which women are less likely to assert their own needs to avoid conflict or shield themselves from stress in cohabitation situations. This phenomenon has been seen in other painful conditions such as cancer and post-MI (e.g., Perndorfer et al., 2019). Indeed, protective buffering is likely enhanced because couples may be in a state of “forced coexistence” during lockdowns resulting from the COVID pandemic. Thus, it may reflect the responsibility that women take on to abate the conditions that the pandemic has caused or may cause (Fodor et al., 2021).

The results of the impact of multidisciplinary consideration suggest that the pandemic-related pain experience is quite complicated, and treatments may need to be specifically tailored and that

women may be particularly vulnerable. Additionally with shifts to homeschooling, loss of social support, and social isolation, it is perhaps not surprising that a sense of loss of control, whether it be control over pain or control in life more generally, may play such an important role.

Limitations

Given the general aims of the study, there are several limitations that should be considered. First, the study participants were recruited from CloudResearch, which could bias the sample and limit demographic variability. Also, the study did not use validated assessment instruments. Many of the items were derived from the WHYMPI; however, the objective was to assess pandemic-related changes in the pain experience; thus, items were modified or new items created. The study did not gain an ethnically/racially diverse group of participants, and the impact of the pandemic on BIPOC individuals with CP needs to be addressed in future research. Finally, no data were collected on whether the participant or participants' loved ones contracted the virus, which could have affected survey responses.

Clinical Implications

This study sought to explore how perceptions of multidisciplinary aspects of the CP experience were affected by the COVID-19 pandemic. Overall, the results suggest a pandemic-related general worsening of the CP experience with a more detrimental impact to women, relative to men. Thus, as a result of COVID-19, patients may need additional resources and guidance.

For frontline treatment providers, particularly primary care nurses and physicians, these findings may be relevant to reduce the likelihood of a worsening of symptoms, loss of self-efficacy regarding management of pain or potential maladaptive increase in the use of pain medications. These providers are uniquely situated to assess and manage the behavioral and cognitive factors found in the present study to be associated with a worsening of CP symptoms. Interventions targeted at maintaining physical activity, stress and mood management, and cognitive strategies to develop a sense of internal control over pain may ease the pain-related impact of social, emotional, and behavioral changes brought about during a pandemic. In particular, given the mediational effects, resources on cognitive control over pain may be particularly relevant. Special care could be taken in assessment and treatment for female patients as they appear to be particularly at risk. Furthermore, developing and testing simple internet-delivered cognitive interventions targeting locus of control may be a useful avenue for additional study.

Declaration of Competing Interest

None.

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