COVID-19 Impact Survey

The Impact of COVID-19 on Interventional Pain Management Practices is Significant and Long-Lasting: An Interventional Pain Management Physician Survey

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Conflict of interest: Dr. Soin is the founder and CEO of Soin Neuroscience, which is developing a spinal cord stimulator to treat spinal pain and has a patent for Soin Neuroscience, Jan One, and Avanos and a patent-pending for Soin Therapeutics. Dr. Shah is a consultant for Masimo Corporation, Allergan Inc., and SPR Therapeutics. Dr. Hirsch is a consultant for Medtronic and Senior Affiliate Research Fellow at the Neiman Policy Institute. Each other author certifies that he or she, or a member of his or her immediate family, has no commercial association (i.e.,

Background: As with many others in the house of medicine, the COVID-19 pandemic has adversely impacted the practice of interventional pain management. This in part relates to various state health authority or medical board restrictions with reductions in patient volume for evaluations, follow-ups, and procedures. Of course, the pandemic continues to persist which is in turn leading to longer-lasting effects. Our previous survey was performed in March 2020. At that time, there was a national lockdown in the United States with COVID-19 disease qualifying as a pandemic by the World Health Organization (WHO). The pandemic caused by COVID-19 disease continues to have far-reaching implications on how we deliver routine care to patients and its effect on patient care, economic aspects, and health of interventional pain management providers.

Objective: To assess the current and expected future impact of the COVID-19 pandemic on interventional pain management practices in a physician survey. The study was performed based on performance in 2021 compared to the 2019 pre-COVID era.

Methods: The American Society of Interventional Pain Physicians (ASIPP) administered a 16-question survey to their members by contacting them via a commercially available online marketing company platform. The survey was completed on www.constantcontact.com.

Results: The results showed that 88% of the providers experienced a reduction in income and a similar number expect decreases over the next 12 months. A large proportion of respondents (73.3%) reported a reduction in revenue of 11%-25%. In contrast, another 21.5% reported a revenue decline of 26%-50%, and 29% reported 11%-25% increase in expenses. Overall, new patient volume decreased 11%-25% based on the response from almost 63%, whereas almost 9% reported a decline of 26%-50%. In contrast, established patient volume declined 1%-10% as reported by 64% of the respondents, compared to an 11%-25% decrease by a small proportion of 14%. All interventional procedures showed significant decreases across the board, with 69% of the respondents reporting a decline in-office procedures, 64% in ambulatory surgery center (ASC) procedures, and 57% in hospital outpatient department (HOPD) procedures, ranging from 11%-25%.

Limitations: The survey included a relatively small number of member physicians which could introduce sampling error. Consequently, it may not be generalizable for other specialties or even to pain medicine.

Conclusion: The COVID-19 pandemic has put interventional pain practices throughout the United States under considerable financial and psychological stress. This study seeks to quantify the extent of economic loss and other challenges resultant from the pandemic. Almost 99% reported a decrease in revenues in the last 12 months, with 86% reporting an expected reduction in the next 12 months and 49% reporting an increase in expenses. Declines have been reported in all sectors with new patients, office procedures, ASC, and HOPD procedures, except for established patient visits, which have shown minor declines compared to other domains. Understanding the

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issues facing interventional pain management physicians facilitates the development of strategies to actively manage provider practice/well-being, and to minimize risk to personnel to keep patients safe.

Key words: Interventional pain management, burnout, interventional pain physician, corona COVID-19, financial stress, anxiety, depression

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In March 2020, the World Health Organization (WHO) qualified the COVID-19 disease as a pandemic and the United States imposed a national lockdown with stoppage of elective surgical procedures (1). The nationwide lockdown and the continued repeated restrictions of the ongoing pandemic, caused by COVID-19 continue to have far reaching implications on how we deliver routine care to patients. Thus, the COVID-19 pandemic has disrupted interventional pain management practices by reducing patient volume for interventional techniques and new patients (2-4). In addition, practices have experienced reductions in revenues with continued risks of ongoing cuts in reimbursements, increased copays and deductibles, increased insurance premiums with medical policies reducing utilization patterns, along with escalating higher practice costs (5-21). Medicare fee-for-service (FFS) utilization patterns of interventional pain management services also indicates a 19% reduction from 2019 to 2020 (21). At this writing, the world is swept by another variant of COVID-19, Omicron, following the Delta variant (22-24).

The economic impact of COVID-19 on healthcare is also having substantial impact on the health of physicians and other members of the healthcare team with increasing stress and emotional exhaustion, impacting overall well-being leading to ever-increasing burnout (3,5,25-34). Interventional pain management practices have been particularly impacted, with diminution in revenue and significant increases in practice costs (2,4,5). Consequently, multiple guidelines have been developed to combat some of these issues and provide appropriate care to chronic pain patients (28,29).

Our initial survey of burnout among interventional pain physicians (5) showed significant impact on interventional pain management practices with 98% of the participating physicians affected by COVID-19 and 91% of these physicians experiencing adverse economic effects. In addition, 67% of the physicians responded that in-house billing was responsible for their increased level of burnout, whereas 78% reported that electronic medical records (EMRs) were one of the causes. Overall, 78% were very concerned. Almost all respondents have been affected with a reduction in interventional procedures. Further, 60% had a negative opinion about the future of the practices, whereas 66% were pessimistic about the entire healthcare industry. Of note, this survey (5) was performed during the midst of the COVID-19 pandemic with national shutdown.

As we moved into the second, third and now the fourth pandemic phase with multiple resurgences and new strains, the most recent being Omicron, there are new and worsening clinical problems for patients (22-24). The literature has been replete with increasing musculoskeletal disability associated with COVID and descriptions of a Post-Acute COVID-19 Syndrome (PACS) and issues related to long COVID (35). Further, musculoskeletal pain has been reported in one-third of patients with acute COVID-19 as part of the complex spectrum of a PACS (36), in addition to pulmonary, cardiovascular, hematological, renal, gastroenteric, dermatological, endocrine and neuropsychiatric sequelae (35). A Chinese study published in Lancet (37) showed that for some patients' recovery would take longer than one year. This should be considered when planning delivery of healthcare services post-pandemic. Symptoms such as persistent fatigue, breathlessness, brain fog and depression could debilitate millions globally. Long COVID is a modern extraordinary medical challenge of the first order (37-39).

This survey is designed to supplement the information obtained from the survey during the initial lockdown (5).

Methods

This study was an observational, prospective, and non-comparative study design. Considering the nature of the survey and the lack of disclosure of information, within the limits of the Health Insurance Portability and Accountability Act (HIPAA) and other regulations, Institutional Review Board (IRB) approval was not sought. Interventional pain physicians who were active members in good standing with the American Society of Interventional Pain Physicians (ASIPP) during the COVID-19 crisis, were recruited through registered email addresses. Emails introduced the study and provided a link to the survey via www.constantcontact.com.

Interventional pain management is a subspecialty of medicine defined by the National Uniform Claims Committee (NUCC) as, "the discipline of medicine devoted to the diagnosis and treatment of pain related disorders principally with the application of interventional techniques in managing subacute, chronic, persistent, and intractable pain, independently or in conjunction with other modalities of treatment" (40). Similarly, interventional techniques were defined by MedPAC as, "minimally invasive procedures including, percutaneous precision needle placement, with placement of drugs in targeted areas or ablation of targeted nerves; and some surgical techniques such as laser or endoscopic diskectomy, intrathecal infusion pumps and spinal cord stimulators, for the diagnosis and management of chronic, persistent or intractable pain" (41).

Measurements

In total, a 16-question survey (Appendix Table 1) was distributed via commercially available online marketing company platform – Constant Contact® — to 2,200 providers of ASIPP, with 496 of them looking at the survey. The total number of providers responding was 251, a 51% (n = 251/496) response rate. Survey responses were anonymized, tallied and reported in ratios (%). Some questions (Q1, Q13, Q14) allowed multiple answer selections, and partial answers (2 – 5 individuals) were included in the overall analysis.

Results

Two hundred and fifty-one provider responses were electronically submitted during the month of June 2020 on the ASIPP website. Of these, 43 responses were individual providers with a single practice and the remaining were from 62 groups with 207 providers, totaling 251 providers.

The study was performed based on performance in 2021 compared to 2019 pre-COVID era.

Overall Status of Economic and Personnel Impact

The results are shown in Table 1 and Fig. 1. Of the provider respondents, 72.5% reported a reduction in their staff with a 61% reduction of providers. Only 10.7% reported an increase in providers and 2% reported an increase in staff. Overall, 29% responded that expenditures were increased.

Impact on the Revenue

An overwhelming 98.8% reported decrease in revenue, whereas a substantial proportion of the respon-

Table 1. *Economic and personnel impact of COVID-19.*

Reduction in income	88% (221)
Reduced staff	72.5% (182)
Reduced providers	61% (154)
Increased expenditure	29% (73)
Increased providers	10.7% (27)
Increased staff	2% (5)
Moved to new employment	0.8% (2)

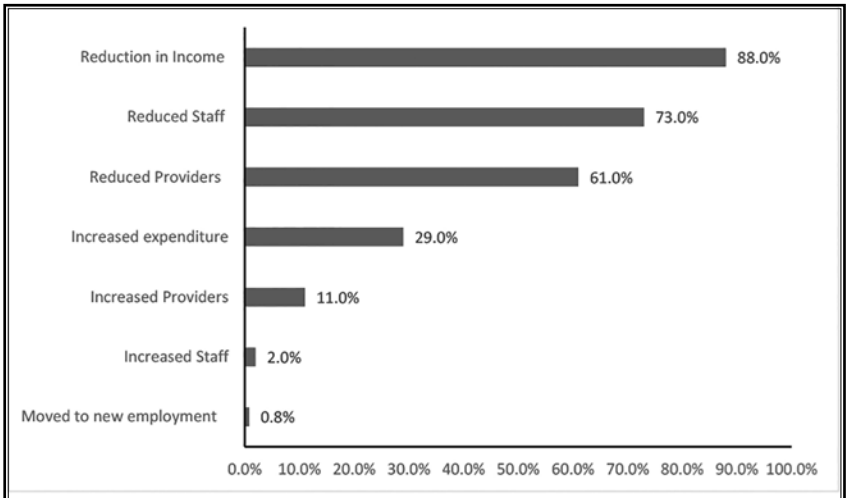

Fig. 1. *Economic and personnel impact of COVID-19.*

dents (73.3%) experienced a diminution of 11-25% with 21.5% reporting a revenue decline of 26-50%, as shown in Table 2 and Fig. 2.

Table 2. *Current and expected future economic impact of COVID-19 on interventional pain management practices.*

Revenue	Decreased Last 12 months	Expected Decrease Next 12 months	Increase In Expenses Last 12 months
1-10%	2% (5)	53.8% (135)	16.3% (41)
11-25%	73.3% (184)	21.9% (55)	29.1% (73)
26-50%	21.5% (54)	7.6% (19)	2.8% (7)
51-75%	1.6% (4)	0.4% (1)	0.8% (2)
76-100%	0.4% (1)	0.4% (1)	
No change	1.2% (3)	2.0% (5)	
NA	0%	13.9% (35)	51.0% (128)

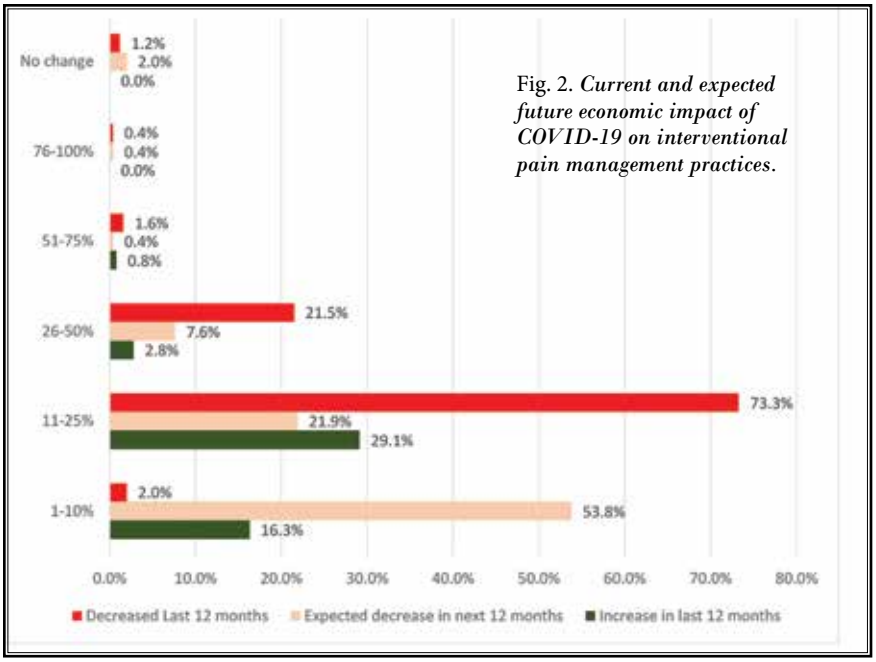

Fig. 2. *Current and expected future economic impact of COVID-19 on interventional pain management practices.*

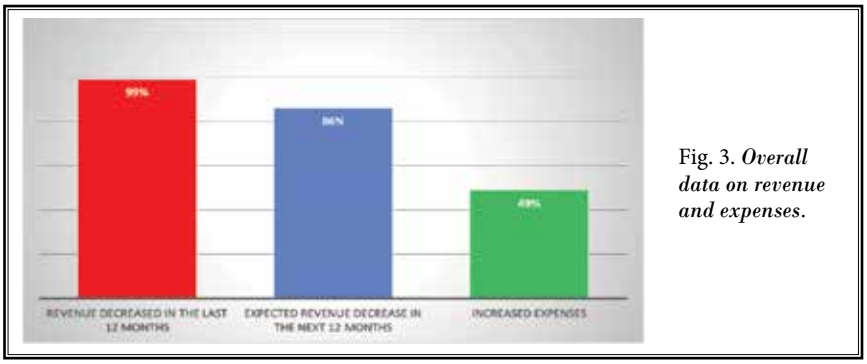

Fig. 3. *Overall data on revenue and expenses.*

In reference to expectations of a decrease in revenue over the next 12 months, 87% reported an expected diminution in revenue, ranging from 53.8% with 1-10% decrease, 21.9% expecting a decrease of 11-25%, and 7.6% expecting a decrease of 26-50%. The third part of this item was the experience of an increase in expenditures in the last 12 months. Only 49% reported on this item with 29% experiencing 11-25% increase in spending, whereas 16.3% experienced a 1-10% increase.

Over half of the providers were unsure about the increase in expenses or data was not available. Thus, 100% of those who answered expect increases in expenses. Thus, overall, the data is ominous with almost 99% reporting a decrease in revenue in the last 12 months, and 86% reporting an expected decrease reduction in revenue in the next 12 months and 49% reporting increases in expenses (Fig. 3).

Patient and Procedure Volume

In this domain, the number of new patients and established patients seen and the number of office procedures, ambulatory surgery center (ASC) procedures, and hospital procedures. These data are shown in Table 3 and Fig. 4.

A reduction in the number of new patients was reported by 77% with a significant proportion reporting a 11-25% reduction, and 8.76% reporting a 26-50% reduction. In reference to established patients, 16% reported an increase in volume, whereas 64.1% reported a reduction of 1-10%, and 13.9% reporting a reduction of 11-25%. In reference to office procedures, approximately 12% reported an increase in volume, whereas the remaining reported a decrease in volume with 5.1% reporting no change, 68.9% reported a 11.25% decrease, and smaller percentages were distributed in the other decrease patterns.

Table 3. *Impact of COVID on procedural and overall patient volume.*

	New Patients		Established Patients		Office Procedures		ASC Procedures		Hospital Outpatient Department Procedures	
	N	Percent	N	Percent	N	Percent	N	Percent		
0%	7	2.79%	7	2.79%	13	5.18%	33	13.15%	37	14.74%
Down 1-10%	4	1.59%	161	64.14%	13	5.18%	4	1.59%	3	1.20%
Down 11-25%	157	62.55%	35	13.94%	173	68.92%	160	63.75%	144	57.37%
Down 26-50%	22	8.76%	1	0.40%	14	5.58%	23	9.16%	5	1.99%
Down 51-75%	2	0.80%	7	2.79%	3	1.20%	2	0.80%	17	6.77%
Down 76-100%	1	0.40%			1	0.40%	1	0.40%	1	0.40%
NA	9	3.59%			6	2.39%	22	8.77%	39	15.54%
Up 1-10%	11	4.38%	6	2.39%	1	0.40%	3	1.20%	3	1.20%
Up 11-25%	28	11.16%	26	10.36%	27	10.76%	2	0.80%	1	0.40%
Up 26-50%	8	3.19%	8	3.19%			1	0.40%	1	0.40%
Up 51-75%	2	0.80%								

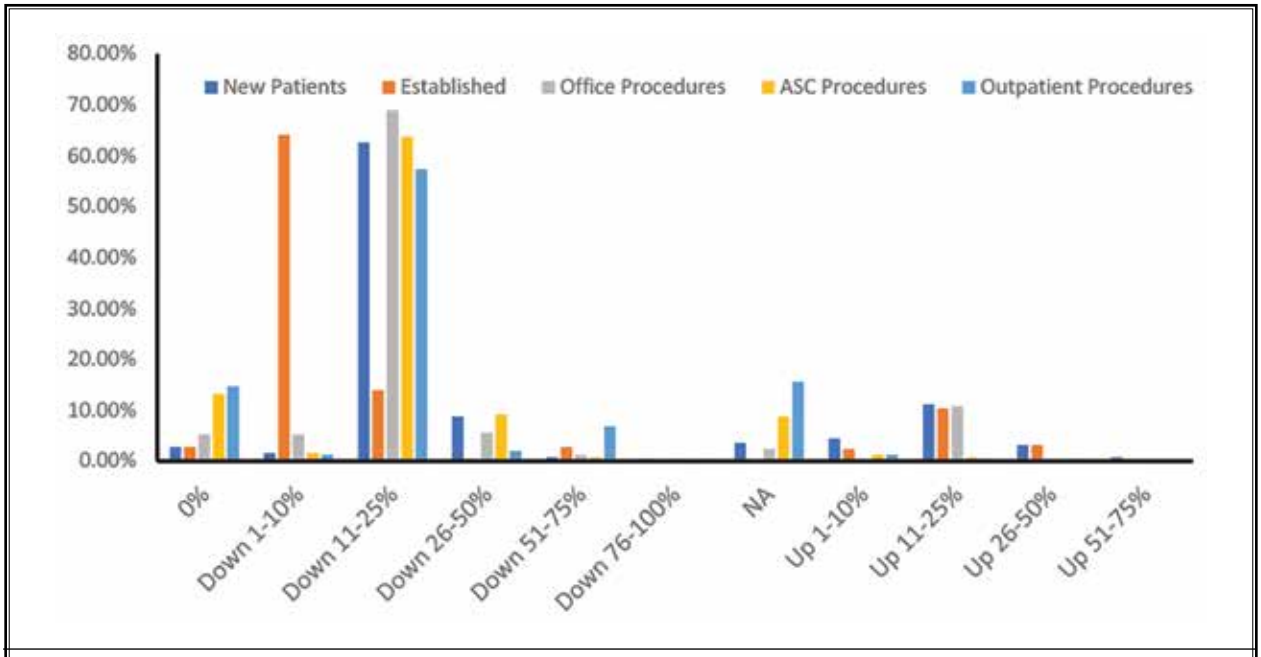

Fig. 4. *Impact of COVID on procedural and overall patient volume.*

With ASC procedure volumes, around 7% reported an increase in volume, 13.1% showed no change with 63.8% showing a decrease of 11-25% and 9.1% showing a decrease of 26-50%.

Hospital outpatient department (HOPD) procedures also showed similar patterns with approximately 15% showing no change and about 2% reporting increases. Overall, 57.4% reported decreases of 11-25%.

Telemedicine

An overwhelming proportion of respondents (87.5%) have used telemedicine during the past 12 months, whereas, 77% responded affirmatively and indicated that they are planning to continue using telemedicine. Sixty percent of providers reported that 11-25% of their visits were telemedicine. The data is shown in Table 4 and Fig. 5.

Table 4. *Impact of COVID-19 on the practice of telemedicine during the last 12 months.*

Telemedicine last 12 months	N	Percent
1-10%	20	7.97%
11-25%	151	60.16%
26-50%	18	7.17%
51-75%	20	7.97%
76-100%	10	3.98%
NO	32	12.75%
Planning to Continue		
Yes	194	77.29%
No	57	22.71%

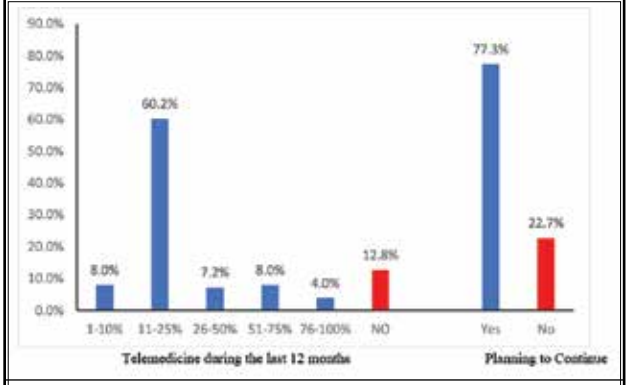

Fig. 5. *Impact of COVID-19 on the practice of telemedicine during the last 12 months.*

Table 5. *Participation of providers in the Paycheck Protection Program (PPP), HHS grants, and Medicare Advance payment loans.*

	Paycheck Protection Program	HHS Grants	Medicare Advance Payment loans
Yes	90.4% (227)	27.5% (69)	14% (35)
No	9.6% (24)	24.7% (62)	86% (216)
No response		47.8% (120)	

HHS Grants and Medicare Advance Payment Loans

As shown in Table 5 and Fig. 6, 90% of responders participated in the Paycheck Protection Program (PPP), whereas 27.5% received US Department of Health and Human Services (HHS) grants and 14% received Medicare advance payment loans. Forty-eight percent of the providers did not respond to this question.

Insurance Mix

The insurance mix showed a decrease in commercial insurance by 32.3% with an increase in Medicare and Medicaid composition by 27.5% and 18.7% of the respondents. A large proportion of the respondents, 67.9% for Medicare, 79.3% for Medicaid, 66.1% for commercial, and 86.8% for self-pay reported no change.

Staffing

A large proportion of respondents (63.7%) reported a decrease in staffing other than providers, whereas 10% reported an increase with 27% reporting no change.

Causes of Stress

As shown in Table 6 and Fig. 7, an overwhelming 82% of the respondents reported COVID-19 related practice restrictions as the major stressor, 82% practice expenses as major stressors, and EMR 19%. In-house billing was reduced to 11.6% as a cause of stressor, whereas outsourced billing was reduced to 5.6%.

A large proportion of respondents, 88%, reported difficulty hiring new staff, specifically 67% reporting difficulty with medical assistants, 60% front office and receptionists, and 64% reporting difficulty with RNs and 54% with midlevel providers.

Staff salaries have increased. Only 19% reported no change, whereas 76.5% reported salary increases with 4% reporting decreases in the salaries.

In addition, 67% of the respondents reported difficulty in retaining staff during the COVID-19 pandemic.

Discussion

This survey confirmed significant impact of COVID-19 on interventional pain management practices often with deleterious effects that appear long lasting. The survey was performed approximately 15 months after the WHO declared novel coronavirus (COVID-19) a pandemic which continues into 2022. ASIPP surveyed the general impact on interventional pain practices during April 2020, approximately 7 weeks after the WHO declared COVID-19 a pandemic, during active lockdowns and blockade of elective surgeries (5). The results of these temporally distinct surveys are similar (5) which is concerning for the long-term vitality of the field. The results suggest that certain challenges continue and will last into the future. 88% of respondents experienced reductions in income and a similar number expect decreases over the next 12 months (Table 1 and Fig. 1). A large proportion of respondents (73.3%) re-

ported a decrease in revenue of an 11% to 25% and another 21.5% reported a revenue decline of an 26% to 50%, with 29% reporting 11% to 25% increase in expenses, and approximately 3% reporting 26% to 50% increase in expenses (Table 2 and Fig. 2). Only 2% have shown a decline in revenues of 1% to 10%, whereas over 16% reported increasing expenses during the past 12 months. The data shows almost 99% of respondents reporting a revenue decrease in the last 12 months, with 86% reporting expected decreases in the next 12 months, and 49% reporting increases in expenses (Fig. 3).

Overall, new patient volume decreased 11% to 25% based on the response from almost 63%, whereas almost 9% reported a decline of 26% to 50% (Table 3 and Fig. 4). In contrast, established patient volume declined 1% to 10% as per the responses from the majority of 64%, whereas the 11% to 25% decrease was noted by 14% of the respondents. New patient volume was shown to increase in approximately 11% of the respondents from 11% to 25%, whereas smaller increases were seen in 4% of the respon-

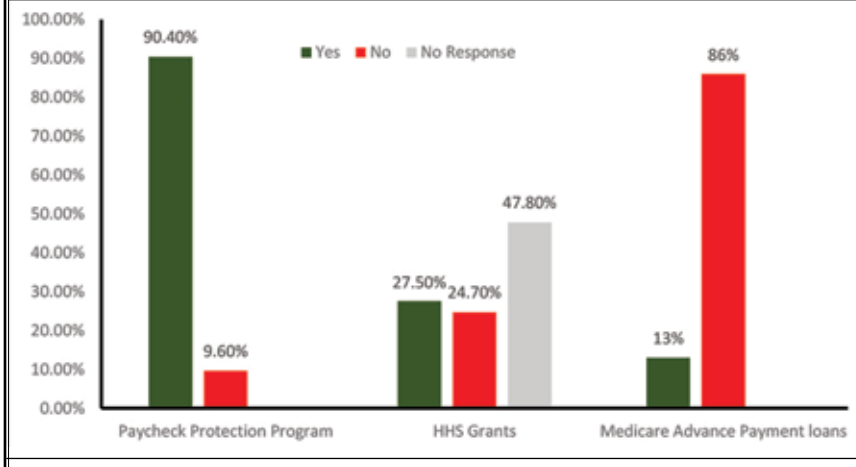

Fig. 6. *Participation of providers in Paycheck Protection Program (PPP), HHS grants, and Medicare Advance Payment loans.*

Table 6. *Causes of stress during COVID-19 pandemic.*

Causes	Percentage (n)
Difficulty hiring new staff	88.4% (222)
COVID19 related practice restrictions	83% (207)
Practice expenses	82% (206)
Increased staff salaries	76.5% (192)
Difficulty retaining staff	66.5% (161)
Electronic medical records	18.7% (47)
In- house billing	11.6% (29)
Outsourced billing	5.6% (14)
Audits	5.6% (14)

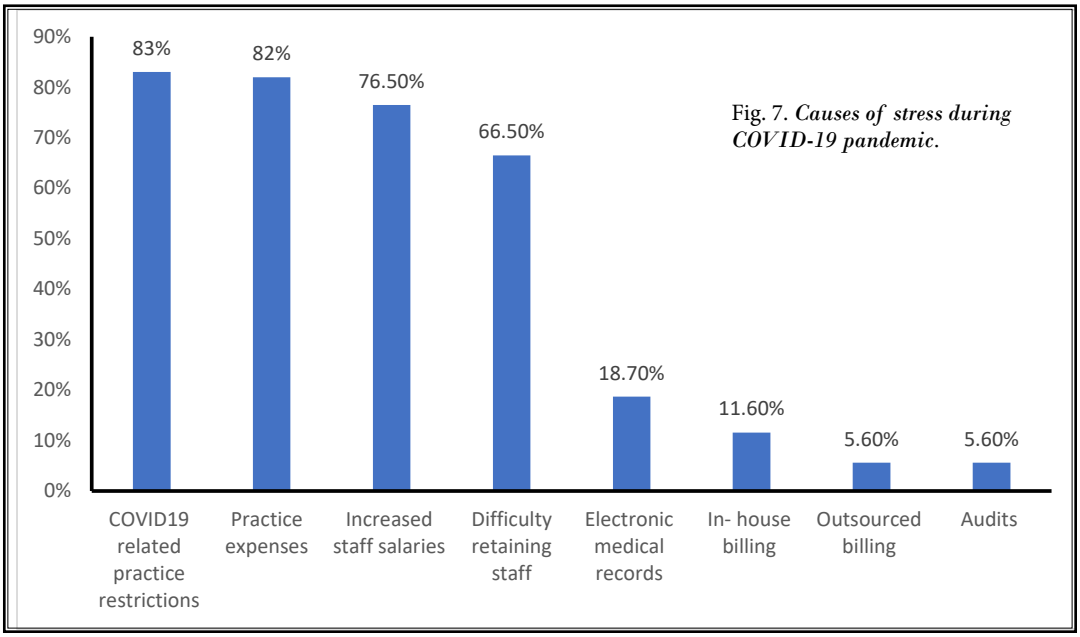

Fig. 7. *Causes of stress during COVID-19 pandemic.*

dents. For established patients, over 10% reported an 11% to 25% increases. All types of interventional procedures showed significant decreases across the board with 69% of respondents reporting a decline in office procedures, 64% in ASC procedures, and 57% in HOPD procedures ranging from 11% to 25%. A smaller number, about 6% for office procedures, 9% for ASC procedures, and 2% for HOPD procedures reported a 26% to 50% decline. Increases in procedure volume was reported in less than 5% of the respondents (Table 3 and Fig. 4). Utilization of telemedicine during the last 12 months was reported by 87.5% of the respondents with 60% reporting an 11% to 25% increase. Further, over 77% of the respondents plan to continue telemedicine during the next year (Table 4 and Fig. 5).

On the government support side during the past year, 90% of the respondents participated in PPP, with 27.5% receiving HHS grants and 14% receiving Medicare advance payment loans. However, the response rate was only 52% for this query (Table 5 and Fig. 6).

The data also showed that there has been a significant change in the insurance mix as reported in National Healthcare Spending Report (8,9) with a decrease in commercial insurance reported by 32% of the respondents with an increase in Medicare reported by approximately 28% of the respondents and approximately 19% of the respondents reporting an increase in Medicaid. However, a large proportion of the respondents reported no change. The survey results also showed approximately 64% of the respondents reporting a decrease in staffing other than the providers with only 10% reporting an increase and 27% reporting no change.

The study also evaluated multiple causes of stressors in interventional pain management practices. These are shown in Table 6 and Fig. 7. Over 88% of the interventional pain management practitioners had difficulty hiring new staff, 83% were stressed related to COVID-19 related practice restrictions, 82% were stressed due to increasing practice expenses, over 76% faced increased staff salaries, and almost 67% had difficulty retaining staff. Additional stressors included in-house billing by approximately 12% and outsourced billing by approximately 6% with EMRs dominating at approximately 19% as a stressor. In addition to these, approximately 6% of the respondents reported stress related to the increasing audits.

The results of this study are similar to that of the previous survey and also multiple other studies reported in general medical and surgical practices (2,5). We believe this study to be helpful in understanding the long-term implications of the COVID-19 pandemic which may become endemic in the coming years (37-39,42).

Cao and colleagues (42) studied 1,276 COVID-19 patients discharged from a hospital in Wuhan, China between January 7 and May 29, 2020. These patients were assessed at 6 and 12 months from the date they first experienced COVID-19 symptoms. Even though most of the symptoms resolved over time, regardless of the severity of illness, 49% of patients still had at least one symptom 12 months after their acute illness down from 68% at 6 months. Fatigue and muscle weakness were the most commonly reported symptoms seen in 52% of patients at 6 months and 20% at 12 months. Compared to men, women were 1.4 times more likely to report fatigue or muscle weakness. Further, patients treated with corticosteroids during the acute phase of COVID-19 were 1.5 times as likely to experience fatigue or muscle weakness after 12 months compared with those who had not received corticosteroids. While 88% of those who were employed prior to COVID-19 infection, only 76% returned to their pre-COVID level of work within 12 months. Among those who did not return to their original work, 32% cited decreased physical function, 25% were unwilling to do their previous job, and 18% were unemployed. In addition, more patients reported anxiety or depression at 12 months than 6 months (23% vs. 26%), and the proportion was much greater than in matched community-dwelling adults without COVID-19 (5%).

Essentially from the beginning of the COVID-19 pandemic, reports of persistent, unexplained, disabling symptoms in survivors, a syndrome that has been described as long COVID. The complex of fatigue, confusion, heart arrhythmias, gut disorders and other problems, which may persist months after an infection begins or arise months after it seems to have concluded, has attracted attention and sympathy, intense patient activism, substantial research interest and huge government investment (38) In fact, last December, the US Congress voted in $1.1 billion to fund 4 years of research into long COVID and this February, the US National Institutes of Health (NIH) announced it would use those funds to create a set of large studies examining adult and child experiences of the syndrome. A study of long COVID patients in France published in November in JAMA Internal Medicine and done by researchers at several universities and medical centers in France and Italy of over 26,000 patients about their experiences with COVID and long-lasting symptoms concluded that

further research in this area should consider underlying mechanisms that may not be specific to the COVID-19 virus (39).

In addition to the effects of the long COVID, other overriding factors include actual and potential reductions in fee schedules, medical policies with restrictions on coverage, increasing copays and deductibles, an increase in Medicare Advantage enrollment with extensive copays and inability of patients to afford interventional pain management procedures which increased to almost 30% of the Medicare population with increases in copays and deductibles. In addition, multiple precertification requirements, extensive enrollment in Medicaid and Medicare Advantage plans (8), ultimately lead to decreased coverage and/or marginal reimbursement. In addition, increasing expenditures, complex staff support, and inability to perform procedures due to hospital capacities, the inability to obtain personal protective equipment (PPE), and increasing costs in all fronts also continuously impact interventional pain management practices. These continue despite the ongoing opioid epidemic, which has exacerbated substantially, which may be described as a fourth wave resulting in part from rapid weaning process, decreased dosages, and ultimately restricting opioids for medically needed individuals (43). These failed policies continue to cost the economy more than $2.5 trillion between 2015 and 2018, including an estimated $700 billion to $1 trillion in 2018 alone representing 3.4% of the US gross domestic product (GDP) (44-46). COVID-19 affected the opioid epidemic leading to escalating overdoses due primarily to illicit fentanyl and its analogs (43,44). Over-prescription and overuse of opioids in patients in whom they were not indicated or effective was responsible for Wave 1 and Wave 2. Waves 3 and 4, due to easy availability of illicit drug that legitimate patients may have felt pushed towards as their prescription supply diminished or disappeared. It is important to note that while opioid prescribing in the United States initially quadrupled from 1999 to a peak in 2012 it has decreased 43% since then from 81 to 47 prescriptions per 100,000 persons in 2020 (43,44). However, despite the declining prescription numbers, overdose deaths have not declined, due to the increased use of heroin and illicit fentanyl.

With restricted access and payment policies specifically disrupting independent practices, independent practices are suffering, while hospital and corporate practices may be helped by other streams of revenues (47-49). A recent study showed consolidation of providers into health systems continues to increase with physician consolidation increasing from 40% to 50% in just 2 years (50).

Reports of national healthcare spending in 2020 show an increase of 9.7% to reach $4.1 trillion, a much faster rate than the 4.3% increase seen in 2019 (8,9). The acceleration in 2020 was due to a 36% increase in federal expenditures for healthcare that occurred largely in response to the COVID-19 pandemic. Further, during the same period, GDP declined 2.2%. Consequently, the proportion of the GDP devoted to healthcare spending increased reaching 19.7% from 17.7% in 2019. During the pandemic the number of uninsured people fell with significant shifts in types of coverage, with an increase in enrollment in Medicaid and a decline in commercial enrollment; however, health care expenditures by private businesses, state and local governments decreased 3.1%. In addition, total private health insurance enrollment declined by 0.8%, whereas Medicare enrollment growth also slowed with only a 2.1% increase compared to 2.6% in 2019. The deceleration was driven in part by increased mortality in the population age 65 and older on account of the pandemic COVID-19, with a disproportionate impact on Medicare beneficiaries. It is important to note those aged 65 and older constituted 14% of all COVID-19 cases, but 80% of all COVID-19 related deaths through the first half of 2021 (10,31). Of importance is that spending for physicians and clinical services slowed in 2020 with an increase of 0.5% compared to 8.9% in 2019, with a deceleration driven by decline in FFS expenditures (8,9).

Additional issues continue affecting interventional pain management. Ironically, this is occurring during a period of decline in overall utilization and expenditures of overall interventional techniques, except for spinal cord stimulation (51-61). There is a lack of telephone only coverage by many insurers, and now complete elimination of telephone only coverage, and limited tele-visit coverages. The recent final schedule of Medicare physician fees and HOPDs, as well as ASCs (47,48) showed a 9.75% cut for physicians and 6% cut for facilities which comes from the combined effect of different policies. Some of these cuts were averted (40,47-49).

A recent survey from the American Medical Association (AMA) of physician practices and financial impact showed 81% of physicians surveyed in July and August said revenue was still lower than pre-pandemic with an average drop in revenue of 32% (2). Twenty-two per-

cent reported a decrease of at least 75%, whereas only 22% reported decreases of less than 25%.

Interventional pain management physicians manage chronic pain patients in multiple settings with non-invasive interventional modalities, structured exercise program, physical medicine modalities, adjuvant drug therapy, and opioids (40,41,60,61). Lack of access to interventional techniques may result in increased levels of opioid usage, and drug abuse patterns (43). The literature is replete with adverse consequence of opioids, including deaths, which have been controlled in recent years (43-46). Further, this control may decelerate, once again succumbing to increases in opioid therapy, in addition to increased availability of the opioids on the street with illicit use of prescription drugs.

In fact, Medicare physician pay has increased only 11% from 2001 to 2020. Meanwhile, the cost of running a medical practice increased 39% during the same time period. Adjusting for inflation and the cost of running a practice, Medicare physician pay actually dropped 22% over a time period as shown in Fig. 8 (49). Ironically, Medicare payment to hospitals increased nearly 60% over the same time period. Consequently, many of the physicians are moving to hospital-based employment or corporate employment. Now, 85% of all physicians under the age of 40 are employees. While hospitals capitalize on this by making it simpler and paying physicians largely based on volume incentives, healthcare costs continue to skyrocket, often increasing substantial expenses, which has been illustrated in site of service differentials. Even then, physician payments are only approximately 20% of Medicare spending (8,9).

The present survey demonstrates that as COVID becomes endemic, it is essential to modify payment and practice patterns to cope with the present realities. In contrast, due to increasing health care costs (8,9), specifically related to the management of low back, neck pain and other painful conditions (60,61), multiple measures have been taken to reduce utilization by stricter requirements of medical necessity and indications, reducing the frequency of interventions and increasing restrictions with precertification requirements. Further, extensive copays and deductibles with managed care organizations, not only for employer sponsored insurers, but also Medicare and Medicaid are leading to lack of access and inability to perform and provide appropriate care on occasions. Instead of reducing access by such means, government and payers should be mindful of not only the health of the nation and access to health care, but also the health of the practices and maintaining a viable competitive system with survival of independent practices by realizing the

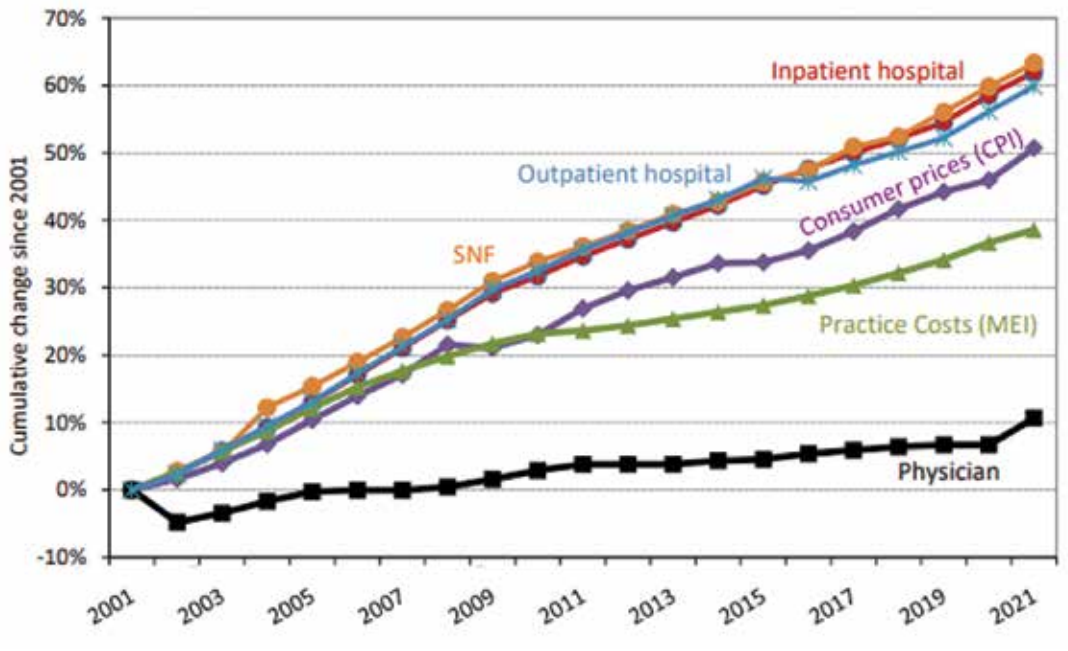

Fig. 8. *Medicare updates compared to inflation (2001-2021).*

savings by equalizing site-of-service differentials with some reductions for hospitals and increases to office-based practices with ASC payments as the basis (41).

Other measures include appropriate stress management as described previously (5). Limitations of this survey include a small sample size with a modest response among the providers, limited to only interventional pain management practices, and high variables provided to the respondents. Consequently, the conclusion may not be generalized to other specialties and may not represent the overall physician community, specifically those in underserved or rural areas. Advantages of this survey include that it is specific to interventional pain management practices with a 50% response among those who received the survey, and responses similar to a previous survey along with multiple other surveys in other specialties. Other limitations include that the survey is not a validated tool for assessing the impact or physician burnout. Further investigations may shed light on the prevailing issues.

Conclusion

The present survey shows the significant negative impact of COVID-19 on interventional pain management practices to be long lasting. Significant economic and personnel impact was demonstrated with 88% reporting reduction in income, 72.5% reporting reduction in staff, and 61% reporting reduction in providers. More concerning for the long-term viability of the specialty and our ability to care for chronic pain patients, is that almost 99% reported a decrease in revenues in the last 12 months, with 86% reporting an expected decrease in the next 12 months and 49% reporting increases in expenses. Reductions have been reported in all sectors with new patients, office procedures, ASC, and HOPD procedures, except for established patient visits, which have shown minor declines compared to other domains.

Author Contributions

The study was designed by LM, VP, AS, and JH. Statistical analysis was performed by VP. All authors contributed to preparation to the manuscript, reviewed, and approved the content with final version.

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Appendix available at www.painphysicianjournal.com

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Appendix 1. *Survey impact of COVID-19 on interventional pain management practices.*

Name: _____

City: _____ **State:** _____

Working status: ☐ Employed by a hospital or hospital-owned medical group
☐ Employed by a physician-owned medical group
☐ Practice owner or partner ☐ _____

Provider: ☐ MD/DO ☐ NP/PA ☐ Other staff

Completing the survey as: ☐ Individual ☐ Group

If group, how many MD\DO: _____ Midlevel: _____

1. Compared to 2019, have you done or experienced any of the following because of COVID-19? Check all that applies to you:

☐ Reduced providers ☐ Increased providers
☐ Reduced staff ☐ Increased staff
☐ Reduction in income ☐ Increased expenditure
☐ Moved to new employment ☐ Moved to employment from ownership
☐ _____ ☐ _____
☐ _____ ☐ _____

2. If you experienced a decrease in revenue in the last 12 months, by what percentage?

☐ 1-10% ☐ 11-25% ☐ 26-50% ☐ 51-75% ☐ 76-100% ☐ _____

3. If you expect a decrease in revenue in the next 12 months, by what percentage?

☐ 1-10% ☐ 11-25% ☐ 26-50% ☐ 51-75% ☐ 76-100% ☐ _____

4. If you experienced an increase in the expenditure in the last 12 months, by what percentage?

☐ 1-10% ☐ 11-25% ☐ 26-50% ☐ 51-75% ☐ 76-100% ☐ _____

5. Compared to 2019, your practice number of new patients seen up or down now compared to then?

☐ Down 1-10% ☐ Down 11-25% ☐ Down 26-50% ☐ Down 51-75% ☐ Down 76-100%
☐ 0% ☐ Up 1-10% ☐ Up 11-25% ☐ Up 26-50% ☐ Up 51-75% ☐ Up 76-100%

6. Compared to 2019, your practice number of established patient visits seen up or down now compared to then?

☐ Down 1-10% ☐ Down 11-25% ☐ Down 26-50% ☐ Down 51-75% ☐ Down 76-100%
☐ 0% ☐ Up 1-10% ☐ Up 11-25% ☐ Up 26-50% ☐ Up 51-75% ☐ Up 76-100%

7. Compared to 2019, your practice number of office procedure volumes seen up or down now compared to then?

☐ Down 1-10% ☐ Down 11-25% ☐ Down 26-50% ☐ Down 51-75% ☐ Down 76-100%
☐ 0% ☐ Up 1-10% ☐ Up 11-25% ☐ Up 26-50% ☐ Up 51-75% ☐ Up 76-100%

8. Compared to 2019, your practice number of ASC procedure volumes seen up or down now compared to then?

☐ Down 1-10% ☐ Down 11-25% ☐ Down 26-50% ☐ Down 51-75% ☐ Down 76-100%
☐ 0% ☐ Up 1-10% ☐ Up 11-25% ☐ Up 26-50% ☐ Up 51-75% ☐ Up 76-100%

9. Compared to 2019, your practice number of hospital procedure volumes seen up or down now compared to then?

☐ Down 1-10% ☐ Down 11-25% ☐ Down 26-50% ☐Down 51-75% ☐ Down 76-100%
☐ 0% ☐ Up 1-10% ☐ Up 11-25% ☐ Up 26-50% ☐Up 51-75% ☐ Up 76-100%

10. Did you use telemedicine during the last 12 months?

☐ No ☐ 1-10% ☐ 11-25% ☐ 26-50% ☐ 51-75% ☐ 76-100%

11. Are you planning to continue use telemedicine?

☐ Yes ☐ No ☐ _____

12. Did your practice receive Paycheck Protection Program **(PPP) support?**

☐ Yes ☐ No ☐ _____

13. Did your practice receive the HHS bonus?

☐ Yes ☐ No ☐ _____

14. Did your practice receive Medicare Advance Payment loans?

☐ Yes ☐ No ☐ _____

15. Insurance mix:

Medicare: ☐ Increase ☐ Decrease ☐ No change
Medicaid: ☐ Increase ☐ Decrease ☐ No change
Commercial: ☐ Increase ☐ Decrease ☐ No change
Self-pay: ☐ Increase ☐ Decrease ☐ No change

16. Number of staff other than the providers: ☐ Increase ☐ Decrease ☐ No change

17. What are the causes or stress, if any, COVID-19 related? Check all that applies to you.

☐ Practice expenses ☐COVID-19 related practice restrictions
☐ In-house billing ☐ Outsourced billing ☐ Electronic medical records.
☐ _____

18. Are you having difficulty hiring new staff?

☐ Yes ☐ No ☐ _____

If Yes, at what positions are difficult (check all that applies to you):

☐ Medical Assistants ☐ Receptionists ☐ Front Office ☐ Billing ☐Administration ☐RNs ☐ PA/NP

19. Have your salaries changed for new hires compared to pre-pandemic?

☐ Salaries increased ☐ Salaries decreased ☐ No change in salaries

20. Did you have difficulty retaining staff during the pandemic?

☐ Yes ☐ No ☐ _____