Descriptive Exploratory Study of Individuals' Use of Pulsed Electromagnetic Fields, the Micro-Pulse, for Pain Relief

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Pain has caused innumerable suffering to countless individuals and has impacted their lives in profound ways. There are many detrimental effects of pain including decreased ability to work, depression, isolation, increased pharmaceutical use, and addiction. Pain, on a worldwide scale, remains ineffectively treated and alternative solutions for managing pain are needed. Pain is conventionally treated with pharmaceuticals, primarily narcotics. Continuation of medications for these painful conditions often causes dependence and addiction. The pain and narcotics cycle contributes to the opioid epidemic. The cost in human lives is immense.

Pulsed Electromagnetic Field (PEMF) is a holistic modality used for various ailments. This exploratory descriptive research study focused on the experience of individuals using the Micro-Pulse, PEMF, for pain relief. The mind/body connection was a foundation of the holistic theoretical framework for this study. The theoretical grounding for this study was Watson's (2018) theory of human caring, which is based on a foundation of holistic healing incorporating mind, emotional body, physical body, and spirit for treatment of pain. Understanding an individual's experience of pain relief will potentially raise awareness and promote the exploration of holistic therapeutic approaches for patients in pain.

Introduction

Pain has caused innumerable suffering to countless individuals and has impacted their lives in profound ways. According to the American Academy of Pain Medicine Pain (AAPM, 2018), pain has more sufferers, over 100 million individuals per year, than other major diseases combined, including diabetes, heart disease, and cancer. The incidences of painful conditions are increasing, especially with an aging population and the rise in obesity. There are many detrimental effects of pain including decreased ability to work, depression, isolation, increased pharmaceutical use, and addiction. Worldwide, pain remains ineffectually treated and innovative solutions for managing pain are needed. Pain is conventionally treated with pharmaceuticals, primarily narcotics; continuation of these medications often leads to dependence and addiction. The cost in human lives cannot be estimated as this pain and narcotics cycle has contributed to the opioid epidemic.

The mind/body connection was a foundation of the holistic theoretical framework for this study. The theoretical grounding for this study was Watson's (2018) theory of human caring, which is based on a foundation of holistic healing incorporating mind, emotional body, physical body, and spirit for treatment of pain. Understanding an individual's experience of pain relief will potentially raise awareness and promote the exploration of holistic therapeutic approaches for patients in pain. PEMF is a holistic modality used for various ailments. This exploratory descriptive research study focused on the experience of individuals using PEMF, the Micro-Pulse, for pain relief.

Pain and pain relief were the phenomena of interest and focus for this research. Pain is one of the most serious health care burdens and is one of the most challenging symptoms of modern medicine. "Pain is a disease is usually characterized by specific signs and symptoms, and it is a response to environmental factors, ineffective agents, defects of the organism, or a combination of these

factors" (Raffaeli & Arnaudo, 2017, p. 2004). Pain is a concept and a symptom and types include chronic, subacute, and acute. Three primary facets of a disease are, "the presences of the impairment of normal functions, the presence of a specific symptomatology, and a distinct etiopathogenesis" (Raffaeli & Arnaudo, 2017, p. 2004). Pain is characterized as intermittent, intractable, lancinating, referred, burning, and dull pain. Anatomical terms include headache, back pain, neck pain, and all other types of bodily pain. In psychiatric/psychogenic terms, the description psychosomatic is frequently used.

Neuropathic and nociceptive pain are the mechanistic terms for various types of chronic pain. Chronic pain is one of the primary causes of disability worldwide can last for months, years, or even a lifetime. Chronic pain is categorized as pain that "lasts longer than the usual course of an acute injury or disease and continues for months or years" (AAPM, 2018). The mental, emotional, social, occupational, and economic consequences of pain are substantial.

The opioid epidemic is a nationwide calamity, resulting in the death of many Americans. "Socioeconomic factors, including education, employment, and income are potential contributors to the growing opioid crisis in the United States" (Meit, Heffernan, Tanenbaum, & Hoffmann, 2017, p. 1). "One causative factor is that the traditional treatment for pain is principally narcotics. In the United States, from 1999 to 2014, more than 165,000 persons died from overdoses correlated to opioid pain medication" (CDC, 2016). "Every year, an additional 1 in 10 people develops chronic pain" (Jackson et al.,2015, p. S10). "What starts as a valid reason to take these medications often leads to addiction, overdose, and death" (Meit et al., 2017, p. 18). The nurse researcher is located in the Appalachian mountains of North Carolina where "69 % of the overdose deaths in Appalachia, or 3,859 deaths, were caused by opioids" (Meit et al., 2017, p. 18). One of the most beneficial forms of electromagnetic therapy is PEMF (Markov, 2011). Over the past 70 years, PEMF exposure has been shown to reduce pain and inflammation in many conditions (Hubbard & Dennis, 2012). These electromagnetic modalities are often used in physiotherapy exercises to heal soft tissue injuries and alleviate pain. The recognition of the value of this modality to treat pain continues to increase in the medical community. This research study focused on PEMF, specifically the Micro-Pulse, for the treatment of pain.

Magnetic fields target pain in multiple ways. "One main hypothesis for application of EMF's for the treatment of disorders is that in any disease; the electrical or magnetic features of the involved cells, tissues, organs, or systems are disrupted and applying exogenous EMF's can balance them to a healthy state" (Yadollahpour & Rashidi, 2017, p. S76). The purpose of the study was to explore the experiences of individuals using the Micro-Pulse, for pain relief and the following research question guided this study: Tell me about your experience of using the Micro-Pulse for relief of your pain?

Patient experience with PEMF treatment for pain.

In summary, the research focused on patients' experience of treatment for pain with the Micro-Pulse. Clinical research has shown that PEMF can be used safely to reduce acute and chronic pain and decrease the need for pain medications. However, its acceptance in the medical community has been limited and it is one of the reasons there is a lack of quantitative and qualitative data related to the benefits of PEMF.

Interventions focusing solely on pharmacological approaches have often produced only short-term effects. "The Global Burden of Disease (GBD) study stated that musculoskeletal disorders were responsible for more than 120 million years lived with disability (YLDs) and account for more than 21% of the worldwide disability" (Vargas et al., 2018, p.e656). This necessitates the need for alternative solutions. Numerous physicians refer chronic pain sufferers to non-drug-based therapies and complementary and alternative medicine with a goal of reducing drug dependency and invasive procedures (Pawluk, 2003).

The findings from this dissertation study are a foundation for understanding the patient experience of treatment with the Micro-Pulse. The results from this study will add to current procedures and policies related to care and treatment of patients in pain. Eventually, this study could contribute to a practical method, supporting noninvasive, side effect free, non-addictive, affordable, pain relief options. To compensate for the catastrophic opioid epidemic, alternative modalities must be considered for patients in pain. Frequently a traditional allopathic approach to pain relief issues does not solve the problem. A more holistic approach to pain relief is needed by all healthcare professionals. According to Becker (1990), the new scientific revolution has shown that the whole of the body is more than the sum of its parts, that the ability of living things to heal themselves is far greater than the mechanists thought, and that electricity and magnetism are at the very basis of life. (p. 25).

Understanding and treating pain represents one of the most difficult challenges in the history of medicine. This research study addressed the gaps and weaknesses of prior research related to the patients' experience of pain treatment.

Descriptive studies.

The qualitative exploratory descriptive study was the method used for understanding the pain relief experience of the individuals in the study. Qualitative descriptive studies comprise a valuable methodologic approach. Findings from this study generated new knowledge beneficial for pain relief measures. There is a research gap of qualitative descriptive studies on the Micro-Pulse and PEMF for pain relief.

Nurses facilitating pain relief and promoting comfort is an integrative, holistic approach to nursing care. This descriptive exploratory study of individuals' use of the Micro-Pulse for pain relief contributed to the body of nursing knowledge for holistic modalities from a nursing perspective. Watson's (2018) theory of human caring was the theoretical framework for this qualitative exploratory descriptive study. The goal of this research was to highlight the patient perception and experience of seeking pain relief while contributing a deeper knowledge to solutions for the multifaceted opioid epidemic.

Methods

The results of the work are the experiences of 28 individuals who used the Micro-Pulse for pain relief. An exploratory descriptive design methodology was used to understand the phenomenon of participants' experiences of pursuing pain relief. This chapter begins with results and a description of the research process including organization of participant statements, data analysis, themes derived from participant responses, analysis of the themes, excerpts from the nurse researcher's journal, participants' noteworthy comments, output from MAXQDA (Appendix J from the original dissertation), demographics (Appendix K from the original dissertation), and a summary.

Demographics.

There were 12 women and 16 men included in this study. Ages ranged from 33 to 65. Twenty-one are college graduates, five attended college, and two are high school graduates. The longest duration of pain, 44 years, was a 52-year-old male who fell from a tree as a child. The shortest duration of pain experienced by a participant was two months. Of the painful conditions treated with the Micro-Pulse, 92% were chronic conditions lasting longer than 10 years. Eighteen participants had a primary care provider or physician managing their care and 10 participants had none.

MAXQDA.

Transcribed interviews were read and re-read and entered into MAXQDA and analyzed using a three-step method. “This qualitative data analysis software systematically organizes, evaluates, and interprets textual and multimedia data with numerous advanced features” (Creswell & Clark, 2018, p. 68). The three steps included:

1. Occurring and common narrative were color coded in MAXQDA.
2. Segment coding was categorized and color-coded. For example, pain relief was colored coded turquois blue and all statements related to pain relief were coded in turquoise.
3. The retrieved coded segments emerged into themes.

While analyzing the data in MAXQDA, the researcher discovered connections between the participant responses as themes emerged. One benefit of this type of design is while describing results, patterns and commonalities are discovered among the participants’ experiences. Descriptive research explores and explains a group situation (Creswell & Clark, 2018). Each narrative is followed by a table listing a summary of the descriptions and themes from participants’ interviews matching their descriptive statements (included in Chapter 4). Noteworthy quotes of the participants as selected by the researcher were separately highlighted. The participants’ identities were protected by assigning a number to each participant. To avoid researcher bias since the researcher could identify participants from the numbers, numerical codes were also color coded. Each participant was assigned their own color, totaling 28 colors.

The interview questions were designed to encourage the participants to share as much about their experience as they felt comfortable sharing. Questions one through three addressed the pain type, cause, location, duration treatment, and management. Questions three through seven focused on the use of the Micro-Pulse, including application, frequency, effectiveness, cost, numerical pain scale, comparison to other modalities, and medication use. Question eight focused on the impact of pain on life, work, and relationships. Question nine encouraged participants to share other concerns about their experience that may have not been covered in the previous questions.

Adaptive methods.

Descriptive research guided the development of the findings. Some participants had a chronic pain experience (n= 22), while some (n=6) experienced acute pain. There were numerous types of pain (and complaints) treated, including all types of back pain, migraines, dental pain, A-fibb, Alzheimer’s, carpal tunnel, hip, and coccyx pain. In addition, other types included sleep disturbances, degenerative disc disease, failed back surgery, sciatica, tail bone, sacral, post-surgery, plantar fasciitis, arthritis, foot and ankle, shoulder, bursitis tendonitis, multiple sclerosis, and complex regional pain syndrome (CRPS). Musculoskeletal pain was the most common type of unrelieved pain. The protocols and methods of application and duration of the Micro-Pulse varied among all participants. Each participant determined a schedule that worked for them, as they experimented with placement, rotation of coils, frequency, and treatment times.

One participant’s unique use of the Micro-Pulse was the application of the device to the jawline for tooth and jaw pain. After successfully using it for this type of pain, the participant applied it to the left eye with a goal of testing the Micro-Pulse for pain relief and improved vision. First the participant went to an ophthalmologist and had both eyes tested prior to Micro-Pulse treatment. Then, the Micro-Pulse was applied to the left eye for a month but omitted it from the right eye. Post treatment tests revealed that the left eye reverted to 20/20 vision and the right eye remained the same. A benefit of the Micro- Pulse’s healing capabilities for this participant was improved vision.

Results

Five themes emerged from participant statements and are the major finding of this study. These themes were related to seeking and finding pain relief: feeling hopeless, engaging in self-care,

finding pain relief, sharing the experience of pain relief, and modifying the use of pharmaceuticals. These themes and corresponding participant statements are detailed in the Appendices (Appendix L from the original dissertation). They are also included in participants' noteworthy statements (Appendix M from the original dissertation).

Theme 1: Feeling Hopeless.

Feeling hopeless, the first theme, emerged from participants' feelings of despair and sadness as their lack of pain relief caused hopelessness. Most had tried many modalities or medications with no lasting pain relief. The time, money, and energy invested in pain relief pursuits, with little success, left them feeling desperate and hopeless.

This theme is expressed in the following descriptive statements from participants. Participant #1 "We were at a point with my mom where we were ready to try anything. She was at the late stages of Alzheimer's."

Participant#11: "I could never get ahead. No matter what I did. It was an energy deficit."

Participant#15: "And after all the time of rest, rest, rest, you think it is going to get better, and it never gets better."

Participant#16: "So, I was desperate when I found the technology."

Participant#17: "If you talk to my daughter, her pain went on for 20 years. It was becoming debilitating and she was becoming desperate. My daughter had tried everything, I mean everything for her back pain."

Participant#19: "I said I'm all for anything at this point in time because the pain wasn't going away … One time I sat on my couch just crying in tears because the pain didn't go away."

Other participants, especially those who experienced chronic pain, voiced hopelessness and desperation.

Theme 2: Engaging in Self-Care.

This theme is expressed in the following descriptive statements from participants. Engaging in self-care is a strong theme derived as participants self-administered the Micro-Pulse, allowing them to be autonomous from the medical system. Devising their own treatment regimens that worked for them fostered empowerment and self-reliance and increased self-esteem. They were able to enjoy their lives again and bond with their loved ones. The ability to do things they could not previously do, like walking, climbing stairs, sports activities, and holding a child in their arms, was empowering for these participants.

Participant#2: "Within a week, she was able to start reading a newspaper again which she always liked to do. It helped her in the later part of her life, not be as confused. I know it worked."

Participant#3: "But ever since then, I've never had a migraine come to fruition because I've always been able to abort it with the device. I carry one for that. I sleep on it now."

Participant#4: "I don't know if it's just that, but I depend on those machines. Now, I feel like I'm normal for me and I didn't have that in a long time. If it comes back, I go to the machine; I'm more free and I can drive a car."

Participant#11: "I didn't find any help from Western medicine … I let it go for about four hours and

then I would amp it up to the medium setting and it was even more healing."

Participant#13: "I continued to wear it in the back area for a couple of months. I would wear it while I slept, too. So, I took it upon myself to do something for my pain."

Participant#17: "So now, if I twinge my back, I will use it prophylactically. I will use the Micro-Pulse on it, and it won't develop, it won't get bad." Participant #19,"I could do things I couldn't do before."

Theme 3: Finding Pain Relief.

Finding pain relief was a common experience for all the participants except one. All participants were amazed, comforted, and relieved when they finally experienced a reduction or complete loss of pain. This theme is expressed in the following descriptive statements from participants.

Participant#11: "I could feel something flowing in my body again in that area and it didn't hurt anymore."

Participant#13: "It was miraculous. In about a week, everything, calmed down and the nerves calmed down. I owned my life again. It was so exciting. It was like, 'Oh my God.'"

Participant#15: "With his coils, I came back around five months. It blew my mind. Another week of this, I'm guessing that it will be resolved. Pretty amazing."

Participant#17: "For my ankle, I tucked it in my sock for one whole day, while I worked. I bought an M-1 and it was wonderfully wearable and being able to work with it on was a major benefit. I remember waking up and noticing that there was no pain and I rotated my foot and there was greater range of motion and less swelling. I remember wondering if there would be pain when my foot hit the floor, but there wasn't. Not long after that, I walked on snow and I had walked up and down stairs normally. The pain never returned and, recently, I was babysitting my brothers 8-year-old granddaughter and she wants me to play tag or race her on foot with her on a bike and she also wants a head start, but what I noticed is that I found myself speed-walking and almost jogging, which I never did, even when I was younger."

Participant#18: "I cannot remember the last time I was in pain. I can't remember the last time I hesitated walking up or down stairs. And I am going to tell you, it never went back. I could not sit through church service and I could not sit in dining room chairs because of my back. That has not happened since I used this machine."

Theme 4: Sharing the Experience with other patients.

Many participants shared the experience of pain relief with others and encouraged a friend, family, or co-worker to use the Micro-Pulse. They cared about their loved ones and were generously lending the Micro-Pulse or buying one for friends or family. One participant created an app on his iPhone to educate other individuals in pain about the benefits of the Micro-Pulse. This theme is expressed in the following descriptive statements from participants.

Participant#1: "I have given them as gifts several times."

Participant#5: "I have such an epic for this. I'll tell friends who are having pain."

Participant #7, "I put the ICES on the lady this weekend while she was working, and put a rubber band around her wrist, and put the two electrodes on her wrist, and after two – or three hours, she said it was like 80% gone. She was feeling so much better."

Participant#9: "Then my wife broke her wrist. When she broke it, I immediately, knowing the pain relief I got, I used the one I had on her and I ordered another one from Bob. I've also referred two or three of my friends who had pain, and basically, they had the same experience."

Participant#11: "My wife used it on her eyes to help her vision."

Participant# 13: "His wife, had been in a car accident, broke her knee really bad. They had been using the machine for a year or so. So, he told me about it. I have told like seven or eight people about it who have all bought the device itself and it has been phenomenal."

Participant#14: "When I moved here, to Santé Fe, my land lady broke her knee and I gave it to her, and she wore it for a few days, and she had less pain. Just word of mouth from Australia."

Participant# 16: "This is what I tell people who don't really know about PEMF. In fact, my therapist he's been very fascinated by it. My mom has used it and she has seen benefits too. I gave her my old device and I bought the new one. She uses it on her knee."

Participant#18: "My sister, I was thinking for other people. I believe in it and want to give back."

Theme 5: Modifying the Use of Pharmaceuticals.

The theme of abandoning or reducing the use of pharmaceuticals was reflected in participants statements about their decreased dependency on drugs, including narcotics, after using the Micro-Pulse. After experiencing pain relief, many participants stopped taking all types of drugs, including alcohol. This theme is expressed in the following descriptive statements from participants.

Participant#3: "I don't think I've taken any Tylenol or any of that since I got it. It totally replaces any other pain meds for me."

Participant#4: "They prescribed hydrocodone and a muscle relaxer, which I kind of depended on. Then in research in trying to figure out how to get off these pills, I came across PEMF."

Participant#5: "He gave me a steroid shot that wore off, another steroid shot, that wore off, they said the next thing you are going to have to have is an epidural. I didn't want to do that. Then I remembered the Micro-Pulse, so I put that on my hip, and that's gone."

Participant#10: "They gave me OxyContin and OxyContin MR. One for them is a 24-hour pain reliever. Three hours post op, I put on a Micro-Pulse over the incision."

Participant#13: "I avoid drugs even over the counter as much as I possibly can since having it and being able to use it."

Participant#16: "I have used off and on hydrocodone. I've done things like that. I try to really stay away from any oral medication or pharmaceuticals because this has really been the most effective thing I could do."

Participant#21: "I had been pounding the Tylenol and ibuprofen pretty heavily when I got that. I have been able to back off to just once in a while."

Participant#16: "All the pain I've been drinking about every night - gin, rum, was trying dope, too, so I wouldn't have to feel the pain so bad. But all the pain after I got up off the end of that bed was gone. I went and didn't drink that night. But I no longer take anything for pain whatsoever."

This is a profound finding since long term use of narcotics often leads to addiction. One participant experienced pain continuously for over 20 years before she found the Micro-Pulse and stopped

taking all pain medications. Another participant stopped drinking alcohol and consuming narcotics, breaking a long-term addiction habit.

The only participant who did not experience pain relief, was suffering with CRPS. He called the inventor of the Micro-Pulse to discuss placement and frequency of the device. After implementing the recommended adjustments, he still had no relief and selected another holistic modality to use. He stated,“ It did not work for my pain. It didn’t holdup.”

“How has dealing with pain affected your life, work, and relationships?” was the final question and one of the most revealing. It allowed the participants to express their feelings about their journey from pain to reprieve. This theme is expressed in the following descriptive statements from participants.

Participant# 6: “It made me mean and very short tempered.”

Participant#12: “But if I didn’t do this… a lot of people depend on me. Again, I am so glad I have this.”

Participant#19: “I would take pain medication. That’s no good. The pain goes away for a little while, but you feel awful.” *Participant# 27:* “Oh gosh. It has definitely affected every part of my life. It has made work a struggle. You can’t explain it to somebody if they haven’t been through a chronic pain state. I use a little device on my neck in the mornings and at night. It is a challenge. It is an absolute challenge. I am divorced. I think that is a big part of my divorce.”

“I haven’t had to think about pain. I have friends who are still in pain. You don’t want to go out socially. You are kind of this outsider doing a different experience. It affects every part of your life and it is truly hard to explain that to someone.”

Impact of technology.

Several findings revealed by the participants related to the technology of the Micro-Pulse are significant. In approximately 12 of the participant cases, prolonged use of low power PEMF eliminated orthopedic pain (indicates tissue recovery and not pain blocking). Eight of the participants relieved their pain with lower intensity pulses and shorter duration of application. If the effects of the Micro-Pulse were an opioid-like effect, the dosage needed would increase with time, not decrease. If the Micro-Pulse helped participants significantly reduce orthopedic injury pain, and if they use it for at least two or three more weeks beyond the reduction of pain, then often their pain did not resume. This indicates that the Micro-Pulse initiates a regenerative cycle in injured tissues. This theme is expressed in the following descriptive statements from participants.

Participant#8: “The use of low power PEMF eliminated orthopedic pain. This indicates tissue recovery and not pain blocking.”

Participant#24: “I realized that lower intensity pulses and shorter duration of application worked the best.”

Summary of Results

Overall, most participants could not function well in their daily lives and spent a great deal of time taking medications, trying various modalities, keeping doctor’s appointments, and searching for solutions for their pain. Most participants learned about the Micro-Pulse by word of mouth, while others learned about it from their chiropractor, searching the Internet, or watching YouTube videos. Participants were amazed when they experienced pain relief and felt they were compelled to share their experience with others. Many bought the Micro-Pulse for family and friends or gave

their device away to loved ones while upgrading their Micro-Pulse purchase. Autonomy and disconnection from the healthcare system were very important to these individuals. The majority discontinued medications and reformed unhealthy lifestyle habits. One participant experienced pain continuously for over 20 years before she used the Micro-Pulse and then discontinued all medications. A man who had become, in his own words, “A drug addict and an alcoholic,” stopped drinking and taking drugs, breaking a long-term addiction, once he was pain free.

Discussion

This exploratory descriptive research study focused on the experiences of 28 individuals who were seeking pain relief. Participants used PEMF, the Micro-Pulse, for their painful conditions. This chapter is organized as follows: introduction; discussion of the findings; advancement of caring science; implications for nursing practice, nursing education, nursing policy, research; and conclusion.

Using the exploratory descriptive research method as a research tool enabled participants to freely express what was important to them, supported by the length of the interviews and the rich data generated from the process. Results from this Micro-Pulse study show that, except for one participant, all of the participants experienced pain relief.

The main results of this study emerged from the participants’ experiences. Findings indicate that the Micro-Pulse reduced pain for 27 out of 28 participants. Five emerging themes were feeling hopeless, engaging in self-care, finding pain relief, sharing the experience of pain relief, and modifying the use of pharmaceuticals. Participants had tried other complementary and alternative medicine (CAM) modalities and medications, with little to no avail. The participants could not function normally in their daily lives and spent a great deal of time taking medications, trying various modalities, seeing doctors, and searching for solutions to their pain. The lack of pain relief resulted in feelings of sadness, hopelessness, and despair as participants continued to live in pain. Although not all participants responded to the treatments in the same timeframes and treatment protocols varied, 99% of the participants experienced some pain relief or therapeutic outcome. As participants experienced pain relief, they felt empowered and compelled to share their experience with others. Many of the participants reduced or discontinued their use of pharmaceuticals.

Among the research studies conducted on PEMF and included in Chapter 2 in the literature review, vast differences between the protocols, devices used, frequencies, applications, and durations of treatments are evident. With so many variations, comparing results and formulating evidence-based conclusions was challenging. Even in the studies analyzed, differences in outcomes were impacted by the type of PEMF device, dosages, treatment protocols, and participants’ compliance.

For this Micro-Pulse study, the diverse ways the participants applied the Micro- Pulse had no impact on the efficacy of the treatments. Some conditions treated with the Micro-Pulse included arthritis, carpal tunnel, degenerative disc disease, dental issues, elbow pain, foot pain, and generalized muscle and musculoskeletal pain. Often the healing cycle was replicated when they used the Micro-Pulse for other complaints: Alzheimer’s, constipation, digestive problems, Huntington’s disease, hypermobility syndrome, incontinence, and sleep disturbances. One participant used the Micro-Pulse for his dental appointments to avoid Novocain injections.

The participant findings also related to the technology of the Micro-Pulse. Six participants expressed how the Micro-Pulse settings and duration of application impacted effectiveness. As one participant explained, High power PEMF may mostly work by pain signal blocking. Yet, low power daily PEMF did not for several reasons: It can take a while to get a pain relief effect. An opioid-like effect would be almost immediate, not requiring days or weeks and the effect tends to go on with improvements in function, such as joint mobility, range of motion, and muscle strength. These indicate tissue recovery; not pain blocking.

For approximately 12 of the participants, prolonged use of low power PEMF eliminated orthopedic pain, indicating tissue recovery rather than pain blocking. The use of low power PEMF took longer to have noticeable effects, but decreased the pain for days, weeks, months, or even years. Eight participants relieved their pain with lower intensity pulses and a shorter duration of applications. As one participant noted,

An interesting finding is if the effects of the Micro-Pulse were an opioid-like affect, the dosage needed would increase with time, not decrease." "If the Micro- Pulse helps to significantly reduce orthopedic pain, and if I use it for at least two or three more weeks beyond the reduction of pain, then approximately 80% of my pain does not resume.

This indicates that the Micro-Pulse begins the regenerative cycle in injured tissues. This is an important finding in that the continued use of the Micro-Pulse needs to be long enough for the healing process to complete. Some other commonalities among 92% of the participants were:

1. Participants were anxious for pain relief when they tried the Micro-Pulse.
2. Participants had previously used many other modalities but were still in pain.
3. After participants used the Micro-Pulse for one specific painful condition and experienced pain relief, they used the Micro-Pulse for other ailments, and these were not always related to pain.
4. Most participants did not believe in, nor did they want to use, medications.
5. All participants, except one, stated they had some kind of pain relief using the Micro-Pulse.
6. All participants, except one, stated they will continue to use the Micro-Pulse.

Conclusion

In summary, although relatively few studies have examined the efficacy of the Micro-Pulse, this research proposed this device may be highly effective for patients with all types of pain. The use of the exploratory descriptive design provided a framework to explore participant experiences. The current opioid epidemic is fueled, in part, by ineffective efforts to manage pain. Individuals' lives are impacted in unfortunate ways as they suffer unnecessarily with pain, creating a cycle of pain, narcotics, dependence, abuse, rapid deterioration, and death. Most primary care providers resort to medications and invasive interventions as a first line treatment. "As opioid prescriptions and use have 'skyrocketed' over the past 20 years, the striking increase has paralleled surges in opioid overdoses and treatment for dependence on prescription painkillers" (Reuben et al., 2015, p. 296). The opioid epidemic is a catastrophic crisis and drastic interventions are needed. In the United States, from 1999 to 2014, more than 165,000 persons died from overdoses correlated to opioid pain medication (CDC, 2016). The incursion of counterfeit pills, closely resembling oxycodone, Xanax, and Norco, has augmented fentanyl overdoses by individuals acquiring them on the illicit drug market (CDC, 2016). Fentanyl, a drug used for pain management, is responsible for many recent overdoses (CDC, 2016). In July 2016, the Drug Enforcement Administration delivered a nationwide report signifying that hundreds of thousands of counterfeit pills have been entering the U.S. drug market since 2014, some containing deadly amounts of fentanyl and fentanyl analogs (CDC, 2016). The CDC report disclosed that the most important recommendation was non-opioid therapy as the preferred treatment for chronic pain (Dowell, Haegerich, & Chou, 2016). Opioids should only be used when benefits for pain and function are expected to outweigh the risks (Dowell et al., 2016).

The successful use of the Micro-Pulse in lieu of surgical interventions or narcotics demonstrates that holistic modalities are a viable option for patients. In comparison to traditional allopathic interventions and medications, the Micro-Pulse, a caring/healing modality, is less invasive; has fewer side effects; promotes patient autonomy; decreases the risk of addiction, overdose, and death; and effectively relieves pain. Federal policies and future research are essential in areas of pain assessment, treatment, management, education, and funding.

Integration of the Micro-Pulse can improve safety and effectiveness of pain treatment, reducing risks of opioids and other drugs, and enabling individuals to live by design instead of default. Holistic approaches for pain management should be implemented more frequently as a first resort, not as a last one. Findings could afford an origin for theory development and offer insight into safer ways of treating pain.

Nurses are on the frontlines with college students and the first year of college is an opportune time to educate students, individually and in groups. By identifying students at risk for drug abuse, further educational resources and interventions could be provided, thereby decreasing adverse outcomes. A possible solution to the influx of drugs onto college campuses is to identify and support students at risk with early detection, education, interventions, and continued care. Influencing government policymakers to implement laws is the next step of this health policy recommendation.

The theory of human caring (Watson, 2018) served as a blueprint for this research and will continue to guide a career based in caring-healing: grow-seek-be-learn-become. This nurse researcher strives to become a Caritas™ © scholar, spreading the teachings of Watson and advancing caring science, especially now as the opioid epidemic is snowballing.

According to Rosa (2017), We are currently witnessing firsthand the widespread consequences of our individual and collective choices on the planet and beginning to see how the foundational premise of nursing - to preserve and protect human dignity in the promotion of good health and well-being - must now be expanded in order to create and sustain a more equitable and inclusive world. (preface).

As emphatically stated by Ki-Moon (2018) at the Center for Global Citizens, “We can only empower those in need, if each and every one of us acts with passion and compassion as a global citizen.”

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