

INTEGRATING ACUPUNCTURE INTO LONG TERM CARE AND REHAB CENTERS FOR OUR ELDERLY

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Abstract

Scientific evidence has established a connection between chronic pain, cognitive impairment and poor mobility among our elderly population. The current standard of care for treating pain and the symptoms of cognitive impairment is a combination of physical therapy (PT), occupational therapy (OT), speech therapy (ST) and medications including narcotics. These drugs can lead to further deterioration and an increased risk of falls and fractures creating an ongoing cycle of worsening pain and cognition with an accelerated progression to dementia.

PT, OT and ST offer a non-pharmacological approach to improve quality of life without imposing additional health risks. Acupuncture is another non-pharmacological therapy that offers many benefits, including pain relief, and works not only as a stand-alone treatment but also improves treatment outcomes when used as a complimentary modality. Long-term care facilities are structured to accommodate the inclusion of PT, OT and ST into daily care for residents. This same framework can accommodate the integration of acupuncture into the existing therapy regimen.

The goal of this project is to develop an educational presentation for healthcare providers working in skilled nursing and post-acute rehab centers that brings awareness to the issue and encourages a coordinated and collaborative effort to integrate acupuncture into the facility as a safe and effective way to reduce pain while also slowing the progression of cognitive impairment and mobility issues.

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Introduction

Our aging population is one of the most important developments of the twenty-first century¹. By 2050 approximately 1.5 billion people will be age 65 or older with the Oldest Old — defined as those aged 85 and up — representing the fastest growing portion of the World's population². It is anticipated that the Oldest Old will grow to 434 million by 2050 and 944 million by 2100³. The US Census Bureau's Population Projection states the number of Americans ages 65 and older will comprise 23 percent of the United States' total population by 2060. Learning to care for this portion of our population is one of the most pressing issues of the twenty-first century.

Providing adequate care for this demographic comes with numerous challenges. As our population shifts, we must also acknowledge the need for a shift in our current standards of geriatric care. When care falls short, unnecessary illness and medical costs result. Unmet needs in healthcare lead to frustration among patients and unnecessary burden for our already stressed healthcare workers.

Acupuncture has the ability to bridge many of the gaps in our current system yet it is vastly underutilized in the Long Term Care (LTC) and Acute Rehabilitation setting. As a healthcare worker providing acupuncture for the residents of two Skilled Nursing & Post-Acute Rehabilitation centers over the last six months I have seen how relevant and connected the issues of pain, cognitive impairment and poor mobility are among our elders. This paper

¹ Ilgaz & Gözüml, 2019

² Evans, Vihstadt, Westrom & Baldwin, 2015

³ van Rijckevorsel-Scheele, Willems, Roelofs, Koppelaar, Gobbens & Goumans, 2019

aims to highlight the current gaps in care and develop an educational presentation to facilitate the integration of acupuncture into daily practice at LTC facilities.

Method and Materials

A literature review was conducted by searching PubMed and PubMed Central using combinations of the following keywords: *Acupuncture, Elderly, Chronic Pain, Long Term Care Facility, Nursing Home, Adverse Events, Polypharmacy, Geriatric Care, Cognitive Impairment, Opiates, Opioids, Fall Risk, Dementia, Gait, Absorption and Drug Metabolism*. 120 articles were reviewed of which 79 were found to contain information relevant to this project.

Web based searches were conducted for statistics concerning demographics of our World's population, nursing homes and facts related to Alzheimer's disease and dementia.

Real-world experience and data were obtained through the implementation of an acupuncture program at two long term care facilities in the East Bay. One facility contained mostly convalescent residents while the other focused more on short-term rehabilitation. All residents approved to receive acupuncture were being treated for chronic low back pain, defined as pain lasting three or more months. The pain could not be the result of rheumatoid arthritis or fracture.

Aging

Aging is not a disease process. It is a loss of functional capacity and homeostatic mechanisms that increase our risk of injury and disease. As we age our musculoskeletal system exchanges muscle mass for fat leading to decreased strength, problems with balance and a propensity for falls. The loss of strength we experience can be as high as 33 percent after the age of 60⁴. In addition to the normal processes and loss of function that occur as we age, the number of elderly suffering with chronic disease is approximately 93.9 percent with an average of 4.2 comorbidities per elder⁵. As we continue caring for this population under our current standards of care, there is no reason to believe these numbers will decline.

Advances in modern medicine keep us alive longer. These advances combined with increasing rates of chronic disease have led to an increased need for long-term care (LTC). Concurrently, social and economic trends have led to an increase in the number of elderly who have little to no family support^{6,7}. This puts them in the precarious position of being unable to care for themselves while having no one to support and care for them at home.

The US Department of Health and Human Services estimates 70 percent of the current older population will need LTC. As of 2019, approximately 1.5 million people were living in nursing homes in the United States. This number will continually rise over the

⁴ Carpenter & Stern, 2010

⁵ Park, Park, Song, Sohn, & Kwon, 2017

⁶ Park, et al., 2017

⁷ Evans, et al., 2015

coming decades as our population ages. These residents suffer from many chronic and degenerative conditions. Two of the most common being chronic pain and dementia.

Chronic Pain

Among community dwelling elderly people, the prevalence of chronic pain is estimated to be as high as 50 percent^{8,9,10}. This number increases to 83 percent when evaluating residents of LTC facilities¹¹. Over 45 percent of them require the daily use of pain medication¹².

Poor pain management is a common problem among the elderly. Misconceptions that pain is to be expected as we age, combined with concerns about prescribing, contribute to this issue^{13,14,15}. This leads to major consequences for the elderly: poor mobility, increased risk of falls, cognitive impairment, depression, social isolation, and sleep disorders are all manifestations of persistent pain^{16,17}.

Despite our best efforts, complete elimination of pain is not a realistic expectation for this demographic. When treating pain in elderly patients the goal is to reduce the intensity,

⁸ Leong & Nuo, 2007

⁹ Zwakhelen, Koopmans, Geels, Berger, & Hamers, 2009

¹⁰ Barry, Parsons, Passmore & Hughes, 2016

¹¹ Won, Lapane, Vallow, Schein, Morris & Lipsitz, 2004

¹² Evans, et al. 2015

¹³ Ferrell, 1995

¹⁴ Ferrell, Ferrell & Rivera, 1995

¹⁵ Herr & Garand, 2001

¹⁶ Gallagher, Verma & Mossey, 2005

¹⁷ Giovannini, et al., 2021

frequency and duration of the pain to maximize quality of life and minimize the risk of side effects that come from many of the narcotics and analgesics used in treatment¹⁸.

Additionally, when working with elderly in LTC facilities, the main objective is to prevent further decline in a patient's health. Therefore, even small improvements in pain are considered valuable¹⁹.

Cognitive Impairment and Dementia

Dementia is one of the primary causes of disability among our elderly. It manifests as decreased function in learning, memory, language, executive function, complex attention, perceptual motor skills — such as hand-eye coordination — and social cognition. In 2018 approximately 50 million people were living with dementia worldwide, a number expected to grow by 9.9 million new cases each year. Medical costs associated with dementia reached 1 trillion US dollars in 2018 and is forecast to double by 2030²⁰. Recent data shows 51.3 percent of nursing home residents have Alzheimer's disease (AD) and an additional 24.8 percent have mild to moderate cognitive impairment²¹.

Mild cognitive impairment (MCI) is used to describe the transitional phase between normal function and dementia²². While some people with MCI may remain stable, or even return to normal, more than half will progress to dementia within 5 years²³. Alzheimer's

¹⁸ American Geriatrics Society, 2009

¹⁹ Evans, et al. 2015

²⁰ Ahn & Hyun, 2019

²¹ Michas, 2021

²² Zis, Daskalaki, Bountouni, Sykioti, Varrassi & Paladini, 2017

²³ Gauthier, et al., 2006

disease and vascular dementia are the most common forms accounting for 60-80 percent and 10-20 percent of cases respectively²⁴.

Dementia itself is not treatable but many medications are used to treat the symptoms resulting from dementia. These symptoms, commonly referred to as “behavioral and psychological symptoms of dementia” (BPSD) not only burden the patient but are difficult for health care workers to manage²⁵. These patients have difficulty articulating the symptoms they are experiencing which leads to frustration for patients and caregivers. The pharmacological treatments used for BPSD are frequently ineffective and can sometimes be dangerous.

Namenda (memantine HCl) and Aricept (donepezil) are currently the first line of treatment for symptoms of moderate to severe dementia. Namenda is an N-methyl-D-aspartate (NMDA) receptor antagonist used to decrease abnormal activity in the brain of Alzheimer’s patients. Studies have shown Namenda to be ineffective in patients with mild dementia and found it only produced a very small effect among those with moderate dementia. Commonly reported side effects include dizziness, confusion, headache, sleepiness, constipation, vomiting, pain (especially back pain) and coughing. More serious side effects are rare but include hallucination and shortness of breath²⁶.

Donepezil (Aricept), is a reversible inhibitor of acetylcholinesterase indicated for the symptomatic treatment of moderate dementia. Studies have found donepezil to be more

²⁴ Chen, Huang, Lin, Lee, Wu & Yen, 2021

²⁵ Trivedi, Goodman, Dickinson, Gage, McLaughlin, Manthorpe, Ashaye, & Iliffe, 2013

²⁶ Casciotti & Fox-Rawlings, 2022

effective than placebo but the improvements are modest²⁷. 73 percent of patients on a 24-week trial of donepezil experienced adverse drug events including agitation (25%), fatigue (15%), headache (14%), insomnia (13%) and confusion (12%) and 12 percent of patients were unable to continue due to cardiovascular events, agitation, nausea, vomiting, muscle cramps and urinary incontinence²⁸. Neither Namenda nor Aricept have been found to radically improve memory and thinking and they do nothing to stop the progression of dementia²⁹.

Antipsychotics continue to be the first choice of treatment for agitation and psychosis in dementia yet these drugs have minimal effect and are scientifically linked to increased mortality rates³⁰. Anti-anxiety medications, like benzodiazepines, are often used long-term thereby increasing the risk of adverse effects such as delirium, dependency and rebound anxiety. These medications are strongly associated with worsening cognition and increased falls³¹ and do nothing to slow the progression to dementia³². When combined with narcotics, the risk of adverse effects is even greater. Elderly patients are much more likely to have memory and psychomotor issues related to the interactions between opioids and

²⁷ Knowles, 2006

²⁸ Froelich, et al., 2004

²⁹ Casciotti & Fox-Rawlings, 2022

³⁰ Maust, et al. 2015

³¹ Defrancesco, Marksteiner, Fleischhacker & Blasko, 2015

³² Alzheimer's Association, 2018

benzodiazepines. The negative interactions caused by the concurrent use of opioids and psychotropic drugs increase an elder's risk of falling and fracturing a hip four-fold³³.

Approximately 50 percent of elderly people with dementia also suffer from chronic pain. Due to their impaired cognition, they often cannot communicate their pain and instead appear to have depression, boredom, anxiety, agitation, aggression or delirium³⁴.

Because the visible signs of pain have a tendency to manifest as psychological symptoms, these patients are often treated with sedatives and antipsychotics. Two-thirds of nursing home residents use psychoactive medications³⁵. Sedative treatments and antipsychotics have limited effects on pain while exposing the patients to potentially serious side effects, including falls. Avoiding inappropriate use of these drugs should be the first consideration when treating pain in dementia patients³⁶.

Not only do dementia patients have difficulty expressing their pain, the brain changes that occur during the progression of the disease effect the way both pain and analgesia are perceived. Vascular dementia (VaD) patients report significantly higher levels of pain than non-dementia patients. This is likely related to white matter lesions that affect the peripheral nervous system of these patients³⁷ creating symptoms of muscular contractions, spasms, loss of motor function and increased pain. Conversely, Alzheimer's patients experience an alteration in their response to analgesic drugs and placebo mechanisms. In AD,

³³ Cravello, et al. 2019

³⁴ Breland, Barrera, Snow, Sansgiry, Stanley, & Wilson, 2015

³⁵ Evans, et al. 2015

³⁶ Cravello, et al., 2019

³⁷ Jellinger, 2008

neuropathological changes occur in the prefrontal lobe which damage its connection to the rest of the brain. These changes alter the analgesic response that occurs and require higher dosages of pain medications to obtain the same effect that a lower dose would obtain in a non-dementia patient³⁸.

With no effective cure and only minimal success in the treatment of symptoms, prevention of dementia is an essential step for the management of our aging population³⁹.

The Connection Between Pain, Cognitive Impairment and Mobility

Two of the most important events of human evolution are upright bipedal walking and encephalization⁴⁰. As our ability to think and walk evolved together, it is easy to see how a decline in one results in a decline in the other. Disability tends to arise as we age and this is often due to simultaneous declines in our mobility and cognitive function. These two disorders occur together far more frequently than could be credited to chance. Epidemiological evidence also supports a strong association between cognition and movement. The two are so closely related that changes to our gait are used as a preclinical marker of disease⁴¹.

³⁸ Cravello, et al., 2019

³⁹ Yan, et al., 2019

⁴⁰ Lewin, 2003

⁴¹ Montero-Odasso, 2015

Pain and cognitive impairment occur together in many elders. This combination puts them at a higher risk for mobility decline as the presence of both pain and cognitive impairment have an additive association with poor mobility⁴².

Mobility limitation is associated with a rapid decline in function and quality of life and an increase in mortality. New research shows that interventions designed to improve cognitive function have beneficial effects on mobility. **Guidelines encouraging the use of medications that negatively impact mobility and cognition must be reevaluated to prioritize interventions, such as acupuncture, that treat pain and preserve mobility in our elderly⁴³.**

Our Current Standard of Care: Analgesics and Narcotics

Aging comes with a loss of homeostatic activity that effects many physiological processes such as absorption, metabolism, excretion and our overall response to drugs. These changes have huge impacts on pharmacokinetics and pharmacodynamics which make safe and effective pain management even more difficult when working with our elderly⁴⁴.

Geriatric pain is most commonly treated with non-steroidal anti-inflammatory drugs (NSAIDS), acetaminophen and narcotic analgesics such as opioids. NSAIDS are the top choice to provide effective and sustained relief for mild to moderate pain. While safer than many other pharmacologic options, they do come with a significant risk of adverse events for our elderly.

⁴² Schepker, et al. 2016

⁴³ Anton, et al., 2020

⁴⁴ Carpenter, et al., 2010

As we age, our bodies secrete less and less gastric bicarbonate which is necessary to neutralize hydrochloric acid in the stomach. The reduction in gastric bicarbonate — combined with decreased blood flow, decreased mucosal function and a delay in gastric emptying — impacts the body's ability to protect the stomach. These factors, which naturally occur in everyone as they age, increase the risk of gastritis, ulcer formation and GI bleeding — all of which are potential side effects of NSAIDS. These side effects can even occur among the younger and healthier portions of our population. The loss of stomach protection among the elderly makes the risk of developing GI bleeding more pronounced. NSAID related bleeding occurs not only in the stomach but also in the esophagus, duodenum and intestines⁴⁵. This risk is further heightened due to the high percentage of **elderly taking anti-platelet aggregators, such as aspirin and Plavix, and blood thinners, such as Warfarin and Eloquis, for stroke prevention.**

Once an NSAID is absorbed by the stomach, we rely on our kidneys to eliminate the drug from our system. Everyone experiences a decline in renal function with age. **This is a natural and expected decline in renal function that comes with aging but it is often referred to medically as Chronic Kidney Disease.** This is born from a combination of decreased renal blood flow, a decrease in functional mass plus a decrease in glomerular filtration rate and creatinine clearance. Each of these factors directly hinder drug elimination by the kidneys. As a result, the kidneys rely on a process called prostacyclin-mediated renal afferent arteriolar vasodilation to maintain glomerular blood flow. This same mechanism is impaired by NSAIDs causing a further decline in elimination of drugs by the kidneys. NSAIDS may

⁴⁵ Blanda, 2006

also cause papillary necrosis and interstitial nephritis. This natural decline, and drug induced impairment, of renal function often results in increased drug serum levels and toxicity⁴⁶. As NSAIDs are lipid soluble, they have a tendency to accumulate in the adipose tissue of those with extra fat. In the case of those who are malnourished and frail, the increased drug serum levels lead to an increased level of unbound/active drug in the blood⁴⁷.

Last, NSAIDS also inhibit common antihypertensive medications such as beta-blockers and ACE inhibitors. This can potentially lead to hyperkalemia, fluid retention, hypertension and heart failure⁴⁸. Considering 75 percent of adults ages 75 and older have hypertension⁴⁹, the likelihood of this interaction occurring is quite high.

Acetaminophen (APAP) is another commonly used analgesic for treating pain in our elderly. It is, in fact, the most commonly used analgesic in the world. Due to the physiological changes that occur with aging, comorbidities and potential interactions with other medications, acetaminophen metabolism may be reduced as much as 50 percent in this demographic⁵⁰.

Acetaminophen is a major cause of acute liver failure among the world's population. The impaired hepatic metabolism of our elderly puts them at a much higher risk of APAP toxicity. Furthermore, acetaminophen's analgesic capabilities come with a ceiling effect.

⁴⁶ Blanda, 2006

⁴⁷ Carpenter, et al., 2010

⁴⁸ Blanda, 2006

⁴⁹ Muntner, Carey, Gidding, Jones, Taler, Wright & Whelton, 2018

⁵⁰ Blanda, 2006

This means there is a maximum dose beyond which it has no additional analgesic effects. Therefore, its use in the treatment of moderate to severe pain is limited⁵¹.

From 1999 to 2004, COX2 inhibitors were increasingly used for the treatment of pain, especially among the elderly suffering with osteoarthritis related pain. Initially thought to be the pinnacle of analgesics due to its lack of GI toxicity (as seen with NSAIDs) and central nervous system toxicity (as seen with opiates), an increasing number of reports related to cardiovascular toxicity stemming from these drugs resulted in the decline of their popularity. By 2010, nearly 40 percent of patients previously being treated with COX2 inhibitors were instead being treated with narcotics such as opioids.

Opioid medications are some of the most effective and widely used treatments for pain. Unfortunately, the adverse effects associated with opioid use are well documented⁵². The most common side effects of narcotic analgesics are tolerance, dependence, sedation, delirium, GI disorders, adverse drug-drug interactions and respiratory depression⁵³. It has been proven that narcotic analgesics are associated with a higher risk of cardiovascular morbidity and mortality than both NSAIDs and COX2 inhibitors⁵⁴.

After the decline in use of COX2 inhibitors, American Heart Association guidelines began to encourage the use of narcotics for pain management in our elderly. As the rate of opioid prescribing increased from the early 2000's until 2016, the rate of opioid related

⁵¹ Karani & Meier, 2004

⁵² Benyamin, et al, 2008

⁵³ Cravello, et al. 2019

⁵⁴ Laine, et al., 2003

deaths in those aged 65 and older increased by 635 percent⁵⁵. These guidelines were issued without considering the morbidity and mortality of falls and fractures associated with narcotics. This omission is of particular importance considering 50 percent of patients 80 years and older experience at least 1 fall per year. 32 percent of these falls result in a severe injury such as a hip fracture. Half of older adults hospitalized with a fractured hip never regain their prior level of function⁵⁶.

Not only did opioid related deaths rise among our elderly during this period, there was also a corresponding rise in the percentage of patients suffering falls and fractures. Most of this increase could be directly linked to patients that were prescribed narcotic analgesics. Even after controlling for age and comorbidities, the prescribing of a narcotic analgesic remained the most significant risk factor⁵⁷.

Elderly patients taking narcotics are 3.3 times more likely to experience a fall and subsequent fracture than those who were prescribed COX2 inhibitors and 4.1 times more likely to experience a fall than those taking NSAIDs. Opioids are associated with an increased rate of falls due to the sedation and confusion they often cause in elderly patients⁵⁸. Once again, due to the age related decline in a body's ability to metabolize drugs, elderly patients are especially prone to opioid toxicity which leads to many health complications including falls.

⁵⁵ Gomes, Tadrous, Mamdani, Paterson & Juurlink, 2018

⁵⁶ Sterling O'Connor, & Bonadies, 2001

⁵⁷ Rolita, et al., 2013

⁵⁸ Marvin, Ward, Poots, Heard, Rajagopalan & Jubraj, 2017

Polypharmacy and Our Deteriorating Health

The World Health Organization defines polypharmacy as “the administration of multiple drugs concurrently or an excessive number of drugs.” While the qualifying number of drugs has not been defined, many health agencies have adopted five medications as the qualifying number for polypharmacy.

As we age, we tend to develop an increasing number of comorbidities. With each new comorbidity comes an increase in the number of medications we are prescribed. As this occurs with a simultaneous decline in our body’s ability to metabolize drugs, the risk of experiencing an adverse drug event rises⁵⁹. Not surprisingly, the increasing rate of polypharmacy in the U.S. parallels the rise in chronic disease. For our elderly, this has created a vicious cycle where the treatment of one chronic disease gives rise to additional comorbidities requiring further pharmaceutical treatment and so on. Polypharmacy is responsible for 177 billion dollars in health care costs annually⁶⁰. It is also associated with multiple geriatric syndromes and a reduced functional capacity among our elders⁶¹.

Adults over the age of 65 are the largest consumers of all prescription medications, including opioids and psychoactive drugs such as benzodiazepines⁶². Many health practitioners unknowingly worsen quality of life and medical outcomes by following guidelines and adjusting medications to reach intended healthcare goals. Common conditions afflicting our elderly such as kidney disease and heart failure unavoidably require

⁵⁹ Cravello, et al., 2019

⁶⁰ Resnick, Galik, Holtz, Holmes, Fix, Vigne, Zhu, & Lewis, 2018

⁶¹ Maher, et al, 2014

⁶² Kuo, Raji, Chen, Hasan, & Goodwin, 2016

the use of multiple long-term medications⁶³. This compounds the difficulties and risks of pharmaceutical treatment among our elderly population.

Polypharmacy in nursing homes has been a concerning issue for the last four decades. A data review found that “91 percent, 74 percent and 65 percent of nursing home residents take more than five, nine and ten medications, respectively”⁶⁴. The US Center for Medicare and Medicaid services implemented a quality indicator measure to focus on nursing home residents taking multiple medications. They found that close to 40 percent of LTC residents were taking more than 9 prescribed medications⁶⁵. Interestingly enough, adverse drug events (ADEs) have been found to occur in 40 percent of hospitalized elderly patients⁶⁶, and these numbers are twice as high among nursing home residents taking 9 or more medications⁶⁷.

Studies evaluating nursing home residents concluded 31 percent experience medication errors⁶⁸. This not only increases the risk of adverse drug events but causes an irreversible deterioration in overall health⁶⁹.

A 2009 study analyzed data from 453 patients comparing those who had not fallen with those who had fallen once and those who had fallen multiple times and found the number of medications was directly associated with an increased risk of falls⁷⁰. Additional

⁶³ Farrell, et al., 2014

⁶⁴ Jekanovic, Tan, Dooley, Kirkpatrick & Bell, 2015

⁶⁵ Dwyer, Han, Woodwell, & Rechtsteiner, 2010

⁶⁶ Hohl, Dankoff, Colacone, & Afilalo, 2001

⁶⁷ Nguyen, Fouts, Kotabe & Lo, 2006

⁶⁸ Ferrah, Lovell & Ibrahim, 2017

⁶⁹ Park, et al., 2017

⁷⁰ Fletcher, Berg, Dalby, & Hirdes, 2009

studies have determined there is a 7 percent increase in fall risk for each additionally prescribed medication⁷¹.

Cognitive impairment, a precursor to dementia, is also associated with polypharmacy. A study of 294 elders found 22 percent of patients taking 5 or fewer medications to have impaired cognition while 33 percent of those taking 6-9 medications and 54 percent of those taking 10 or more suffered from cognitive impairment⁷². On average, patients with dementia take 5 to 10 medications, only 1 or 2 of which are for the management of BPSD⁷³.

A study focusing on elderly patients with dementia also found an increased prevalence of polypharmacy among those experiencing falls⁷⁴. It has been determined that every medication added after the fourth increases an elderly patient with dementia's fall risk by 14 percent⁷⁵.

Medical professionals are trained to prescribe medications but very few are instructed about non-pharmacological interventions. Considering this, it is no surprise that medications, in spite of their limitations, are prescribed before considering other alternative approaches. Unfortunately, once patients are prescribed a drug in this scenario, they are maintained on them for long periods of time all the while increasing their morbidity, mortality and fall risk⁷⁶.

⁷¹ Damián, Pastor-Barriuso, Valderrama-Gama & de Pedro-Cuesta, 2013

⁷² Maher, Hanlon & Hajjar, 2014

⁷³ Lau, Mercaldo, Harris, Trittschuh, Shega, & Weintraub, 2010

⁷⁴ Tromp, Pluijm, Smit, Deeg, Bouter, & Lips, 2001

⁷⁵ Freeland, Thompson, Zhao, Leal, Mauldin, & Moran, 2012

⁷⁶ Cohen-Mansfield, 2001

Polypharmacy combined with age-related changes to pharmacokinetics and pharmacodynamics make it quite difficult to safely use medications, especially multiple medications, in nursing home residents⁷⁷. This scenario further complicates the pharmacologic approach to treating their pain⁷⁸.

Breaking the Cycle With Acupuncture

Given the established link between pain, cognitive impairment and mobility, one must wonder why we continue to work under guidelines that lead to further deterioration in a patient's health. Better options exist but a lack of cross-education and coordinated care leads to an under utilization of these methods at the expense of our elders' wellbeing.

A web-based survey of 660 internists at Mayo Clinic found only 30 percent of physicians understood the medicinal use of acupuncture and were comfortable counseling their patients about its potential benefits⁷⁹. By educating each other and cultivating professional relationships between acupuncturists and Western medicine practitioners, we can facilitate the coordination needed to integrate our modalities and provide better care.

Integrative medicine combines the best aspects of Western medicine and acupuncture to enhance the efficacy and outcome of both systems⁸⁰. A 2015 study evaluated the impact of medicine's social organization on treatment outcomes and found coordinated

⁷⁷ Spinewine, Schmader, Barber, Hughes, Lapane, Swine & Hanlon, 2007

⁷⁸ Giovannini, et al. 2021

⁷⁹ Wahner-Roedler, Lee, Chon, Cha, Loehrer & Bauer, 2014

⁸⁰ Wainapel, Rand, Fishman & Halstead-Kenny, 2015

complementary medicine, such as acupuncture, was more likely to be effective and synergistic with biomedicine, when compared to uncoordinated efforts⁸¹.

This type of coordination was demonstrated through a 2015 pilot project introducing three complimentary integrative health (CIH) modalities — acupuncture, chiropractic and massage therapy — into daily practice at a LTC facility for elderly adults. Before implementing CIH at the facility, several meetings were held between CIH providers and LTC staff to learn about CIH's scope of practice, to assess training needs of CIH providers to safely work with the residents and to develop procedures to incorporate CIH into daily practice without causing a disruption to the facility and residents.

A request for CIH services could be initiated by a resident, a resident's family member or an LTC staff member. Once initiated, a CIH provider would meet with the resident and determine appropriateness of care. CIH providers were encouraged to attend weekly meetings with LTC nurses to discuss plans of care for specific residents as well as resident responses to the CIH services being provided.

Over the 16 month course of the project, 322 acupuncture treatments were provided with no adverse events. The majority of residents and their family members felt the CIH services were worth while and expressed a desire for services to be available in the future. The most common perceived benefits were relief of pain, enhanced function and improved psychological and social wellbeing. All staff members interviewed felt CIH was beneficial to the workplace given the improvements in residents' overall health. Many staff members also

⁸¹ Shim, 2015

felt an indirect positive effect from the CIH services because the residents' feeling better made their work easier⁸².

When provided as an integrated modality, acupuncture produces greater treatment results compared to the use of biomedicine or acupuncture alone. In some instances, acupuncture relieves the adverse side effects of Western medical treatments which helps patients continue with treatment until the desirable outcome is obtained. This synergistic effect has been observed with patients on medications for chronic musculoskeletal pain⁸³. Combining acupuncture with analgesics helps achieve optimal pain relief with lower doses thereby reducing the risk of adverse effects such as declining cognitive function and an increased risk of falls. In some cases, acupuncture may completely alleviate the need for any pain medication.

Integrating acupuncture into existing standards of care can also decrease the likelihood of conditions such as MCI and depression progressing to dementia. Depression and MCI commonly occur together in the elderly. A 2021 analysis of real-world data evaluated the effect of acupuncture on patients diagnosed with depression between 1997 and 2010. The analysis determined those who were treated with acupuncture were less likely to develop dementia in subsequent years. While the risk of dementia did increase with age, acupuncture significantly decreased the risk of progressing to dementia among all age groups for both male and female patients⁸⁴.

⁸² Evans, et al., 2015

⁸³ Shim, 2015

⁸⁴ Chen, et al., 2021

Evidence has shown acupuncture to be a safe and reliable treatment modality for elders with MCI due to its beneficial effects on cognition and memory. With dementia, decreased connectivity in the prefrontal cortex hinders our working memory and ability to maintain attention. As lesions develop in this region, patients experience impaired short-term memory and inhibited behavioral responses. Acupuncture has a modulatory effect on the connectivity of our brain's networks and increases connectivity between multiple brain regions of MCI patients, especially the cognition related areas⁸⁵. These types of changes can be measured through improved scores on the MMSE⁸⁶, MoCA⁸⁷, ADL⁸⁸ and CDT^{89,90}. By improving the connectivity there is an opportunity to improve memory, attention, behavior and mobility.

A 2022 study aimed to evaluate acupuncture's effect on the brain function of patients with MCI. The study revealed that acupuncture specifically improves the hemodynamic response function (HRF) of patients in addition to brain activation and connectivity. In a healthy brain, local neuronal activation causes vasodilation and an increase in cerebral blood flow. These mechanisms are impaired with MCI and dementia and have a direct effect on

⁸⁵ Shan, et al., 2018

⁸⁶ Appendix A

⁸⁷ Appendix B

⁸⁸ Appendix C

⁸⁹ Appendix C

⁹⁰ Li, Wang, Du, Pu & Xu, 2020

HRF. After receiving acupuncture, HRF of the MCI patients became comparable to the healthy control group⁹¹.

A number of studies have incorporated resting-state functional magnetic resonance imaging (RS-fMRI) to evaluate the effects of acupuncture on the brains of patients with AD. The regions activated by acupuncture in both the left and right hemispheres overlap with regions of the brain that are impaired in AD patients⁹². According to the American Geriatrics Society 2015 Beers Criteria Update Expert Panel, acupuncture influences the pathology of Alzheimer's Disease through its neuroprotective effects, by inhibiting accumulation of toxic proteins, regulating glucose metabolism and reducing neuronal apoptosis.

The stimuli produced in the brain by acupuncture promotes activity changes in a wide range of areas including the somatosensory cortices, limbic system, basal ganglia, brain stem and cerebellum⁹³. By influencing connectivity and neuroplasticity throughout these regions, acupuncture has the potential to slow the progression of MCI and dementia.

In addition to acupuncture's beneficial effects on the brain, its ability to improve the absorption of drugs makes the effects of medications commonly used to treat BPSD and pain in dementia patients more significant at potentially lower doses⁹⁴. Acupuncture alone and acupuncture combined with pharmacotherapy are both shown to have better efficacy than drugs alone when treating these symptoms in the elderly⁹⁵. A study evaluating the

⁹¹ Khan, et al., 2022

⁹² Zhou & Jin, 2008

⁹³ Kwon & Lee, 2021

⁹⁴ Li, et al., 2020

⁹⁵ Ahn & Hyun, 2019

effectiveness and safety of acupuncture for BPSD determined acupuncture did not pose a risk to drug treatments such as extrapyramidal side effects and again found that acupuncture combined with psychotropic drugs compared with psychotropics alone, proved to be more effective than treatment with only drugs⁹⁶.

Aside from acupuncture's positive effects, adverse events associated with the modality are mild, transient in nature and do not require medical care. The most common are local bleeding, discomfort at the needle site, tiredness, and forgotten needles. Serious complications, such as pneumothorax and needle fracture requiring surgical removal, occur at a very low incidence of 0.001 percent⁹⁷.

The Pilot Project

In January 2020 Medicare (CMS) finalized its decision to cover acupuncture for the treatment of chronic low back pain. CMS defines chronic low back pain as back pain lasting longer than twelve weeks that is not related to rheumatoid arthritis, fracture, infection, cancer or fibromyalgia. CMS coverage allows for 12 acupuncture sessions in a 90-day period with a maximum of 20 acupuncture sessions allowed per year. If a patient reports no improvement — or worsening pain — after the twelfth appointment, they are not eligible for the remaining eight sessions. Last, the acupuncture must be approved, both initially and to continue past the twelve session mark, by an M.D. before CMS will cover the treatments.

From December 2021 through the end of June 2022, I worked in conjunction with Nicholas Collins, P.A., to establish acupuncture programs at two Skilled Nursing and

⁹⁶ Kwon & Lee, 2021

⁹⁷ Ernst & White, 2001

Rehabilitation centers in the East Bay. Patient eligibility was determined using the CMS coverage guidelines. The project was implemented with two main objectives: provide effective acupuncture and do so without disrupting, or creating additional work for, the facilities. Participants were treated individually in their rooms. To avoid unnecessary transfers that require the assistance of a CNA, patients were treated in whatever position they were found. This meant many participants received acupuncture while sitting in their wheelchairs. Approximately half of the participants were ambulatory and able to transfer without assistance. In those instances, the patient could choose if they preferred to sit or lie down for the session. The positioning had no apparent outcome on treatment results.

A total of 16 patients participated in the pilot program: seven were convalescent residents, nine were short-term/post-acute rehabilitation patients. 15 of the 16 participants reported acupuncture was a positive experience for them and many of the short-term patients expressed a desire to continue after being discharged from the facility. For most, this was their first experience with acupuncture. This was also true for many of the facilities' staff members and it was not uncommon to have nurses, PT's and CNA's observe the sessions and ask questions about acupuncture and its benefits.

Over the six month period, 145 acupuncture treatments were provided with zero instances of adverse events. Patients ranged in age from 65 to 97 with an average age of 81. All post-acute rehab patients were discharged before reaching the 12-session evaluation point. Among participants who reached the 12-session evaluation, there were no reports of increased pain and only one patient reported no improvement. All other patients reported a reduction in intensity, frequency or both with 50 percent reporting a 3 to 4.5 point reduction

in intensity on a 10-point pain scale and 50 percent reporting a reduction in the frequency of their pain. It is my observation that the participants experienced not only symptomatic relief but also the benefits of therapeutic touch and social engagement that are inseparable from this form of medicine. These two components are essential to humanity and contribute to improvements in quality of life.

For this project, I had the advantage of working alongside Mr. Collins who was treating patients in the same facilities. He was able to conduct the initial eligibility screening for approval and subsequent enrollment. Outside of this circuit, implementing the initial screening will be the biggest challenge. Therein lies the goal of this project.

By educating the healthcare workers and staff members at LTC facilities about the benefits of acupuncture, I hope to encourage their participation in the coordination and collaboration that is essential for a successful acupuncture program to exist in this setting.

The interest for CIH services is prevalent among residents and their family members. As residents started receiving acupuncture, it was not uncommon for others to inquire about the services for themselves. While acupuncture is not required by industry standards, I hope that this project will encourage more facilities to offer the modality thereby enticing others to follow suit in order to remain competitive. Perhaps, with time, industry standards will be reevaluated to include CIH services such as acupuncture.

Conclusion

Acupuncture is a beneficial treatment for our elderly. It is a safe and effective way to treat pain, has no negative interactions with a patient's current treatment regimen, benefits cognition and mobility and has a promising future in the treatment of dementia. Unlike many pharmaceutical options, acupuncture improves overall health instead of contributing to a further decline. While the effects of narcotics and analgesics provide only short term relief, studies have shown the effects of acupuncture can remain at 85 percent for as long as 12 months after receiving the last session⁹⁸. Considering the goal of pain management for our elderly is not a complete elimination but a reduction in the intensity, frequency and duration to maximize quality of life and minimize the risk of side effects, acupuncture seems to be a well tailored solution.

Skilled Nursing and Post-Acute Rehab facilities present a window of opportunity to integrate acupuncture into the current standards of care and potentially change the trajectory of certain disease progressions and, at the very least, improve the quality of life for our elders. By improving quality of life for LTC residents, we alleviate some of the burden placed on caregivers and LTC staff.

Those who are admitted for short-term rehabilitation purposes stand to benefit the most. They are in a transitional period during which they are unable to live on their own but have the potential to recover to their baseline level of functioning and return home. These residents typically require pain management as they are recovering from surgeries, injuries or other serious medical issues. They are just as likely to have pain unrelated to their current

⁹⁸ Nielsen, et al., 2021

condition. Instead of managing their pain with only narcotics, which we know have detrimental effects on cognition and mobility, we could be treating them with acupuncture. This allows for more effective pain management while having a simultaneous positive influence on their overall health trajectory.

The goal of this project is not to suggest we stop using analgesics, narcotics and pharmaceuticals. The goal is to promote the integration of acupuncture into the current biomedical system, thereby creating a more positive outcome for patients and healthcare workers alike. The proposed presentation for LTC staff and health care workers is attached hereto as Appendix E.

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Appendix A

Mini Mental State Examination - MMSE

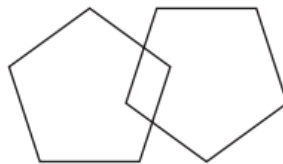
The MMSE is a tool used to assess mental status. It tests five areas of cognitive function: orientation, registration, attention and calculation, recall, and language. The maximum score is 30. A score of 23 or lower is indicative of cognitive impairment. It is easy to administer and takes only 5-10 minutes to complete.

The Mini-Mental State Exam

Patient _____ Examiner _____ Date _____

Maximum Score

- | | | |
|---|-----|---|
| | | Orientation |
| 5 | () | What is the (year) (season) (date) (day) (month)? |
| 5 | () | Where are we (state) (country) (town) (hospital) (floor)? |
| | | Registration |
| 3 | () | Name 3 objects: 1 second to say each. Then ask the patient all 3 after you have said them. Give 1 point for each correct answer. Then repeat them until he/she learns all 3. Count trials and record.
Trials _____ |
| | | Attention and Calculation |
| 5 | () | Serial 7's. 1 point for each correct answer. Stop after 5 answers.
Alternatively spell "world" backward. |
| | | Recall |
| 3 | () | Ask for the 3 objects repeated above. Give 1 point for each correct answer. |
| | | Language |
| 2 | () | Name a pencil and watch. |
| 1 | () | Repeat the following "No ifs, ands, or buts" |
| 3 | () | Follow a 3-stage command:
"Take a paper in your hand, fold it in half, and put it on the floor." |
| 1 | () | Read and obey the following: CLOSE YOUR EYES |
| 1 | () | Write a sentence. |
| 1 | () | Copy the design shown. |



_____ Total Score
ASSESS level of consciousness along a continuum _____
Alert Drowsy Stupor Coma

Appendix B

Montreal Cognitive Assessment - MoCA

The Montreal Cognitive Assessment (MoCA) is a tool used to detect early signs of MCI. It specifically looks at short term memory, visuospatial abilities, executive functions, attention, concentration, working memory, language and orientation to time and place. It is thought to be 90% accurate in detecting MCI in its early stages.

VISUOSPATIAL / EXECUTIVE		Copy cube		Draw CLOCK (Ten past eleven) (3 points)		POINTS		
				<input type="checkbox"/> Contour <input type="checkbox"/> Numbers <input type="checkbox"/> Hands			___/5	
NAMING								
						___/3		
MEMORY								
Read list of words, subject must repeat them. Do 2 trials. Do a recall after 5 minutes.			FACE	VELVET	CHURCH	DAISY	RED	No points
		1st trial						
		2nd trial						
ATTENTION								
Read list of digits (1 digit/ sec.).		Subject has to repeat them in the forward order		[] 2 1 8 5 4		___/2		
		Subject has to repeat them in the backward order		[] 7 4 2				
Read list of letters. The subject must tap with his hand at each letter A. No points if ≥ 2 errors		[] FBACMNAAJKLBAFAKDEAAAJAMOF AAB				___/1		
Serial 7 subtraction starting at 100		[] 93	[] 86	[] 79	[] 72	[] 65	___/3	
		4 or 5 correct subtractions: 3 pts, 2 or 3 correct: 2 pts, 1 correct: 1 pt, 0 correct: 0 pt						
LANGUAGE								
Repeat : I only know that John is the one to help today. []						___/2		
The cat always hid under the couch when dogs were in the room. []								
Fluency / Name maximum number of words in one minute that begin with the letter F		[] _____ (N ≥ 11 words)				___/1		
ABSTRACTION								
Similarity between e.g. banana - orange = fruit		[] train - bicycle		[] watch - ruler		___/2		
DELAYED RECALL								
Has to recall words WITH NO CUE		FACE	VELVET	CHURCH	DAISY	RED	Points for UNCUE recall only	
		[]	[]	[]	[]	[]		
Optional								
		Category cue						
		Multiple choice cue						
ORIENTATION								
[] Date		[] Month	[] Year	[] Day	[] Place	[] City	___/6	

Appendix C

Activities of Daily Living - ADL

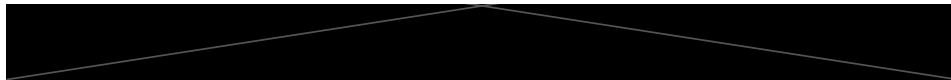
The ADL score is used to determine a person's need for placement in a nursing home. The score is based upon the four "late loss" ADLs — bed mobility, transfer, toilet use, and eating. The score determines how much functional assistance will be required by a potential resident, and this score indicates the level of functional assistance or support required by the resident⁹⁹.

⁹⁹ cms.gov, 2022

Appendix D

Clock Drawing Test - CDT

The CDT is a quick to administer test for dementia. It is less useful for detecting MCI than other similar evaluations such as the MMSE and MoCA. It tests multiple areas of cognition — executive function, attention, language skills, frontal lobe function, and visuospatial skills. To perform the test, a patient must be able to understand verbal instructions, remember the instructions using short-term memory, and use visual skills to draw a clock.



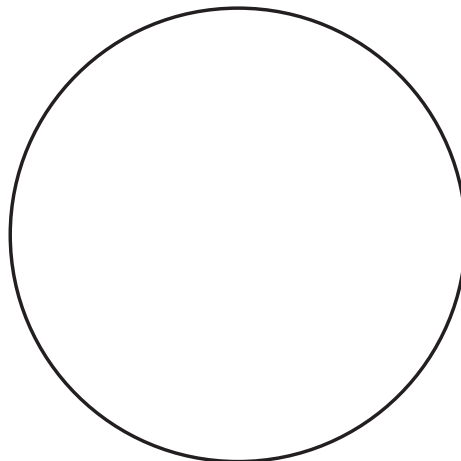
Clock Drawing Test (CDT)

The CDT can serve as a supplement to the Standardized Mini-Mental State Examination because it draws on a number of cognitive domains such as working memory, executive functioning (planning, conceptualizing), and visuoconstructional skills. It is also less affected by language, culture, and education than many other tests.

The CDT may be completed and scored according to one of many different protocols, or more commonly it can be administered and rated in an informal and subjective manner such as the following:

- Present the patient with a pre drawn circle about 10 cm in diameter.
- Ask the patient to place the numbers on the circle like a clock. Note whether the patient uses appropriate planning in distributing the numbers properly, or whether the patient perseverates or forgets the task and continues numbering past 12.
- Ask the patient to place hands on the clock showing the time to be 10 minutes after 11. Patients with faulty conceptualization may be drawn to placing the hands at 10 and 11 rather than at 11 and 2, or they may fail the task completely.

..... Fold along this line to administer



Appendix E

Slide Presentation