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Research Article

Alberta Complementary Health Integration Project (ABCHIP): Meeting the Pain and Mental Health Care Needs under COVID-19 for Vulnerable Populations

Mingshan Lu[1,2,3,4]*, Yong Tao[5], Xin Xia[2,3,4,5], Gongliang Yang[2,3], Max Jajszczok[6], Yingying Cong[3,4], Sumaiya Sharmin[1], Jing Jiang[7], Yun Xiao[2], Laura Peng[2], Joshua Quan[2] and Bentong Xu[3,4]

[1]Department of Economics, University of Calgary, 2500 University Drive NW, Calgary, Alberta, Canada T2N 1N4

[2]Department of Community Health Sciences, University of Calgary, 3330 Hospital Drive NW, Calgary, Alberta, Canada T2N 1N4

[3]Alberta College of Acupuncture and Traditional Chinese Medicine, 500, 628 – 12 Ave SW Calgary, Alberta, Canada T2R 0H6

[4]Huatuo Clinic, 300, 628 – 12 Ave SW Calgary, Alberta, Canada T2R 0H6

[5]Healing Point Acupuncture Clinic / Classic Acupuncture & Herbal Clinic, 949 Sherwood Ave, Ste 100, Los Altos, CA 94022, USA

[6]Island Health, Vancouver Island Health Authority, 1900 Fort St, Victoria, BC, Canada V8R 1J8

[7]Department of Forest and Conservation Sciences, Faculty of Forestry, University of British Columbia, 3041-2424 Main Mall, Vancouver, BC, Canada V6T 1Z4

Abstract

Background: The combined effect of COVID-19 and economic recession has worsened the health of disadvantaged and vulnerable groups, particularly the young and the elderly who have been experiencing pain and/or mental health issues. We report the Alberta Complementary Health Integration Project (ABCHIP) design which integrated evidence-based nonpharmacologic care into the conventional healthcare system that aimed to address the pain and mental health care needs of the aforementioned vulnerable groups.

Design: We present the plan for the implementation of the ABCHIP program to facilitate access to nonpharmacologic care options, which focuses on two populations in Alberta who deal with pain, mental health, and addiction: children and adolescents (aged 24 and under), and the elderly (aged 55 and above). ABCHIP is an interventional study spanning one year which involved 606 patients in total. The last measure for the study was taken in October 2022 and the study followed the patients for a year. For each patient, a nonpharmacologic treatment protocol is added based on the patient's major health condition (sciatica, depression, knee pain, etc.). The treatment modalities include acupuncture therapy and one or both of the following: Qigong classes and dietary supplements. Furthermore, a wide range of well-validated instruments were employed to assess patients' outcomes on pain relief, depression and anxiety reduction, sleep quality improvement, fatigue and anger management, and quality of care, using: the Brief Pain Inventory (BPI), Patient Health Questionnaire 9 (PHQ-9), Pittsburgh Sleep Quality Index (PSQI), PROMIS Short Form v1.0 Fatigue 8a & PROMIS Pediatric Short Form v2.0 Fatigue 10a, EQ-5D-5L, PROMIS Short Form v1.1 Anger 5a & PROMIS SF v2.0 5a. Participants were evaluated regularly throughout the treatment: at baseline, and once every three visits.

Conclusion: We offered additional services to high-risk, high-need groups by integrating effective community-based nonpharmacologic therapies with conventional medical procedures to improve population health.

Keywords: Acupuncture; Community Intervention; Integrative Medicine; Mental Health; Pain; Populations; Vulnerable

***Corresponding author:** Mingshan Lu, Department of Economics, University of Calgary, 2500 University Drive NW, Calgary, Alberta, Canada T2N 1N4, Tel: +1 4032205488; E-mail: lu@ucalgary.ca

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Introduction

The psychosocial consequences of pandemics may affect some populations more than others. Elderly populations with pre-existing medical, psychiatric or substance use issues may be more vulnerable to the psychosocial impacts of contracting COVID-19 [1,2]. These individuals are at heightened risk if they have compromised immune systems, which may further deteriorate due to residing in communal living environments such as aged care facilities or due to receiving treatment in communal settings where effective infection control measures may be more difficult to implement [1,2]. For those with already weakened immune systems, their risks may increase when living in a communal setting [1,2]. On the other hand, the pandemic has taken a toll on the mental and physical well-being of children, adolescents, and youth. Children and adolescents have experienced stress and anxiety due to school closures and being separated from peers. Exposure to crisis event coverage in the media and incorrect information being shared on social media has made this worse [3,4]. Again, with mental health issues, the negative impacts of pain, be it acute or chronic, are more severe because of the pandemic. The joint effect of the fear of contracting COVID-19 on the patient side, and the lack of capacity in our overburdened healthcare system leads to under-treatment of pain [5], which subsequently could lead to many health consequences, including worsening quality of sleep and mental

health in general. Healthcare policy wise, not enough attention has been given to the specific consequence of the COVID-19 pandemic on people living with chronic pain, despite the efforts of several pain physicians and researchers raising the alarm about the vulnerabilities of these patients and the necessity to maintain the continuity of care during the pandemic [6,7]. Leaving these pain and mental health needs unmet can lead to an increase in health care utilization, loss of productivity, learning loss, reductions in quality of life, and even loss of life; all of which impose huge costs on individuals, families, and communities as a whole [8,9].

Acupuncture's effectiveness in addressing pain and mental health issues has been thoroughly investigated by researchers and clinicians from all over the world, including major institutions such as Harvard University and the University of York. Acupuncture has been shown to be effective in treating chronic pain, mental stress, anxiety, depression, and substance dependence [10-16]. Recent studies show that acupuncture users have a wide socio-demographic profile, and it can play a role in managing the health needs of marginalized communities. Specifically, when barriers such as knowledge, accessibility, and affordability to access acupuncture treatments are removed, some disadvantaged populations are open to engaging in acupuncture treatments. In addition, research reports that group treatment models and integrative health settings may increase acupuncture availability and uptake among marginalized people [17-20].

Other evidence-based nonpharmacologic therapies, such as dietary supplements, physical activity, and mindfulness have been shown to be effective for patients with depression or anxiety across age groups and cognitive skills [21-23]. Specifically, in a systematic review, magnesium was confirmed as a therapeutic supplementation for patients with depression and anxiety [24]. Another systematic review with meta-analysis found that vitamin B intake (containing B6, B8, and B12) reduced psychiatric symptoms significantly [25]. Meditative movement practices like Qigong have been studied for treating chronic pain and symptoms associated with mental stress [26]. More specifically, Qigong has been found to be beneficial in improving quality of life, sleep quality, balance, handgrip strength, trunk flexibility, alleviating musculoskeletal pain, and improving overall sleep quality for people with chronic illness [26]. Noticeably, Qigong has been found to significantly improve mental health for youth, college students, and the elderly [27- 32].

Alberta's economic outlook and budgetary constraints require policymakers to look into cost-effective ways to provide patient-centered services for our vulnerable populations. In the Alberta Complementary Health Integration Project (ABCHIP), an innovative approach is taken to integrate evidence-based nonpharmacologic options with conventional medicine to improve conditions related to pain, mental health and addiction. For the two vulnerable disadvantaged populations in Alberta: children and adolescents and seniors, the objective of ABCHIP was to promote evidence-based nonpharmacologic care integration in the treatment and prevention of COVID-related pain and mental health-related issues.

Methodology

Hypothesis

Patients who receive acupuncture and one or both of dietary supplements and meditative movement therapy will have improved mental and physical well-being, as well as a higher quality of life.

Objectives

- To assess improvements in the psychosocial well-being of participants;
- To examine the reduction in the usage of the patient's habit-forming pharmaceuticals;
- To measure pain during and after the course of care;
- To measure changes in pain interference and physical function

Recruitment

The study was conducted in the Alberta College of Acupuncture & Traditional Chinese Medicine (ACATCM) - Huatuo Clinic and participants were recruited through public outreach efforts, Alberta Health Services (AHS) mail-out services, and recommendations from primary care physicians. To reach those who require mental health care among these two vulnerable categories, we collaborated with primary care doctors as additional patient referral sources, building on the already existing primary care network connection. We also used the AHS mail-out service in collaboration with the AHS/SPOR group at the Center for Health Informatics (CHI) at the University of Calgary to broaden our patient outreach. The Enterprise Data Warehouse (EDW), located within Alberta Health Services, was used to locate potential participants who are seniors and children/adolescents with mental health issues. Additionally, advertisements were used to find candidates and fill positions, with participants having the option of self-referral or recommendation by a medical professional. The study's website, http://www.abchip.ca, was made available and updated as required for recruitment and informational purposes. Additionally, participants were recruited via social media, including Facebook. To draw in potential patients, project flyers and curbside posters in English, Chinese, and Korean were also put up in various Calgary neighborhoods.

Inclusion and Exclusion Criteria

Our study group included children and adolescents (aged 24 and below) and elderly (aged 55 and above) who are Alberta residents with chronic pain or pain management, substance use, and mental health issues. These populations are particularly vulnerable under the impacts of the COVID-19 pandemic. The inclusion criteria of the ABCHIP study are listed as follows:

- Aged 24 or below, and aged 55 or above;
- Those who have any of the following concerns or conditions: mental health concerns and/or conditions (e.g., sleep disorders, anxiety, depression, oppositional defiant disorder, developmental disorders, eating disorders, cognitive impairment and dementia, digestive complaints, etc.);
- Chronic pain or pain management issues;
- Addiction (drugs and others).

The exclusion criteria are:

- Patients who do not give their consent;
- Children whose parents or guardians do not give their consent;
- Patients who withdrew their consent;
- Patients who are not available or comfortable receiving the treatment.

Data collection method

With participants' consent, we collected basic demographic information to help us establish a better understanding of what factors contribute to their willingness to use nonpharmacologic care services. Information on conventional health care utilization, pain, mental health, quality of life, and healthcare utilization was also collected. This data was collected via and stored on REDCap (Research Electronic Data Capture), a secure web application for building and managing online surveys and databases. We also launched a public campaign program to showcase ABCHIP projects to promote education and awareness of the benefits of evidence-based nonpharmacologic care options and ABCHIP among both healthcare providers and patients.

Our survey questionnaires included various well-validated and widely used instruments to measure pain conditions and levels of pain, depression, anxiety, sleep quality, fatigue, work status, addiction, and overall quality of life (see "Outcome Indicators"). Baseline questionnaires also included demographic questions (patients' age, gender, race/ethnicity, income, etc.).

Additionally, patients who finished their course of treatment in ABCHIP were also invited to participate in patient interviews. With patient consent, a semi-structured guided interview was conducted. Participants were asked to share their experience with ABCHIP, identifying strengths as well as areas for future improvement.

Interventions

Licensed practitioners with 5-15 years of expertise provided patients with complimentary and proven nonpharmacologic treatment, with modalities including acupuncture, dietary therapy, and meditative movement therapy (Qigong). Practitioners proposed an individualized treatment plan for the patient, using the established treatment protocols as guidelines. The number of treatments depended on the condition being treated and its severity. A common treatment plan for a single complaint typically lasted one to three months, involving three modalities: a minimum of two acupuncture treatments a week; dietary therapy with a dietary supplement if needed; and regular Qigong exercise on a voluntary basis. Since this is a community service project, we aimed to serve as many participants as possible while keeping a reasonable level of treatment outcome. We chose a minimum of 6 acupuncture sessions and a maximum of 12 sessions, at the frequency of twice a week. This treatment frequency has been shown to be necessary to reach optimal treatment results, especially for those with chronic pain and mental health issues [32-40]. In addition, there were patients with varied health concerns, and some were less critical than others. If the patients felt they had reached their treatment goals, they were allowed to leave after their sixth treatment session.

Acupuncture intervention: All ABCHIP patients received acupuncture, which was done by inserting very thin needles into the body surface at certain points to obtain *De Qi*. A minimum of six and a maximum of 12 acupuncture treatments, at least twice a week, were included in every treatment plan.

Dietary Therapy: Following Health Canada Guidelines, ABCHIP health professionals provided recommendations on dietary supplements (magnesium, vitamin B supplementation including B6, inositol, and B12), which have been shown to be beneficial for patients with depression or anxiety. This was an optional need-based intervention and was provided only if the health professionals deemed it necessary.

Qigong: If the patient is interested in practicing this exercise, the patient was offered the opportunity to join in person and/or online interactive Qigong learning sessions with a Qigong master to learn. Other online learning tools such as recorded Qigong videos were also provided.

Outcome Measures

All outcome measures are listed in table 1.

Measure	Instrument	Description
Pain severity	Brief Pain Inventory (BPI)	Calculated from the mean of four pain severity questions: pain at its "worst" in the past week, "least" in the past week, "average" pain in the past week, and pain "now." The answer to each of the four questions ranged from zero to 10, where zero indicates no pain and 10 indicates the worst pain imaginable.
Pain interference	Brief Pain Inventory (BPI)	Calculated from the mean of seven pain interference questions, which asks how much pain interferes with seven daily activities: general activity, mood, walking ability, normal work (at home and outside home), relationships, sleep, and enjoyment of life. The answer to each question ranges from zero to 10, where zero indicates no interference with function and 10 indicates that pain completely inhibited function.
Depression	Patient Health Questionnaire 9 (PHQ-9)	The PHQ-9 score is generated from the sum of answers to nine questions that ask for the frequency by which patients experienced nine symptoms of depression, including feelings of hopelessness, decreased interest in activity, and loss of appetite. The PHQ-9 score ranges from zero to 27, and a higher score indicates more severe depression.
Anxiety	Patient Reported Outcomes Measurement Information System (PROMIS) Anxiety 8a for adults & PROMIS Anxiety- Pediatric for minors.	The sum of answers to eight questions focusing on fear, anxiety, misery, and hyperarousal was used to generate an overall score ranging from 8 to 40. A higher score indicates more severe anxiety.
Sleep Quality	Pittsburgh Sleep Quality Index (PSQI)	Nineteen questions are used to generate seven component scores in accordance with the scoring instructions: subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. A global sleep quality score ranging from zero to 21, generated from the sum of the seven component scores, was reported. Overall, a higher PSQI score indicates worse sleep.
Fatigue	PROMIS Short Form v1.0 Fatigue 8a for adults & PROMIS Pediatric Short Form v2.0 Fatigue 10a for minors	The sum of answers to questions in these questionnaires generated a fatigue score up to 40, where a higher score indicates greater fatigue.

Overall Quality of Life	EQ-5D-5L	Asks questions about patients' mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. The answers to the five questions was used to generate a health utility score in accordance with the instrument instructions. This score ranges from slightly less than zero, indicating a health state that is worse than death, to one, which indicates full health. The higher the score, the better the patient's state of health.
Anger	PROMIS Short Form v1.1 Anger 5a for adults & PROMIS SF v2.0 5a for minors	The sum of answers to all five questions was used to generate a score ranging from 5 to 25, where a higher score indicates more severe anger.
Substance use	Self-reporting mechanism	Patients self-report the number of doses of non-prescription substances taken in the past year (Baseline) or in the past week (Follow-up) as well as the type of substance used. The number of patients who did not use substances, who used 1-35 doses per week, 36-70 doses per week, 71-140 doses per week, and >140 doses per week were tabulated. A comparison was made between the number of patients in each dosage category at baseline and at their final treatment. The total number of doses of each type of substance will also be compared from baseline to the final treatment.
Work	Self-reporting mechanism	Patients' self-reported employment statuses were collected and categorized as one of the following: not employed, part time employed, full time employed, part time employed and not working, or full time employed and not working. The number of patients between the ages of 14 and 65 in each category at baseline and after the final treatment will be used for economic analysis.
Health care utilization	Self-reporting mechanism	Patients self-reported the number of times they visit the emergency department as well as the number of inpatient days at a hospital in the past year (Baseline) or the past week (Follow-up). The average number of ER visits and the estimated number of hospital admissions will be used for economic analysis.

Table 1: Measure, Instrument and Description.

Data analysis

Immediately after each 3 treatment sessions, the participants were asked to answer questions about all the outcome measures listed in an online questionnaire on REDCap. The short-term outcome of the study are assessed from this information, whereas long-term effects are projected using short-term outcome indicators and the economic burden of illnesses estimations in the existing literature [41-47].

Our primary outcome indicators are changes in pain severity and pain interference, quality of sleep, mental health conditions, quality of life, and healthcare utilization, and are constructed by comparing admission and discharge patient conditions. Descriptive statistics are employed to report the proportion/mean for each demographic variable, as well as the baseline health status. Distributions of outcome severity and mean outcome scores at baseline and post-treatment, mean individual differences and percent changes in treatment outcomes from baseline to post-treatment are reported (clinical outcomes of ABCHIP are reported in [48]).

Economic evaluation, including cost-effectiveness and cost-benefit analyses, are performed. We translate the observed impacts into cost savings by looking at healthcare utilization and by measuring both reduction in direct cost (i.e., hospital, physicians, drugs, research, and other institutional care expenditures) and indirect costs (i.e., reduction of quality of life, lost productivity due to disability and premature mortality). Comparing the costs and benefits of the ABCHIP program will inform policy makers whether there is potential cost savings from integrating conventional medicine and evidence-based nonpharmacologic options into the health care system (economic evaluation outcomes of ABCHP are reported in [49]).

Accommodation

To fulfill the objective of the study, ABCHIP employed 11 outcome measures in total. It can be challenging to strike a balance between the comprehensiveness of outcome measurements and the length of the survey data collection. We incorporated the following elements into our project. First, we recruited a social worker in our study team who works on-site with patients who have mental health conditions, substance use problems, or other challenges. ABCHIP participants were encouraged to have an initial one-hour visit with the social worker, as well as following 30-minute visits during their project participation, whenever they felt they needed help from the social worker. Second, our data collectors received extensive training from the social worker on both survey items and communication skills with individuals who suffer from mental health and addiction concerns. Such training is to guarantee that the survey is carried out in the most efficient and patient-centered manner. Third, we ensured that all participants were properly educated and prepared for the survey, as well as aware of the support available from our project team throughout data collection in case they felt uncomfortable or stressed at any moment. This is explicitly stated in the patient consent form, which is given to participants when they sign up for the research. Members of our project team also interacted with participants to ensure they were aware of it. Finally, we have tested the survey instruments with five participants at the initial stage of the study. The average length of the survey was around 30 minutes, and all participants found the survey manageable.

In summary, we feel that the survey instruments we selected for this study are appropriate for our participants. We have taken every precaution to ensure that the extra time required for data collection does not burden or stress the participants. Most significantly, this enabled us to develop comprehensive outcome measures, allowing us to undertake a complete outcome and economic evaluation of this intervention.

Discussion

Managing pain and mental health conditions presents several difficulties. Many of these concerns are based on diseases that are already challenging to treat in a general practitioner institution, such as chronic pain, stress-related mental health issues, and preventing and/or treating addictions. With the ABCHIP approach, a treatment plan can be designed specifically for each patient in order to meet their unique needs and guarantee the greatest results.

The community initiative that has been presented is based on the ability of Alberta's healthcare system to handle the historical surge of

rising pain, mental health and addiction issues requirements brought on by COVID-19. Through this project, we hoped to enhance conventional community-based medical practices with effective evidence-based nonpharmacologic care options (such as acupuncture therapy, dietary therapy, meditative movement therapy, etc.) and offer extra services to high-risk, high-need groups. This research is much needed and timely. The findings of ABCHIP will contribute valuable knowledge to the integration of evidence-based nonpharmacologic therapies into conventional medicine in pain reduction, improving mental health, and substance use treatment effectiveness as well as generating cost savings.

Data Availability

The acupuncture treatment protocol and questionnaire of the study will be shared upon request.

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