

Research Article

Implementation of Self-Administered Acupressure for Chronic Low Back Pain Relief among Patients in a Community Free Clinic Using a Smartphone Application

Zhen Li^{1*}, Ramona Benkert¹, April Vallerand¹ and Suzanna Zick²

¹Department of Nursing, Wayne State University, USA

²Department of Family Medicine, University of Michigan, USA

***Corresponding author**

Zhen Li, Department of Nursing, Wayne State University, 5557 Cass Ave, Detroit MI, USA, Tel: 313-557-4082; Fax: 313-557-6946

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Abstract

Purpose: The purpose of this study was to evaluate the feasibility and preliminary effectiveness of implementing a self-administered acupressure intervention for chronic low back pain (CLBP) relief among patients in a community free clinic in the Metro Detroit area.

Methods: A one group pretest- posttest study design was used. Participants were recruited from November 2022 to January 2023 at the free clinic. Eligible participants received a one-hour acupressure training using a smartphone application and handouts. They were asked to practice at home with instructions for the following six weeks. Participants were contacted weekly through phone calls or text messages. Study outcomes were collected at baseline, every following week, and at the end of the six-week intervention.

Results: A total of six participants enrolled in this study, one dropped out. During the six weeks of intervention, participants demonstrated a high retention rate (83.3%), a high adherence rate (94%) and high satisfaction towards using acupressure for CLBP relief. The total pain severity measured with Brief Pain Inventory decreased significantly by (52%) at the end of the six-week practice. The pain interference of CLBP showed a significant improvement in sleep quality, mood, and enjoyment of life. Participants' knowledge of acupressure was increased significantly after a one-hour training using the smartphone application and handouts. Participants' attitude, subjective norms, perceived behavior control and behavior intention (constructs from the Theory of Planned Behaviors) of using acupressure were also increased compared to their baseline levels, however these results did not show statistical significance.

Conclusions: It is feasible to implement self-acupressure for CLBP relief among patients visiting a community free clinic using a smartphone application as the learning tool. Future studies are needed to confirm outcome effectiveness using randomized controlled trials with a larger sample size for this population.

ABBREVIATIONS

BPI: Brief Pain Inventories; CAM: Complimentary & Alternative Medicine; CDC: Centers for Disease Control and Prevention; CLBP: Chronic Low Back Pain; IRB: Institutional Review Board; PCB: Perceived behavior control; RCT: Randomized Controlled Trial; TCM: Traditional Chinese Medicine; TPB: Theory of Planned Behavior

INTRODUCTION

Chronic low back pain (CLBP), defined as low back pain that persists for three months or longer, is one of the leading causes of disability, and one of the most common reasons for missed work [1]. Currently, it is the third most costly condition in the United States with over \$134 billion estimated healthcare cost per year which has placed a tremendous burden on the social and healthcare systems [2]. About 85% of CLBP is classified as non-specific, meaning no structural change, no inflammation,

and no identifiable specific disease [such as, tumor, compression fracture, lumbar radiculopathy, etc.] [3,4]. Being an older age (e.g. over the age of 55) and female gender are the two primary risk factors for developing CLBP [5]. In addition, other risk factors may include sedentary lifestyle, strenuous physical activity, bad posture, obesity, lack of formal education, and psychosocial stress [4,5]. The prevalence of CLBP has doubled over the past two decades [1]. In underserved African American and Latino communities, CLBP has a higher prevalence and is associated with greater risks for falls, disability, depression, sleep disorder and poor quality of life [6]. Therefore, it is critical to develop effective, safe, and affordable pain management strategies for CLBP to prevent disability and minimize social and economic burden, particularly in underserved communities.

Pharmacological treatments, such as opioids, are often prescribed for treating CLBP. However, medications are not always effective and sometimes can lead to drug misuse and

overuse [7]. Therefore, the American College of Physicians' guidelines recommended using nonpharmacological therapies as the first line of treatment for CLBP [8]. The recommended non-pharmacological therapies for CLBP include exercise, physical therapy, yoga, tai chi, cognitive-behavior therapy, meditation, osteopathic and spinal manipulation, acupressure, acupuncture, interdisciplinary rehabilitation, and more [8,9].

Acupressure, as one of the nonpharmacological interventions, was developed based on Traditional Chinese Medicine Theory. By applying pressure at certain points throughout the body, acupressure can relieve symptoms such as pain, nausea, stress, fatigue, and others [10-13]. Acupressure can be administered by a provider or by oneself. The self-administered approach is more favorable because it is low cost and can be done in a variety of locations not just in a clinical setting. Previous research by Murphy et al. [14], demonstrated that self-administered acupressure can reduce CLBP by (35-36%) compared with usual care after six-weeks of practice and participants showed an average 85% adherence to acupressure practice during six-weeks of home monitoring period. Another study by Yeh et al. [15], also demonstrated a high adherence (85-94%) to self-administered auricular acupressure for CLBP using the smartphone application as a self-guided practice tool and a reduction of 29% in pain intensity after four weeks of practice. These results suggested that self-acupressure is an easy, quick, and effective non-pharmacological treatment option for CLBP management.

Although acupressure offers many benefits and patients have positive views towards it, the main barrier for adopting this kind of practice is the lack of knowledge about the evidence and its effectiveness [16-18]. Therefore, it is important to provide acupressure education to both patients and providers to improve the uptake of this practice [17,18]. So far, there are no studies available looking at the feasibility of introducing self-acupressure for CLBP management to the underserved communities where the prevalence for CLBP is high and the resources for acupressure education is limited. Therefore, the purpose of this study was to evaluate the feasibility and preliminary effectiveness of implementing self-acupressure practice for CLBP relief to patients in a community free clinic using a smartphone application as the learning tool. Specifically, for feasibility, participants' recruitment, retention, adherence, and satisfaction were evaluated; for preliminary effectiveness, participants' changes in symptoms of CLBP, as well as knowledge, attitude, beliefs, and behavior intention of using self-acupressure were evaluated.

Theory of planned behavior

The Theory of Planned Behavior (TPB) has been used to predict several health-related behaviors changes, such as hand hygiene, physical activity, diet management, smoking cessation and more [19]. In this study, TPB was used to assess the effects of acupressure implementation on participants' attitude, beliefs, and behavior intention related to using acupressure for CLBP relief. This theory proposes that there are three factors that predict human behavior: attitude, subjective norms, and perceived behavior control (PBC) [20]. Attitude is a person's evaluation or appraisal of the behavior; subject norms are the

social pressure surrounding a person to perform or not perform the behavior; and the perceived behavior control is a person's perception of ease or difficulty of performing the behavior [20]. All three factors combined to impact the concept of behavior intention which reflects a person's desire to perform the behavior [20]. In this study, the concept of attitude referred to participants' beliefs towards the use of acupressure; the subjective norms were social support from participant's family and friends; the perceived behavior control was participants' self-confidence in completing acupressure practice as instructed for six weeks; and the behavior intention was their desire to continue using acupressure for CLBP relief.

MATERIALS AND METHODS

Design

One group pre-post-test design was used for this implementation study. Based on the small sample size ($n < 10$), no control group was assigned. The study was reviewed and approved by the Institutional Review Board (IRB) of Wayne State University. Written informed consents were collected from participants before project implementation.

Setting

This project was implemented from November 2022 to February 2023 at SAY Detroit Family Health clinic at Highland Park, Michigan. The Say Detroit clinic was founded in 2008 offering free medical education, prevention, and treatment to uninsured individuals and families in the Detroit area and beyond.

Participants

Participants were selected from patients who visit SAY Family Health clinic for their medical exams and treatments. Participants' eligibility was screened by reviewing their medical records or referral to this study by their medical providers at the clinic. The inclusion criteria for eligible participants included 1) at least 18 years or older; 2) medical diagnosis of non-specific CLBP lasting three months or longer (CLBP condition was not related to fracture, cancer, surgery, inflammation, and neuropathy); 3) willingness to participate in this program; 4) ability to follow acupressure instructions independently and answer survey questions provided in English; 5) minimal changes in medical regimens for pain control. Individuals were not included if they were pregnant or had acupuncture or acupressure treatments within the past three months.

Intervention

The acupressure protocol for CLBP was developed and tested for its effectiveness by researchers in previous studies [14,21]. The protocol, also referred to as stimulating acupressure, consists of six acupoints including Du 20, Large Intestine 4 (LI4), Conception Vessel 6 (CV6), Stomach 36 (ST36), Spleen 6 (SP6) and Kidney 3 (K3) [14,22]. Two of the acupoints (Du 20 and CV6) are unilateral and the other four acupoints are bilateral on both left and right sides of the body, making it ten acupoints in total [14,22]. The self-administered acupressure intervention for CLBP relief was delivered using a smartphone application (Me Time Pain Relief®) and a hand out with illustrations and written instruction.

The application is available for free download from Apple and Google Play stores. It contains an eight-minute instruction video regarding how to locate each acupressure point and how to apply appropriate pressure to each point. The application also contains a timer and a symptom tracker. Details of the development and features of Me Time applications were described in previous studies [22,23]. Participants were instructed to apply pressure using their fingers to each acupoint for three minutes for a total of 30 minutes each per day, at least five times per week. Participants' fidelity to intervention was validated once by asking participants to demonstrate on their own bodies how to locate and stimulate each acupoint. All participants showed 100% accuracy in locating each point by the end of one-hour training.

Procedure

Eligible participants were first met at the clinic individually to obtain written consent, and to complete demographic questionnaires, pre-intervention surveys (knowledge, attitude, beliefs, and behavior intention) and brief pain inventories (BPI) as their baseline assessment. Then participants were given a one-hour one-on-one acupressure education session at the clinic regarding how to use the smartphone application and a review of the handouts to find the acupoints on their own body. Post-test surveys for knowledge were given immediately after the training session. The fidelity to intervention was also validated by asking participants to locate acupoints on their own bodies. Next, participants were asked to practice acupressure daily at home as instructed and record daily practice time in a written log for the next six weeks. During the following six weeks, participants were contacted via phone calls or text messages to monitor their progress in pain relief and adverse reactions and to answer any questions about the intervention. At the end of the sixth week, participants were asked to meet at the clinic again to return their time logs and fill out the adherence questionnaires, the brief pain inventory, post intervention satisfaction surveys, and questionnaires for assessing attitude, beliefs, and behavior intention at the end of week six. Participants who had completed the six weeks' study received a \$20 gift card.

Outcome measures

A demographic questionnaire was used to collect participants' demographic data (e.g., age, gender, race, income, education, employment, marital status, current pain management) at baseline. For feasibility outcomes, enrollment, attrition, and retention rate were calculated based on the data collected from participants. A self-reported adherence survey was used to assess how often participants practiced self-acupressure as instructed for the past six weeks. This survey was adapted from the medical outcome study [24] and Li et al., [25]. It consisted of five questions, for example, "I followed the instruction exactly to practice acupressure at home", "I had a hard time doing acupressure as instructed". Each question used a three-point scale with 1 being "none of the time", 2 being "some of the time" or 3 being "most of the time". In addition, participants' adherence to practice was also evaluated using time logs filled out by participants during the six weeks of intervention [14]. A self-reported post-intervention satisfaction survey was used to measure participants' overall experience. Four questions using

a five-point Likert scale assessed participants' satisfaction, the training materials, whether they will continue using acupressure, and recommend the training to others with 1 being "very unsatisfactory", "very difficult" or "very unlikely" and 5 being "very satisfactory", "very easy" or "very likely". Three open-ended questions were used to collect positive and negative feedback as well as suggestions for future improvements. For preliminary effectiveness outcomes, the Brief Pain Inventory (BPI) was used to measure the effects of self-acupressure on pain severity (question 1-6) and pain inference (question 9 A-G) [26]. A self-reported pre and post training questionnaire was used to assess changes in knowledge and to validate skills before and after the one-hour acupressure training; this questionnaire had four true or false questions. The first three were used to assess acupressure knowledge; the last question was used to verify fidelity to intervention by assessing whether participants were able to find acupoints accurately. A self-reported pre and post intervention questionnaire was used to assess participants' attitude, social norms, perceived behavior control and behavior intention. This questionnaire was adapted from Flowers et al., [27]. Four questions were selected from each category using a five-point Likert scale with 1 being "strongly disagree" or "very unlikely", and 5 being "strongly agree" or "very likely". The questions were "I think doing self-acupressure for chronic back pain would be ... (beneficial to harmful)" (attitude), "people who are important to me think I should practice acupressure" (social norms), "I am confident that I can do acupressure exercises if I want to (perceived behavior control), and "the likelihood of me doing self-acupressure at least five days a week in the next month is ... (very unlikely to very likely) (behavior intention).

Data Analysis

Descriptive statistics, such as means and percentages, were used to analyze the sample population, evaluate the adherence rate and feasibility (recruitment, attrition, and completion rate), as well as calculate satisfaction scores in post-intervention survey. Inferential statistics, such as paired t-tests, were used to compare the results regarding changes in knowledge, attitude, social norms, perceived behavior control and behavior intention in pretest and post-test questionnaires. Paired t-tests were also used to compare the differences in self-reported pain scores before and after the six-week acupressure practice at home.

RESULTS

Patient demographics

The demographic characteristics of the six participants who enrolled in the program are shown in Table 1. The mean age of the participants was 57.8 (SD=15.25, range from 36-83). Most participants were African American (66.7%) female (83.3%), who reported an annual income of less than \$35,000, and had a high school diploma or less (66.7%). Most participants (66.7%) were taking medications for chronic low back pain.

Feasibility of recruitment, retention, adherence, and satisfaction

From November 2022 to January 2023, 255 patients visited the clinic for their physical exams. Fifteen patients were presented with nonspecific chronic low back pain problem and their medical

Table 1: Demographic characteristics of participants.

Variable	Participants n (%)
Mean (SD) range	57.8 (15.25) 36-83
Gender	
Female	5 (83.3)
Male	1 (16.7)
Race	
White	0
Black/ African American	4 (66.7)
Others	2 (33.3)
Marital Status	
Married or domestic partnership	2 (33.3)
Single, never married	2 (33.3)
Widowed	1 (16.7)
Divorced	1 (16.7)
Employment	
Full time	0
Part time	1 (16.7)
Not working	5 (83.3)
Annual Income	
Less than \$10,000	4 (66.7)
\$10,0000 - \$35,000	2 (33.3)
Greater than \$35,000	0
Education level	
Some high school, no diploma	1 (16.7)
High school graduate, diploma, or the equivalent	1 (16.7)
Some college credit, no degree	2 (33.3)
Associate degree	1 (16.7)
Bachelor's degree	1 (16.7)
Current back pain management	
Prescribed medication	1 (16.7)
OTC	3 (50)
Exercise	2 (33.3)
Physical Therapy	2 (33.3)
Massage	1 (16.7)
Others	1 (16.7)

diagnosis was confirmed with the healthcare providers at the clinic. Three of the patients were not eligible due to pregnancy or having cognitive disability. 12 eligible patients were approached and introduced to the acupressure program. Nine of them (75%) showed interest in signing up for acupressure for back pain relief, and the other three declined. Three of the nine patients who were interested didn't show up for their appointments. In the end, six patients agreed to enroll, however, one patient dropped out in the second week due to an incident of falling at home. The remaining five patients completed the six-week intervention. Thus, the total enrollment rate is 41.6% (5/12); the attrition rate is 16.7% (1/6) and the retention rate is 83.3% (5/6).

Participants' self-reported time logs and adherence surveys collected at the end of six-week intervention showed high adherence to practice. The average practice time calculated from the time logs was six times per week with each time being approximately 30 minutes. The mean score from adherence survey was 2.88 (SD=0.17, range 2.60 to 3.00) which is equivalent to 94% (2.88/3).

All participants (n=5) completed the program evaluation at the end of six weeks. All participants gave favorable ratings of four or five on the five-point Likert scale. Participants gave the "over all experience" an average rating of 4.6 (SD=0.55), "easiness of training instruction" an average score of 4.6 (SD=0.55), likelihood to continue practice an average rating of 4.4 (SD=0.55), and likelihood of recommending to others an average rating of 4.8 (SD=0.45). In addition, in the open-ended question what you like most about the program. Participants stated, "It was easy to perform and very effective."; "I like the effect it had on my painful back."; "it helped with my back pain."; "I like the consistence." "It relaxed me.". In the question about what you like least about this program. Two participants reported, "my hands got tired after a while"; "The points felt tender to touch". All participants were content with the overall design of the program, no additional comments, or suggestions left for future improvement.

The adverse reactions, collected from participants' feedback during the six-week home monitoring period, were minimal. No participant reported bruising, skin breakdown or other adverse reactions due to incorrect application. Two participants reported finger soreness and acupoint tenderness starting around week three. The principal investigator suggested that participants apply pressure using the easer end of a pencil or massage pen instead of fingers. Participants reported that the soreness and tenderness were tolerable and gradually improved as they continued to practice.

Preliminary effectiveness

CLBP symptoms: The Brief Pain Inventory (BPI) scores showed that the average number of the pain areas was reduced from 6.12 (SD=6.01) to 1.80 (SD=1.78). Both the total pain severity and pain interference decreased after six weeks of the acupressure intervention compared to their baseline level. Table 2 demonstrated that the total pain severity decreased significantly by 52%, from 25.6 (SD= 5.46) to 12.2 (SD=12.52) (P =0.038); the total pain interference decreased from 34.0 (SD=18.15) to 15.2 (SD=15.32) (P=0.063). Further analysis of pain severity showed that the worst pain within 24 hours decreased significantly from 8.5 (SD=2.07) to 3.4 (SD=3.21) as well as the least pain within 24 hours also decreased significantly from 4.5 (SD=1.92) to 1.8 (SD=1.79). However, the level of reduction was not significant for average pain within 24 hours and pain right now (Table 2). Further analysis of pain interference showed that sleep quality, mood and enjoyment of life were improved significantly at the end of the six-week intervention (Table 2). The combined pain relief without (baseline) and with acupressure (week six) increased from 28% to 68% (P =0.126) (**Appendices**).

Knowledge, attitude, beliefs, and behavior intention: After one-hour of acupressure training using the video within the smartphone app along with handouts, participants' mean knowledge score increased significantly from 1.33 to 3.00 (P = 0.02 and t = -3.371).

Measurements using constructs of Theory of Planned Behavior showed the overall attitude, beliefs, and behavior intention of using acupressure for CLBP relief were increased, however, none of the results were statistically significant using the paired t-test (Table 3). Compared to baseline scores,

Table 2: BPI scores for pain severity and pain interference.

Outcomes measures	Baseline	Week 6	P value
	Mean (SD) (n=5)	Mean (SD) (n=5)	
Total pain severity	25.6 (5.46)	12.2 (12.52)	0.038*
Total pain interference	34.0 (18.15)	15.2 (15.32)	0.063
Subcategory of pain severity			
Worst 24	8.5 (2.07)	3.4 (3.21)	0.010**
Least 24	4.5 (1.92)	1.8 (1.79)	0.046*
Average pain	5.5 (1.52)	3.8 (4.15)	0.419
Pain now	6.1 (2.28)	3.2 (4.15)	0.053
Subcategory of pain interference			
General activity	6.0 (1.73)	2.8 (3.35)	0.120
Walking	3.0 (3.74)	1.6 (2.07)	0.280
Working	4.4 (3.29)	1.6 (2.19)	0.108
Sleep	6.2 (2.17)	2.8 (2.77)	0.034*
Mood	5.4 (3.65)	1.4 (2.19)	0.028*
Enjoyment of life	6.2 (3.96)	1.6 (2.61)	0.033*
Relationship with others	2.8(2.77)	3.4 (3.21)	0.760

Note: *means $P < 0.05$, ** means $P \leq 0.01$
Abbreviations: Brief Pain Inventory (BPI)

Table 3: Mean score of attitudes, subjective norms, PBC, and behavior intention at baseline and week six

	Preintervention (n=5) SD	Post intervention (n=5) SD	P value
Attitude	3.6 (0.55)	4.4 (0.89)	0.242
Subjective norms	3.6 (0.55)	4.2 (0.84)	0.208
PBC	3.6 (0.89)	4.4 (0.55)	0.099
Behavior intention	4.0 (0.71)	4.4 (0.54)	0.374

Abbreviations: Perceived Behavior Control (PBC)

participants' mean score in attitude increased 22%; subjective norms score increased 17%; perceived behavior control (PBC) increased 22%; and behavior intention increased 10% at the end of six weeks intervention.

DISCUSSION

Our findings suggest that it was feasible to introduce acupressure for CLBP relief to patients in the underserved community. Participants demonstrated a high retention rate and a high adherence rate to daily practice, while reporting few adverse effects and high satisfaction with their acupressure practice at the end of the six-week intervention. Our findings also suggest that self-administered acupressure can significantly reduce CLBP within six weeks of practice. Participants reported significant improvement in CLBP severity, sleep quality, mood, and enjoyment of life. The one-hour acupressure training delivered using a smartphone application and handouts was able to quickly increase participants' knowledge and promote the use of acupressure practice. Lastly, the six-week acupressure intervention increased participants' attitudes, beliefs and behavior intention towards using acupressure for CLBP relief, indicating a high likelihood of continuing acupressure practice in

the future based on the Theory of Planned Behavior.

For feasibility outcomes, we assessed recruitment, retention, adherence, and satisfaction. The enrollment rate for this study was only 41.6%; this was mostly due to participants not showing up for their appointments. The issue of appointment non-compliance has been an ongoing problem in the community free clinic, which was not a focus of this program. However, to overcome this limitation, future studies may consider extending the length of the recruitment period to enroll a larger number of participants. The retention rate was 83.3%. Previous study by Yeh et al. [15], showed a higher retention rate of 89% for participants who used the acupressure application along with telehealth compared to those who used the application alone (78%). Our study used weekly follow ups with phone calls or text messages which was like the telehealth presented in confirming that routine follow ups play a positive role in maintaining participants' retention. The adherence rate to acupressure practice was 94%, which was similar to the 85-94% reported in Yeh et al. [15], suggesting participants were able to practice self-acupressure for CLBP as instructed most of time. In the post invention survey, all participants reported a higher satisfaction score as "very satisfied" or "satisfied" with the overall experience compared

to Yeh et al. [15] where a majority of the participants reported “somewhat satisfied”. The overall high satisfaction reflected that participants were happy with the positive effects that they experienced after practicing self-acupressure for six weeks, such as better sleep, better pain control, and more energy. It was possible that the six-week acupressure intervention produced stronger positive effects than the four-week intervention in Yeh et al. [15], thus participants reported higher satisfaction.

For preliminary effectiveness results, our data showed that participants had a significant reduction in pain severity by the end of week six among patients in the community free clinic. The significant reduction of CLBP observed in this study was slightly higher compared to the 36% pain reduction reported in Murphy et al. [14]. Firstly, it is possible that the small sample in this study may be biased in selecting participants who were highly motivated to practice acupressure, thus leading to higher CLBP relief. Secondly, participants in our study were recruited from the clinic by providers’ referral, while participants from Murphy et al. [14], were recruited from the community. It is possible that the involvement of medical providers in the recruitment process may have positively affected the outcome of this intervention. Participants took this treatment more seriously and showed high commitment to the treatment regime, thus yielding a higher reduction in pain control. Thirdly, our study was focused on predominantly African Americans while Murphy et al. [14], was primarily focused on a White population. A previous study showed that African Americans had higher prevalence of using complementary and alternative medicine (CAM) (including prayers) than Whites [28]. However, whether the effect of acupressure or other CAM therapies was affected by race needs further exploration using larger samples and randomized controlled studies.

We also assessed changes in participants’ knowledge, attitude, beliefs, and behavior intention as the preliminary effectiveness outcomes. Our data also showed that immediately after the one-hour acupressure training, participants demonstrated a significant improvement in acupressure knowledge scores. In addition to the result demonstrated in Yeh et al. [15] which was primary focused on participants with a college level of education, our data suggested that it was also effective to learn and self-administer acupressure using a smartphone application for participants in the underserved community with a high school level of education or less. The acupressure implementation had a positive impact on participants’ attitude, perceived behavior control, social norms, and behavior intention, however the changes were not statistically significant which may be due to small sample size and lack of controls. A previous study showed that attitude and past behavior can significantly impact the intention to use Traditional Chinese Medicine based on TBP [29]. Similarly, the increased attitude and high satisfaction with the overall experience demonstrated in our study could positively affect the intention to acupressure in the future. This indication was also shown in participants’ post-intervention satisfaction survey; all of them expressed that it was “likely” or “very likely” that they would continue acupressure practice for CLBP relief in the future.

LIMITATIONS

The small sample size was one of the limitations for this study. Along with no control group, the small sample may have contributed to some of the insignificant statistical analysis in preliminary outcomes. Future studies may consider using randomized controlled trials with larger sample sizes to increase the validity and accuracy of the results. Secondly, this study sample was limited only to patients who visited the local community free clinic, which is not generalizable to other underserved populations. Future studies may consider expanding enrollment to a few more clinics in the underserved community.

IMPLICATIONS

To our knowledge, this is the first study to evaluate the feasibility and preliminary effectiveness of implementing self-acupressure for CLBP relief among patients in the underserved community clinic. Our findings suggest that self-administered acupressure can be potentially used as an easy, safe, and affordable option for reducing CLBP for this population. The self-acupressure approach improves patients’ satisfaction and health outcomes in CLBP management. With future large implementation studies, healthcare providers and decision makers serving in community free clinics may consider integrating this method into patients’ comprehensive pain management plan for CLBP.

CONCLUSION

It was feasible to introduce self-administered acupressure to patients in the underserved community for CLBP relief. Our preliminary results showed that self-acupressure practice can significantly reduce CLBP within six weeks of practice. The acupressure implementation improved participants’ knowledge, attitude, belief, and behavior intention and promote continuous use of acupressure for CLBP relief in the underserved community. Given the small sample size and lack of controls, future studies are needed to evaluate the effectiveness using randomized controlled trials with a larger sample size for this population.

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REFERENCES

1. Freburger JK, Holmes GM, Agans RP, Jackman AM, Darter JD, Wallace AS, et al. The rising prevalence of chronic low back pain. *Arch Intern Med.* 2009; 169: 251-258.
2. Dieleman JL, Cao J, Chapin A, Chen C, Li Z, Liu A, et al. US health care spending by payer and health condition, 1996-2016. *JAMA.* 2020; 323: 863-884.
3. Koch C, Hänsel F. Non-specific low back pain and postural control during quiet standing—a systematic review. *Front Psychol.* 2019; 10: 586.
4. Elik M, Zgorzalewicz-Stachowiak M, Zeńczak-Praga K. Application of Pilates-based exercises in the treatment of chronic non-specific low back pain: state of the art. *Postgrad Med J.* 2019; 95: 41-45.

5. Kahere M, Ginindza T. The prevalence and risk factors of chronic low back pain among adults in KwaZulu-Natal, South Africa: an observational cross-sectional hospital-based study. *BMC Musculoskeletal Disorders*. 2021; 22: 1-10.
6. Bazargan M, Loeza M, Ekwegh T, Adinkrah EK, Kibe LW, Cobb S, et al. Multi-Dimensional Impact of Chronic Low Back Pain among Underserved African American and Latino Older Adults. *Int J Environ Res Public Health*. 2021; 18: 7246.
7. Dowell D, Haegerich TM, Chou R. CDC guideline for prescribing opioids for chronic pain—United States, 2016. *JAMA*. 2016; 315: 1624-1645.
8. Qaseem A, Wilt TJ, McLean RM, Forcica MA, Clinical Guidelines Committee of the American College of Physicians. Noninvasive treatments for acute, subacute, and chronic low back pain: a clinical practice guideline from the American College of Physicians. *Ann Intern Med*. 2017; 166: 514-530.
9. Skelly AC, Chou R, Dettori JR, Turner JA, Friedly JL, Rundell SD, et al. Noninvasive nonpharmacological treatment for chronic pain: A systematic review update. Agency for Healthcare Research and Quality (US). 2020; 227.
10. Chen YW, Wang HH. The effectiveness of acupressure on relieving pain: a systematic review. *Pain Manag Nurs*. 2014; 15: 539-550.
11. Chen L, Wu X, Chen X, Zhou C. Efficacy of auricular acupressure in prevention and treatment of chemotherapy-induced nausea and vomiting in patients with cancer: a systematic review and meta-analysis. *Evid Based Complementary Alternat Med*. 2021; 2021: 1-11.
12. Zick SM, Kruger G, Harte S, Sen A, Harris RE, Pearce CL. Acupressure for Cancer-fatigue in Ovarian Cancer Survivor (AcuOva) Study: a community-based clinical trial study protocol examining the impact of self-acupressure on persistent cancer-related fatigue in ovarian cancer survivors. *Contemp Clin Trials*. 2021; 107: 106477.
13. Rani M, Sharma L, Advani U, Kumar S. Acupressure as an Adjunct to Pharmacological Treatment for Depression, Anxiety, and Stress in Patients with Knee Osteoarthritis. *J Acupunct Meridian Stud*. 2020; 13: 129-135.
14. Murphy SL, Harris RE, Keshavarzi NR, Zick SM. Self-administered acupressure for chronic low back pain: a randomized controlled pilot trial. *Pain Med*. 2019; 20: 2588-2597.
15. Yeh CH, Kawi J, Ni A, Christo P. Evaluating auricular point acupressure for chronic low back pain self-management using technology: A feasibility study. *Pain Manag Nurs*. 2022; 23: 301-310.
16. Becker WC, Dorflinger L, Edmond SN, Islam L, Heapy AA, Fraenkel L. Barriers and facilitators to use of non-pharmacological treatments in chronic pain. *BMC Fam Pract*. 2017; 18: 1-8.
17. Faircloth AC, Dubovoy A, Biddle C, Dodd-McCue D, Butterworth JF. CME Article: Perceptions of acupuncture and acupressure by anesthesia providers: A Quantitative descriptive study. *Med Acupunct*. 2016; 28: 79-86.
18. Hmwe NT, Browne G, Mollart L, Allanson V, Chan SW. Older people's perspectives on use of complementary and alternative medicine and acupressure: A qualitative study. *Complement Ther Clin Pract*. 2020; 39: 101163.
19. Lee S, Vincent C. Analysis and evaluation of the theory of planned behavior. *ANS Adv Nurs Sci*. 2021; 44: E127-140.
20. Ajzen, I. The theory of planned behavior. *Organizational Behavior and Human Decision Processes*. 1991; 50: 179-211.19.
21. Zick SM, Wyatt GK, Murphy SL, Arnedt JT, Sen A, Harris RE. Acupressure for persistent cancer-related fatigue in breast cancer survivors (AcuCrft): a study protocol for a randomized controlled trial. *BMC Complement Altern Med*. 2012; 12: 1-4.
22. Murphy SL, Zick SM, Harris RE, Smith SN, Sen A, Alexander NB, et al. Self-administered acupressure for veterans with chronic back pain: Study design and methodology of a type 1 hybrid effectiveness implementation randomized controlled trial. *Contemp Clin Trials*. 2023; 130: 107232.
23. Zick SM, Kruger G, Harte S, Sen A, Harris RE, Pearce CL. Acupressure for Cancer-fatigue in Ovarian Cancer Survivor (AcuOva) Study: a community-based clinical trial study protocol examining the impact of self-acupressure on persistent cancer-related fatigue in ovarian cancer survivors. *Contemp Clin Trials*. 2021; 107: 106477.
24. Hays RD. The medical outcomes study (mos) measures of patient adherence. *J Behav Med*. 1994 Mar; 17: 361-367.
25. Li LW, Harris RE, Murphy SL, Tsodikov A, Struble L. Feasibility of a randomized controlled trial of self-administered acupressure for symptom management in older adults with knee osteoarthritis. *The J Altern ComplementMed*. 2016; 22: 396-403.
26. Cleeland CS, Ryan K. Pain assessment: global use of the Brief Pain Inventory. *Ann Acad Med, Singap*. 1994.
27. Flowers EP, Freeman P, Gladwell VF. The development of three questionnaires to assess beliefs about green exercise. *Int J Environ Res Public Health*. 2017; 14: 1172.
28. Robles B, Upchurch DM, Kuo T. Comparing complementary and alternative medicine use with or without including prayer as a modality in a local and diverse United States jurisdiction. *Front Public Health*. 2017; 5: 56.
29. Xia Y, Chang JH, Miao HZ, Wang D. Impact of the COVID-19 pandemic on intention to use traditional Chinese medicine: A cross-sectional study based on the theory of planned behavior. *J Integr Med*. 2021; 19: 219-225.