



Research Article

Preliminary Survey of Chronic Pain Treatments by Epidural Block Via Home Visit

Koki Shimoji^{1-3*}, Keiko Yamakawa¹, Haruka Goto¹, Chou Chewei¹

¹Integrated Preventive Medical Clinic, 2-6-27 Kasumi, Narashino, Chiba 275-0022, Japan

²Pain Control Institute, 45-304 Yurai-cho, Shinjuku-ku, Tokyo 162-0805, Japan

³Department of Anesthesiology, Niigata University Graduate School of Medicine, Asahi-machi 1, Chuo-ku, Niigata, Japan

*Corresponding author: Koki Shimoji, Pain Control Institute, 45-304 Yurai-cho, Shinjuku-ku, 162-0805 Tokyo, Japan

Citation: Shimoji K, Yamakawa K, Goto H, Chewei C (2024) Preliminary Survey of Chronic Pain Treatments by Epidural Block Via Home Visit. J Surg 9: 1985 DOI: 10.29011/2575-9760.001985

Received Date: 18 January, 2024; **Accepted Date:** 22 January, 2024; **Published Date:** 24 January, 2024

Abstract

Background: Pain management for patients at home, who hardly walk to visit a hospital or were homebound, may be a major challenge for pain control.

Objective: To provide the epidural block (EpB) techniques by home visit for small groups of patients suffering from chronic pain who were homebound or could not walk to visit the outpatient clinic,

Study Design: Evaluation of the EpBs by home visit in these chronic pain patients.

Setting: In response to the general practitioners, we organized the epidural block teams for home visit treatments.

Methods: Our team conducted the EpBs via home visit for these chronic pain patients.

Results: A numerical rating scale (NRS) was decreased by this home visit treatment in all patients, and activity in daily life (ADL) were increased in 16 of 25 patients at one week and/or at the time of termination of our visit.

Conclusions: The EpBs might be valuable for these patients with chronic pain who were homebound or hardly walk to visit a hospital and should be conducted by the pain control team trained in nerve block techniques as well as resuscitation skills and close communication tools to be provided for the patients and their families.

Keywords: Chronic pain; Epidural block; Home visit; Pain management

Introduction

Chronic pain is a significant health problem particularly for the elderly and may lead to frailty [1-3]. There are a large number of patients who hardly walk to visit the outpatient clinics and/or are forced to stay at home with their families. Although approximately 70% of people in this country hope to stay in their homes for chronic pain care, roughly the same percent of people receive end-of-life care at hospitals or similar facilities due to medical insurance services and the rapid progression of the 'nuclear

family' [4]. Actual numbers note that about 65% of people die at home and 35% die at a hospital in this country [4]. A report has noted, however, that more accessible home and hospice services are required through arranging regional resources to reduce family burden, alleviating patient-perceived burdens, and improving 24-h support at home [5]. We believe that pain clinicians and their teams should be more assigned to treat not only chronic pain of active workers but also these kinds of patients at home, as the population pyramid shows a rapid increase in the elderly worldwide [2,5]. Despite these social circumstances, there have been scarce reports except the caudal epidural blocks reported [6] on pain treatments in patients with chronic pain at home, who hardly walk to visit outpatient pain clinics. The present report surveys the preliminary

results of our experiences using the epidural block treatments in these patients. The initial experience was reported elsewhere [7].

Methods and Procedures

The proposed treatment, with possible side effects, was explained to all patients and their families and the consent obtained before each visit. The epidural blocks (EpBs) were performed in 24 of 25 patients in response to -requests by local practitioners (GPs, home doctors). Before the patients were treated, a conference was held to prepare for home visits with each practitioner (9 orthopedists, 11 internists). During our first home visit, the procedures were explained at the patients' bedside, attended by their families, the practitioners, home nurses, and hospital office personnels. Each patient was duly informed of the disease by the home doctor and had achieved a good understanding. There were

no patients with coagulopathy. All patients that were taking the Nonsteroidal-Anti-Inflammatory Drugs (NSAIDs) and pregabalin-related drugs before, during and after our visits were instructed to continue to do so. On the day of our visits, we carried bags which included the portable epidural block sets (Figure 1), the portable sphygmomanometer, a pulse oximeter, the drip set with a 200ml saline pack, and drugs such as adrenaline (1.0 mg), noradrenaline (1.0 mg), atropine (0.5 mg), diazepam (10 mg), morphine (10mg), about 1~2 ampules of each. An Ambu bag was also prepared for emergencies during each visit. Before leaving the patient's home, we ensured that the patient was comfortable and free from any ill effects of the treatment. At the same time, we requested the patient's home doctors, general practitioners, for their evaluation of our treatments.

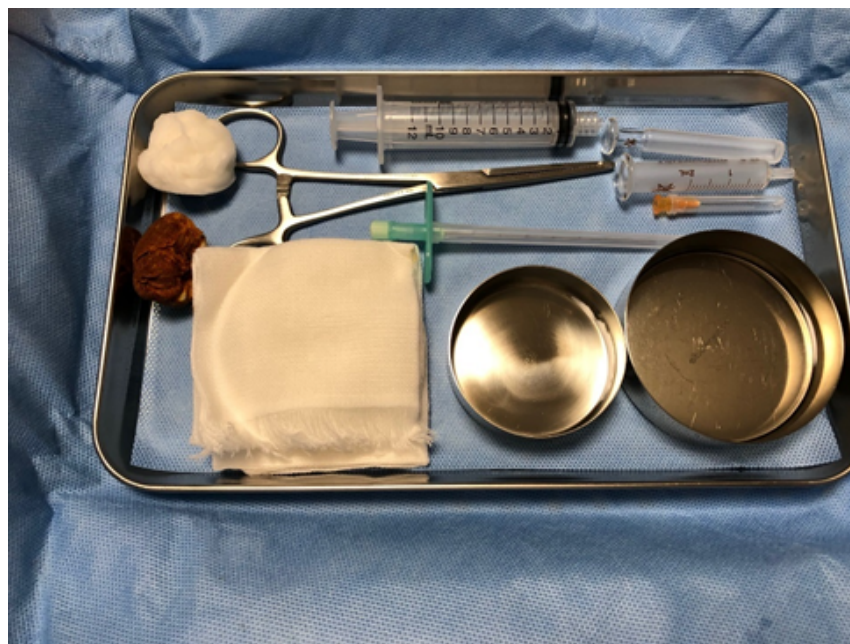


Figure 1: Portable epidural block set: From top, a plastic syringe for local infiltration and epidural injection of lidocaine, two cotton balls of 10% Povidone iodine for skin sterilization and neutralizer (0.5% sodium thiosulfate solution (left), a Pean forceps (middle), a glass syringe (2ml) for assessing the resistance of the epidural space with a disposable subcutaneous needle for local anesthesia (right), the disposable epidural needle (22-gauge), a piece of gauze, and two stainless steel containers for 1.0% lidocaine and saline.

A numerical rating scale (NRS) was measured before and one week after or at the termination of the treatments.

Six basic activities of daily lives (ADLs): eating, bathing, getting dressed, toileting, transferring, and continence were evaluated by the nurses before and after the treatments from 0 (able to perform none) to 6 (able to perform all) (Table 1). Thus, the total number varied between 0 to 6 depending on patients' ADLs. The home visit treatment was completed in each patient through consultation with the patients' home doctors. Overviews or comments by the practitioners on the effectiveness of our home visit procedures were described as fair (+), effective (++) and highly effective (+++) after the termination of treatments (Table 1).

Nb	Age	Sex	Complaints	Diagnosis	Tx	Nm	NRS	ADL	Ev
1	99	M	BP, KP	Spinal canal stenosis	LE	22	6→2	2→6	+++
2	62	M	Hemiparesis	Brainstem thrombosis	LE	2	7→1	1→1	+++
3	76	F	BP	Subdural Hematoma	TE, ivh	3	9→5	3→3	+
4	96	F	Lumbago	Compr Fr(L4,L5)	LE	3	7→1	2→2	+++
5	84	M	BP	Meta of Prosta Ca	TE, ivh	13	9→5	2→2	++
6	79	F	Lumbago	Lumbar Spondylosis	LE	2	5→3	5→6	++
7	90	M	Lumbago	Lumbar Spondylosis	LE	10	7→5	4→6	+
8	79	F	Lumbago	Lumbar Spondylosis	LE	84	9→5	3→3	++
9	76	F	BP	Kyphosis, Spondylosis	LE	73	9→1	2→6	+++
10	83	F	BP & Ab Pain	Postop Inguinal Hernia	LE	1	8→3	5→6	++
11	84	F	Headache	Subdural Hematoma	LE	1	9→1	4→6	+
12	39	M	Lumbago	Lumbar Spondylosis	LE	1	10→2	4→6	++
13	59	F	BP, Chest Pain	Lung Meta of Ovarian Ca	Miv	1	10→1	1→1	+++
14	79	F	BP	Lumbar Spondylosis	LE	1	8→1		
15	86	F	BP	Spinal Canal Stenosis	LE	5	7→3	5→6	++
16	81	M	Lumbago	Spinal Canal Stenosis*	LE	7	6→3	6→6	++
17	85	F	Hemiparesis	Brain Infarction	TE	4	7→3	5→6	++
18	75	F	Leg Pain plus	Ovarian Ca. Spine Meta.	RB	2	9→0	5→5	++
19	81	F	BP	Uterus Ca. Postop. Pain	LE	1	7→1	5→6	++
20	65	F	Neck Pain	Cerebral Palsy	CE	13	7→3	5→5	++
21	75	M	Neck Pain	Spinal Canal Stenosis	CE	5	8→3	6→6	+++
22	87	F	Lumbago	Compr Fr(L4,L5)	LE	3	5→3	6→6	++
23	54	F	Neck Pain	Postfacial Paralysis Compl.	CE	2	6→4	6→6	++
24	95	F	Lumbago	Spinal Canal Stenosis	LE	8	7→4	5→6	++
25	78	F	Lumbago	Lumbar Spondylosis	LE	5	8→5	6→6	+++

Procedures of the Epidural Blocks (EpBs)

Before the EpBs, the patients were laid laterally and flexed as far as possible on the bed or the futon-tatami mats, like the spinal tap position, while the operator sat in the chair or on the tatami. The EpBs were conducted at the C7/T1 through to L/S levels according to the pain segments of each patient. Approach to the epidural space was carried out via the paramedian or lateral approach after local anesthesia with 5~10ml of 1.0% lidocaine injection.

The epidural space was approached through the loss of resistance method. The epidural needle, a 22-gauge disposable, was inserted approximately 20~30 mm lateral to the spinous process up to the roots of the transverse spinal process, and then moved upward, i.e., the 'walking on the transverse process' method [8], and slightly advanced the needle in the ligamentum flavum. When the loss of resistance was achieved with a 2 ml glass syringe lubricated inner side with 1.0~1.5 ml of air, the needle was left as it was for a while and the inspiration test was made. Then, 7 to 10 ml of 0.3~0.5 % lidocaine was injected into the epidural space while observing signs of toxicity, allergy and extravasation.

Before and after the EpBs, blood pressure and pulse rate measurements were conducted immediately before and after the block, and at 5-, 10-, 30- and 45-minute intervals. The pulse-oximeter was also applied to a finger to monitor oxygen saturation and pulse. Frequent observation of vital signs and conversation with the patients were also undertaken throughout the procedures.

Results

Considerable pain relief was achieved in all patients with improvements in NRS (Table 1). Changes in NRS and ADL are summarized in Table 1. NRS measurements were improved in all patients, and ADL in 16 of 25 patients, assessed 7 days after the visits or at the termination of visits. No sequelae during and after treatments was found in any patients. There were no patients in whom the blood pressure decreased more than 20% after the procedures. The pulse oximeter showed no change during the procedures except in case 13 (oxygen saturation was improved), treated by morphine drip instead of the epidural block. The comments by practitioners on our treatments after termination of visits varied from fair to highly effective. Impressive cases are described in the following case presentations.

Specific Case Presentation

Case 1, 99- year-old, male: In response to the request of a home doctor, we visited a 99-year-old patient who had been lying in bed for almost 6 months due to severe lower back pain, along with knee pain and paresthesia in both legs. Prior to these 6 months, he served as a volunteer and worked in the local area as the town

chair. He fell and injured his waist on the street 6 months ago. After being rescued and carried by the neighbors to a local hospital, he was diagnosed with a lumbar ligament rupture and spinal canal stenosis without bone fracture. Since that accident he could not leave his home for work due to the severe lumbago and knee pain. The patient said that he had never experienced any illness prior to the accident. He had been spending almost all his time in bed at home, and over time lost the ability to leave the bed entirely. Neurologically, there was a slight potentiation of knee and tendon reflexes in both legs, and a warm sense decrease (8/10) in the left toe. There were also movement limitations of the hip, knee and foot joints in both sides. We conducted the epidural block every week, as well as rehabilitation (joint movements and a walk in his home with assistance from his family. One week after our first visit, a physical therapist joined our team for rehabilitation work once a week. He could gradually move throughout the house and would eventually walk on the street with a cane within three months. The patient and his family were excited and grateful that he could walk outside again.

Case 10, 83- year-old, female: She had been complaining of severe lumbago with a slight fever (37.1) for a week. She had an appetite despite suffering from constipation for these 3 days. There were no neurological findings, but a large, hard mass with tender and distinct boundaries by palpation was found in the right lower abdomen at our first visit. We suspected the inguinal herniation of intestines. However, we could not proceed through palpation due to the severe local tenderness. After a lumbar EpB, her lumbago ceased, and the abdominal wall tension relaxed; we tried to reposition the herniated mass without success. In response to our request, she was admitted to the emergency room in a nearby hospital. A large, uniform mass clearly separated from the other organs was demonstrated. The surgical operation for her inguinal herniation was conducted by a surgeon in a few hours following our visit.

Case 12, 76- year-old, female: She was diagnosed with scoliosis and osteoporosis of the spine 14 years ago. Unfortunately, her husband suffered from severe dementia and treated her violently and disappeared leaving her alone. Her back pain gradually aggravated despite massage, taking NSAIDs and corset fixing. She could not move and lay on her bed without movement. Her orthopedist consulted us for her pain management. We treated her with the thoracic or lumbar EpB once a week (a total of 73 blocks). At the same time, vitamin D, calcium citrate and elcatonin were injected intramuscularly for her osteoporosis. For approximately 1.5 years she has been able to walk to purchase a small amount of food. Currently, she has also been able to visit the rehabilitation hospital once a week to strengthen her back and lumbar muscles. Her NRS improved from 7 to 3, and her ADLs improved 3 to 6 at the termination of our nerve block treatments.

Case 13, 59-year-old, female: Asked by a practitioner, we visited the female patient who had been discharged from the palliative unit of a hospital a week ago in response to her husband who wanted to care for her in his home. She was suffering from ovarian cancer, stage four, leading her to severe dyspnea caused by lung metastasis with general malaise. Her husband said that she could not speak to him owing to her severe back pain and dyspnea. At the time of our visit, the respiratory pattern of the patient showed shallow tachypnea with an agonized appearance. Auscultation showed wet rales in all areas of her lungs. The pulse oximeter revealed 89% of the oxygen saturation despite nasal oxygen supply of 3 l/min. Instead of the epidural block, we titrated morphine starting from 2mg step-by-step until reaching 20mg (2, 3, 5, 5 and 5mg) through the IV root in the radial vein. Her respiratory rates decreased with an increase in tidal volume. The pulse oximeter showed gradual increase up to 96%. Her back pain and agonized appearance gradually disappeared and was replaced with a peaceful look. Thus, we did not proceed with the epidural block in this patient. She now spoke to her husband with a gentle smile. She died 2 days later without pain.

Discussion

From this preliminary survey on our attempts for nerve blocks at home, mainly epidural blocks (EpBs), including iv morphine in a case of terminal care, it is suggested that the nerve block techniques and narcotic use at home might be useful tools of care for chronic pain patients as well as terminal patients. Thus, to organize the pain treatment team might be useful for pain control at home not only due to their nerve block techniques but also with their acute care experiences. Caregivers who apply the epidural block techniques for the patients should have enough experiences with intensive and emergency care in terms of safe pain treatment procedures at home.

Our promising results suggest that we could care for prefrail or even frail patients with the nerve block treatments via home visits and physical intervention if the physical therapists assist as coworkers as in these cases.

Case 1 reveals that his severe musculoskeletal pain might have led to life in bed which could have resulted in a frail status. The return to walking with support from his family is might have heightened his quality of life. Musculoskeletal conditions are the leading cause of disability worldwide and have a significant impact on other aspects of the health of the elderly such as low physical activity level, poor mobility, frailty, depression, cognitive impairment, falls and poor sleep quality [1-3] as found in case 1. The clustering of musculoskeletal pain with other pain conditions is also common, and the number of pain sites is an important prognostic factor [2]. While musculoskeletal pain is usually nociceptive in origin, older people with musculoskeletal conditions

may also experience neuropathic pain and central pain syndromes. The burden of musculoskeletal disease is now increasing due to the rapid ageing of populations worldwide. Interaction of musculoskeletal pain with co-existing conditions, including other types of pain, needs to be studied in longitudinal studies to identify modifiable targets for intervention. Additionally, potential impacts of musculoskeletal pain and prognostic factors need to be investigated [2].

Autonomous motivation which seems to be consistent with internal health control, and a higher health locus of control is a positive factor for activating home exercises [9]. We always encouraged the patients to move around their homes as much as possible. Throughout our study, our impression was that chronic pain would be affected by several factors, such as patient's psychological motivation, skeletal movements, family assists. Application of home-based neuromodulation or virtual reality rehabilitation methods might be valuable in this regard [10,11]. On the other hand, case 10 showed that the epidural block made the diagnosis easier, as the technique healed the lumbago and relaxed the abdominal wall, even though we could not succeed in treating the herniation manually as the mass was too large. In this case, the history and examination suggested severe incarcerated inguinal hernia and she was admitted for urgent surgery in a nearby hospital. Thus, physical examination should be taken to check the diagnosis made by the referring practitioner before proceeding to the nerve block techniques at home. In this case, we happened to face a large, herniated mass even though the patient's complaint was lumbago. The patient's severe lumbago might have originated from incarcerated hernia as well as constipation.

In case 13, the nerve block was refrained because her dyspnea was so severe that she was unable to speak to her husband. The treatment was focused on controlling her dyspnea so that she could communicate with her husband. The careful titration of morphine led to sound respiration and simultaneous increase in oxygen saturation measured by the pulse-oximeter. We were impressed by her husband's deep appreciation for our staff. We could have used the techniques of morphine drip infusion epidurally [12]. However, we decided to infuse morphine intravenously by titrate in that emergency. Thus, this case may show that the pain team should carry an opioid such as morphine as well as emergency care drugs even in cases scheduled for the nerve blocks at home visits. Careful intravenous titration of morphine instead of the EpB in case 13 might also show that severe respiratory distress could be treated with morphine titration even during home visits as other authors found the similar effects of morphine in the inpatients [13], and in laboratory animals [14].

The ageing population is increasing worldwide, and this trend is bringing challenges both for the elderly as well as society.

With an ageing population, society can expect increased demands on health services and older persons can face mental, social, and physical challenges. To meet these challenges, the elderly as well as society needs to consider how to promote healthy ageing at home, and not at a hospital [15-17]. Further, family-related problems should be kept in mind; the relationship of the patients with families, health status of the families, economic situations, and other factors are not discussed in this survey. Thus, given our preliminary survey of pain treatment mainly via the epidural block techniques at home, we highlighted challenges pertaining to pain management of such older people who hardly visit the outpatient clinic due to difficult walk or homebound. We also identified a new area where such pain control teams have an opportunity in response to chronic pain management with their more specific and practical techniques and the communication skills to the patients and their family members. This plenary survey further suggests that prefrail or frail patients would benefit from additional skills and knowledge in managing their pain to increase activity, participation, confidence, and self-efficacy.

To our knowledge, our experience is the first to explore the possible contribution of this kind of pain control team to care and treat pain at the patients' residences. Providing information in response to questions and concerns raised by the patients' families should be frequently addressed to reduce their anxiety and increase their confidence in such treatments. Furthermore, in cases where the patients and their families demonstrate emotional distress, our staff can also provide brief counseling and/or refer community resources such as social workers. In our study, our staff was willing to be actively involved in problem-solving and decision making to act for their pain-related concerns. This will lessen emotional and physical stress of the patients as well as their families in managing pain at home. The length of our stay in home treatments was 53 to 75 min. Early communication between healthcare providers and the patients with their families about illness and care plan can promote earlier enrollment in home pain services and promote earlier preparation of the staff's pain management knowledge and skills, which ensures a continuity of care at home.

Several study limitations were noticed. First, the detailed lifestyle data of patients and their families could not be fully collected or described particularly during the recent COVID-19 pandemic period. Characteristics of patients' and their families' involvement should have influenced the pain treatments. Second, our study did not examine changes in communication patterns over time. Third, our preliminary experiences lack diversity in cases. Future research should be needed to replicate this study in large populations. Furthermore, we should need individualized interventions for pain management in chronic pain patients at home. Our experiences may be evaluated further to guide future

tailored interventions to optimize and maximize the efficiency of the nerve block treatments via home visits. Utilizing various communication tools (e.g., written materials, websites or mobile applications, videoconferences) and additional multi-disciplinary approaches [18] could be applied for more effective ways of nerve block treatments at home, particularly during recent COVID-19 pandemic period [19].

Summary

It would be valuable to visit homes and conduct the nerve block (the epidural block) for the chronic pain patients who are homebound or not able to visit the outpatient clinic due to an inability to walk. It should be stressed, however, that caregivers should have the emergency maneuver skills as well as carry the appropriate drugs and equipment. This application of the nerve block techniques at home may be valuable for the patients unable to walk or homebound and vulnerable to hospital environments.

References

1. Khan KT, Hemati K, Donovan AL (2019) Geriatric Physiology and the Frailty Syndrome. *Anesthesiol Clin* 37: 453-474.
2. Otones Reyes P, Garcia Perea E, Pedraz Marcos A (2019) Chronic Pain and Frailty in Community-Dwelling Older Adults: A Systematic Review. *Pain Manag Nurs* 20: 309-315.
3. Shem Tov L, Matot I (2017) Frailty and anesthesia. *Curr Opin Anaesthesiol* 30: 409-417.
4. Japanese Ministry of Labor, Health, and Welfare Home Page: Current Trend of Medical Care by Home Visit, 2019.
5. Ševčíková H, Raftery AE (2016) bayesPop: Probabilistic Population Projections. *J Stat Softw* 75: 5.
6. Casale FF, Thorogood A (1985) Review of domiciliary consultations for pain relief. *Anaesthesia* 40: 366-368.
7. Shimoji K, Takahashi N, Iwata N (2006) Application of nerve block technique to home visit treatments. *Journal of Japan Society of Pain Clinicians* 13: 414-418.
8. Moore DC (1990) The 1990 John J. Bonica lecture. The role of the anesthesiologist in managing postoperative pain. *Reg Anesth* 15: 223-231.
9. Liu-Ambrose T, Davis JC, Best JR, Dian L, Madden K, et al. (2019) Effect of a Home-Based Exercise Program on Subsequent Falls Among Community-Dwelling High-Risk Older Adults After a Fall: A Randomized Clinical Trial. *JAMA* 321: 2092-2100.
10. Conti L, Marzorati C, Grasso R, Ferrucci R, Priori A, et al. (2023) Home-Based Treatment for Chronic Pain Combining Neuromodulation, Computer-Assisted Training, and Telemonitoring in Patients with Breast Cancer: Protocol for a Rehabilitative Study. *JMIR Res Protec* 12: 49508.
11. Funao H, Tsujikawa M, Momosaki R, Shimaoka M (2021) Virtual reality applied to home-visit rehabilitation for hemiplegic shoulder pain in a stroke patient: a case report. *J Rural Med* 16: 174-178.

12. El-Baz NM, Faber LP, Jensik RJ (1984) Continuous epidural infusion of morphine for treatment of pain after thoracic surgery: a new technique. *Anesth Analg* 63: 757-764.
13. Ellingsrud C, Agewall S (2016) Morphine in the treatment of acute pulmonary oedema--Why? *Int J Cardiol* 202: 870-873.
14. Akella A, Tiwari AK, Rai OP, Deshpande SB (2016) Morphine blocks the *Mesobuthus tamulus* venom-induced augmentation of phenyldiguanide reflex and pulmonary edema in anesthetized rats. *Indian J Pharmacol* 48: 74-77.
15. Nakai Y, Makizako H, Kiyama R, et al. (2019) Association between chronic pain and physical frailty in community-dwelling older adults. *Int J Environ Res Public Health* 16: 1330.
16. Otones Reyes P, García Perea E, Pedraz Marcos A (2019) Chronic Pain and Frailty in Community-Dwelling Older Adults: A Systematic Review. *Pain Manag Nurs* 20: 309-315.
17. Blyth FM, Noguchi N (2017) Chronic musculoskeletal pain and its impact on older people. *Best Pract Res Clin Rheumatol* 31: 160-168.
18. Peterson S (2018) Telerehabilitation booster sessions and remote patient monitoring in the management of chronic low back pain: A case series. *Physiother Theory Pract* 34: 393-402.
19. George JM, Xu Y, Nursa'adah BJ, Lim SF, Low LL, et al. (2020) Collaboration between a tertiary pain centre and community teams during the pandemic. *Br J Community Nurs* 25: 480-488.