

ORIGINAL ARTICLE

Non-Pharmacological Treatment Uptake For Chronic Musculoskeletal Pain Among Community-Dwelling Older Adults in Petaling District, Selangor

Foong Sim Lee¹, Halimatus Sakdiah Minhat², Siti Anom Ahmad¹

¹ Malaysian Research Institute on Ageing, UPM (MyAgeing), Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia

² Department of Community Health, Faculty of Medicine and Health Science, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia

ABSTRACT

Introduction: Chronic musculoskeletal pain is a common disabling condition among older adults with the majority, remain undertreated. This study aimed to determine the uptake of non-pharmacological treatment for chronic musculoskeletal pain among older adults and the associated factors. **Methods:** A stratified sampling proportionate to size with individual clinics as the strata were used to recruit 276 respondents from six public health clinics in Petaling district, one of the most aged districts in the state of Selangor, Malaysia. Based on the proportion calculated, eligible older adults were selected by systematic random sampling from the registration list. Data was collected using a pre-tested and validated questionnaire through a face-to-face interview with respondents. The questionnaire comprised of seven sections, namely, socio-demographic, comorbidity, depression, pain severity, treatment options, attitude towards chronic pain and chronic musculoskeletal pain. Inferential analysis was conducted using Chi-Square (χ^2) and Fisher's Exact Tests. The P value of < 0.05 regarded as statistically significant. **Results:** A total of 242 (87.7%) of the respondents had chronic musculoskeletal pain, in which 235 (85.1%) were treated with non-pharmacological treatments. The commonly used non-pharmacological treatments were exercise (67.8%), biological-based therapies (40.9%) and massage (33.7%). The uptake of non-pharmacological treatment for chronic musculoskeletal pain among older adults was significantly associated with the presence of diabetes. **Conclusion:** The findings revealed the remarkably high uptake of non-pharmacological treatment among older adults who experienced chronic musculoskeletal pain which was significantly associated with diabetes and the presence of other diseases like high blood pressure, osteoarthritis, back pain and rheumatic arthritis.

Keywords: Chronic musculoskeletal pain, Non-pharmacological treatment, Older adults, Diabetes, Comorbidity

Corresponding Author:

Halimatus Sakdiah Minhat, DrPH

Email: halimatus@upm.edu.my

Tel: +6012-343 8175

INTRODUCTION

The world population is ageing fast. United Nations New York reported that globally, adults aged 60 years and above projected to increase from 12.3 per cent in 2015 or one in eight people to 16.5 per cent in 2030 or one in six people. This increase translated to a projected growth from 901 million to 1.4 billion. This number is expecting to continue to rise to 2.1 billion by the year 2050 (1). Between the year 1991 and 2010, the Malaysian population aged 60 years and above has increased by 1.2 million and is expected to rise to 7 million by 2040 which accounts for 17.6% of the estimated total population of 40 million by then (2). In Malaysia, the chronological definition of elderly is those who are 60 years old and above, the cut-off age adopted

by the United Nations (3).

The ageing process undoubtedly amplifies the incidence of health conditions, which contributes to chronic pain among older adults. The typical chronic pain experienced by older adults is of musculoskeletal origin, generally due to the incidence of age-related disorders (4). Approximately 80% of the older adults experienced some form of musculoskeletal pain and incidence increases steadily with ageing (5). Chronic musculoskeletal pain (CMP) is a primary cause of disability and falls in the older adult population (6). CMP is a common and often undertreated observable fact among the community-dwelling older adults as well as those living in the care institutions (7). Based on Brown et al., pain in older adults is usually undertreated and also not being valued as an essential health issue (8). Due to inadequate treatment, it leads to a decline in functional ability and activities of daily life are affected (7). The incapability to perform some of the most fundamental tasks of daily function was 70–80%

more prevailing in older adults with pain and was more pronounced in those with multiple pain sites than those without pain (9). The most typical sites of CMP are the spine, knees, shoulders and feet, and the four associated primary musculoskeletal conditions are osteoarthritis, rheumatoid arthritis, low back pain and osteoporosis. Sleep disturbance, reduced activities, fatigue and mood alternations commonly linked to CMP. However, the impact and symptom of experience differ significantly among older adults (10).

According to the National Health and Morbidity Survey 2006 (11), the prevalence of chronic pain among the older adults in Malaysia was 15.2% where the prevalence increased with advancing age. The highest prevalence was seen among the old-old group (80 years and older), females, Indian ethnicity, widows/widowers, rural residency and those without any education. Complaints of pain increased with age in the age group of >65, where the main issue was about joints, localized osteoarthritis of the knee and disability of not able to squat (12). The prevalent causes of pain among the older adults were post-stroke pain, cancer-related pain, peripheral vascular disease, post-herpetic neuralgia, painful diabetic neuropathy and musculoskeletal disorders (including osteoarthritis, low back and neck pain, osteoporotic fractures and chronic joint pain) (13).

CMP is commonly managed by a plethora of treatment options that include pharmacological and non-pharmacological (14). Many factors are contributing to optimal pain treatment among older adults. These include socio-demographic factors, older adult's cognition status, a high number of comorbidities, awareness of pain relief, fear of addiction, side effects, pain reporting, communication problem and older adults knowledge on treatment options. Consequently, pain management is difficult to be carried out due to the presence of multiple health problems and the increased prevalence of treatment side-effects (15). It is paramount for healthcare providers caring for this group of population to pay more considerable attention and be aware of the determinants to care, age-related physiologic changes, concomitant diseases and medications that would impact therapeutic option selection to ascertain safe and effective pain management (16). Hence, the treatment chosen to treat CMP is crucial to ensure it relieves pain and uplifts the quality of life of older adults. Although it is common, the published adherence of older adults towards non-pharmacological treatment for CMP is unknown. The main advantage of using non-pharmacological therapies in treating older adults is the absence of drug-related side-effects (13). Non-pharmacological treatment strategies encircle a wide range of treatments and modalities that includes physical therapy, manual therapy, relaxation/biofeedback, cognitive-behavioural therapy (CBT), Trans-cutaneous Electro Nerve Stimulation therapy (TENS), mind-body therapy, biologically-based therapies, exercise, acupuncture, massage, heat/cold

therapy, chiropractic and many more programmes (17).

Majority of the researches on treatment options, assessment and pain management of older adults were focusing mainly on the management of acute postoperative pain and pain related to specific chronic illnesses. There is a lack of research conducted on the older adults CMP experience and management particularly in Malaysia context. The overall purpose of this study was to identify and further understand the uptake of non-pharmacological treatment options for CMP among the older adults in Petaling District, Selangor. In this manner, the study sought to fill the gap of research on CMP which has typically focused on young adults or all aged group in general either in the community or particular workplace setting but no investigation specifically on older adults and the associated factors towards non-pharmacological treatment option aspect.

MATERIALS AND METHODS

Study Design and Duration

This research study was a cross-sectional study which was carried out from August 2018 to September 2019.

Study Population

In this study, the subjects were recruited from six public health clinics located at Petaling District of Selangor. In Petaling District Selangor, Malaysia, there are a total of eight public health clinics, located at Seri Kembangan, Kelana Jaya, Puchong, Taman Medan, Shah Alam Section 7 and 9, Kota Damansara and Paya Jaras (Adapted from Selangor State Health Department, 2018). Paya Jaras health clinic was omitted due to low elderly proportion as advised by the Selangor State Health Department and Kota Damansara clinic was used for the pilot study. Thus, the final total number of public health clinics included in this study was only six. Selangor state was chosen because Selangor is the highest populated state among all the 13 states in Malaysia in terms of the total population of all ages as well as older adults which accounted for 6.38 million and 0.48 million respectively. Petaling District was purposively selected based on the highest proportion of older adults among the nine districts in Selangor (Source: Department of Statistic Malaysia 2017). The older adult populations aged 60 years and above who came to the designated health clinics were selected based on the inclusion and exclusion criteria. The inclusion criteria are, older adults aged 60 years and above and those who can understand English or Malay; the exclusion criteria are older adults who are too ill (with major pathologies of the musculoskeletal structures including fractures, spinal cord injuries, infections or neoplasms as diagnosed by certified medical practitioners) and those are who severely demented with cognitive score of < 17 measured using the Mini Mental State Examination. Thus, only older adults who are aged

60 years and above, can understand English or Malay and with a good cognitive score of above 17 were included in the study. From the total of 282 eligible older adults recruited from the six clinics based on the inclusion and exclusion criteria, only 276 respondents completed the questionnaires making the response rate of 97.9%. The reason for the non-response from 6 respondents was due to incompleteness of questionnaires where these respondents stopped amid interview for doctor's appointment and did not return to complete the surveys. The sampling size of this study was calculated based on two-sample population proportions formula to compare two (2) groups for hypothesis testing. A stratified sampling proportionate to size with individual public health clinic as the strata was used in this study. The selection of a total number of respondents from the individual clinic was made based on the calculated proportion, which was calculated according to the number of eligible older adult patients in all the selected six clinics and also the estimated sample size calculated. The proportion of older adults selected from each health clinic was done using systematic random sampling based on the calculated interval (k) for each stratum and a pre-determined starting point.

Validation and reliability of questionnaires

A pre-test through a face to face interview on the draft questionnaires in both language – English and Malay for this study conducted on thirty older adults who took part voluntarily at Kota Damansara public health clinic to validate the content of questionnaires. Content validity of these questionnaires has been reviewed and verified by two experts from Public Health Medicine Department, UPM before disseminating for the pre-test exercise. The main objective of this pre-test was to assess the level of understanding among the older adults on language, the time needed to complete the draft questionnaire, and whether they encounter any difficulty in selecting a response. Cronbach Alpha was used to measure the consistency and reliability of two new questionnaires with Likert Scale statement namely the Graded Chronic Pain Scale in local Malay language and Attitude towards Chronic Pain (modified version) where both showed a Cronbach Alpha value of above 0.905 and 0.914 respectively. An alpha value of 0.70 is considered a sufficient measure of reliability or internal consistency of an instrument (18).

Questionnaires

There were seven sections of questionnaires being used to measure all the different variables involved in this study. The socio-demographic questionnaire was used to gather necessary information of age, gender, ethnicity, marital status, education level and income of respondents. This questionnaire is to provide an overview of the characteristics of respondents who participated in the study. The Comorbidity questionnaire comprised of 13 types of diseases was used to collect information on the presence of the type of comorbidity among the

respondents. This questionnaire was adapted from the Self-Administered Comorbidity Questionnaire by Sangha et al., (19) but was modified to suit the purpose of this study. For each disease, respondents were required to answer Yes or No question. The obtained information further regrouped into 1 illness and > 1 illness. Geriatric Depression Scale (GDS), a validated simple, 14-item, Yes/No questionnaire was adopted to identify the possible depression among older adults (20) which later categorised into Yes and No. Musculoskeletal Pain History to obtain information of respondents on the presence of musculoskeletal pain, duration of pain, pain sites, cause of pain and the pain solutions opted by respondents. A list of Treatment Options for CMP with the purpose to record the types of treatment options being adopted by older adults in addressing their CMP issues. Graded Chronic Pain Scale (GCPS) questionnaire is a multi-dimensional measure that assessed the pain severity and pain-related disability scoring based on an 11-point Likert scale with responses ranging from 0-10 (21). Calculated scores were later being reclassified as low and high pain. Attitude towards Chronic Pain (ATCP) questionnaire is a modified version questionnaire used to assess the constructs of stoicism and cautiousness of the older adults relevant to pain perception, reporting and treatment (22). All items scored on a 5-point Likert scale ranging from 1 – 5 to measure the degree of agreement in terms of respondents' attitude towards chronic pain in which the scores were later being re-categorised as poor and good.

Ethical consideration

Before data collection, ethical approval (Reference Number: KKM.NIHSEC.P18-853 (6)) for this study was obtained from the Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia and individual public health clinics together with the written and verbal consent from each study participant.

Statistical Analysis

Data collected were entered and analyzed using the statistical package SPSS® for Windows® version 23.0. All continuous variables described as median (Interquartile Range [IQR]) or means (Standard Deviations [SD]). As for categorical data, all documented as frequency (n) and percentages (%). For categorical data, the analysis was executed using Chi-Square (χ^2) and Fisher's Exact Tests to measure for the association. Bivariate analysis was conducted to test the strength and direction of the relationship between the independent and dependent variables. A multiple logistic regression model was used to examine and evaluate predictors of the treatment options among the older adults in Petaling District, Selangor. A statistical probability level of P value < 0.05 was considered as statistically significant.

RESULTS

The prevalence outlook of musculoskeletal pain and the

non-pharmacological treatment options uptake among the respondents are displayed in Table I. From the 276 respondents, a high percentage of 87.7% of them experienced pain, and 85.1% of them chose various non-pharmacological treatments to address their CMP issues. The top 5 most favourable treatments were exercise (67.8%), biologically-based therapies (food supplements, nutrition, naturopathy, homoeopathy, herbs, traditional Chinese medicine (40.9%)), massage (33.7%), acupuncture (11.6%) and physical therapy (11.2%).

Table I: Prevalence of CMP and Non-pharmacological Treatment Uptake (n=276)

Factor	n	%
Chronic Musculoskeletal pain		
No	34	12.3
Yes	242	87.7
Non-pharmacological treatment		
No	41	14.9
Yes	235	85.1
Physical Therapy	31	11.2
Manual Therapy	24	8.70
Relaxation/Biofeedback	7	2.50
Cognitive-behavioural therapy (CBT)	1	0.40
Transcutaneous Electro Nerve Stimulation Therapy (TENS)/ Bio-stimulation	19	6.90
Mind-Body Therapy	7	2.50
Biologically-based therapies (food supplements, nutrition, naturopathy, homoeopathy, herbs, traditional Chinese medicine)	113	40.9
Exercise	187	67.8
Acupuncture	32	11.6
Massage	93	33.7
Heat/Cold therapy	12	4.30
Chiropractic	2	0.70

The socio-demographic characteristics of the 276 eligible older adults who agreed and participated in the study are shown in Table II. The mean age of this sample was 67.71. Majority of the respondents was from the young-old group (88.8%), slightly more male (51.1%) than female (48.9%), were non-Malay (58.0%), married (89.5%), received higher education (54.3%) and from the low-income category (80.4%). There was a high presence of multi-morbidities among the respondents where 81.2% of them reported having more than one illness, and 18.8% had one illness. A high proportion of the sample had high blood pressure (79.3%). More than half of the sample had diabetes (54.3%), osteoarthritis (50%), back pain (48.9%) and rheumatic arthritis (29.0%). The bulk of the sample (74.6%) was in a healthy state without any depression. In terms of pain severity among the sample, the majority of respondents (85.1%) were experiencing low pain intensity. As for the attitude towards chronic pain, slightly more than half (52.2%) of the respondents commented they could not manage their pain well and usually will resort to medication as a solution.

The associated factors for non-pharmacological treatments uptake are exhibited in Table III. The association was tested using the Chi-Square and Fisher's

Table II: Characteristics of the Respondents (n=276)

Factors	n	%	Mean ± SD
Age group			
Young Old (60 – 74 years)	245	88.8	
Old-Old (>75)	31	11.2	67.71 ± 5.62
Gender			
Male	141	51.1	
Female	135	48.9	
Ethnicity			
Malay	116	42.0	
Non-Malay	160	58.0	
Marital Status			
Single	29	10.5	
Married	247	89.5	
Education Level			
Low (No formal & primary)	126	45.7	
High (Secondary & Tertiary)	150	54.3	
Income			
Low Income (B40)	222	80.4	
High Income (M40 & T20) (DOSM, 2016)	54	19.6	
Type of Chronic Illnesses			
Heart disease	36	13.0	
High blood pressure	219	79.3	
Lung disease	11	4.00	
Diabetes	150	54.3	
Ulcer or stomach disease	43	15.6	
Kidney disease	21	7.60	
Liver disease	9	3.60	
Anaemia or other blood diseases	2	0.70	
Cancer	7	2.50	
Osteoarthritis	138	50.0	
Back pain	135	48.9	
Rheumatic arthritis	80	29.0	
Number of Comorbidities			
1 Illness	52	18.8	
> 1 Illness	224	81.2	
Depression			
No	206	74.6	
Yes	70	25.4	
Pain Severity			
Low	235	85.1	
High	41	14.9	
Attitude			
Poor	144	52.2	
Good	132	47.8	

Exact Tests. Based on the results, significant association found between non-pharmacological treatments and comorbid of diabetes ($\chi^2 = 4.56, P = 0.033$). However, from the Multiple Logistic Regression analysis, there was no statistically significant predictor found towards non-pharmacological treatment options for CMP among the older adults in Petaling District Selangor. A comparison matrix on the various non-pharmacological treatment options uptake for CMP among the older adults of different population is displayed in Table IV.

DISCUSSION

In this study, a high prevalence of CMP among the community-dwelling older adults within Petaling District, Selangor was observed at 87.7%. This finding is consistent with the results from a systematic review on 25 studies that involved 116,091 elderly Brazilians where the prevalence estimates reached 86% for CMP in any location (23) and also in line with another study

Table III: Associated factors for Non-pharmacological Treatment Uptake (n=276)

Factors	Non-Pharmacological Treatment		x / Fisher's Exact Test	P Value
	Yes n (%)	No n (%)		
Age				
Young Old (60-74 years)	207 (84.5)	38 (15.5)	0.74	0.390 ^b
Old-old (≥ 75)	28 (90.3)	3 (9.7)		
Gender				
Male	120 (85.1)	21 (14.9)	0.00	0.985 ^a
Female	115 (85.2)	20 (14.8)		
Ethnicity				
Malays	99 (85.3)	17 (14.7)	0.79	0.850 ^b
Non-Malays	136 (85.0)	24 (15.0)		
Chinese	92 (83.6)	18 (16.4)		
Indians	43 (87.8)	6 (12.2)		
Others	1 (100)	0 (0.0)		
Marital Status				
Married	212 (85.8)	35 (14.2)	0.87	0.350 ^a
Single	23 (79.3)	6 (20.7)		
Education				
Lower Education	104 (82.5)	22 (17.5)	1.24	0.265 ^a
Higher Education	131 (87.3)	19 (12.7)		
Income				
Low (B40)	189 (85.1)	33 (14.9)	0.002	0.993 ^a
High (M40 & T20)	46 (85.2)	8 (14.8)		
Type of Chronic Illnesses				
Heart Disease				
No	205 (85.4)	35(14.6)	0.11	0.743 ^a
Yes	30 (83.3)	6 (16.7)		
High Blood Pressure				
No	48 (84.2)	9(15.8)	0.05	0.824 ^a
Yes	187 (86.0)	32(14.6)		
Lung Disease				
No	225 (84.9)	40(15.1)	0.30	0.583 ^a
Yes	10 (90.9)	1(9.1)		
Diabetes				
No	101 (80.2)	25 (19.8)	4.56	0.033 ^{**}
Yes	134 (89.3)	16 (10.7)		
Ulcer or Stomach Disease				
No	197 (84.5)	36 (15.5)	0.42	0.644 ^b
Yes	38 (88.4)	5 (11.6)		
Kidney Disease				
No	215 (84.3)	40 (15.7)	1.83	0.333 ^b
Yes	20 (95.2)	1 (4.8)		
Liver Disease				
No	225 (84.6)	41 (15.4)	1.81	0.367 ^b
Yes	10 (100.0)	0 (0.0)		
Anaemia or Other Blood Disease				
No	234 (85.4)	40 (14.6)	1.97	0.275 ^b
Yes	1 (50.0)	1 (50.0)		
Cancer				
No	229 (85.1)	40(14.9)	0.00	1.000 ^b
Yes	6(85.7)	1 (14.3)		
Osteoarthritis				
No	116 (84.1)	22 (15.9)	0.26	0.612 ^a
Yes	119 (86.2)	19 (13.8)		
Back Pain				
No	116 (82.3)	25(17.7)	1.88	0.170 ^a
Yes	119 (88.1)	16 (11.9)		
Rheumatic Arthritis				
No	166 (84.7)	30(15.3)	0.11	0.742 ^a
Yes	69 (86.3)	11 (13.8)		
Number of Comorbidities				
1	41 (78.8)	11 (21.2)	2.01	0.156 ^a
>1	194 (86.6)	30(13.4)		
Depression				
No	176 (85.4)	30 (14.6)	0.05	0.815 ^a
Yes	59 (84.3)	11 (15.7)		
Pain Severity				
Low	200 (85.1)	35 (14.9)	0.00	0.966 ^a
High	35 (85.4)	6 (14.6)		
Attitude towards Chronic Pain				
Good	117(88.6)	15 (11.4)	2.44	0.118 ^a
Poor	118(81.9)	26 (18.1)		

^a Chi-Square Test (X²)

^b Fisher's Exact Test

* Significant at P<0.05

Table IV: Non-pharmacological treatment uptake among the older adults of different population

Author	Year	Title	Aim	Method	Population	Conclusion
Cunningham & Kashi-kar-Zuck	2014	Non-pharmacological Treatment of Pain in Rheumatic Diseases and Other Musculoskeletal Pain Conditions	Review focused on research-based evidence for non-pharmacological intervention including psychological intervention, physical exercise, patient education, and complementary approaches for pain management for patients with rheumatic diseases and common musculoskeletal pain conditions, such as low back pain.	Review	Mixture	Overall, a number of non-pharmacological treatment approaches, including cognitive behavioural therapy, exercise, and patient education, have had beneficial effects in improving patient outcomes in the context of multidisciplinary care. Emerging evidence suggests that combined non-pharmacological approaches (e.g., exercise and cognitive behavioural therapy) may be beneficial, particularly for patients with higher levels of distress and disability
Hirase, Kataoka, Nakano Sakamoto and Okita	2018	Effects of Exercise Training Combined with Increased Physical Activity to Prevent Chronic Pain in Community-Dwelling Older Adults: A Preliminary Randomized Controlled Trial	To examine if exercise training combined with increased physical activity more effective in improving pain and physical activity than exercise training alone in community-dwelling older adults without chronic pain and subsequently to develop a chronic pain prevention program.	Randomized controlled trial	Japanese	For physical activity, the intervention group showing significant improvement in pain intensity and total number of pain sites than the control group. In older adults without chronic pain, exercise training combined with increased physical activity improves key outcome indicators more effectively than exercise training alone.
Tang, Tse, Leung and Fortis	2019	The effectiveness, suitability, and sustainability of non-pharmacological methods of managing pain in community-dwelling older adults: a systematic review	To evaluate the effectiveness, suitability, and sustainability of non-pharmacological pain management interventions for community-dwelling older adults	Systematic review	Mixture	Non-pharmacological methods of managing pain were effective in lowering pain levels in community-dwelling older adults, and can be promoted widely in the community.
Couilliot et al.	2013	Acceptability of an acupuncture intervention for geriatric chronic pain: an open pilot study	To investigate the acceptability and effectiveness of acupuncture for persistent musculoskeletal pain in the elderly and assessed the conditions for a future controlled trial.	Intervention pilot study	France	Results suggested that acupuncture is highly acceptable and could be very useful in the management of chronic pain when performed in very old frail people with chronic physical and mental disability.
This Study	2019	Non-pharmacological treatment uptake for chronic musculoskeletal pain among the older adults in Petaling District, Selangor	To determine the uptake of non-pharmacological treatment for chronic musculoskeletal pain among older adults and the associated factors	Cross-sectional	Malaysia	Findings revealed the remarkably high uptake of non-pharmacological treatment among older adults who experienced chronic musculoskeletal pain which was significantly associated with diabetes

conducted in Turkey by Cicekci et al (2017) (24), the frequency of CMP recorded at as high as 97% in older adults population.

With the fast growth of the older adult population, the number of individuals suffering from CMP also has increased exponentially. CMP is a common determinant for older adults to seek treatment and care from healthcare providers (25). In light of this trend, it is paramount to have effective and comprehensive pain management strategies to assist the older adults in overcoming their pain distress and disability. CMP is usually managed by an abundant of treatment options that comprise of pharmacological and non-pharmacological treatments. Many factors are contributing to optimal pain treatment among older adults (15).

From the findings of this study, it was a visible result of the high uptake of non-pharmacological treatments for CMP among the older adults at 85.1%. From this bulk of 235 older adults who opted for non-pharmacological treatments to address their CMP problem, there was minimal distribution difference between Malays and Chinese older adults. Ethnic disparities in pain responses and management have been discovered constantly in the older adults cohort (26). Different ethnic with different culture influences one's experiences, response to pain and reporting, beliefs in illness prevention and treatments as well as pain coping and presence of comorbidities. Different ethnic have different preference and belief in intervention treatment for dealing with CMP like Chinese older adults found to perceive non-

pharmacological therapies like massage, acupuncture, and herbal medication as natural, healthy, more controlled and less reverse effects (27).

Among all the listed non-pharmacological treatments, exercise (67.8%) was the most common form of treatment adopted by the older adults to address their CMP issues followed with biological-based therapy (40.9%), massage (33.7%), acupuncture (11.6%) and physical therapy (11.2%). These results were consistent with the previous studies conducted on the various non-pharmacological pain management options for CMP.

According to Carlsons & Carlsons (2011) (25), CMP may lead to limitations in strength and flexibility in older adults. Exercise considered as an active path has been incorporated to restore the strength, flexibility and endurance to muscle groups though it took months to see significant results that often contributed to improved functionality in the long term. Exercise is regarded as one of the essential non-pharmacological approaches in CMP management (28). Though exercise interventions for chronic pain are evidence-based, however, are underutilized and ought to be included as a central component in the long term treatment plan for older adults. The fundamental elements include balance training, strengthening, flexibility, and endurance, the mix of which should be customized according to the needs of each older adult. Routine exercise, muscle strengthening, interventions to enhance physical activities, together with weight management programmes are useful techniques in managing CMP

like osteoarthritis, low back pain and knee pain, among the older adults. Kjekken et al (29) in their overview of 9 systematic reviews on exercise therapy for muscle and bone health, found a substantial amount of empirical evidence supporting exercise therapy as a mainstay in the management of musculoskeletal pain and treatment effect increases with the number of exercise sessions in particular for low back pain and knee osteoarthritis. Biologically-based therapies that include vitamins, herbs, whole food diets, functional foods, minerals, fatty acids, proteins, prebiotics and probiotics, botanic compounds, traditional Chinese herbs and animal-derived extracts were commonly accepted to supplement the older adults' daily diet as part of the pain management strategies (30).

One of the most widely used complementary therapy chosen by older adults to address the psychological factor due to CMP is massage therapy (31). Many studies confirmed the positive effects of massage therapy in reducing anxiety and stress by modulating the appropriate brain wave activities and evident that massage therapy effectively improves the health and well-being of older adults. It was not a surprise that 33.7% of the older adults from our study chose massage therapy in overcoming their CMP discomfort.

Acupuncture is also a preferred non-pharmacological treatment option by older adults to address their CMP issues (32). Acupuncture is one of the standard treatments available for managing acute and chronic pain (33) and most preferred by Chinese older adults (27). It is regarded as a safe, effective and cost-effective treatment for various types of pain and recommended as the first-line treatment for pain before opiates prescribed. As discovered by Couilliot et al, acupuncture is an acceptable and effective chronic pain treatment for older adults (34). Acupuncture evident to have moderate to high effect on relieving pain with the most substantial evidence for osteoarthritis, back pain, neck pain, shoulder pain, myofascial pain, osteoarthritis and also headache has been well-supported by the growing research statistics worldwide.

Physical therapy was another non-pharmacological treatment from our findings that were supported by previous studies. Physical therapy interventions as pointed out by Edeer et al., (35) can provide pain relief, beneficial effects on physical ability, improve the mood of older adults with negligible adverse risk able, correct muscle imbalances, enhance the shock absorption capacity of tissue structures, reduce stress and correct mal-alignments of joint structures. Strengthening exercises found to be an effective intervention treatment for LBP as it helps to alleviate pain, improve physical functions and prevent disability in clinical settings. When combined with other pain modalities and manual therapies, it further enhanced the effectiveness of pain reduction (36). Exercise training coupled with

more physical activity is an appropriate and effective intervention programme to impede chronic pain in community-dwelling older adults.

Though pharmacotherapy is the first-line treatment option used to assist older adults in pain control, which is relatively easy to apply, older adults also have an increased risk of adverse reactions (7). Multimorbid older adults are susceptible to the risks of unintended medication, adverse outcomes and adverse drug events (37). As supported by Naci et al. in their meta-epidemiological study, non-pharmacological therapies regarded as effective, at times better than drug therapy in treating various chronic conditions among older adults (38). Non-pharmacological treatment options have fewer risks of side effects and are more economical for older adults (39). According to Woolf and Pfleger, the musculoskeletal condition is a significant burden on older adults and is the second-largest contributor to disability worldwide. The most typical musculoskeletal conditions are osteoarthritis, rheumatoid arthritis, and low back pain. Osteoarthritis, which is associated with loss of joint cartilage, commonly leads to pain and loss of function primarily in the knees and hips of those aged >60 years. By the year 2020, osteoarthritis is projected to be the fourth leading cause of disability due to the increases in life expectancy and ageing populations. Rheumatoid arthritis, an inflammatory condition usually affects multiple joints is more prevalent among women. Low back pain is the most prevalent of musculoskeletal conditions and affects nearly everyone at some point in time and about 4–33% of the population at any given point (40).

Older adults having comorbid of Diabetes was found to have a significant association with a non-pharmacological treatment option. Based on the statistics provided by the International Diabetes Federation, there are approximately 425 million adults aged between 20-79 years living with diabetes in 2017, and this is expected to rise exponentially to 629 million in 2045 (41). Based on the Malaysian National Health Morbidity Survey III 2006, the national prevalence of diabetes was 11.6% where the incidence among the 60-64 years old was ranging from 20.8 to 26.2% (42). People diagnosed with Diabetes Mellitus tend to experience various musculoskeletal system problems, which led to pain and loss of function at the involved sites and restrict the exercise programmes (43). Among some of the musculoskeletal conditions associated with Diabetes Mellitus that can cause significant disability are rheumatic arthritis, osteoarthritis, gouty arthritis, osteoporosis, diabetic muscle infarction, diabetic amyotrophy, limited joint mobility, Charcot joint, trigger finger, stiff hand syndrome, carpal tunnel syndrome, frozen shoulder, Dupuytren's contracture and diffuse idiopathic skeletal hyperostosis (42). Even though multiple pharmacological treatment options widely used in patients with Diabetes Mellitus, non-pharmacological

interventions were recommended to be considered to modify the pathophysiological mechanisms of the disease (44). Proper non-pharmacology interventions like appropriate dietary, combined with consistent physical activities, are essential in the management of Diabetes Mellitus. The beneficial outcomes are it not only improves glycaemic outcomes but at the same time bestow advantages for other associated diseases like dyslipidaemia, hypertension, obstructive sleep apnea and cardiovascular diseases. A combination of proper diet, aerobic exercise, strength training and yoga therapy has been recognised to be effective and helpful in attaining glycaemia control, modulating body composition and risk factors hence delaying the progression of the Diabetes Mellitus complications in particular.

However, from this study, there were no significant associations found between non-pharmacological treatment options and all socio-demographic factors, presence of comorbidities of other high prevalence diseases like heart, high blood pressure, lung, ulcer or stomach, kidney liver, anaemia or other blood disease, cancer, osteoarthritis, back pain and rheumatic arthritis; depression, pain severity and attitude towards chronic pain.

According to Tracy & Morrison, the consideration for which type of treatment option for CMP influenced by age as increasing age associated with various physiologic changes. Given its precise physiologic mechanisms, pharmacotherapy is the first, and most widely used treatment modality. The dose and route pain medications are two critical considerations due to the age-related changes in absorption, metabolism, distribution, and excretion among older adults. For this group of older adults, multi-disciplinary treatment approaches that combined with non-pharmacological treatment due to the absence of drug-related side effects always recommended (16). However, the bigger portion of the respondents of this study was from the young-old group with low pain intensity. This scenario seems to explain why age has no significant association with non-pharmacological treatment.

Notwithstanding the prevalence and impact on the various health aspects and musculoskeletal pain were much higher in women than men (45) and on top of that women tend to adopt more psychological approaches (27) based on the findings by many previous studies, but there was no significant gender difference in this study. In a multicultural society like Malaysia, pain identification and management in older adults requires health care providers to bridge language, religion and cultural barriers. Older adults with different cultural beliefs may have a different mode of expression, pain acceptance and preference of treatment options. Nevertheless, there were more non-Malay respondents in this study which comprised of different ethnicities in this category.

Low education level and being single are more likely to be associated with higher pain scores and also more likely to report pain (46). The non-significance of the association was because the majority of the respondents of this study was married and with a higher education level. Income or socio-economic status is also another factor that affects the provision of treatments for older adults (47). Due to financial difficulties, some older adults cannot afford the costs of particular pain therapy (48). This fact appeared to fit well to the findings of this study as the majority of the respondents was from the low-income group.

Though non-pharmacological treatment like problem-solving therapy, a form of cognitive-behavioural therapy is an effective treatment customarily used for persistent pain, depression and dysfunction by redirecting the cognitive focus away from pain (49), there were no significant associations between non-pharmacological treatment and all these conditions. In this study, majority of the respondents were in a healthy state without any depression, nor suffering from severe pain and disability. Belief, attitude, and awareness of the older adults were identified as barriers in choosing the non-pharmacological treatment as the modality to address their chronic pain (50). Having the belief that medications are more effective, scepticism on the efficacy of non-pharmacological treatment and unaware of the availability of non-pharmacological treatment options are common among older adults.

To the best of our knowledge, this study was the first comprehensive study conducted on prevalence and the treatment uptakes for CMP among older adults in Petaling District, Selangor based on the available published journals. Data obtained from this study can grant baseline information on the pattern of non-pharmacological treatment options, being adopted by the community-dwelling older adults. These findings are an essential future reference to improve gaps and problems identified in chronic pain, treatment options and pain management. Data can be used as the reference for early identification and development of an appropriate type of effective pain relief or intervention strategies and programmes to manage this group of the population for the prevention of CMP as well as rehabilitation. Improvements in treatments and CMP management help to shift the threshold of disability among older adults. Even a slight success in treatment may reduce the degree of pain, maintaining older adults independent for more extended periods in the community.

Limitations in this study includes not able to measure causal relationship since the study design used in this study was a cross-sectional study. This study relied on self-reported data, and there was no medical test that could refute the existence of CMP among respondents. The recall biases might exist as well. The sample size of 276 was recruited from a group of patients visiting

the respective health clinics within one Petaling District only. Other districts and states in Malaysia need to be included. There are still many other factors like knowledge, family support, decision making and more Complementary and Alternative Medicine approaches not included in this study.

The focal point of this study was to explore the uptake of the non-pharmacological treatment approach for CMP among older adults and the associated factors. Based on the findings of this study, suggested that further studies should focus on pain relief strategies to address the prevalence of CMP, be multi-centred and include a more extensive involvement of subjects to increase the power of study so that findings could be generalized to the whole nation of Malaysia. Since the present study was a cross-sectional study by nature, for future research, it is highly recommended to explore the decision-making, develop pain relief and intervention strategies including comprehensive and broad health education programmes for older adults based on the above significant factors to address CMP; also to conduct a cohort or case study to identify causality of CMP.

CONCLUSION

Based on the findings of the study, we confirmed that CMP was typical among older adults in Petaling District at a high prevalence of 87.7%. The findings revealed the remarkably high uptake of non-pharmacological treatment among older adults who experienced CMP which was significantly associated with diabetes and the presence of other comorbid like high blood pressure, osteoarthritis, back pain and rheumatic arthritis. Though there was no significant predictor found between non-pharmacological treatment option and all researched factors, this study has provided an insight into the prevalence of CMP among older adults and the uptake of non-pharmacological treatment non-pharmacological treatment options by this group of population in association with its contributing factors.

ACKNOWLEDGEMENTS

We are much grateful to all the voluntary elderly who participated in the survey for their consent and cooperation. We would like to thank the Director-General of Health Malaysia for his permission to publish this article. This study was supported by the Malaysian Research Institute on Ageing, UPM (MyAgeing).

REFERENCES

1. United Nations, Department of Economic and Social Affairs PD (2017). World Population Ageing 2017 - Highlights. 2017.
2. Tey NP, Siraj SB, Kamaruzzaman SBB, Chin AV, Tan MP, Sinnappan GS, et al. Aging in multi-ethnic Malaysia. *Gerontologist*. 2016;56(4):603–9.
3. Yunus NM, Abd Manaf NH, Omar A, Juhdi N, Omar MA, Salleh M. Determinants of healthcare utilisation among the elderly in Malaysia. *Institutions Econ*. 2017;9(3):117–42.
4. Takai Y, Yamamoto-mitani N, Okamoto Y, Koyama K. Literature Review of Pain Prevalence Among Older Residents of Nursing Homes. *Pain Manag Nurs*. 2010;11(4):209–23.
5. Donald IP, Foy C. A longitudinal study of joint pain in older people. 2004;43(10):1256–60.
6. Leveille SG, Jones RN, Kiely DK, Hausdorff JM, Shmerling RH, Guralnik JM, et al. Chronic musculoskeletal pain and the occurrence of falls in an older population. *JAMA - J Am Med Assoc*. 2009;302(20):2214–21.
7. Kaye A, Baluch A, Scott J. Pain Management in the Elderly Population: A Review. *Oschner J*. 2010;10(3):179–87.
8. Brown ST, Kirkpatrick MK, Swanson MS, Mckenzie IL. Pain Experience of the Elderly. *Pain Manag Nurs* [Internet]. 2011;12(4):190–6. Available from: <http://dx.doi.org/10.1016/j.pmn.2010.05.004>
9. Patel KV, Guralnik JM, Dansie E., Turk DC. Prevalence and impact of pain among older adults in the United States: findings from the 2011 National Health and Aging Trends Study. *Pain*. 2013;154(12):1–22.
10. Jьni P, Low N, Reichenbach S, Villiger PM, Williams S, Dieppe PA. Gender inequity in the provision of care for hip disease: Population-based cross-sectional study. *Osteoarthr Cartil*. 2010;18(5):640–5.
11. Mohamed Zaki LR, Hairi NN. Chronic pain and pattern of health care utilization among Malaysian elderly population: National Health and Morbidity Survey III (NHMS III, 2006). *Maturitas* [Internet]. 2014;79(4):435–41. Available from: <http://dx.doi.org/10.1016/j.maturitas.2014.08.014>
12. Veerapen K, Wigley RD, Valkenburg H. Musculoskeletal pain in Malaysia: A COPCORD survey. *J Rheumatol*. 2007;34(1):207–13.
13. Mitchell C. Assessment and management of chronic pain in elderly people. 2001;(1997).
14. Babatunde OO, Jordan JL, Van Der Windt DA, Hill JC, Foster NE, Protheroe J. Effective treatment options for musculoskeletal pain in primary care: A systematic overview of current evidence. Vol. 12, *PLoS ONE*. 2017.
15. Veale DJ, Woolf AD, Carr AJ. Chronic musculoskeletal pain and arthritis: Impact, attitudes and perceptions. *Ir Med J*. 2008;101(7).
16. Tracy B, Morrison RS. Pain Management in Older Adults. *Clin Ther* [Internet]. 2013;35(11):1659–68. Available from: <http://dx.doi.org/10.1016/j.clinthera.2013.09.026>
17. Connelly P (American GS. The Management of Chronic Pain in Older Persons. *Am Geriatr Soc*. 1998;46:635–51.
18. Taber KS. The Use of Cronbach's Alpha When

- Developing and Reporting Research Instruments in Science Education. *Res Sci Educ.* 2018;48(6):1273–96.
19. Sangha O, Stucki G, Liang MH, Fossel AH, Katz JN. The self-administered comorbidity questionnaire: A new method to assess comorbidity for clinical and health services research. *Arthritis Rheum.* 2003;49(2):156–63.
 20. Yesavage JA. Geriatric Depression Scale (Short Version). *Psychopharmacol Bull.* 1988;24(4):709–11.
 21. Von Korff M, Ormel J, Keefe FJ, Dworkin SF. Grading the severity of chronic pain. *Pain.* 1992;50(2):133–49.
 22. Yong H, Gibson SJ, Helme RD. Development of a Pain Attitudes Questionnaire to Assess Stoicism and Cautiousness for Possible Age Differences. 2001;56(5):279–84.
 23. Miranda VS, Bf Decarvalho V, Machado LA, Marcos J, Dias D. Prevalence of chronic musculoskeletal disorders in elderly Brazilians: a systematic review of the literature [Internet]. 2012 [cited 2019 Feb 8]. Available from: <http://www.biomedcentral.com/1471-2474/13/82>
 24. Cicekci E, Ozisler Z, Ozel S, Unsal-delialioglu S, Ozisler C. The Factors of Musculoskeletal Pain in Geriatric Patients and the Relationship between Pain and Quality of Life. *Int J Clin Med.* 2017;8:504–13.
 25. Carlson H, Carlson N. An overview of the management of persistent musculoskeletal pain. *Ther Adv Musculoskelet Dis* [Internet]. 2011 [cited 2017 Dec 5];3(2):91–9. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3382682/pdf/10.1177_1759720X11398742.pdf
 26. Campbell CM, Edwards RR. Ethnic differences in pain and pain management. *Pain Manag.* 2012;2(3):219–30.
 27. Yu H, Tang F. Use , Perceived Effectiveness , and Gender Differences of Pain Relief Strategies Among the Community- Dwelling Elderly in Taiwan. *Pain Manag Nurs* [Internet]. 2011;12(1):41–9. Available from: <http://dx.doi.org/10.1016/j.pmn.2009.10.002>
 28. Edeer AO, Tuna H. Management of Chronic Musculoskeletal Pain in the Elderly: Dilemmas and Remedies. *Pain Perspect* [Internet]. 2012 [cited 2017 Dec 3]; Available from: <http://dx.doi.org/10.5772/50780>
 29. Kjekken I, Smedslund G, Dagfinrud H, Grotle M, Moe RH, Hagen KB, et al. Exercise therapy for bone and muscle health: an overview of systematic reviews. *BMC Med.* 2012;10(1).
 30. Bruckenthal P. Integrating Nonpharmacologic and Alternative Strategies Into a Comprehensive Management Approach for Older Adults With Pain. *Pain Manag Nurs* [Internet]. 2010;11(2):S23–31. Available from: <http://dx.doi.org/10.1016/j.pmn.2010.03.004>
 31. Hirase T, Kataoka H, Inokuchi S, Nakano J, Sakamoto J, Okita M. Factors associated with chronic musculoskeletal pain in Japanese community-dwelling older adults A cross-sectional study. *Medicine (Baltimore)* [Internet]. 2017 [cited 2017 Dec 6]; Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5466222/pdf/medi-96-e7069.pdf>
 32. Tang SK, Tse MMY, Leung SF, Fotis T. The effectiveness, suitability, and sustainability of non-pharmacological methods of managing pain in community-dwelling older adults: A systematic review. *BMC Public Health.* 2019;19(1):1–10.
 33. Fan AY, Miller DW, Bolash B, Bauer M, McDonald J, Faggert S. Global Views Acupuncture’s Role in Solving the Opioid Epidemic: Evidence, Cost-Effectiveness, and Care Availability for Acupuncture as a Primary, Non-Pharmacologic Method for Pain Relief and Management — White Paper 2017. *J Integr Med* [Internet]. 2017;15(6):411–25. Available from: [http://dx.doi.org/10.1016/S2095-4964\(17\)60378-9](http://dx.doi.org/10.1016/S2095-4964(17)60378-9)
 34. Couilliot MF, Dares V, Delahaye G, Ercolano P, Carcaillñ M, Vytopilova P, et al. Acceptability of an acupuncture intervention for geriatric chronic pain: An open pilot study. *J Chinese Integr Med.* 2013;11(1):26–31.
 35. Edeer A., Tuna H. Management of Chronic Musculoskeletal Pain in the Elderly: Dilemmas and Remedies. In: *Pain In Perspective* [Internet]. 2012 [cited 2019 Mar 24]. Available from: <http://www.intechopen.com/books/pain-in-perspectivehttp://dx.doi.org/10.5772/50780>
 36. Hirase T, Kataoka H, Inokuchi S, Nakano J, Sakamoto J, Okita M. Effects of Exercise Training Combined with Increased Physical Activity to Prevent Chronic Pain in Community-Dwelling Older Adults: A Preliminary Randomized Controlled Trial. *Pain Res Manag.* 2018;2018:1–7.
 37. Fried TR, Tinetti ME, Iannone L, O’Leary JR, Towle V, Van Ness PH. Health Outcome Prioritization as a Tool for Decision Making among Older Persons with Multiple Chronic Conditions. *Arch Intern Med* [Internet]. 2014 [cited 2019 May 12];171(20):1854–6. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4036681/pdf/nihms583476.pdf>
 38. Naci H, Loannidis JP. Comparative effectiveness of exercise and drug interventions on mortality outcomes: metaepidemiological study. *BMJ.* 2013;347.
 39. Laird R, Udeshi AR. Chronic Musculoskeletal Pain: Initial Pharmacological and Nonpharmacological Therapies. *Today’s Geriatr Med.* 2016;2(March/April):10.
 40. Woolf AD, Pfleger B. Policy and Practice Burden of major musculoskeletal conditions. *Bull World Heal Organ.* 2003;81(9):646–56.

41. Letchuman GR, Wan Nazaimoon WM, Wan Mohamad WB, Chandran LR, Tee GH, Jamaiyah H, et al. Prevalence of diabetes in the Malaysian National Health Morbidity Survey III 2006. *Med J Malaysia*. 2010;65(3):173–9.
42. Majjad A, Errahali Y, Toufik H, Djossou JH, Ghassem MA, Kasouati J, et al. Musculoskeletal Disorders in Patients with Diabetes Mellitus: A Cross-Sectional Study. *Int J Rheumatol*. 2018;2018(March 2016).
43. Sozen T, Calik Basaran N, Tinazli M, Ozisik L. Musculoskeletal problems in diabetes mellitus. *Eur J Rheumatol*. 2018;5(4):258–65.
44. International Diabetes Federation. *IDF Worldwide Diabetes Atlas 2017*. 2017; Available from: <file:///C:/Users/000000/Downloads/Atlas-8e-Global-factsheet.pdf>
45. Woo J, Leung J, Lau E. Prevalence and correlates of musculoskeletal pain in Chinese elderly and the impact on 4-year physical function and quality of life. *Public Health [Internet]*. 2009;123(8):549–56. Available from: <http://dx.doi.org/10.1016/j.puhe.2009.07.006>
46. Satghare P, Chong SA, Vaingankar J, Picco L, Abdin E, Chua BY, et al. Prevalence and Correlates of Pain in People Aged 60 Years and above in Singapore : Results from the WiSE Study. 2016;2016.
47. Bernheim SM, Ross JS, Krumholz HM, Bradley EH. Influence of Patients' Socioeconomic Status on Clinical Management Decisions. 2008;53–9.
48. Ayres, E., Warmington, M. & Reid MC. Managing chronic pain in older adults: 6 steps to overcoming medication barriers. *J Fam Pract*. 2012;61(9):0–4.
49. Makris UE, Abrams R, Gurland B, Reid MC. Management of Persistent Pain in the Older Patient A Clinical Review. *JAMA*. 2014;312(8):825–36.
50. 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 [Internet]*. 2017 [cited 2019 Jul 13]; Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5359906/pdf/12875_2017_Article_608.pdf