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Patient activation level and its associated factors in adults with chronic pain

A cross-sectional survey

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Abstract

Background: Patients' capacity to manage their own health can be graded by levels of activation. Highly activated patients tend to have better health outcomes. However, little is known about the activation levels of chronic pain patients in China. This study aimed to identify:

(1) the activation levels within this population; and

(2) demographic and pain factors associated with the level of activation.

Methods: In this cross-sectional survey, patients completed a sociodemographic questionnaire, Brief Pain Inventory and Patient Activation Measure (PAM) 13. Patient activation was measured and categorized into Levels 1–4. Its associations with sociodemographic, patient-reported diseases and pain variables were explored using Wilcoxon rank sum test and Kruskal-Wallis H test.

Results: Of 338 patients, 84 were excluded. Of the 254 remaining, 51.6% of patients were at lower activation levels (PAM Levels 1 and 2). Higher activation levels (PAM Levels 3 and 4) were recorded in patients with younger age ($P = .00005$), higher education ($P = .0018$), non-laboring occupations ($P = .0239$), and fewer co-morbidities ($P = .00615$). Intensities of the worst pain ($P = .000627$), average pain ($P = .0213$), and current pain ($P = .0353$), as well as the impact of pain on relationships with others ($P = 0.00529$), mood ($P = .00391$), sleep ($P = .0132$), and interest in life ($P = .0248$), were negatively correlated with activation levels.

Conclusion: Half of the chronic pain patients in this population displayed lower activation levels. Older age, less education, manual labor, more co-morbidities, more intense pain and greater impact of pain on life were associated with lower activation levels. Pain education programs need to target the individual's PAM level.

Registration: This trial was registered in Chinese Clinical Trial Registry. Number: ChiECRCT-20180170

Abbreviation: PAM = patient activation measure.

Keywords: chronic pain, co-morbidities, pain intensity, patient activation measure, patient activation, self-management

1. Introduction

Patient activation refers to one's internal readiness and capability to undertake health promoting actions.[1] It plays an important role in contemporary healthcare as it shifts from a disease-centred system to a more patient-centred model.[2] Patients can be graded into four levels of activation using Patient Activation Measure (PAM-13). At Level 1 patients tend to be overwhelmed and play a passive role in their own health. At Level 2, patients lack knowledge and confidence for self-management. Patients at Level 3 plan to take action, but lack confidence and skills to support behaviors. At Level 4 patients have adopted relevant behaviors to support their health, but may not be able to maintain them under stress.[1]

Higher activation levels correlate positively with health-related outcomes, including complication prevention, improved lifestyle and cost-effectiveness of health care.[3] Lower activation levels associated with unhealthy behavior, increased health care utilization and the development of chronic diseases.[4–6] Several studies have shown that demographic characteristics such as age, education and income are associated with activation.[7–12] Patients who are more active in managing their health tend to be more satisfied with the care provided for them, and have better health outcomes.[3,13–15]

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Chronic pain affects about 20% of people worldwide[16,17] and over 30% of adults in China.[18] Mental health is impacted, with 54% of these patients experiencing depression, and over 50% reporting anxiety.[19] It is a lifetime task for chronic pain patients to deal with the impacts (eg, depression and anxiety, poor sleep, reduced quality of life) of chronic pain.[20] Encouraging patients to self-manage their pain is the core part of modern pain management strategy.[5]

Self-management is defined as "the individual's ability to manage the symptoms, treatment, physical and psychological consequences and lifestyle changes inherent in living with a chronic condition.[21]" The effects of health interventions including self-management are often dependent on the baseline level of patient activation.[3,5,6,22]

The influence of patient activation on self-management has been studied in patients with chronic conditions such as atrial fibrillation, diabetes, chronic kidney diseases and chronic obstructive pulmonary diseases in various countries.[23–27] However only a few studies have been conducted to assess the activation level in chronic pain patients in Korea and in Norway.[8,28] No similar studies have been conducted in China.

This survey aimed to assess the levels of patient activation in adults with chronic pain, and to identify the socio-demographic, pain and health factors associated with the level of activation. The research questions were: whether the levels of activation varied among patients with chronic pain; and if there were differences in demographic and pain features between patients with high and low levels of activation. The results will provide in-depth understanding of the capacity of patients at our service to be engaged in their own health, and the types of patients that might be at risk of disengagement. The findings will facilitate the development of targeted interventions to engage patients more effectively in the self-management of their chronic pain.

2. Materials and methods

2.1. Ethics

This study was approved by China Ethics Committee of Registering Clinical Trials (ChiECRCT-20180170). Our study was conducted in full conformity with principles of the "Declaration of Helsinki", and within the laws and regulations of our country in which the research was conducted. Data was derived from questionnaires, and the investigators were not involved in the care of potential participants. Whether patients took part in the study did not impact on their pain management.

2.2. Participant recruitment, selection and study design

This cross-sectional survey was a single centred study and conducted at Jiangsu Province Hospital of Chinese Medicine. This top-tier 2,500 bed facility is the affiliated hospital of Nanjing University of Chinese Medicine, with annual outpatient visits exceeding five million. Patients were recruited through the outpatient orthopaedics, acupuncture, and pain clinics, between November 10, 2018 and March 31, 2019. To be included the patients must have had chronic pain lasting for 3 months or more, the capacity to read or write, and be aged 18 or above. We used the convenience sampling method. While patients were waiting to see their doctors, a pain nurse who did not know the patients and was not involved in their care handed out information regarding the study. Patient demographics questionnaires, the Brief Pain Inventory (BPI) and PAM-13 were given to all patients at the reception desk. Participation was voluntary and anonymous. Patient identifiers such as names or hospital numbers were not collected. The pain nurse was briefed on the study and trained to answer questions from patients on site. Completed forms were returned to the pain nurse on site. Participants did not receive any remuneration for participating in the study. Whether they chose to participate or not did not affect the level of care that they received. The only inconvenience from this study was that participants would be asked to volunteer 15–20 minutes of their time to answer the questionnaires.

2.3. Variables and measures

In this study, we used data from the following questionnaires: The PAM-13 is a 13 item widely used questionnaire to assess a patient's capability of self-managing their health issue. PAM has strong psychometric properties and has been shown to be a valid (KMO = 0.75) and reliable ($\alpha = 0.81$) measure.[29] We used the validated Chinese version of PAM-13. Participants were asked the extent to which they agreed or disagreed with PAM statements on beliefs, confidence and knowledge about managing one's health. Patient activation is measured on a 0–100 score scale, where higher scores represent higher activation. Four levels of activation can be identified: Level 1 (passive and overwhelmed); Level 2 (lack of knowledge and confidence); Level 3 (taking action but lack of confidence and skills) and Level 4 (adopting relevant behaviours but difficulty sustaining them under stress). Individuals with more than three N/A answers were excluded. Subsequently, all individuals with a valid PAM-13 score were assigned to one of the four stages of activation, based on the Insignia Health guidelines.

BPI, developed by the Pain Research Group of the WHO Collaborating Centre for Symptom Evaluation in Cancer Care, is a medical questionnaire used to rapidly assesses the severity of pain, and its impact on functioning. The validity (KMO = 0.88) and reliability ($\alpha = 0.91$) of the BPI have been verified in existing literature.[30] We used the Chinese version of BPI short form, which consisted of nine items evaluating

(1) the presence of pain,
(2) pain sites and pain severity:
(3) highest,
(4) lowest and
(5) average pain intensity in the past 24 hours; and
(6) current pain level. Intensity was measured on a 0–10 scale with 10 being the highest. Current treatment
(7) and the extent of pain relief
(8) after treatment in the past 24 hours were assessed (0%-100% scale where 100% represents complete pain relief). The impact of pain on functioning in the past 24 hours
(9) was measured on a 0–10 scale with 10 the greatest possible impact on daily life / mood / walking ability / work / relationships / sleeping / life interest.

In addition to these nine items, participants were questioned about the duration of their pain, their expectations of treatment, willingness to make lifestyle changes in order to reduce the impact of pain on their life, and willingness to take part in pain education. Expectation of pain treatment included reducing or eliminating pain, or reducing the impact of pain on their life.

Social and demographic characteristics reported included gender, age, marital status, education level (high school and

below, or junior college and above), occupation (laborer or non-laborer), and co-morbidities (heart diseases, gastrointestinal diseases, anemia and hematological diseases, hypertension, kidney diseases, osteoarthritis or degenerative arthritis, lung diseases, depression/anxiety, rheumatic arthritis, diabetes, cancer, apoplexy or other neuronal diseases, and other conditions.

3. Data analysis

Data were analyzed using R 3.6.3 software. Mean ± SD was used to describe quantitative data with normal distribution, median (interquartile interval) was used to describe quantitative data without normal distribution. Enumeration data were expressed using adoption rate or constituent ratio. Patient activation were categorized into Levels 1–4 by Insignia Health. Wilcoxon rank sum test or Kruskal-Wallis H test were used to analyze the differences in BPI, features of pain and social demographic data among four levels of PAM. The chi-square test was used to analyze the correlation between education level and occupation. All the statistical tests were conducted using bi-directional tests, and P value less than .05 was considered to be statistically significant.

4. Results

We distributed 338 copies of surveys and 21 did not complete the questionnaire. The response rate was 93.8%. 63 did not provide a valid PAM-13 score as they gave more than three N/A answers. As a result, 254 valid questionnaires were collected.

1. Descriptive Statistics of Baseline Variables
   The majority of the participants were female (62.2%), middle aged (51.4 years old), married (86.6%), having education at high school or below (58.7%), and in non-laboring occupations (75.6%). The common co-morbidities included gastrointestinal diseases (35.8%), hypertension (28.4%), osteoarthritis or degenerative arthritis (29.9%), and other conditions (19.7%). The median of number of co-morbidities was 1 (Table 1).
2. Descriptive Statistics of Pain Variables
   Twenty-five patients had pain in the head and face, 104 in the trunk, 78 in the limbs and 39 reported two or more regions, while 8 patients did not provide a pain region. The majority of participants had a pain duration over one year (57.5%). The median pain intensity was 6 for the worst pain. More than half of the participants (52.8%) expected to eliminate their pain, while others hoped to reduce pain or to relieve the impact of pain on their life. The majority of the participants were willing to change their lifestyle in order to reduce the impact of pain (91.7%) and to accept pain education (90.6%) (Table 2).
3. PAM Scores and Levels
   The mean PAM score was 56.56 ± 15.39. Of all the participants, 51.6% were categorized as Level 1 (24.8%) or Level 2 (26.8%); 48.4% were categorized as Level 3 (34.3%) or Level 4 (14.2%) (Table 3).
4. Differences in Patient Activation Level by Baseline Variables
   As shown in Table 4, there were significant differences in activation levels according to age (P=.000506), educational level (P=.00182), occupation (P=.0239), osteoarthritis or degenerative arthritis (P=.00967), cancer (P=.0417), and number of co-morbidities (P=.00615). Those aged up to

Table 1

Descriptive statistics of baseline variables.

Variables		Value
Age (Mean ± SD)		51.43 (15.35)
Gender	Male	96 (37.80%)
	Female	158 (62.20%)
Marital Status	Single (unmarried, bereft or divorced)	34 (13.39%)
	Married	220 (86.61%)
Educational level	High school and below	149 (58.66%)
	Junior college and above	105 (41.34%)
Occupation	Non laborer	192 (75.59%)
	laborer	62 (24.41%)
Co-morbidity	Heart diseases	37 (14.57%)
	Gastrointestinal diseases	91 (35.83%)
	Anemia and hematological diseases	5 (1.97%)
	Hypertension	72 (28.35%)
	Kidney diseases	7 (2.76%)
	Osteoarthritis or degenerative arthritis	76 (29.92%)
	Lung diseases	2 (0.79%)
	Depression/anxiety	17 (6.69%)
	theumatic arthritis	29 (11.42%)
	Diabetes	26 (10.24%)
	Cancer	16 (6.30%)
	Apoplexy or other neuronal diseases	16 (6.30%)
	Other	50 (19.69%)
Number of co-mobidities (Median (Q25,Q75))		1 (1,2)

SD = standard deviation.

Table 2

Descriptive statistics of pain variables.

Variables		Value
Number of pain sites (Median (Q25,Q75))		1 (1,2)
Pain duration	3–12 mo	108 (42.52%)
	1–2 yr	71 (27.95%)
	2–5 yr	44 (17.32%)
	More than 5 yr	31 (12.20%)
Pain intensity (Median (Q25,Q75))	The highest intensity during this period	6 (5,7)
	The lowest intensity during this period	1 (0,3)
	Average intensity during this period	4 (3,5)
	Current intensity	3 (3,5)
Pain impacts (Median (Q25,Q75))	Daily life	4 (3,6)
	Mood	5 (3,7)
	Walking ability	2 (0,5)
	Daily work	3 (2,6)
	Relationship with others	2 (1,3)
	Sleeping	4 (2,6)
	Life interest	3 (1,5)
Expect of pain treatment	Relieving pain	88 (34.65%)
	Eliminating pain	134 (52.76%)
	Reduce pain impact	32 (12.60%)
Willing to change lifestyle	Yes	233 (91.73%)
	Not clear	9 (3.54%)
	No	12 (4.72%)
Willing to accept pain education	Yes	230 (90.55%)
	Not clear	20 (7.87%)
	No	4 (1.57%)

Table 3

PAM scores and levels.

PAM level	Number	Percentage	PAM scores (Mean ± SD)
1	63	24.80%	40.76 (10.02)
2	68	26.77%	51.15 (1.57)
3	87	34.25%	60.58 (4.35)
4	36	14.17%	84.7 (11.02)
Total	254	100%	56.56 (15.39)

PAM = patient activation measure, SD = standard deviation.

50 years old were more likely to have a higher level of activation than those older than 50 ($P = .000506$). We observed that patients who were educated to college level or above were more likely to have a higher activation level, compared with those with an education of high school or below ($P = .00182$). Regarding occupation, non-laborers were more likely to have a higher level of activation than laborers ($P = .0239$). Of the non-laborers, 52.6% were categorized as Level 3 or Level 4, while only 35.5% of laborers were categorized as Level 3 or Level 4. Participants with osteoarthritis or degenerative arthritis were less likely to have a high activation level compared with those without osteoarthritis or degenerative arthritis ($P = .00967$). Cancer patients were more likely to have a high level of activation than non-cancer patients ($P = .0417$). Patients with one co-morbidity or without any co-morbidities were more likely to have a high activation level than those with two or more co-morbidities ($P = .00615$).

Activation levels did not differ significantly by gender, marital status, or types of co-morbidity, with the exceptions of osteoarthritis and cancer. (Table 4)

5. Differences in Patient Activation Level by Pain Variables

Features of pain differed significantly among the activation levels. Patients whose worst pain intensity was less than 6 out of 10, average pain intensity of below 4, or current pain intensity of below 3 were more likely to be categorized as Level 3 or Level 4, when compared with those with a worst pain intensity of 6 or higher ($P = .00617$) or average pain intensity of 4 or higher ($P = .0213$) or a current pain intensity greater than or equal to 3 ($P = .000627$).

Where pain impacted on everyday life, a reduced impact on mood, relationship with others, sleep, and life interest was more likely to be associated with higher activation levels ($P = .00391$, $P = .00529$, $P = .0132$, $P = .0248$, respectively).

Levels of activation did not differ by number of pain sites, pain duration, lowest pain intensity; or pain impact on daily life, walking ability or normal work. (Table 5)

5. Discussion

This study identified several factors associated with activation levels. Among Chinese chronic pain patients, more than 50% were at low activation levels, which were associated with older

Table 4

Differences in patient activation level by baseline variables.

Variables		PAM Level 1	2	3	4	*P*
Age	≤50	20 (15.27%)	38 (29.01%)	48 (36.64%)	25 (19.08%)	
	>50	43 (34.96%)	30 (24.39%)	39 (31.71%)	11 (8.94%)	**5.06E-04**
Gender	Male	25 (26.04%)	24 (25.00%)	27 (28.13%)	20 (20.83%)	
	Female	38 (24.05%)	44 (27.85%)	60 (37.97%)	16 (10.13%)	.52
Marital Status	Single (unmarried, bereft or divorced)	8 (23.53%)	8 (23.53%)	10 (29.41%)	8 (23.53%)	
	Married	55 (25.00%)	60 (27.27%)	77 (35.00%)	28 (12.73%)	.37
Educational level	High school and below	47 (31.54%)	38 (25.50%)	50 (33.56%)	14 (9.40%)	
	Junior college and above	16 (15.24%)	30 (28.57%)	37 (35.24%)	22 (20.95%)	**1.82E-03**
Occupation	Non laborer	44 (22.92%)	47 (24.48%)	70 (36.46%)	31 (16.15%)	
	laborer	19 (30.65%)	21 (33.87%)	17 (27.42%)	5 (8.06%)	**2.39E-02**
Heart diseases	No	53 (24.42%)	58 (26.73%)	73 (33.64%)	33 (15.21%)	
	Yes	10 (27.03%)	10 (27.03%)	14 (37.84%)	3 (8.11%)	.51
Gastrointestinal diseases	No	40 (24.54%)	43 (26.38%)	61 (37.42%)	19 (11.66%)	
	Yes	23 (25.27%)	25 (27.47%)	26 (28.57%)	17 (18.68%)	.79
Hypertension	No	41 (22.53%)	51 (28.02%)	58 (31.87%)	32 (17.58%)	
	Yes	22 (30.56%)	17 (23.61%)	29 (40.28%)	4 (5.56%)	.12
Osteoarthritis or degenerative arthritis	No	38 (21.35%)	44 (24.72%)	68 (38.20%)	28 (15.73%)	
	Yes	25 (32.89%)	24 (31.58%)	19 (25.00%)	8 (10.53%)	**9.67E-03**
Depression/anxiety	No	56 (23.63%)	64 (27.00%)	82 (34.60%)	35 (14.77%)	
	Yes	7 (41.18%)	4 (23.53%)	5 (29.41%)	1 (5.88%)	.12
Rheumatic arthritis	No	54 (24.00%)	57 (25.33%)	79 (35.11%)	35 (15.56%)	
	Yes	9 (31.03%)	11 (37.93%)	8 (27.59%)	1 (3.45%)	.05
Diabetes	No	54 (23.68%)	60 (26.32%)	79 (34.65%)	35 (15.35%)	
	Yes	9 (34.62%)	8 (30.77%)	8 (30.77%)	1 (3.85%)	.07
Cancer	No					
	Yes	0 (0.00%)	5 (31.25%)	8 (50.00%)	3 (18.75%)	**4.17E-02**
Apoplexy or other neuronal diseases	No	56 (23.53%)	66 (27.73%)	81 (34.03%)	35 (14.71%)	
	Yes	7 (43.75%)	2 (12.50%)	6 (37.50%)	1 (6.25%)	.22
Number of co-mobidities	≤1	26 (20.63%)	30 (23.81%)	44 (34.92%)	26 (20.63%)	
	>1	37 (28.91%)	38 (29.69%)	43 (33.59%)	10 (7.81%)	**6.15E-03**

PAM = patient activation measure.

Table 5

Differences in patient activation level by pain variables.

Variables		PAM Level				P
		1	2	3	4	
Number of pain sites	1	40 (24.69%)	48 (29.63%)	51 (31.48%)	23 (14.20%)	
	>1	22 (26.19%)	20 (23.81%)	31 (36.90%)	11 (13.10%)	.86
Pain duration	3 mo 2 yr	44 (24.58%)	47 (26.26%)	63 (35.20%)	25 (13.97%)	
	>=2 yr	19 (25.33%)	21 (28.00%)	24 (32.00%)	11 (14.67%)	.84
The highest intensity during this period	<6	18 (16.36%)	28 (25.45%)	47 (42.73%)	17 (15.45%)	
	≥6	45 (31.25%)	40 (27.78%)	40 (27.78%)	19 (13.19%)	**6.17E-03**
The lowest intensity during this period	<1	19 (21.84%)	20 (22.99%)	30 (34.48%)	18 (20.69%)	
	≥1	44 (26.35%)	48 (28.74%)	57 (34.13%)	18 (10.78%)	.07
Average intensity during this period	<4	26 (20.63%)	30 (23.81%)	48 (38.10%)	22 (17.46%)	
	≥4	37 (28.91%)	38 (29.69%)	39 (30.47%)	14 (10.94%)	**2.13E-02**
Current intensity	<3	4 (8.16%)	11 (22.45%)	24 (48.98%)	10 (20.41%)	
	≥3	59 (28.78%)	57 (27.80%)	63 (30.73%)	26 (12.68%)	**6.27E-04**
Pain impact on daily life	<4	22 (20.95%)	27 (25.71%)	43 (40.95%)	13 (12.38%)	
	≥4	41 (27.52%)	41 (27.52%)	44 (29.53%)	23 (15.44%)	.32
Pain impact on mood	<5	20 (17.70%)	29 (25.66%)	42 (37.17%)	22 (19.47%)	
	≥5	43 (30.50%)	39 (27.66%)	45 (31.91%)	14 (9.93%)	**3.91E-03**
Pain impact on walking ability	<2	26 (26.00%)	23 (23.00%)	34 (34.00%)	17 (17.00%)	
	≥2	37 (24.03%)	45 (29.22%)	53 (34.42%)	19 (12.34%)	.59
Pain impact on normal work	<3	19 (25.33%)	13 (17.33%)	33 (44.00%)	10 (13.33%)	
	≥3	44 (24.58%)	55 (30.73%)	54 (30.17%)	26 (14.53%)	.38
Pain impact on relationship with others	<2	18 (19.57%)	18 (19.57%)	38 (41.30%)	18 (19.57%)	
	≥2	45 (27.78%)	50 (30.86%)	49 (30.25%)	18 (11.11%)	**5.29E-03**
Pain impact on sleeping	<4	23 (20.72%)	26 (23.42%)	39 (35.14%)	23 (20.72%)	
	≥4	40 (27.97%)	42 (29.37%)	48 (33.57%)	13 (9.09%)	**1.32E-02**
Pain impact on life interest	<3	22 (21.15%)	23 (22.12%)	39 (37.50%)	20 (19.23%)	
	≥3	41 (27.33%)	45 (30.00%)	48 (32.00%)	16 (10.67%)	**2.48E-02**
Expect of pain treatment	Relieving pain	25 (28.41%)	26 (29.55%)	28 (31.82%)	9 (10.23%)	
	Eliminating pain	30 (22.39%)	32 (23.88%)	49 (36.57%)	23 (17.16%)	
	Reduce pain impact	8 (25.00%)	10 (31.25%)	10 (31.25%)	4 (12.50%)	.19
Willing to change lifestyle	Yes	57 (24.46%)	62 (26.61%)	79 (33.91%)	35 (15.02%)	
	Not clear	3 (33.33%)	1 (11.11%)	4 (44.44%)	1 (11.11%)	
	No	3 (25.00%)	5 (41.67%)	4 (33.33%)	0 (0.00%)	.58
Willing to accept pain education	Yes	56 (24.35%)	59 (25.65%)	80 (34.78%)	35 (15.22%)	
	Not clear	6 (30.00%)	8 (40.00%)	5 (25.00%)	1 (5.00%)	
	No	1 (25.00%)	1 (25.00%)	2 (50.00%)	0 (0.00%)	.29

PAM = patient activation measure.

age, less education, working in manual laboring roles, more comorbidities, more intense pain and greater impact on life. This presents a challenge to implement self-management strategies among those populations. Targeted strategies tailored to individual levels of activation are required to improve self-management skills.

5.1. Comparison with other studies

The mean score for patient activation in our study was 56.6 ± 15.4, which is similar to that of patients with osteoarthritis in a community in Korea (56.0 ± 16.6).[8] Of our sample 51.6% were categorized as at a low level of activation, reflecting that half of these patients were passive and lacked knowledge about chronic pain. Clinicians could focus on building patients' self-awareness and delivering relevant pain information to this large group of patients. This is also similar to the Korean study,[8] where 55.2% of the participants had a low activation level.

A systematic review[25] summarized patient activation among diverse populations. It revealed that in a normal population, 41.4% were at Level 4, 37.2% at Level 3, 14.6% at Level 2, and 6.8% were at Level 1. In the study of patient activation in patients with atrial fibrillation,[26] 38.2% of the participants were at Level 4, 45.5% at Level 3, 7.3% at Level 2, and 8.9% at Level 1. More than 80% of these atrial fibrillation patients were at a high activation level. This result is similar to that of a normal population, and a much higher rate than that of our study, where 48.4% were at a high activation level.

The discrepancy in the proportion of patients with a high activation level between those with chronic pain and those with atrial fibrillation could be due to two factors: patient motivation and education. Firstly, patients may not consider chronic pain to be a disease, and therefore do not take measures to mitigate it. Unlike cardiovascular diseases including atrial fibrillation, or cancer, patients rarely die of chronic pain directly. Thus, they may pay little attention to chronic pain, with the result that they are less active in self-managing their pain. Indeed, in our sample, those with cancer pain having a high level of activation. Secondly, chronic pain is often more prevalent among disadvantaged populations, who have lower levels of education and income, and laborious work.[16,17,31] In our sample, 58.7% had lower levels of education, compared to only 17.1% in the atrial fibrillation sample. Level of education could be an important factor impacting on activation level among patients with chronic pain.

However, in a Norwegian study which evaluated the effect of a self-management intervention for chronic pain on patient activation,[28] 52.9% of the sample were of low education level, but 76.5% of the participants were at a high activation at baseline. It implies that chronic pain patients with low education can also have a high level of activation. This may be due to the patients' motivation and Norwegian public primary healthcare services. All the patients enrolled in the Norwegian study were interested in and willing to take part in the self-management intervention group or control group (low-impact physical outdoor activity group). The Healthy Life Centres, as a part of Norwegian public primary healthcare services, aim to help people change health behaviors and to manage health challenges, and incorporate self-management initiatives as part of their services. Thus, participants may have obtained some knowledge and skills to self-manage their pain before they took part in the study.

5.2. Activation level of sociodemographic characteristics

We found that higher activation levels were associated with higher educational level. This result is consistent with previous studies.[7–10,12] In our study younger age was associated with higher activation level. This finding is in agreement with several studies,[10–12] but in contrast to McCabe's research,[26] where no relationship between age and activation level was found in patients with chronic atrial fibrillation. In our study, non-laborers may have a higher activation level than those undertaking laboring work. This relationship may be mediated via level of education. In our study higher-educated patients tended to have higher activation levels, as well as occupations other than laboring (phi = -0.272; $P = .0000277$). Some studies have shown a positive relationship between higher income and higher activation level.[9,10] We found patients with higher educational level tended to have lower worst pain intensity (mean of worst pain in higher educated patients: 5; mean of worst pain in lower educated patients: 6) ($P = 0.004963$). This is consistent with existing literature which showed that people with poor education have more pain.[32–34]

In our study, there was no statistically significant difference in activation between males and females. This is in contrast to some studies[26,35] where the authors found that males were more likely to have higher activation levels. Conversely, other studies[5,10] found that males were less likely to be categorized in higher levels. The current study showed no relationship between marital status and activation level.

5.3. Activation level and Co-morbidities

We observed that osteoarthritis or degenerative arthritis patients were at a lower activation level than non-arthritis patients. In our study, patients with osteoarthritis or degenerative arthritis were also significantly older than non-osteoarthritis or degenerative arthritis patients ($P = .00000156$). This effect may be age related: older adults tend to both have osteoarthritis or degenerative arthritis, and also be less likely to be active in self-managing their chronic conditions.[10–12]

In our study, we also found that having cancer is associated with activation level. In our study, patients with cancer had a higher activation level. This may be because cancer is life threatening. Highly activated patients are more likely to prepare a list of questions for a physician, to seek health information, to know about treatment options for their disease, and to compare the quality of health care received from providers, compared to patients at lower activation levels.[36] Furthermore, as the prognosis of cancer is not clear, cancer patients may be more motivated to improve outcomes.

Our study demonstrated that participants with one or no co-morbidity were more likely to be at a higher activation level than those with two or more co-morbidities. This finding is consistent with several previous studies, in which people with multiple chronic diseases tended to have lower activation levels compared to people with a single chronic condition or without any chronic conditions.[23,37]

5.4. Activation level and pain parameters

We observed a negative relationship between pain intensity and PAM levels, as well as pain impact and PAM. The higher the pain intensity or the stronger the impact of pain, the lower the activation level. Better mood was associated with higher activation in our chronic pain patients, consistent with findings for chronic conditions such as osteoarthritis, diabetes and hypertension.[8,35,38]

The effects of health interventions are often dependent on the baseline level of patient activation.[3,5,6,22] A previous study showed that higher preoperative patient activation was associated with better patient-reported outcomes after total joint arthroplasty.[39] Patients with different activation levels may need different self-management guidelines. For low-level patients, clinicians may need to focus on building patients' self-awareness, helping patients understand behaviour patterns, encouraging patients to build confidence through small steps, and helping patients to continue to make gradual changes. For patients with higher levels of activation, clinicians should work with patients to adopt new behaviours, focus on preventing relapses and handling new situations when they arise, and help patients maintain their behaviours in spite of stress.

In some studies,[28,40] a chronic pain self-management course did not improve either levels of activation or pain after 3 and 12 months, compared with a low-impact outdoor physical activity offered to the control group. Important reasons for these results may be that in those studies patients were randomly allocated, rather than grouped according to different activation levels. Moreover, the self-management course was not tailored to activation level. It is important to identify patients' activation level and tailor interventions to specifically address gaps in confidence and capability.

5.5. Limitations

There are several limitations in our study. First of all, we used the convenience sampling method, and participants came from orthopaedics, acupuncture and pain clinics. We neither involved all clinics related to chronic pain, nor involved inpatients. Nevertheless, musculoskeletal pain is the main source of chronic pain.

In addition, our hospital is a Chinese medicine hospital. It is unknown if patients opting to visit Western medicine hospitals may present a different picture. Hence, sampling bias should be taken into consideration. Although in our study cases were collected from one hospital, they came from a broad geographical area, so this sample provided a reasonable representation of patients with chronic pain.

6. Conclusion

Chronic pain patients in China have low levels of activation. Those who are older, less educated, or manual laborers, or have more co-morbidities, more severe pain intensity and more severe pain impact on life tended to have lower levels of activation in managing their own health care. The next step will be to understand the specific needs of Chinese pain patients with different levels of activation. For those at lower activation levels, tailored pain management strategies are needed to achieve optimal outcomes.

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