

Predictors of acupuncture referral for chronic non-specific low back pain among medical practitioners in Malaysia

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ABSTRACT

Introduction: Chronic non-specific low back pain (cnLBP) is a common primary care health issue. While acupuncture offers promising potential as a complementary treatment, its acceptance and integration into standard medical care for cnLBP remains inconsistent. This study investigated the predictors of acupuncture referral for cnLBP using the Theory of Planned Behaviour (TPB).

Materials and Methods: This was a cross-sectional observational study. Medical practitioners were recruited from the Malaysian Medical Association via email invitations. Data were collected via a validated online questionnaire and analysed using SPSS, employing bivariate correlation and multiple linear regression analyses to examine the predictors of referral behaviour.

Results: A total of 389 medical practitioners were recruited. The respondents were predominantly general practitioners aged 35–44 years, with 10–19 years of clinical experience, and approximately 90.0% managed cnLBP. Despite the high awareness of the Traditional and Complementary Medicine Act (92.0%), only 33.2% referred patients to acupuncture. Few had acupuncture training (3.6%) or personal experience (7.7%), and services were available in 12.1% of the workplaces. Medical practitioners possess substantial knowledge about acupuncture treatment for cnLBP; however, misconceptions and uncertainties regarding its mechanisms persist. Using multiple linear regression analysis, the significant predictors of acupuncture referral were self-experience ($\beta=0.151$, $p<0.01$), attitude ($\beta=0.189$, $p<0.001$), and perceived behavioural control ($\beta=0.101$, $p<0.05$).

Conclusions: Despite positive attitudes and substantial awareness, barriers hinder the broader integration of acupuncture in cnLBP treatment. Targeted education, institutional support, and enhanced research collaborations are essential for improving referral rates and expanding the treatment options for cnLBP.

KEYWORDS:

Acupuncture referral, chronic low back pain, planned behaviour

INTRODUCTION

Acupuncture is a longstanding therapeutic practice, having roots in China for over 2,500 years.¹ It has attracted interest

within the modern medical community, with studies demonstrating its effectiveness in treating various health conditions.^{2,3} In 2020, given the increased demand for acupuncture, the “WHO Benchmark for the Practice of Acupuncture” was published to emphasise critical elements for the safe practice of acupuncture.⁴ The National Policy of Traditional and Complementary Medicines (T&CM) proposed the integration of T&CM into the national healthcare system.⁵ Therefore, acupuncture is now recognised in Malaysia under the T&CM Act.⁶ There are 16 T&CM units in the Ministry of Health (MOH) hospitals offering various modalities, and acupuncture is offered in 14 units. Registered medical practitioners refer patients seeking treatment to T&CM units after definitive diagnoses.⁷ Patients are then further screened by T&CM unit healthcare staff to ensure they are suitable for T&CM treatment. Furthermore, to ensure standardisation of care, the MOH has published guidelines on acupuncture use, and the indicated conditions include chronic pain, stroke rehabilitation, and post-chemotherapy nausea and vomiting.⁸

Chronic low back pain affects millions of people globally, is commonly seen in primary care settings, and is often difficult to treat.^{9,10} Chronic low back pain is defined as prolonged lower back pain for >12 weeks.¹¹ It is usually associated with movement limitation, reduced life quality, work productivity loss, and financial burden on healthcare institutions.^{9,12} Chronic low back pain is a serious concern in Malaysia among several occupational groups.¹³ Age, sex, body mass index, working posture, lifting heavy objects, lifestyle, working hours, and mental health have been identified as risk factors for lower back pain in Malaysia.¹³ Chronic non-specific low back pain (cnLBP) occurs when no specific disease or structural pathology has been identified to explain the pain, and approximately 90% of chronic low back pain cases are non-specific.¹¹ Conventional cnLBP management includes non-pharmacological (activity modification, physical therapy, and psychological approach) and pharmacological (analgesic) approaches.¹¹ However, acupuncture has been used as a therapeutic approach for cnLBP in several countries. Notably, studies have found that acupuncture can alleviate symptoms and enhance physical function in individuals with cnLBP, and its beneficial effects might endure over time.^{14–16}

The Theory of Planned Behaviour (TPB) is a psychological framework that aims to predict and understand human behaviour by considering individuals' attitudes, subjective

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norms, and perceived behavioural control.¹⁷ These three factors collectively influence behavioural intentions, predicting actual behaviour. Therefore, by examining these factors, researchers can gain insights into the psychological determinants that impact health-related decisions and actions,^{18,19} which are essential for designing interventions, enhancing the effectiveness of healthcare practices, and improving patient outcomes. cnLBP is a prevalent condition that significantly affects patients' quality of life and substantially burdens healthcare systems globally.^{9,10,12} Acupuncture, a complementary medicine, has shown promise in managing cnLBP.^{12,15,16} However, its acceptance and integration into mainstream medical practice remain inconsistent due to varying attitudes within the healthcare system and cultural perceptions in Malaysia. Acupuncture has roots in Malaysian society, particularly among the Chinese population; however, its recognition in the broader medical community faces challenges. Notably, some healthcare professionals remain skeptical, citing a lack of standardised training, limited experience with acupuncture, and insufficient evidence-based research. Additionally, limited exposure among other ethnic groups has led to hesitation in its adoption as a treatment option, slowing its incorporation into mainstream practice. Therefore, in this study, we aimed to determine medical practitioners' knowledge regarding the use of acupuncture for cnLBP and identify the factors influencing acupuncture referral for cnLBP under the TPB conceptual framework.

MATERIALS AND METHODS

Study design and setting

This cross-sectional observational study employed an online questionnaire based on the TPB Model framework to have an overview of medical practitioners' knowledge, attitudes, subjective norms, and perceived behavioural control regarding acupuncture referral for cnLBP. Data collection was conducted over 5 weeks between March 1, 2024, and April 5, 2024. The study targeted medical practitioners registered with the Malaysian Medical Association (MMA), which is the largest association representing Malaysia's medical community. Inclusion criteria were full registration with the Malaysian Medical Council (MMC) and active clinical practice as a medical practitioner. Therefore, medical practitioners with temporary MMC registration and medical students were excluded from the study.

Sampling method

Participants for this study were recruited using convenience sampling, with all registered MMA practitioners invited to participate through email. The invitation included a subject information sheet and a link to the questionnaire on Google Forms, with only those providing implied consent being able to proceed. The sample size was calculated using the Open Epi online calculator (https://www.openepi.com/Menu/OE_Menu.htm) based on a projected total of 10,000 registered MMA members and a reported 37% prevalence of complementary therapy referrals by medical professionals.² With a 95% confidence level and 5% margin of error, the calculated sample size for this study was 346 participants.

Research instrument

A newly developed, self-administered questionnaire was used to collect data based on the effectiveness of online surveys in reaching medical practitioners across a wide geographical area. This approach also enhanced accessibility, allowing participants to respond at their convenience and ensuring a diverse and representative sample.

The questionnaire included seven main sections. The first section was the demographic segment to collect personal and professional data (sex; age; years of clinical practice; area of expertise; practice entity; involvement in managing cnLBP; prior acupuncture experience, whether by training, self-experience, or referral; awareness of the T&CM Act's implementation; and acupuncture service facility in the workplace). The following six sections had 5–16 items each, designed to evaluate knowledge, attitudes, subjective norms, perceived behavioural control, intention, and action based on the TPB framework. Standard wording was used in these items, as recommended in the technical report *Constructing a Theory of Planned Behaviour Questionnaire*, to measure the TPB components.²⁰

Responses for knowledge questions were "True," "False," or "Unsure." Furthermore, to assess the knowledge level, one mark was given for correct answers and zero for wrong and unsure answers. Knowledge level was classified based on total score percentiles; the lower two quartiles were "Very Poor" and "Poor," and the upper two quartiles were "Good" and "Excellent". TPB component responses used a 5-point Likert scale: "Agree," "Strongly Agree," "No Opinion," "Disagree," and "Strongly Disagree." AND "Never," "Rarely," "Sometimes," "Often," and "Always". The mean of the five responses for each item was calculated for analysis.

Questionnaire content was validated based on the items' relevance, clarity, simplicity, and ambiguity, and modifications were made according to experts' recommendations. Subsequently, the questionnaire underwent a pilot test to test its consistency and reliability using Cronbach's alpha before full-scale adoption. In addition, any shortcomings were addressed based on respondent feedback to finalise the questionnaire.

Data analysis

Data were analysed using the SPSS (version 27.0; IBM, Armonk, NY, USA). Numerical variables were expressed as means, standard deviations, medians, and interquartile ranges, while categorical variables were expressed as frequencies and percentages. Bivariate correlation and multiple regression analyses were applied to ascertain the relationship among knowledge level, attitudes, subjective norms, perceived behavioural control, intention, and action of acupuncture referral. Multiple regression analysis is suitable for a cross-sectional study based on the TPB framework because it allows for the assessment of the contributions of each TPB construct to predict behavioural intentions or actions while also controlling for confounding factors outside of the TPB framework. This enables a more accurate evaluation of how TPB and additional factors jointly influence the outcome. Statistical significance was set at P values <0.05.

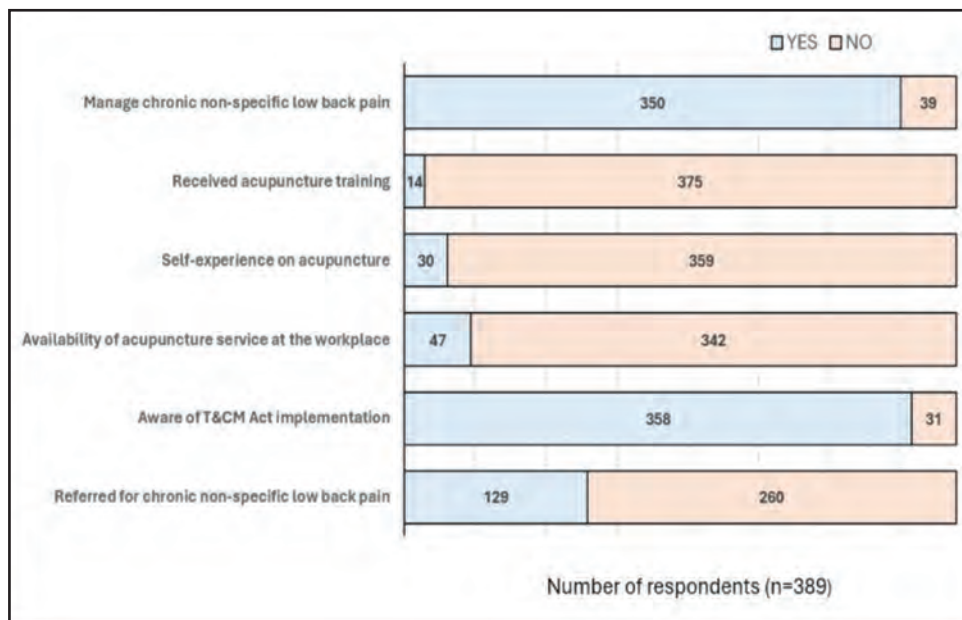


Fig. 1: Clinical characteristics (n=389)

Ethics approval and confidentiality

Participant anonymity was maintained throughout. The study was approved by the UNIMAS Medical Ethics Committee (UNIMAS/TNC(PI)/09 - 65/01 Jld.3 (29) and the IMU University Joint Committee for Research and Ethics (4.15/JCM-281/2024).

RESULTS

Respondent characteristics

In total, 389 medical practitioners responded to the questionnaire. The data were screened, and no missing values were found. The gender distribution showed a slight male predominance, with 217 male respondents (55.8%) compared to 172 female respondents (44.2%). The respondents' mean age was 42.0 years (standard deviation [SD]=7.9; range, 29–78 years). The mean practising years was 16.2 (SD=7.5; range, 2–50 years). Notably, most respondents (75.3%) were general practitioners (including medical officers at health clinics), and the remaining (24.7%) were specialists (family medicine specialists, 4.9%; medical-based specialists, 9.5%; and surgical-based specialists, 10.3%). The place of practice was predominantly in private clinics or hospitals, with 70.4% of respondents working in these settings. Table I shows the respondents' characteristics.

Clinical characteristics

Figure 1 illustrates clinical characteristics among 389 respondents, with a focus on managing cnLBP and their experience with acupuncture. A majority (90%) reported involvement in cnLBP management, yet only a small portion (3.6%) had formal training in acupuncture. Additionally, personal experience with acupuncture was limited, with just 7.7% of respondents having tried it themselves. Only 12.1% reported access to acupuncture services at their workplace, underscoring restricted availability in clinical settings. Awareness of the T&CM Act was notably high at 92%,

suggesting a strong familiarity with regulatory guidelines for acupuncture. Despite this, only 33.2% had referred patients for acupuncture treatment for cnLBP, pointing to a gap between awareness of acupuncture's potential benefits and its practical application in patient referrals.

Factors affecting behavioural action for acupuncture referral for cnLBP treatment

Spearman's rho was used to measure the strength and direction of the relationship between the independent variables and behavioural actions for acupuncture referral (Table II). The percentage score of behavioural action for acupuncture referral showed a moderate positive correlation with received acupuncture training ($\rho=0.12, p<0.05$), acupuncture self-experience ($\rho=0.18, p<0.01$), attitude towards referral ($\rho=0.19, p<0.01$), and perceived behavioural control ($\rho=0.13, p<0.05$), suggesting that training, personal experience, positive attitudes, and better perceived behavioural control were positively correlated with actual referral behaviours. The results also showed that the availability of acupuncture facilities in the workplace was positively correlated with the intention to refer patients for acupuncture treatment ($\rho=0.11, p<0.05$), suggesting that workplace service availability may influence referral intentions. Acupuncture knowledge, training, and self-experience were positively correlated with attitudes ($\rho=0.11, p<0.05$; $\rho=0.15, p<0.01$; and $\rho=0.20, p<0.01$, respectively) and perceived behavioural control ($\rho=0.10, p<0.05$; $\rho=0.18, p<0.01$; and $\rho=0.16, p<0.01$, respectively) among the respondents. These findings highlight the crucial role that knowledge, training, and personal experience play in shaping practitioners' attitudes and self-efficacy toward acupuncture referral.

There was a strong correlation between age and years of practice ($\rho=0.97, p<0.01$), indicating that their clinical experience also increased as practitioners aged. Additionally,

Table I: Respondent characteristics (n=389)

Characteristics	n	%
Sex		
Male	217	55.8
Female	172	44.2
Age in years		
< 35	50	12.9
35-44	223	57.3
45-54	92	23.7
≥55	24	6.2
Years of practice		
< 10	59	15.2
10-19	226	58.1
20-29	86	22.1
≥30	18	4.6
Type of practice		
General practitioner	293	75.3
Specialist	96	24.7
Place of practice		
Private clinic/hospital	274	70.4
Govt. clinic/hospital	115	29.6

Table II: Relationship between behavioural action for acupuncture referral for cnLBP and selected variables: Bivariate correlation analysis (n=389)

Parameters	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Age	--													
Sex	0.09	--												
Years of practice	0.97**	-0.09	--											
Manage cnLBP	-0.04	0.05	-0.01	--										
Received training	0.12*	-0.05	0.12*	-0.03	--									
Acupuncture self-experience	0.02	-0.07	0.01	-0.03	0.62**	--								
Acupuncture service availability	0.09	-0.04	0.09	0.07	0.10	0.01	--							
Aware of the T&CM Act implementation	-0.05	0.06	-0.06	0.28**	-0.10	-0.09	-0.01	--						
Attitude	0.07	-0.03	0.05	-0.04	0.15**	0.20**	0.04	0.03	--					
Subjective norms	-0.05	0.09	-0.04	0.10	0.09	0.05	0.00	0.01	0.09	--				
Perceived behavioural control	0.00	-0.01	0.01	0.02	0.18**	0.16**	0.06	-0.03	0.15**	0.06	--			
Acupuncture knowledge	0.01	0.07	-0.01	0.01	0.05	-0.03	0.02	0.07	0.11*	0.03	0.10*	--		
Intension to referral	0.06	0.07	0.07	0.05	0.09	0.13*	0.11*	-0.02	-0.01	0.09	0.04	-0.01	--	
Action of referral	0.01	0.08	0.02	-0.10	0.12*	0.18**	0.04	-0.03	0.19**	0.05	0.13*	0.05	0.07	--

*p<0.05, **p<0.01, ***p<0.001

Table III: Predictors of behavioural action for acupuncture referral for cnLBP: Multiple regression analysis (n=389)

Variables	Beta	SE	β	p-value	95% CI	
					LL	UL
(Constant)	0.560	19.949	-	0.978	-22.166	17.579
Age	-0.109	0.638	-0.044	0.864	-1.363	1.144
Sex	3.926	1.940	0.100	0.044*	0.285	7.892
Years of practice	0.136	0.672	0.052	0.840	-0.221	0.237
Acupuncture self-experience	11.051	3.739	0.151	0.003**	3.648	18.612
Acupuncture service availability at the workplace	1.816	2.943	0.030	0.538	-3.881	7.811
Aware of the T&CM Act implementation	-1.902	3.540	-0.026	0.591	-8.694	5.048
Acupuncture knowledge	0.012	0.048	0.001	0.829	-0.105	0.083
Attitude	0.282	0.075	0.189	0.001***	0.125	0.444
Subjective norms toward referral	0.092	0.084	0.054	0.276	-0.088	0.259
Perceived behavioural control	0.218	0.108	0.101	0.044*	0.023	0.436
Intention to refer for acupuncture	0.033	0.055	0.030	0.554	-0.076	0.133

*p<0.05, **p<0.01, ***p<0.001

years of practice were positively correlated with receiving acupuncture training ($\rho=0.12$, $p<0.05$), suggesting that more experienced practitioners were more likely to explore complementary therapies, such as acupuncture, to treat cnLBP. The awareness of the T&CM Act was moderately correlated with managing cnLBP ($\rho=0.28$, $p<0.01$), indicating that those aware of the Act were more likely to manage cnLBP using acupuncture.

Table III presents the bootstrap regression analysis examining the influence of various predictors on behavioural action for acupuncture referral. Acupuncture self-experience significantly impacted referral behaviour ($\beta=0.151$, $p<0.01$), highlighting the importance of personal acupuncture experience in influencing referral decisions. The finding suggests that practitioners with personal experience using acupuncture are more likely to refer patients for acupuncture treatment. Furthermore, attitudes towards acupuncture also significantly affected referral behaviour ($\beta=0.189$, $p<0.001$), indicating that more positive attitudes towards acupuncture were associated with increased referral actions. Perceived behavioural control was another significant predictor ($\beta=0.101$, $p<0.05$), suggesting that the more control practitioners felt over referring patients for acupuncture, the more likely they were to do so. Notably, there was no significant relationship between the subjective norms and acupuncture referral ($\beta=0.054$, $p=0.276$), suggesting that peer opinions did not directly influence the decision-making process for referring patients for acupuncture treatment. Furthermore, the regression analysis revealed that sex was statistically significant ($\beta=0.100$, $p<0.05$), indicating that sex differences influenced referral behaviour, with male practitioners being more likely to refer patients for acupuncture treatment. However, other demographic and professional characteristics, such as age, years of practice, availability of acupuncture service, awareness of T&CM Act implementation, and knowledge of acupuncture, did not show any significant relationship with referral behaviour for acupuncture treatment.

DISCUSSION

cnLBP is a highly prevalent condition that significantly impairs the quality of life for many individuals.^{9,10} However, despite the availability of various treatment modalities, managing cnLBP remains a challenge in clinical practice.¹¹ Our results showed that a substantial majority of respondents (90.0%) are involved in managing cnLBP in their clinical practice. However, over time, medical practitioners may recognise the limitations of conventional methods in treating cnLBP, prompting them to explore complementary therapies. This may explain the positive correlation between years of practice and receiving acupuncture training ($\rho=0.12$, $p<0.05$) and that between managing cnLBP and the awareness of the T&CM Act's implementation ($\rho=0.28$, $p<0.01$). However, while there is high awareness of the T&CM Act (92.0%) and recognition of acupuncture as an approved T&CM modality (82.5%), the actual referral rate for acupuncture treatment remains considerably low at 33.2%. This discrepancy highlights the need for increased efforts to promote the acceptance and integration of acupuncture into cnLBP treatment protocols. Notably, most of those who made referrals were general practitioners (73.5%), predominantly

male (59.7%). The significant relationship between sex and acupuncture referrals found in this study could be due to several factors. Male practitioners may feel more confident in recommending acupuncture, possibly due to cultural or social norms that make them more open to non-conventional treatments. They might also perceive acupuncture as lower risk or have more exposure to it through education or personal interest. Additionally, male practitioners may interpret patient needs differently, being more likely to see acupuncture as a beneficial option for cnLBP.

Understanding the medical practitioners' knowledge levels regarding specific therapies or health conditions is essential for improving treatment efficacy, patient outcomes, guideline adherence, and overall healthcare quality.^{2,21,22} Herein, the general awareness and knowledge about acupuncture among medical practitioners were positive, with most respondents demonstrating a good understanding of the role of acupuncture in managing cnLBP. However, some misconceptions persist, which may hinder the referral process. Notably, some medical practitioners misunderstood or were uncertain about acupuncture procedures, such as whether local anaesthesia was required before acupuncture (17.7%), whether acupuncture needles worked by blocking the regional nerves (38.6%) and the safety of acupuncture in patients with diabetes (41.6%). Regarding the effectiveness of acupuncture in treating cnLBP, there was a misunderstanding or uncertainty regarding acupuncture needles soaked with herbs to gain analgesic effects (27.8%). These misunderstandings highlight the need for focused educational efforts. Notably, pre-congress workshops and interdisciplinary forums could serve as platforms to address these knowledge gaps. These educational initiatives would likely improve the understanding of medical practitioners and correct misconceptions, fostering a more favourable attitude towards acupuncture referral. Our findings align with previous studies that indicate a positive correlation between the level of knowledge and attitudes of practitioners towards their practice behaviour.²³⁻²⁶

Interestingly, the study also corroborated earlier research, showing that healthcare practitioners with a positive attitude toward complementary medicine are more likely to accept and incorporate it into their clinical practice.²⁷ This indicates that fostering positive attitudes through education and awareness campaigns could be pivotal in enhancing the integration of acupuncture and other complementary therapies. However, it is important to note that while there is a positive relationship between knowledge and attitudes, the study found no significant relationship between the level of knowledge and the actual referral action ($\beta=0.001$, $p=0.829$). This indicates that other factors, such as established clinical practices and the availability of institutional facilities, could influence the decision-making process. Similarly, previous studies have demonstrated that knowledge alone does not necessarily translate into action.^{28,29} The gap between knowledge and actual practice highlights the importance of a well-planned process and the motivation to implement change. Notably, institutional support is crucial, suggesting that for integrative healthcare systems to develop effectively, education and knowledge must be paired with strong institutional backing. This combined approach could bridge

the gap between knowledge and practice, facilitating the integration of acupuncture into mainstream medical care.

Moreover, the study's findings were consistent with those of earlier studies, indicating that healthcare professionals with prior training and self-experience in complementary therapies, such as acupuncture, exhibit higher acceptance and integration rates of these therapies into their practice.^{2,30,31} Training and self-experience help medical practitioners recognise the value of acupuncture and feel more confident in recommending it to patients. This emphasises the need to include complementary medicine subjects in undergraduate medical programs, giving students early exposure and practical experience with these treatment modalities. This educational strategy could create a new generation of medical practitioners who are more open to integrating complementary therapies into their practice.

Furthermore, we evaluated the perceived behavioural control in two aspects: self-efficacy and barrier. The results showed a moderate positive correlation between perceived behavioural control towards acupuncture referral ($\beta=0.101$, $p<0.05$). This is consistent with previous studies,^{8,18,32} indicating that healthcare practitioners were more likely to perform behavioural actions when they had higher perceived behavioural control. Practitioners who feel confident and have the necessary resources, support, and knowledge to refer patients to acupuncture are more likely to do so. However, despite the positive perceived behavioural control towards acupuncture referral, barriers are preventing its broader adoption. Notably, concerns about the lack of scientific evidence supporting acupuncture (53.0%) and the quality of acupuncturists (63.0%) were major deterrents. These concerns highlight the need for stronger research and collaboration between modern and complementary medicine professional bodies. Healthcare providers should prioritise enhancing education and training, promoting scientific evidence, and raising awareness of relevant policies, such as the T&CM Act.

Additionally, establishing clear referral systems and supportive institutional policies will facilitate the integration of acupuncture into conventional medical practice. Strategies to overcome existing barriers include streamlining referral processes, reducing paperwork, providing directories of acupuncturists, and educating patients about the benefits of acupuncture in managing cnLBP. We found that many respondents (81.2%) expressed interest in learning more about acupuncture as a treatment option for cnLBP. However, confidence in identifying suitable patients for acupuncture treatment was relatively low, with only 28.1% of practitioners feeling assured in their ability to do so. This gap highlights the need for more continuous medical education programs and professional development modules focused on enhancing knowledge and confidence in selecting suitable patients with cnLBP for acupuncture treatment.

Finally, we found no significant correlation between subjective norms and the action to refer patients with cnLBP for acupuncture treatment ($\beta=0.054$, $p=0.276$). This indicates that the opinions and expectations of colleagues, peers, and the broader medical community may not strongly influence individual practitioners' choices to recommend acupuncture.

This finding is consistent with previous research, which has identified subjective norms as a weak predictor of behavioural actions.^{27,32,33} Notably, several factors may explain this result. First, practitioners may rely more on their own clinical experience and training than the opinions of others. Second, the perceived lack of scientific evidence supporting acupuncture could lead practitioners to prioritise their own judgment or institutional guidelines over peer influence. Third, time constraints in busy clinical settings may prompt practitioners to make independent decisions, minimising the role of social or professional expectations. Ultimately, this suggests that personal attitudes and clinical autonomy are likely stronger drivers in the decision to refer patients for acupuncture than subjective norms.

This study has several strengths and some limitations. As the first investigation into Malaysian medical practitioners' behavioural actions regarding acupuncture referrals for cnLBP, it provides valuable insights into the complex relationships among predictors, intentions, and actions in this decision-making process. Furthermore, the study's findings contribute to the understanding of areas for improvement in healthcare integration and patient care optimisation. Furthermore, the recruited participants ($n=389$) exceeded the calculated sample size of 346, which enhanced the reliability and statistical power of the findings.

However, the limitations of this study include potential bias from convenience sampling of a single association's members, which may affect generalizability to the broader population of Malaysian medical practitioners. The cross-sectional study design also poses a limitation in establishing causality. The use of a self-administered online questionnaire offered advantages such as cost-effectiveness, wide reach, and convenience; however, it also presented challenges. Online surveys can reach diverse audiences and potentially increase participation rates through anonymity and convenience; however, they may exclude certain demographics (senior practitioners) owing to technological barriers, potentially skewing the sample. Additionally, the lack of supervision in online surveys may lead to lower-quality data due to hurried responses.

CONCLUSION

This study reveals significant relationships between various factors and medical practitioners' acupuncture referral behaviours for cnLBP. Personal experience with acupuncture, positive attitudes, and higher perceived behavioural control were associated with increased referral rates, while the availability of acupuncture facilities in the workplace positively influenced referral intentions. Notably, greater acupuncture knowledge was associated with more favourable attitudes and higher perceived behavioural control. These findings have important implications for medical education and healthcare policy. Therefore, incorporating acupuncture education into medical training can foster more informed attitudes and boost practitioners' confidence in recommending it as a treatment option. Hands-on experience or exposure to acupuncture in clinical settings could further enhance referral behaviours. From a policy perspective, improving access to acupuncture services in

healthcare facilities may promote its wider use, particularly for managing cnLBP.

Future research could explore sex differences in referral behaviours, examining whether male and female practitioners differ in their attitudes, personal experience, or perceived control when referring patients for acupuncture. Additionally, qualitative studies could investigate barriers preventing practitioners from acting on their intention to refer, such as lack of institutional support or patient-related concerns. A comparative analysis of referral patterns between private and public sector practitioners could also provide insights into how different healthcare settings and policies influence referral behaviours and whether disparities in access to acupuncture services exist.

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CONFLICT OF INTEREST

All authors declare that there are no competing interests associated with this study.

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