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Analysis of racial/ethnic differences in pain perception, quality of life, and self-efficacy among chronic neck pain patients

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Sonia Dua Dewan, Rahul Krishnan Kutty, Lau Gong Siew
Faculty of Health Sciences, MAHSA University, Jenjarom, Malaysia

Abstract

Introduction. Perception of pain can be influenced by biological, cognitive, and psychological factors in chronic pain conditions. Racial/ethnic disparity has been reported in the prevalence, severity, and outcome of pain. The study aim was to compare pain intensity, health-related quality of life (HRQoL), and self-efficacy in chronic neck pain (CNP) subjects of different ethnic groups.

Methods. Overall, 64 subjects with CNP were recruited and allocated into 3 groups: Malay (21), Chinese (23), and Indian (20). Baseline data were collected with the Pain Self-Efficacy Questionnaire (PSEQ), Short Form Health Survey (SF-36), and Numeric Rating Scale (NRS). A comparative research design served to compare pain intensity, HRQoL, and self-efficacy in the CNP subjects of the different ethnic groups.

Results. In NRS, the Chinese group reported higher pain intensity in categories of least pain intensity and average pain intensity. PSEQ data on current pain intensity and worst pain intensity showed high ratings of both categories in the Malay and Indian groups. The Indian group exhibited more pain relief seeking behaviour than the Malay group (40.52 ± 9.85). In SF-36, the *p*-value for mental health was 0.19, which suggests low mental health, i.e., higher catastrophization when dealing with chronic pain.

Conclusions. Significant ethnic differences were reported in the parameters of pain perception, HRQoL, and self-efficacy among the Chinese, Malay, and Indian groups. Pain perception and duration play a minor role in perceived HRQoL, whereas pain perception relates more to the outcome of perceived disability.

Key words: chronic neck pain, racial/ethnic, pain perception, quality of life, self-efficacy, catastrophizing

Introduction

All humans experience pain as pain is an integral part of the body protective mechanism [1], responsive to repeated exposure to tissue injury, leading the nervous system to plasticity and hypersensitivity. The International Association for the Study of Pain classification describes chronic pain as that exceeding 3 months [1, 2] as a sole or a leading complaint. The prevalence rate of musculoskeletal pain, including neck pain, has shown a significant correlation between pain severities among office workers [2].

Various studies on non-specific neck pain suggest that neck injuries can cause an array of issues beyond pain and range of motion deficits, including sensorimotor impairments and changes in muscle performance. Non-specific neck pain is defined as pain with a postural or mechanical basis. Neck pain is the most frequent neuromuscular pain disorder leading to chronic disability and affecting the psychological well-being of the patients. Neck pain is ranked 4th in terms of disability in the Global Burden of Disease [2, 3]. Self-independence in completing daily tasks often constitutes a challenge for patients suffering from chronic neck pain (CNP) [4]. According to the International Classification of Functioning, Disability and Health, the physiological impairment of pain affects body structures, the ability to perform activities, and quality of life, leading to social limitation [5–9].

Neck pain makes individuals avoid movements contributing to pain, and the inactivity leads to shortening of the neck structures, which results in reduced range of motion of the neck and poor head posture [6–9].

A systematic review on the prevalence of chronic pain suggests a greater variation in reporting chronic pain in Asian adults and a higher pain prevalence in the Asian elderly population [10]. Researchers conducted a study in Singaporeans and reported that Indians exhibited higher pain sensitivity than the Chinese and Malay [10, 11]. Another population-based study performed in the United Kingdom implies a higher pain-related burden in south Indian immigrants than in the general population [10].

An ethnic group is defined as a group of people who share a certain social background, behaviours, culture, history, beliefs, and physical characteristics [12]. Ethnicity is one of the factors that influence how a person perceives, experiences, and responds to pain. It shapes individual beliefs and behaviour in relation to disease, lifestyle, help-seeking behaviours, and receptiveness to healthcare management [13, 14].

Research has shown that pain communication is better among people of the same ethnicity than between cultures; this refers to both patients and health professionals [15]. The reporting of pain varies from African Americans to Asians; the former openly express their pain experience and the latter find verbalizing pain a social stigma. Chinese women often endure intense pain quietly and choose not to articulate their feelings [16].

Chronic pain has been demonstrated to influence the quality of life as it can disturb sleep and lead to physical and emotional fatigue, loss of social contacts, difficulty in performing activities of daily living, and absenteeism [17]. Patients with CNP show impaired quality of life, which affects not only physical but also mental health [18, 19].

Correspondence address: Sonia Dua Dewan, Faculty of Health Sciences, MAHSA University, Jalan SP 2, Bandar Saujana Putra, Jenjarom, Selangor, Malaysia, e-mail: sonia@mahsa.edu.my

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Health-related quality of life (HRQoL) as investigated among the multi-ethnic Singaporean population was reported to be different in Chinese respondents than in Indian and Malay people. The Chinese presented higher physical HRQoL, followed by Indian and Malay, whereas mental HRQoL was higher in Malay relative to Chinese respondents [20]. However, although the Malaysian society is multi-ethnic, multicultural, and multilingual, there is a dearth of evidence on the relationship between ethnic differences and quality of life among CNP patients.

Pain self-efficacy beliefs are associated with levels of physical disability, depression, the general health status of chronic pain patients, and pain severity [13]. Self-efficacy is defined as an individual's degree of belief or trust to perform an activity or specific behaviour which requires achieving a goal, with the consideration of the effort demanded from the individual and persistence in facing aversive experience [20].

Self-efficacy beliefs and coping were evaluated in 2 studies, presenting disparities in pain sensitivity and coping skills among Chinese and Indian populations. The Chinese prefer traditional medicines and use of healthcare only in emergencies. This difference in pain threshold and endogenous pain inhibition could contribute to higher pain severity in the Indian as compared with the Chinese population, but lower efficacy scores in the Chinese than in Indians in stressful situations was shown as a racial difference [21]. A systematic review highlighted that African Americans used distraction, catastrophizing as coping attempts more frequently than Caucasian patients and Caucasians engaged in ignoring strategies more often to deal with pain [22].

Chronic pain is a complex problem, negatively affecting the quality of life. Long-lasting pain impacts on the mental health, often leading to emotional suffering and behavioural changes [23]. People with persistent pain often have difficulties in raising their issue with clinicians. The meaning of pain applies differently to everyone as pain is considered a both sensory and emotional experience.

Racial differences in pain and pain parameters have been explored in the western countries and extensively reported. Ethnic differences in pain responses and pain management are persistent and despite advances in pain care, ethnic minorities remain at risk for inadequate pain control. Clinicians most of the time face the cultural sensitivity and unawareness of treatment outcomes for minority patients. Ethnic differences in pain response are multifactorial and complex; longitudinal studies examining the various factors known to influence the disparities should be undertaken [13].

Cultural differences, especially in terms of discrimination and racial inequality in the world and their impact on health functioning, have not been adequately studied. Explanations for ethnic differences in pain reports are inevitably complicated [24].

The use of biopsychosocial approach has been recommended for musculoskeletal conditions in most clinical guidelines. The application of multidimensional management for musculoskeletal pain has changed physiotherapists' comprehension and practice [25, 26]. As today's society becomes increasingly multicultural, it is necessary for healthcare professionals to understand their patients on the basis of the culture they bring with them, especially their values and lifestyle. The perception of pain and behaviours associated with pain are influenced by the sociocultural contexts of the individuals experiencing pain [17].

Despite the extensive research on the prevalence and consequences of neck pain, there is a dearth of literature concerning the impact of ethnic differences on pain, quality of life, and self-efficacy in patients with CNP in Malaysia. The aim of this study was to compare the pain intensity, HRQoL, and self-efficacy in CNP patients of different ethnic groups.

Subjects and methods

A quantitative approach and non-experimental, comparative research design were incorporated to compare the pain intensity, HRQoL, and self-efficacy in CNP individuals of different ethnic groups. This design was designated in order to identify, analyse, and explain similarities and differences across cross-cultural societies. The study was conducted over a period of 9 months. In this interventional study, 64 participants of different ethnicity groups were selected in accordance with the inclusion and exclusion criteria lay down by the researchers. These samples were collected from 2 centres: MAHSA clinic Klang and MAHSA clinic JUC, Malaysia. A convenience sampling method was adopted. The inclusion criteria involved age of 30–50 years, neck pain over the previous 3 months, stiffness in the cervical spine with or without unilateral arm pain. Subjects were excluded from the study if they had recent cervical or shoulder injury, herniated disk with radiculopathy, or underlying pathologies in the cervical area.

Information pertaining to the study benefits was explained in a language that the subjects would understand. No individual was forced to participate and all were informed that they might withdraw anytime. All information directly or indirectly related to patient identity and health status was dealt with full confidentiality.

Demographic data were collected and all subjects were asked about their neck pain duration, number of hours of daily computer usage, underlying pathologies. Subjects who met the inclusion and exclusion criteria were given time to fill the Pain Self-Efficacy Questionnaire (PSEQ), Short Form Health Survey (SF-36), and Numeric Rating Scale (NRS) on the spot, and data were collected immediately after the participants had completed the forms. NRS was used to determine the current pain intensity, least pain intensity, worst pain intensity, and average pain intensity. It has moderate test-retest reliability, with intraclass correlation coefficient value of 0.76, and it has shown adequate responsiveness in subjects [27]. PSEQ has been utilized to measure the degree of trust that patients with chronic pain have on themselves to perform daily activities or functions [22]. SF-36 is a self-report HRQoL questionnaire, applied to indicate the health status of particular populations.

The Neck Disability Index served as a screening tool for sampling. In a narrative review, it was found to be a valid, reliable, responsive, and internally consistent clinical tool to measure self-reported disability among subjects with neck pain [28].

Data analysis

The descriptive data were analysed by using measures of central tendency, such as mean, median, mode, and standard deviation as measure of dispersion. Ethnicity and gender, nominal data, were analysed with measures of mode and percentage. Age (ratio data) was analysed with measures of mean and standard deviation.

The inferential statistics were analysed by using measures of mean and standard deviation as NRS, PSEQ, and SF-36 results are interval data. The comparison between different ethnic groups on pain intensity, HRQoL, and self-

efficacy in CNP subjects was analysed with a one-way ANOVA test. The statistical analysis was performed with IBM SPSS version 24. Confidence interval was set at 95%, while significance was assumed at $p < 0.05$.

Ethical approval

The research related to human use has complied with all the relevant national regulations and institutional policies, has followed the tenets of the Declaration of Helsinki, and has been approved by the Faculty of Health Sciences Research Review Committee, Research, Innovation and Enterprise – MAHSA University, Malaysia (approval No.: FHSS-PT/18/UG04).

Informed consent

Informed consent has been obtained from all individuals included in this study.

Results

All variables were initially screened for accuracy and normality through computing descriptive statistics for each test variable. Frequency distributions with histograms and descriptive statistics (mean or median, standard deviation) were used to identify any characteristics of shape or distribution that might affect the analysis. Because all variables were found to be within normal limits, parametric procedures were conducted for all statistical analyses.

Ethnic distribution

In this study, 64 subjects were included: 21 (32.8%) in the Malay group, 23 (35.9%) in the Chinese group, and 20 (31.3%) in the Indian group (Table 1).

Table 1. Descriptive statistics of demographic data

Demographic variable	Malay (*n* = 21; 32.8%)	Chinese (*n* = 23; 35.9%)	Indian (*n* = 20; 31.3%)
Gender			
Male	3 (14.29%)	3 (13.04%)	4 (20.00%)
Female	18 (85.71%)	20 (86.96%)	16 (80.00%)
Age (years) (mean ± *SD*)	25.09 ± 1.55	24.09 ± 1.98	25.75 ± 1.12
Age range (years)	23–27	21–27	23–27

Gender distribution

The Malay group included 3 males (14.29%) and 18 females (85.71%), the Chinese group included 3 males (13.04%) and 20 females (86.96%), and the Indian group included 4 males (20.00%) and 16 females (80.00%) (Table 1).

Age distribution

The subjects' average age was 25.09 ± 1.55 years in the Malay group, 24.09 ± 1.98 years in the Chinese group, and 25.75 ± 1.12 years in the Indian group, with the respective age ranges of 23–27, 21–27, and 23–27 (Table 1).

For illustrative purposes, a one-way ANOVA test was applied for NRS, PSEQ, and SF-36 effect sizes of the pain perception, HRQoL, and self-efficacy. ANOVA is used to determine whether there are any statistically significant differences between the means of 2 or more independent (unrelated) groups.

One-way ANOVA for NRS in the Malay, Chinese, and Indian groups

Factorial ANOVAs were run for the 3 ethnic groups. The results showed minimal statistical significance. Significant differences in the perception of pain were observed on the basis of NRS for current, least, worst, and average pain intensity. The Chinese group reported higher scores in the categories of least pain intensity (0.39 ± 0.72) and average pain intensity (1.57 ± 1.16) ($p = 0.005$). The data on current pain intensity (1.81 ± 0.81, 1.75 ± 0.91) and worst pain intensity (3.33 ± 1.11, 3.35 ± 0.81) revealed high ratings of both categories in the Malay and Indian groups, respectively (Table 2).

One-way ANOVA for PSEQ in the Malay, Chinese, and Indian groups

The mean PSEQ result was 40.52 ± 9.85 for the Malay group, 50.70 ± 13.63 for the Chinese group, and 39.30 ± 9.25 for the Indian group. The one-way ANOVA analysis showed that the *p*-value between the groups was 0.002, which reflects differences in PSEQ among the 3 groups ($p < 0.05$) (Table 3).

According to our results, only a change bigger than 1.22 points in PSEQ can be considered as a 'real' change of pain self-efficacy in patients. However, the lowest score was 9.25 in the Indian community, followed by 9.85 for the Malay. The

Table 2. One-way ANOVA for NRS in the 3 ethnic groups

NRS	Malay	Chinese	Indian	*p*	Significance
Current pain intensity (mean ± *SD*) (VAS)	1.81 ± 0.81	1.57 ± 0.79	1.75 ± 0.91	0.60	M > C > I
Least pain intensity (mean ± *SD*) (VAS)	0.29 ± 0.56	0.39 ± 0.72	0.15 ± 0.49	0.43	C > M > I
Worst pain intensity (mean ± *SD*) (VAS)	3.33 ± 1.11	2.78 ± 1.31	3.35 ± 0.81	0.16	I > M > C
Average pain intensity (mean ± *SD*) (VAS)	1.67 ± 0.66	1.57 ± 1.16	1.95 ± 1.00	0.42	C > M > I

NRS – Numeric Rating Scale, VAS – visual analogue scale, M – Malay, C – Chinese, I – Indian

Table 3. One-way ANOVA for PSEQ in the 3 ethnic groups

Variable	Malay	Chinese	Indian	*p*
PSEQ (mean ± *SD*)	40.52 ± 9.85	50.70 ± 13.63	39.3 ± 9.25	0.002*

PSEQ – Pain Self-Efficacy Questionnaire
* significant value ($p < 0.05$)

low mean score (39.30 ± 9.25) in the Indian group presents lower efficacy in performing activities than in the other 2 groups. The results reflect more pain relief seeking behaviour in the Indian group, followed by Malay (40.52 ± 9.85). Participation in and adherence to exercises, long-term disability, and depression are the risks associated with low pain self-efficacy. The Chinese group exhibited high self-efficacy scores (50.70 ± 13.63), indicating confidence in dealing with physical activities, as well as coping with pain. Higher self-efficacy values are a predictor of adherence to exercise programmes and maintaining long-term effects of rehabilitation.

One-way ANOVA for SF-36 in the Malay, Chinese, and Indian groups

SF-36 is directly transformed into a 0–100 scale on the assumption that each question carries equal weight. The lower the score, the higher the disability; the higher the score, the lower the disability. The results show the values of the various SF-36 components, which indicate individual patients' health status. Out of the 8 domains of the SF-36 questionnaire, there were statistically significant differences in bodily pain and general health domains between the 3 groups ($p < 0.05$). The other 6 domains presented no difference between the groups ($p > 0.05$). The mean result for bodily pain was 79.40 ± 8.40 in the Malay group, 83.56 ± 13.14 in the Chinese group, and 75.38 ± 6.99 in the Indian group. The mean result for general health was 74.17 ± 9.92 in the Malay group, 69.20 ± 14.69 in the Chinese group, and 64.97 ± 6.37 in the Indian group. The results indicate that among the various variables of the SF-36 questionnaire, the bodily pain and general health variables exhibited statistically significant differences ($p = 0.04$ and $p = 0.03$, respectively) (Figure 1).

This can be interpreted as CNP affecting the general health and bodily pain domains in the 3 groups. On the basis of the results, it can also be concluded that the CNP-related level of disability is very minimal in the investigated groups.

The mean mental component result did not show any statistically significant difference between the groups ($p = 0.79$). But the mean for mental health was 58.33 ± 8.31 in the Malay group, 62.96 ± 14.18 in the Chinese group, and 57.60 ± 6.92 in the Indian group. The p-value for mental health equalled 0.19, which is suggestive of low mental health or, in other words, higher catastrophization when dealing with chronic pain.

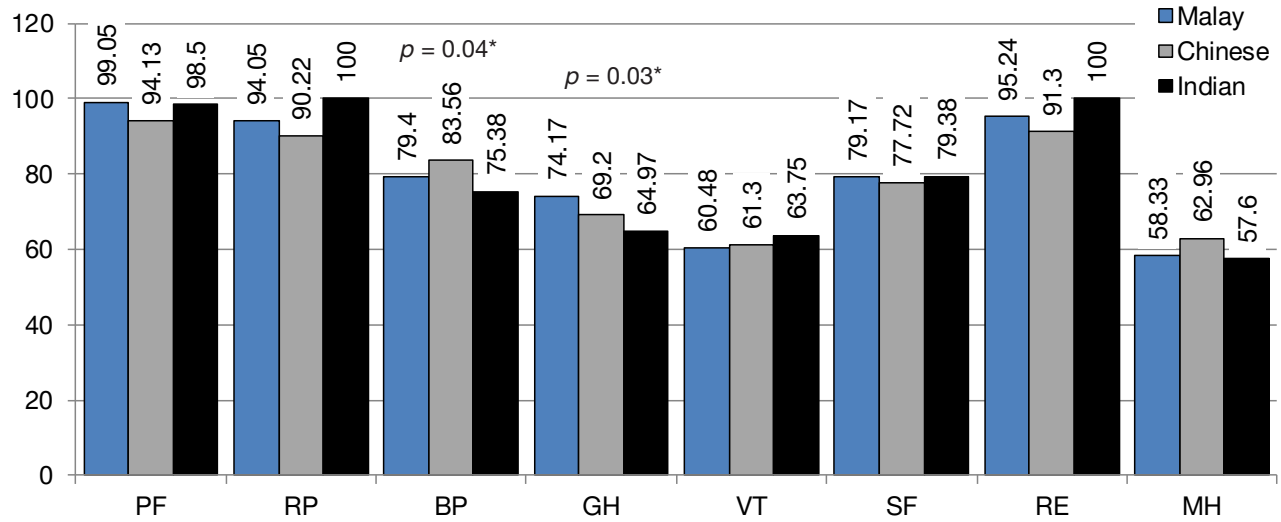
Discussion

The current study aimed to compare ethnic differences in pain intensity, HRQoL, and self-efficacy among CNP patients.

The Chinese group reported higher pain intensity in categories of least pain intensity (0.39 ± 0.72) and average pain intensity (1.57 ± 1.16) ($p = 0.005$). The data on current pain intensity (1.81 ± 0.81, 1.75 ± 0.91) and worst pain intensity (3.33 ± 1.11, 3.35 ± 0.81) indicate high ratings of both categories in the Malay and Indian groups, respectively. The Malay, Indian, and Chinese groups showed no difference in reporting pain intensity; however, the mean value of pain intensity in the Indian group demonstrated higher pain score than those in the Malay and Chinese groups. Previous research revealed that ethnicity had a larger impact on pain severity, as well as emotional and behavioural responses associated with chronic pain [15], affecting the perception and experience of pain [13]. Evidence suggests that different ethnic groups exhibit disparity in pain perception and also pain management [29].

Furthermore, in the present study, self-efficacy scores were found to be low in the Indian group as compared with the Malay and Chinese groups, who reported higher scores. This may be due to the fact that the Chinese with persistent pain use peer support and prefer not to verbalize pain. They continue to perform functional activities showcasing confidence, which is pertinent to their culture.

In turn, the low self-efficacy scores in Malaysian Indians can be explained by the high mean value of pain score that makes them more careful, less confident, and reluctant to endure the pain when performing tasks. The Malaysian Indian, especially from lower socioeconomic groups, use more catastrophizing. The coping strategies adopted, mostly ignoring the pain, further impair their functioning. Long-term suffering can lead to negative interpretations of pain, which can constitute hindrance to management.



SF-36 – Short Form Health Survey.
Physical well-being domain: PF – physical functioning, RP – role physical, BP – bodily pain, GH – general health.
Emotional and social well-being domain: VT – vitality, SF – social functioning, RE – role emotional, MH – mental health
* significant value ($p < 0.05$)

Figure 1. One-way ANOVA for SF-36 in the 3 ethnic groups

The above statement contrasts with another local study which showed that the prevalence of pain among the Indian ethnic group was greater compared with the Malay and Chinese in both public primary care clinics and general practice clinic settings. These findings may point to possible genetic factors and cultural backgrounds determining the response to pain among the Indian population. Perceptions of pain threshold are greatly affected by family members, peers, and cultural issues [30].

The results of HRQoL among the 3 ethnic groups presented moderate differences in mean values ranging 75.38–83.56 and 64.97–74.17, respectively, for the bodily pain and general health domains (Figure 1), whereas other domains (physical functioning, physical role limitations, vitality, emotional role limitations, mental health, and social functioning) showed no difference. The Malay respondents scored better in physical HRQoL than the Indian and Chinese groups; however, mental HRQoL was higher in the Indian respondents compared with the Malay and Chinese subjects. The results are in conflict with a study conducted in Singapore, where Chinese subjects presented higher physical HRQoL than Indian and Malay subjects, whereas mental HRQoL was higher in the Malay compared with Chinese and Indian participants [30]. Another study suggested a diminished HRQoL in CNP patients, which is not in line with the findings of the present study. This could be due to the fact that depressive symptoms and preference-elicitation methods affect the preference scores that neck pain patients assign to their health [9].

The significant cross-national and cross-cultural variability in HRQoL perceptions is interesting in the context of the known differences in the level of economic development of particular countries. In terms of the national *per capita* income, Japan ranked highest, with Singapore having the second highest *per capita* income in Asia after Japan [30].

The SF-36 results showed moderate differences between the 3 groups, confirming that people suffering from CNP experience limitations in their daily social activity and reduced work capacity. This leads to greater disabilities, and social support will be sought frequently.

Overall, the results of this study revealed differences in self-efficacy between the examined groups. No differences were found between Malay, Chinese, and Indian subjects for pain intensity or HRQoL. However, for the mean value of pain intensity, the Indian group presented a higher score than the Malay and Chinese groups. The mean values of the physical and mental components showed differences in HRQoL between the ethnic groups: the Malay respondents had a higher mean value of physical HRQoL than the Indian and Chinese subjects, but mental HRQoL was higher in the Indian participants as compared with the Malay and Chinese groups.

Limitations

The limitations of the study involve small population size, sampling, and the short study duration. The use of convenience sampling may have hindered the generalization of results. Certain biases like response bias, bias or recall could have affected answers while filling the questionnaire on pain intensity, HRQoL, and self-efficacy.

Conclusions

Chronic pain is associated with negative outcomes with respect to pain intensity, aspects of coping, quality of life, and health. On the basis of depression, anxiety, catastrophizing, pain intensity, and pain duration, we managed to identify subgroups of patients with chronic pain that differed with respect to the perceived HRQoL and disability.

In our study, significant ethnic differences were reported in various parameters, like pain perception, quality of life, and self-efficacy measures, among the Chinese, Malay, and Indian groups. The socioeconomic conditions and health status suggest important cultural differences. Pain perception and duration play a minor role in the perceived HRQoL, whereas pain perception relates more to the outcome of perceived disability.

The role of sociocultural factors should be explored in future studies of CNP. From the clinical perspective, it is very important to assess everyone in detail with respect to depression, anxiety, self-efficacy, and pain when planning treatment and rehabilitation.

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Conflict of interest

The authors state no conflict of interest.

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